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OTTAWA, 1966

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Volume XXXI • No. 1

PROMPT WORLD-WIDE GEOMAGNETIC EFFECTS OF HIGH-ALTITUDE NUCLEAR EXPLOSIONS

B. Caner

Price 25 cents

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1964

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Prompt World-Wide Geomagnetic Effects of High-Altitude Nuclear Explosions

B. Caner

Abstract:—A brief summary of observational data is presented, covering the disturbances recorded within seconds of high-altitude nuclear explosions, with particular emphasis on the "phase B" signal recorded at H + 2 seconds following the "Starfish" test of July 9th, 1962. The salient characteristics of this signal are specified: global synchronism at 2 seconds after the explosion (± 0.1 — 0.2 secs), large initial amplitudes (up to 30 — 50 γ) with an extremely sharp rise, initial frequency 0.25 — 0.28 cps, and altitude dependence, occurring only if the source is above the E layer. Ten possible mechanisms are discussed and tested against the observational data. It is concluded that the only mechanisms which would satisfy all the observed characteristics are those involving hydromagnetic-electromagnetic conversions. Although no conclusive decision can be reached on the basis of presently available data, the most likely one of these mechanisms appears to be hydromagnetic waves along the field line through the detonation point, with energy conversion into electromagnetic modes at the mirror points.

Résumé:—L'auteur donne un aperçu des données d'observation, sur les perturbations produites par les explosions atomiques à haute altitude et enregistrées en quelques secondes. Il souligne notamment le signal de «phase B», enregistré à H + 2 secondes après l'essai «Starfish» du 9 juillet 1962. Il précise les caractères saillants de ce signal: synchronisme global à 2 secondes après l'explosion (± 0.1 à 0.2 seconde), fortes amplitudes initiales (jusqu'à 30 à 50 gammas) avec hausse extrêmement brusque, fréquence initiale de 0.25–0.28 cps, et dépendance de l'altitude, cette phase étant observée seulement si l'explosion a lieu au-dessus de la couche E. Il traite de dix mécanismes possibles et les vérifie en les comparant avec les données d'observation. Il conclut que les seuls mécanismes qui répondraient à toutes les particularités observées sont ceux qui entraînent des transformations hydromagnétiques-électromagnétiques. Bien que les renseignements actuellement disponibles ne permettent pas d'aboutir à une conclusion formelle, le plus vraisemblable de ces mécanismes semble être celui des ondes hydromagnétiques qui suivent la ligne du champ magnétique en traversant le point de détonation, l'énergie étant transformée en formes électromagnétiques aux points du miroir.

INTRODUCTION

This report examines in detail one narrow aspect of geomagnetic disturbances set up by high-altitude nuclear tests—the world-wide signals recorded within a few seconds of detonation, with particular emphasis on the major oscillatory signal, the start of which is recorded at many locations about two seconds after the detonation, and which we have designated "phase B". Slower geomagnetic arrivals as well as radio propagation effects have been reported and analysed by several observers (for example, Maeda et al., 1964). Although all these effects are obviously related insofar as the source is concerned, the actual mechanisms involved appear to be entirely different, thus justifying the separate treatment of an isolated feature such as the "phase B" signal.

The main interest of this signal lies in its broad similarity with certain types of natural geomagnetic pulsations. Having the advantage of a controlled source (at least in time and location), it therefore provides an interesting opportunity for complementing the study of possible natural micropulsation mechanisms, even though the analogy with natural phenomena can only be followed to a limited extent. Although no explicit conclusions are drawn in this respect, the proposed mechanisms have been narrowed down to essentially the same as those which are being considered as explanations for pearl-type micropulsations.

This report will be limited to a discussion of globa geomagnetic effects recorded within a few seconds of the detonation, and it will not include isolated local effects in the vicinity of the launching zones or conjugate areas. The observational data will first be presented fairly briefly. A number of possible mechanisms will then be considered on a qualitative basis, with rough order-of-magnitude quantitative support. It should be mentioned at the outset that no fully acceptable unique solution is proposed. In particular, theoretical work is required on hydromagnetic-electromagnetic energy conversion at very low frequencies. However, this investigation should provide a useful basis for more detailed work on any particular mechanism. In view of the large release of energy in various forms, a unique solution may not be possible on the basis of the presently available data, since combinations of several different mechanisms may be involved.

The energy output of a nuclear explosion is 10^5 Joules per kiloton. For an unshielded fission explosion in space this is distributed roughly as following (Glasstone, 1963; Latter and LeLevier, 1964): Approximately 30–70% in x-rays (1 to a few Kev energy range), 0.01–1% in prompt γ-rays (mean energy about 1 Mev.) 0.01–1% in prompt neutrons (0.1 Mev to a few Mev), and the remainder in kinetic energy of fission products, with a few percent in delayed radiation.

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OBSERVATIONAL DATA

The relevant nuclear tests for which information is available are the following:

August 1958: Two tests in the Pacific above Johnston Island, namely "Teak" at an altitude of 70-80 km, and "Orange" at 30-40 km. The announced yield was "in the megaton range". Sowle (1961) estimated the yield as about 4 megatons for "Teak" and 2-4 megatons for "Orange".

August-September 1958: Three low-yield (1-2 kilotons) explosions over the South Atlantic, code-named Argus I, II and III, at altitudes of about 480 km.

July 9, 1962: Johnston Island, yield estimated at 1.4 megatons, altitude 400 km, code name "Starfish".

October 20, 26, and November 1, 1962: Low- and medium-altitude ("tens of kilometers") tests, with sub-megaton yields.

None of the lower-altitude (under 100-km) tests produced major global geomagnetic effects. Most of them produced both fast (onset time within 1 second; McNish, 1959) and slower-following bay-type disturbances at locations within 1,000 to 2,000 km of the launch area, falling off rapidly with distance. Some sharp effects were also observed at the conjugate points. Lawrie, Gerard, Gill (1959) and Obayashi (1963) have summarized and interpreted these effects. However, no major world-wide effects were observed, in spite of the high yields.

For the higher-altitude Argus tests, effects were observed at magnetic stations at widely separated locations (Eschenbrenner, et al., 1960), in spite of the low yields. Amplitudes were very small (fraction to a few gammas), and recordings were obtained only on sensitive equipment, in some cases barely above the background level. Berthold, Harris and Hope (1960) have summarized these data in detail for Argus III (Sept. 6, 1958). The arrival times were plotted against station-to-detonation-point distances. The slope of a straight line fitted to the first arrival points indicated a ground-level propagation velocity of 3050 km/sec. No probable error was specified for this result.

Similar global effects were recorded following the "Starfish" test of July 9, 1962, but with considerably higher amplitudes, presumably due to the higher yield. The test was announced well in advance, and a countdown transmitter could be monitored. Nevertheless, a surprisingly small amount of *high-quality* unclassified data has been collected in geomagnetism. With a few notable exceptions very few stations improved their operating techniques for this particular period in order to obtain timing accuracies of ± 0.1 seconds or better (in particular accurate *absolute* timing on the record itself and speed-up of recorders). Also, the hour timemark obliterated the first arrival at many locations, particularly on slow-speed magnetograms. Finally, the amplitude of the signals was unexpectedly large. At almost all locations the instrument settings were too sensitive and the traces went off-scale. Consequently very little valid amplitude data have so far become available, and this report is based almost entirely on timing considerations, particularly from the four following stations:

Victoria, B.C., Canada—Dominion Observatory
College, Alaska—University of Alaska
State College, Pa., U.S.A.—HRB Singer Inc.
Christchurch, England—Signals Research and Development Establishment

The Christchurch data were particularly valuable in view of the long distance coverage, and in view of the high quality of the available recordings—complete three-component sets of high-speed high-sensitivity as well as broad-band lower-sensitivity recordings. Figures 1, 2 and 3 show the high-speed recordings for Victoria, State College and Christchurch, and Figure 4 the relative frequency response of the instrumentation used. The relevant data for the four stations are summarized in Table 1. Consecutive lines contain the following information: a) great circle distance (km) to Johnston Island; b) delay time (seconds) for the first arrival. The detonation time (H=0) is 0900:09.025 $\pm$ 0.025 sec, as deduced from the sharp cut-off of the countdown transmitter and other recorded radio effects (Hanley, 1962; Caner and Whitham, 1962); c) probable and maximum errors for the delay time—the latter includes the uncertainty in origin time; d) components recorded, and estimated peak-to peak amplitude (in gammas) of the first movements (all off-scale); e) reference.

TABLE 1

Victoria	College	State College	Christchurch
5400	5600	9600	12000
2.0	2.1	2.4	1.94
±0.1 (0.2)	±0.06 (0.1)	±0.1 (0.3)	±0.01 (0.04)
D > 20	F > 5	NS > 10	EW > 10–15 NS > 5 Z < 0.5
Caner and Whitham (1962)	Wilson and Sugiura (1963)	Sechrist (1962)	Stevens (unpub.)

An important group of observations comes from the network of the U.S. Army Electronics Research and Development laboratory. These have not been published, but a summary of the results was presented in a paper at the IUGG meeting (Bomke, et al. 1963). A strong

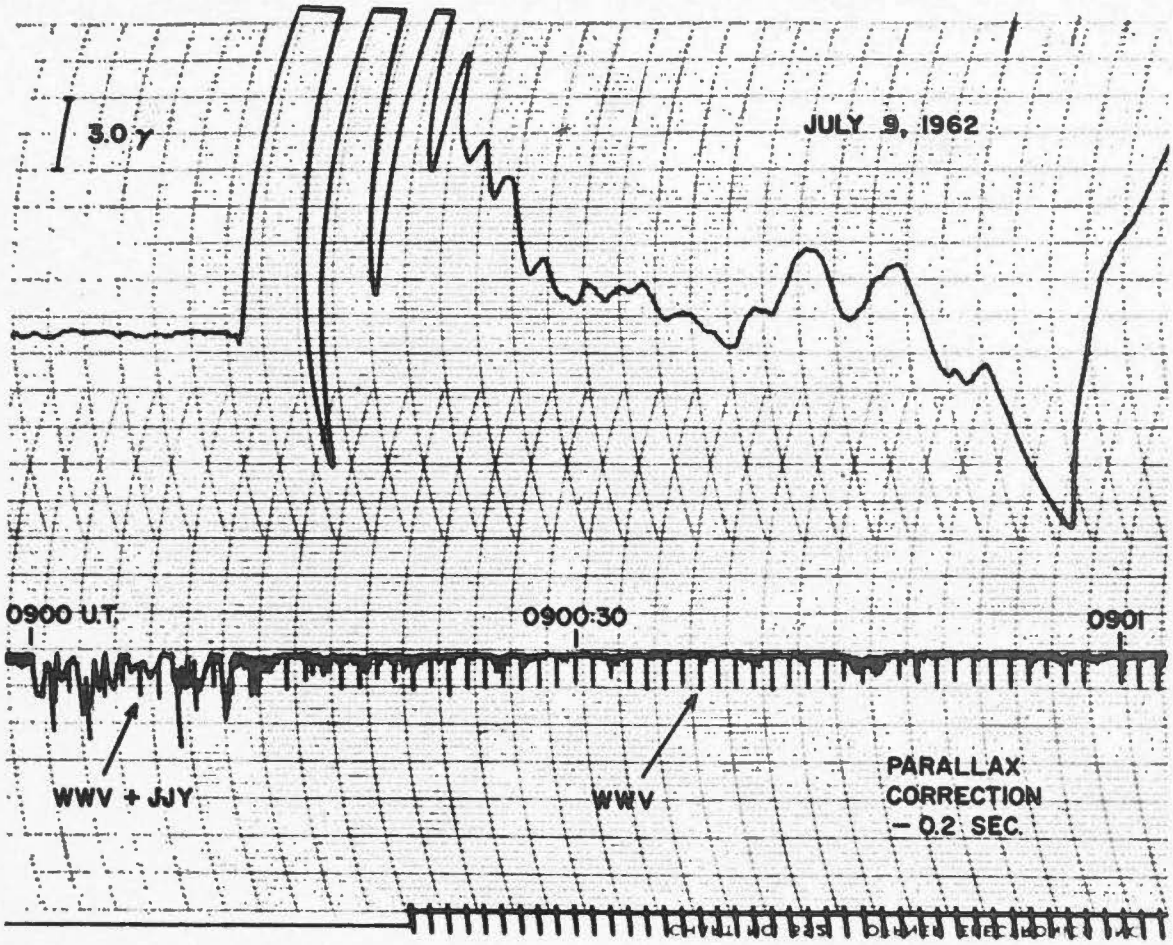

FIGURE 1. Geomagnetic recording at Victoria, B.C. July 9, 1962, 0900—0901, U.T.

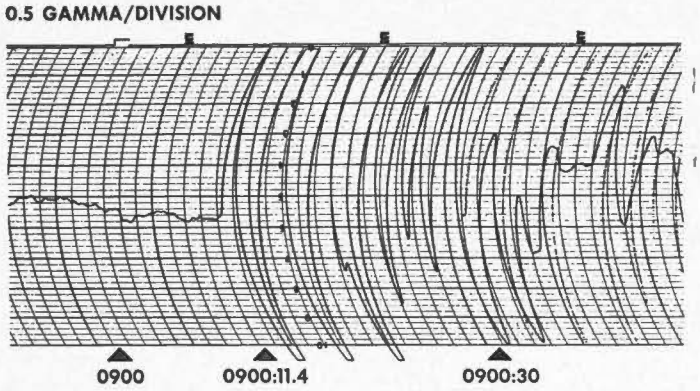

FIGURE 2. Geomagnetic recording at State College, Pa., July 9, 1962, 0859:50—0900:45, U.T.

oscillatory signal was recorded at H+1.9 seconds simultaneously at all the stations of this network (Florida, Maine, South Carolina, New Jersey as well as Hawaii and Samoa). No probable error was given for this figure; +0.1 seconds is probably a reasonable estimate. A sharp broad-band pulse containing higher frequencies (but of much lower amplitude) was recorded at the instant of detonation at Samoa and Hawaii.

A third group of observations comes from the network of the Institut de Physique du Globe of the University of Paris (Roquet, Schlich and Selzer, 1962). Two of the stations, Chambon-la-Forêt in France and Kerguelen in the Indian Ocean, reported the instantaneous arrival at H+0 (±0.1 to ±0.2 seconds), followed by a very strong and sharp reinforcement of the perturbation at Chambon about 2 seconds later (Roquet, et al. 1963). The third station, Dumont d'Urville in the Antarctic, reported a major arrival at H+2 ± 1.5 seconds.

Finally, high-resolution ELF recordings obtained at Byrd in the Antarctic (Lokken, private communication) and at Westford, Mass. (Balser and Wagner, 1963) show both the instantaneous pulse and the higher-amplitude, lower-frequency signal at H+2, with distinct separation between the two signals. Because of the high-frequency passbands of these systems (5-35 cps for Westford, 2-30 cps for Byrd) no conclusions can be drawn regarding the waveform of the second signal on these recordings.

One of the outstanding characteristics of the second signal is its horizontal polarization. Unfortunately no on-scale three-component recordings are available to provide an accurate quantitative assessment, but for

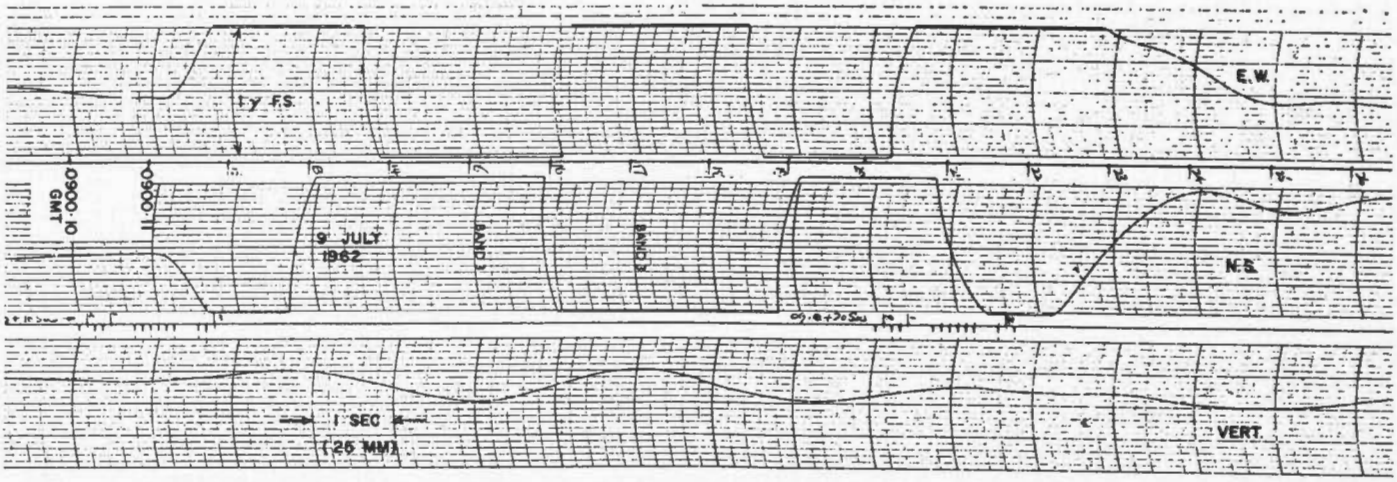

FIGURE 3. Geomagnetic recording at Christchurch, England, July 9, 1962, 0900:09—0900:26, U.T.

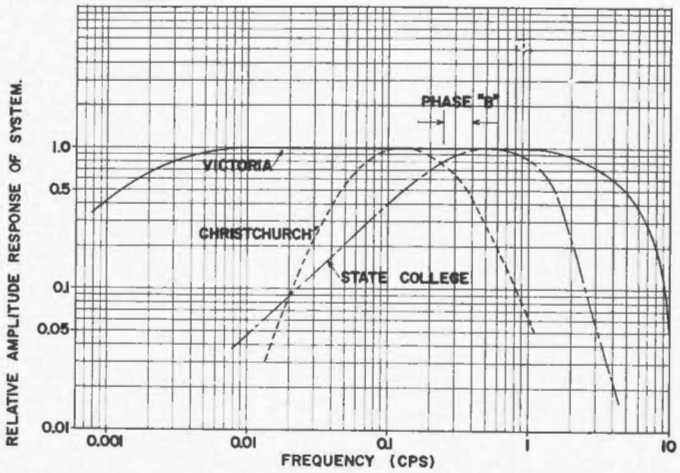

FIGURE 4. Frequence response characteristics of instrumentation used at Victoria, State College, and Christchurch.

example at Christchurch (*see* Table 1 and Figure 3) the ratio $\Delta H/\Delta Z$ is at least 10:1, probably much higher. Similar ratios have been inferred by Bomke at al. (1963). With one notable exception, there appear to be no major polarization effects within the horizontal plane. For example the orthogonal components recorded at Victoria and State College have the same order of magnitude, and the same applies to the two horizontal components recorded at Christchurch. The exception to this pattern is a single-component (declination) recording obtained by the UK Signals Research and Development Establishment at Ascension (geographic coordinates: $\delta = 8°S$, $\lambda = 14.3°W$; geomagnetic latitude $\lambda' = 1°S$) with a peak amplitude of less than 0.5 gamma. The frequency response of the system is roughly linear between 0.03 and 0.2 cps, with 3 db points at 0.007 and 2 cps. In comparison, H and F geomagnetic recordings obtained at two other equatorial stations, Huancayo and Jicamarca (both at $\lambda' \sim 1°S$), indicate amplitudes comparable to those obtained at higher latitudes (Casaverde, et al. 1963). The induction magnetometers at these two stations were recording H (magnetic NS), whereas D (magnetic EW) was recorded at Ascension.

There are many other recordings, but since absolute timing accuracies are $\pm$ 0.5 to $\pm$ a few seconds, they do not add any useful information from the point of view of timing, although they are important for an examination of geographic coverage. As pointed out by Roquet, Schlich and Selzer (1963) the evidence for global synchronism is overwhelming. We can identify the following distinct effects:

> *"phase A"*: an instantaneous pulse, low-amplitude, high-frequency content (>2 cps), at H + 0 ($\pm$milliseconds to $\pm$ 0.1 second).
>
> *"phase B"*: a second, major oscillatory signal starting at H + 2 simultaneously ($\pm$ 0.1 to 0.2 sec) all over the globe. The period is initially about 3.5 to 4 seconds, and appears to decrease to about 2 to 2.5 seconds by the fifth oscillation. This period decrease is not definitely proved, since at most stations the traces went off-scale and the zero reference shifted. In view of the rapid amplitude decay a reliable frequency measurement becomes difficult.

Amplitude Considerations. The present report has been based almost entirely on timing considerations. An analysis of amplitude-location relations could go a long way towards the removal of the ambiguity between the different mechanisms, through the determinations of focus location, attenuation characteristics, and possible anisotropies in propagation. Unfortunately the data published so far are unsatisfactory from this point of view, for two reasons:

(a) Most of the magnetic recordings obtained with the appropriate passband went off-scale during the first "phase B" fluctuations. This means that only a lower amplitude limit can be assigned, depending on the full-scale range of the particular instrumentation, which varies between 0.5 and 50 γ for different stations. Recorders fitted with scale-limit (bias) stepping mechanisms introduced an uncertainty of one or even two steps (i.e. 1-2 full scale ranges) because of the unusually rapid full-scale excursions—see for example Baker and Strome (1962).

(b) Variability in recorded component and in instrumentation. Quite apart from tellurics (which cannot be included for amplitude comparisons) there are six normally acceptable ways of choosing a single-component recording (D, H, Z, X, Y, F), of which five are usually recorded with either amplitude-linear or rate-of-change detectors. This means eleven different methods, quite apart from the widely varying frequency response characteristics. This makes it almost impossible to extract amplitude comparisons to better than an order of magnitude, even if the recordings had remained on scale. Also, vertical components, particularly at the frequencies involved in the "phase B" signal, are far too heavily dependent on local geological conditions to be useful for amplitude comparisons. In view of the availability of commercially-manufactured total-force instruments, it was to be hoped that at least a number of total-field amplitudes would have been available from identical equipment. However, in some cases the large and rapid variations of the "phase B" signal were beyond the range that could be effectively recorded (because the counting period becomes comparable with the time scale of the fluctuations), and "phase B" recordings on some total-field instruments must be used with caution. For example, Unterberger and Byerly (1962) reported that two rubidium vapour magnetometers operating at the same location (5 feet apart) gave coherent recordings up to H+2 seconds and after H+30 seconds, but not during the "phase B" fluctuations. Judging from the published record reproductions, the same comment probably applies to the total-field recording obtained at Ottawa (Baker and Strome, 1962).

To summarize, the normal observation routines and standard instrumentation were not designed to cope with the extraordinary features of this artificial geomagnetic disturbance.

Geographic Coverage. All the stations that reported *major* (large amplitude) and clearly-defined "phase B" arrivals lie in a geomagnetic longitude band about 205° wide (240° to 85°). This may be suggestive of some sort of broad field-line guiding effect, or at least of some hemispheric limitation, although it is probably fortuitous; it may simply represent the geographic distribution of stations having the appropriate sophisticated instrumentation and advance notification of the test. Bomke, et al. (1963) reported highly isotropic propagation for the USAERDL stations (which cover a 105°-band in geomagnetic longitude to the east of Johnston Island). A definite answer to whether isotropy applies on a global scale as well will have to await publication of records from other continents, in particular from the Soviet telluric network with its extended longitude coverage.

One isolated report which does not fit into an isotropic global coverage pattern remains to be explained, but is of limited significance until confirmed by other observations: A telluric recording at Alert (δ = 82.5°N, λ = 62.5°W; λ' = 86°N) failed to give a measurable response (Caner and Whitham, 1962). Detection sensitivity of the instrumentation used is a few mv/km, and response time about one second. In comparison, a telluric "phase B" recording at Lincoln, New Zealand, exceeded hundreds of mv/km (Gill, 1962). To judge by the published record reproductions, the amplitude may have exceeded 1 V/km. Similarly, on telluric recordings obtained at Prince Albert, Sask. (δ = 53.2°N, λ= 105.9° W; λ' = 62°N), the amplitude is well in excess of the 30-mv/km full-scale range (Graystone, 1963). At Meanook (λ' = 61.8°N) the amplitude probably exceeded 100 mv/km (Cook, private communication). It should be pointed out that the Alert recording was obtained on a field survey (Law, et al. 1963), not as part of a regular observatory operation. It is consequently of limited reliability, because of the instrumental uncertainties inherent in temporary installations.

Phase A—Interpretation

Interpretation of the "phase A" signal does not present any particular difficulty; there are two possible mechanisms:

(a) a spheric, presumably excited by the prompt γ-ray emission (which occurs within microseconds and deposits most of its energy at altitudes of about 20–30 km), or possibly by electrostatic (charge separation) effects. It is probably reinforced by Schumann oscillations of the earth-ionosphere cavity. This is confirmed by the Byrd ELF recording which has excellent time resolution—the fundamental Schumann frequency can be clearly identified on the first signal (Lokken, private communication). The first signal on the Westford ELF recording is reported to be similar to that observed for lightning strokes (Balser and Wagner, 1963).

(b) the second possible mechanism is effects of neutron-decay betas. This is discussed in more detail later.

The reason not all stations recorded the "phase A" signal, is almost certainly a combination of instrumental limitations and rapid amplitude fall-off with distance. The frequency response of most of the detectors used falls off very rapidly beyond a few cps; for example the 3 db high-frequency cut-off points for Victoria, State College and Christchurch (broadband record) are 5 cps, 1.5 cps and 2 cps respectively. A very low-amplitude signal at 8 cps would therefore be masked by background activity and/or instrument noise, whereas it shows up on records obtained either at close locations (Hawaii, Samoa), or with specialized ELF equipment (Byrd, Westford), or with low-noise high-frequency sensitive equipment such as that used by the French network.

Phase B—Interpretation

Interpretation of the "phase B" signal is far more complicated and controversial. The salient characteristics of this signal are summarized below, and any suggested mechanism must take these points into account:

(a) global synchronism ($\pm$0.1–0.2 sec)
(b) two-second delay after explosion ($\pm$0.1–0.2 sec)
(c) extremely sharp rise (over 20–30 gamma/sec)
(d) initial period 3.5–4 sec (i.e. frequency 0.28–0.25 cps)
(e) amplitude heavily damped
(f) large initial amplitude (about 30–50 gamma)
(g) altitude-dependence (occurs only when the source is above the E-layer).
(h) decreasing period, to about 2–2.5 sec (?)
(i) horizontal polarization of the magnetic vector.

Before beginning a discussion of possible mechanisms, it is useful to reconsider the Argus III data to check whether they could fit some of the above characteristics. The relevant figure from Berthold, et al. (1960) is reproduced in Figure 5. If we visualize the full vertical scale (i.e. extended to zero distance) it becomes obvious that the slope of a line based on a number of points bunched over a narrow range is extremely sensitive to errors in individual point positions. The Azores observation is not very reliable: to quote from Newman's (1959) original paper: "there may be a signal between plus 4 and plus 6 seconds". This leaves five points, all in the range 12000–13700 km, i.e. covering only about 15 per cent of the total range. Considering the probable errors of some of the observations, it becomes obvious that any slope derived on this basis is not too reliable. In fact, it can be clearly seen that a vertical line (i.e. global synchronism) would fit the data just as well or better (see dashed line on Figure 5). This is strengthened by Troitskaya (1961), who reported that the arrivals recorded at the Soviet telluric stations (extending over 120° in longitude) were simultaneous to within one

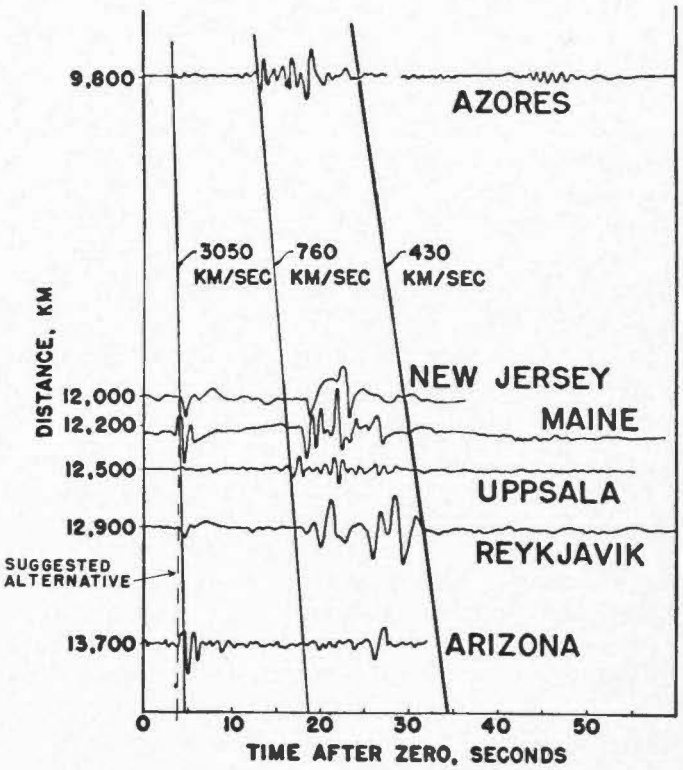

FIGURE 5. Summary of geomagnetic recordings from Argus III (after Berthold, Harris and Hope, 1960).

second. The exact delay time is unfortunately not known, since the effective origin time has not been published. It would be very interesting to know whether the delay is of the order of two seconds also, or whether it is dependent on yield and altitude. It is not clear whether the papers by Berthold, et al. (1960) and Bomke, et al. (1960) were based on access to unpublished origin time data, or whether the origin time was derived from extrapolation of the distance-time lines for later arrivals. In the latter case, the same objections apply as previously discussed for the 3050 km/sec velocity, and the origin time can be considered unknown to $\pm$2 seconds, i.e. a two-second delay is possible. However, if these papers were based on access to reliable origin information (which is a likely assumption), the delay indicated by the data is about 4 $\pm$ 0.5 seconds. Troitskaya (1960) reached a similar tentative conclusion, based on the time spacing between a first impulse-type arrival (assumed at H+0) and the second (oscillatory) signal.

A number of different mechanisms are now discussed in detail; some of these are obviously unsuitable to explain the "phase B" signal, but since at one time or another they have been considered, they must be included briefly. We have attempted to present a number of possibilities with a minimum of personal bias, in order to provide a broad basis for a more detailed discussion

of one or two specific mechanisms that we consider as most likely. No claim is made that all possibilities have been considered—others can almost certainly be proposed, particularly if complex combinations of different mechanisms are considered. However, in view of the sharp and clearly defined nature of the signal it is felt that a relatively simple explanation is more likely, preferably one which ties in with "prompt" detonation effects rather than with delayed fission-product decay.

The listing of mechanisms is divided into two groups: I: direct "overhead" effects; II: secondary-focus mechanisms.

I. DIRECT-EFFECT MODELS

(1) *Hydromagnetic waves*

The fission "bubble" expands at a rate of about 100–1000 km/sec (Latter and LeLevier, 1963). It is highly diamagnetic and therefore acts as a piston on the earth's magnetic field, setting up hydromagnetic waves in the different modes. Some of these can almost certainly be identified among the later arrivals, but in as far as "phase B" is concerned they do not fit the requirement of global synchronism, since the relevant propagation velocities are of the order of a few hundred to a few thousand km/sec—far too low to account for the simultaneous arrivals at distant locations.

Kato and Takei (1963) have computed the propagation delay of hydromagnetic waves for stations up to 180° in distance, using least travel-time ray paths. Since the altitude range up to 5000 km was considered, this computation includes the possibility of propagation in high-altitude, high-velocity ducts (Bomke, et al. 1960) as well as in low-velocity ionospheric layers. They conclude that hydromagnetic waves could not explain the observed arrival times, since computed delays ranged up to about 10 seconds for the more distant stations.

(2) *Ionization effects due to neutron-decay betas*

The prompt neutron emission can account for some effects directly, but these must be limited to the geometrically accessible regions, since neutron paths are not bent or deflected. However, beta particles that have decayed from these neutrons can be guided down to ionospheric altitudes by magnetic field lines, and therefore produce ionization effects in regions not directly accessible to the neutrons themselves. For a fission explosion, the neutron-decay betas have terminal energies of 0.78 Mev, with a very broad maximum centred at about 0.25 Mev (Zmuda, et al. 1963b).

This mechanism was first proposed by Crain and Tamarkin (1961) to explain sudden changes in ionization following the August 1958 tests. It has been further developed recently by Sechrist (1962), Zmuda, et al. (1963a,b), Willard and Kenney (1963), Kenney and Willard (1963), and others. There seems very little doubt that this mechanism accounts for at least some of the observed prompt VLF effects. The known existence of such a mechanism, as contrasted with the mainly hypothetical nature of some of the other proposals, makes it very tempting to apply it to the geomagnetic data as well, but there are two major objections:

(a) The fixed time delay. Over the distances involved the onset times at different locations should vary between milliseconds and fractions of a second (on the assumption of mean neutron energy of 1 Mev, i.e. ejection velocities of 1.4×10^9 cm/sec). However, should the origin spectrum contain an unexpectedly large flux of very low-energy neutrons, the delay times could indeed reach two seconds at some remote locations, but in that case there is no global synchronism. For the predicted fission spectrum, the onset time would be practically instantaneous (within the time resolution used in this report, i.e. ± 0.1 to 0.2 seconds). This mechanism could therefore account for some of the "phase A" arrivals, but not for "phase B". For the "Orange" test in 1958, Benioff (quoted by Hodder, 1960) reported small (fractional gamma) signals instantaneous with the detonation ($\pm$?) at two locations remote from the detonation point ($>$ 7000 km), but on field lines accessible to neutron-decay betas. Field (1962) attributed these signals to neutron decay betas.

(b) The second major objection is amplitude. For a 1.4-megaton fission bomb, the number of ion pairs formed by deposition of betas at the relevant altitudes (80-100 km) is about 75 per cm^3 in one second. A rough estimate of the amplitude of the resulting geomagnetic effects can be obtained by comparison with the diurnal fluctuations (Field, 1963). For mid-latitude stations, $H_D \sim 20\text{-}50\gamma$, $N_o \sim 10^4/\text{cm}^3$, the resultant signal would be of the order of 0.1 to 0.5 gamma. If the prompt deposition (at the first pass) alone is considered, the amplitudes would be even lower. Using Kenney and Willard's (1963) figures, the number of ion pairs formed in a 1 cm^2 flux tube over Victoria would account for an increase of only about seven ion pairs per cm^3 in the relevant region, i.e. a 0.01 to 0.05 gamma signal. Recent estimates (Kenney, private communication) indicate a possible increase in these values by a factor of 10. However, they would still be too low (by a factor of about 100) to account for the observed 30γ signals.

(3) *Fission-product decay betas*

The decay of fission products provides a far more copious source of betas than the decay of the prompt neutrons. The bulk of their energy is deposited at

altitudes of 80 km and below (mean energy about 1 Mev). However, deposition is spread over a period of seconds following the detonation. Also these electrons cannot be rapidly transported across the field lines and their prompt effects must be confined to the field lines directly accessible to fission products. The upwards-expanding diamagnetic bubble confining the fission products provides a means for spreading these beyond the immediate field line through the detonation point. Since at these altitudes the magnetic field is the dominant factor for stopping expansion of the bubble, its terminal dimensions can be estimated. Latter and Le Levier (1963) have shown that the terminal cross-section area A of the flux-tube containing the bubble is

$$A(km^2) = 3 \times 10^4 \left(1 + \frac{Z}{R_E}\right)^4 Y^{2/3}$$

where Z = altitude in km, R_E = earth radius in km, and Y = explosion yield in kilotons. The corresponding deposition area $A_0(km^2)$ at altitude 80 km is

$$A_0 = \left(1 + \frac{Z}{R_E}\right)^{-3} . A$$

For the "Starfish" test (Z = 400 km, Y = 1400 kilotons), $A = 480 \times 10^4$ km² (Radius = 1240 km) and $A_0 = 400 \times 10^4$ km² (Radius 1130 km). These are maximum values, based on the assumption that the entire energy output goes into expanding the bubble. A more reasonable proportion would be about 0.5 to 0.7 of total yield.

Even though a small proportion of the decay electrons (about 5 per cent, Colgate, 1963) is ultimately injected into higher L-shells through magnetic instabilities, the bulk of the deposition is limited to the area A_0. The prompt ground effects due to ionization are therefore limited to a range of about 20° at each conjugate area (i.e. about 15°S to 35°S and 15°N to 35°N), and the mechanism is inadequate to explain the geographic extent of the "phase B" signals—quite apart from other objections (timing, sudden onset). Transverse drift would of course extend the longitudinal coverage, but even for very high-energy electrons the drift rate is far too slow to account for "phase B" arrivals.

(4) *Setting up of local conditions*

One possible mechanism suggested by Selzer (private communication) is that the two-second delay represents a "setting-up" time of conditions at the point of observation rather than a propagation or origin delay. In other words, the actual triggering impulse reaches all over the globe simultaneously (within the available time resolution) and ". . the two-second delay would have been the time necessary for the process, involved in each of these local excitation, to be performed" (Roquet, Schlich and Selzer, 1963). The triggering mechanism is not specified, but either the "phase A" pulse or neutron-decay betas could fit the timing requirements. However, it would appear to be almost impossible to reconcile the sharp sudden commencement with this hypothesis. Unless some sort of breakdown effect can be formulated, any such process would be gradual from the instant of impulse arrival, rather than sharply defined at H+2.

II. SECONDARY-FOCUS MECHANISMS

We are now considering a group of possible mechanisms called "secondary focus" type for want of a better name. These imply energy in some form impinging on an interface, or other critical region, and setting up a secondary focus of disturbance from which energy is reemitted at, or close to, the speed of light. The two-second delay would be accounted for by propagation delay between primary source and secondary focus, or by the time required to set up the necessary conditions for emission at the secondary focus, or a combination of both. It is felt that in view of the close synchronism of the signals recorded at widely separated locations, such a "secondary focus" mechanism is far more likely than a direct primary "overhead" effect at each station.

The actual nature of the energy conversion and of the speed-of-light transmission mode are as yet unspecified—the required theoretical work is beyond the scope of this preliminary investigation. It should be pointed out that the term "e.m. wave radiated from a secondary focus" must be used only with reservations, particularly if the disturbance is to be propagated in the earth-ionosphere wave guide. At the frequencies involved (0.25–0.30 cps) the free-space wavelengths are more than 10^6 km, i.e. orders of magnitude greater than the dimensions of the wave guide or the propagation distances. The static ($1/d^3$) and induction ($1/d^2$) effects both become comparable to radiation effects at distances less than 1/6 of a wavelength.

On the other hand the signal could be considered as a series of impulses, with recovery in between. The observed sine-shaped fluctuations would then be explained by filtering through the transmission medium and/or instrumentation. This would in fact fit some of the proposed mechanisms better than a monochromatic source emission, but it still leaves unspecified the mode in which these impulses are propagated at the speed of light.

(1) *Neutron-decay betas*

The direct overhead ionization effects of neutron-decay betas at each station have previously been considered and rejected. However, because of the focussing effect of the field-line geometry, a high proportion of them will be deposited in the conjugate areas and in the auroral zones (Kenney and Willard, 1963). This could

provide a possible triggering mechanism for secondary disturbances. The main objections to this theory are:

(a) the two-second time delay: the deposition is practically instantaneous at the time-scales considered, i.e. milli-seconds to about 0.2 second, and (b) the previously considered amplitudes. This mechanism is almost certainly responsible for the (instantaneous?) auroral displays reported from auroral zone locations, and probably also for the abnormally high-amplitude horizontal component deflection reported from an auroral zone magnetic observatory (Meanook; Cook, private communication). It is however unlikely to be responsible for the global "phase B" signal.

It should be pointed out that if our assumed neutron spectrum (i.e. fission explosion) is incorrect, this mechanism may have to be reconsidered. In particular, if a very large flux of very low-energy neutrons is produced, a longer delay (two seconds) could be accounted for in the case of an auroral zone secondary focus, and the mechanism may be theoretically possible as far as the timing is concerned. However, the available amplitude data point towards a source in the detonation area rather than in the auroral regions (Bomke, et al. 1963).

(2) *Fission-product decay betas*

The effects of fission-product decay betas have been discussed, and it was concluded that they do not fit "phase B" observations in as far as direct overhead ionization effects are concerned. However, the relatively concentrated deposition of these betas in the conjugate area could provide a possible secondary-focus mechanism. The transit time of the betas along the field lines is practically instantaneous at the time resolutions considered, which raises the question of the two-second delay. The expansion time of the bubble is of the right order of magnitude. Colgate (1963) estimated 2.5 seconds as the time required for the bubble to reach its terminal dimensions R = 1000 km. A precise figure would be difficult to obtain in view of the uncertainties in parameters: in particular, the proportion of the total yield that is available for expansion of the bubble could vary between 30 per cent and 70 per cent.

A continuous process rather than a sudden release could be expected, since energetic electrons would be continuously escaping from the bubble during expansion. However, the expansion of the bubble may actually provide some sort of energy "filtering" mechanism: higher energy electrons would lose energy in expanding the bubble against the pressure of the magnetic field, until at the time the expansion is stopped (H+1.9 sec?) a reasonably monoenergetic flux is released to spiral to the conjugate areas and to trigger the secondary disturbance. This mechanism does not explain the oscillatory nature of the signal (since the mirroring electrons have much shorter periods), but it appears to fit the timing requirements for the initial impulse of "phase B".

The spectral characteristics of fission decay betas have been discussed by Zmuda, et al. (1963a), but the general arguments for this particular mechanism are practically unaffected by the precise spectral distribution, since the beta transit time to the conjugate area is short compared with two seconds, even for low-energy electrons.

(3) *Hydromagnetic-electromagnetic conversion at the lower ionosphere boundary.*

A very simple, and therefore attractive, model was tentatively proposed by Bomke, et al. (1963). A hydromagnetic wave propagates vertically downward from the detonation point, and on reaching the lower ionosphere boundary sets up a secondary disturbance that is then propagated at the speed of light. The conversion efficiency between hydromagnetic (h.m.) and electromagnetic (e.m.) waves at a sharp interface (which is satisfied at the wavelengths involved) is of the order of one to a few percent (Kahalas, 1960).

The propagation time for a hydromagnetic wave between the detonation point and 80 km altitude could possibly account for the two-second delay. A precise computation of this propagation delay would be meaningless, since the properties of the medium below the detonation point would have been drastically altered by the prompt radiation. However, some limiting values can be derived, since the main prompt ionizing effects over this path are due to x-ray energy deposition.

There are two major uncertainties in the parameters used for computation of these effects: a) the x-ray yield, which could vary between 30 per cent and 70 per cent of the total yield, depending on the type and construction of the device; b) the x-ray temperature of the radiating materials, which ranges between kT = 0.5 Kev and 2 Kev for an unshielded explosion.

Since the energy from high-temperature explosions is deposited mainly at lower altitudes where recovery is very rapid (Latter and LeLevier, 1963), lower-temperature devices would have the maximum effect on the mean Alfvén velocities over the entire path. Consequently an upper limit for the propagation delay can be obtained by considering a 0.5-Kev bomb with an x-ray yield 75 per cent of the total yield (i.e. 1050 kilotons for "Starfish"), and a lower limit for 2 Kev and 350 kilotons. The energy deposition as a function of altitude has been computed using the saddle-point method outlined by Latter and LeLevier (1963):

$$E(z) = \frac{15}{\pi^4}\left(\frac{\pi}{2}\right)^{\frac{1}{2}} \frac{3.4\times10^3}{(kT)^3}\, r(z)\cdot\left[C.h(z)\right]^{\frac{1}{8}}\cdot \exp\left[-\frac{4}{3}[C.h(z)]^{\frac{1}{4}}\right]$$

where $E(z)$ = the energy deposition (ergs/cm^3) per unit x-ray flux

kT = the x-ray temperature in Kev

$r(z)$ = the density at altitude z (gr/cm^3)

$h(z)$ = the total mass per unit area of the atmosphere between the explosion and altitude z

and $C = 10.2 \times 10^3/(kT)^3$

The values of the parameters $r(z)$ and $h(z)$ have been derived from the ARDC model atmosphere (Minzner, Champion and Pond, 1959).

The x-ray flux at any altitude is given by $F(z) = 3.2 \times 10^8 Y/R^2$, where Y is the x-ray yield in kilotons, and R the distance in km, i.e. R = 400-z for "Starfish". Multiplying $E(z)$ by $F(z)$ for each altitude gives the magnitude of the ionizing pulse, and since 2.1×10^{10} ion pairs are produced for each erg of deposited energy, the resultant ionization $\triangle N$ can be computed. Figure 6 shows the values of $\triangle N$ at altitudes from 50 to 350 km, for 0.5 and 2 Kev temperatures and an x-ray yield of 1050 kilotons.

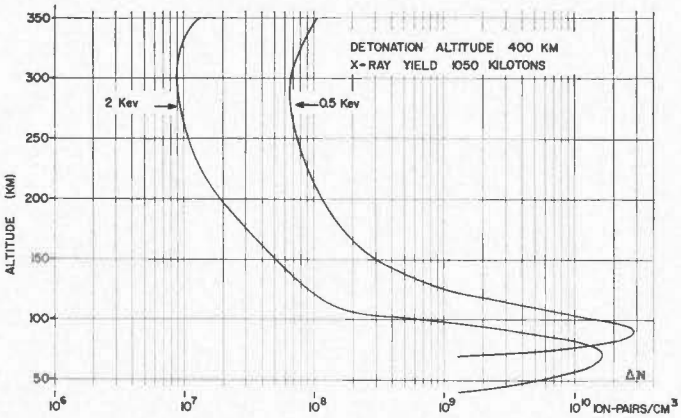

FIGURE 6. X-ray ionizaton below the detonation point.

The corresponding Alfvén velocities as a function of altitude have been derived and are plotted in Figure 7. The propagation time delay between altitudes of 350 and 80 km based on these velocities is

T_{max} = 46 seconds (0.5 Kev, 1050 kilotons)

T_{min} = 10.6 seconds (2 Kev, 350 kilotons).

Some qualifying comments should be made:

(1) The ambient ionization has been neglected, since night-time ion densities are several orders of magnitude below the x-ray ionization densities.

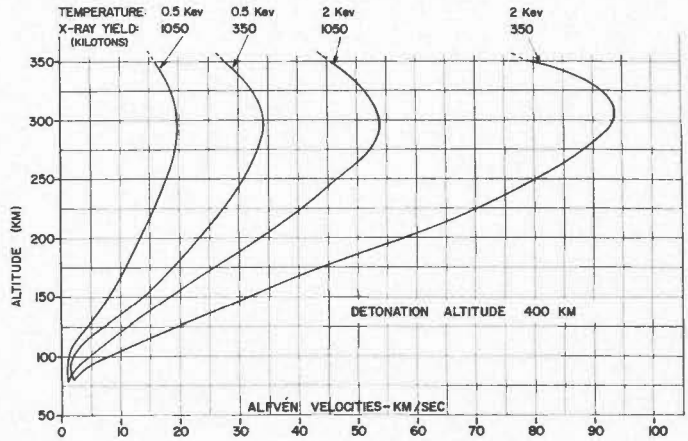

FIGURE 7. Alfvén velocities below the detonation point.

(2) Ionization by other prompt energy emissions has been ignored. In particular, neutron products and the low energy tail of the γ-ray pulse contribute to ionization in this region. However, energy considerations and a few check-computations showed that their contribution would amount to about 1 to 2 per cent of the x-ray effects, which can be neglected as far as the Alfvén velocities are concerned.

(3) The saddle-point method gives a good approximation to the values obtained by exact numerical integration methods for altitudes up to about 120 km (Latter and LeLevier, 1963). Above this height the divergence becomes progressively worse, the saddle-point derived values being consistently lower than the exact values. Above 200 km it is little better than a rough estimate. Nevertheless, for computations of Alfvén velocities this is quite adequate, since about 60 per cent of the total time delay is introduced between altitudes of 120 and 80 km. A factor-of-two error in ionization densities over the rest of the path would affect the total delay time by a maximum of 20 per cent.

(4) No attempt has been made to even estimate conditions just below the explosion point (i.e. 350-400 km altitude). The difficulty has been avoided by postulating that the piston itself was still driving through most of this layer (i.e. negligible time delay —expansion velocities are about 100-1000 km/sec). The triggered hydromagnetic wave was then assumed to have started at an altitude of 350 km. Most of the bubble expansion is upwards into less resistant medium (Colgate, 1963), and 50 km appears to be a reasonable estimate of the maximum downward range of the expansion.

(5) The values of the parameters r(z) and h(z) are suitable mean values, but Johnson (1961) has emphasized that actual values at any one time could be significantly different. Some check calculations have been carried out, using extreme values for these parameters, and the over-all effect on the delay time is of the order of ± 2 to 5 per cent. A further possible ± 1 to 2 per cent is introduced by the variations in the mean molecular weight.

To summarize, as far as the "minor" sources of error are concerned, the delay times should be considered +25 per cent, −5 per cent, i.e.

$$T_{max} = 44\text{—}58 \text{ seconds.}$$
$$T_{min} = 10\text{—}13 \text{ seconds.}$$

A further major uncertainty is introduced by the shock-wave nature of the disturbance. The piston velocity is at least an order of magnitude greater than the Alfvén velocity in the medium below. The hydromagnetic Mach number $M = (1/\sqrt{2})\ [\alpha/\alpha_0 + (\alpha/\alpha_0)^2]^{1/2}$ where α is the density behind the shock front and α_0 is the undisturbed density (Lundquist, 1952). In the absence of detailed information about the explosion characteristics, we can arrive at limiting (maximum) values of M by considering a strong shock. For this case $\alpha/\alpha_0 = (\gamma + 1)/(\gamma - 1)$ where γ is the ratio of the specific heats. The correct value of γ is not known—an acceptable range for this region is $\gamma = 1.4$ to $\gamma = 2$. The low values of γ used by Caner and Whitham (1962) to explain the possibility of very high Mach numbers are not justified, since the medium is by no means fully ionized (1 to 2 per cent only), and since the shock direction is normal to the direction of the field. For shocks normal to the field direction in a medium where the magnetic pressure is much higher than the hydrodynamic pressure, $\gamma = 2$ can be used (Montgomery, 1959) and $M = 2.45$. At the other extreme, the ratio of the specific heats up to an altitude of 90 km is normally defined to be 1.4 (Minzner, Champion, and Pond, 1959). For $\gamma = 1.4$, $M = 4.6$. Applying this maximum value of M to T_{min}, we arrive at an extreme value for $T_{min} = 2.2$–2.8 seconds.

It would appear therefore that for bomb temperatures up to 2 Kev a two-second delay is not impossible, although not very likely. In particular the low x-ray yield and high Mach number are rather extreme assumptions. However, for higher-temperature devices (fusion bomb ?) a two-second delay would be well within the acceptable range of values.

There are two objections to this model:

(a) The monochromatic nature of the observed signal does not fit the essentially impulsive (i.e. broadband) origin disturbance. Although selective propagation could explain the predominance of certain frequency bands (Jacobs and Watanabe, 1962), it is unlikely that this could be effective enough over the short pathlength involved to account for a sharp frequency selection as observed.

(b) The main objection against this mechanism is the fact that lower altitude tests (in particular "Teak", at or just below 80 km) do not produce similar effects. Admittedly the conversion of explosion kinetic energy into hydromagnetic forms is considerably more efficient at the higher altitudes. Nevertheless, considering how close the "Teak" detonation was to this hypothetical "secondary focus" altitude, some comparable effects (even if with much lower amplitudes) should have been observed, with a reduced or zero delay. It should be mentioned that this argument is somewhat complicated by the possibility that shielding experiments may have been included in some of the tests. For example, relatively simple devices can reduce the prompt radiation flux by factors of 100 or more, and the mean energy levels by factors of 10–20 (Latter, Herbst, and Watson, 1961; Latterand Le Levier, 1963). Also the actual type and construction of the bomb, in particular the casing material, has a strong influence on the spectrum of the emitted prompt radiation. Although shielding experiments may have been included in some of the smaller tests, it is very unlikely that major ones such as "Teak" included any such complications. Nevertheless, it should be kept in mind that not only do we have a minute sample, but we do not even have reliable origin information on these few tests. Consequently any arguments as to why only certain tests do or do not produce certain results must be used with caution.

(4) *Hydromagnetic impulse guided along the field-line.*

In this mechanism a hydromagnetic impulse is guided along the field-line through the detonation point, with partial reflections at each end. The mechanism is effectively a variant of the previous one, but might also explain the oscillatory nature of the signal, the observed period, and the absence of similar effects from lower-altitude tests. It would also fit the damped amplitude effect, and the "bounce" period is of the right order, 3 to 4 seconds.

A simple consideration of the geometry involved indicates a major timing vs. period objection. Figure 8 shows the relevant field-line, drawn to scale. It is obvious that if t (the initial delay, H→P) is 2 seconds, T (the first bounce period, P→R) cannot be as low as 3.5–4 seconds. There is, however, a possible explanation for the discrepancy: the "reflection point" P is in the

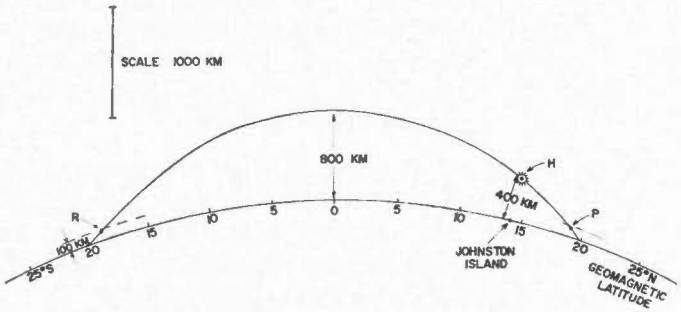

FIGURE 8. Field-line through the detonation point in "Starfish" test of July 9, 1962.

direct radiation zone, and the medium around it undergoes vast instantaneous changes in ionization due to prompt radiation, in particular x-rays, which for the spectrum of a fission bomb deposit most of their energy at altitudes of 70 to 90 km. The γ-rays deposit energy down to lower altitudes—about 20–30 km for the Mev energy range. Although the ionization due to the prompt γ-ray pulse decays within microseconds, some persisting net ionization at these lower altitudes results from delayed fission-product γ-rays. It is therefore possible that for the first pass (H→P) the medium was practically opaque to h.m. waves, or that the necessary (interface sharpness?) conditions at point P did not exist. The initial "secondary focus" would therefore be set up at point R in the southern hemisphere. This removes the timing-geometry objection: for t (H→R) = 2 seconds, T (R→P) = 3–4 seconds is quite reasonable. Crain (1963) has shown that at the relevant altitudes (75 km) the x-ray-induced ionization decays with time-constants of the order of a few seconds. Consequently, when the reflected wave reaches P (i.e. after 5–6 seconds, H→R→P) the "interface" may have sufficiently recovered to permit efficient energy conversion (h.m.→e.m.) and reflection. The very slight reverse movement which preceded the main movement on several recordings (e.g. Victoria, Figure 1, or Jicamarca—see Figure 5 of Casaverde, et al., 1963) may represent the effect of the "aborted" first H→P pass. The fact that the delay H→P was only slightly less than H→R would be reasonable, in view of the large x-ray-induced initial increase in ionization over the H→P section.

There is an interesting ambiguity in this model. Does energy emission occur at both mirror points (i.e. are there two secondary sources), or does only the southern focus exist, with the northern end having recovered sufficiently to permit passage of the h.m. wave and reflection, but not for efficient h.m.→e.m. energy conversion? In as far as timing data are concerned, this question can be restated as: does the observed 3.5 to 4-second period represent the transit time for a one-way bounce (R→P or P→R), i.e. focus at each end, or does it represent a full mirror period (R→P→R), i.e. focus at the southern end only? Even under normal conditions the Alfvén velocities are not known to better than a factor of 1.5 to 2, and with the artificial ionization changes over parts of the path it becomes impossible to compute the mirror period with sufficient accuracy to resolve the above ambiguity. The limiting cases fit just about equally the two possibilities. For undisturbed night-time conditions, the mean Alfvén velocities at altitudes of 350, 500, 750 km are 800, 1000 and 2000 km/sec respectively (Jacobs and Watanabe, 1962), and a full mirror period of four seconds is possible. Under disturbed conditions these velocities are reduced by a factor of two or more, and the four-second period would have to be the time per one-way transit, i.e. focus at each end. The ambiguity might be resolvable on theoretical grounds once the exact conditions for reflection and energy conversion are established. In any case, the overall validity of this model is in no way affected by this ambiguity.

We are well aware of the weaknesses in this qualitative treatment, and considerable theoretical work on the conditions for h.m.→e.m. energy conversion must be carried out before such a model is fully acceptable. It does, however, fit the experimental timing data extremely well—it is the only theory so far which fits *all* the specified conditions, including the decrease in period. This could be explained by the fact that on the first pass the ion density over parts of the path would have been significantly increased by detonation products travelling faster than the h.m.-wave, and the Alfvén velocity (which is inversely proportional to the square root of the ion density) would be lower than normal. As the artificial ionization decays (time constants of the order of seconds) the Alfvén velocity increases and the bounce period decreases. The observed 20 to 30 per cent decrease in bounce period over about 15 seconds would indicate an effective initial increase in ion density of 50 to 70 per cent—not unreasonable for this particular path which is partly in the prompt radiation zone and also along the guided path of fast betas.

(5) *Hydromagnetic wave along the field-line.*

Some of the points discussed for the previous model can also be applied to a long-period hydromagnetic wave propagating along the field-line through the detonation point. The two-second delay would represent the propagation time of the wave front to the conjugate point. The distinction between this model and the preceding one should be clearly understood. In the preceding model we considered a hydromagnetic impulse (i.e. broadband "wave-packet") which is propagated along the field-line. 0.25 p.p.s. represents the *repetition rate* of the impact of this impulse on the interface, not a wave frequency. The higher component frequencies of the pulse

are either not converted into electromagnetic forms, or are filtered out by propagating media and/or instrumentation. In this model we consider a single hydromagnetic standing wave, frequency 0.25 cps, with direct coupling to a 0.25-cps electromagnetic wave at an interface.

The main objection to this mechanism is the monochromatic nature of the signal. It is however possible that preferential excitation of the eigen periods, combined with selective h.m.→e.m. conversion of certain frequency bands, could provide a suitable explanation. The fundamental characteristic period can be estimated by numerical integration $T = \int (2/V_A).\, ds$ over the field-line (Obayashi and Jacobs, 1958). It lies between about six and 15 seconds (using the Alfvén velocities for night-time during periods of maximum and minimum sunspot activity respectively). In view of the increase in ionization due to radiation, and of the extreme distortion of the field-line by the diamagnetic bubble, a precise determination of eigen periods is impossible. The observed periods are therefore well within an acceptable range of values for the first harmonic.

This mechanism fits the observational data in all respects. The decrease in period is also obtained: as the artificially-induced increase in ionization decays, the Alfvén velocity increases and the eigen period decreases. There appears to be no obvious way of distinguishing between this and the preceding model on the basis of the observational data, but we feel that the standing-wave model is preferable, even if only on aesthetic grounds. It does not involve any elaborate considerations of geometry or focus location, and it does not require complex filtering mechanisms to explain the observed quasi-sinusoidal signals.

(6) *Protons guided along the field-line*

The major source of prompt protons from a fission process is neutron decay. The protons have essentially the same kinetic energy as the parent neutrons. The energy distribution of prompt neutrons from a fission process has been discussed in detail by Bonner, Ferrel, Rinehart (1952), Hill (1952), and Watt (1952). In the energy range 0.075 Mev to 17 Mev it can be roughly represented by the semi-empirical formula given by Watt (1952):

$$N(E) = 4.75 \times 10^6 \sinh (2E)^{\frac{1}{2}} \exp (-E)$$

No information is available for energies below 75 Kev. Figure 9 shows a plot of the energy distribution up to 7 Mev. The spectrum has a very broad maximum centred at 0.8 Mev—emission is practically constant, within a few per cent, between 0.4 Mev and 1.3 Mev. Even though energies range to above 18 Mev, most of the neutrons are below 2 Mev, the fall-off being practically exponential above 2 Mev.

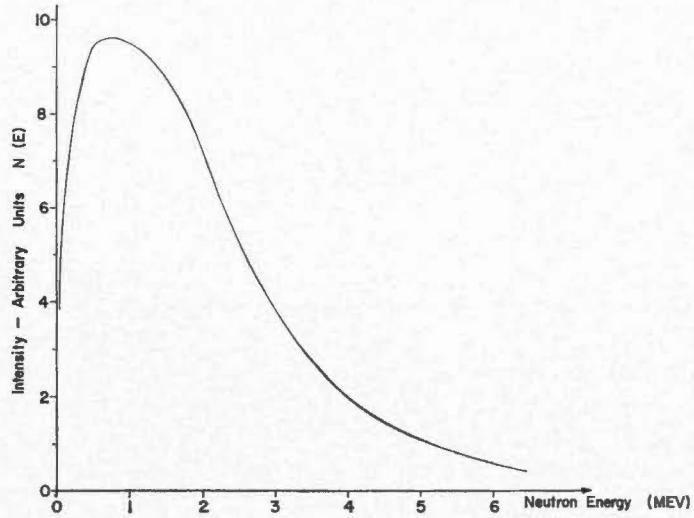

FIGURE 9. Energy spectrum of fission neutrons.

For this particular field-line the two-way mirror period of 1 Mev protons is about two seconds (Zmuda, et al. 1963a), three seconds for 0.4 Mev, and four seconds for 0.25 Mev, which is of the right order for the observed "phase B" periods. In this connection it should be mentioned that Zmuda, et al. (1963a) reported 10-second period cyclic VLF effects over the NPG-APL/JHU path, which they tentatively attributed to 0.4 Mev protons mirroring over NPG. In view of the uncertainties in field-line geometry and other parameters, it is possible that the two effects could be reconciled to fit the mirroring of protons with the same energy (say 0.3-0.4 Mev) along different field-lines.

The same objections of timing-geometry (initial delay vs. period) which were discussed in one of the preceding mechanisms, can be made to this mechanism and the same solution can be proposed, viz. the first reflection and energy conversion occurs at the southern end. Here again the same ambiguity as in the previous model arises: does a "focus" exist at each end, or only at the southern end. In this case, however, the ambiguity can be solved. The relevant reflecting altitudes are higher (about 100 km for 0.4-Mev protons), and the x-ray-induced ionization decays far more slowly at these altitudes than at 80 km. For altitudes 95 to 115 km the decay constant varies between 400 and 3000 seconds (Crain, 1963), depending on the exact altitude and magnitude of the ionizing pulse. If this model is valid, there can be only one "secondary focus" (at the southern end), and the 3.5 to 4 seconds represent a full mirror period, i.e. protons with energies 0.25 to 0.20 Mev. This provides the possibility of an experimental check on the validity of this model. Observed signal amplitudes should be higher near the conjugate point than near the detonation point. This does not appear to be the case, but the

evidence is based on only one set of observations: Bomke, et al. (1963) reported that the amplitude recorded at Hawaii was higher than that recorded at Samoa by a factor of about four.

Another major objection to this mechanism is the sharpness of the commencement, and the clearly defined frequency of the subsequent swings. In view of the broad energy distribution spectrum of the protons, a continuous (seconds rise time) commencement and complex waveforms could be expected. Also this model provides no explanation for the decreasing period. However, should the emission turn out to contain a major, *reasonably monoenergetic* source of low-energy (0.2–0.4 Mev) protons, the mechanism may have to be reconsidered in more detail. It should be pointed out that the presented spectral distribution data refer to emitted neutrons in general. The spectrum of the proportion that escapes the debris area would probably be shifted toward the low-energy end due to shielding by the debris. The shift could be considerable if deliberate neutron shielding had been part of the test, but this is unlikely in view of the bulk of the necessary shields. However, the general feature (i.e. broad maximum, almost 2 Mev "wide") would presumably remain unchanged, even though it may be centred around a lower energy, so that this does not fit the requirement for a monoenergetic flux.

CONCLUSIONS

The preceding discussion indicates quite clearly that of the proposed mechanisms only those involving hydromagnetic-electromagnetic conversions satisfy all the observed characteristics of the "phase B" signal. The most likely one of these appears to be one involving standing waves along the field-line through the detonation point, with energy conversion into electromagnetic modes at the mirror points. No unique solution is claimed: other models are possible, and with the limited amount of data a sensitive enough criterion for distinguishing between mechanisms is hard to define. For example, an interesting HF backscatter recording with high time resolution has been reported by Davis and Headrick (1964). Short-period fluctuations (interpreted as perturbations in E-layer conditions) were observed to be in peak-to-peak synchronism with the geomagnetic "phase B" signal; Davis and Headrick cite this as an argument in favor of a neutron-decay beta mechanism, but it could equally well be consistent with ionospheric cross-modulation by a strong h.m. or e.m. wave, either at the reflecting (E) layer or during passage through the D-layer.

Whatever the triggering mechanism, further theoretical work is required on the energy conversion mechanism at the secondary focus, and on the speed-of-light propagation of the secondary disturbance. In particular the latter would have to be treated as a near-field rather than as a radiation-field problem.

Normally, stations that do not record any significant effects do not publish "negative" reports. However, the location of possible "blind spots" could help to resolve the ambiguities between the proposed mechanisms. For example, if confirmed by other reports, the absence of E-W components at equatorial stations would permit significant deductions to be made about the polarization of the disturbance in the horizontal plane. The need for more three-component recordings is evident. Alternatively, confirmation of a gap at very high geomagnetic latitudes (>80°) would be strong evidence for a broad field-line-guided mechanism rather than an isotropic e.m. wave.

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April, 1964.

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M. J. S. Innes, W. J. Pearson and J. W. Geuer

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Page 32, right coln., para. 2, line 3, for sussurite read saussurite.

Page 32, right coln., para. 2, line 5, for strains read trains.

Page 34, left coln., line 22, for gnessic read gneissic.

Page 43, left coln., para. 2, line 4, for and about +7 mgals read to about +7 mgals.

Page 43, left coln., para. 4, line 9, for do no suffice read do not suffice.

Page 47, left coln., para. 1, for True depth — 3,210 feet read True depth — 2,310 feet.

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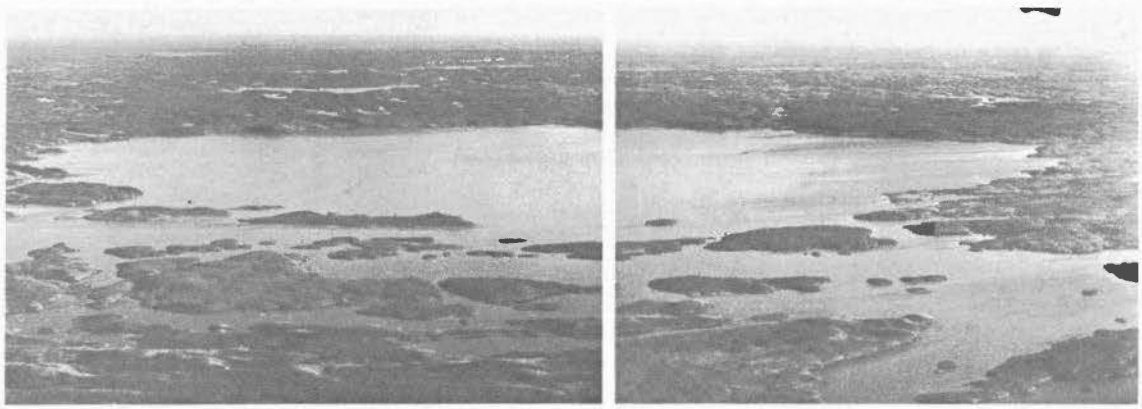
The Deep Bay Crater

M. J. S. Innes, W. J. Pearson* and J. W. Geuer



A view looking southeast across Deep Bay from a height of 7,500 feet; island-studded Reindeer Lake appears in the foreground.

ABSTRACT:—Deep Bay forms the southeastern part of Reindeer Lake in northern Saskatchewan. It is a circular, water-filled depression with a diameter of some six and a half miles, a surface elevation of 1,100 feet above mean sea level, and a depth of 720 feet; its centre lies at longitude 102° 59.4′W, latitude 56° 24.4′N. Topographical, geological and geophysical studies, combined with the results of diamond drilling strongly indicate an origin by meteoritic impact, and lend no support to the thesis that the Deep Bay depression is geologically or structurally controlled. The evidence suggests that the crater was formed at least 150 million years ago and had an original rim dimension of almost six miles, a rim height of 890 feet and a true depth of 2,310 feet. Deposition of Mesozoic sediments over the centuries have combined with erosional forces to reduce the crater to its present form.

RÉSUMÉ:—La baie Profonde forme la partie Sud-Est du lac Caribou dans le Nord de la Saskatchewan. C'est une dépression circulaire remplie d'eau de quelque six milles et demi de diamètre, dont la surface est à 1,100 pieds au-dessus du niveau moyen de la mer et d'une profondeur de 720 pieds. Le centre gît par 102° 59.4′ de long. W. et 56° 24.4′ de lat. N. Des études topographiques, géologiques et géophysiques utilisées avec les résultats obtenus par forage au diamant, indiquent clairement une origine météoritique, et infirment la thèse selon laquelle la dépression de la baie Profonde serait d'ordre géologique ou structural. Il semble que le cratère ait été formé il y a au moins 150 millions d'années, que le diamètre à l'origine ait été de près de six milles, avec un rebord de 890 pieds de hauteur et une profondeur vraie de 2,310 pieds. Des dépôts sédimentaires du mésozoïque au cours des siècles et les forces d'érosion auraient réduit le cratère à sa forme actuelle.

Introduction

Following the discoveries of the New Quebec Crater (Meen, 1950), the Brent Crater (Millman, Liberty, Clark, Willmore and Innes, 1960), and the Holleford Crater (Beals, Ferguson and Landau, 1956; Beals, 1960) attention was drawn to a large circular water-filled depression, known as Deep Bay, which forms the southeastern part of Reindeer Lake in northern Saskatchewan, (*see* above and Figure 1.). Its existence has long been known, but it is only recently that careful scientific investigations have been carried out at Deep Bay and consideration given to the possibility that it may have been formed by the impact and explosion of a large meteorite (Innes, 1957).

Four separate field investigations of the Deep Bay crater have been carried out by the Dominion Observatory. The first investigation was carried out in August 1956 in co-operation with the Department of Mineral Resources of the Province of Saskatchewan; topographical, geophysical and geological observations were made. The topographical observations included the determination of the heights of stations along several traverses, and of prominent topographic features to provide vertical control for the construction of a topographical map (in pocket) of the Deep Bay area. In addition measurements of water depths were made with an echo sounder along several boat traverses to provide in-

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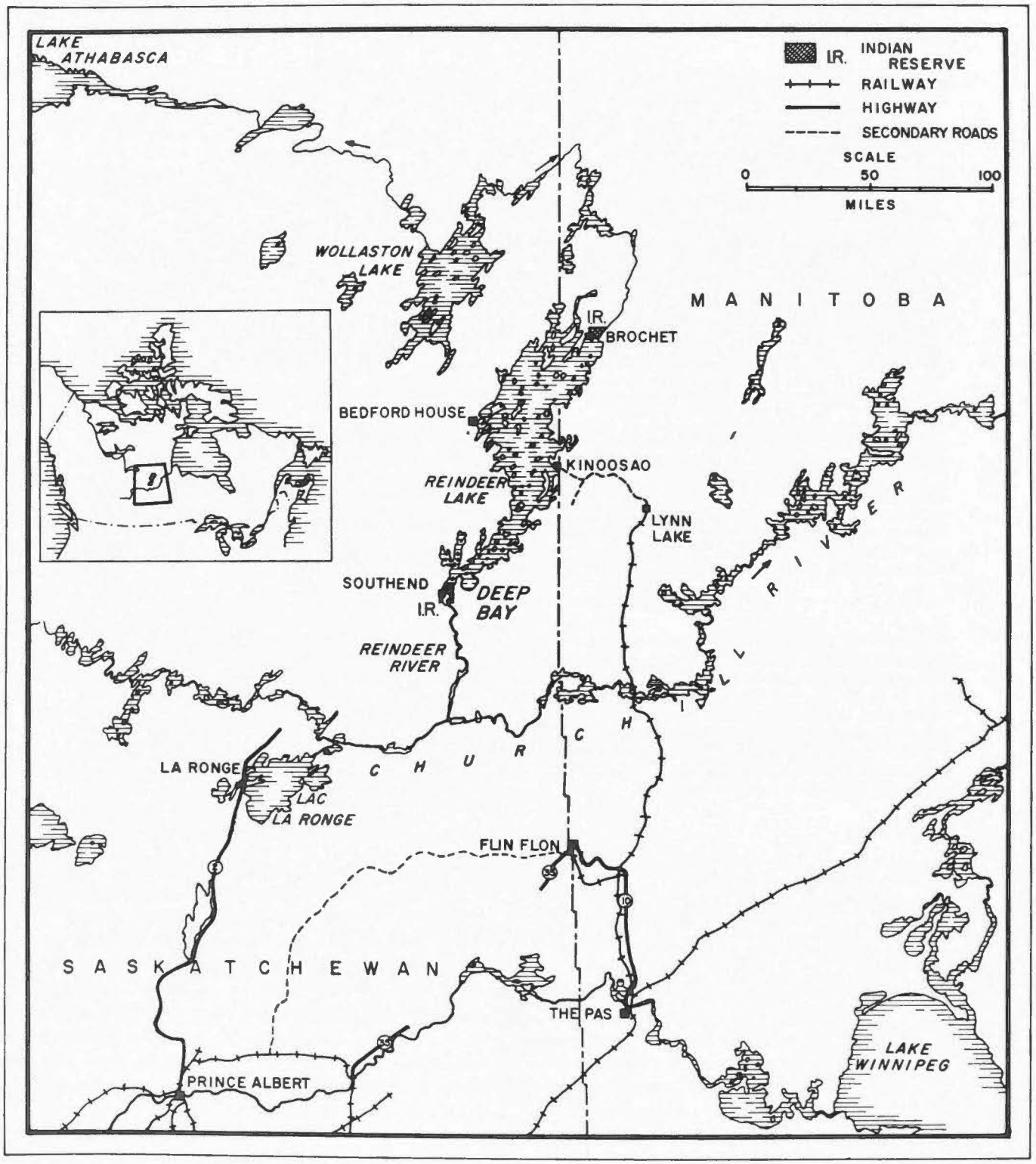

FIGURE 1. Location map.

formation concerning the relief of the present floor of the crater.

The geophysical work consisted of both gravity and magnetic observations. A light aircraft was used for transportation and regional gravity measurements were made on the margins of most lakes suitable for landing within a radius of 15 miles from the centre of Deep Bay. In addition detailed gravity observations were carried out at intervals of about half a mile along the complete shoreline of the bay and along five inland radial traverses for a distance of two to four miles. Observations of the vertical magnetic intensity were carried out during the same period by the Geological Survey of Canada using an airborne magnetometer. Geological mapping was carried out in conjunction with the gravity survey work. Practically all outcrops along the shore of Deep Bay were examined as well as those along the inland traverses and those in the vicinity of the regional gravity stations.

In the winter of 1959 a program for training observers and testing instruments designed for measuring gravity on sea ice in the Canadian Arctic provided an opportunity for further gravity work at Deep Bay. During the last week of February, forty-five gravimeter stations were established on the ice to provide a clear picture of the gravitational field over the bay. Additional gravity measurements were made in July 1960, in conjunction with a Dominion Observatory field program in northern Saskatchewan using helicopters for transportation. It was possible to extend the regional gravity coverage out to a distance of about 30 miles from the crater, and also, to supplement the detailed gravity measurements obtained on previous surveys.

Finally during the winter of 1961–62 a diamond-drilling program was carried out from the ice surface of Deep Bay partly to ascertain the true depth of the crater and partly to investigate the nature of the material filling the crater and underlying its floor.

It is the purpose of this paper to present the combined results of the geological, topographical and geophysical studies and also the findings of the diamond-drilling program. Accounts of the preliminary results of these investigations have been presented elsewhere (Innes, 1957; Innes, 1961; Beals, Innes and Rottenberg, 1963; Innes, 1964).

History and Previous Work

The records show that the first white man to visit Reindeer Lake was the famous explorer David Thompson, who in 1796 succeeded in establishing a new fur trade route from the south to Lake Athabasca via Reindeer Lake. As reported by J. B. Tyrell (1916), Thompson followed and surveyed the western margin of the lake, and although he spent two winters at Bedford House, a trading post he established near the middle of Reindeer Lake, (*see* Figure 1) no mention of Deep Bay appears in the narrative of his report.

The first geological work in the area was carried out nearly one hundred years later by D. B. Dowling (1897) who surveyed the western shoreline of Reindeer Lake. Deep Bay is not specifically mentioned in his report but it is named as such and shown on his geological map as a large bay with indefinite shoreline extending in a southeasterly direction from the main body of Reindeer Lake. The Topographical Survey of Canada made a monumented stadia traverse around the shoreline of Reindeer Lake including Deep Bay during the summers of 1922 and 1925 and good maps showing the topography (not including heights) for the area on a scale of 4 miles to one inch have been available since 1928.

Further geological work was carried out by the Geological Survey of Canada in 1928, with the examination confined almost entirely to the coastline and islands of Reindeer Lake (Stockwell, 1928). The Oliver Lake and Wapus Lake areas including the southern end of Reindeer Lake were studied by F. J. Alcock in 1937, and the results published as G.S.C. Maps Nos. 527A and 528A on a scale of 4 miles to one inch. The Spalding Lake and Reindeer Lake areas immediately to the north were surveyed geologically in 1938 by L. J. Weeks and the results published as G.S.C. Maps Nos. 595A and 596A. In 1950 H.M.S. Rice made a compilation (G.S.C. Map 1016A) on a scale of eight miles to one inch, of geological information for the Reindeer Lake area from published maps of the Geological Survey of Canada and of the Manitoba Department of Mines and Mineral Resources.

As outlined above, Deep Bay is clearly indicated on all but the earliest maps of the area, and it is rather surprising that no mention of its unique character appears in the reports of any of these earlier investigations. As far as can be learned the first published reference that the features of Deep Bay are in marked contrast to the rest of Reindeer Lake appears in a book by P. G. Downes (1943). The author in describing a canoe trip in northern Saskatchewan makes reference to Deep Bay as follows:

> "The southern end of the lake is hemmed in by comparatively high and rugged hills gradually lessening to the north. Here sand-girt islands begin to appear and the whole effect is of a more subdued topography. In the southeast corner is a large and perfectly symmetrical round bay quite devoid of islands and tremendously deep. This huge bay, utterly out of character with the rest of the lake, is a spot usually to be avoided. It is too deep for nets, affords no shelter from the wind, and is supposed to be inhabited by a gigantic fish of miraculous abilities and voracious appetite, inclined occasionally to come up through the ice and select itself a young caribou."

From the information available the first suggestion that Deep Bay may have been formed by a meteorite was made by the late Professor D. S. Rawson, head of the Biological Department of the University of Sas-

katchewan, in a letter to Mr. A. I. Bereskin, Controller of Surveys for the Department of Natural Resources of the Province of Saskatchewan, as follows:

> Dear Mr. Bereskin:
>
> In view of the recent interest in craters which may have been caused by meteors, you may be interested to know that I found a depth of 660 feet in Deep Bay. This bay is almost circular, and about seven miles in diameter. It is about three times as deep as any other part of the lake, and thus looks to me like a crater of some kind.
>
> Yours very truly,
> D. S. Rawson,
> Head, Biology Department,
> University of Saskatchewan,
> Saskatchewan.
>
> Sept. 19, 1951.

Mr. Bereskin, in turn, passed this information to the Geological Survey of Canada, who discounted the suggestion, but unfortunately did not bring the matter to the attention of the staff of the Dominion Observatory.

The senior author (Innes, 1948; Innes and Thompson 1953) first observed and photographed Deep Bay (*see* Plate I, centre spread) from a light aircraft in 1947 while conducting a regional gravity survey throughout northern Saskatchewan and Manitoba. In 1948 and again in 1951 while carrying out gravity surveys in the Reindeer Lake area, attempts to land in Deep Bay were unsuccessful because of unfavourable winds. The unique character of Deep Bay, tales of tractor trains in winter breaking through the ice at the entrance of the bay, superstitious fears of the local Indians and their unwillingness to cross the bay by canoe, formed the subject of many interesting conversations with the manager of the trading post at Southend. However the suggestion was never made at this time that Deep Bay may have been formed by meteoritic impact and explosion. Only after the Dominion Observatory had carried out investigations of the Brent crater (Millman, Liberty, Clark, Willmore and Innes, 1960) and the Holleford crater (Beals, 1960) and initiated systematic searches for other craters in the Canadian Shield, (Beals, Ferguson and Landau, 1956) was it realized that Deep Bay, too, may have had a similar origin (Innes, 1957).

Description of Deep Bay Area

Location, Accessibility and Inhabitants

Deep Bay, the centre of which has coordinates 102° 59.4′ west longitude, 56° 24.4′ north latitude, elevation 1,106 feet above sea level, is located in the Canadian Shield midway between the great sedimentary basin of the central plains to the southwest and Hudson Bay to the northeast. Although near one of the principal water routes followed by canoes in summer and tractor trains on the ice in winter while freighting supplies to northern outposts, Deep Bay can be reached most easily by aircraft from the small settlement of La Ronge 120 miles to the southwest which is presently the northern limit of the highway system of the province of Saskatchewan.

Reindeer Lake lies immediately south of the tree line that separates the forest area from the tundra and barren lands. The northern end of the lake is sparsely wooded and only small stands of stunted spruce trees are found; on the other hand the country to the south near Deep Bay where it has not been ravaged by forest fires is fairly well wooded with spruce, tamarack, birch and poplar. Reindeer Lake, which may be classed as one of the larger of the many lakes of the Canadian Shield, trends in a direction slightly east of north, is about 150 miles long and some 30 miles wide at its widest point. The lake narrows to the south where for about 70 miles of its length it is only a few miles wide. Its highly irregular and rocky shoreline and its myriads of low rocky islands, both large and small, rising from remarkably clear and transparent water, make Reindeer Lake one of the most beautiful and picturesque lakes of northern Canada (*see* Plates IA and IB).

The region is still sparsely populated and most of the inhabitants are concentrated in the vicinity of the trading posts of Southend and Brochet which have been operated by the Hudson Bay Company for more than 150 years. The native population consists of both Cree and Chipewyan Indians who for the most part live on reservations near the trading posts. In 1961 there were 210 Cree Indians (38 families) living at Southend and 330 Chipewyan Indians (73 families) living on the reservation near Brochet.

Fur trading is the oldest and perhaps still the most important industry of the Reindeer Lake area although commercial fishing and mineral exploration activities have had a stimulating effect on the economy in recent years. A fish packing plant and operational centre of the Saskatchewan Department of Natural Resources is now established at Kinoosao on the east side of the lake midway between Brochet and Southend. A road connecting this community with the mining centre of Lynn Lake, Manitoba, 100 miles to the east on the Canadian National Railroad affords year-round access route to Reindeer Lake and Deep Bay. One result of this new road is that several hunting and fishing lodges have been established and Reindeer Lake is fast becoming a mecca for sportsmen and fishermen.

Topography

Topographically, the Reindeer Lake area is similar to many other places in the Canadian Shield, with flat-topped rock exposures forming hills and ridges above the general level of the lakes, the relief of which seldom exceeds 150 feet. Travelling by canoe, although one might wonder at the wide expanse of Deep Bay (nearly 6½

FIGURE 2. A morphological map of Reindeer Lake south. The height of land surrounding Deep Bay is evident from the drainage pattern.

PLATE II. Mosaic of Deep Bay prepared from aerial photographs taken by the RCAF.

miles in diameter), and the complete absence of islands and scarcity of sheltered beaches along its margin, it is unlikely that the near perfect circularity of the bay would be noticed. From an aircraft, flying at a considerable height, these unique features are immediately apparent and stand out in marked contrast to the main body of Reindeer Lake, with its numerous islands and irregular bays and shorelines. The contrast in topographic expression of the Deep Bay region as compared to that of the southern part of Reindeer Lake is clearly illustrated in Figure 2 (*see also* Plate II).

Details of the topography can best be seen from the one mile to one inch map (in pocket) prepared by the Topographical Survey of Canada, which gives elevations and water depths contoured at intervals of 50 feet. The surface elevations, determined photogrammetrically, vary from about 1,106 feet above sea level, the height of Reindeer Lake, to 1,520 feet, the height of the highest point in the map area, which is located about half a mile inland from the eastern shoreline of Deep Bay. Contours of the water depths are based on echo soundings recorded along eleven boat traverses (Figures 3 and 4) of the bay during the summer of 1956 and on results of direct measurements taken through the ice during the winters of 1959 and 1961. Professor D. S. Rawson kindly provided data he collected in a study of Reindeer Lake

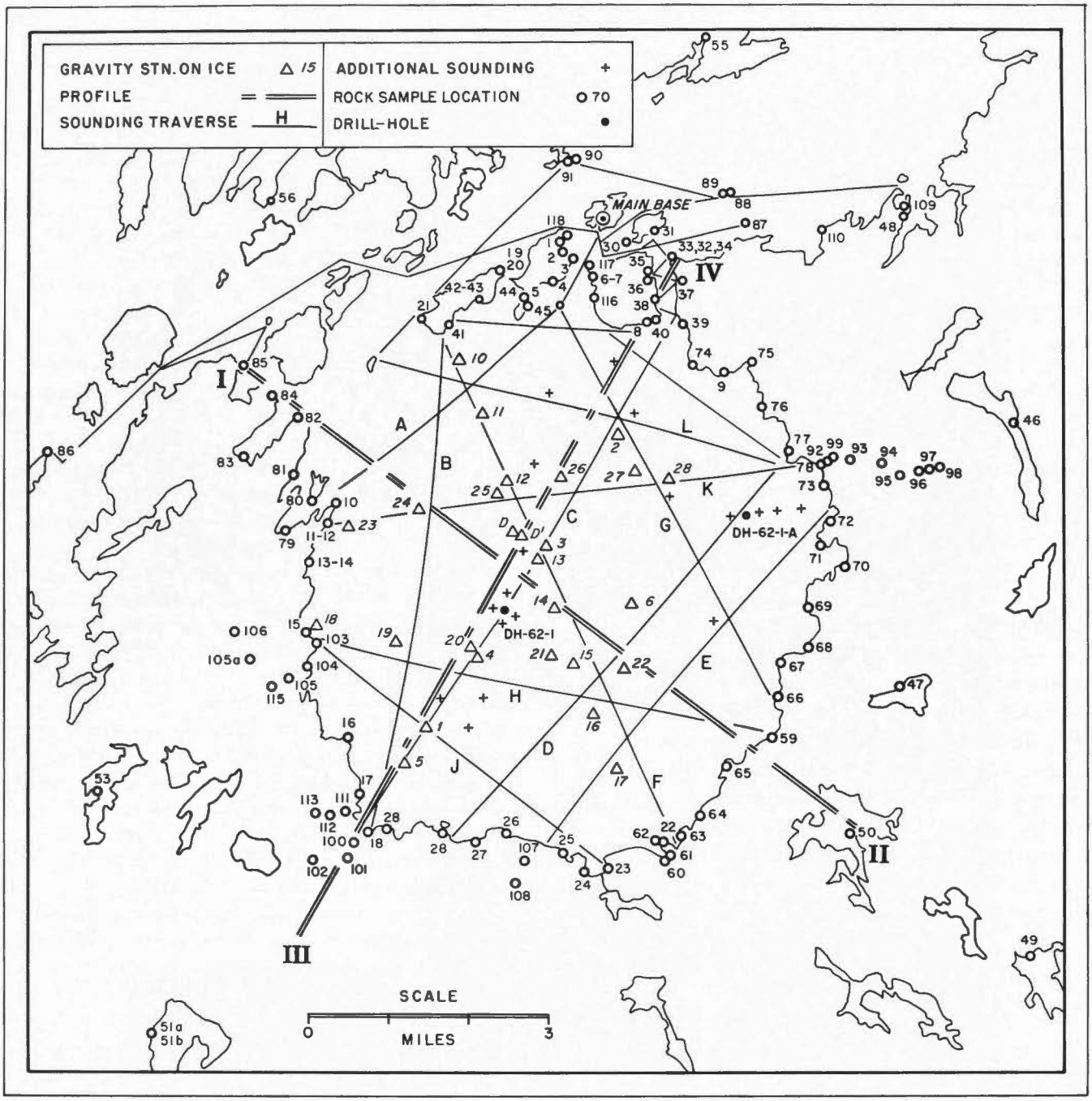

FIGURE 3. Location map of survey operations.

in connection with the fishing industry and these have been used to supplement and verify data obtained by echo sounding.

The soundings show that Deep Bay is a non-symmetrical basin with an average depth of about 500 feet. The deepest part forms an arcuate or kidney-shaped depression about one mile wide and five miles long lying to the east and south of the centre of the bay and reaching a maximum depth of 720 feet. The lowest part of the floor, therefore, has an elevation of 386 feet above sea level and lies approximately 1,130 feet below the highest surface elevation in the vicinity. In striking contrast the main body of Reindeer Lake has few recorded depths greater than 150 feet, and has an average depth of less than 100 feet.

The Effects of Glaciation

The region shows much evidence of having been overridden by huge masses of glacial ice that radiated from the great Keewatin ice centre west of Hudson Bay. The area is made up of irregular hummocky hills and discontinuous ridges, between which the depressions

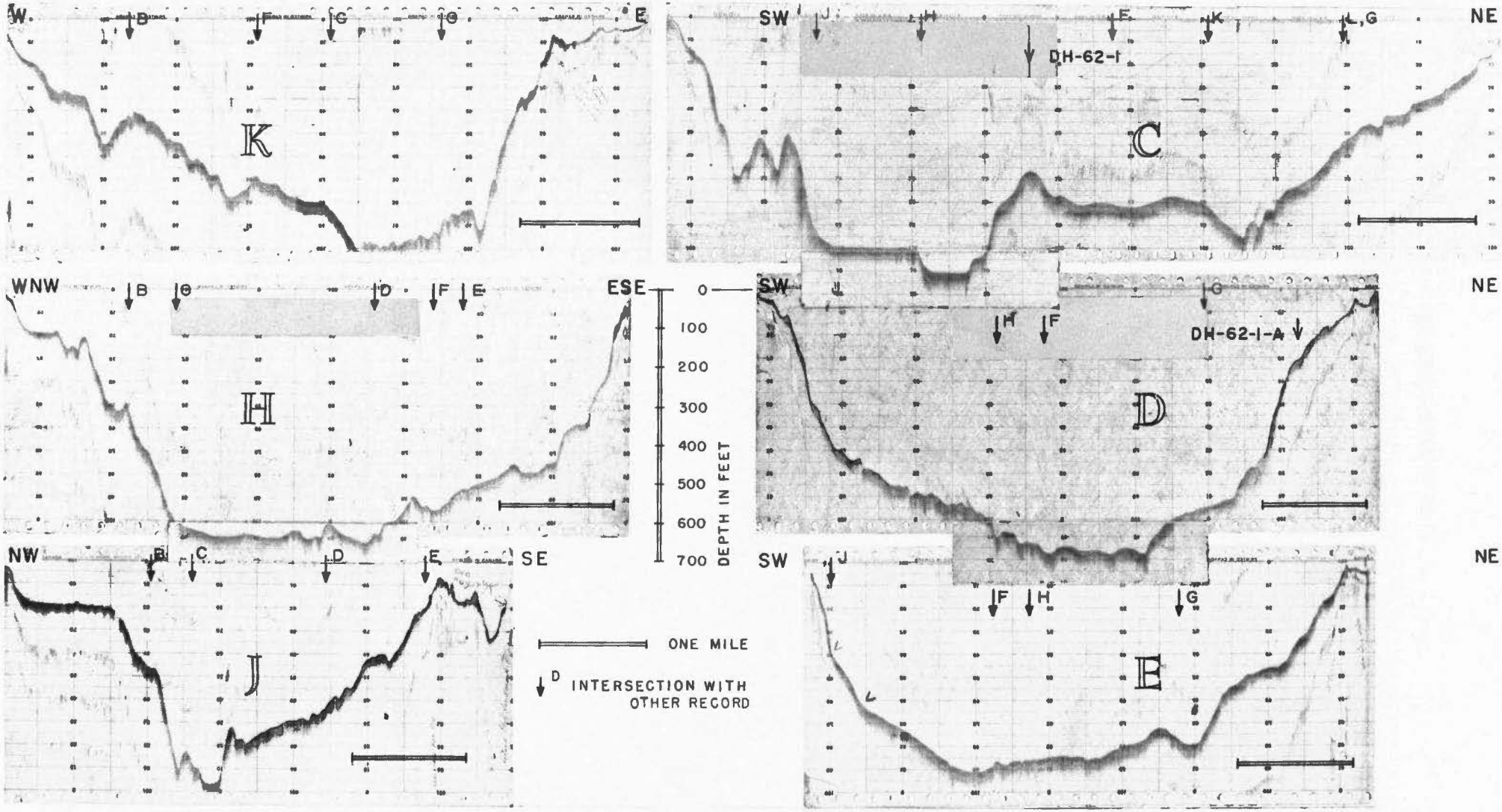

FIGURE 4. Depth recordings for boat traverses C, D, E, H, J and K.

are occupied by lakes varying in size and shape, and by boulder drift and swamp and muskeg. Glacial striae, well preserved in the granitic rocks and indicating that the ice advanced from the northeast, vary from north 15 degrees east to north 30 degrees east near Deep Bay. Erosional and depositional processes of the glacial ice, without doubt, have played the major role in reducing the topography of the Deep Bay crater to its present form. The intense fracturing of the rocks forming the rim, would permit, with the onset of glaciation, penetration and freezing of water along joint planes and fractures. This in turn would promote wedging out of the rock from its normal position, and facilitate erosion. The southwestern rim of the crater would be reduced most rapidly by heavy grinding and scouring as it would present an almost vertical scarp to the advancing ice sheet. On the other hand, the glacier would tend to ride up over the northeastern rim and here plucking probably has been the most effective mechanism of erosion.

Although deeply eroded, much of the bedrock portion of the rim remains and stands on the average about 270 feet above the waters of the bay. The present rim diameter, as marked by the height of land surrounding the bay is about 8½ miles. As with the Brent crater (Millman, Liberty, Clark, Willmore, and Innes, 1960) the drainage pattern of the Deep Bay area is both concentric and radial, and with the exception of three broad channels into Reindeer Lake along the northern side, the drainage is restricted to short intermittent streams no greater than two miles in length. The drainage pattern is clearly illustrated also in Figure 2.

The rim is best preserved along the eastern and southeastern side of the crater, partly because glacial action tends to accentuate the topographic expression of structures that parallel the direction of ice movement but also perhaps because the rocks underlying this area are more resistant. Here the rim stands 400 feet or more above the lake and retains in several places steep and precipitous inner slopes (*see* Plate IIIA centre spread). The original rim diameter has been estimated (Innes, 1961) to have been about 40,000 feet (7.57 miles) on the assumption that the present shoreline of Deep Bay, having a mean diameter of 6½ miles, represents the sectioning of the crater at its original ground level. On this basis Baldwin's (1949) formulae relating crater depths and rim heights with diameter, would place the floor of the Deep Bay crater at a depth of 2,100 feet and the original rim at a height of 1,500 feet with respect to the present surface of the lake. (*see* Figure 5).

Another topographic feature of considerable interest is what appears to be a pre-glacial valley extending in a southwesterly direction from the bay. Another valley which trends northeasterly from a point on the bay diametrically opposite, may prove to be a continuation of the southwesterly one. The approximate locations of these valleys are indicated by the shading in Figure 6, which shows the linear and fracture pattern in considerable detail. The valleys are now occupied by glacial deposits and small lakes and streams.

Wide sand beaches of fine-grained sand occur where these valleys enter Deep Bay. The southwest beach carries both garnet and magnetite sands which have been concentrated by wave action (*see* Plates IIIB, IIIC, centre spread). Along this beach and as far as three miles to the east shale pebbles occur in the sands. The greatest concentration of these pebbles and boulders, which range from one inch or less up to ten inches in diameter, occur on the southwest beach. Eastward from this beach the size and number of pebbles rapidly diminish. Shale pebbles in minor amounts also were noted in the drift in the valley to the southwest.

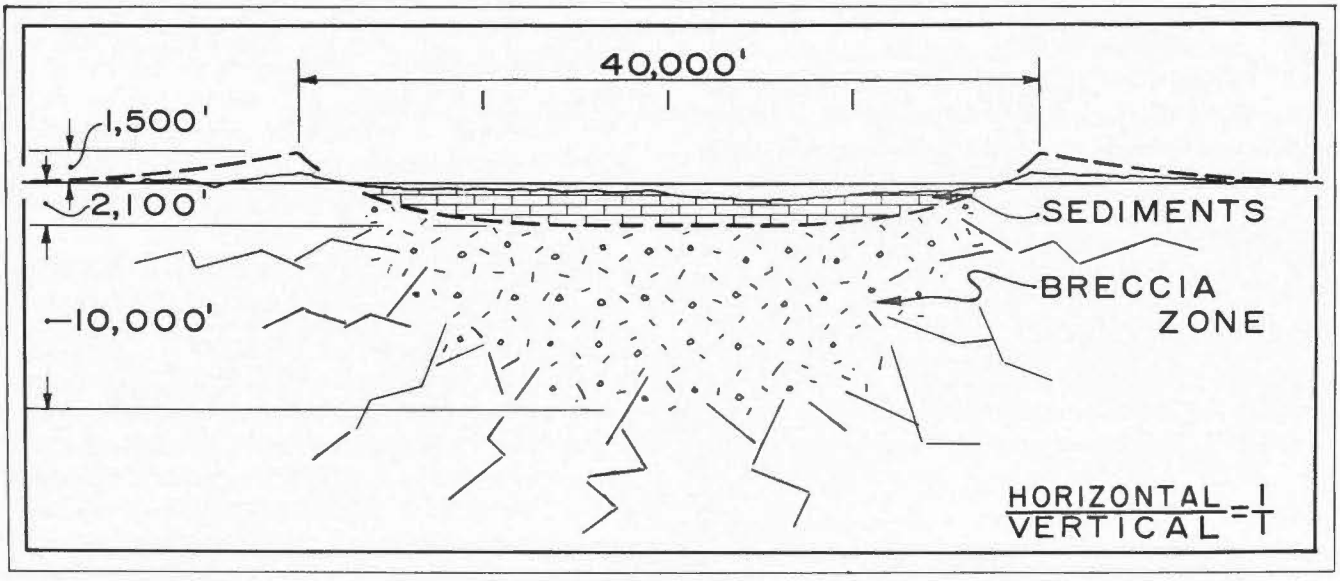

FIGURE 5. Section of typical meteorite crater of the size of Deep Bay, based in part on Baldwin's (1949) depth-diameter relationship.

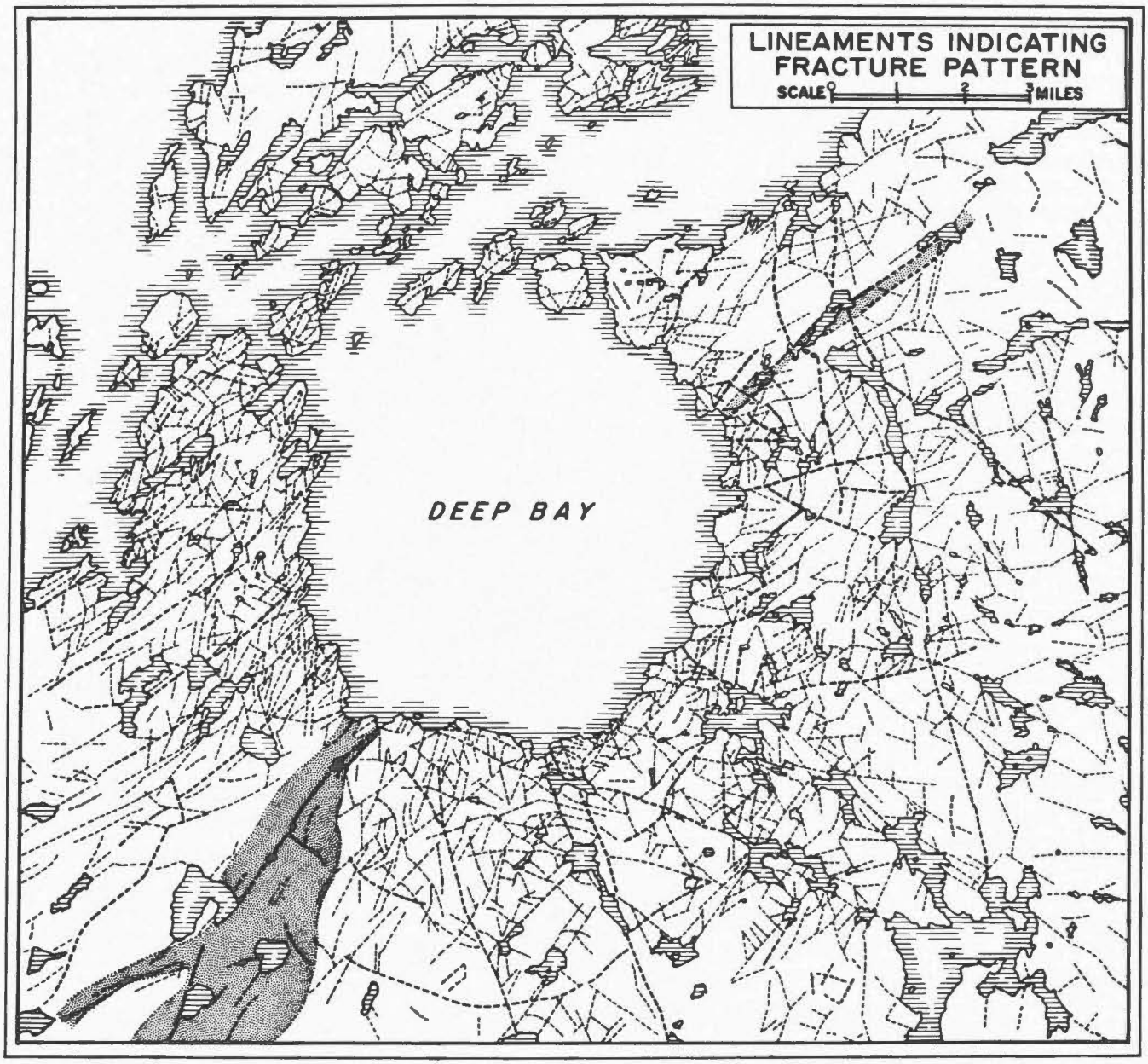

FIGURE 6. Fracture pattern surrounding Deep Bay, on the basis of photo interpretation.

The shale on sectioning was found to carry fossils which appeared to be fish scales, and abundant spores and pollen grains. Presence of the shale posed a problem, for nowhere in the Reindeer Lake area or to the north or northeast has this rock type been observed. Dr. D. J. McLaren of the Geological Survey of Canada kindly had specimens of the shale examined petrographically and for faunal and floral evidence by which the shale could be dated. The conclusions reached are summarized as follows:

1. The rock is a quartzose shale, rich in organic matter and unmetamorphosed.
2. Its age is likely Mesozoic, probably late Jurassic or Cretaceous.
3. It was deposited in a marine environment but presumably not far from shore.

As there are no known occurrences of this rock type within hundreds of miles, the most likely explanation for its presence is that it has been derived from deposits of shale within the bay itself. As will be discussed in a later section the presence of shale in situ near the centre of Deep Bay has been confirmed by drilling but as yet the total thickness of the sedimentary column is not known. The estimate of 2,100 feet for the depth of the crater floor below the original ground level suggests the sedimentary rock underlying the waters of Deep Bay may have a thickness of 1,400 feet.

Gilvarry (1960) noting that the present water depth is considerably less than that predicted for an impact crater the size of Deep Bay, incorrectly concludes that the crater is Pleistocene in age and owes its shallow depth to having been formed in a Pleistocene lake, now largely extinct. He presumes that freezing of the water in the crater has protected it from glacial filling and that its original depth has not changed significantly. In this respect he follows a similar argument used by Harrison (1954) to explain the lack of a great thickness of glacial debris in the New Quebec crater. Harrison's explanation is that with the onset of glaciation the crater lake froze over and formed a firm foundation for the over-riding glacier. However it seems probable that the ice within the crater was not entirely stagnant. Although there is some doubt in regard to the exact nature of the movement of glacial ice, whether by plastic flow or a more complex process of rotational slipping, (Lewis, 1949) the ability of glaciers to scour out basins necessitating movement at the base of the mass of glacial ice has long been recognized. There is indirect evidence (Innes, 1964) that the floor of the New Quebec crater has undergone some glacial scouring.

It is probable that prior to the Pleistocene era the Deep Bay crater was totally filled with sedimentary rock and material, and that it owes its present great depth to glacial scouring. Detailed examination of the depth recordings show that for traverses parallel to the direction of glacial movement, the depth traces are characteristically smooth. On the other hand for traverses opposed to the direction of movement, the traces are more complex indicating irregular grooving of the glacial ice. The U-shaped depression as outlined by the arcuate contours near the middle of the bay is most surely the expression of the main flow of glacial ice having been deflected by the granitic walls of the crater, and a convincing demonstration that movement of ice at the bottom of the bay took place. It is of interest to compare the relief of the floor of Deep Bay with the kidney-shaped lakes occupying the floor of the Brent crater from which an estimated 200 feet of Palaeozoic sediments have been removed by glacial action (Millman, Liberty, Clark, Willmore, and Innes, 1960).

General Geology

General Statement

The rocks of the Deep Bay area are well exposed in the vicinity of the shoreline and rim and are all of Precambrian age, (*see* geological map in pocket and Table 1). The oldest rocks are an assemblage of metamorphic gneisses of sedimentary origin which trend in a northeasterly direction across the northwest half of the area. For purposes of description these have been divided into three main groups—biotite gneisses, hornblende gneisses, and calcareous gneisses. A unit of migmatitic rocks underlies the southeastern half of the area and includes lesser amounts of granitic rocks, pegmatites, augen and biotite gneisses. The geological boundary between the migmatites and gneissic unit to the northwest is gradational in most places. The granitic rocks, including granodiorite, granodiorite gneisses, pegmatites, and migmatite occur along the northwestern and northern sides of the bay. The contact between the granitic unit and gneisses to the southeast is arbitrary. Some of the granitic rocks of this group are definitely intrusive while others appear to be the products of granitization. Both the granodiorite and metamorphic gneisses are cut by pegmatites which may in part be related to the granitic intrusion and in part the result of metamorphic segregation.

TABLE 1

TABLE OF GEOLOGICAL FORMATIONS

Cenozoic (Pleistocene and Recent)	Glacial drift	Gravel, sand, boulder clay
Mesozoic	Sedimentary rocks	Unmetamorphosed quartzose shale
		Major unconformity
PRECAMBRIAN	Granitic rocks	Pegmatite, granodiorite, granodiorite gneiss, migmatite
	Migmatite	Migmatite, granitic rocks, pegmatite, augen gneisses, biotite gneiss
	Metamorphic gneisses	Gradational and intrusive contact
		Calcareous gneisses—hornblende pyroxene, gneiss, carbonate-pyroxene-hornblende gneiss, calcareous feldspathic quartzite, leucocratic calcareous quartz-feldspar gneiss
		Hornblende gneisses—hornblende-biotite gneiss, hornblende—garnet gneiss.
		Biotite gneisses—biotite-garnet gneiss, biotite gneiss.
		Feldspathic metasediment

For purposes of description the three main groups of metamorphic gneisses have been further subdivided as follows:

(i) *Biotite Gneisses*
  1) Biotite-garnet gneisses
  2) Biotite gneisses

(ii) *Hornblende Gneisses*
  1) Hornblende-garnet gneisses
  2) Hornblende-biotite gneisses

(iii) *Calcareous Gneisses*

1) Hornblende-pyroxene gneiss
2) Carbonate-pyroxene-hornblende gneiss
3) Leucocratic calcareous feldspar-quartz gneiss
4) Calcareous feldspathic quartzite.

The biotite gneisses make up the major part of the metamorphic gneisses with the hornblende-bearing gneisses occurring only as thinner layers interlayered with the biotite variety. For this reason the biotite and hornblende gneisses are mapped as one unit. The calcareous gneisses occur to the north-northeast side of the bay as a well-defined unit.

The feldspathic metasediment was only observed on the north end of an island in Numabin Bay to the west of Deep Bay. This rock type has been intruded by granitic rock which forms the outcrop on the remainder of the island. The metasediment is a fine-grained light buff weathering rock composed essentially of feldspar and quartz. The unit has been strongly sheared and foliated with the foliation striking north 40° east and dipping vertically. Irregular pegmatites cut the metasediment and stringers and lenses of quartz parallel the foliation which appears to be parallel to the original bedding.

The Biotite Gneisses

The presence of garnet is the main distinguishing feature between the biotite-garnet gneiss and the biotite gneiss. The biotite-garnet variety is by far the most abundant and is interlayered with the non-garnetiferous type and the hornblende-bearing gneisses. The biotite-garnet and biotite gneisses vary in grain size from fine to coarse with garnet porphyroblasts attaining a diameter of up to 10 mm. The gneissic structure is generally pronounced, with alternation of biotite-rich layers and ones with abundant quartz and feldspar. Some of the layering is also due to the concentration of garnets in layers up to two inches wide. Commonly the gneissosity is accentuated by the *lit-par-lit* arrangement of narrow stringers and layers of granitic and pegmatitic material. The variation in the amounts of biotite in the different layers gives them different shades of grey ranging from light to dark. Foliation is developed by the parallel orientation of the biotite flakes and is parallel to the gneissosity. Quartz, feldspar, biotite, and garnet are the main constituents. Some non-garnetiferous biotite gneiss layers carry blue quartz. Graphite is present in nearly all these gneisses. A modal analysis of six specimens of the biotite gneisses is given in Table 2.

Microscopically the biotite gneisses have a granoblastic texture in which the quartz and plagioclase generally form a wavy granulitic fabric or a simple mosaic. The biotite nearly always shows pronounced parallel orientation with concentration into definite layers. In some layers the larger grains of quartz and plagioclase are flattened and elongated in the direction of gneissosity and foliation. Grain size ranges from 0.2 to 4 mm with garnets attaining a diameter of 6 mm. The main constituents of the dark layers are quartz, plagioclase and biotite and of the lighter layers quartz and plagioclase. Garnet may be confined to the darker layers, concentrated in definite garnetiferous layers or evenly distributed throughout the rock. The average garnet constituent of the garnetiferous-biotite gneiss is about 9 per cent. Minor amounts of apatite, zircon, and graphite are common to nearly all of these gneisses, while pyrrhotite and pyrite occur in the gneisses in zones of shearing.

TABLE 2.—A MODAL ANALYSIS OF BIOTITE GNEISSES

Slide	P-4R	P-8R	P-9R	P-13R	P-16R	Av.	P-15R
Minerals	%	%	%	%	%	%	%
Quartz	30	38	41	34	33	35	34
Plagioclase	40	29	35	34	48	37	47
Biotite	19	22	20	21	13	19	16
Garnet	10	11	4	1	7	9	
Apatite	×	×	×		×	×	×
Zircon		×	×	×	×	×	
Graphite	1	×	×	×	×	×	3
Magnetite	×					×	
Pyrite	×					×	
Pyrrhotite							×

× = present in minor quantity, <1%
Slides P-4R, −9R, −8R, −13R, −16R—Biotite garnet gneiss
Slide P-15R—Biotite gneiss.

The plagioclase is oligoclase or andesine with anorthite content ranging from An_{28} to An_{40}. The plagioclase is often altered to sericite or sussurite. The quartz is commonly strained and contains microscopic inclusions and bubbles aligned into strings or strains. The biotite is a deep reddish-brown, strongly pleochroic and commonly contains pleochroic halos which surround zircon inclusions. In some cases the biotite shows alteration to penninite and magnetite. Graphite replaces whole lamina in some biotite grains. The garnets generally have a poikiloblastic texture.

The Hornblende Gneisses

The hornblende gneisses form but a small proportion of the unit on the map representing the biotite and hornblende gneisses. There are two main types in the hornblende-bearing group, the hornblende-biotite gneiss, and the hornblende-garnet gneiss.

The hornblende-biotite gneiss is fine to medium grained with alternation of hornblende-rich layers and those of essentially a quartz-feldspar composition. The layers, which vary from grey to dark grey in color depending on the mafic mineral content present, range from 1/10 inch to two inches in thickness. A distinct foliation parallels the layering and the hornblende shows pronounced lineation. Megascopically the gneiss contains hornblende, feldspar, quartz, and minor biotite.

Microscopically, the hornblende-biotite gneiss has a granoblastic texture with the quartz and feldspar forming a simple mosaic and the hornblende and biotite aligned parallel to the gneissosity. There is a wide variation in grain size between the different layers. In the hornblende-biotite layers it ranges from 1 mm to 2 mm while in the quartz-feldspar layers from 2 mm to 4 mm.

Table 3 gives a modal analysis of each of the hornblende gneisses. The hornblende is distinctly pleochroic from green to greenish brown. The plagioclase, which is partly altered to sericite and to a lesser degree to carbonate and muscovite, is oligoclase with an anorthite content of An_{28}. The biotite, which is essentially concentrated in the hornblende-rock layers, is strongly pleochroic from straw yellow to brown. The larger quartz grains show strain and contain strings of microscopic inclusions. The minor constituents include apatite and zircon which occur as euhedral to subhedral grains.

TABLE 3.—A MODAL ANALYSIS OF HORNBLENDE GNEISSES

Rock Type	Hornblende-biotite gneiss	Hornblende-garnet gneiss
Slide	P-49 R	P-113 R
Minerals	%	%
Quartz	32	3
Plagioclase	43	38
Hornblende	17	55
Biotite	7	
Muscovite	×	
Garnet		3
Carbonate	×	×
Apatite	1	
Zircon	×	×
Magnetite		1

× = present in minor amounts, <1%

The hornblende-garnet gneiss is a fine- to medium-grained, well layered gneiss in shades of grey to black. The gneiss has a granular, sugary-looking texture and is quite dense. A foliation parallels the gneissic structure, but lineation of the hornblende in the foliate plane is not pronounced. Megascopically the rock consists essentially of hornblende and feldspar with lesser amounts of quartz and garnet. The size of the garnets average about 1/16 inch in diameter.

Microscopically, the hornblende-garnet gneiss has a granoblastic texture with the feldspar and quartz forming an equigranular mosaic. The hornblende grains have subparallel orientation parallel to gneissosity. Grain size varies from .75 mm to 2.5 mm. In the darker layers hornblende and plagioclase form 93 per cent of the rock with quartz and garnet together with minor constituents —magnetite, zircon and carbonate—forming the remainder.

The hornblende is a brown variety, strongly pleochroic, with pleochroic halos around fine zircon inclusions. The plagioclase, which has an anorthite content of An_{28}, shows minor alteration to sericite and carbonate. The garnets are small and occur as rounded and subhedral forms and they are usually free of inclusions. Magnetite occurs interstitially and replaces both plagioclase and hornblende.

The Calcareous Gneisses

This group of gneisses occurs in an east-northeasterly trending belt on the north-northeast side of the bay and consists of four types, namely:

(i) hornblende-pyroxene gneiss

(ii) carbonate-pyroxene-hornblende gneiss

(iii) leucocratic calcareous feldspar-quartz gneiss

(iv) calcareous feldspathic quartzite.

The carbonate-pyroxene-hornblende gneiss forms the greater portion of these.

The hornblende-pyroxene gneiss occurs interlayered with the carbonate-pyroxene-hornblende variety and is generally fine to medium grained and only moderately gneissic. The layering consists of grey to dark grey layers ranging in thickness from 1/16 inch to one inch and are generally lenticular. Some of the lighter layers or lenses are stained a rusty color. The gneiss consists essentially of hornblende, pyroxene, feldspar, and quartz. In hand specimens the mafic minerals are not easily differentiated. A modal analysis of the different types of calcareous gneisses is given in Table 4.

TABLE 4.—A MODAL ANALYSIS OF CALCAREOUS GNEISSES

Slide	P5-R	P-6R	P-7R	P-48R	P-33R
Minerals	%	%	%	%	%
Quartz	27	1	1	39	57
Plagioclase	42	21	27	45	31
Microcline					7
Biotite	1			1	1
Muscovite					×
Hornblende	19	77	4		7
Pyroxene	10		10		
Carbonate		1	57	2	3
Epidote	1				
Apatite	×			1	
Sphene			1	4	×
Zircon	×			×	
Graphite	×				3
Magnetite		×		×	
Pyrrhotite				×	
Pyrite		×			×

× = present in minor amounts, not estimated.
Slide P5R Hornblende-pyroxene gneiss
Slide P-6R, P-7R Carbonate-pyroxene-hornblende gneiss
Slide P-48R Leucocratic-calcareous-feldspar-quartz gneiss
Slide P-33R Calcareous feldspathic quartzite.

Microscopically the gneiss is a granoblastic aggregate of plagioclase, quartz, hornblende, pyroxene, and minor biotite with epidote, apatite, zircon, and graphite as minor constituents. The hornblende possesses only a subparallel orientation, while that of the biotite is pronounced. The grain size varies from 0.5 mm to 3 mm. The plagioclase is andesine with an anorthite content of An_{40}. It shows moderate alteration to sericite, chlorite, and carbonate and carries inclusions of hornblende and quartz. The hornblende is of the greenish brown variety, strongly pleochroic and contains pleochroic halos produced by fine zircon inclusions. The quartz shows moderate strain and contains microscopic inclusions commonly found in the quartz of nearly all the gneisses of the area. The biotite is a deep reddish-brown and strongly pleochroic.

The carbonate-pyroxene-hornblende gneiss is fine to medium grained and is well layered. The layering consists of alternating pale greenish grey, dark grey to black, grey-green and pink to buff layers; the thickness of the individual layers ranges from 2/10 inch to three inches. A distinct foliation parallels the gnessic structure and layering in the dark grey and black layers and the lineation of the hornblende is well developed, while that of the grey-green and pink to buff layers is poorly developed.

Microscopically the textures of the different layers is granoblastic with the hornblende in the dark bands showing a linear orientation in the foliate plane. The dark layers consist essentially of hornblende with plagioclase and minor amounts of quartz, epidote, magnetite, and pyrite, while the grey-green layers are composed of plagioclase, pyroxene, carbonate, a small amount of hornblende and minor amounts of quartz and sphene. The pink and buff layers consist mainly of calcite with a minor amount of diopside. The grain size in the grey-green and dark layers ranges from 0.2 mm to 1 mm, while in the pink and buff layers the calcite grains may attain a size of 6 mm. The plagioclase in all the layers is almost entirely altered to saussurite, clinozoisite, sericite, chlorite, and carbonate. It is considered to have a composition of andesine. The hornblende in the black layers is a brown variety, while that in the grey-green is greenish brown and moderately pleochroic. The pyroxene is very pale green to colorless diopside and is partly replaced by hornblende. The sphene when present occurs as rounded to anhedral grains.

The leucocratic calcareous feldspar-quartz gneiss was observed about three miles to the east in a bay off the north shore. It is a medium-grained, light grey to grey, faintly gneissic rock. Megascopically the rock contains feldspar, quartz, hornblende, and carbonate.

Microscopically the gneiss has a granoblastic texture, the quartz and feldspar forming an equigranular mosaic with sutured boundaries between the larger quartz grains. The hornblende has a subparallel orientation and is roughly concentrated into bands. The grain size varies from 1 mm to 3 mm with the larger grains being formed by quartz. The minerals in their order of abundance are plagioclase, quartz, hornblende, sphene, and carbonate. Minor constituents include apatite, zircon, magnetite, pyrite, graphite, and epidote. The oligoclase with an anorthite content of An_{27} is partly altered to sericite, clinozoisite, and carbonate. The hornblende is a green variety with small pleochroic halos. It shows replacement by carbonate, epidote, and vermicular growths of quartz. The carbonate occurs as interstitial grains throughout the slide. The sphene, which is comparatively abundant, is present as subhedral grains up to 1.5 mm in length. The apatite and zircon occur chiefly as small rounded inclusions.

The rock classified as calcareous feldspathic quartzite occurs mainly along the northern side of the calcareous rock unit. The width of the quartzitic layer was not measured but it is estimated that it is at least ten to fifteen feet thick where it outcrops on the northeast point of the mainland opposite the large square shaped island. Original bedding is apparent for it appears that some of the beds were more calcareous than others and have been dissolved out on the weathered surface where it is washed by the waters of the lake, leaving the more siliceous beds standing out in relief. The rock which is fine to medium grained weathers grey to white with rusty staining in places. Macroscopically it consists of quartz, feldspar, and carbonate with lesser amounts of graphite and pyrite.

Microscopically the rock consists of a granoblastic aggregate of quartz and feldspar with graphite and carbonate and minor amounts of biotite, muscovite, sphene, and pyrite. The quartz and feldspar form a wavy mosaic fabric in which the largest quartz grains show elongation parallel to bedding.

The quartz is strained and contains grains of microscopic inclusions. The feldspar consists of oligoclase with an anorthite content of An_{28} and of microcline. The plagioclase is moderately altered to sericite and muscovite. The carbonate is interstitial and the graphite flakes have a subparallel orientation. Biotite, which is present as a minor quantity, is of the reddish-brown variety. The sphene occurs as subhedral grains. Pyrite is interstitial and replaces other minerals.

The Migmatitic Rocks

The unit classified as migmatite consists of biotite gneisses, the greater portion of which has been recrystallized, replaced by, and mixed with quartzofeldspathic material. The rock of this unit varies in grain size from fine to coarse and in color from light to medium grey. The essential minerals are feldspar, quartz, and biotite. The biotite content remains fairly uniform ranging from 17 to 30 per cent. Garnet may or

PLATE IA

PLATE IB

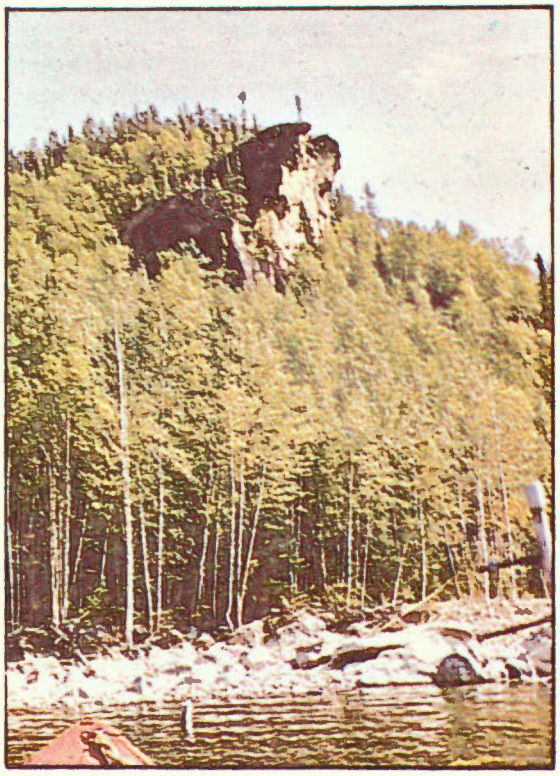

PLATE IIIA

PLATE IIIB

PLATE IIIC

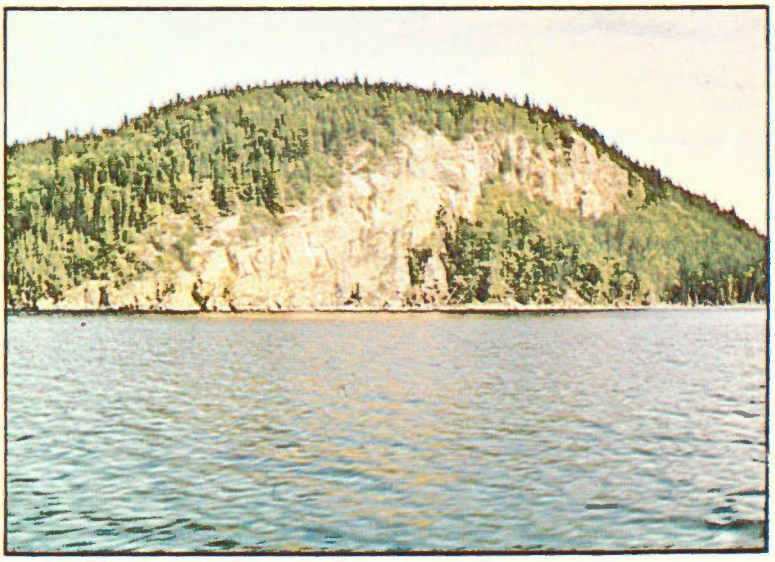

PLATE V

PLATE IA

A view of Reindeer Lake looking southeast; Deep Bay can be seen in the upper right.

PLATE IB

Air photograph of islands near south end of Reindeer Lake.

PLATE IIIA

Vertical rock scarp facing Deep Bay on eastern shoreline.

PLATE IIIB

Wide sand beach along southwest shoreline of Deep Bay.

PLATE IIIC

Concentration of limonite at eastern end of southwest beach.

PLATE V

Vertical scarp forming wall of eastern channel between Deep Bay and Reindeer Lake.

PLATE VIA

Typical shoreline, showing vertical and radial fractures.

PLATE VIB

Rectangular blocks formed by horizontal and vertical jointing along east wall of the crater.

PLATE VIC

Angular blocks, essentially in place fifty feet above lake level, along north shore of the crater.

PLATE VIA

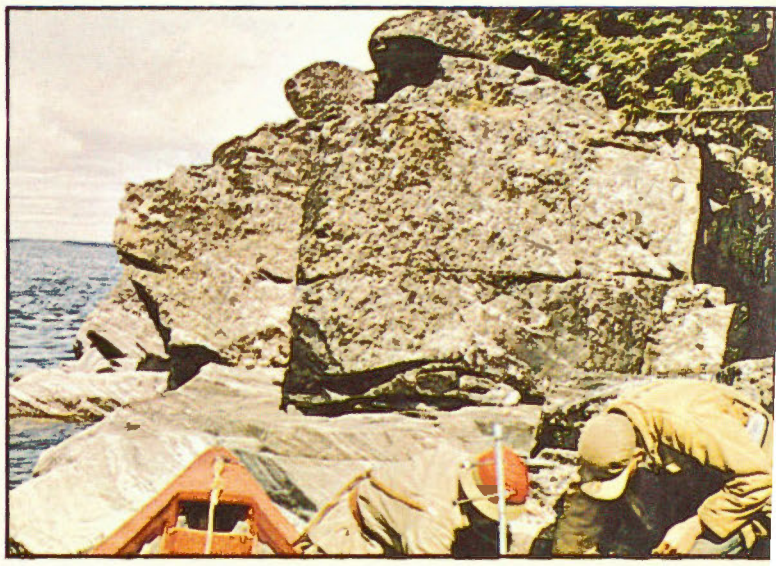

PLATE VIB

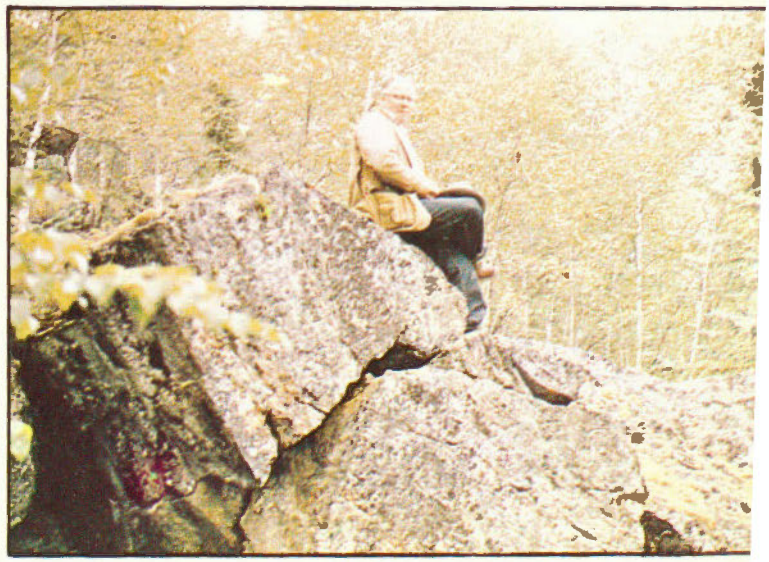

PLATE VIC

may not be present. In the coarser phases of the migmatite porphyroblastic feldspar augen occur, which vary from 1/8 inch to one inch in length. The migmatite generally shows a foliation produced by biotite and a gneissic structure is formed by narrow, elongated layers of the original rock, lenses and layers of recrystallized material and layering produced by metamorphic segregation. Inclusions of the biotite gneisses generally retain an orientation parallel to the regional gneissosity. However, some inclusions may show rotation, indicating mobilization of the introduced material.

TABLE 5.—A MODAL ANALYSIS OF SPECIMENS FROM MIGMATITE ZONE

Slide	P-23R	P-29R	P-63R	P-65R	P-69R	P-73R
Minerals	%	%	%	%	%	%
Quartz	33	28	36	24	35	39
Plagioclase	48	38	32	51	34	41
Microcline				×	6	1
Biotite	17	28	30	18	23	18
Muscovite					1	1
Hornblende				4		
Garnet	2	6				×
Sillimanite	×					
Carbonate	×					×
Epidote				3		
Apatite		×	×	×		×
Sphene				×		×
Zircon	×	×	×		×	
Graphite		×	×		1	×
Magnetite	×	×				

× = present in minor amounts, <1%
P-23R, P-29R—porphyroblastic augen migmatite.

Microscopically the migmatite has a granoblastic texture with quartz and feldspar forming a simple mosaic and the biotite having a subparallel to pronounced foliate arrangement, varying from one area to another within the unit. The variation in grain size is wide, ranging from 1 mm to 5 mm. Table 5 gives the mineral composition of six specimens from the migmatite zone.

Of the six specimens from the migmatite zone all contain oligoclase plagioclase with anorthite contents ranging from An_{25} to An_{30} and three contain microcline. The quartz in general shows strain, contains inclusions and frequently has sutured boundaries. Both the large feldspar and quartz grains contain inclusions of other minerals. The reddish brown variety of biotite is most common, but dark brown and greenish brown varieties are present in some sections. The biotite in nearly all the slides contains pleochroic halos. Muscovite occurs in two sections and hornblende was noted in only one. It was of the green variety and strongly pleochroic. The garnets have a poikiloblastic structure and range in size from $\frac{1}{16}$ to $\frac{1}{2}$ inch in diameter. Section P-23R contains sillimanite which occurs as fine needles associated with quartz. Apatite, zircon, and graphite are common minor constituents while carbonate, sphene, and magnetite are less common. Alteration products include sericite after feldspar, penninite after biotite and epidote after plagioclase and biotite.

The Granitic Rocks

The granitic rock unit lies to the extreme north side of the area mapped. This unit includes granodiorite, granodiorite gneiss, pegmatite, and some migmatite. No true granite was observed in the area. The migmatite occurs more or less in the contact zone of the granodiorite with the biotite gneisses.

The largest masses of granodiorite were observed on two large islands at the north edge of the bay. These are considered to be of intrusive origin for they carry inclusions of biotite gneiss which sometimes show rotation with respect to the gneissosity of the gneisses in the immediate area. To the north and west of the granodiorite the rock is mainly granodiorite gneiss which in part at least is the product of granitization.

The granodiorite is a medium- to coarse-grained pinkish grey rock which in places is massive, exhibiting no or very minor foliation while in other localities it possesses distinct foliation produced by the parallel alignment of the biotite.

The granodiorite gneisses designated in the geological map are generally medium grained and vary from faintly gneissic to distinctly layered, the layering being produced by the concentration of biotite into definite layers. The major constituents of both the granodiorite and gneisses are quartz, feldspar, and biotite.

TABLE 6.—A MODAL ANALYSIS OF SPECIMENS FROM GRANITIC UNIT

Rock Type	Granodiorite	Granodiorite gneiss
Slide	P-2R	P-90R
Minerals	%	%
Quartz	31	18
Plagioclase	35	23
Microcline	29	24
Biotite	5	33
Muscovite		×
Carbonate	×	
Apatite	×	×
Zircon	×	×
Magnetite	×	2

×—present in minor quantity

Microscopically the granodiorite and gneisses contain quartz, plagioclase, and microcline in a granoblastic mosaic. The orientation of the biotite is random to subparallel in the granodiorite while in the gneisses it is more pronounced. Table 6 gives the modal analysis of two specimens of the granitic rocks.

The main difference between the granodiorite and granodiorite gneiss is the proportion of feldspar and quartz in the grandiorite and the greater amount of biotite in the gneiss where it is more distinctly confined to definite layers. The plagioclase is oligoclase with an anorthite content ranging from An_{20} to An_{29}. Albite, pericline, and carlsbad twinning is common. The microcline exhibits the typical grid twinning. The plagioclase shows considerable alteration to sericite and saussurite in the granodiorite while in some of the gneisses there is alteration to carbonate and muscovite as well. Sericitization of the microcline has taken place to a minor degree. The quartz, which is generally interstitial to the feldspar, shows slight to moderate strain in the granodiorite but in some of the gneisses it is much more pronounced. Strings of microscopic inclusions are commonly present in the quartz of both the grandiorite and granodiorite gneiss. The biotite in the granodiorite is of the reddish brown variety, strongly pleochroic from pale yellow to reddish brown while in the gneisses it may be either dark brown or reddish brown. Pleochroic halos are common. Biotite shows alteration to penninite associated with magnetite. Accessory minerals include apatite and magnetite.

Economic Geology

There are no known mineral deposits of economic importance in the immediate area but there are graphite, pyrite and pyrrhotite occurrences. Graphite is a common minor constituent of most of the gneisses, but it occurs as a major constituent in some layers of gneiss within the synclinal structure on the west side of the bay. Here some layers and lenses are estimated to contain as much as 25 per cent graphite. Outcrops carrying these layers weather a yellowish brown to yellow and are easily observed from the air. The gneisses carrying graphite in this structure are highly sheared and foliated. The graphite occurs as flakes lying in the foliate or shear plane. Disseminated pyrite and pyrrhotite are associated with the graphite.

Finely disseminated pyrite and pyrrhotite with some graphite occur in shear zones up to 15 feet wide in a number of zones around the bay. These zones weather a reddish brown to yellowish brown and are conspicuous even at a distance. Areas of mineralization are indicated on the geological map.

Structure

Careful examination of the structural relationships between these various rock types in no way suggests a geological origin for Deep Bay. In the geological investigation, particular attention was paid to mapping structure, to determine if the bay and surrounding rim could have resulted from some form of structural control. As only a reconnaissance geological study has been carried out so far, liberal use of aerial photographs has been made to determine structural and regional trends, lineaments and fracture patterns.

Both foliation and gneissosity are well developed in the gneisses and generally parallel one another, but in certain localities a second foliation has been superimposed. Some of the layering in the gneisses is regarded as being due to the recrystallization of the original sedimentary beds, thus the foliation and gneissosity in all the rock units generally strike in a northeasterly direction and dip from 85 to 40 degrees to the northwest. The general trend (*see* geological map in pocket) is approximately the same on both sides of the bay.

The regional structural trend (Figure 7) is also northeasterly, striking across the bay, thus indicating that the depression forming Deep Bay is not structurally controlled. A prominent structural feature on the west side is a shallow synclinal structure that is abruptly terminated at the shoreline. To the south and east the structural trends indicate complicated folding which bears no relationship to the shape of Deep Bay.

That Deep Bay is the result of a tremendous explosion is clearly indicated by the intense fracturing and shattering of the granitic rocks which is most pronounced in the vicinity of the shoreline. Large-scale fracture zones and fault zones of various widths, now partially obscured by glacial action and deposition, cut radially and obliquely across the rim and persist for several miles from the margin of the bay. Although these are quite difficult to trace from ground observation they stand out quite clearly when seen from an aircraft or from aerial photographs. Deciduous trees, chiefly birch and poplar characteristically tend to flourish in the depressed fracture zones, while coniferous varieties, mainly spruce seem to prefer the ridges and higher terrain.

The most prominent lineaments are shown in Figure 6. Various phenomena such as fractures, faults, bedding planes, schistosity, glaciation and others all have a bearing on their organization and contribute to their pattern. Although the lineaments have a somewhat random arrangement, there are prominent sets which extend for great distances and are more or less radial to the shoreline. These may be attributed to the crater-forming event. One such set of lineaments corresponds to the main channels of the northeast and southwest trending valleys described in the topography. Although it has been suggested that these are preglacial valleys, there is evidence that both valleys may be controlled by large radial faults formed by the explosion and later accentuated by glacial action. Plate IV shows an almost vertical scarp of a fault that parallels the northeastern valley on its northwestern side. Further, in the vicinity of the small lake (*see* topographical map in pocket) about three miles southwest of the bay, a trail follows the southwest valley between two prominent parallel ridges which

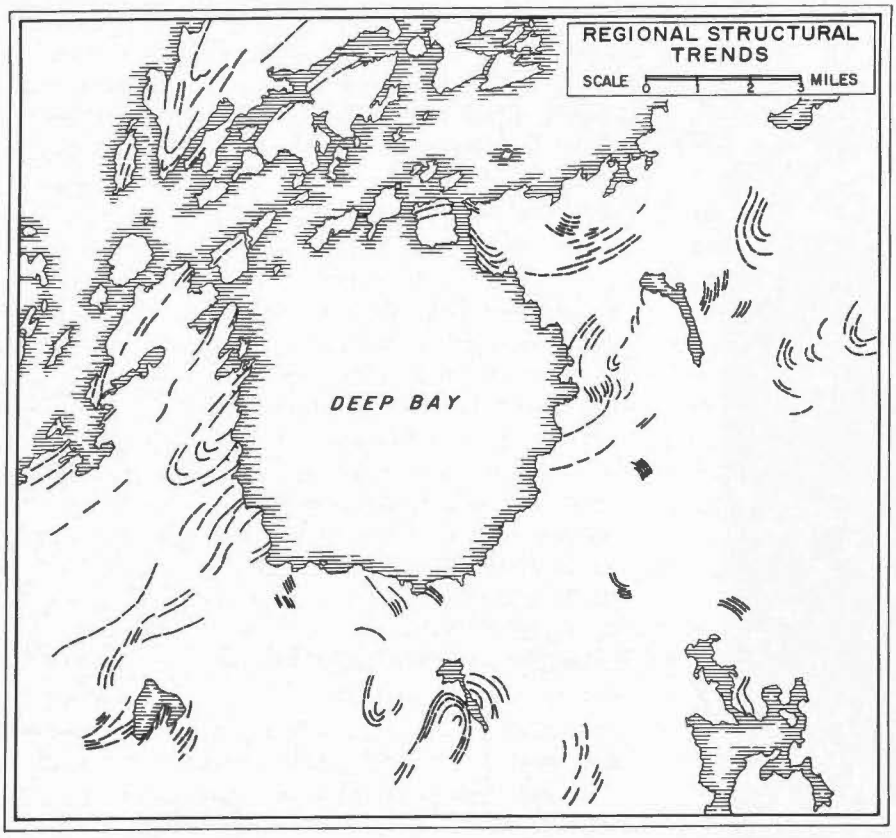

FIGURE 7
Regional structure trends.

rise 100 to 175 feet above the valley floor and which in places are less than one-tenth of a mile apart. A heavy mantle of fine sand drapes both ridges forming slopes varying from about 30 to 45 degrees, the angle of repose for sand. This and the straightness of the depression strongly suggest that these sand ridges are bedrock controlled and that the course of the southwest valley is in fact controlled by a radial fault zone. It seems likely that the channels connecting Deep Bay with the main body of Reindeer Lake to the north also may prove to be the expression of radial faulting. Evidence for such faulting is provided from the abruptly rising rock walls and from water soundings, which, show (*see* topographical map) that the channels, particularly the two eastern ones, are extraordinarily deep. Plate V is a view of the scarp which forms the eastern wall of the eastern channel.

The rocks forming the shoreline of Deep Bay show signs of major shattering and fragmentation (*see* Plates VIA, VIB, VIC, centre spread). A close-set pattern of jointing has been observed in many rock exposures but generally the jointing has resulted in the formation of huge rectangular blocks which decrease in number as the jointing decreases in intensity with increasing distance from the bay. Figure 6 shows the lineaments and the fracture pattern in considerable detail.

A system of concentric fractures is also well developed particularly in that area less than three miles from the shoreline. Perhaps the most prominent feature that may be the expression of such fracturing is a narrow arcuate lake three miles long, located about three miles east of the crater. There is some evidence from the drainage pattern and from the dissected topography that this depressed zone is much longer and circumscribes the whole crater and has a diameter of about 12 miles. Within this area lie the rocks that form the now deeply eroded rim of the crater, with the general appearance of having been shattered into huge blocks by a process involving little or no horizontal movement.

Implications of Structure Data

Nearly 30 years ago, Boon and Albritten (1936) in an attempt to explain generally the salient features of the underlying structure of meteorite craters suggested a concentric pattern of ring synclines and anticlines as one outstanding characteristic of impact structures. The circular fracture zone surrounding the rim of the Deep Bay crater may indeed be identified as a ring syncline in the sense that it is generally a depressed zone, but by no stretch of the imagination is it possible to identify topographical irregularities at larger distances, as outer concentric anticlines and synclines. Without doubt this circular break occurred in response to compressional and tensional stresses set up in the violent action of the crater's formation. It has a diameter of 12 miles, nearly twice the diameter of the present crater at ground level, and roughly marks the outer limit of intense fracturing

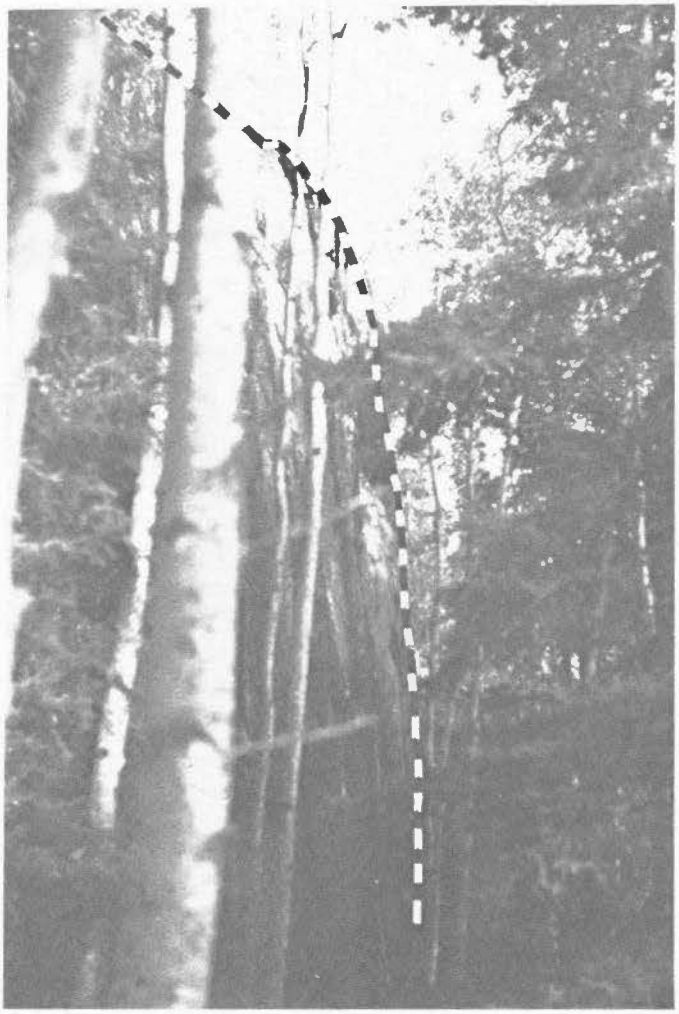

PLATE IV A
Radial fault scarp that parallels northeastern valley.

PLATE IV B
Close-set pattern of rock-fracturing along north shore.

and jointing accompanying uplift of the crustal rocks in the formation of the rim. The fracture zone surrounding the Brent crater (Millman, Liberty, Clark, Willmore and Innes, 1960) is in a much more advanced stage of erosion but nevertheless careful stereoscopic examination of the aerial photographs reveals, particularly on the northeast side of the crater, a partial 'ghost' ring or halo having an indefinite diameter of about 20,000 feet. This is also about twice the accepted crater diameter.

The circular fracture surrounding Deep Bay may be analagous to the markings surrounding the lunar maria although these have diameters (150 to 670 km) on a scale much grander than that of Deep Bay. Hartman and Kuiper (1963) interpret the concentric structures surrounding the lunar basins as ring-faults formed at the times of the impacts which formed the basins. Their table which gives the diameters of the lunar concentric systems, indicates that for the smaller basins, the ratio of the diameters of the outer rings to the diameters of the basins vary from 1.9 to 2.2. Interestingly enough the same ratio is found if the dimensions of extremely small impact craters are examined. For example, in experiments to investigate the mechanism and conditions under which shatter cones may be formed by shock from high-speed impact, Shoemaker and Gault (1962) describe a tiny crater, 5 cm in diameter and 1.3 cm deep formed by impact of a spherical aluminum pellet into dolomite. Of interest to this discussion is the fact that the impact also formed an almost completely circular fracture zone having a diameter of 11 cm or 2.2 times larger than this small crater's diameter.

Although it is obvious that circular fracturing must be a consequence of and accompany all cratering by impact, the true nature of the process is not clearly understood. Ring fractures have not been observed at the more recently formed Arizona and New Quebec craters, perhaps largely because of being obscured by overlying drift and unconsolidated material. In view of the interesting comparisons made above and the more advanced stage of erosion at Deep Bay, which permits a view of the rock deformation to a considerable depth, the fracture zone surrounding Deep Bay warrants further careful field examination and possibly diamond drilling.

Geophysical Investigations

The topographical, geological and structural investigations that have been outlined, strongly support the hypothesis that Deep Bay has been formed by meteoritic impact and explosion. If so, the great amount of energy expended in its formation would result in marked changes in the physical properties of the country rock, not only at the point of impact but in the area surrounding the crater. Accordingly geophysical investigations employing magnetic, gravity and seismic methods were carried out in the expectation that they might provide important evidence to test the validity of an explosive origin.

Magnetic Investigations

The total-intensity magnetic map of the Deep Bay area (in pocket) is based upon an aeromagnetic survey carried out by the Geological Survey of Canada. Because of the rugged topography the observations were carried out at a flight altitude of 1,000 feet above general ground level, almost twice the height usually flown in conducting detailed aeromagnetic surveys in the Canadian Shield areas. Nevertheless, the results are equally definitive and in qualitative agreement with the magnetic results obtained at other fossil craters (Millman, Liberty, Clark, Willmore, and Innes, 1960).

It is generally known that granitic gneisses of the Canadian Shield produce highly variable magnetic fields, largely due to concentrations of magnetite crystals in contact zones and along bedding planes. Apparently these crystals become polarized under the influence of the earth's magnetic field during the processes of thermal and dynamic metamorphism in which the rocks were transformed into gneisses. Contours of variations in the magnetic field, therefore, tend to follow the outlined major structural features.

The magnetic field in the Deep Bay area is highly irregular with local disturbances giving rise to steep gradients of as much as 600 gammas per mile, the anomaly contours tending to follow the prominent structural trends of the gneisses. The variation in intensity appears related to the amount of granitic material within the gneisses. Peak anomaly values and also the steepest gradients are produced by the paragneisses that underlie the northwestern half of the crater area; on the other hand the intensities are much lower and uniform over the injection gneisses to the south and east. The most significant feature of the magnetic map is the small and uniform variation in intensity over the central portion of the crater when compared with the anomalies for the surrounding area. Over the bay, the total variation does not exceed 190 gammas with uniform gradients no larger than 50 gammas/mile.

Several factors, all of which are consistent with the hypothesis of an explosive origin, may be mentioned to explain satisfactorily the low magnetic relief associated with the central part of the crater. First of all the aeromagnetic data are influenced by variations in the distance between the magnetic source and the magnetometer. These results are typical of those in areas of deep sedimentation, the widely spaced contours and low gradients being an indication of a considerable depth to the boundaries between rocks of contrasting magnetic properties. While the great thickness of sedimentary material now filling the crater would contribute considerably to the

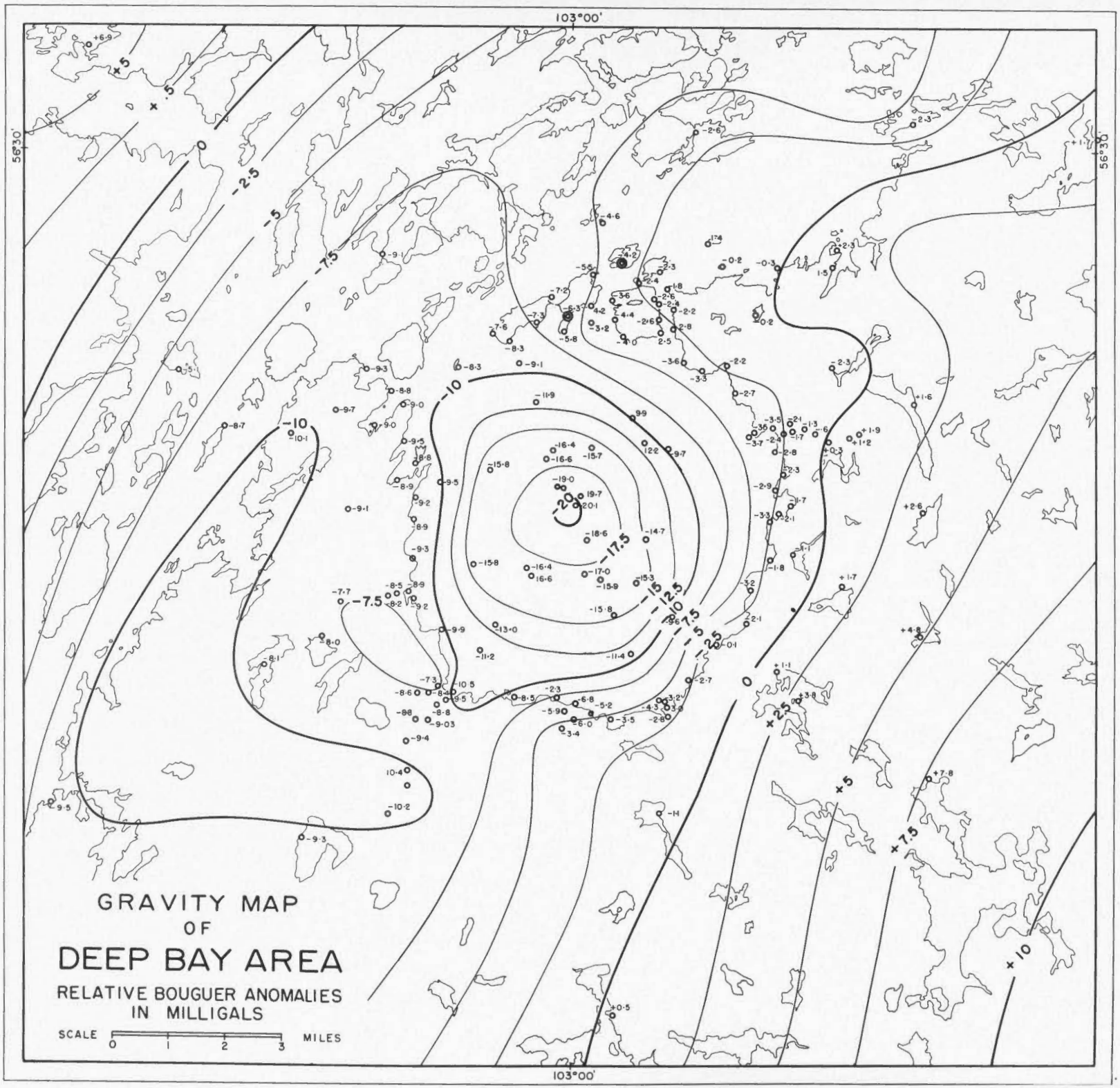

FIGURE 8. Bouguer gravity anomaly map contoured at intervals of 2.5 mgals.

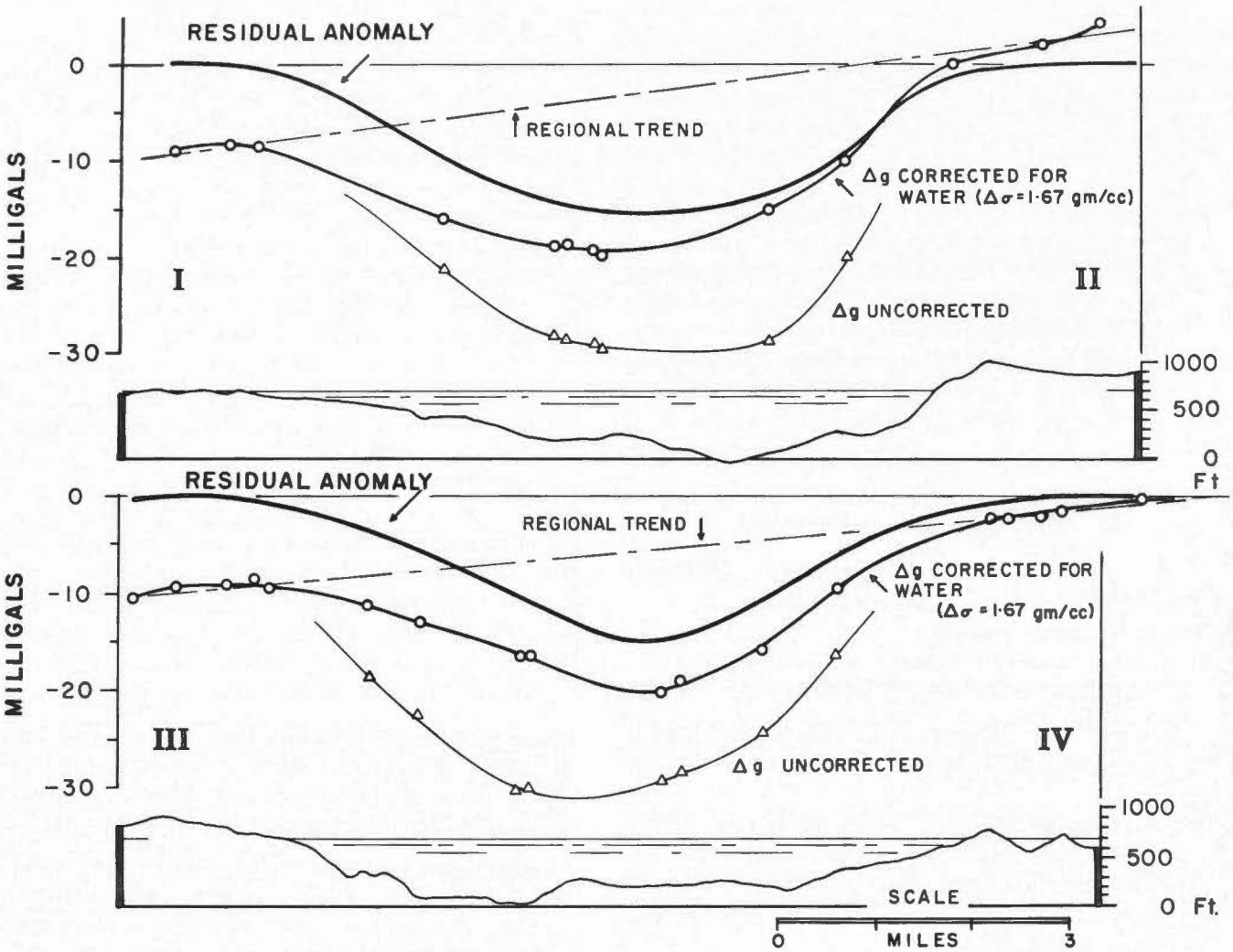

FIGURE 9. Gravity and topographical profiles I—II, and III—IV across Deep Bay.

decrease in magnetic intensity because of its lower and more uniform susceptibility compared to the surrounding gneisses, the great volume of fragmental rock and breccia underlying the sediments most likely is responsible for the major effect. Impact and explosion would disrupt the systematic alignment of the magnetic materials within the gneisses to form a random distribution of poles within the brecciated zone, thus resulting in a general decrease in the magnetic field intensity.

There is evidence that the crater-forming event also disrupted the magnetic pattern beyond the shoreline of Deep Bay. It will be noticed that the low magnetic relief extends about three miles to the southeast of the shoreline of Deep Bay and also northwest to the edge of the map area. The area is underlain by paragneisses that, although disturbed, have suffered very little or no horizontal movement. While no straightforward explanation can be offered without further investigation, it seems possible that the apparent abnormal polarization may be a magneto-mechanical phenomenon, whereby the magnetization of these rocks has been altered as the result of shock. It also seems possible that heat generated by the impact may have been sufficiently high for the rocks to lose their magnetism.

Gravity Results

The gravity anomaly map (Figure 8) and two diametrical gravity profiles (Figure 9) give the important results of the gravity investigation. The rugged terrain and dense vegetation surrounding the crater made the gravimeter operations very difficult and the usual practice of establishing a rectangular array of stations could not be followed. However the gravimeter observations totalling 122 land stations and 27 ice stations seem plentiful enough to provide a clear picture of the main variations in the gravitational field over the crater and vicinity. While conventional gravimeters were used to observe the land stations, a thermostatically controlled Worden gravimeter with greater than usual damping characteristics and a specially constructed eyepiece for averaging the readings was employed for the measurements during the winter from the ice surface of the Bay.

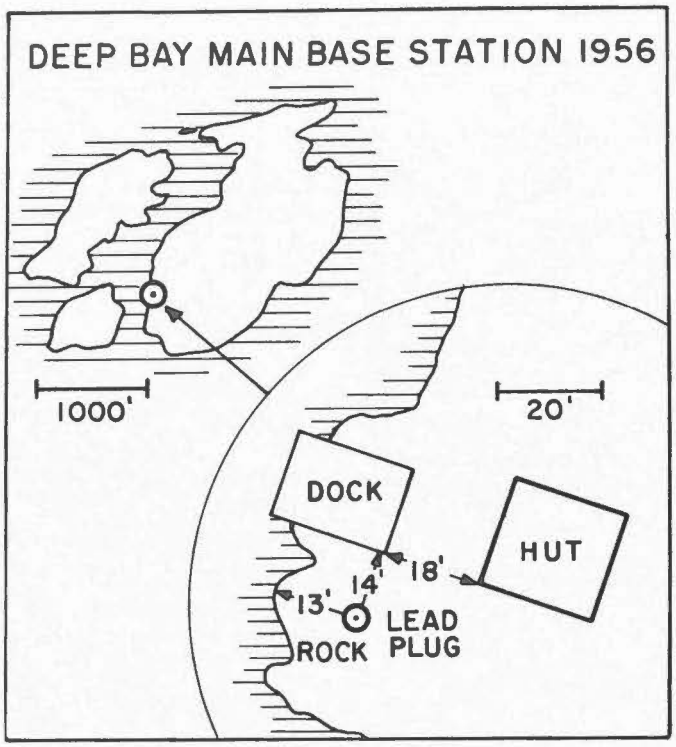

FIGURE 10
Site of main gravity base station.

Repeat observations at selected stations indicated that the gravity measurements have uncertainties of 0.2 mgal or less.

The Bouguer anomaly values are all relative to an arbitrarily selected main base station located to the north of Deep Bay on a small island in Reindeer Lake and identified by a lead marker in a rock outcrop (Figure 10). This station has coordinates;

Latitude: 56° 28′.2 N.
Longitude: 102° 58′.8 W.
Height: 1,110 feet above mean sea level.

The value of gravity for this station is 2.8 mgals higher than Dominion Observatory base station no. 9185-60 and has an absolute value of 981.5321 cm/sec^2, relative to the national base station in Ottawa. From this it may be deduced that the relative gravity anomaly of −4.21 mgals adopted for the main base station corresponds to an absolute Bouguer anomaly of −39.60 mgals and that all anomaly values in Figure 8 may be converted to absolute Bouguer anomalies by subtracting 35.39 mgals.

In preliminary reports of this work (Innes, 1957, 1961, and Beals, Innes, and Rottenberg, 1963) the Bouguer anomaly values were calculated in the usual way using a surface density of 2.67 gms/cc, arbitrarily adopted before density data were available from rock sampling. More recently the densities of 153 samples of granitic rocks from the area have been found to have a mean value of 2.77 gms/cc. The distribution of the rock sampling is shown in Figure 3; the location number, description, and density of each specimen are collected in a table in Appendix A; while the mean density for each of the four main groups of granitic rocks recognized in the area are given in Table 7. Use of 2.67 gms/cc in-

TABLE 7.—TABLE OF ROCK MEAN DENSITIES AND GRAVITY ANOMALIES

Rock Unit	Rock Density (gms/cc)			Gravity Anomalies (mgals)		
	No. of Samples	Range in Density	Density	No. of Stations	Range	Mean
Granodiorite and granodiorite gneiss	28	2.60–3.07	2.72	19	− 9.3 to −1.4	−6.09
Biotite garnet and hornblende paragneisses	47	2.47–3.05	2.78	36	− 9.9 to +1.6	−5.6
Calcareous gneisses	17	2.66–3.02	2.85	11	− 6.3 to +2.3	−2.38
Migmatites	61	2.63–3.06	2.75	48	−10.2 to +7.8	−3.67
Mean	153		2.765	114		−2.96

stead of 2.77 gms/cc in the reductions, produces errors as great as 0.2 mgal for the land stations of higher elevation, and 0.9 mgal for ice stations where water depths are the greatest. Because of the present uncertainty of the variation of density with depth within the crater, only a qualitative interpretation of the gravity anomalies is attempted here, and such reduction errors may be deemed negligible. However to facilitate further study and detailed analysis of the gravity field when better control is available the principal facts for the 27 gravity measurements made on the ice surface of Deep Bay are collected in Appendix B.

The gravity map shows relative Bouguer anomalies contoured at intervals of 2.5 mgals. The anomalies have a total range of 27 mgals, from −20 mgals near the middle of Deep Bay and about +7 mgals in each of the northwest and southeast quadrants of the map area. The trends of the contours are northeasterly conforming with the general direction of the geological structure. In Table 7 the range and mean value of the gravity anomalies are tabulated for each of the units of granitic rocks. Although both density and anomaly values are quite variable for each unit their mean values nevertheless show some direct correlation.

As found over other circular features of suspected meteoritic origin the gravitational field associated with Deep Bay is negative with contours of equal anomaly forming a circular pattern concentric with the shoreline. The amplitude of the gravity variation is much larger than found associated with other structures, reaching a minimum value after corrections for water depths, of about 20 mgals near the centre of the Bay. After making a further correction for regional gradients of about 0.9 and 1.3 mgals per mile to the northeast and southeast respectively the maximum residual anomaly (Figure 9) is about −15 mgals.

With little doubt the relatively lower gravity values over Deep Bay must arise from the low-density sedimentary rocks within the basin and the underlying broken and fragmental granitic rocks. As gravity provides a measure of the total rock deformation suffered during the crater's formation (Innes, 1961) it is important to distinguish the relative amounts of these two low-density materials. Unfortunately the gravity anomalies by themselves do no suffice for this and a direct answer must await the results of a successful diamond drilling program. The results of a seismic survey of Deep Bay (Sanders, Overton and Bataille, 1964) using refraction techniques, are consistent with the gravity measurements and show a disturbed zone under the crater in which the velocity of propagation of the seismic waves is approximately 25 per cent less than the normal background value of 20,000 ft/sec for Precambrian terrain. As the observations were made on ice, which has a seismic velocity of 10,000 ft/sec, definitive values for the propagation velocity of the sedimentary rock could not be obtained. However the results suggest that the sedimentary sequence may extend to depths of 1,800 to 2,500 feet below the level of the lake. More definitive seismic information should be obtainable from a summer survey.

Erratics of Cretaceous shale discovered on the south beach were found to have densities which vary from 2.00 to 2.64 gms/cc with a mean value of 2.53 gms/cc. If the sedimentary material now lying above the crater floor consists of shale having the same mean density, its contribution to the negative gravity field for the thicknesses estimated above would vary from 3 to 6 mgals, leaving from 9 to 12 mgals to be explained by the underlying fragmental rocks.

Diamond Drilling Results

The Drilling Program

A diamond-drilling program was undertaken from the ice surface of Deep Bay during the winter of 1961–62 in order (1) to determine the depth from the surface of the lake to the floor of the original crater, and the nature of the material lying above and below the crater floor; (2) to test generally the structural interpretations based upon geophysical and geological observations. Two holes 62–1 and 62–1A were put down at the sites indicated in Figure 3. It would be expected that the most valuable information could be obtained by drilling at the exact centre of the crater where the water depth is about 575 feet. However because of the limited experience Canadian companies have had in drilling in deep water, it was necessary to restrict the operations to sites where depths are 400 feet or less. The site for the first hole, 62-1 therefore, was located about three quarters of a mile west of the centre of the crater, where, over a small area of about 20 acres, the present floor rises so that the water depth is slightly less than 400 feet (*see* topographical map in pocket). The hole was put down to a total depth of 591 feet below the surface of the lake. After penetrating 400 feet of water and about 100 feet of fine silty clay including one granite boulder three feet thick, poorly compacted shale was encountered. The shale was more indurated with depth, which permitted fair core recovery from a depth of 507 feet to the bottom of the hole.

At a depth of 591 feet the drill rods became stuck and it became necessary to abandon the hole before reaching the full objective. Inability to provide adequate support for the outer casing and to maintain it in a vertical attitude presented grave difficulties. As great lengths of casing and several strings of drilling rods had already been lost through failure and buckling of the outer casing and as very little time remained before spring breakup of the ice , it was deemed advisable to complete the operation by drilling in much shallower water.

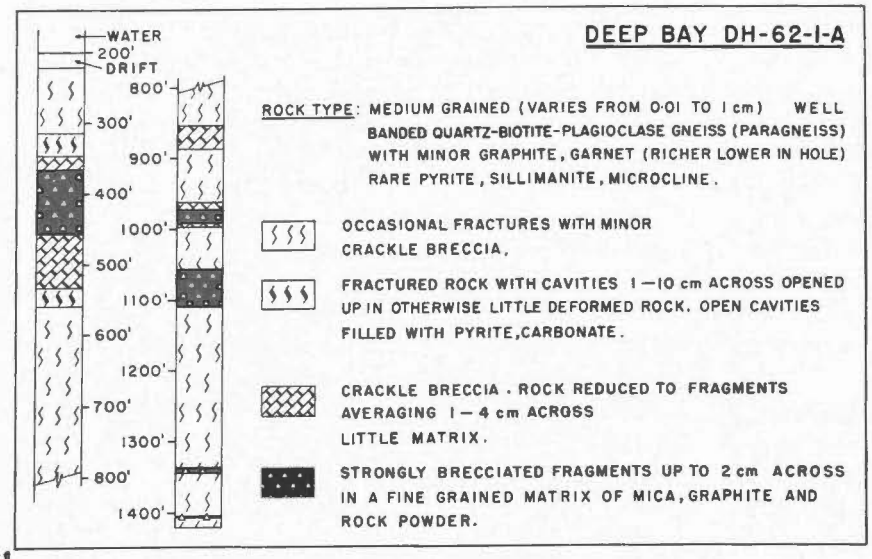

FIGURE 11
Log of drilling and vertical section for drill hole 62-1A.

Accordingly the drill rig was moved to a site about one mile from the eastern shoreline of the bay where the water is only about 200 feet deep. Although considerable difficulty was also experienced here in penetrating the unconsolidated material and glacial drift, this 62-1A hole was finally collared into bedrock at a depth of 240 feet, and put down to a total depth of 1,420 feet.

Logs of Drill Hole 62 1-A

A log and vertical section showing the rock types encountered in hole 62-1A are illustrated in Figure 11. Specimens of core are shown in Plate VII. The rock types lie entirely within the biotite-garnet gneiss unit recognized in the general field geology of the region. The main variety is a well-layered, medium-grained, quartz-oligoclase-biotite gneiss with a number of associated minerals in varying proportions. From near-surface down to 1,125 feet graphite is conspicuous, making up as much as 10 per cent of the rock in some bands. Garnet is abundant below 582 feet rising to as much as 35 per cent of the mode at 1,125 feet. Sillimanite was identified in a biotite-granite gneiss from 395 feet. Common accessories include apatite, pyrite, microcline, monazite, and zircon. Diopside occurs with the sillimanite-bearing gneiss but amphibole was not recognized in any thin section.

A minor assemblage of coarser quartz-microcline-muscovite rocks forms thin irregular horizons within the biotite-garnet gneisses and may be genetically associated with the nearby migmatite unit. Minor oligoclase and biotite with this assemblage are strongly altered to sericite and chlorite respectively.

The granoblastic, post-kinematic texture which is typical of this gneiss group has been overprinted by an intense deformation leading to the development of zones of fracturing, crushing, and brecciation. At its most intense, the deformation yields a breccia of wall rock fragments up to several centimetres across in a matrix of finely crushed minerals also derived from the wall rock. Introduced carbonate with or without pyrite cements the breccia matrix in some cases. The same minerals line cavities that have been opened up in the closely fractured rocks flanking the breccia zones. Alteration of feldspars and mafic minerals to sericite and chlorite respectively is conspicuous where this mineralization has taken place. However there is no sign of secondary quartz. Primary quartz in some cases shows intense undulous extinction which may be connected with the brecciation.

There is no evidence of strong lithologic control over the localization of deformation as all rock types are brecciated in similar manner. The absence of secondary quartz raises hopes that high-pressure polymorphs such as coesite, if formed, may still survive.

Discussion of Drilling Results

The drilling results suggest that the original crater diameter was considerably less than 40,000 feet as first estimated. Although the drill core from hole 62-1A shows evidence of intense deformation with the development of extensive zones of breccia, there are nevertheless long sections of core, up to 400 feet long in which only occasional fractures are evident. These slightly fractured sections grade into zones of crackle or mosaic (Norton, W. M., 1917) breccia, which is rock reduced to fragments containing little or no matrix. The zones of crackle breccia in turn grade into the zones of most intense deformation in which the strongly brecciated fragments

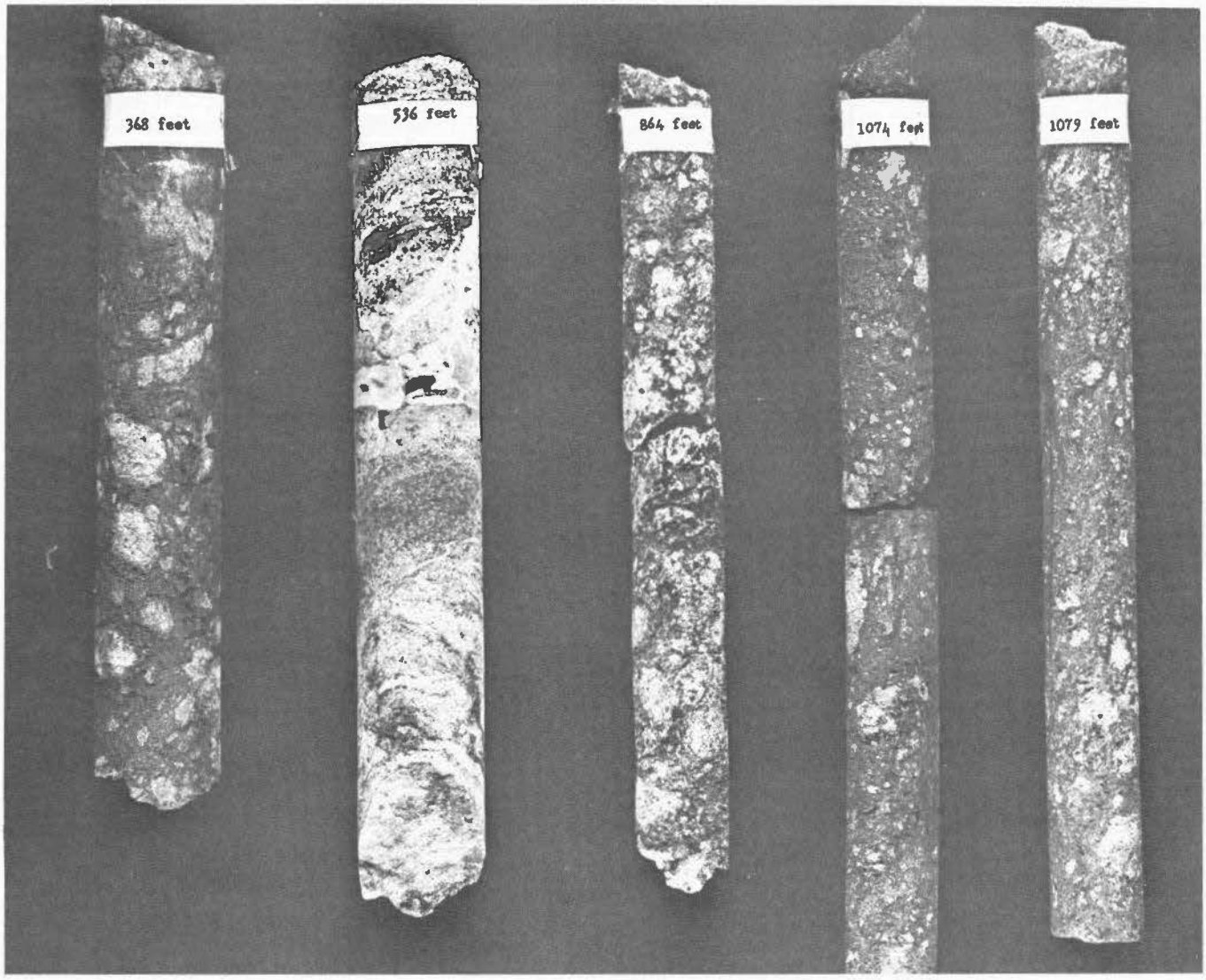

PLATE VII. Specimens of drill core from drill hole 62-1A.

are bound in a fine-grained matrix of mica, graphite and rock powder. The general nature of the deformation in which there is little or no evidence of mixing strongly suggests that hole 62-1A is situated very close to the outer limit of the zone of complete rupture but does not lie within it.

The estimate of an original rim diameter of 40,000 feet for Deep Bay is based upon the assumption that the present shoreline, which has a diameter of about 6½ miles (34,300 feet) represents the sectioning of the true crater at the average level of the surrounding terrain at the time the crater was formed. If this estimate is correct one would expect that in drilling offshore at the site of hole 62 1A it would be necessary to penetrate at least 500 feet of overburden and/or consolidated sedimentary material before reaching the breccia zone. The fact that the drilling intersected granite gneiss that is essentially in place at a depth of 240 feet below the surface of the lake is, therefore, further evidence that the original crater diameter was considerably less than 40,000 feet.

This conclusion and the fact that the upper surface of the sedimentary rock (shale) was found to lie at a depth of 500 feet near the centre of the lake led to a reexamination of the depth recordings to see if it were possible to make a better estimate of the configuration of the true crater, its centre, and the horizontal distribution of the sedimentary rock within it. The results of this investigation are illustrated in Figure 12. It was found that the character of the depth profiles tends to vary with their orientation, whereby those profiles, or portions thereof that parallel the direction of glacial ice movement, are distinctly less irregular than those that are opposed. This may be seen from careful analysis of depth records reproduced in Figure 4.

The topographically featureless areas of the crater floor are believed to be the expression of flat-lying sedi-

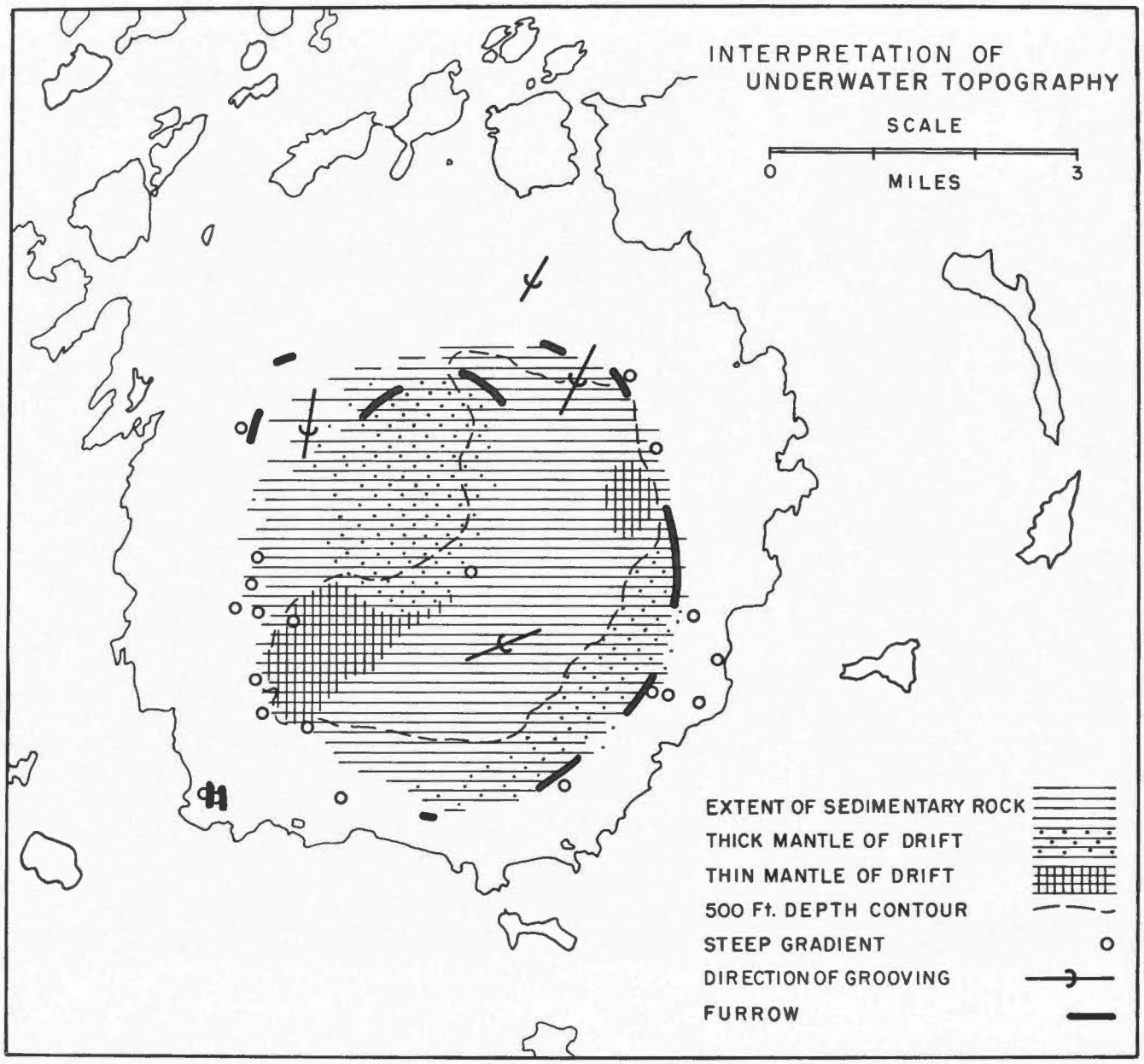

FIGURE 12. Geological interpretation of the underwater topography of Deep Bay.

mentary rock above which the mantle of glacial drift and unconsolidated material is thin. It is significant that all these areas lie at depths of about 500 feet or greater; in contrast, irregularities in the relief of the crater floor in other areas are believed largely due to varying thicknesses of the glacial deposits. Quantitative analyses show that the gradients of the depth profiles across the inner slopes of the crater vary from about 5 to 20 degrees but in several places, notably to the south and east, the gradients reach maximum values of about 35 degrees. Abrupt changes in the gradient that are clearly indicated on all records, are believed to mark the outer limit of complete rupture. The arcuate furrows or depressions near this outer limit are believed to be the expression of the contact between the sedimentary rock and the gneisses forming the crater's inner wall. Projection down-slope from the points where these discontinuities occur, to a depth of 500 feet, has been used to define the outer limit of the bay underlain by sedimentary rock as illustrated in Figure 12. The configuration of this area is nearly circular with a diameter of about 4.5 miles or 23,760 feet.

The conclusion then, that this hole lies within the fracture zone, and the fact that no sedimentary rock was encountered suggests that the original crater diameter was considerably less than 40,000 feet as was first estimated. The revised crater model consistent with this

new information and based upon Baldwin's (1963) depth-diameter relationships, is illustrated in Figure 13. The revised crater dimensions are as follows:

Original rim diameter	—	31,000 feet
Apparent crater depth	—	3,200 feet
Rim height	—	890 feet
True depth	—	3,210 feet

These dimensions suggest that at least 450 feet of the crater's original rim has been eroded, and that the sedimentary rocks now lying within the crater have a minimum thickness of about 1,600 feet.

The most important result from the drilling operation has been confirmation of the interpretation given the geophysical data, namely that the negative anomaly fields reflect deformation of rock underlying the waters of Deep Bay in the form of intense fracturing and fragmentation. Although it may now be predicted more confidently that crater-filling breccia underlies the sedimentary rocks within the bay, it is extremely important to follow up this work by successfully putting down a drill hole at the centre of the crater.

Age of the Deep Bay Crater

From the evidence on hand it is possible to fix the age of the Deep Bay crater only within very wide limits. It is clear from the foregoing that it has been formed in granite gneiss of the Churchill province of the Canadian Shield and is therefore younger than the Hudsonian orogeny (Stockwell, 1962) or 1,700 million years. Diamond drilling has revealed the existence of at least 100 feet of undisturbed Mesozoic strata near the centre of the bay. On the basis of fossil evidence these strata are considered to be of Upper Jurassic or Lower Cretaceous age, formed about 150 million years ago. This also may be taken as a minimum age of the crater, but of course does not preclude the possibility of older strata at depth. Although it is dangerous to estimate geological age upon the amount of erosion, the fact that the deeply eroded rim is sufficiently high to control the drainage in the area, suggests that the Deep Bay crater is perhaps not much older than the sedimentary rock within and this may be taken as a fair estimate of the age of the Deep Bay crater.

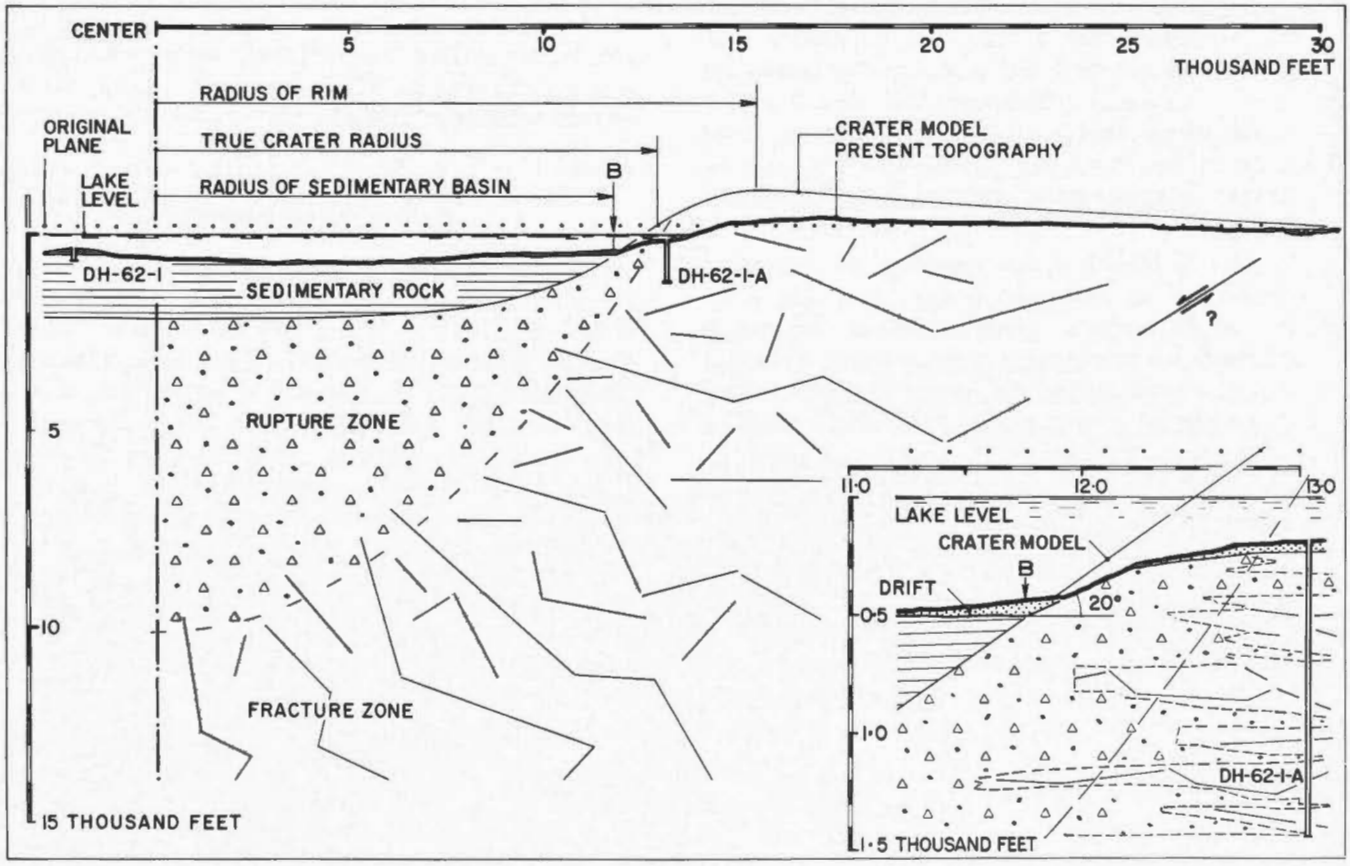

FIGURE 13. Structural section of Deep Bay based on topographical, geophysical and drilling results. The dimensions of the crater model are based on Baldwin's (1963) depth-diameter relationship.

Summary and Future Investigations

In presenting this account of the investigation, the suggestion that Deep Bay is of meteoritic origin is accepted even though positive identification such as the discovery of meteoritic material is lacking. All evidence topographical, geological, and geophysical indicate a crater structurally similar to the well-authenticated Barringer meteorite crater in Arizona. This is clearly recognized even though Deep Bay is many times larger, has been formed in a terrain underlain by much harder rock, is aeons older and is deeply eroded, so much so, that only a portion of its original superstructure remains. No evidence has been uncovered to support the possibility that Deep Bay may have been formed from internal forces. The fact that the crater's walls cut abruptly across pre-existing structures eliminates the possibility that Deep Bay is geologically controlled. There is no evidence to suggest that the crater is an erosion basin formed by certain rock types eroding more quickly than others; nor is there evidence that the crater has been formed by subsidence, controlled by faulting or by systems of intersecting faults. Deep Bay lies near the centre of the Canadian Shield and remote from areas in which there is evidence that volcanic activity has occurred since the end of Precambrian time. It should finally be mentioned that of the Canadian craters that have been studied and identified as of probably meteoritic origin (Beals, Innes and Rottenberg, 1960; Halliday and Griffin, 1963; Dence, Innes, and Beals, 1964; Dence, 1964; Innes, 1964) all have a random distribution and show no preference of location in respect to major or minor geological structures.

Although the results of the foregoing investigations have the merit of appearing to explain Deep Bay as of meteoritic origin, definite confirmation of the events that produced this outstanding feature can be achieved only by further investigation and study. A complete and thorough geological investigation of the area should be carried out, with particular attention being given to structural details, including statistical studies of rock deformation and fracturing for a distance of at least one diameter from the shoreline of Deep Bay. At the same time a systematic rock sampling program is required to provide oriented specimens for laboratory studies of rock deformation, as well as for the determination of the density and the magnetic and other physical properties of the country rock. Further geophysical work should include (a) more complete gravity mapping both in the vicinity of the crater and over the bay itself; (b) careful seismic work during the summer months to map the configuration of the true crater floor; (c) long-term heat-flow measurements from the deepest part of the bay.

Most important of all is the need to carry out a diamond-drilling program from the ice surface of the bay in winter. Drill cores from holes successfully put down offshore and near the middle of the bay will provide information for a wide variety of basic studies related to crater formation. First of all they will provide information concerning the character of the material underlying the crater's floor from which it should be possible to distinguish with confidence between the rock deformation resulting from comparatively slow tectonic events and the more complete crushing and fragmentation characteristic of impact breccia. Basic studies should include careful petrographic examination of the drill cores for shock-induced effects, including changes in the physical properties of the rocks and the determination of the nature and amount of shock-melted materials. Diamond drilling of the crater will enable a better estimate to be made of the crater parameters, its true depth, width, the extent of the lens of breccia postulated to underlie the crater floor and the age of the crater. Finally because of the restricted environment offered by the Deep Bay crater, the sedimentary rock lying within it should provide a splendid record of all marine transgressions and withdrawals for this area of the Shield, since the craters formation. Clearly the scientific study of the Deep Bay crater has only begun.

Acknowledgements

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APPENDIX A

Table of Rock Densities

Specimen Number	Rock Description	Density
1	Biotite-quartz-feldspar-garnet gneiss	2.76
2	Granite (intruding No. 1)	2.68
2	" " "	2.63
3	Biotite-quartz-feldspar-garnet gneiss	2.78
4	Biotite-quartz-feldspar-garnet gneiss	2.84
5	Hornblende-biotite-quartz-feldspar-garnet gneiss	2.88
6	Hornblende gneiss	3.01
6	Hornblende-calcareous-quartzitic gneiss	3.02
7	Calcareous banded gneiss (quartzitic)	2.86
7	" " " "	2.81
7	" " " "	2.82
8	Garnet-biotite-quartz-feldspar gneiss	2.88
9	Biotite-quartz-feldspar-garnet gneiss with granitic injection	2.72
9	Quartz-feldspar-biotite-garnet gneiss	
10	Quartz-feldspar-biotite-garnet gneiss	2.71
11	Mineralized-quartz-feldspar-biotite gneiss	2.47
12	Biotite-quartz-feldspar-garnet gneiss	2.65
12	Biotite-quartz-feldspar-garnet gneiss	2.76
12	" " " " "	2.78
13	Garnet-biotite-quartz-feldspar gneiss	2.81
14	Pegmatite carrying chrome mica	2.56
14	" " " "	2.51
15	Quartz-biotite-garnet gneiss	2.72
16	Biotite-quartz-feldspar-garnet gneiss	2.74
16	" " " " "	2.70
16	" " " " "	2.68
17	Biotite-quartz-feldspar-garnet-injection gneiss	2.74
18	Unmetamorphosed quartzose shale (drift only)	2.10
19	Feldspar augen-biotite-quartz-feldspar-garnet gneiss	2.70
20	" " " " "	2.61
21	Biotite-quartz-feldspar gneiss with granite injection	2.71
21	" " " " "	2.62
21	" " " " "	2.68
21	" " " " "	2.60
22	Biotite-hornblende-quartz-feldspar gneiss	2.71
23a	Feldspar augen-injection gneiss	2.71
23b	Feldspar augen-biotite-quartz-feldspar gneiss	2.73
24	Feldspar augen-injection gneiss	2.80
24	" " " "	2.77
25	Biotite-quartz-feldspar-garnet injection gneiss	2.70
25	Feldspar augen-injection gneiss	2.72
25	" " " "	2.64
25	" " " "	2.74
26	Feldspar augen biotite-quartz-feldspar-garnet gneiss	2.76
26	Feldspar augen-injection gneiss	2.70
26	" " "	2.66
27	Feldspar augen-injection gneiss	2.69
28	Feldspar augen-injection gneiss	2.74
29a	Biotite-quartz-feldspar-garnet gneiss	2.77
29b	" " " " feldspar augen gneiss	2.76
30	Biotite-quartz-feldspar gneiss	2.89
30	" " "	2.78
30	" " "	2.61
30	" " "	2.78
31	Biotite-quartz-feldspar gneiss	2.80
32	" " "	2.76
32	" " "	2.74
33	Calcareous-quartzitic gneiss	2.66
33	" " "	2.94
34	Graphite mineralization in gneiss	2.68
35a	Hornblende gneiss	2.96
35b	Garnet-hornblende gneiss	2.90
35c	Calcareous-quartzitic gneiss	2.86
35d	Hornblende-quartz-feldspar gneiss	2.82
35	" " " "	2.71
37	Calcareous-quartzitic gneiss	2.78
37	" " "	2.81
38	Hornblende-biotite-quartz-feldspar gneiss	2.85
38	" " " " "	2.84
38	" " " " "	2.87
39	Hornblende-biotite-quartz-feldspar-garnet gneiss	2.82
39	" " " " " "	2.89
40	Biotite-quartz-feldspar-garnet gneiss	2.82
40	" " " " "	2.95
40	" " " " "	2.79
41	Biotite-quartz-feldspar-garnet gneiss	2.73
41	" " " " "	2.73
42	Quartz-feldspar-biotite gneiss	2.74
42	" " " "	2.73
43	Granite	2.59
43	"	2.68
43	"	2.64
43	"	2.60
44	Quartz-feldspar-biotite-garnet gneiss	2.76
45	" " " "	2.89
46	Biotite-quartz-feldspar gneiss (graphite mineralization)	2.74
47	Feldspar augen-biotite-quartz-feldspar gneiss	2.77
48	Quartz-feldspar-hornblende gneiss	2.72
49	Hornblende-quartz-feldspar gneiss	2.81
50	Hornblende-biotite-quartz-feldspar-garnet gneiss	2.96
51a	Biotite-quartz-feldspar-garnet gneiss	2.79
51b	Biotite-quartz-feldspar-garnet injection gneiss	2.75
52	Biotite-quartz-feldspar-garnet gneiss	2.83
53	Biotite-quartz-feldspar-garnet gneiss	2.79
53	" " " " "	2.75
54	Hornblende gneiss	3.04
54	" "	3.04
55	Quartz-feldspar-biotite injection gneiss	2.77
55	" " " " "	2.74
56	Quartz-feldspar-biotite-garnet gneiss	2.69
56	" " " " "	2.62
57	Quartz-feldspar-hornblende gneiss	2.77
58	Biotite-quartz-feldspar-garnet gneiss	2.79
59	Feldspar augen injection gneiss	2.66
60	Biotite-quartz-feldspar-garnet gneiss	2.78
61	Graphitic granite	2.63
62	Pegmatite carrying magnetite	2.96
62	" " "	2.74
63	Biotite-hornblende-quartz-feldspar gneiss	2.74
64	Biotite-quartz-feldspar injection gneiss	2.77
65	Quartz-feldspar-biotite-hornblende gneiss	2.74
65	" " " " "	2.72
66	Feldspar augen injection gneiss	2.67
66	" " " "	2.67
66	" " " "	2.68
67	Mineralized gneiss	2.66
67	" "	2.88
68	Feldspar augen injection gneiss	2.72
68	" " " "	2.76
69	Feldspar augen gneiss	2.70
69		2.72
70	Feldspar augen gneiss	2.75
71	Quartz-feldspar-biotite-garnet injection gneiss	2.79
71	" " " " "	2.77
71	" " " " "	2.79
72	Garnetiferous-feldspar augen gneiss	2.81
73	Feldspar augen gneiss	2.73
75	Biotite-quartz-feldspar-garnet injection gneiss	2.84
75	" " " " " "	2.84
76a	Biotite-quartz-feldspar-garnet injection gneiss	2.76
76b	" " " " " "	3.05
77	Quartz-feldspar-biotite-garnet gneiss	2.78
78	Feldspar augen biotite-quartz-feldspar-garnet gneiss	2.75
79	Biotite-quartz-feldspar-garnet gneiss	2.74
80	Biotite-quartz-feldspar-garnet gneiss	2.73
81	Biotite-quartz-feldspar-garnet gneiss	2.74
81	" " " " "	2.77
81	" " " " "	2.76
82a	Granite	
82b	Feldspar augen biotite-quartz-feldspar-garnet gneiss	2.76
82	" " " "	2.64
83	Biotite-hornblende-quartz-feldspar gneiss	2.77
83	" " " " "	2.79
84	Biotite-granitic gneiss	2.70
85	" " "	2.69
85	" " "	2.68
86	Arkose	2.70
86	"	2.68
86	"	2.68
86	"	2.66
87	Biotite-quartz-feldspar gneiss	2.79
88	" " " "	2.73
88	" " " "	2.78
89	Granite (coarse grains)	2.60
90	Banded biotite-quartz-feldspar gneiss (granitic)	2.71
90	" " " " " "	2.70
91	Amphibolite	3.07
92	Feldspar augen biotite-quartz-feldspar gneiss	2.73
93	Feldspar augen injection gneiss	
94	" " "	
95	Biotite-quartz-feldspar-garnet gneiss	

APPENDIX A—*Concluded*

Specimen Number	Rock Description	Density
96	Feldspar augen injection gneiss	
97	Injection gneiss	2.70
98	Biotite-quartz-feldspar-garnet gneiss (medium grained)	2.74
98	Biotite-quartz-feldspar-garnet gneiss (coarse grained)	2.70
98	Biotite-quartz-feldspar-garnet gneiss	2.72
99	Feldspar augen injection gneiss	2.75
100	Injection gneiss	2.70
101	Biotite-quartz-feldspar gneiss	2.76
102	" " " injection gneiss	2.81
103a	Mineralized graphite quartz-feldspar-biotite gneiss etc.	
103b	Biotite-quartz-feldspar gneiss	
104	Biotite-quartz-feldspar-garnet gneiss	
105	Mineralized graphite and sulphide biotite-quartz-feldspar-garnet gneiss	
107	Garnetiferous feldspar augen gneiss	2.75
108	Biotite-quartz-feldspar injection gneiss	2.74
108	" " " "	2.80
109a	Calcareous gneiss	
109b	Biotite-quartz-feldspar (associated with [a])	2.90
110	Quartz-feldspar-biotite gneiss	2.77
110	" " " "	2.76
111	Biotite-quartz-feldspar gneiss	2.76
112	Hornblende gneiss (2 varieties)	2.74
112	" "	2.88
113	" "	3.06
116	Biotite-quartz-feldspar-garnet gneiss	2.75
117	" " " " "	2.75
118a	Granite	2.60
118b	Biotite-quartz-feldspar-garnet gneiss	2.78

APPENDIX B

Principal Facts for Ice Stations

Station No.*	Water Depth (ft)	Δg from main Base (mgals)	Latitude Correction (mgals)	Relative Bouguer Anomaly		
				$\sigma = 2.0$ gm/cm³ (mgals)	$\sigma = 2.67$ gm/cm³ (mgals)	$\sigma = 2.77$ gm/cm³ (mgals)
T-1	450	−25.7	+3.1	−16.9	−13.0	−12.4
T-2	420	−17.6	−1.3	−13.5	− 9.9	− 9.4
T-3	450	−29.7	+0.4	−23.6	−19.7	−19.1
T-4	650	−32.4	+2.0	−22.1	−16.6	−15.7
T-5	350	−22.3	+3.6	−14.2	−11.2	−10.8
T-6	710	−31.0	+1.2	−20.7	−14.7	−13.8
T-7(D)	460	−29.1	+0.2	−23.0	−19.1	−18.5
T-8(D′)	450	−28.8	+0.2	−22.9	−19.0	−18.4
T-10	100	− 8.8	−2.4	−10.0	− 9.1	− 8.6
T-11	230	−15.3	−1.5	−13.9	−11.9	−11.6
T-12	360	−23.6	−0.5	−19.5	−16.4	−16.0
T-13	450	−30.4	+0.7	−24.0	−20.1	−19.5
T-14	510	−30.7	+1.3	−22.9	−18.6	−17.9
T-15	675	−32.5	+2.2	−21.7	−15.9	−15.0
T-16	540	−30.3	+3.0	−20.4	−15.8	−15.1
T-17	420	−24.2	+3.8	−15.0	−11.4	−10.9
T-18	0	−11.1	+1.6	− 9.5	− 9.5	− 9.5
T-19	290	−23.8	+1.8	−18.3	−15.8	−15.4
T-20	650	−32.2	+2.0	−21.9	−16.4	15.5
T-21	660	−33.1	+2.1	−22.6	−17.0	−16.1
T-22	650	−31.3	+2.2	−20.8	−15.3	−14.4
T-23	140	−13.4	+0.1	−11.4	−10.3	−10.1
T-24	250	−21.2	−0.2	−18.2	−16.1	−15.7
T-25	400	−24.5	−0.3	−19.7	−16.6	−15.8
T-26	475	−25.1	−0.6	−19.6	−15.7	−15.0
T-27	510	−22.3	−0.6	−16.4	−12.1	−11.4
T-28	540	−21.2	−0.5	−14.8	− 9.7	− 9.5
T-29	450	−23.1	+2.9	−14.5	−10.6	−10.0

*For location of stations see Figure 3.

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A COMPUTER-ORIENTED SYSTEM FOR THE REDUCTION OF GRAVITY DATA

J. G. Tanner and R. J. Buck

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95637—1½

A Computer-Oriented System for the Reduction of Gravity Data

J. G. Tanner and R. J. Buck

ABSTRACT:—In 1958, the Dominion Observatory expanded its program of regional and local gravity measurements throughout Canada. The regional observations are taken at intervals of 10 km using different makes of gravimeters, and transportation is provided by fixed and rotary-winged aircraft, automobiles and ships. The local surveys consist of detailed investigations of geological features and of areas in which steep horizontal gravity gradients are observed. The resulting increase in the volume of data (tenfold in about 5 years) required that a system of processing, filing and plotting of data from both types of survey be developed. The basic unit of the system is a computer program that reduces field observations to simple Bouguer and free-air anomalies, for use in both geodetic and geophysical investigations. The computed output data cards are maintained in a Principal Facts file, which is used to prepare Bouguer anomaly maps on an automatic plotter, and from which data is supplied upon request.

RÉSUMÉ:—En 1958, l'Observatoire fédéral a élargi ses travaux de mesures gravimétriques régionales et locales partout au Canada. On fait des observations régionales à tous les 10 km avec divers genres de gravimètres à l'aide d'avions, d'hélicoptères, d'automobiles et de navires. Les relevés locaux consistent en une étude détaillée des accidents géologiques et des régions où l'on observe des gradients gravimétriques horizontaux très prononcés. L'augmentation du volume des données (qui ont décuplé en cinq ans environ) a exigé la mise au point d'un nouveau système d'interprétation, de classification et de restitution des données que les deux genres de relevés permettent de recueillir. Ce système repose sur une calculatrice qui réduit les observations prises sur le terrain aux anomalies simples de Bouguer et à l'air libre pour utilisation en recherches géodésiques et géophysiques. Les cartes portant les renseignements sont conservées dans un Fichier des données principales, qui sert à préparer des cartes des anomalies de Bouguer à l'aide d'un restituteur automatique, et d'où on peut tirer des renseignements sur demande.

Introduction

In recent years the requirements for gravity data to assist with geological and geodetic studies have increased enormously. This is largely due to the ease of access to electronic digital computers making the calculation of such quantities as deflections of the vertical and the vertical gradient of gravity on a large scale quite feasible. However, to make the most of computers for such calculations it is extremely important that the basic data, whether free-air or simple Bouguer anomalies, be relatively error free, be on the same datum, and be filed in such a manner that all gravity information for any area under consideration is readily available. Therefore, a prime requirement for any scientific institution actively engaged in field programs to obtain regional gravity observations is a flexible system that not only computes the required gravity anomalies from field data, but also makes provision for revision of datum and cataloguing of the results.

The Dominon Observatory is the federal institution charged with the responsibility of conducting regional gravity studies in Canada. In addition, it acts as the central collecting and coordinating agency for gravity measurements made by other Canadian interests whenever transfer of such data is feasible. In order to carry out better the responsibility for distributing gravity data both nationally and internationally, a complete system for processing and handling gravity measurements has been developed at the Dominion Observatory over the past few years. The general procedures employed are based on a computer program written for an IBM 1620 computer equipped with card input-output, 40,000-digit storage capacity, and indirect addressing. The flow chart is shown in Figure 1.

In this paper the main features of the system are presented. Included are a brief description of the station numbering system, computation procedures complete with the equations used, and filing procedures. The discussion is concerned mainly with techniques used to process regional gravity observations made at intervals of about 10 km. Although the same procedures can apply generally to studies of geological features such as small intrusives, dykes and faults, it should be appreciated that compilation and filing procedures may vary considerably. Therefore the term "detail stations" as used here refers to regional work unless otherwise specified. Other terms used are "source deck" and "object deck" referring to the computer input and output respectively.

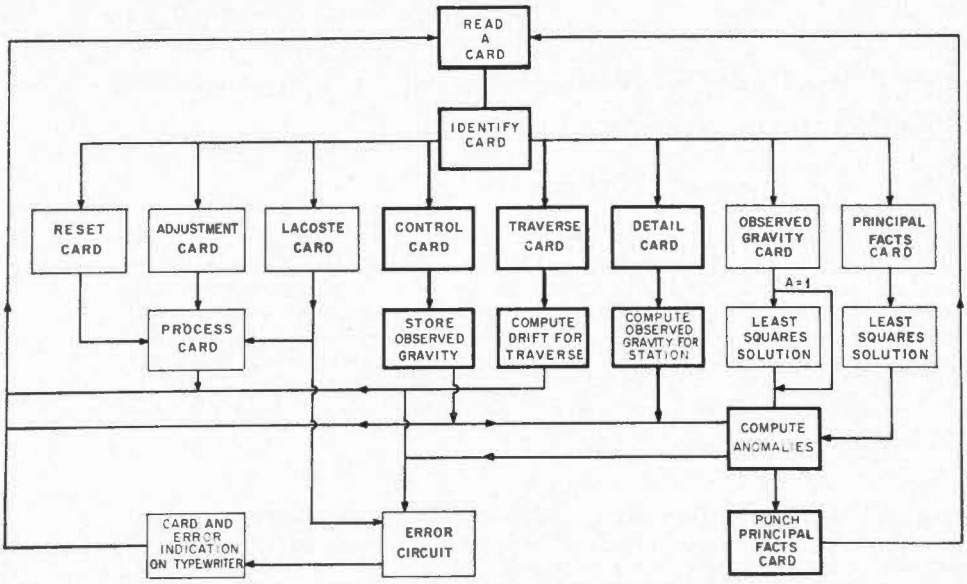

FIGURE 1

The flow chart for the computer program written to process gravity data.

Field Procedures

Current programs within the Dominion Observatory require that scientific personnel be sent to all parts of Canada under conditions that vary from those of the cold, rugged Arctic where aircraft are the main source of transportation, to those of the warmer, southern regions of Canada where standard passenger vehicles and surface ships are used for transportation. Accordingly, instrumental requirements vary from easily portable Worden gravimeters used with light aircraft, to underwater LaCoste and Romberg gravimeters used primarily to make gravity measurements in coastal waters. Because of the variety of instruments used and the different physical conditions encountered one rigorous survey procedure cannot be expected to apply to all surveys. However, in a general way all field parties follow the procedures given below.

Normally two types of gravity stations, control and detail, are established during the course of a regional gravity survey. Control stations that are used to provide the reference gravity values for the survey, fall into two general classes—primary and secondary. Primary control stations are observed using the well-known method of base-looping (Nettleton, 1940) and are inter-connected to form a series of closed circuits. As it is desirable that all control stations be on a common datum, the control network of the different surveys are interconnected, additional ties are made to pendulum stations, and finally an adjustment is made to form a national network of primary control stations. These sites are clearly marked and small-scale sketches drawn in order that the control stations may be reoccupied at some future date if necessary. The interval at which control stations are established varies from 40 km in populated southern regions to 150 km in uninhabited northern areas. Occasionally, extreme variations in the ambient temperature in northern areas result in high and erratic drift rates for the portable, unthermostatted Worden instruments, necessitating the use of secondary control stations intermediate to those of the primary network. These stations are established by traversing from primary control stations, taking single readings at desired sites with LaCoste and Romberg gravimeters. Since these instruments have excellent drift characteristics and since the time interval between readings at primary control points is restricted to less than three hours, the accuracy of gravity values for secondary control stations is comparable to that of primary control stations. Secondary control stations, however, are intended only for use during the particular survey and are not formally described.

A detail station may be defined as any single gravimeter observation taken relative to a control station in such a manner that the effect of instrument drift may be removed. Since the maximum desired error in the gravity value for any detail station relative to a control station is $\pm$ 0.25 mgal, the time interval between control-station readings for any detail-station traverse is determined by the drift characteristics of the particular instrument used. However, in the measurement of gravity at sea, extremely long time intervals between control-station readings are unavoidable, resulting in increased uncertainty in the relative gravity value for the detail station.

Wherever possible gravimeter readings are taken at bench marks or other well defined pointed of elevation, but, as much of Canada is accessible only by aircraft, such a requirement cannot always be met and elevations must be determined in many cases by using altimeters.

Water depths are obtained by a wire sounder or echo sounder and ice thicknesses are usually determined by seismic methods. Station locations are marked on maps and/or mosaics or are recorded using a navigational system such as Decca from which the geodetic coordinates can be computed. Normally the latitude and longitude of these stations are recorded to the nearest 0.1 minute of arc.

To complete the field operations data sheets are prepared to facilitate the preparation of punch cards using the formats shown in Figures 2, 3, and 4 which provide a sample of the manner in which traverse data are assembled. Thus the field personnel involved can thoroughly check the data and forward them to the computing section for processing in a relatively short interval after the completion of the survey. Figure 5 illustrates the output or object format and the sample data contained on the card are based on the traverse data given in Figures 2, 3, and 4.

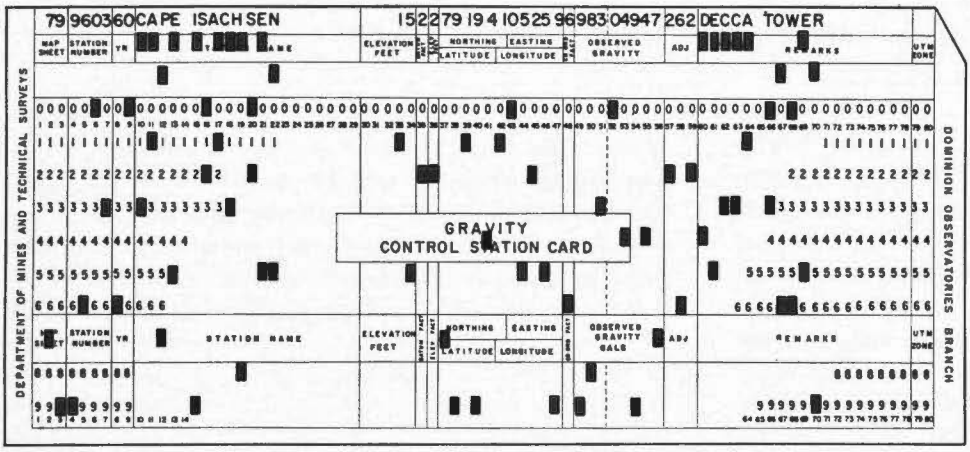

FIGURE 2

The control card. The color code for this card is blue.

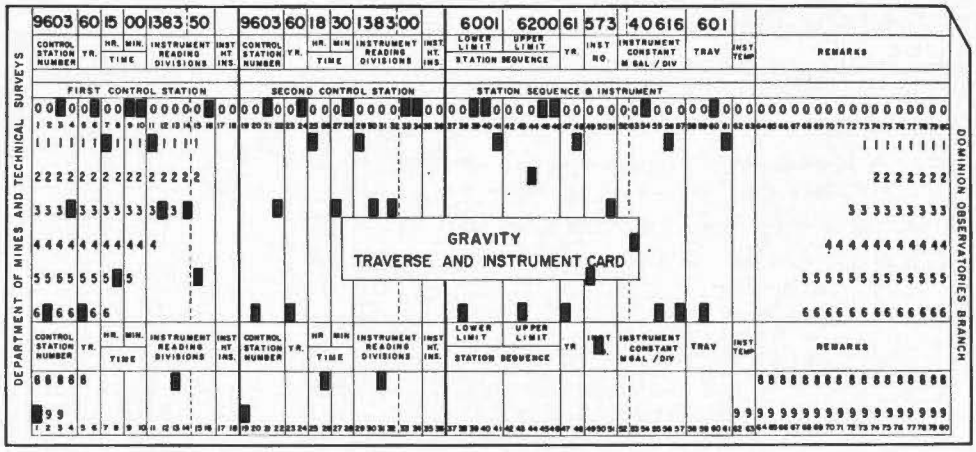

FIGURE 3

The traverse card. The color code for this card is green.

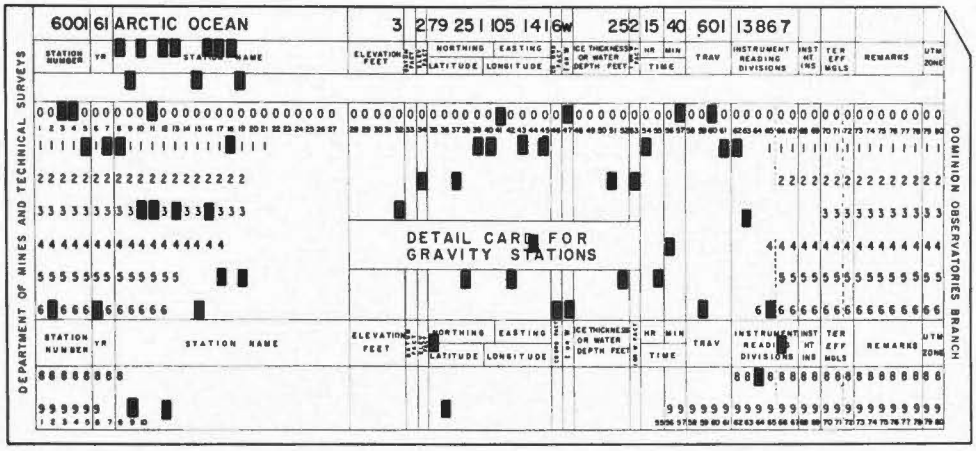

FIGURE 4

The detail card. The color code for this card is white.

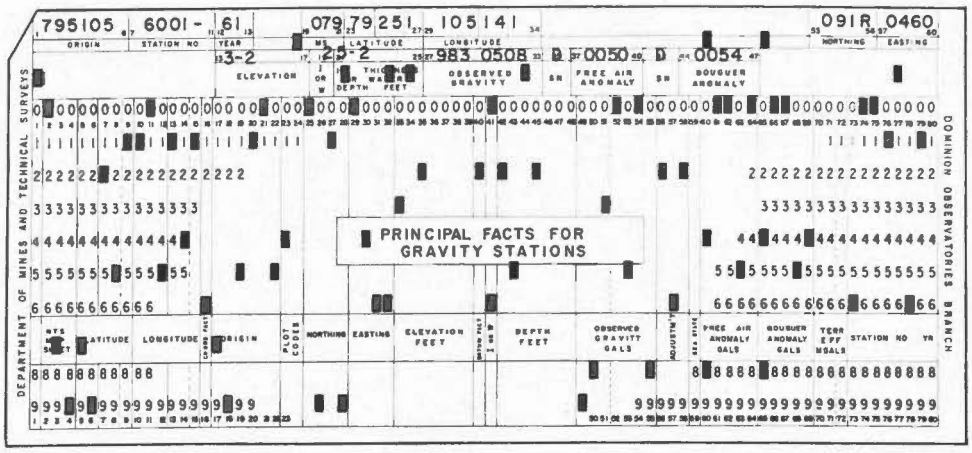

FIGURE 5

The Principal Facts card. The color code for this card is red. Note that the elevation, depth, and station number are left adjusted in their respective fields. The letters in the sign columns of the anomalies represent plus signs, and are necessary for the selection of this symbol by the plotter. Letters in the units positions of the northing and easting are caused by the combination of a minus (11) punch and the units digit in the same column.

The foregoing discussion has been concerned mainly with regional gravity observations. For detailed gravimetric studies, provision has been made on the detail and observed gravity cards for the use of the Universal Transverse Mercator (UTM) coordinate system in place of the latitude and longitude. Station locations can be recorded to the nearest ten metres, allowing for a more accurate determination of position and correspondingly greater accuracy in reduction of the data. When UTM coordinates are used the latitude and longitude are calculated within the computer and put out on the Principal Facts cards.

Station-Numbering System

In addition to several field programs within the Dominion Observatory group, data are received from other scientific institutions and from commercial interests in both the mining and petroleum industries. Since all data, when processed, are entered into a common data file, some system of distinguishing the source of any particular gravity station must be available. Also, a ready means of distinguishing control and pendulum stations should be a prime consideration in laying out the system. This, of course, can be accomplished in a variety of ways but one of the most effective is a comprehensive numbering system for gravity stations. Accordingly, at the Dominion Observatory all projects are assigned a sequence-of-station number as shown in the sample index given in Table I. The station number as entered on the data cards (Figures 2 and 4) is composed of two parts, (a) the number assigned chronologically within the particular sequence and (b) the year the observations are made or received by the Dominion Observatory. So that the various types of stations may be recognized the following additional divisions are made:

i) control stations are assigned a number of the form 9XXX-XX

ii) pendulum stations are assigned a number of the form 99XX-XX

iii) detail stations are numbered in the form XXXXX-XX with the digit "9" not permitted in either the first or second position of the station number.

In each instance the last two digits refer to the year of the observation. Except for pendulum stations the first two digits of each number may be used as a reference to the instrument used, area of survey, and other information given in Table I. This simple means of

TABLE I

Sample Index of Station Sequence for 1962

Area	*Party*	*Instruments*	*Detail Station Sequence*	*Control Station Sequence*	*Traverse No.*	*Remarks*
Polar Continental Shelf Project	L. W. Sobczak	LaCoste G-25	00001—01000	———	0001—0100	
		Worden 573	01001—02000	9001—9200	0101—0200	
		Worden 460				Spare instr.
Baffin Island	J. R. Weber	LaCoste G-7		9201—9500	0921—0950	
		Worden 431	02001—03500	———	0201—0350	
		Worden 546	03501—05000	———	0351—0500	
		Canadian 132	———	———	———	Spare instr.
Western Canada	ABC Oil Co.	———	10001—12000	———	———	Observed gravity values only

identification permits extension of the numbering system for international use by including, on the Principal Facts cards, a three- or four-digit alphameric field referring to the country in which the data originated.

The number given to control and pendulum stations has been restricted to four digits plus the year because it has been found in practice that specific stations are frequently referred to by number rather than by geographic name. A five-digit number, as used for all other stations, has been found to be cumbersome and difficult to remember.

Referring to Table I it can be seen that the general practice, wherever possible, is to assign detail station numbers of less than 10,000 to Dominion Observatory projects. Indeed, only rarely has it been necessary to assign numbers in access of 10,000 as the general practice has been to allot a sequence that is slightly greater than estimated for any particular project. Thus, at the conclusion of the main field programs there are usually sufficient unused blocks of numbers available to satisfy the requirements of other minor projects.

Processing Data

General Procedures

Although data are received from other sources in a form different from that of traverse data (Figure 6) and provision is made within the program to process this information, about 90 per cent of the computer operation is taken up with the calculation of free-air and Bouguer anomalies from traverse data. Accordingly, emphasis is placed on procedures used to process such data and, except when required, no description is provided for other branches in the flow diagram (lighter face) of Figure 1.

Upon completion of the field program the observational data are placed on the appropriate punch cards (Figures 2, 3, and 4) and the source deck, consisting of control cards followed by traverse and detail cards, is assembled. These latter are merged mechanically by sorting on the traverse number (Figures 3 and 4). At this stage a thorough check is made of the source deck for both general order and for transcribing and punching errors. This phase is greatly facilitated by a color-code that has been adopted for each data card and also by a print-out or interpretation of the perforations on each card as shown in Figures 2, 3, and 4. When the check has been completed, a card is placed in front of the source deck, which indicates to the computer the nature of the reduction and hence the general flow of the program.

The computer operation proceeds along the lines indicated in Figure 1. The arithmetic operations are based on the equations given subsequently. There is, however, one aspect of the operation—namely, the error indications given on the typewriter—that is worthy of particular mention at this point. The tests for errors made by the program fall into two general classes, editing and gross errors in the data. Editing checks involved tests to determine whether a particular computation can be logically executed. For example, upon reading and identifying a detail card the computer checks that the reading, time of reading, station coordinates, elevation and other required information has been properly recorded and that this information is consistent with the traverse card data. Gross errors for which the computer is programmed to test include excessive drift rates, unusually large gravity differences and other similar errors. When an apparent error is located the program instructs the computer to give the error indication on the typewriter as well as a reference to the particular data card and, if computations are involved, the magnitude of the error. The existing version of the program contains provision for about 40 possible errors.

The initial processing of the traverse data is carried out on the computer with no card output. This editing run is intended to produce only error indications on the typewriter. These error indications must be checked, corrections made to the input data as necessary, and the

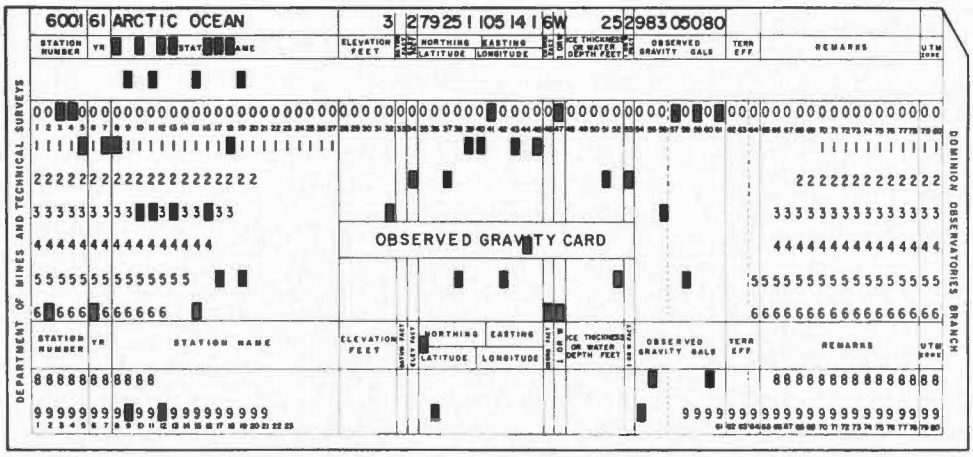

FIGURE 6

The observed gravity card.

corrected data recomputed with card output. The resulting Principal Facts cards are then sorted in preparation for plotting the Bouguer anomalies.

The system of sorting and filing of the Principal Facts cards is oriented toward the use of an automatic data plotter. Since latitude and longitude coordinates are non-linear, a system of rectangular coordinates such as the Universal Transverse Mercator system must be used to plot the station locations. Because standard plotters can accept a maximum of four digits in the abscissa and ordinate, the basic map-plotting unit is one degree of latitude by two degrees of longitude, or a 1:250,000-map sheet on the National Topographic System for Canada. Maps of all scales can be prepared by combining or subdividing these units. The location of any station is given as a northing and easting, to the nearest ten metres, from the origin point at the centre of the map unit.

For permanent storage the data cards contained within each map unit are inserted, in sequence, into a file known as the Principal Facts file. The map units are arranged by origin number (Figure 5) which is obtained from the latitude and longitude of the origin. Although this file uses the UTM coordinate system, the latitude and longitude of the station are retained on the Principal Facts card for purposes of checking maps and as a basis for geodetic and other computations. At present, only a card file is maintained. However, when the volume of cards becomes very large, it will be necessary to use digital magnetic tape to store the information.

Computation Procedures

As was pointed out in the introduction the aim of this system is the production of a file of basic gravity data for use in both geophysics and geodesy. Consequently only standard reduction procedures are used to obtain the Bouguer and free-air anomalies and although the methods used here are listed in geophysics texts in one form or another, a résumé has been included for convenience. The vertical gradient of gravity is assumed to be 0.09406 mgal/foot and the crustal, ice and water densities are assumed to be 2.67, 0.90 and 1.03 gm/cc respectively. Bouguer anomalies are computed assuming the topography to have the form of an infinite sheet having a thickness equal to the height of the gravity station above sea level. For stations located over glacial ice or water-covered regions, the reduction is carried out by assuming the body of ice or water to have the form of an infinite sheet and replacing it with standard crustal material during the Bouguer reduction.

No provision has been made to compute the terrain effect because there are insufficient topographic data available for many parts of Canada and because the volume of data required to put the computations on a routine basis far exceeds the capacity of small computers such as the IBM 1620 used for this problem. At the same time it can be pointed out that, as the relief in most of Canada is relatively low, the effect of terrain is generally less than one mgal and it is doubtful whether it is necessary to undertake such an enormous and expensive project such as the routine computation of the terrain effect for most of the interior of Canada. However, in the mountainous regions along the eastern and western coastlines the effect of topography may be as large as 20 mgal. Therefore, if gravity observations in these regions are used for geological and isostatic investigations, corrections for this effect must be determined either by the use of templates (Nettleton, 1940) or by assuming the topography to have some geometric form such as a raised triangular strip. This is very tedious and time-consuming and it is hoped than an investigation currently under way will permit the evaluation of terrain effects in mountainous regions using very large computers.

In the program a special case is provided for underwater measurements made with a LaCoste and Romberg gravimeter operated by remote control from the deck of a surface ship. As the instrument is read on the sea floor and as it is customary to refer gravity observations to the water surface, the observed gravity value is transformed to an equivalent surface observation by applying the free-air effect and a double Bouguer correction for the body of water. All subsequent corrections applied to these data are similar to those made for other observations.

The equations used to obtain the observed gravity values from the gravimeter readings and the free-air and Bouguer anomalies are listed below*.

(*i*) *Temperature effect on Worden instruments*

When these instruments are operated without a temperature-control unit the scale constant varies with temperature as follows:

$$K = K_{cal} - 0.000072\,(75 - T)\,K_{cal} \qquad (1)$$

where K is the corrected scale factor, K_{cal} the instrument constant determined from the calibration line or tilt table, and T the instrument temperature in degrees Fahrenheit. The constant 0.000072 is provisional pending final results of a series of experiments conducted at the Dominion Observatory (Hamilton, personal communication).

*The use of symbols within these or other equations in the text is uniform throughout and, therefore, each symbol is defined only when it first appears.

(ii) Drift rate

For the computation of the drift rate a linear relationship with time is used. For precise work the time interval between readings at control stations is usually kept to less than three hours.

$$\sigma = \frac{(R_{cs1} - R_{cs2}) + \dfrac{(g_{cs1} - g_{cs2})}{K}}{t_{cs2} - t_{cs1}} \qquad (2)$$

where σ is the drift rate, R_{cs1} and R_{cs2}, g_{cs1} and g_{cs2}, and t_{cs1} and t_{cs2} are respectively the readings, gravity values and times of readings at the first and second control stations.

(iii) Observed gravity for detail stations

$$g_s = g_{cs1} + K\Big((R_{cs1} - R_s) + \sigma\,(t_s - t_{cs1})\Big) \qquad (3)$$

where g_s is the observed gravity value, R_s is the reading, and t_s is the time of reading at the particular detail station.

(iv) Theoretical gravity or latitude effect

The reference spheroid used at the Dominion Observatory is the International ellipsoid of 1930 given by the equation

$$\gamma_t = 978.049\,(1 + 0.0052884 \sin^2 \varphi - 0.0000059 \sin^2 2\,\varphi) \qquad (4)$$

where γ_t is the theoretical value of gravity and φ is the latitude of the station.

(v) Free-air anomaly

This anomaly is computed for geodetic use and recent theoretical developments (Nagy, 1963) require the free anomaly at the surface. This is accomplished by taking the difference between the measured value at the topographic surface and the theoretical value which is extrapolated from the reference ellipsoid.

The general expression is given and particular solutions can be obtained by setting the quantities not involved to zero. The equation is

$$\Delta g_{FA} = g_s - \left(\gamma_t - \frac{dg}{dz}\,h\right) - \left(\frac{dg}{dz} - 4\,\pi\,G\,\rho_w\right) d_w \qquad (5)$$

where Δg_{FA} is the free-air anomaly, dg/dz is the vertical gradient of gravity, h is the station elevation, G the universal constant of gravitation, w the density of water, and d_w the depth of water.

(vi) Bouguer anomaly

The Bouguer anomaly is intended for use with geological investigations and is determined using the equation

$$\Delta g_B = g_s - \gamma_t + \frac{dg}{dz}\,h - 2\,\pi\,G\,\rho_c\,h + 2\,\pi\,G\,(\rho_c - \rho_w)\,d_w + 2\,\pi\,G\,(\rho_c - \rho_i)\,d_i - \left(\frac{dg}{dz} - 4\,\pi\,G\,\rho_w\right) d_w \qquad (6)$$

where Δg_B is the Bouguer anomaly, ρ_c is the assumed crustal density, ρ_i is the assumed density of ice, and d_i is the thickness of ice.

(vii) Map-sheet number

The map-sheet number (Figures 2 and 5) is based on the National Topographic System which divides all Canada south of latitude 80°N into areas of 4° of latitude by 8° of longitude. The boundaries of the NTS map sheets coincide with those adopted by International Civil Aeronautics Organization for the 1:1,000,000 series of maps. North of latitude 80°N, because of the convergence of the meridians, the division into map sheets is based on 4 degrees of latitude and 16 degrees of longitude. For any station south of 80°N the map-sheet number can be determined using the formulae

$$D_{12} = \frac{\lambda^\circ - 48^\circ}{8^\circ} \qquad (7)$$

and

$$D_3 = \frac{\varphi^\circ - 40^\circ}{4^\circ} \qquad (8)$$

where D_{12} are the first and second digits of the map-sheet number, D_3 is the third digit of the map-sheet number and φ° and λ° indicate the degree square in which the station is located. All decimals are dropped in the calculations. North of latitude 80°N the map-sheet number cannot be generated from these equations and is assigned individually by the computer on the basis of the coordinates.

Changing Datum

Improved instrumentation as well as an increased number of observations necessitate periodic revision of local, national and international gravity networks. To obtain the best values of gravity for the stations in a control network two steps are usually required, namely, the accurate calibration of the gravimeters *vs.* some standard gravity interval and the adjustment of circuit misclosures using a method of least squares. If the change in the gravity standard is one of calibration only, the program provides for this according to the equation

$$g_{cs} = (1 \pm F)(g_p - g_u) + g_p \qquad (9)$$

where F is the factor expressing the calibration change, g_p is the value of gravity at the National Reference Station, and g_u is the unadjusted gravity value for the control station. This modification is accomplished by providing the computer with the quantities F and g_p and reprocessing the traverse data. In addition to preparing new Principal Facts cards, the computer punches out control and traverse cards containing the corrected gravity values and scale constants respectively. On the other hand, if new information requires that the observavation equations be changed, the entire network must be re-adjusted and new control cards prepared.

A constant datum change is effected using the relation

$$g_{cs} = g_u \pm D \tag{10}$$

where D is the constant correction required to adjust the control station gravity value.

In cases where the data are very old and many of the control stations are either destroyed or cannot be relocated it may not be feasible to reprocess the original traverse data. In this situation provision has been made for the application of the least-squares solution to the principal facts data. This is usually done by re-occupying about 10 per cent of the stations to provide the new datum or standard for the old data. The gravity values are adjusted to fit the new datum using the equation

$$g_s = Ag_u + B \tag{11}$$

The quantities A and B, which are the slope of the line giving the best least-squares fit and the y-intercept respectively, can be determined using the equations

$$A = \frac{\Sigma g_u \Sigma g_o - n \Sigma g_u g_o}{(\Sigma g_u)^2 - n \Sigma g_u^2} \tag{12}$$

and

$$B = \frac{\Sigma g_u \Sigma g_u g_o - \Sigma g_u^2 \Sigma g_o}{(\Sigma g_u)^2 - n \Sigma g_u^2} \tag{13}$$

where n is the number of stations used in the least squares solution and g_o is the observed gravity value according to the current datum in use at the Dominion Observatory. The standard error of estimate (S) for the least-squares solution is given by the expression

$$S = \sqrt{\Sigma g_o^2 - A \Sigma g_u g_o - B \Sigma g_o/(n-2)} \tag{14}$$

A large part of the data obtained from sources outside the Dominion Observatory is received with the observed gravity values already calculated. As this material is generally on a datum different from that accepted by the Dominion Observatory, a least-squares solution must be applied using equations 11, 12 and 13 as indicated in Figure 1. As there is considerable difficulty in relocating sites of these gravity stations on the basis of coordinates alone it has, in some cases, proven difficult to obtain a satisfactory least-squares solution on the basis of a nominal number of station reoccupations.

Conclusion

The main features of a computer-oriented, punch-card system for general gravity reductions have been presented along with a brief discussion on each major division of the project. Based on the experience gained during a five-year period of development the following major requirements for such a system are given:

1. Particular care must be taken to reference properly the object deck with the source data.
2. Provision must be made to adjust the gravity results quickly in accordance with a datum change.
3. The corrections applied to the observed data in computing the free-air and Bouguer anomalies should be made as simple as possible. As these quantities are used for numerous other calculations, complex reduction procedures that are usually to some extent interpretative, may tend to obscure the accuracy and possibly even the significance of the end result.
4. Wherever possible, factors such as those given in Appendix A, indicating the accuracy or the source of the data should be assigned to the elevation, geographic coordinates and the water depth or ice thickness. When using the anomalies to calculate gradients or plumb-line deflections the quality of the source data should be known in order to assess properly the significance of the computed result.

APPENDIX A

Contained on the data cards shown in Figures 2, 3, 4, and 5 are factors that indicate either the quality or the source of the work. A brief description of the purposes and the basis used to assign the factor is given below:

a) Datum factors

This factor is used when working with altimeters and indicates the source of the reference elevation for the altimeter traverse.

This classification is as follows:

1. Spirit level.
2. Other altimeter or radar altimeter.
3. Arbitrary.

b) Elevation

This classification is based on the estimated accuracy of the elevation as follows:

1. ± 3 ft.
2. ± 10 ft.
3. ± 25 ft.
4. ± 100 ft.
5. greater than ± 100 ft. (includes estimations).

c) Coordinate factor

This is assigned on the basis of the source of the geographic coordinates as follows:

1. Coordinates scaled from 1:25,000 map
2. Coordinates scaled from 1:50,000 map
3. Coordinates scaled from 1:125,000 map
4. Coordinates scaled from 1:250,000 map
5. Coordinates scaled from 1:500,000 map
6. Coordinates obtained by instrumental means (Decca, star shots, etc.)
7. Coordinates from other sources.

d) Depth factor

The depth factor follows the same scheme as does the elevation factor:

1. ± 3 ft.
2. ± 10 ft.
3. ± 25 ft.
4. ± 100 ft.
5. greater than ± 100 ft. (includes estimations).

e) Datum number

This quantity provides a reference to the datum or adjustment on which the observed gravity values are based. It is a three-digit number with the last two digits referring to the year of the adjustment.

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RECORD OF OBSERVATIONS AT AGINCOURT MAGNETIC OBSERVATORY 1963

A. A. Onhauser and M. H. Onhauser

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AGINCOURT MAGNETIC OBSERVATORY, 1963

Geographic Latitude 43°47′N
Geographic Longitude 79°16′W

Geomagnetic Latitude 55.0°N
Geomagnetic Longitude 347.0°E

Introduction

Observations and continuous photographic recording of the magnetic elements date back to 1898(1) at Agincourt Magnetic Observatory. This magnetic work was carried out as usual during 1963. Although industrial construction advanced closer to the observatory site and artificial disturbances were discernible in the recordings, it is believed that the values reported in this publication have not been impaired.

The personnel consisted of A. A. Onhauser, officer-in-charge, with assistants M. H. Onhauser, and D. L. McKeown who joined the staff on September 11.

Absolute Instruments

Elliott Magnetometer No. 48(1) continued as the standard for declination. The Agincourt Schuster-Smith magnetometer(2)(3) and QHM's Nos. 258 and 391(4) were used for horizontal intensity. Inclination was determined with earth inductor No. 1911, and a proton precession magnetometer(5)(6) was used for total intensity.

The International Magnetic Standard corrections adopted for these instruments are as follows:

for D, I.M.S. = Elliott 48 −0.8′
for H, I.M.S. = QHM 258 +3.7γ (0.00024H)
for H, I.M.S. = QHM 391 +0γ
for H, I.M.S. = Schuster-Smith +0γ
for I, I.M.S. = Earth Inductor 1911 −0.25′
for F, I.M.S. = Proton Precession Magnetometer +0γ (4257.60 cps per oersted)

Variometers

The three-component, normal sensitivity, photographic recorders, la Cour and Ruska were operated continuously. The Ruska recordings were adopted as standard on April 1, 1963. (The la Cour recordings had been used as standard for Z since 1939 and for D and H since 1941). The la Cour magnetograms were then used as auxiliary. The la Cour Z variometer was changed to low sensitivity recording at the end of October.

An electrical recording magnetometer, Type T 613, Dominion Observatory design(7) operating continuously, provided a visible record of the variations in H, D, and Z. It was used as a low sensitivity set in the event of severe magnetic storms, and for determining at once the state of the magnetic field, quiet or disturbed.

The scale values per mm of these variometers during 1963 were:

	H	D	Z
la Cour	5.1γ	0.9′	6.1γ (Jan to Oct 31)
			16.4γ (Nov and Dec—low sensitivity)
Ruska	5.4γ	1.1′	5.2γ (Jan to Oct 31)
			5.3γ (Nov and Dec)
T613	9.2γ	2.0′	8.7γ

Absolute Observations and Base-line Values

Absolute observations were made at least once a week. Base-line values were adopted by using French curves and getting the best fit to the observed values. The r.m.s. differences of the observed minus the adopted base-line values were 0.4′ in declination, 2 gammas in horizontal component, and 3 gammas in the vertical component.

Notes on the Tables

Greenwich mean time (U.T.) is used throughout.

Table 46 lists the three-hour range indices in D, H, and Z, as well as the K-indices which are sent regularly to the International Association of Geomagnetism and Aeronomy for publication. The magnetograms were also read each month for sudden commencements, bays, and pulsations, and the results sent to the IAGA.

Annual Means

Year	D	H	Z	I	F
	West			North	
	° ′	γ	γ	° ′	γ
1953	7 15.2	15487	56219	74 35.9	58313
1954	16.0	522	209	33.8	313
1955	16.4	561	194	31.3	308
1956	16.8	601	218	29.4	343
1957	19.1	642	203	26.8	339
1958	19.7	686	196	24.2	344
1959	18.8	739	207	21.2	369
1960	19.7	797	205	18.1	383
1961	19.7	864	177	13.8	374
1962	20.6	929	147	09.7	363
1963	23.0	990	121	05.8	354

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HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 1 Agincourt H = 15,500 γ + January 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	460	456	452	450	443	445	450	448	452	456	453	455	454	451	447	435	437	440	439	442	447	456	458	457	449
2 Q	460	460	458	456	456	455	456	457	460	461	461	463	465	465	459	454	444	442	451	459	466	469	473	473	459
3	466	470	466	465	461	465	464	465	466	470	470	470	471	466	463	456	454	457	461	466	472	475	475	474	466
4	467	465	465	462	466	469	469	470	475	479	482	485	485	481	470	447	445	451	459	455	459	461	466	463	467
5	451	451	450	450	450	450	451	451	449	456	460	459	457	455	449	441	435	434	435	439	447	453	455	458	449
6 Q	458	459	459	457	457	456	456	457	459	461	462	463	465	464	456	447	441	446	451	456	462	466	466	462	458
7	458	452	446	450	450	456	462	462	462	463	461	461	462	460	451	436	425	430	446	453	461	462	461	458	454
8	457	456	453	454	456	453	453	457	452	456	458	459	461	458	451	440	433	440	450	459	467	468	466	466	455
9 Q	464	462	462	459	458	461	463	463	464	464	465	465	467	465	455	445	438	440	449	457	464	470	470	468	460
10	464	458	453	450	455	459	460	464	465	468	466	465	464	463	460	456	453	451	454	455	460	465	466	466	460
11	466	466	465	465	464	464	467	472	474	476	477	478	480	480	471	461	455	450	441	450	455	468	466	464	466
12	463	461	460	457	457	457	460	460	459	457	459	461	462	462	461	455	447	451	459	468	483	482	473	478	462
13 D	467	441	440	435	433	432	443	458	451	467	466	453	467	460	448	437	439	431	433	447	452	456	446	436	447
14 D	444	444	439	449	442	443	445	455	444	454	439	454	465	460	443	429	414	413	424	417	432	448	459	457	442
15 D	443	443	447	450	463	429	436	454	441	452	469	459	456	453	448	444	440	438	436	441	445	449	455	460	448
16	442	423	441	451	452	455	452	446	450	451	456	456	456	459	434	413	427	433	436	439	412	431	436	445	441
17	444	449	454	446	446	434	449	443	438	459	457	460	463	459	451	449	441	413	434	439	445	452	453	459	448
18	455	448	448	452	447	452	451	453	455	464	455	464	469	464	455	454	446	444	449	453	453	457	446	439	453
19	441	454	456	455	459	470	461	461	443	455	468	466	465	458	434	439	439	429	437	449	454	444	445	444	451
20	450	459	461	457	458	459	455	460	459	459	460	461	464	460	455	449	446	445	450	455	456	460	461	462	457
21	464	462	461	459	457	458	457	460	457	457	461	461	462	460	455	450	452	449	452	454	459	464	463	461	458
22	458	457	458	457	457	458	457	457	457	462	466	465	467	464	460	451	447	451	457	461	467	464	467	465	460
23	456	457	457	452	453	457	463	465	469	472	472	471	468	463	460	452	448	454	457	462	467	466	467	471	462
24	468	467	464	467	472	464	463	463	468	472	466	467	472	472	467	458	453	451	458	464	459	446	441	443	462
25	437	438	442	456	456	451	451	451	451	453	454	457	459	453	446	435	428	435	437	443	452	461	463	463	449
26	463	462	461	458	455	459	461	461	462	466	467	467	468	468	464	462	464	468	467	463	463	466	469	471	464
27 Q	472	472	471	469	471	471	470	472	472	474	469	467	469	469	468	467	468	467	463	463	464	468	469	469	469
28 Q	469	468	468	466	467	468	468	471	471	472	472	472	472	471	469	470	471	474	478	475	472	474	474	474	471
29	474	473	472	472	472	472	473	473	475	474	473	472	472	471	469	470	472	477	482	479	469	462	455	462	471
30 D	462	453	471	453	446	433	436	438	431	416	451	434	425	428	436	461	450	450	460	475	475	450	456	450	448
31 D	437	424	410	422	395	379	374	354	356	380	410	444	430	413	386	390	380	402	431	444	445	456	457	455	411
Mean	457	455	455	455	454	453	454	456	454	459	461	462	463	460	453	447	443	444	450	454	458	460	461	460	455

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 2 Agincourt D = 7° W + ... ′ January 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	19.6	19.2	19.3	20.0	19.8	18.2	19.8	20.2	19.6	20.6	20.0	19.1	17.9	16.8	17.8	20.3	23.1	23.7	23.7	24.1	23.6	22.6	21.7	20.7	20.5
2 Q	19.7	19.4	19.5	19.7	19.9	20.1	20.6	20.8	20.8	20.8	20.7	20.1	19.1	17.7	17.0	18.6	20.1	21.4	22.3	22.4	21.8	20.9	20.5	19.8	20.2
3	19.4	18.9	19.1	19.6	19.7	20.1	20.4	20.7	20.2	20.0	19.6	19.6	19.6	18.1	17.7	19.5	21.1	22.1	22.6	23.2	22.4	21.4	20.7	20.4	20.2
4	20.3	20.0	19.5	19.4	19.8	19.1	20.4	20.6	20.7	20.6	20.5	19.9	18.7	17.4	16.6	20.0	22.4	25.8	25.9	25.2	24.1	23.1	22.2	21.2	21.0
5	20.3	19.6	19.7	20.4	20.5	20.1	20.9	21.3	23.9	22.5	19.9	19.1	19.9	18.9	17.7	18.9	20.9	22.2	23.5	23.7	23.2	22.2	21.4	20.8	20.9
6 Q	20.4	20.2	19.9	20.3	20.5	20.7	21.1	21.1	20.8	20.6	20.5	20.3	19.7	18.1	16.6	18.3	20.4	22.8	23.8	23.6	22.5	21.3	20.2	19.9	20.6
7	20.2	18.3	19.5	19.3	19.3	21.4	20.4	20.7	20.5	20.4	20.5	20.5	19.9	18.1	17.8	19.1	21.2	25.8	25.4	24.5	23.3	21.4	20.6	20.3	20.8
8	19.7	19.5	19.7	20.3	20.8	21.0	21.7	21.5	20.1	20.7	21.0	21.1	19.9	18.7	17.7	18.5	21.2	24.7	25.1	24.1	23.4	22.5	21.4	20.6	21.1
9 Q	20.1	19.7	19.5	19.8	20.1	20.7	20.6	20.4	20.2	20.2	20.3	20.2	19.4	18.6	17.5	18.6	20.5	22.2	23.3	23.2	22.8	21.9	20.6	20.3	20.4
10	20.3	20.1	20.2	19.3	19.6	20.3	20.9	21.0	20.6	20.6	20.5	20.5	19.9	20.2	20.0	19.6	20.9	21.4	22.1	22.2	22.1	21.3	20.6	20.1	20.6
11	19.7	19.4	19.5	19.8	19.8	20.2	20.5	19.9	19.6	19.8	20.1	19.8	18.7	17.3	16.9	17.6	19.4	21.0	24.5	28.4	26.8	24.3	23.2	21.1	20.7
12	20.2	19.6	19.4	19.5	18.4	19.7	20.3	20.0	20.0	20.2	20.5	20.5	20.2	18.5	16.9	17.8	20.4	23.4	24.8	24.4	23.7	22.5	22.0	20.7	20.6
13 D	20.5	21.6	18.5	8.6	16.9	17.1	19.9	15.0	27.0	18.5	23.9	26.2	23.1	19.7	18.6	17.4	20.4	24.1	25.2	25.6	23.9	22.7	21.7	15.4	20.5
14 D	17.7	18.4	17.0	15.2	14.8	16.9	20.8	24.5	25.4	26.2	31.2	31.9	24.1	22.2	24.6	26.7	24.2	23.8	26.1	26.8	23.0	23.6	20.8	20.6	22.9
15 D	18.8	18.4	18.4	15.0	24.0	16.6	21.9	25.1	19.7	33.4	22.2	21.5	21.4	22.0	21.5	19.4	22.1	22.9	24.3	25.6	25.2	22.9	21.6	20.5	21.8
16	19.3	4.6	17.9	21.1	20.4	20.6	20.5	25.2	31.3	19.7	20.4	21.4	23.5	22.2	22.1	25.4	23.9	23.1	22.8	25.2	26.2	24.5	21.6	18.8	21.7
17	20.6	18.5	19.8	18.9	19.4	25.7	21.5	19.6	25.3	21.7	22.8	23.6	22.8	21.3	19.4	17.6	19.6	23.6	23.3	25.3	24.3	23.2	21.5	20.6	21.6
18	20.9	19.4	17.4	19.6	17.2	19.5	19.5	20.4	22.0	21.4	23.8	24.4	23.5	21.6	19.8	18.6	20.8	21.6	23.3	23.5	22.3	22.2	20.7	14.1	20.7
19	15.4	19.2	21.2	20.2	19.6	23.0	21.7	20.0	25.4	27.3	23.3	21.5	19.9	20.0	25.9	24.5	22.6	25.7	25.9	26.6	25.6	23.6	21.4	20.7	22.5
20	20.2	19.7	20.5	20.5	20.9	21.2	20.6	22.2	22.6	19.1	21.4	22.1	20.2	19.6	18.8	18.8	20.1	22.5	23.7	23.7	23.5	22.8	21.9	21.4	21.2
21	21.0	20.7	20.9	20.6	20.9	21.4	21.0	20.9	21.1	21.4	21.7	21.9	21.0	19.9	18.8	20.0	21.0	22.7	23.9	23.8	23.0	22.0	21.5	21.0	21.3
22	21.0	20.8	20.7	21.0	21.0	21.0	21.5	21.5	20.8	20.7	21.1	21.0	20.1	18.7	18.0	19.1	20.4	22.2	24.5	24.1	23.6	22.2	21.6	21.5	21.2
23	20.7	20.4	20.1	19.9	19.9	20.8	20.9	22.7	19.3	19.7	19.9	20.2	20.8	20.4	20.1	20.9	21.1	22.1	22.9	23.0	22.9	22.4	21.1	20.8	21.0
24	20.9	20.6	20.7	20.0	20.3	20.4	21.4	20.9	22.2	20.9	21.3	22.6	20.7	19.1	19.1	20.5	21.2	23.9	24.7	25.8	25.7	26.3	22.9	21.9	21.8
25	21.4	20.2	21.1	19.4	22.2	22.0	22.1	21.3	21.7	21.8	21.7	20.7	19.3	18.9	20.1	22.1	23.0	24.9	24.9	23.5	23.0	22.0	21.4	21.2	21.7
26	21.1	21.0	21.1	21.3	21.3	21.3	21.5	21.6	21.1	21.7	20.8	20.6	20.3	19.5	19.2	20.2	20.6	21.3	21.3	21.1	21.2	22.1	21.9	21.4	21.1
27 Q	21.1	21.1	21.0	21.1	21.3	21.3	21.4	21.4	21.2	21.0	20.3	20.4	20.1	19.7	20.2	21.5	22.8	23.0	22.6	21.9	21.8	21.9	22.0	21.5	21.3
28 Q	21.3	21.2	21.3	21.4	21.8	21.2	21.3	21.1	20.2	21.0	21.0	20.4	19.7	19.5	20.5	21.4	22.2	23.8	23.6	21.8	20.5	21.0	21.3	21.2	21.2
29	21.1	20.1	20.2	20.2	20.3	20.2	21.0	20.5	20.3	20.0	20.2	19.8	19.5	18.8	19.2	21.3	22.8	23.8	23.4	23.6	24.8	24.0	24.2	21.9	21.5
30 D	22.0	21.7	17.1	23.1	21.2	23.7	18.4	16.1	15.0	30.6	14.3	5.8	8.0	18.9	21.8	26.0	28.4	28.6	27.2	24.7	28.4	27.5	27.1	23.0	21.6
31 D	16.8	16.4	17.2	14.6	15.0	16.4	10.8	7.4	4.2	21.5	11.8	25.0	32.3	34.6	42.3	38.0	29.1	34.4	35.1	31.3	25.8	21.7	20.3	19.8	22.6
Mean	20.1	19.3	19.6	19.3	19.9	20.4	20.5	20.5	21.1	21.8	20.9	21.0	20.4	19.8	20.0	20.9	21.9	23.7	24.4	24.4	23.7	22.7	21.7	20.4	21.2

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 3 Agincourt Z = 56,000 γ + January 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	144	144	143	144	144	143	142	141	143	141	140	141	143	140	136	137	140	143	144	146	148	148	146	145	143
2 Q	145	144	142	142	142	141	141	141	141	140	140	140	140	138	132	132	136	138	143	144	144	144	141	139	140
3	138	138	138	138	138	138	138	137	137	137	135	136	138	138	133	132	133	133	133	137	138	138	137	137	136
4	137	137	137	137	133	134	135	135	135	133	133	132	132	130	126	126	132	137	144	142	144	141	139	139	135
5	137	136	135	134	134	133	133	133	132	126	127	128	132	131	127	126	131	133	136	137	138	137	136	134	133
6 Q	134	133	133	132	132	132	132	132	132	132	132	131	132	132	130	127	130	131	132	132	132	133	131	131	132
7	131	131	133	133	132	127	124	130	131	130	130	131	131	131	128	120	124	132	134	134	137	136	133	133	131
8	133	132	132	132	132	131	131	127	128	131	132	132	133	132	130	121	125	131	136	134	133	133	132	131	131
9 Q	132	132	131	131	132	132	132	131	130	129	129	129	131	130	129	127	126	132	137	133	133	134	132	132	131
10	132	132	134	134	133	132	132	132	132	132	131	131	132	133	132	129	129	130	131	132	134	134	133	132	132
11	132	131	131	131	131	131	131	129	129	128	128	128	128	127	126	122	121	121	127	132	134	135	135	134	129
12	134	133	133	133	132	132	132	132	132	132	132	132	132	132	131	128	127	130	134	135	134	132	132	131	132
13 D	132	146	143	128	95	136	132	103	121	103	110	118	123	130	132	127	126	130	137	141	140	141	141	146	128
14 D	146	147	145	135	129	126	128	121	122	112	94	120	129	129	127	127	133	145	150	161	164	155	146	145	135
15 D	144	146	144	138	95	105	80	108	92	91	105	124	134	135	135	132	132	138	141	145	145	144	143	142	127
16	142	142	145	145	141	136	133	121	104	110	123	129	135	134	134	141	144	144	145	148	154	157	157	152	138
17	150	147	143	144	142	119	102	104	114	128	133	135	136	138	138	136	138	141	150	150	151	150	147	145	137
18	145	146	147	146	140	135	139	136	138	135	134	136	136	136	137	139	138	139	139	142	145	146	152	158	141
19	153	153	150	147	142	134	126	131	124	118	124	131	134	136	135	134	136	139	148	148	151	154	156	157	141
20	153	148	144	142	141	140	137	128	122	128	136	140	140	136	139	133	134	136	141	143	145	143	142	142	139
21	142	141	140	140	140	140	140	140	139	136	136	139	140	139	136	136	134	133	135	140	142	140	139	139	139
22	137	137	139	137	137	137	136	136	135	136	137	137	139	137	136	136	136	133	136	135	142	140	140	140	137
23	141	143	141	142	140	137	135	136	133	134	134	135	136	135	133	130	133	137	140	140	140	140	140	140	137
24	138	136	136	136	134	133	135	136	134	134	133	136	136	131	128	126	128	131	136	139	140	148	173	155	137
25	153	149	146	139	133	136	138	136	136	137	139	139	139	136	133	133	134	137	141	144	142	142	140	139	139
26	138	137	136	137	139	139	137	136	136	136	136	136	136	136	134	131	135	135	136	136	134	136	137	137	136
27 Q	136	136	136	136	136	135	135	135	135	134	134	135	136	134	133	133	134	135	137	140	136	134	135	136	135
28 Q	136	135	135	135	136	135	136	134	134	134	134	134	134	131	130	129	128	128	131	135	133	131	133	134	133
29	134	134	134	134	134	134	134	134	133	132	133	133	135	133	131	130	132	134	133	134	134	134	137	140	134
30 D	139	145	139	136	141	131	135	139	135	75	91	101	119	119	114	118	126	135	140	142	145	154	179	222	134
31 D	195	208	211	170	139	121	101	54	38	-8	6	41	61	86	104	121	135	166	179	176	158	151	148	146	121
Mean	141	142	141	138	134	133	130	128	127	122	125	129	132	132	131	130	132	136	140	141	142	141	142	143	135

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 4 Agincourt — H = 15,500 γ + — February 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		455	453	453	454	454	454	455	456	465	456	457	466	463	465	460	453	446	441	448	457	444	444	437	456	454
2	Q	459	459	459	459	458	459	460	461	464	465	464	464	461	458	450	445	445	451	460	462	464	467	470	471	460
3		471	470	466	466	467	469	466	466	467	470	470	470	465	456	443	436	435	444	455	460	465	467	469	470	462
4		471	471	470	470	470	469	469	470	471	471	470	469	464	453	440	435	437	438	439	448	454	459	464	465	460
5		466	467	466	468	467	466	465	465	468	466	465	464	465	461	453	453	449	452	457	459	462	465	470	473	463
6		473	474	473	472	473	471	471	472	472	472	473	473	469	460	456	457	456	456	462	465	469	473	473	476	468
7		477	475	474	473	474	474	474	473	473	474	478	479	478	476	474	472	465	464	467	469	468	468	467	469	472
8	Q	467	463	459	458	458	459	458	460	460	462	463	463	463	463	463	461	460	463	469	470	468	464	465	467	463
9		469	470	470	469	470	470	471	474	474	478	476	476	479	477	477	477	481	486	481	489	494	490	489	465	477
10	D	504	454	409	393	423	418	404	367	418	441	449	462	434	434	435	438	431	438	440	435	450	449	455	449	435
11	D	454	454	460	461	464	465	450	452	449	438	459	460	450	446	442	439	430	446	454	450	453	450	459	468	452
12	D	469	450	458	454	465	455	446	453	439	466	468	466	463	454	453	452	453	453	454	449	454	459	454	452	456
13	D	455	459	457	476	471	453	440	466	450	459	464	460	449	446	440	410	402	430	443	429	444	460	460	445	449
14	D	444	456	460	466	470	476	474	454	444	468	470	470	465	450	438	440	435	446	451	460	461	470	471	470	459
15		471	472	471	468	468	471	473	469	469	466	466	466	460	447	449	452	450	450	457	469	471	469	470	471	464
16		472	471	471	470	470	468	468	470	472	472	471	475	472	467	462	457	447	456	462	466	468	471	473	476	468
17		477	477	476	473	472	471	473	472	471	472	473	473	472	467	462	461	458	458	466	472	476	476	475	476	471
18		477	477	477	477	476	475	477	479	479	480	479	482	482	479	476	473	469	474	478	483	486	489	488	489	479
19	Q	488	486	483	482	481	482	483	486	486	488	488	488	488	489	489	489	487	483	484	485	488	492	489	489	486
20		488	483	478	477	479	481	482	477	477	478	484	492	489	488	488	487	489	492	489	489	482	483	465	468	483
21		476	477	476	475	477	471	471	470	467	471	476	475	473	470	470	467	462	466	477	483	477	472	465	467	472
22		468	467	466	466	460	462	463	461	461	465	470	471	471	468	460	457	456	459	460	467	473	470	472	471	465
23		471	471	471	471	470	470	474	472	467	471	473	472	471	466	462	454	450	463	469	475	472	471	470	472	469
24	Q	472	472	471	466	467	467	469	470	471	472	473	474	471	465	458	459	457	460	469	478	487	487	482	476	470
25		473	470	465	468	466	470	471	472	474	474	474	475	474	471	474	470	464	465	471	480	483	482	479	477	473
26		476	475	474	472	474	473	474	470	470	472	470	471	468	464	462	464	459	454	460	467	474	474	472	475	469
27	Q	474	475	474	474	475	474	475	475	476	476	475	474	473	468	464	464	460	459	461	464	469	473	474	474	471
28		474	470	470	469	464	468	470	474	471	475	479	478	475	469	462	454	451	454	464	474	481	489	490	478	471
29																										
30																										
31																										
Mean		471	468	466	466	467	466	465	464	465	458	471	472	468	463	459	456	453	457	462	466	469	471	470	470	466

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 5 Agincourt D = 7° W + ... ′ **February 1963**

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	20.6	21.1	21.2	21.4	21.8	21.9	21.9	22.0	21.8	16.5	23.0	20.7	20.6	28.4	28.1	26.8	28.5	29.6	28.9	27.6	25.1	23.4	20.1	20.7	23.4
2 Q	20.8	20.4	20.5	20.6	20.9	21.3	21.4	21.3	21.1	21.3	21.2	21.1	20.2	20.2	20.7	22.1	23.9	25.0	24.3	23.3	22.4	21.9	21.5	21.5	21.6
3	21.1	20.7	21.1	20.8	22.0	21.4	21.9	21.3	20.5	20.2	20.1	19.8	19.5	19.5	20.6	23.2	26.4	27.4	26.9	25.8	25.0	22.9	22.1	21.4	22.1
4	20.9	21.0	21.2	21.3	21.4	21.5	21.6	21.3	21.1	20.4	20.3	20.0	19.2	17.6	17.8	20.6	22.9	25.3	27.4	26.7	25.0	22.3	22.1	21.3	21.7
5	21.1	21.0	20.7	20.7	21.1	21.1	20.7	20.5	20.4	20.0	19.7	19.6	18.7	18.1	19.5	22.5	25.0	25.1	25.7	24.8	24.1	22.9	21.7	21.2	21.5
6	20.8	20.3	18.4	19.6	20.2	21.1	21.2	21.6	21.1	20.5	20.2	20.0	19.5	18.8	19.6	21.3	23.3	23.9	24.2	23.6	23.0	22.0	21.5	21.2	21.1
7	20.8	20.7	20.5	20.0	21.2	21.4	21.4	21.4	21.6	22.1	20.8	20.7	19.8	19.0	18.7	19.8	21.7	23.1	23.1	22.3	22.1	22.1	23.3	22.0	21.2
8 Q	20.9	21.1	21.1	21.2	20.9	20.7	21.0	20.7	20.5	20.7	20.7	20.9	20.6	20.5	20.6	20.9	21.4	21.7	21.6	20.7	19.8	20.3	21.4	21.3	20.9
9	21.0	20.8	20.8	20.8	20.9	21.0	20.9	20.7	20.5	20.2	20.1	19.9	19.6	19.6	19.7	21.2	21.3	21.2	21.2	20.4	19.7	20.5	23.5	28.3	21.0
10 D	24.9	23.1	20.8	30.5	23.3	20.9	24.3	40.7	17.9	14.1	20.7	21.3	28.9	28.5	24.4	24.6	25.9	25.4	26.0	26.2	23.2	17.3	20.9	15.9	23.7
11 D	14.0	17.1	21.7	21.7	25.2	28.9	24.3	20.1	20.7	21.3	18.6	17.8	19.8	19.3	21.7	24.1	24.1	24.2	24.6	25.1	23.0	22.0	20.6	18.5	21.6
12 D	20.0	10.3	13.3	21.5	25.5	23.8	31.0	25.0	30.5	19.7	18.4	19.7	21.3	21.2	22.2	23.1	24.6	24.2	24.1	24.0	22.6	23.3	19.6	19.5	22.0
13 D	18.0	19.1	17.3	16.2	20.3	20.5	32.3	21.8	22.6	24.2	20.9	21.6	24.6	23.2	19.9	22.6	26.0	27.1	23.3	25.3	24.4	22.6	21.6	17.6	22.2
14 D	16.1	19.6	19.9	19.8	22.8	22.2	21.7	25.3	32.0	16.9	18.7	19.1	19.3	19.9	20.6	21.4	21.6	22.5	23.9	23.3	22.2	21.5	21.6	22.2	21.4
15	21.6	21.0	20.8	20.5	19.9	21.6	21.9	21.6	21.4	20.7	21.6	21.6	21.1	22.5	21.6	20.7	22.3	23.9	24.7	24.2	23.5	22.6	22.3	21.8	21.9
16	21.5	21.1	12.2	21.3	21.5	21.6	21.7	21.8	21.9	21.1	22.1	21.1	20.5	20.1	20.3	21.5	24.1	24.3	24.2	23.5	23.0	22.7	22.3	21.8	21.9
17	21.5	21.0	21.1	21.5	21.3	21.6	21.8	21.5	21.5	21.9	21.5	20.9	20.8	20.2	19.9	20.8	22.1	23.7	24.6	24.5	23.5	22.5	22.3	22.0	21.8
18	21.6	21.5	21.5	21.4	21.3	21.1	21.5	20.9	21.1	20.7	19.9	20.0	20.0	19.7	19.9	20.8	21.7	22.3	22.5	22.1	22.4	22.5	22.0	21.5	21.2
19 Q	21.2	21.1	21.2	21.3	21.3	21.0	21.1	21.0	20.8	20.8	20.8	20.7	20.3	19.7	19.8	20.1	21.7	23.1	23.0	22.7	22.7	22.6	22.4	21.9	21.4
20	21.6	21.9	21.7	21.0	20.9	20.5	20.1	20.1	18.9	18.5	20.1	20.1	19.8	18.9	20.7	21.3	22.7	23.5	22.6	23.0	22.7	23.6	24.6	22.6	21.3
21	22.4	21.8	21.9	22.0	21.3	21.1	21.6	21.0	20.4	21.1	19.3	20.3	20.5	20.1	20.3	21.0	23.8	25.7	25.3	24.5	23.4	23.1	22.9	22.4	22.0
22	21.7	21.3	21.6	21.6	19.2	21.7	21.3	21.6	25.7	20.2	19.7	19.5	20.1	19.3	19.8	20.9	23.1	24.6	25.1	24.0	22.5	21.3	21.3	21.2	21.6
23	21.3	21.3	21.3	21.4	21.4	21.7	21.9	21.1	20.1	20.1	20.3	20.7	21.2	18.3	19.3	21.0	26.1	26.5	25.4	24.2	22.0	21.2	21.2	21.0	21.7
24 Q	20.8	21.0	21.1	21.5	21.4	21.6	21.8	21.8	21.6	21.3	21.1	20.8	19.9	19.0	19.0	20.7	22.9	25.2	26.5	25.6	23.5	21.7	21.4	21.8	21.8
25	21.9	20.8	20.1	21.1	20.9	21.6	21.8	21.8	21.3	21.4	21.0	20.2	19.5	20.2	20.4	21.2	22.8	24.8	26.4	25.8	23.8	22.3	21.9	21.7	21.9
26	21.3	21.5	21.5	21.3	21.3	21.3	21.3	21.7	22.5	21.7	18.3	19.0	19.6	20.0	20.9	22.4	24.5	25.5	26.0	25.5	23.7	22.5	22.1	21.8	22.0
27 Q	21.1	21.1	21.3	21.5	21.7	21.6	21.3	21.3	21.1	21.2	20.2	20.2	19.5	19.0	19.0	20.2	21.9	22.9	23.7	24.2	23.4	22.8	22.4	22.0	21.4
28	21.7	21.6	21.8	20.3	19.1	21.2	21.8	21.9	21.9	24.5	20.5	19.3	18.4	17.0	18.4	20.2	22.4	24.8	25.9	25.7	23.8	22.4	22.2	23.0	21.6
29																									
30																									
31																									
Mean	20.8	20.5	20.6	21.2	21.4	21.7	22.4	22.2	21.9	20.5	20.4	20.2	20.5	20.3	20.5	21.7	23.5	24.5	24.7	24.2	23.0	22.1	22.0	21.4	21.8

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 6 Agincourt $Z = 56,000\ \gamma +$ February 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		141	141	141	141	141	142	143	139	119	115	120	116	126	119	120	122	132	115	145	151	151	157	157	151	135
2	Q	144	141	139	138	138	138	138	138	138	138	137	136	137	134	135	137	139	140	143	144	141	138	137	138	139
3		138	137	137	138	137	135	137	138	138	137	135	134	136	135	134	135	138	140	143	143	141	139	138	136	137
4		134	133	133	133	133	133	133	133	133	132	132	132	134	132	130	131	132	136	139	139	137	134	134	133	133
5		133	133	133	133	133	133	133	133	132	133	132	132	133	130	121	120	121	124	126	131	133	137	136	135	131
6		134	133	133	133	132	133	133	133	133	134	134	133	133	131	130	128	131	132	131	133	134	134	134	134	133
7		133	133	133	133	132	133	132	133	132	133	133	132	132	130	125	120	121	126	129	131	132	133	134	134	131
8	Q	134	135	134	134	133	132	132	132	132	132	131	131	130	128	126	126	127	127	127	128	128	127	128	129	130
9		129	129	128	128	128	128	129	128	128	127	127	126	126	125	122	120	120	122	124	127	125	124	128	151	127
10	D	249	221	167	85	134	140	108	48	84	103	132	124	117	132	143	141	141	148	151	150	162	162	152	157	140
11	D	147	147	147	141	129	105	115	130	140	127	135	136	135	140	138	138	144	145	141	141	145	146	144	145	138
12	D	141	141	143	135	126	123	94	108	83	121	130	134	136	136	134	133	134	137	141	144	145	148	149	146	132
13	D	148	145	142	129	123	116	69	94	112	123	130	131	136	133	134	131	148	152	153	155	156	146	146	148	133
14	D	149	150	147	133	117	119	130	123	79	122	131	135	137	137	140	141	141	142	142	144	142	140	140	140	134
15		142	141	141	140	140	137	134	137	137	137	135	136	136	138	140	137	135	136	140	140	138	137	138	139	138
16		138	138	137	137	137	137	137	137	136	136	136	136	137	136	135	129	128	130	131	132	137	138	138	137	135
17		137	136	135	136	136	137	137	136	136	136	136	136	136	136	134	132	132	134	133	135	136	134	135	135	135
18		135	135	134	135	135	135	135	135	135	132	132	132	132	131	129	127	128	129	130	131	131	131	134	135	132
19	Q	132	132	133	132	134	134	135	134	134	132	132	131	131	131	131	129	125	125	127	129	129	129	130	131	131
20		130	130	131	135	134	132	131	130	129	129	131	129	129	125	123	118	117	118	121	125	129	133	142	148	129
21		137	135	134	134	134	134	130	125	124	123	123	127	129	129	124	123	120	125	132	132	131	132	134	134	129
22		133	133	133	133	133	134	131	131	127	124	131	132	135	132	129	131	130	125	129	133	133	132	132	133	131
23		131	131	131	131	130	131	129	120	129	131	131	131	131	130	125	120	124	129	129	132	131	131	132	132	129
24	Q	131	131	130	131	131	132	131	132	132	132	131	131	133	134	131	124	124	129	134	135	132	131	132	134	131
25		134	134	136	135	134	134	134	134	132	132	132	132	132	131	130	121	120	124	129	133	132	131	131	132	131
26		130	130	130	130	129	128	124	130	129	123	122	125	128	128	128	123	122	124	127	129	132	132	131	131	128
27	Q	131	130	130	130	130	130	129	129	129	128	128	129	129	129	129	124	123	124	121	127	128	128	129	130	128
28		128	128	128	127	127	128	128	128	127	124	125	126	127	123	122	117	115	119	126	130	132	129	129	129	126
29																										
30																										
31																										
Mean		140	139	136	132	132	131	128	127	126	128	131	131	132	131	130	128	129	131	134	136	137	136	137	138	132

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 7 Agincourt H = 15,500 γ + March 1963

Day	Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	472	467	467	466	472	466	452	466	462	461	466	466	463	457	450	439	427	439	454	465	476	471	472	467	461
2		472	472	473	472	474	473	477	474	473	474	478	483	477	474	462	451	445	450	461	466	478	483	484	484	471
3		479	478	478	478	483	478	477	476	476	473	478	473	472	471	466	458	451	452	460	467	473	471	474	478	472
4		477	479	479	480	478	477	477	478	478	477	479	478	474	473	472	463	457	456	463	468	477	484	478	478	474
5		477	479	480	479	475	474	475	478	477	479	480	480	475	472	462	457	454	457	468	479	479	478	479	478	474
6		479	480	479	474	469	473	474	479	479	479	480	480	478	470	461	452	453	459	462	466	468	474	479	478	472
7		479	478	479	473	472	467	474	475	476	479	479	479	475	474	470	464	456	459	469	479	477	491	474	457	473
8	D	473	461	451	447	464	469	454	476	453	471	480	469	489	476	459	442	437	443	458	471	469	475	474	466	464
9	D	471	460	460	445	459	462	465	474	466	472	476	475	473	464	462	455	454	454	462	469	475	480	461	481	466
10	D	480	492	473	458	470	467	464	454	449	441	465	474	445	421	403	411	449	426	444	472	473	452	460	447	454
11	D	436	444	462	476	467	467	467	470	471	471	470	472	470	463	448	439	440	447	456	459	459	474	475	470	461
12		469	469	476	467	471	467	477	475	472	475	470	476	471	459	455	441	445	446	450	461	467	475	477	478	466
13		477	476	475	475	475	476	479	476	476	472	475	481	474	464	450	455	458	453	455	460	467	476	477	477	470
14	Q	477	475	476	476	476	476	476	477	478	480	481	481	480	471	464	461	461	464	471	474	475	476	480	482	475
15		482	480	475	477	474	472	476	476	476	477	480	479	475	465	456	444	440	448	460	471	479	482	483	485	471
16	Q	486	483	482	482	481	482	482	481	482	483	484	482	481	476	467	456	448	448	459	471	480	485	486	486	476
17		483	482	482	483	484	486	486	486	487	486	486	481	476	471	465	463	462	468	474	480	476	477	475	477	478
18		480	480	481	474	475	479	476	476	470	473	475	475	468	457	447	456	458	467	475	476	480	479	478	478	472
19		484	475	478	469	469	461	468	474	477	477	475	473	469	463	460	452	455	463	473	467	473	474	467	469	469
20		474	470	469	474	474	475	474	475	477	478	480	481	480	479	475	474	474	478	480	482	484	480	468	475	476
21		476	475	474	474	475	475	473	473	479	479	478	477	474	468	459	453	453	458	463	469	475	478	479	480	472
22	Q	480	481	480	480	480	480	480	481	481	480	480	479	474	469	463	452	452	460	468	480	485	485	486	489	476
23		490	486	484	482	485	488	489	484	489	495	485	496	490	477	461	466	467	467	468	473	476	482	479	481	481
24		480	480	478	478	479	480	480	482	484	484	483	480	475	470	460	446	447	452	461	473	484	482	479	480	474
25		485	483	482	481	483	483	481	482	483	486	486	487	482	471	458	447	449	458	470	479	487	492	491	488	478
26	Q	486	485	485	485	485	485	485	486	487	487	486	481	479	469	460	453	453	454	469	475	473	480	483	483	477
27	Q	486	482	483	482	482	482	486	486	486	487	487	486	484	478	467	458	457	464	476	479	487	490	487	487	480
28		487	487	487	488	490	492	492	490	491	496	496	493	491	485	472	458	449	454	464	477	490	493	497	492	484
29		492	491	494	489	493	493	494	494	494	488	488	483	480	482	474	460	450	452	461	472	480	487	491	492	482
30		489	488	487	483	483	482	482	484	482	483	482	483	483	483	477	471	471	474	481	487	488	487	493	494	483
31		492	490	489	488	489	484	482	480	482	483	484	485	483	477	467	459	456	461	474	487	490	504	500	492	483
Mean		479	478	477	475	477	476	477	478	477	478	480	480	476	469	460	453	453	456	465	473	477	481	480	479	473

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 8 Agincourt D = 7° W + ... ′ March 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	23.6	23.6	22.7	24.4	20.4	20.4	16.9	19.3	15.9	20.1	18.8	19.2	20.5	19.3	18.7	19.4	23.6	27.4	27.4	26.8	25.3	24.9	23.2	22.4	21.8
2	21.3	21.9	22.3	22.2	22.4	21.4	23.7	21.0	19.1	18.9	19.3	18.2	18.6	18.4	18.6	21.3	24.4	25.9	26.9	26.3	24.4	23.2	22.4	22.6	21.9
3	22.4	22.3	22.0	21.7	20.7	21.7	24.9	23.8	20.4	17.5	16.9	19.0	19.4	18.6	19.1	21.2	23.8	25.7	26.5	15.6	25.5	24.4	22.9	22.4	21.6
4	21.6	21.4	21.4	21.5	22.2	21.5	21.7	21.4	22.6	21.4	19.6	20.7	20.7	20.2	20.4	21.5	24.6	26.8	26.8	26.0	24.8	24.2	23.4	23.3	22.5
5	22.4	22.2	22.4	22.3	21.5	21.7	21.7	21.2	21.2	21.2	20.0	19.7	19.1	18.8	19.3	21.4	24.6	26.9	27.0	26.6	25.6	24.6	23.5	23.5	22.4
6	22.2	21.7	21.6	22.3	22.6	20.7	21.5	21.6	21.4	21.3	21.0	20.5	19.8	19.5	19.1	22.4	25.4	27.4	28.8	29.1	28.9	25.7	23.4	22.7	22.9
7	22.1	22.3	22.3	21.1	38.7	22.7	21.3	20.7	20.5	20.7	21.4	21.3	20.7	20.1	19.7	20.6	23.4	24.8	25.6	26.6	26.1	26.6	29.6	32.6	23.8
8 D	23.2	19.5	13.9	19.3	22.2	21.7	20.4	18.2	15.0	19.7	20.1	30.4	25.8	19.4	21.2	25.8	29.0	31.1	28.8	29.1	30.8	25.8	23.6	23.8	23.2
9 D	21.8	22.7	22.4	18.2	23.6	19.5	20.5	20.7	21.3	21.1	19.7	19.5	19.4	19.3	20.6	20.6	23.8	26.3	25.9	25.6	24.8	24.2	24.2	21.4	22.0
10 D	20.0	14.0	19.4	19.6	19.0	23.5	26.6	19.1	23.2	28.8	22.4	21.2	25.1	26.0	26.6	31.0	29.1	29.3	27.5	27.7	23.5	17.9	21.2	19.0	23.4
11 D	4.8	15.3	17.2	20.8	22.3	19.5	23.5	25.3	22.4	22.1	22.2	20.9	18.6	17.2	18.5	19.5	22.2	25.0	27.2	28.0	26.3	25.5	25.0	19.4	21.2
12	18.6	19.0	17.4	20.2	23.6	26.3	24.1	22.4	24.4	24.4	25.7	22.6	19.5	18.6	19.1	21.5	24.2	26.8	28.5	27.5	26.5	25.0	23.3	22.2	22.9
13	21.6	21.5	21.5	21.9	22.1	21.6	22.2	21.4	24.3	22.6	23.8	22.0	21.5	21.1	21.9	22.6	22.8	24.9	26.4	26.5	25.4	23.6	22.5	21.4	22.8
14 Q	21.2	20.9	21.7	21.8	21.4	21.3	21.7	21.8	21.8	21.7	21.5	21.3	20.0	19.9	20.0	21.2	23.3	25.4	25.6	26.0	25.5	24.6	23.2	22.1	22.3
15	21.5	21.2	20.1	20.6	21.1	21.9	22.0	21.4	21.4	21.3	21.1	20.5	19.1	18.0	18.5	18.9	21.2	24.9	27.4	27.3	26.4	25.2	23.5	22.7	22.0
16 Q	22.2	22.1	22.1	21.6	21.8	21.8	21.6	21.6	21.6	21.4	21.2	20.4	19.2	18.1	17.3	18.0	20.1	23.4	24.7	26.5	27.3	25.5	24.3	23.2	22.0
17	22.5	22.3	21.6	22.1	21.7	22.1	21.5	21.2	21.0	20.4	20.6	19.5	18.3	18.1	18.3	20.0	25.6	28.9	28.9	27.5	27.0	26.4	23.1	23.2	22.6
18	22.3	21.8	22.2	21.5	21.5	21.6	20.4	20.0	16.8	16.2	19.2	19.3	17.7	16.8	21.3	27.1	27.3	27.5	26.1	26.4	26.7	26.8	25.6	24.3	22.4
19	24.3	22.7	22.3	21.4	20.6	19.5	18.0	19.1	19.5	19.1	19.3	18.9	18.4	18.0	18.9	21.5	24.5	24.5	25.2	25.7	25.5	25.5	24.0	22.3	21.6
20	22.2	20.9	21.7	21.5	21.6	20.9	21.0	20.5	19.8	19.6	20.4	20.5	18.7	18.3	18.8	20.7	23.0	24.9	25.8	25.7	25.2	24.8	23.3	24.1	21.8
21	22.3	22.2	21.4	19.4	21.4	21.4	20.9	23.8	21.4	20.4	21.0	20.1	19.1	18.0	18.9	21.3	24.6	26.5	26.9	25.6	24.3	23.1	22.6	22.7	22.1
22 Q	22.5	22.3	22.3	22.3	22.2	22.1	21.6	21.5	21.4	21.4	21.3	20.8	19.1	16.6	16.5	19.0	22.5	25.5	26.4	25.9	24.9	23.4	23.2	22.3	22.0
23	22.6	22.9	22.6	22.3	21.4	21.0	20.1	19.4	20.4	19.4	22.2	22.6	16.4	16.2	22.0	23.3	25.2	26.9	27.7	27.5	26.3	24.7	23.7	22.8	22.5
24	22.3	22.2	22.3	22.3	22.3	22.2	21.8	21.5	21.3	21.2	21.4	20.4	19.7	16.9	17.7	20.4	24.1	27.3	27.7	27.6	26.5	24.6	24.0	22.3	22.5
25	22.1	22.0	22.2	22.3	21.8	21.7	21.7	21.5	21.1	20.5	20.5	19.6	18.0	16.5	17.9	21.1	24.7	27.9	28.3	27.4	25.5	23.5	22.5	22.6	22.2
26 Q	22.8	22.7	22.5	22.3	22.1	22.0	21.5	21.3	21.3	21.2	21.1	20.3	18.3	16.7	17.3	19.5	24.1	27.1	28.8	29.6	28.4	25.9	24.3	23.2	22.7
27 Q	22.2	22.1	21.5	21.8	22.1	21.6	21.6	21.3	20.9	20.6	20.6	20.1	18.5	17.2	17.7	20.8	23.6	25.7	26.4	25.5	24.6	24.1	23.3	22.6	21.9
28	22.3	22.1	22.0	21.9	21.7	21.3	20.5	22.0	19.3	19.4	19.1	19.1	18.1	16.9	16.1	18.0	22.3	25.5	27.6	28.8	28.2	26.8	24.6	22.7	21.9
29	21.6	21.2	20.3	21.0	21.2	21.2	20.4	19.8	19.0	18.4	18.1	19.0	20.6	18.3	15.2	16.9	19.3	23.4	26.3	27.8	27.7	26.2	24.5	22.5	21.2
30	22.1	22.0	21.4	21.3	21.5	21.4	21.0	20.1	19.0	19.9	20.5	21.4	19.8	18.5	18.3	19.0	21.4	23.5	25.4	25.9	25.6	25.2	24.3	22.9	21.7
31	22.2	21.9	22.0	21.9	21.1	21.1	19.4	18.8	19.8	19.8	20.4	19.8	19.0	18.0	18.4	20.3	23.3	26.2	27.5	27.6	26.2	25.5	25.1	24.5	22.1
Mean	21.5	21.4	21.2	21.4	22.2	21.6	21.5	21.0	20.6	20.7	20.7	20.6	19.6	18.5	19.1	21.2	23.9	26.2	27.0	26.6	26.1	24.8	23.8	22.9	22.3

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 9 Agincourt H = 56,000 γ + March 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	130	140	145	153	144	131	128	114	114	138	138	137	138	136	133	124	124	131	137	141	142	140	137	139	135
2	140	138	136	136	133	133	128	128	130	130	129	131	126	129	129	124	125	130	134	134	135	132	133	132	132
3	131	129	132	131	124	127	124	122	113	120	122	124	127	130	128	127	125	126	129	132	134	134	135	135	127
4	139	138	129	128	128	128	129	129	124	122	123	125	126	128	127	120	120	125	129	132	132	132	129	129	130
5	127	127	127	128	129	129	128	128	127	127	126	126	126	126	124	119	118	120	124	127	130	131	132	132	127
6	131	130	131	132	135	131	130	131	131	128	129	129	126	125	126	118	116	122	130	142	140	140	138	137	130
7	136	135	136	137	136	135	135	136	136	136	135	136	136	135	135	129	128	129	131	138	140	146	155	182	138
8 D	165	159	167	156	152	146	128	66	104	138	133	108	100	119	124	126	131	138	141	150	167	167	161	156	138
9 D	153	154	154	140	114	123	140	144	138	139	140	143	142	143	142	127	128	133	136	140	142	148	151	148	140
10 D	146	137	132	136	121	126	91	107	115	91	101	120	118	120	131	151	149	148	174	162	166	166	167	177	136
11 D	149	149	148	135	110	117	135	139	132	135	135	138	138	135	138	140	144	149	150	155	158	153	154	155	141
12	148	146	139	143	134	121	127	130	134	135	134	136	139	142	141	138	135	136	139	143	147	145	142	139	138
13	136	136	135	135	134	132	130	130	127	126	132	133	133	133	133	137	130	131	136	138	141	141	139	138	134
14 Q	136	135	135	135	133	132	132	132	132	133	133	135	135	136	136	133	133	134	136	137	137	139	138	136	135
15	133	133	133	130	130	133	133	133	133	133	133	134	134	135	132	127	124	128	131	133	134	135	133	133	132
16 Q	129	129	129	129	129	129	129	129	129	128	128	129	129	128	126	124	122	124	128	130	133	133	134	132	129
17	131	128	127	128	128	127	126	127	126	127	127	127	129	127	123	117	114	115	121	125	126	129	136	133	126
18	131	130	130	130	134	131	128	122	116	121	127	129	129	127	125	120	116	119	127	126	130	134	137	137	127
19	137	132	131	135	133	127	129	132	132	129	127	128	129	127	124	118	122	126	129	133	136	137	138	142	131
20	138	137	137	134	134	133	133	133	132	129	127	124	127	127	123	116	113	116	117	120	125	134	137	138	128
21	136	133	131	127	127	130	128	127	127	128	130	131	131	127	124	122	116	117	124	130	133	133	131	130	128
22 Q	131	130	129	129	128	128	129	128	128	128	128	128	128	127	123	117	116	121	122	124	127	128	128	127	126
23	127	127	128	128	127	127	126	127	127	125	122	114	118	122	123	122	120	121	122	126	132	136	134	131	126
24	129	128	127	127	127	127	127	127	127	127	126	127	128	131	129	126	127	127	127	125	126	127	130	130	128
25	130	127	127	127	126	123	126	126	126	126	126	128	124	128	124	121	123	127	131	133	133	131	128	127	127
26 Q	127	127	126	126	126	127	126	126	126	126	126	128	129	128	124	118	117	119	124	128	128	128	128	128	126
27 Q	128	127	127	128	128	127	127	125	126	127	127	128	128	128	127	123	122	124	128	128	130	128	128	128	127
28	127	127	126	126	126	125	124	122	119	123	123	125	127	127	122	119	118	122	128	128	128	132	132	129	125
29	128	127	126	125	124	125	125	124	123	123	123	125	126	127	126	126	123	121	123	127	130	129	135	133	126
30	131	129	129	129	130	130	130	128	128	128	127	126	127	128	122	117	116	119	122	123	126	127	128	128	126
31	125	124	124	124	123	124	123	123	125	124	126	127	128	127	124	123	124	125	126	127	128	132	132	135	126
Mean	135	134	133	132	129	129	128	126	126	127	128	128	128	129	128	125	124	127	131	133	136	137	137	138	130

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 10 Agincourt — H = 15,500 γ + — April 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		488	483	475	482	482	455	451	464	466	477	484	483	477	470	458	453	452	456	466	476	484	487	489	490	473
2		489	488	487	483	483	483	484	487	487	487	487	487	486	482	472	463	463	466	465	476	483	486	485	487	482
3		483	487	488	487	489	488	488	484	482	488	492	489	484	477	469	462	461	470	481	488	493	497	495	497	484
4	D	498	493	488	488	489	489	495	493	498	501	503	499	488	478	453	465	475	485	487	482	488	499	492	484	488
5	D	462	457	473	466	485	483	465	465	462	471	471	475	471	458	452	437	443	459	465	482	487	482	473	474	467
6	D	481	480	483	488	489	486	488	477	466	488	484	461	480	476	457	461	467	475	482	485	494	482	477	482	479
7		482	485	486	485	487	482	481	477	482	471	484	482	474	472	463	452	451	466	476	487	490	491	490	472	478
8		483	485	482	484	483	488	485	484	487	487	485	482	477	472	465	455	446	457	472	486	494	495	491	489	480
9		487	487	483	482	487	477	477	480	485	485	483	482	475	461	449	447	449	450	470	482	490	485	487	488	476
10	Q	486	484	483	483	483	483	484	485	484	483	481	477	469	457	448	445	449	460	471	475	485	489	492	490	476
11	Q	492	493	490	489	489	489	489	489	489	487	487	487	480	469	457	449	453	462	476	481	484	489	494	498	482
12		485	483	490	488	491	491	488	493	489	483	483	490	485	468	456	455	457	462	481	484	485	477	478	487	480
13		487	483	488	483	482	488	488	488	487	477	477	477	480	471	457	460	462	474	478	483	500	489	479	484	480
14	D	465	471	481	483	482	483	481	482	481	478	484	486	470	461	445	449	483	491	493	485	487	487	502	499	480
15		473	460	473	468	472	476	454	462	473	472	476	467	462	463	467	467	468	476	482	484	489	487	494	488	473
16		483	485	479	479	484	485	483	486	485	482	484	482	481	476	474	466	461	463	467	483	483	495	500	496	481
17		488	482	500	488	485	485	482	483	486	485	485	483	478	471	466	463	467	479	488	494	496	500	496	493	484
18		490	491	490	490	488	490	494	494	490	489	490	486	479	478	474	481	490	501	491	506	487	490	483	489	489
19		485	488	490	490	499	488	494	479	485	496	497	492	485	479	478	482	486	489	491	501	502	499	493	491	490
20		490	495	495	494	491	494	489	490	492	492	495	493	484	472	464	458	475	486	495	497	491	491	489	490	488
21	Q	491	489	490	490	486	488	489	489	490	490	489	484	476	474	472	475	484	488	487	496	496	491	485	489	487
22		494	483	472	482	485	485	487	486	488	486	486	484	481	475	462	457	472	487	495	502	512	490	486	489	484
23		484	479	467	462	460	461	468	458	474	470	474	476	469	458	449	450	462	478	489	496	497	495	489	485	473
24	Q	486	486	486	486	486	487	490	491	491	490	491	487	481	469	458	458	469	487	501	502	500	497	493	496	486
25		497	498	500	502	502	502	500	499	496	497	496	492	485	472	465	465	474	485	491	496	505	502	500	499	493
26		497	497	492	492	494	491	491	493	495	495	496	492	486	472	461	461	469	483	492	498	513	507	504	507	491
27		501	503	503	499	494	499	489	489	479	478	480	484	483	488	480	468	477	483	496	478	474	486	493	491	487
28	Q	490	491	492	494	494	495	496	497	501	501	499	496	491	487	481	479	485	494	496	493	489	490	495	501	493
29		501	500	500	500	500	496	493	496	497	497	496	496	496	490	480	480	498	509	511	510	507	505	500	498	498
30	D	501	499	499	496	496	496	495	497	499	499	502	496	490	480	479	491	496	512	509	523	521	477	500	506	498
31																										
Mean		487	486	487	486	487	486	485	485	486	486	487	485	480	473	464	462	468	478	485	490	494	491	491	491	483

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 11 Agincourt — D = 7° W + ... ′ — April 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	24.0	23.2	20.7	22.3	20.5	9.2	17.0	19.6	19.7	21.2	21.6	18.4	17.2	17.5	18.8	21.7	24.9	26.7	27.3	26.8	25.8	24.5	23.4	22.5	21.4
2	22.2	22.1	22.0	22.6	22.2	22.0	21.9	21.5	21.3	21.1	20.6	19.9	19.5	19.1	20.4	22.9	26.4	27.7	29.8	29.1	27.5	25.6	24.3	22.8	23.1
3	17.9	21.4	22.1	21.5	21.2	22.1	22.2	20.6	21.6	22.5	21.0	19.8	18.4	18.3	19.1	20.7	24.8	27.6	28.7	28.2	26.7	24.9	23.4	22.5	22.4
4 D	22.3	22.2	21.9	22.3	21.3	20.7	19.4	18.1	18.4	15.9	17.6	17.1	14.4	18.7	22.0	28.7	29.4	29.6	30.6	31.1	26.7	25.1	23.9	21.4	22.5
5 D	20.5	11.8	16.2	19.0	29.4	28.7	18.1	17.4	20.8	23.4	21.7	21.8	20.1	19.3	21.2	23.6	27.8	29.3	29.1	26.5	25.6	25.5	21.9	16.2	22.3
6 D	20.1	20.9	19.3	22.0	22.5	21.2	22.5	23.4	33.9	20.4	20.3	24.3	20.3	20.0	22.2	23.2	27.0	28.5	27.9	27.4	24.8	23.3	20.3	21.3	23.2
7	20.5	19.0	21.0	22.3	21.4	22.3	27.1	27.4	21.3	29.2	20.0	18.4	19.9	20.1	20.4	25.4	28.4	28.7	27.5	25.9	24.6	22.8	21.7	19.2	23.1
8	20.6	21.2	21.5	22.2	22.2	22.7	21.5	21.1	21.0	20.6	21.2	20.1	18.7	17.2	17.6	19.4	23.3	26.5	28.8	27.7	26.0	24.0	22.5	21.6	22.1
9	21.9	21.3	21.3	21.0	22.4	21.4	22.1	23.3	22.2	20.6	20.0	19.1	17.3	17.9	19.2	22.4	26.0	29.7	29.0	26.9	25.0	23.2	22.2	21.7	22.4
10 Q	21.9	22.1	22.1	22.1	21.9	22.1	22.0	22.1	21.2	20.8	19.8	19.2	17.9	18.8	20.4	24.2	27.4	28.8	29.6	28.9	26.6	24.2	22.9	22.5	22.9
11 Q	22.5	22.2	22.2	22.1	22.0	21.9	21.5	21.4	21.4	21.9	20.6	19.0	17.5	17.6	18.9	21.6	24.8	27.4	27.9	27.2	26.1	24.6	23.0	22.1	22.4
12	20.3	20.3	22.1	22.1	22.2	21.5	21.4	24.2	19.8	21.8	22.6	18.2	16.2	15.1	18.7	23.0	26.4	29.4	30.5	30.5	29.7	28.2	25.3	23.2	23.0
13	22.4	21.5	18.8	19.9	21.5	22.1	22.0	21.1	21.2	23.7	22.2	18.7	17.2	16.5	18.3	23.4	26.8	29.2	31.3	32.5	31.0	30.3	28.8	27.0	23.6
14 D	21.4	22.1	23.8	22.6	21.8	21.8	21.0	20.9	20.0	20.3	21.3	19.1	22.4	24.0	27.4	31.9	31.9	26.6	26.3	26.9	26.3	25.2	25.2	18.3	23.7
15	19.8	14.9	10.7	20.7	19.9	19.9	22.2	22.0	16.0	16.7	17.7	18.9	20.0	21.5	22.4	22.6	23.2	23.8	23.6	23.9	23.9	24.0	23.4	22.6	20.6
16	17.8	21.4	21.1	19.2	21.3	21.5	20.7	20.5	20.5	20.3	18.4	18.5	18.4	18.2	19.7	20.2	22.4	25.4	27.5	27.4	26.7	25.9	25.5	24.4	21.8
17	23.4	20.8	18.4	21.3	21.8	21.0	21.0	20.9	20.4	19.9	19.9	19.5	17.9	18.2	19.7	22.4	24.9	28.3	29.9	27.6	25.4	24.0	24.0	23.7	22.3
18	23.3	23.1	22.6	21.9	21.5	21.2	21.1	20.4	19.1	20.9	18.9	17.8	19.0	19.7	21.3	22.6	26.1	28.7	29.2	27.4	27.1	25.3	25.1	21.5	22.7
19	19.8	21.8	22.1	21.3	21.7	28.3	20.8	17.5	16.5	16.7	16.7	16.1	16.5	17.3	18.7	21.5	25.1	28.6	27.8	25.2	22.3	20.9	20.1	20.1	21.0
20	16.7	22.2	22.4	22.2	22.0	21.8	21.9	23.1	20.0	18.9	17.0	16.8	17.1	21.3	24.2	29.0	32.5	31.4	29.3	26.6	24.5	22.8	21.9	21.9	22.8
21 Q	21.9	22.0	22.0	22.0	22.0	21.9	21.3	21.1	20.9	20.8	19.7	19.8	21.0	21.5	23.0	24.9	27.1	28.2	29.2	26.4	24.0	22.4	21.9	21.1	22.8
22	20.0	19.5	18.1	21.6	22.4	22.1	21.7	21.2	20.8	20.4	18.5	16.8	16.0	16.7	19.6	23.3	27.1	29.4	29.4	28.0	26.5	25.2	21.7	20.8	33.0
23	21.6	21.8	20.8	22.2	20.9	21.9	20.6	22.3	17.6	14.6	15.0	13.8	15.1	17.6	22.1	27.2	30.2	30.6	28.4	25.5	23.7	22.2	21.1	21.0	21.6
24 Q	21.4	21.7	21.8	22.0	21.8	21.7	21.0	20.6	20.1	19.9	18.8	17.8	16.9	18.0	21.6	25.2	28.3	29.8	29.1	27.4	25.7	24.0	23.1	22.9	22.5
25	22.0	20.0	22.1	21.5	22.5	22.7	22.0	20.0	19.8	19.4	17.9	16.7	16.5	17.3	19.9	24.2	27.9	29.2	30.0	29.3	27.2	25.8	24.1	21.8	22.5
26	20.7	21.5	22.1	21.3	20.6	20.6	21.9	21.1	20.6	19.9	18.7	17.0	15.7	16.4	19.7	24.9	29.0	29.8	29.9	29.0	27.3	26.2	24.1	24.0	22.6
27	23.5	22.9	22.7	21.1	20.1	18.2	16.6	19.9	20.4	22.4	20.7	16.9	16.5	15.9	16.6	21.0	26.3	28.3	29.0	31.2	28.5	24.8	23.3	22.1	22.0
28 Q	21.4	21.1	21.1	21.2	21.1	21.1	20.8	20.5	19.8	19.3	18.6	18.1	18.3	18.1	17.8	18.8	21.5	22.8	23.8	23.9	24.2	23.6	22.8	22.3	20.9
29	21.8	21.5	21.5	21.4	16.5	19.7	19.4	19.8	19.2	18.9	18.4	17.4	17.0	17.4	20.7	24.8	27.8	28.5	27.5	26.0	24.7	23.4	22.5	22.1	21.6
30 D	21.9	21.1	20.5	21.2	20.6	20.4	19.5	18.6	18.1	18.3	17.2	15.7	15.0	17.5	20.9	21.4	21.3	26.0	31.1	24.5	29.6	28.6	23.2	24.5	21.5
31																									
Mean	21.2	21.0	20.8	21.5	21.6	21.5	21.1	21.0	20.4	20.4	19.4	18.4	17.8	18.4	20.4	23.5	26.5	28.2	28.6	27.5	26.1	24.7	23.2	22.0	22.3

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 12 Agincourt — Z = 56,000 γ + — April 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	135	140	148	143	141	142	137	138	133	127	128	135	137	135	130	127	125	125	128	129	131	131	132	132	134
2	129	129	129	129	131	130	129	129	129	128	129	129	131	129	127	126	123	126	132	134	137	135	134	134	130
3	132	131	128	127	123	119	120	122	125	124	126	126	126	124	123	120	118	117	116	119	126	130	127	126	124
4 D	126	126	126	127	127	127	125	121	118	110	122	123	124	124	120	122	118	117	123	131	135	142	142	152	126
5 D	153	111	128	131	51	74	114	121	128	120	124	129	123	126	122	121	126	127	135	137	137	138	142	145	123
6 D	137	134	125	109	113	115	113	101	71	109	118	118	124	119	118	118	122	128	131	136	144	144	139	138	122
7	133	127	126	123	122	126	117	103	104	101	112	119	121	119	116	116	118	123	128	130	132	133	133	133	121
8	134	129	128	127	125	122	122	125	126	124	126	126	128	125	123	120	119	120	130	134	135	134	133	132	127
9	127	126	125	124	105	111	121	124	123	124	125	125	123	120	118	117	120	123	128	131	133	133	132	128	124
10 Q	127	127	126	126	126	126	126	126	126	126	126	127	128	126	126	126	128	131	132	131	131	132	131	127	128
11 Q	124	122	122	122	122	121	121	121	121	120	118	121	121	121	118	118	120	119	122	126	126	127	128	127	122
12	125	126	125	123	123	122	122	118	116	116	111	111	116	116	117	119	119	121	127	131	135	133	131	128	122
13	125	124	120	117	121	121	121	120	117	109	106	104	103	104	104	108	109	112	122	130	140	143	146	151	120
14 D	153	141	137	133	128	125	125	124	122	122	120	121	117	110	107	103	104	107	115	121	127	131	137	146	124
15	142	136	101	121	120	122	110	85	96	112	117	117	119	121	120	116	115	116	120	121	121	121	128	129	118
16	130	130	132	130	128	125	124	125	122	121	121	124	122	120	118	114	112	114	117	123	126	130	130	131	124
17	132	132	109	117	122	119	120	121	119	121	121	121	117	114	112	107	105	110	115	117	119	122	124	124	118
18	122	122	122	121	121	121	120	119	115	115	111	114	115	114	114	108	109	109	115	129	134	144	139	135	120
19	127	126	123	123	116	107	105	99	115	122	121	121	117	120	109	106	107	115	120	126	129	128	126	124	118
20	124	121	120	120	120	120	119	116	104	109	113	115	113	109	108	107	109	110	116	122	126	127	126	124	117
21 Q	122	121	121	121	120	120	121	121	121	121	120	120	119	116	115	115	119	121	124	127	130	131	129	126	122
22	127	121	127	127	126	125	125	124	125	125	125	124	122	122	120	116	119	127	133	140	147	148	137	132	128
23	128	129	130	125	125	127	128	127	105	121	129	127	128	125	122	120	121	122	123	129	132	132	131	130	126
24 Q	128	128	127	127	127	126	126	126	127	127	128	127	126	127	126	120	119	119	123	127	130	130	128	127	126
25	127	126	125	120	116	115	117	121	122	122	122	123	123	122	118	115	118	122	126	126	131	132	132	130	123
26	128	127	127	125	106	116	122	124	124	125	126	126	126	127	124	124	125	125	127	127	131	135	133	133	126
27	132	131	129	131	132	124	119	124	122	123	116	122	118	112	110	111	108	108	118	122	123	126	127	127	121
28 Q	127	126	126	125	125	125	123	123	123	123	124	122	122	118	111	103	103	111	115	119	123	127	126	124	121
29	123	123	123	124	118	119	122	123	123	124	125	126	123	120	113	108	113	119	124	125	126	124	122	122	121
30 D	123	123	122	123	123	123	123	123	122	122	123	121	118	115	111	104	96	102	107	122	153	144	135	129	121
31																									
Mean	130	127	125	125	120	120	121	120	118	120	121	122	122	120	117	115	116	118	123	127	132	133	132	132	123

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 13 Agincourt — H = 15,500 γ + — May 1963

Day	Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	493	495	504	467	467	478	470	464	442	453	469	478	467	457	452	456	447	465	485	494	491	484	480	490	473
2	D	486	494	483	482	489	484	489	498	494	471	467	478	473	455	442	446	451	461	479	479	489	491	497	504	478
3		510	497	494	493	486	488	488	504	492	489	483	481	474	466	467	462	464	466	485	504	496	505	516	488	487
4	D	494	492	467	480	478	467	458	447	452	467	472	476	473	458	449	449	448	460	479	492	489	488	495	488	472
5		475	474	482	494	491	484	482	482	493	486	479	482	479	472	468	468	485	500	505	505	495	491	489	493	486
6		493	488	494	488	494	473	477	479	487	489	489	488	485	471	457	454	467	478	488	495	489	492	495	499	484
7		497	494	489	488	488	489	494	497	495	494	485	490	483	467	459	458	470	479	490	499	504	504	500	502	488
8		491	488	492	490	495	495	494	494	484	497	495	489	485	476	467	473	482	493	504	515	510	506	494	497	492
9		493	498	503	508	500	500	488	486	483	480	479	482	473	469	459	450	461	472	485	492	483	500	498	482	484
10		488	489	483	472	482	487	489	479	481	484	480	483	478	460	449	447	458	488	510	509	518	516	509	489	486
11		488	477	473	485	482	487	488	486	483	472	475	481	461	458	452	456	460	473	489	498	505	518	501	500	481
12		492	482	483	484	484	484	477	478	487	488	484	488	483	469	456	457	464	472	489	489	498	494	488	494	482
13	D	488	477	484	482	454	476	473	483	483	469	481	440	460	464	454	456	466	477	497	510	520	516	513	496	480
14		478	474	479	497	495	476	456	474	470	471	478	477	477	473	469	468	472	479	494	499	497	505	495	494	481
15		490	495	495	495	497	499	482	485	489	491	494	493	489	479	464	459	472	484	498	501	508	507	499	484	490
16	Q	489	494	489	489	487	486	485	485	484	485	490	493	490	484	475	470	474	483	487	492	495	496	495	497	487
17		497	495	495	493	494	497	497	495	497	499	490	495	502	484	480	476	482	483	489	489	490	492	489	492	491
18	Q	495	495	493	491	493	491	493	495	495	496	496	494	488	480	479	484	495	506	516	508	504	497	496	494	495
19		495	497	498	500	501	502	504	503	500	499	502	500	490	480	467	469	481	500	517	537	537	517	506	495	500
20		469	473	490	486	485	486	487	494	493	492	494	493	485	477	473	469	479	491	504	512	513	506	503	501	490
21		502	496	496	494	497	497	497	496	497	499	502	502	498	490	476	474	481	492	505	514	505	503	505	506	497
22	Q	503	503	501	500	500	501	499	498	496	497	500	496	486	475	468	468	469	480	494	508	514	512	509	506	495
23	Q	503	503	503	502	501	502	503	502	499	499	500	500	495	480	474	479	491	505	512	517	516	507	503	503	500
24	Q	505	505	505	501	500	498	496	495	496	496	495	493	487	485	486	492	505	522	530	533	525	517	512	512	504
25		514	518	512	514	519	521	519	517	519	517	511	497	496	475	492	499	503	513	526	520	517	524	510	510	511
26		502	490	490	485	490	497	499	497	496	496	494	490	485	481	479	484	486	486	500	510	514	513	511	505	495
27		501	502	500	499	498	504	497	497	496	497	498	499	492	486	475	470	487	498	502	506	517	515	511	516	499
28		507	517	508	486	480	490	492	479	480	479	488	492	488	481	474	474	490	503	513	513	510	511	514	511	495
29	D	481	500	484	492	473	485	475	496	493	492	492	490	483	473	474	475	480	491	507	508	511	507	506	497	490
30		493	497	511	484	479	487	482	491	489	491	491	485	485	479	469	468	474	485	496	502	511	496	496	507	489
31		499	499	498	497	495	507	505	497	497	495	494	496	486	475	476	476	487	499	513	530	534	520	491	491	498
Mean		494	493	493	491	489	491	488	489	488	488	489	488	483	474	467	467	475	487	500	506	507	505	501	498	490

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 14 Agincourt D = 7° W + ... ′ May 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	24.9	22.8	14.0	18.2	19.7	22.2	25.4	27.4	31.0	28.7	26.1	18.0	18.7	21.2	21.9	27.2	29.2	31.6	29.0	26.8	25.1	24.7	21.5	20.7	24.0
2 D	21.1	10.4	17.2	19.7	22.4	24.0	25.6	20.6	19.7	25.7	31.0	23.7	16.6	17.6	19.7	22.7	27.2	27.6	26.6	25.7	24.0	22.6	18.2	19.5	22.0
3	21.8	20.8	16.6	21.2	19.7	19.5	17.8	20.8	17.7	17.5	18.0	16.3	17.0	18.6	19.1	20.3	23.7	27.0	28.7	26.7	25.9	23.7	17.2	20.5	20.7
4 D	16.5	14.6	19.2	21.4	19.5	23.7	22.5	26.4	29.1	25.9	16.9	16.2	13.2	12.7	16.9	21.3	26.2	27.1	26.5	25.5	24.8	23.2	18.5	17.6	21.1
5	17.7	19.3	20.4	19.6	18.1	20.9	25.5	27.0	21.1	20.1	21.0	18.3	17.5	17.7	20.5	23.7	26.9	28.9	28.6	26.7	24.2	22.5	21.8	21.4	22.0
6	21.2	20.4	16.3	18.4	19.3	18.8	20.3	19.7	20.5	21.4	19.3	17.9	16.7	17.7	21.0	23.5	26.1	27.9	28.3	27.5	26.6	24.4	22.7	21.4	21.6
7	21.3	21.4	21.1	21.4	21.7	21.8	22.3	20.8	21.5	20.3	20.7	16.5	15.7	16.7	19.6	22.3	25.7	28.7	28.8	28.7	27.5	25.4	22.7	20.9	22.1
8	17.7	20.6	21.4	19.8	21.9	24.2	21.6	20.2	23.8	21.2	16.5	15.4	15.2	16.2	18.3	23.9	27.8	30.0	29.2	27.8	26.6	24.7	22.7	22.5	22.0
9	21.8	21.4	19.2	17.2	19.9	19.8	24.9	18.9	20.1	24.7	20.6	14.5	14.7	16.6	17.3	21.9	26.6	28.8	28.4	28.2	29.0	25.8	23.9	21.8	21.9
10	22.3	19.8	17.7	20.3	21.4	21.5	19.2	19.4	17.8	17.8	18.9	17.3	14.2	14.6	17.9	23.3	28.4	28.8	29.1	29.3	24.5	24.0	23.8	21.8	21.4
11	19.5	18.0	21.7	16.4	26.2	20.9	22.6	24.0	22.9	26.2	23.9	16.8	15.7	15.5	18.4	23.1	27.1	28.9	29.1	28.6	27.4	25.1	23.4	22.3	22.6
12	22.4	19.7	20.9	21.6	21.6	21.4	23.8	24.2	22.0	18.5	17.0	15.8	15.6	14.2	17.0	19.7	23.7	25.1	27.9	28.8	27.8	25.7	24.2	23.0	21.7
13 D	20.9	13.4	17.8	18.4	23.3	23.7	17.4	20.8	22.2	22.9	18.7	26.6	21.6	18.8	19.4	21.6	23.6	24.9	25.8	25.0	24.0	22.0	20.4	21.2	21.4
14	18.8	20.7	22.7	16.1	14.9	19.8	30.1	20.7	20.9	22.9	18.8	15.2	15.5	16.3	18.7	23.1	26.8	27.9	27.6	27.6	26.4	24.7	22.1	21.4	21.7
15	22.8	22.8	22.9	21.0	20.5	20.5	21.9	23.1	19.9	18.7	18.0	17.4	18.0	18.6	20.9	24.7	27.0	29.0	28.9	29.1	26.4	24.0	22.9	22.5	22.6
16 Q	22.2	16.5	20.6	22.5	22.6	22.1	22.2	21.6	20.7	19.7	18.4	16.7	16.0	16.2	18.5	22.4	25.4	25.7	26.1	25.8	24.7	24.0	23.1	22.2	21.5
17	22.2	21.9	21.6	21.3	21.3	20.3	18.5	18.9	19.8	18.7	19.4	16.6	13.1	11.6	14.4	19.4	23.9	27.0	29.3	27.9	25.7	24.8	23.6	22.6	21.0
18 Q	22.0	21.9	21.6	21.6	21.6	21.7	21.2	20.8	20.7	20.7	19.7	18.7	17.2	17.7	19.2	23.7	25.9	27.0	26.4	25.7	24.1	22.9	22.5	22.0	22.0
19	22.2	22.4	22.1	21.9	21.7	21.6	20.8	19.5	19.5	18.4	17.4	16.3	14.5	17.4	20.3	25.7	28.8	30.0	29.8	27.0	25.1	23.4	22.2	22.8	22.1
20	19.6	20.7	16.5	19.4	18.1	19.9	20.7	21.5	19.8	19.3	17.7	16.5	17.2	19.7	22.1	25.8	27.7	28.6	29.1	28.3	24.5	22.6	21.6	21.6	21.6
21	21.5	22.7	22.9	22.9	22.0	21.6	21.2	21.2	20.7	19.8	18.1	16.4	15.7	16.7	20.9	26.7	29.3	28.9	28.3	27.6	26.9	24.9	21.6	20.6	22.5
22 Q	38.1	37.9	38.0	37.6	37.9	37.7	37.9	37.9	38.5	38.5	38.7	38.5	37.2	36.4	37.4	21.9	25.8	28.8	29.0	27.4	24.8	22.7	21.1	20.6	32.9
23 Q	21.5	21.8	21.5	21.5	21.5	21.4	20.5	20.6	19.5	19.2	16.0	14.4	14.2	16.8	20.6	25.7	28.2	28.9	28.4	26.8	24.7	23.7	22.6	22.6	21.8
24 Q	22.6	22.4	22.1	21.8	21.5	21.3	20.7	19.2	19.5	18.6	17.3	16.5	16.8	18.4	20.5	23.7	24.7	25.1	25.7	25.2	24.2	22.6	22.6	22.1	21.5
25	21.9	21.5	21.9	21.5	20.7	20.5	19.5	18.4	18.2	17.3	15.3	13.4	14.5	15.3	22.6	26.8	28.4	28.7	28.5	27.9	26.8	24.6	23.1	21.5	21.6
26	20.5	22.3	22.0	22.1	22.0	22.8	21.5	20.5	20.7	20.0	18.4	17.6	17.5	17.9	18.9	22.1	24.8	28.7	29.8	29.1	27.9	25.7	24.5	21.3	22.4
27	20.9	21.8	22.3	22.7	23.0	22.5	21.9	21.7	20.6	19.9	18.1	21.3	15.4	15.2	16.2	18.3	23.4	25.6	26.7	27.3	27.5	25.6	23.4	21.4	21.8
28	20.2	22.3	20.4	13.1	15.4	19.4	22.7	21.8	29.8	30.9	21.4	17.6	16.7	18.3	21.4	25.6	27.8	29.0	30.3	28.8	26.2	23.6	22.0	21.4	22.8
29 D	21.0	20.5	10.0	8.7	18.2	25.7	29.9	26.0	21.5	19.5	17.3	17.3	17.3	18.6	21.8	24.7	26.6	27.9	27.0	26.6	23.7	23.5	22.6	22.4	21.7
30	22.6	22.1	16.3	17.1	23.7	21.2	23.3	20.5	19.8	20.0	19.5	18.4	17.1	17.6	19.7	23.1	26.3	26.8	25.7	25.7	24.0	22.6	21.8	22.1	21.5
31	22.8	23.5	23.5	23.5	23.5	23.5	22.8	21.9	22.6	22.4	20.5	17.3	16.8	20.6	23.7	25.9	27.6	26.8	26.8	25.7	24.9	21.7	22.4	21.5	23.0
Mean	21.7	20.9	20.4	20.3	21.4	22.1	22.8	22.1	22.0	21.8	20.0	18.0	16.9	17.7	20.2	23.3	26.5	27.9	28.0	27.2	25.7	23.9	22.2	21.5	22.3

VERTICAL INTENSITY
Mean values for periods of sixty minutes, Universal Time

Table 15 Agincourt — Z = 56,000 γ + — May 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	124	124	143	136	145	134	111	97	77	80	90	116	117	120	121	117	117	126	130	133	134	138	144	144	122
2 D	137	126	116	122	107	68	72	106	121	102	76	90	111	115	115	112	115	122	125	127	130	133	139	137	113
3	134	137	131	132	128	118	112	105	117	124	128	127	124	121	115	117	121	124	123	132	134	141	149	144	127
4 D	136	115	129	130	122	93	77	64	37	50	101	121	122	118	114	115	118	125	127	129	133	136	143	141	112
5	140	135	132	112	99	114	110	105	110	114	123	124	123	120	117	111	114	120	121	120	124	128	129	130	120
6	128	127	119	113	86	97	113	118	124	126	125	123	123	123	121	121	123	119	115	120	125	130	130	130	120
7	127	125	125	124	124	123	122	118	123	121	122	120	118	117	115	114	114	113	119	124	128	129	129	132	122
8	134	132	130	125	124	118	119	119	105	111	116	121	122	120	119	117	112	113	117	119	125	132	134	132	122
9	128	127	123	111	115	112	67	87	105	101	101	114	115	114	110	107	108	113	122	132	137	138	143	139	115
10	132	132	128	129	134	128	106	100	119	126	128	131	127	123	121	121	126	128	133	144	154	151	153	155	130
11	145	144	101	124	84	121	123	121	117	119	114	122	119	128	125	125	122	125	132	136	135	141	141	145	125
12	143	142	141	137	131	127	121	110	114	125	130	132	131	128	123	122	120	118	120	123	132	140	141	138	129
13 D	140	137	130	130	64	77	110	121	114	94	119	99	113	122	123	125	130	130	130	129	137	145	147	147	121
14	149	144	126	101	100	119	89	93	97	99	99	112	116	115	115	113	115	116	119	121	123	128	135	135	116
15	130	126	126	124	115	103	99	112	120	126	127	126	124	122	124	125	119	119	123	131	138	141	141	135	124
16 Q	134	126	122	125	124	125	126	126	126	129	131	132	130	124	124	127	125	121	124	125	129	132	132	132	127
17	129	125	124	123	124	121	116	121	124	124	121	114	113	114	111	109	106	104	106	111	116	122	124	124	118
18 Q	124	123	123	123	122	122	122	122	121	124	125	125	122	119	117	113	112	114	120	124	124	123	125	123	121
19	120	120	120	120	120	120	119	118	117	121	125	125	124	120	115	118	119	122	129	134	138	141	145	155	125
20	160	146	122	102	113	122	125	125	127	129	128	125	122	118	114	109	103	109	117	119	119	121	123	125	122
21	125	123	124	123	120	122	124	123	122	124	126	123	119	116	114	115	114	113	117	124	128	128	126	125	122
22 Q	120	119	119	119	119	119	119	119	121	122	124	122	116	112	115	118	111	109	118	119	120	123	124	124	119
23 Q	121	121	121	121	121	121	121	120	116	116	116	116	116	111	106	108	108	116	125	121	121	121	121	121	118
24 Q	120	120	120	118	118	120	118	118	120	120	120	120	120	120	115	107	102	105	110	118	115	114	115	118	116
25	117	114	114	117	117	114	114	114	114	117	119	117	111	111	105	100	102	109	114	119	119	119	119	122	114
26	114	126	126	129	118	108	108	113	118	118	118	118	118	114	109	105	98	103	109	116	123	126	126	126	116
27	123	120	118	117	116	109	112	112	117	117	117	117	117	112	112	103	97	92	99	102	108	112	117	117	112
28	121	116	108	100	101	106	111	100	94	85	91	102	107	111	109	108	106	107	115	121	121	121	121	121	109
29 D	118	116	110	71	83	84	58	86	106	110	115	115	110	110	110	110	110	113	115	118	118	120	120	120	106
30	121	120	107	97	87	63	43	99	113	115	113	114	115	115	116	116	120	122	123	120	120	119	115	115	109
31	114	114	114	114	114	109	104	107	110	114	109	104	104	104	101	101	109	109	114	119	127	143	136	130	114
Mean	129	127	122	118	113	111	106	110	112	113	116	118	118	117	115	114	113	115	120	124	127	130	132	132	119

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 16 Agincourt — H = 15,500 γ + — June 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		496	491	491	491	485	491	490	497	496	495	480	496	489	471	459	465	467	479	492	502	512	513	506	496	490
2		502	498	498	498	499	491	501	497	491	497	502	503	501	486	491	472	464	475	481	486	491	507	507	507	494
3		497	495	497	503	498	497	503	498	497	497	493	490	491	481	470	467	470	482	493	502	510	513	502	503	494
4	Q	497	493	494	494	492	493	493	486	491	496	497	498	490	477	474	464	474	481	490	497	501	506	497	496	490
5	Q	498	497	496	494	494	492	493	492	494	496	500	497	487	478	470	466	470	481	487	492	497	505	503	503	491
6		502	503	503	505	503	503	502	502	503	505	508	509	500	481	473	473	481	508	535	551	572	551	519	541	510
7	D	519	516	511	454	445	445	423	386	455	459	463	457	451	446	447	425	432	451	454	482	490	499	498	488	462
8		490	488	487	488	483	486	487	484	486	474	480	480	478	466	451	445	452	458	476	491	493	514	526	505	482
9		493	495	486	480	483	483	488	485	483	482	483	475	478	473	462	457	455	474	487	496	505	508	505	499	484
10		501	499	493	491	494	496	493	493	491	487	483	488	484	473	470	465	471	484	498	513	518	506	506	505	492
11		506	507	504	496	494	506	494	496	498	496	492	483	478	468	465	481	493	501	510	512	515	511	510	494	496
12		509	502	500	504	494	494	494	495	496	500	499	497	496	485	473	459	456	468	488	505	510	515	518	514	495
13		506	499	500	493	496	514	500	499	499	490	489	495	495	492	486	474	476	480	485	495	506	511	507	505	494
14		502	490	499	499	499	500	500	500	500	506	505	503	500	499	496	496	505	505	506	507	507	511	507	506	502
15		506	497	501	500	496	493	493	490	499	500	501	503	499	489	479	483	496	507	520	524	527	506	501	497	500
16	Q	499	503	501	501	501	501	501	500	500	505	508	506	498	489	484	479	480	492	512	521	522	514	508	510	501
17		507	495	498	506	510	500	500	495	490	493	494	492	479	453	456	469	478	481	492	489	501	512	511	507	492
18	D	500	501	498	484	474	484	501	503	501	507	506	496	470	474	488	480	480	494	487	528	545	518	507	492	497
19		473	481	488	485	485	491	489	493	497	500	497	493	485	474	468	470	473	482	508	501	512	504	507	510	490
20		494	497	480	496	498	495	484	485	486	479	476	483	489	482	463	458	474	496	512	520	523	517	515	516	492
21		506	497	501	498	507	496	494	493	513	493	500	497	493	483	475	477	482	490	499	501	507	502	507	507	497
22	Q	509	511	502	502	499	502	502	498	500	498	498	493	488	486	485	485	490	496	509	517	523	516	511	500	501
23	Q	501	501	500	501	500	501	497	496	498	498	498	498	489	482	477	476	488	501	453	509	507	507	515	512	496
24		509	509	507	508	509	517	513	507	511	510	512	503	498	497	481	475	499	514	515	513	514	512	521	524	507
25	D	517	519	502	499	478	491	484	490	503	516	502	499	494	486	494	499	505	508	512	557	512	513	525	490	504
26	D	491	481	480	481	460	491	486	462	479	498	498	492	485	481	477	473	471	484	500	498	506	512	512	511	488
27	D	510	508	498	502	481	481	502	491	508	502	498	494	492	491	491	486	485	483	481	486	492	503	521	507	496
28		512	503	508	507	505	502	497	494	481	498	503	502	492	485	474	484	485	483	498	513	511	515	505	502	498
29		499	501	502	503	502	503	505	502	502	503	505	501	499	494	481	450	470	497	503	511	516	518	510	503	499
30		507	494	490	494	499	491	493	498	498	503	492	496	486	482	474	464	468	482	493	508	508	496	505	498	492
31																										
Mean		502	499	497	495	492	494	493	490	495	496	495	494	488	480	474	471	476	487	496	508	512	511	510	505	494

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 17 Agincourt D = 7° W + ... ′ June 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	21.2	20.0	19.5	19.5	15.5	19.5	21.5	20.7	21.1	28.9	23.9	14.4	12.3	13.7	17.6	23.9	26.8	29.4	28.8	27.4	25.3	22.6	21.3	20.5	21.5
2	19.0	20.9	19.0	20.6	20.9	24.6	24.6	21.6	20.8	18.5	17.4	19.3	24.8	19.6	20.1	24.4	26.9	26.9	28.6	29.0	26.1	24.0	22.1	20.7	22.5
3	20.6	21.6	20.6	19.3	18.0	19.6	21.9	21.6	21.6	18.5	16.5	14.8	14.8	16.9	18.5	21.6	24.3	26.9	26.9	26.1	23.8	22.7	22.2	21.1	20.8
4 Q	21.5	21.6	21.7	22.3	22.3	22.3	24.9	18.4	23.6	19.1	16.5	14.6	14.6	16.5	20.5	23.9	26.2	27.5	27.8	27.0	24.9	22.8	21.7	21.5	21.8
5 Q	21.0	21.7	22.6	22.6	22.6	22.0	21.7	21.2	20.7	19.7	17.9	15.5	14.6	16.8	20.5	23.1	27.8	18.1	28.6	27.5	25.4	23.0	21.0	20.5	21.6
6	20.8	21.3	21.8	21.8	21.8	21.8	21.1	20.1	19.2	18.2	16.4	13.4	13.2	15.0	16.6	22.1	26.4	29.0	32.6	32.6	38.0	38.1	35.2	29.7	23.6
7 D	26.7	12.4	8.9	13.6	11.4	20.9	33.5	35.1	35.4	21.1	20.1	16.2	14.8	18.0	19.9	25.1	30.3	29.8	32.3	29.5	28.3	25.6	19.2	21.9	22.9
8	22.0	22.0	21.2	21.8	22.4	24.2	25.0	22.9	23.1	21.5	19.4	15.8	15.8	16.8	18.0	23.1	26.5	29.2	29.4	29.2	29.2	26.6	20.8	21.0	22.8
9	21.6	22.6	26.3	20.1	23.4	24.8	22.1	21.1	22.1	21.5	19.0	18.5	16.5	16.9	18.3	22.7	26.9	30.0	29.5	17.9	25.3	23.4	21.9	20.9	22.2
10	20.7	20.4	22.2	22.4	22.2	22.8	22.6	22.2	21.2	20.4	20.2	15.4	14.9	15.7	18.0	21.2	26.4	28.6	28.0	28.3	26.4	26.2	24.4	23.5	22.3
11	22.3	21.3	20.5	21.3	22.6	21.6	21.4	21.6	20.9	19.7	17.3	15.0	14.7	15.2	16.3	19.1	24.5	27.6	27.8	27.6	26.0	23.4	20.5	20.3	21.2
12	20.7	21.4	22.2	18.6	20.9	21.6	23.4	22.7	21.3	20.3	19.4	18.1	25.5	25.8	17.4	20.8	25.0	28.1	30.5	30.7	28.7	25.7	22.8	21.5	23.0
13	21.4	21.4	19.3	21.6	22.4	21.9	22.4	20.4	19.8	15.3	22.4	12.0	12.5	14.6	17.0	20.4	25.6	28.4	29.3	29.6	26.1	24.6	27.7	22.2	21.4
14	19.1	18.4	22.4	22.7	23.0	22.7	22.4	22.4	22.4	21.6	20.4	17.0	16.2	17.2	17.7	19.5	22.7	24.1	25.1	25.6	25.1	24.0	22.2	21.4	21.5
15	21.0	19.9	20.7	21.5	21.0	22.5	21.5	21.3	22.2	20.5	18.3	16.3	17.1	18.3	20.5	25.9	28.9	28.0	28.9	28.6	27.8	26.2	24.4	23.6	22.7
16 Q	23.2	22.8	22.9	22.8	22.5	22.5	22.5	22.5	22.3	21.5	19.0	17.3	16.5	17.3	19.4	23.6	27.8	30.7	28.9	26.2	23.6	22.5	21.1	20.2	22.5
17	20.8	22.3	23.0	22.9	22.3	22.9	24.7	21.5	24.1	21.5	16.5	25.5	15.7	19.6	23.0	25.7	28.0	29.4	29.4	28.9	26.7	23.1	20.5	21.5	23.3
18 D	21.7	21.5	22.0	15.2	21.5	14.2	17.1	18.9	18.8	18.3	17.1	14.6	13.6	19.6	19.4	22.2	27.1	28.4	29.9	27.0	22.8	25.3	26.5	25.5	21.2
19	20.7	21.3	18.3	20.5	20.5	22.5	22.5	21.8	21.3	19.9	18.7	17.8	18.6	19.4	20.8	24.1	25.2	27.8	28.4	30.4	27.8	27.8	25.7	23.6	22.7
20	20.2	18.2	18.9	22.0	22.8	22.0	27.0	29.9	22.2	22.3	19.2	19.8	16.3	16.3	19.4	24.4	26.7	28.2	29.6	28.1	25.7	25.7	24.0	23.6	23.0
21	20.5	21.1	22.5	22.2	23.1	21.7	21.5	21.5	24.7	23.6	17.3	16.3	16.3	16.5	17.3	18.7	23.4	26.2	26.7	27.3	26.3	24.9	23.4	22.5	21.9
22 Q	22.5	21.5	22.5	22.3	22.3	22.8	20.5	22.0	20.5	20.5	20.0	19.4	19.4	19.9	21.0	23.8	25.9	27.8	28.9	28.5	27.0	25.5	24.2	23.4	23.0
23 Q	23.1	22.3	22.5	23.8	23.6	22.0	22.3	22.3	21.5	22.1	20.2	22.9	15.7	18.6	24.7	28.6	27.8	28.9	27.8	25.1	23.0	21.5	21.5	22.3	23.1
24	21.7	22.3	22.8	22.8	22.5	21.7	23.1	20.7	20.5	19.5	18.1	16.3	15.0	16.8	18.9	23.8	27.0	27.6	26.9	28.3	27.8	27.3	25.6	26.5	22.5
25 D	23.2	23.1	21.7	22.0	20.9	13.1	29.9	24.9	17.8	18.3	17.3	16.8	16.0	17.5	21.0	22.5	24.4	37.3	26.5	27.4	26.2	30.1	25.9	22.5	22.8
26 D	19.7	1.2	17.1	17.7	22.4	22.6	22.2	31.0	30.5	21.8	18.2	16.4	16.6	17.6	17.4	21.4	22.5	23.9	26.2	26.3	26.0	25.9	23.7	24.5	21.4
27 D	23.7	23.5	16.4	25.1	17.2	23.5	18.4	24.2	23.6	19.0	18.0	19.9	19.6	17.4	18.4	19.7	22.6	25.7	27.9	27.5	26.0	26.8	24.8	21.9	22.1
28	20.9	22.6	22.1	22.3	22.1	19.7	19.0	22.0	32.3	25.2	19.5	17.4	17.9	18.4	18.7	21.8	23.7	26.8	28.3	29.2	26.6	24.8	24.5	23.2	22.9
29	22.1	21.9	21.9	22.6	23.1	22.9	23.7	26.0	23.7	20.6	17.6	16.4	15.0	14.5	16.1	18.4	23.7	26.6	29.0	28.1	26.5	24.9	23.0	21.6	22.1
30	20.8	19.7	20.6	22.1	23.5	26.0	25.9	22.0	22.4	21.6	22.1	21.9	20.3	18.4	18.4	19.3	23.8	28.1	29.6	26.8	26.3	26.3	24.1	20.6	23.0
31																									
Mean	21.5	20.4	20.8	21.2	21.4	21.8	23.0	22.8	22.7	20.7	18.8	17.2	16.5	17.5	19.0	22.5	25.8	27.8	28.6	27.7	26.5	25.4	23.4	22.5	22.3

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 18 Agincourt — Z = 56,000 γ + — June 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		121	118	118	113	108	108	112	113	113	92	63	66	83	92	92	98	108	111	116	124	124	121	121	119	106
2		118	116	113	104	99	88	92	103	111	114	115	109	92	95	99	95	99	103	113	118	124	124	124	119	108
3		116	115	113	110	102	97	86	95	104	115	112	112	112	108	107	107	110	112	117	116	120	124	123	123	111
4	Q	123	120	117	117	117	117	113	101	110	118	123	123	121	120	116	111	110	108	115	120	123	125	124	124	117
5	Q	122	120	117	117	117	117	117	119	120	122	123	122	121	119	114	107	110	111	116	117	121	122	122	121	118
6		116	116	116	116	116	115	116	116	117	117	121	119	117	116	111	103	101	106	109	116	127	161	123	204	121
7	D	220	204	89	19	79	100	18	38	142	122	131	118	119	118	124	131	122	128	133	139	142	148	159	139	120
8		26	126	122	116	118	115	151	105	105	94	95	105	111	109	110	113	115	118	116	121	128	135	155	148	115
9		147	111	112	111	89	78	152	108	114	123	119	118	121	121	120	124	122	119	116	121	126	127	131	131	119
10		126	121	121	121	121	115	118	121	120	115	111	111	111	109	108	110	113	111	115	122	127	126	127	125	118
11		123	120	115	114	115	100	110	116	121	121	118	117	115	111	110	104	103	99	110	114	111	120	126	127	114
12		125	122	121	110	110	111	114	113	115	121	116	116	118	115	111	114	116	115	122	122	121	121	123	126	117
13		127	126	121	121	121	120	120	115	109	108	105	105	100	104	102	105	106	105	105	109	115	122	121	122	113
14		122	125	121	116	115	116	115	115	115	115	113	112	111	113	111	106	108	114	115	115	115	118	110	106	114
15		121	120	117	115	108	69	68	105	106	113	115	115	110	105	105	105	100	101	105	111	115	115	118	120	108
16	Q	114	110	110	110	110	110	110	110	111	114	113	110	110	111	114	115	116	118	121	121	122	117	118	111	114
17		118	117	115	112	105	103	100	99	95	82	86	85	84	86	90	95	95	109	127	134	139	141	141	133	108
18	D	126	121	120	110	141	137	147	156	105	121	121	118	114	113	112	105	110	115	131	171	209	199	196	200	137
19		170	196	121	142	110	115	113	120	121	121	121	121	115	111	110	105	99	102	106	112	123	126	134	132	123
20		142	135	137	135	129	124	98	64	85	89	97	105	106	106	106	106	108	116	122	122	127	122	124	123	114
21		123	122	122	119	97	100	106	106	100	96	111	112	111	107	105	100	109	110	109	112	116	114	116	117	110
22	Q	116	115	114	115	111	105	103	100	106	114	116	115	113	107	106	106	109	109	106	112	115	117	120	118	111
23	Q	119	120	117	117	115	115	115	115	117	117	118	117	112	109	113	112	107	106	113	116	118	123	122	117	115
24		117	115	115	115	115	103	97	108	114	116	117	112	112	111	107	108	110	107	110	112	115	112	115	115	112
25	D	112	119	128	118	102	85	20	59	93	104	110	112	108	109	112	113	116	115	112	117	139	172	166	181	114
26	D	161	129	124	106	55	114	118	63	46	93	118	125	123	118	123	125	118	118	124	125	128	133	134	129	115
27	D	126	125	125	109	86	82	94	72	78	99	108	111	104	107	108	113	121	123	124	125	138	134	139	136	112
28		134	129	124	119	118	112	109	113	134	150	117	118	113	115	112	115	114	119	126	125	124	129	127	126	122
29		125	124	124	123	122	120	117	107	110	118	121	118	113	111	108	108	113	120	124	128	129	128	128	129	120
30		128	128	124	124	113	98	77	88	103	112	109	112	112	115	115	118	118	123	125	129	129	130	135	139	117
31																										
Mean		126	126	118	113	109	106	104	102	108	112	112	112	110	110	109	109	110	112	117	122	127	130	131	132	115

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 19 Agincourt — H = 15,500 γ + — July 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	503	500	509	497	497	499	503	502	502	500	498	498	493	491	482	474	476	487	503	515	522	516	513	500	499
2 Q	500	500	502	502	502	503	503	506	502	502	506	506	498	490	535	471	476	482	488	503	512	514	517	514	501
3 Q	513	510	508	506	506	504	504	503	504	506	506	508	504	502	490	479	483	497	514	520	525	526	521	518	507
4	514	514	515	516	515	508	502	503	504	514	517	514	499	493	481	477	490	508	578	546	557	557	540	487	515
5	505	513	509	518	514	502	498	474	497	506	506	498	487	480	470	473	477	484	490	509	530	514	525	498	499
6	506	508	503	493	488	500	485	445	466	495	496	494	485	478	464	461	469	477	493	510	521	521	510	503	490
7	505	507	500	492	496	499	503	503	499	488	503	489	493	483	466	474	475	483	505	510	511	515	507	503	496
8	507	504	520	510	504	515	510	499	490	507	504	500	499	496	488	472	484	488	497	499	508	523	516	515	502
9	511	522	501	502	489	503	487	505	500	499	500	500	488	481	472	475	490	504	510	515	520	508	511	518	500
10	504	503	509	517	507	503	503	505	499	504	506	504	498	485	473	475	493	510	518	521	531	515	504	503	504
11	516	515	506	511	509	511	512	505	502	500	500	501	500	489	479	479	485	492	505	511	505	511	512	510	503
12	510	508	504	505	511	510	508	505	505	505	506	506	504	497	491	491	493	494	501	511	520	526	526	527	507
13	519	515	513	510	513	511	510	505	511	508	511	511	510	499	488	478	480	494	511	521	532	531	520	514	509
14 Q	512	512	512	512	511	511	512	512	512	516	520	517	513	504	489	487	498	514	524	527	528	533	528	520	513
15 Q	517	516	515	512	514	511	514	516	516	515	516	510	501	495	489	494	506	511	517	521	519	522	520	526	512
16	532	524	510	517	506	510	513	516	514	516	520	521	515	510	510	515	524	532	541	544	524	520	539	533	521
17	506	494	501	494	500	488	485	499	510	504	536	473	462	478	472	478	494	513	529	532	528	521	517	505	501
18	503	501	502	506	506	513	513	509	505	501	500	500	506	498	479	480	511	514	512	518	517	524	508	498	505
19	509	509	512	507	504	501	502	503	505	506	506	496	486	480	474	478	485	491	506	515	518	518	517	514	502
20	512	512	511	511	512	506	509	507	511	512	512	515	516	509	495	490	495	453	519	529	528	521	519	521	509
21 D	519	517	517	518	512	512	520	532	528	521	495	490	486	509	490	453	467	474	500	506	507	520	523	513	505
22	506	505	502	503	505	502	491	502	485	504	510	501	492	484	474	461	454	479	495	509	513	513	509	506	496
23 D	502	506	512	513	514	513	495	503	507	509	513	517	517	503	485	486	473	490	506	519	532	540	541	516	509
24 D	502	506	501	452	465	476	497	510	499	487	502	502	489	486	496	479	479	485	480	487	502	504	513	512	492
25	509	505	502	494	485	486	490	488	505	512	507	501	499	483	480	494	506	517	532	532	524	509	509	502	503
26	495	499	499	498	502	503	509	499	494	509	502	488	494	483	471	475	480	493	507	518	514	503	506	512	498
27	504	496	488	504	502	496	496	493	499	504	509	504	501	474	466	474	482	493	508	520	514	518	518	513	499
28	510	507	492	496	498	498	502	503	498	493	500	500	492	477	467	464	464	487	502	508	515	518	515	508	496
29 Q	505	508	508	509	508	508	510	511	511	510	514	513	505	492	492	484	481	492	511	522	529	531	532	523	509
30 D	500	497	508	493	477	498	493	488	438	517	514	504	476	492	502	481	470	498	509	522	529	532	541	492	499
31 D	520	498	494	496	515	504	544	492	492	496	492	492	482	486	490	481	476	492	495	513	518	521	524	513	501
Mean	509	507	506	504	503	503	504	501	500	505	507	502	496	491	484	478	484	494	510	517	521	521	519	511	503

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 20 Agincourt D = 7° W + ... ′ July 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	21.7	21.5	19.5	19.5	21.0	23.0	24.5	24.1	22.9	21.9	20.9	20.2	20.0	20.0	20.7	22.9	26.5	31.1	31.8	29.4	26.1	25.7	23.9	23.4	23.4
2 Q	23.2	23.0	23.1	23.0	22.9	22.7	22.7	22.6	24.0	23.0	19.8	18.1	16.5	15.9	17.7	20.9	24.6	28.0	28.8	29.1	28.0	26.7	25.4	23.9	23.1
3 Q	23.5	23.2	21.7	22.7	23.0	22.5	22.1	21.9	21.9	21.6	20.7	19.1	17.5	17.5	18.8	22.5	25.9	28.2	28.0	26.6	25.9	24.6	23.6	23.0	22.8
4	23.1	23.2	23.3	22.6	19.7	18.9	17.6	19.5	20.4	18.0	15.3	12.1	12.6	14.7	18.6	24.5	29.2	29.4	30.2	30.0	32.1	31.8	30.0	35.4	23.0
5	25.3	25.0	24.4	22.0	24.5	25.0	21.8	19.1	24.4	20.2	17.6	24.4	22.3	23.4	16.6	20.8	24.5	28.5	31.2	31.9	30.6	28.1	25.2	26.6	24.3
6	24.3	21.0	27.4	19.7	33.3	11.5	17.6	30.9	31.8	18.9	17.6	15.5	15.0	16.6	18.6	23.9	26.5	29.4	30.0	30.0	27.9	26.0	25.0	24.3	23.4
7	24.2	24.0	20.9	19.6	24.0	25.1	25.2	22.8	23.2	25.8	21.1	18.3	25.1	25.1	19.8	22.1	26.6	28.6	28.6	30.3	29.5	28.2	26.3	25.1	24.6
8	24.0	21.8	17.0	20.9	20.3	20.6	20.9	26.1	30.3	23.4	19.3	17.7	15.6	15.6	17.9	22.4	26.9	28.2	29.9	32.4	31.6	29.0	27.4	26.1	23.5
9	24.0	16.4	18.2	17.5	23.2	18.5	25.3	22.3	24.5	27.9	21.7	16.9	16.7	18.0	19.8	24.8	27.4	28.2	28.2	28.2	27.4	28.2	26.8	23.2	23.1
10	24.4	23.3	23.0	23.4	20.7	20.7	28.5	25.4	27.2	22.8	18.7	16.2	17.3	19.9	21.4	24.5	26.2	29.4	30.4	29.6	27.7	26.7	26.2	23.9	24.1
11	21.2	21.8	22.5	21.2	23.3	22.5	22.8	23.3	23.6	22.5	20.1	18.2	16.8	17.8	19.9	22.2	24.4	28.3	28.3	27.8	28.3	28.1	26.2	25.2	23.2
12	23.9	23.8	23.9	22.7	23.0	24.3	25.2	23.9	23.0	22.0	21.0	19.9	18.8	19.1	19.9	20.6	22.0	24.7	27.8	28.5	27.8	26.2	24.1	25.2	23.4
13	23.5	22.5	22.8	22.8	22.5	23.9	25.2	24.5	21.3	18.8	17.1	17.2	18.6	21.5	25.2	27.5	29.4	29.4	29.2	27.9	26.6	25.2	24.1	23.5	23.8
14 Q	24.3	24.3	22.8	23.0	23.6	23.9	23.5	23.9	23.3	22.0	19.4	16.6	15.5	16.8	19.4	23.6	27.2	28.3	28.3	28.3	27.8	26.0	24.1	23.6	23.3
15 Q	23.7	22.9	23.1	22.1	22.2	22.1	22.9	22.9	21.6	20.5	19.1	27.3	26.3	17.7	20.4	24.2	27.3	30.3	30.0	29.2	27.5	26.5	27.3	26.3	24.3
16	23.7	24.0	20.5	17.1	21.1	22.1	21.3	21.1	21.1	21.1	19.2	17.9	16.3	17.5	20.0	23.1	25.5	25.0	25.4	25.0	24.9	24.9	24.2	24.0	21.9
17	22.6	26.1	18.1	17.7	15.3	10.6	17.6	18.8	26.3	24.6	17.9	22.9	28.4	26.1	26.5	31.8	34.9	33.3	28.9	26.8	26.7	25.8	25.0	24.8	24.1
18	24.4	24.7	24.2	23.7	22.3	22.9	21.9	23.1	22.3	20.6	19.2	20.0	19.3	18.9	22.1	26.8	28.4	28.6	29.7	28.8	28.6	27.7	26.5	25.4	24.2
19	24.0	22.1	22.4	24.5	24.7	23.7	22.6	22.9	22.1	21.3	20.0	21.9	24.1	27.1	29.5	30.7	30.1	28.2	26.1	23.4	23.3	18.5	19.2	20.0	23.8
20	28.3	23.9	24.0	23.8	23.4	23.5	23.0	22.7	22.0	21.0	19.7	17.8	18.3	18.6	18.8	21.8	26.4	30.2	31.4	30.2	27.7	24.1	23.0	22.0	23.4
21 D	22.0	22.7	22.8	22.2	19.9	20.7	24.1	24.3	18.8	21.0	21.0	24.1	28.8	15.8	17.6	23.9	32.6	32.7	32.5	32.4	29.6	26.5	24.0	22.8	24.3
22	22.0	22.3	23.0	22.0	22.5	26.2	34.6	23.9	25.6	27.2	21.1	18.0	19.3	19.7	20.1	23.9	29.1	29.7	30.4	30.2	28.5	26.0	22.0	24.1	24.6
23 D	19.8	22.3	22.0	22.7	22.0	23.4	26.9	22.8	22.0	19.4	27.0	24.4	25.2	27.1	19.9	22.4	22.2	26.3	29.1	30.5	29.1	26.2	22.7	15.4	23.8
24 D	20.2	26.0	19.9	10.9	17.7	27.5	33.8	22.9	22.1	28.5	21.1	18.2	19.6	19.1	18.7	21.1	22.9	24.8	28.2	28.2	27.8	26.1	23.2	23.4	23.0
25	22.9	23.2	22.0	12.4	22.2	23.2	22.9	30.3	27.5	21.3	19.4	18.2	16.7	17.9	21.0	24.8	29.4	32.6	32.5	30.1	26.7	25.8	24.1	22.9	23.7
26	22.6	22.5	21.2	20.2	19.2	21.0	23.7	21.8	26.5	20.6	19.7	21.7	18.1	18.9	22.8	26.4	29.2	28.4	28.6	29.2	30.0	27.6	23.1	22.6	23.6
27	17.4	12.8	19.8	16.7	22.7	21.7	28.0	30.4	29.6	28.1	18.3	16.5	15.4	18.4	14.4	28.0	27.9	29.1	29.1	28.0	26.8	25.2	23.4	22.6	22.9
28	18.8	19.1	20.7	22.1	23.3	25.6	27.8	22.7	22.0	24.9	21.9	18.5	17.3	17.6	19.6	23.8	26.4	28.0	28.5	29.1	28.1	26.7	25.1	24.1	23.4
29 Q	23.8	23.2	23.5	23.6	22.8	22.6	22.6	23.2	22.6	21.6	19.7	17.9	16.6	18.3	20.3	24.6	28.0	29.8	29.0	28.1	26.6	25.7	24.6	21.8	23.4
30 D	16.6	19.7	21.3	8.0	16.6	17.9	16.6	17.6	33.1	20.3	15.5	13.5	18.4	23.7	23.5	23.3	25.8	30.0	30.8	33.5	30.0	29.6	25.8	22.8	22.2
31 D	15.6	18.3	23.0	22.3	19.5	20.7	20.6	20.5	21.5	20.0	18.6	26.1	17.3	20.1	19.4	21.7	24.0	25.4	28.3	28.9	27.8	26.5	25.7	21.8	22.2
Mean	22.4	22.3	22.0	20.4	22.0	21.9	23.7	23.3	24.1	22.3	19.6	19.2	19.2	19.5	20.3	24.0	27.0	28.8	29.3	29.1	28.0	26.4	24.8	23.8	23.5

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 21 Agincourt — Z = 56,000 γ + — July 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		133	129	116	112	117	113	112	111	118	121	124	124	121	124	118	116	117	114	118	118	117	118	121	118	119
2	Q	118	118	118	119	118	119	119	118	117	118	119	117	116	114	113	112	111	113	113	116	118	124	125	124	118
3	Q	119	118	117	117	117	117	118	118	118	120	121	119	117	117	115	112	113	113	114	122	121	121	123	124	118
4		118	117	117	114	112	108	103	111	114	121	119	116	112	107	104	109	108	112	118	135	169	196	204	173	126
5		139	134	135	137	131	74	57	82	120	132	133	129	123	118	118	119	119	121	118	118	124	129	139	139	120
6		142	135	129	130	10	56	82	43	51	109	123	125	124	119	114	118	118	123	125	129	131	128	125	124	109
7		124	124	124	124	124	116	113	117	112	98	90	90	103	112	113	117	108	104	107	103	111	113	118	118	112
8		124	118	108	107	92	90	92	90	76	101	113	115	117	117	116	115	114	109	108	110	113	120	131	135	110
9		137	124	118	112	69	81	40	78	96	103	107	112	112	117	118	117	105	98	101	112	123	125	128	131	107
10		125	121	119	104	101	101	88	90	95	109	114	114	114	111	109	104	102	100	101	104	114	119	122	126	109
11		119	114	113	109	93	96	84	99	110	117	117	118	114	114	109	103	100	106	108	114	119	119	121	120	110
12		119	119	118	118	114	109	106	109	114	115	117	118	114	108	101	93	89	91	92	101	109	114	118	114	109
13		114	115	116	116	115	116	114	110	105	112	116	116	116	114	111	110	105	106	115	119	126	123	120	119	115
14	Q	119	116	114	114	114	115	115	115	115	116	116	115	114	115	110	104	111	110	106	110	115	119	119	116	114
15	Q	115	115	115	116	115	115	115	115	115	115	116	115	114	115	111	103	105	105	105	112	112	114	116	115	113
16		115	116	120	112	119	118	117	116	115	116	115	114	111	111	105	101	100	105	113	115	115	118	120	123	114
17		119	118	117	111	61	59	83	88	61	37	65	86	83	83	146	103	106	115	114	118	122	123	126	126	99
18		126	126	123	120	115	113	99	107	115	115	115	112	111	109	101	90	100	104	103	108	117	126	129	131	113
19		127	120	112	115	115	115	115	114	115	117	116	114	110	110	105	101	102	105	110	114	119	120	121	116	114
20		115	115	115	115	115	115	115	115	115	119	120	119	115	107	95	89	90	94	99	105	110	112	116	116	110
21	D	114	111	111	111	109	110	105	94	84	89	74	75	38	58	74	88	95	106	119	128	134	134	131	126	101
22		120	119	115	115	115	108	61	63	60	95	115	114	113	110	110	110	115	116	121	132	133	134	130	127	111
23	D	124	120	119	116	115	89	61	67	100	113	117	119	119	115	112	103	95	104	114	122	134	140	149	166	114
24	D	138	119	148	36	37	18	18	77	89	98	115	114	108	114	119	114	109	113	120	17	125	130	131	128	97
25		125	119	114	110	92	60	78	58	82	113	116	115	113	114	117	117	113	109	107	108	114	119	126	130	107
26		130	129	123	114	109	108	107	94	103	112	113	113	110	108	112	109	103	98	104	120	129	134	131	125	114
27		126	123	122	102	65	82	76	51	80	104	110	110	113	113	112	111	110	107	112	118	120	127	130	129	106
28		124	111	118	120	119	113	101	110	112	113	115	117	117	116	116	111	112	114	113	117	118	122	120	117	115
29	Q	114	115	115	115	114	112	113	113	113	115	118	121	120	118	118	118	115	112	112	118	124	130	133	138	118
30	D	132	132	124	101	79	107	45	54	9	96	121	117	101	80	85	93	100	104	116	127	158	161	153	149	106
31	D	127	131	132	127	98	99	88	106	116	122	123	123	111	111	106	100	96	98	105	114	119	124	132	148	115
Mean		124	121	120	113	101	98	92	95	98	109	113	114	110	110	110	107	108	107	111	113	123	127	129	129	112

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 22 Agincourt — H = 15,500 γ + — August 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		503	502	523	508	515	503	508	504	502	498	493	494	545	529	451	448	468	500	470	529	531	537	510	511	503
2		505	503	498	498	502	509	498	503	537	491	493	487	475	463	475	497	525	537	542	527	520	513	510	492	504
3		505	497	503	499	503	504	506	508	504	499	499	504	496	538	466	462	477	497	515	520	523	520	511	524	503
4		504	501	501	505	504	506	509	504	503	490	489	487	482	470	478	472	483	503	519	525	521	510	515	523	500
5		507	504	509	494	502	506	506	498	496	494	498	499	495	494	479	472	468	481	498	506	516	516	516	509	498
6		506	503	497	498	485	488	484	499	504	500	501	498	489	472	453	451	456	468	498	507	521	508	520	516	493
7		512	506	488	500	505	505	505	505	499	493	499	499	488	467	459	466	483	499	514	518	519	517	517	514	499
8		512	511	508	512	504	512	513	507	504	506	500	500	495	483	463	455	459	484	503	518	525	528	525	520	502
9		520	523	510	505	491	511	513	501	500	508	503	505	492	477	462	453	467	484	499	512	520	528	528	530	502
10		520	522	522	518	518	522	519	517	514	516	516	517	514	507	495	478	472	487	495	506	517	523	527	525	511
11	Q	518	517	516	514	512	511	516	513	513	512	511	506	495	480	464	463	463	482	496	513	523	526	524	516	504
12	Q	514	514	511	511	515	510	510	510	511	514	506	497	490	483	479	489	500	511	517	519	517	513	513	511	507
13	Q	514	512	510	509	511	510	510	510	511	511	508	506	498	544	483	483	495	508	518	523	521	517	518	517	510
14	Q	513	516	513	512	512	512	513	513	511	508	510	505	497	490	486	496	511	521	526	526	531	528	525	523	512
15		522	525	526	525	524	526	526	525	525	520	521	518	504	490	484	490	496	511	522	527	537	524	500	513	516
16	Q	521	517	510	512	514	515	515	511	508	507	507	507	498	486	473	484	490	507	520	527	530	525	518	517	509
17		514	518	520	520	517	521	517	513	509	506	506	512	506	491	476	480	485	501	517	525	519	517	503	512	509
18	D	512	512	507	497	500	504	499	506	496	512	511	524	496	442	483	480	485	504	512	518	523	506	508	511	502
19	D	512	509	505	501	509	509	507	507	508	506	508	506	500	488	474	475	491	495	480	508	524	542	552	586	508
20	D	506	437	451	463	441	346	396	393	469	452	458	430	426	464	478	470	465	496	507	500	505	501	506	518	462
21	D	513	498	501	490	499	496	496	492	475	450	496	490	479	469	467	460	473	495	501	508	512	523	513	501	492
22		502	500	498	501	504	500	501	496	497	500	501	497	490	479	464	458	465	480	501	514	523	506	507	496	495
23		500	490	477	479	465	463	486	487	481	488	474	466	444	454	455	465	470	480	493	497	498	505	509	507	480
24		501	485	498	501	501	501	499	491	495	499	501	493	477	468	469	474	487	495	500	508	515	512	513	501	495
25		513	507	504	499	500	502	501	502	501	497	505	506	496	484	474	474	477	485	497	517	523	517	518	501	500
26		507	512	508	511	510	499	507	504	504	507	507	502	493	480	470	486	497	506	502	518	518	518	522	517	504
27		518	519	522	513	515	513	520	520	518	517	517	509	507	495	492	494	502	499	515	507	528	528	504	506	512
28	D	507	512	512	509	510	507	507	512	509	539	453	495	501	491	468	466	480	488	496	515	519	523	512	508	502
29		509	509	517	501	504	505	507	508	501	464	495	503	491	475	472	480	481	490	501	502	520	513	523	514	500
30		513	511	511	512	507	509	509	507	507	508	506	501	495	480	479	481	484	501	506	500	511	517	518	512	504
31		497	507	501	512	513	506	501	499	504	504	506	502	490	466	447	453	453	496	518	524	528	520	507	491	498
Mean		510	506	506	504	504	501	503	502	504	501	500	499	492	484	472	473	481	496	506	515	521	519	516	514	501

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 23 Agincourt D = 7° W + ... ′ August 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	17.2	22.2	19.3	19.3	22.2	24.0	18.5	22.4	22.0	19.8	18.5	18.0	16.2	17.2	23.0	29.3	31.3	32.2	31.1	30.4	25.8	25.4	23.5	24.0	23.0
2	21.5	18.7	21.8	22.1	21.5	22.1	28.7	22.1	25.4	25.3	20.6	17.1	16.1	17.6	21.5	29.5	31.8	32.3	30.7	28.7	25.5	24.5	23.4	19.7	23.7
3	20.2	19.6	20.3	18.6	23.3	22.8	25.2	23.3	21.3	20.4	19.6	16.6	16.7	16.5	18.8	24.9	27.9	28.6	28.8	27.7	26.4	25.4	24.6	21.7	22.5
4	18.7	19.1	21.3	20.4	23.2	23.2	21.1	23.3	22.1	20.6	21.9	19.0	18.4	23.2	22.6	26.3	28.7	29.7	30.3	30.5	30.0	27.9	25.3	23.7	23.8
5	17.0	19.4	20.0	18.1	22.9	22.9	21.2	21.0	23.1	26.2	19.7	17.0	16.8	15.8	16.8	21.3	25.2	28.4	29.6	29.9	29.4	27.8	26.0	24.2	22.5
6	23.1	22.7	17.2	16.8	16.9	17.6	28.4	27.3	23.3	23.1	18.3	17.3	15.4	15.1	18.4	25.2	28.6	31.5	32.4	32.3	29.3	25.5	22.0	21.3	22.9
7	18.0	17.5	18.1	25.9	16.3	23.0	24.5	23.9	22.8	25.3	21.1	16.3	14.6	17.7	20.4	24.8	27.6	29.3	29.3	28.0	25.5	23.8	23.0	22.5	22.5
8	21.3	19.5	21.7	18.5	20.3	27.1	22.9	21.1	22.7	21.3	20.0	26.0	24.8	13.4	17.3	25.2	31.3	33.4	33.4	31.2	27.3	23.5	20.9	9.0	23.1
9	21.5	20.2	8.3	19.2	12.5	9.7	22.3	22.8	21.7	18.0	13.9	11.6	11.5	14.6	18.6	23.0	27.0	30.7	32.1	31.1	29.1	26.8	24.2	23.0	20.6
10	23.3	23.9	23.0	22.8	22.3	21.7	21.2	20.7	20.1	19.7	18.6	17.0	17.3	16.9	17.8	24.4	27.5	28.7	29.1	27.8	24.9	23.0	21.7	21.7	22.3
11 Q	22.8	22.8	23.0	22.9	23.4	23.1	21.5	20.7	19.7	18.7	17.0	14.8	13.6	14.6	17.5	22.8	27.0	31.2	31.0	29.1	26.3	23.3	21.0	21.7	22.0
12 Q	22.9	22.7	21.6	21.6	22.0	21.6	21.9	22.2	20.6	19.4	18.0	16.9	17.4	18.0	19.7	25.6	29.0	31.1	30.0	28.0	25.8	23.8	23.0	22.7	22.7
13 Q	22.8	23.5	23.0	22.7	22.7	22.2	21.6	21.1	20.6	19.6	18.5	17.2	17.0	18.5	21.1	25.8	29.0	29.3	28.0	26.9	25.8	24.8	23.8	23.0	22.8
14 Q	23.7	21.3	22.6	23.1	22.6	22.2	21.5	21.3	20.5	20.3	18.4	17.3	16.3	17.6	20.4	24.3	27.0	28.1	28.1	27.3	25.7	23.4	21.8	21.7	22.4
15	22.1	22.6	22.6	22.1	21.8	21.7	21.3	20.5	19.7	18.9	17.3	15.5	12.8	15.8	20.7	26.8	31.0	33.1	31.8	29.7	28.4	26.6	25.4	22.8	22.9
16 Q	22.5	23.4	21.2	23.6	22.7	21.8	21.2	21.0	20.6	20.2	18.8	16.0	14.9	16.6	20.9	25.9	29.1	30.7	29.4	28.1	26.1	23.6	22.5	23.1	22.7
17	22.5	22.7	23.6	23.6	22.3	23.8	24.4	21.8	20.2	18.1	16.0	13.6	14.6	15.7	20.2	26.6	29.0	29.6	29.4	28.1	26.0	23.1	21.7	22.1	22.4
18 D	22.1	20.4	18.1	17.8	19.4	23.0	18.1	21.4	26.1	15.4	13.9	15.5	14.6	27.5	23.3	29.6	20.1	31.1	30.1	28.2	24.6	24.1	21.7	20.8	21.9
19 D	21.6	21.3	21.7	18.8	19.6	20.5	22.5	22.5	22.5	19.5	18.2	16.2	15.3	16.6	19.2	25.4	28.8	29.0	32.2	30.9	31.4	30.6	27.1	16.2	22.8
20 D	16.6	14.4	5.7	7.3	-5.3	12.5	20.9	30.4	26.7	28.3	25.6	27.8	27.2	24.6	21.4	25.6	28.3	28.4	28.8	27.8	25.3	22.8	22.5	20.6	21.0
21 D	11.3	17.8	19.2	18.9	22.5	18.5	25.1	30.9	26.2	25.6	17.2	26.2	17.0	19.4	22.5	25.2	28.8	30.4	29.5	28.3	25.6	23.3	22.3	22.4	23.1
22	22.5	22.6	20.5	21.2	22.3	22.3	26.7	28.0	29.3	21.3	18.3	17.2	16.5	18.5	22.3	25.9	28.5	29.6	29.8	28.4	26.7	25.6	23.8	19.7	23.6
23	19.7	19.2	17.9	20.2	17.0	21.2	19.7	19.9	24.4	25.1	21.8	21.2	23.6	24.6	25.1	24.6	28.0	30.9	30.0	29.0	26.9	24.8	22.8	21.3	23.3
24	18.1	10.0	18.6	22.4	22.4	22.8	22.2	24.7	26.8	27.0	23.1	20.0	17.9	18.2	22.9	27.6	28.9	30.3	29.9	28.7	27.0	25.5	24.2	23.1	23.4
25	23.2	22.9	22.4	21.1	23.7	19.5	21.4	21.5	22.1	23.4	19.2	16.1	14.0	15.1	17.2	22.1	26.2	28.9	29.7	29.4	27.9	25.5	23.4	21.5	22.4
26	18.3	19.2	23.0	21.0	21.2	21.8	19.7	19.3	20.5	20.1	19.2	17.3	16.3	16.3	20.0	24.7	26.8	28.8	29.9	28.8	26.3	25.2	24.7	24.7	22.2
27	24.3	23.0	23.5	22.8	22.1	22.1	21.6	20.7	20.7	20.1	20.1	20.0	20.1	20.4	23.5	30.4	33.0	33.4	33.3	34.2	29.9	26.9	26.7	21.8	24.8
28 D	15.7	24.0	23.8	22.7	18.6	22.0	24.5	24.8	21.6	28.6	32.4	29.9	24.8	19.7	21.5	25.6	28.5	29.2	30.0	28.2	25.0	25.0	23.8	22.1	24.7
29	25.0	22.6	18.9	23.6	23.4	24.1	23.2	20.8	22.4	28.6	28.1	16.3	15.3	16.3	23.0	24.7	26.8	28.2	28.2	28.1	27.0	26.2	25.1	25.7	23.8
30	22.8	24.0	23.9	20.6	21.3	22.5	22.0	21.7	21.5	20.9	19.8	20.5	18.4	20.1	22.9	24.8	29.3	29.4	29.1	25.7	24.5	22.9	23.6	23.0	23.1
31	18.5	16.8	21.1	24.8	23.1	25.0	25.5	26.9	20.0	16.6	16.7	16.2	15.8	17.6	22.2	30.5	30.2	30.4	28.2	23.2	22.5	22.7	18.5	26.0	22.5
Mean	20.7	20.3	20.2	20.8	20.3	21.5	22.6	22.9	22.5	21.8	19.7	18.3	17.1	18.0	20.7	25.8	28.4	30.2	30.1	28.8	26.7	24.9	23.3	21.8	22.8

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 24 Agincourt $Z = 56,000\ \gamma +$ August 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		141	129	154	111	80	77	100	116	117	116	116	115	111	113	117	122	113	113	115	119	128	142	132	132	118
2		122	120	123	121	114	74	47	80	95	106	111	118	116	122	121	111	112	118	125	130	134	136	136	136	114
3		131	127	110	110	95	96	106	110	115	118	116	115	111	106	105	109	107	110	116	121	127	133	129	134	115
4		123	124	124	117	117	120	110	97	105	115	115	108	115	107	105	105	106	109	115	126	136	141	139	137	117
5		135	125	115	104	93	99	110	110	109	105	110	110	113	115	115	115	109	109	115	115	127	138	140	135	116
6		130	126	125	115	86	75	81	95	112	122	124	124	121	120	119	114	109	112	114	117	124	129	130	127	115
7		125	115	117	91	94	104	107	114	113	110	114	116	117	118	115	104	99	101	104	112	116	119	120	120	111
8		120	121	121	114	110	100	101	110	113	111	114	114	112	113	110	125	101	107	113	118	120	123	121	118	114
9		113	114	113	111	88	78	63	79	98	112	116	114	109	105	106	104	108	110	115	120	125	122	121	119	106
10		114	114	113	113	113	113	113	113	114	116	119	118	117	114	112	113	118	120	123	121	120	119	120	118	116
11	Q	116	116	113	114	113	114	114	113	113	113	114	113	112	107	111	111	112	115	118	120	122	125	124	114	115
12	Q	112	113	114	113	113	113	113	111	113	113	114	114	113	118	119	109	107	108	113	120	120	119	119	115	114
13	Q	114	114	113	115	114	114	113	113	113	113	114	113	115	113	109	102	98	103	109	115	116	116	116	116	112
14	Q	114	114	113	113	114	113	113	113	113	115	115	115	115	115	112	114	113	113	114	118	121	120	119	114	115
15		107	107	107	107	107	107	107	107	107	107	107	112	108	105	93	86	86	92	97	108	120	128	124	115	106
16	Q	111	109	109	109	107	107	107	107	108	108	108	111	107	107	103	102	101	107	113	118	121	120	117	116	110
17		114	116	116	113	113	107	105	107	109	108	108	110	107	108	104	97	97	108	108	112	123	128	127	120	111
18	D	116	116	107	107	105	82	93	106	62	40	72	91	89	77	69	87	98	107	113	121	124	128	130	124	99
19	D	119	119	118	112	109	107	112	113	113	114	119	119	119	118	113	110	108	117	139	164	178	204	277	262	137
20	D	264	268	25	80	15	-97	-54	-67	65	86	95	73	82	103	116	112	117	128	129	127	133	137	134	139	92
21	D	137	129	94	86	74	96	75	18	17	19	95	112	116	118	118	112	119	121	127	128	129	135	135	134	102
22		126	122	121	121	117	116	106	87	87	111	112	113	114	116	113	111	111	114	120	124	131	129	134	141	117
23		138	143	112	61	33	4	-6	78	100	101	91	85	101	105	101	106	115	122	124	129	128	129	129	129	98
24		132	123	123	124	123	124	122	118	107	102	108	116	112	110	110	98	96	106	117	122	127	131	129	125	117
25		123	123	123	122	116	116	117	121	122	121	123	123	121	119	116	114	112	112	117	123	123	122	131	128	120
26		129	117	122	118	98	79	96	112	118	119	119	119	117	117	108	106	108	107	109	111	111	112	113	113	112
27		112	111	112	113	113	110	109	107	106	107	106	107	105	101	95	97	98	103	116	118	139	143	134	133	112
28	D	125	118	117	119	109	101	194	96	101	84	50	51	61	78	83	91	99	106	121	136	137	137	135	125	103
29		116	113	109	110	111	110	112	107	94	66	64	88	99	102	99	101	101	105	108	110	114	116	118	113	104
30		111	112	111	106	107	105	103	105	108	108	106	104	107	104	103	101	105	111	113	118	115	113	114	120	109
31		122	114	110	106	108	100	84	86	98	101	110	115	112	107	108	110	116	129	124	119	118	120	124	133	111
Mean		126	124	113	109	100	92	93	96	102	103	107	108	109	109	107	106	106	111	116	121	126	130	131	129	112

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 25 Agincourt H = 15,500 γ + September 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		496	501	504	515	509	512	511	507	500	478	494	502	491	472	475	474	478	496	509	518	519	508	504	500	499
2	Q	506	504	509	509	512	509	507	507	506	506	506	501	495	479	469	471	483	473	512	512	520	517	507	522	502
3		517	507	501	511	513	509	511	508	506	505	501	501	490	479	461	477	493	500	507	512	512	514	501	506	502
4	Q	507	512	512	515	512	512	512	512	508	507	504	504	499	481	466	467	479	491	507	512	528	524	514	504	504
5		506	508	506	507	507	507	507	507	507	506	508	506	507	495	480	464	473	479	496	515	512	512	517	509	502
6	Q	496	501	512	512	513	515	512	511	507	506	501	501	492	477	460	453	464	483	505	514	523	518	512	513	500
7	Q	518	517	517	517	517	515	512	512	512	512	512	507	501	490	475	475	485	496	508	519	523	524	512	519	508
8		520	518	515	512	512	497	500	511	512	512	509	493	488	497	479	466	466	474	485	491	506	517	520	522	501
9		522	520	507	497	469	507	512	508	507	506	512	508	497	464	473	485	484	486	495	507	515	522	520	519	502
10		517	515	512	511	507	512	511	512	512	513	512	504	495	491	490	480	480	496	506	512	523	534	511	507	507
11		506	513	515	508	507	511	507	509	507	504	511	517	512	507	496	490	481	480	496	491	517	501	512	511	504
12		512	517	500	501	508	512	506	496	491	512	509	507	495	485	480	485	493	505	512	518	519	513	507	508	504
13	Q	512	509	512	511	508	508	508	511	511	511	511	509	499	484	474	480	491	506	515	534	539	534	519	511	509
14	D	495	491	480	485	507	504	420	294	265	269	375	439	391	417	432	399	420	464	472	500	506	508	505	488	439
15		496	512	501	497	493	453	497	488	494	494	488	464	450	433	469	464	448	459	481	490	517	507	491	483	482
16		491	487	491	491	496	483	463	490	477	468	461	447	474	475	455	426	461	480	504	490	500	504	509	481	479
17		483	506	501	491	475	492	477	474	425	402	334	391	474	477	459	442	459	479	464	496	507	518	504	505	468
18		498	499	503	496	497	497	497	498	495	495	491	468	474	477	461	451	439	464	486	499	506	512	509	501	488
19		501	493	502	501	507	507	492	481	487	482	470	481	481	484	456	442	453	462	479	486	494	507	498	507	486
20		502	493	496	496	496	496	498	498	495	495	508	515	502	475	440	441	437	489	506	513	513	508	502	497	492
21		492	497	497	497	503	496	494	499	493	493	497	501	492	484	446	426	454	448	467	507	507	496	518	519	489
22	D	524	526	524	497	351	201	171	33	348	487	475	469	463	458	442	441	459	484	519	578	606	875	658	645	467
23	D	234	489	337	211	310	330	472	459	462	455	463	479	477	470	470	465	460	486	501	502	500	492	481	481	437
24		481	481	482	482	486	486	484	486	489	489	487	481	480	481	470	458	468	481	481	475	491	500	497	499	483
25	D	481	524	416	448	470	459	440	389	381	400	459	466	464	464	451	432	439	454	481	495	489	497	491	493	458
26		499	499	499	499	495	456	480	484	486	487	487	482	471	465	470	466	459	461	490	502	508	503	486	474	484
27		486	495	505	502	494	496	499	500	500	497	502	501	492	481	473	466	478	492	502	519	519	519	510	479	496
28	D	472	492	527	459	427	443	427	461	470	489	495	486	472	464	465	440	476	486	491	502	500	486	497	498	476
29		497	510	495	494	494	492	492	484	485	493	481	486	482	491	481	481	481	482	491	497	492	497	486	500	490
30		501	509	488	498	500	498	494	500	500	503	495	506	499	493	487	481	487	496	503	510	514	511	508	509	500
31																										
Mean		492	505	496	489	486	481	480	471	478	483	485	487	483	476	467	460	468	481	496	507	514	523	510	507	489

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 26 Agincourt D = 7° W + ... ′ September 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	19.9	22.8	21.1	23.1	24.3	24.3	23.8	20.5	20.9	28.5	22.3	16.7	15.4	19.3	22.4	28.1	31.4	32.4	30.3	28.4	25.0	22.3	22.2	22.3	23.6
2 Q	21.9	22.0	23.9	23.9	24.2	23.9	23.4	22.3	21.8	20.9	20.0	18.6	18.2	19.4	23.7	27.7	31.5	31.5	31.1	28.6	25.5	24.0	21.8	23.1	23.9
3	24.8	23.1	22.3	23.2	23.6	20.5	21.8	21.5	20.0	19.1	20.0	16.8	16.3	18.9	24.2	28.7	31.0	32.5	32.1	30.4	27.5	25.0	23.1	22.4	23.7
4 Q	23.0	22.7	22.4	22.1	23.2	23.0	22.4	22.4	21.7	20.6	18.5	17.0	18.8	23.3	28.2	32.1	32.9	31.6	29.7	27.2	25.9	25.3	25.3	26.1	24.4
5	21.2	18.3	23.8	23.5	23.6	23.5	23.1	22.2	21.7	22.5	20.4	17.5	15.2	14.9	18.0	22.0	27.5	30.4	29.8	28.3	25.9	23.6	23.1	21.0	22.6
6 Q	22.2	23.3	23.5	23.3	23.3	22.4	22.0	21.0	21.4	22.7	21.1	19.3	17.2	17.1	20.4	26.2	30.9	31.7	30.5	28.1	25.4	23.5	21.8	21.8	23.3
7 Q	22.9	23.2	22.6	23.4	23.3	23.2	23.8	22.7	22.1	21.3	20.3	18.6	17.0	18.1	21.6	25.5	28.4	29.7	29.2	28.0	26.5	25.0	23.2	22.6	23.4
8	22.9	21.5	19.1	17.6	21.5	27.4	20.9	20.5	21.1	20.3	18.7	18.7	24.2	19.7	21.2	25.7	29.7	31.8	31.3	30.5	27.8	25.7	23.6	23.4	23.5
9	23.2	23.8	20.4	15.1	25.6	26.1	21.2	21.3	19.8	21.6	21.2	18.5	18.2	22.7	26.6	25.6	27.9	29.6	29.4	28.3	26.6	24.8	24.6	24.6	23.6
10	24.3	24.2	23.3	20.1	23.0	23.0	22.7	21.6	25.1	21.8	20.2	19.3	19.5	19.5	22.6	25.1	27.5	28.2	28.3	27.7	26.5	25.8	26.2	24.8	23.8
11	20.6	17.7	24.0	20.4	23.5	22.7	23.5	22.2	20.6	24.6	21.6	16.4	20.6	21.4	22.8	25.4	28.8	32.7	29.3	27.7	27.5	26.6	25.1	20.5	23.8
12	23.0	10.1	19.5	22.2	23.7	25.8	24.6	19.3	21.9	20.6	17.7	17.4	16.4	19.6	24.0	26.6	28.8	29.4	29.4	27.7	25.4	23.5	23.0	23.7	22.6
13 Q	22.4	22.7	23.6	23.6	23.5	23.3	23.5	22.4	21.4	20.4	20.6	18.6	17.7	18.8	22.2	26.1	28.1	29.8	29.8	27.9	25.4	24.0	23.5	17.0	23.2
14 D	16.6	21.4	21.4	17.6	22.2	28.2	21.6	12.2	17.2	9.3	15.9	19.5	34.0	32.1	34.0	38.2	42.8	37.2	34.8	27.7	23.5	18.2	17.2	23.5	24.4
15	22.0	15.9	23.7	25.4	28.8	35.3	27.9	21.7	20.4	20.1	21.4	22.6	26.2	31.5	28.8	30.6	28.8	30.8	31.9	30.6	26.9	24.8	22.2	11.1	25.4
16	24.6	21.9	24.6	27.2	29.0	23.7	33.4	26.1	22.7	26.4	24.8	33.6	27.1	22.2	26.1	30.2	34.4	32.9	30.4	26.4	25.8	23.2	22.2	16.2	26.5
17	15.7	15.1	20.6	25.8	26.4	22.9	29.0	29.6	35.0	37.7	51.8	37.2	19.9	20.5	24.3	28.8	31.5	30.3	28.8	27.2	24.3	22.4	22.2	20.6	27.0
18	22.4	22.7	22.7	23.0	24.6	24.3	23.9	23.5	23.5	21.4	19.5	23.5	21.4	22.2	23.3	29.3	30.6	34.2	31.9	29.8	26.4	23.7	22.4	21.6	24.7
19	15.3	23.3	24.4	22.4	23.0	23.5	20.4	25.8	23.0	19.3	31.1	30.0	26.4	24.8	29.8	31.0	35.0	35.9	34.0	31.7	27.2	24.6	23.4	22.7	26.2
20	22.3	21.1	21.3	23.4	24.7	28.7	21.8	20.5	20.6	21.8	22.9	16.9	17.9	19.2	24.7	31.8	33.9	36.0	32.3	30.7	29.5	29.2	27.6	27.4	25.3
21	24.2	22.6	23.6	25.3	22.7	21.5	21.8	21.5	19.6	21.1	22.3	20.3	19.0	19.4	17.1	27.4	26.8	29.1	34.1	29.5	27.4	28.7	35.2	36.2	24.8
22 D	26.5	26.3	28.7	16.3	26.5	38.1	23.1	21.1	20.1	12.1	19.0	20.0	20.8	23.9	24.5	26.5	26.0	29.9	29.5	30.7	41.0	8.1	14.1	24.1	24.0
23 D	33.1	36.1	0.1	31.1	37.1	11.1	16.1	21.8	25.3	25.7	27.4	23.9	23.4	21.4	21.3	24.5	27.4	29.2	28.1	27.4	25.5	25.0	24.7	25.3	24.6
24	25.2	25.2	24.9	24.4	24.6	24.6	24.0	23.3	22.5	23.3	22.8	22.0	22.0	22.0	22.2	23.5	27.3	26.2	27.0	28.8	28.8	28.9	17.5	10.5	23.8
25 D	18.5	15.4	16.8	25.4	21.2	20.2	30.4	31.7	32.5	26.0	21.0	20.2	21.2	20.7	21.0	25.6	25.4	26.2	26.4	25.6	23.3	24.4	25.7	25.2	23.8
26	22.0	24.4	25.2	22.8	18.3	20.7	19.6	20.2	20.4	21.2	22.0	21.2	21.2	23.3	23.6	23.8	25.9	26.4	27.7	26.4	25.2	24.1	24.6	21.2	23.0
27	23.7	24.0	23.5	26.8	23.3	23.3	23.9	23.3	23.8	25.8	24.0	22.2	21.4	21.4	22.8	25.6	27.3	28.3	28.3	27.7	33.4	33.6	29.4	22.2	25.4
28 D	26.2	24.4	23.9	22.2	23.5	23.3	17.8	12.0	20.3	23.5	22.8	23.5	27.5	29.1	30.6	28.8	26.4	28.6	25.4	24.9	19.6	24.1	15.7	20.4	23.5
29	24.4	21.2	23.1	26.8	25.4	22.8	23.1	23.5	28.3	23.8	27.5	25.6	24.9	23.5	23.3	23.8	25.2	27.0	27.3	27.3	27.5	26.3	25.4	22.2	25.0
30	24.1	18.0	18.0	25.2	24.6	22.2	23.8	26.4	23.5	22.0	24.1	23.1	22.2	22.2	22.9	25.0	25.6	27.0	27.3	26.7	25.4	24.6	24.6	25.2	23.9
31																									
Mean	22.6	21.8	21.9	23.0	24.4	24.1	23.8	22.1	22.6	22.2	22.8	21.3	21.0	21.7	23.9	27.3	29.5	30.6	29.8	28.3	26.7	24.4	23.4	22.3	24.2

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 27 Agincourt — Z = 56,000 γ + — September 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	128	125	121	110	117	114	113	113	107	87	99	109	110	113	116	112	111	113	122	125	125	124	120	120	115
2 Q	122	120	120	120	115	115	115	116	116	116	118	117	117	115	114	114	110	114	121	123	127	129	125	122	118
3	122	122	122	121	117	111	107	110	117	115	116	116	115	111	109	99	101	109	116	123	125	127	123	120	116
4 Q	118	117	116	114	113	114	116	117	118	117	117	116	117	115	110	108	109	112	118	122	126	127	126	130	117
5	129	121	120	120	120	117	118	117	118	116	115	119	116	111	107	100	106	114	120	124	123	122	122	127	118
6 Q	126	123	119	117	117	113	111	113	113	114	114	116	115	115	113	117	118	121	123	126	126	121	121	117	118
7 Q	115	114	115	115	113	112	110	112	115	115	115	115	115	114	109	98	105	115	117	125	128	128	123	121	115
8	118	117	121	115	95	100	113	121	115	113	112	117	116	116	121	115	117	117	121	124	125	125	122	117	116
9	117	117	121	117	94	99	114	120	113	116	113	116	116	115	117	115	117	118	121	124	126	123	121	118	116
10	119	119	121	122	123	121	117	113	106	112	115	116	117	116	116	115	114	116	120	121	117	123	121	121	118
11	121	117	118	120	120	119	116	116	110	95	84	94	106	106	107	104	105	110	120	132	138	130	130	128	114
12	125	113	101	116	107	90	89	101	111	111	111	114	110	107	108	104	106	110	116	122	123	122	120	120	111
13 Q	116	113	111	112	112	112	112	113	113	113	113	114	112	108	105	105	103	106	108	112	114	113	115	121	112
14 D	121	124	115	110	35	66	-9	-114	-125	-63	5	51	0	19	67	101	122	145	164	178	153	160	146	131	71
15	125	112	107	118	100	29	68	86	112	109	106	103	93	94	102	108	119	138	150	161	164	165	182	176	118
16	139	135	133	85	84	95	66	65	84	92	81	77	61	93	102	108	122	122	133	158	140	138	145	156	109
17	150	119	114	67	65	82	16	-17	-8	-89	-79	-8	55	90	108	113	120	128	148	151	133	129	122	123	76
18	125	119	107	110	118	117	116	116	111	122	112	102	98	102	108	113	123	131	129	127	121	119	119	122	116
19	118	117	117	115	86	92	79	71	74	69	46	52	69	84	92	100	105	116	125	130	132	128	120	119	98
20	119	122	120	118	112	94	95	107	106	102	105	102	108	110	111	116	116	113	116	120	123	128	137	147	114
21	147	138	133	121	95	117	118	117	108	112	116	117	115	118	117	112	112	117	142	133	133	125	125	117	121
22 D	120	126	163	196	31	-121	-70	-114	58	127	119	109	105	112	123	127	126	130	130	152	203	389	317	210	129
23 D	171	246	-85	-125	60	-17	131	143	114	106	112	122	121	119	119	122	123	127	128	124	119	123	127	129	102
24	127	129	129	129	131	130	130	129	129	129	127	125	121	131	128	125	128	133	137	148	157	179	208	283	143
25 D	231	121	2	96	137	98	65	15	32	68	106	130	124	129	126	124	133	142	140	139	144	144	139	138	113
26	135	131	129	126	65	45	99	122	126	124	123	121	125	127	126	125	127	139	136	129	131	139	144	146	122
27	136	129	111	100	115	121	124	120	115	113	115	119	119	120	120	119	118	121	124	129	141	146	251	250	132
28 D	203	145	142	88	76	36	73	97	106	117	120	119	113	121	132	132	132	125	134	148	159	151	146	130	123
29	132	125	123	108	115	126	126	117	113	111	112	109	116	122	119	117	117	123	131	138	135	140	141	137	123
30	134	116	116	128	128	124	118	110	119	117	123	125	125	127	124	124	124	127	127	128	129	127	126	126	124
31																									
Mean	134	126	110	107	101	89	93	88	95	97	100	105	105	109	113	113	116	122	128	133	185	141	143	141	114

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 28 Agincourt — H = 15,500 γ + — October 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	Q	509	508	506	502	495	502	501	503	503	508	508	503	498	492	485	486	492	495	501	505	506	503	503	506	501
2	Q	507	507	507	507	507	507	508	509	514	514	514	510	503	498	483	487	493	507	517	520	522	519	513	513	508
3	Q	508	508	503	503	503	503	504	504	508	511	514	512	505	495	482	479	485	493	503	510	513	514	514	517	504
4		513	509	509	501	493	498	499	500	508	514	520	514	509	498	479	471	483	498	508	510	515	516	515	515	504
5		514	519	515	515	515	519	522	522	525	511	524	525	514	503	490	476	477	483	494	503	518	515	515	521	510
6		520	514	508	503	509	505	512	515	519	515	517	516	511	503	492	477	472	476	494	511	517	519	520	520	507
7		519	520	520	515	515	515	515	521	521	520	522	522	520	513	502	489	477	487	497	508	519	519	494	503	511
8		510	503	514	511	493	490	499	503	508	503	507	509	503	498	488	478	466	482	494	501	509	508	515	519	500
9		519	515	510	505	504	509	513	513	514	514	514	514	515	510	503	497	496	493	497	507	507	514	507	513	509
10		513	515	514	516	516	520	521	521	520	522	525	527	521	516	505	497	489	491	494	503	501	501	503	509	511
11		507	509	509	509	518	511	504	509	517	523	520	524	531	510	489	472	462	487	490	504	509	517	499	498	505
12	D	490	496	492	481	496	488	509	503	493	503	510	509	487	459	492	468	444	438	475	499	472	490	499	508	488
13		508	503	504	497	507	502	499	506	497	500	513	515	498	497	481	474	481	490	500	500	513	498	475	495	498
14	D	477	476	482	489	497	497	475	492	467	476	514	483	471	471	463	445	438	454	477	498	503	503	506	506	482
15		502	497	505	501	497	489	492	505	508	512	512	506	504	498	486	485	485	492	494	491	499	502	494	503	498
16		501	501	506	507	501	505	502	506	504	501	507	512	500	492	480	474	469	473	485	485	504	511	506	506	498
17		507	512	512	508	507	507	496	502	507	507	510	511	500	490	483	479	475	483	490	495	501	506	507	507	500
18		502	501	504	504	498	501	499	502	501	507	512	513	511	500	484	472	475	485	491	492	502	502	502	505	498
19		506	506	503	496	490	496	495	501	505	508	512	513	512	500	486	474	471	474	486	494	500	502	506	504	498
20		497	501	496	496	500	500	503	507	507	517	525	528	515	497	507	495	485	474	483	500	508	506	483	491	501
21		501	501	493	490	491	500	506	509	512	513	524	524	518	501	486	476	478	482	495	506	511	513	519	518	503
22	Q	518	515	513	512	514	517	519	523	524	526	523	524	523	513	500	492	490	492	506	517	523	529	533	530	516
23		527	524	523	524	524	523	524	525	525	526	525	524	519	509	500	487	483	490	501	517	523	527	529	525	517
24	D	539	504	538	560	424	461	358	409	275	285	376	485	495	470	453	452	464	472	495	496	500	485	475	480	456
25		490	501	489	486	488	488	492	491	496	498	496	495	488	483	474	468	465	468	475	492	496	492	499	505	488
26		504	494	501	496	499	498	500	501	501	502	501	500	497	486	482	469	466	469	483	486	500	508	512	513	495
27	Q	511	508	508	508	506	504	508	511	511	513	514	513	509	502	492	485	485	491	494	502	508	512	512	513	505
28		508	508	508	508	508	507	508	508	509	510	509	513	508	501	492	485	484	481	484	485	502	507	501	493	501
29	D	488	496	487	487	484	485	491	494	498	503	511	512	506	492	482	485	401	417	439	518	702	704	622	447	506
30	D	416	357	344	466	455	482	497	488	492	497	498	502	498	487	474	465	464	464	475	485	491	497	498	498	470
31		500	499	499	499	502	501	501	503	502	511	507	503	497	489	486	490	488	493	497	502	505	507	508	507	500
Mean		504	501	501	503	499	501	500	503	500	502	509	512	506	496	486	478	474	480	491	501	513	514	509	506	500

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 29 Agincourt D = 7° W + ... ′ October 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	24.6	24.6	24.4	21.4	22.0	23.1	22.9	22.8	23.5	23.3	22.8	22.2	22.0	22.2	23.5	25.6	27.4	28.8	29.1	27.3	25.2	24.6	24.8	24.8	24.3
2 Q	24.6	24.6	24.7	24.5	24.4	24.1	23.8	23.5	22.5	22.0	21.4	21.2	21.0	21.7	22.7	25.4	28.3	29.4	27.5	26.2	24.6	23.8	24.1	24.9	24.2
3 Q	24.4	24.1	24.4	25.0	23.6	23.1	23.3	22.5	25.6	21.0	21.0	20.9	19.9	19.9	21.4	24.8	25.9	27.9	28.4	27.5	25.4	24.5	23.6	23.6	23.8
4	24.1	24.1	19.3	22.1	23.1	22.4	23.5	23.9	23.1	22.2	19.9	20.2	18.3	18.2	21.1	26.6	29.8	29.8	28.4	28.0	27.4	26.0	24.9	24.5	23.8
5	24.2	24.5	24.3	23.7	23.1	22.8	22.1	22.5	22.2	25.7	25.3	21.1	19.8	19.4	20.3	23.0	26.9	29.9	30.5	30.3	28.2	26.8	25.4	24.2	24.4
6	23.8	23.9	22.6	22.2	26.3	21.3	23.4	23.4	23.0	22.6	22.3	22.1	20.5	19.8	20.1	21.4	24.9	29.5	29.7	29.0	27.8	26.8	25.8	25.0	24.1
7	23.9	23.6	23.4	23.3	22.3	22.3	22.6	23.2	22.3	21.6	21.5	21.3	20.7	19.4	19.2	19.7	25.3	27.6	28.1	29.1	29.8	30.1	30.2	25.3	24.0
8	24.5	23.2	19.2	21.5	18.1	19.2	21.3	23.6	23.4	21.3	25.3	21.5	21.1	20.8	18.4	20.8	24.2	26.3	28.1	28.2	28.1	26.5	25.5	24.7	23.1
9	24.0	23.9	23.2	23.5	23.7	24.8	23.3	23.3	22.8	22.6	22.4	22.2	20.6	20.4	19.5	20.9	23.8	26.6	28.1	28.8	27.6	27.3	23.9	23.5	23.8
10	25.4	23.8	23.3	23.5	23.5	23.6	23.0	22.4	23.7	24.9	23.7	22.4	23.5	23.7	21.7	23.0	24.3	27.2	29.3	29.0	27.3	26.4	26.6	25.6	24.6
11	24.6	24.3	24.1	23.5	23.8	23.2	20.4	29.6	20.1	19.3	24.8	34.0	30.4	25.1	20.4	22.2	27.5	28.0	28.5	29.2	29.8	28.0	27.2	23.5	25.5
12 D	22.6	21.2	20.2	18.6	20.4	22.3	27.3	22.6	23.7	26.5	27.7	30.4	31.1	41.0	32.1	26.1	27.0	30.0	28.1	27.7	28.8	25.6	25.4	24.0	26.3
13	23.9	23.5	19.9	18.2	31.1	29.0	26.4	22.1	22.9	26.4	24.0	23.5	24.3	21.4	22.8	24.1	26.0	28.0	28.8	28.1	25.9	23.3	24.7	17.2	24.4
14 D	14.0	19.3	24.2	25.4	19.8	24.8	24.7	22.4	27.7	30.8	25.7	27.0	31.4	27.0	25.9	25.2	30.8	31.7	27.9	24.6	24.3	24.6	24.7	23.8	25.3
15	23.4	15.7	19.9	22.5	26.5	21.3	26.3	22.8	23.4	22.4	24.5	27.8	22.8	22.3	20.8	20.8	23.6	26.3	28.3	26.7	25.5	25.7	19.6	23.8	23.5
16	18.6	21.7	21.4	23.8	24.1	24.5	25.9	25.5	21.5	20.7	22.8	23.4	25.3	25.5	25.1	27.8	29.7	28.4	29.9	30.9	23.8	25.7	25.2	24.4	24.8
17	23.4	24.1	24.5	23.8	21.7	20.7	21.5	22.5	22.8	23.7	23.8	23.6	23.1	21.5	21.0	22.5	25.5	27.7	27.8	27.9	27.3	26.3	25.2	24.7	24.0
18	25.3	23.9	23.6	22.0	22.5	23.3	23.6	22.7	22.8	23.4	24.7	26.4	24.4	21.5	21.4	23.6	25.2	26.0	28.2	29.5	28.2	26.7	26.1	25.2	24.6
19	24.1	23.8	23.9	25.8	20.5	20.4	18.9	21.5	20.7	22.3	23.5	24.4	23.3	21.6	22.2	24.3	25.9	28.8	29.0	28.5	27.7	26.9	25.4	24.3	24.1
20	24.6	23.7	22.3	22.7	23.3	20.7	21.6	22.4	22.2	21.4	20.2	23.5	23.7	26.4	25.2	21.2	24.0	28.8	30.6	29.8	30.3	30.0	27.3	24.4	24.6
21	23.5	22.4	20.9	20.9	23.5	22.2	21.1	21.6	22.4	24.8	26.4	22.9	21.3	20.4	19.5	22.4	26.1	28.3	29.2	28.5	27.2	25.8	24.7	24.6	23.8
22 Q	24.3	24.6	23.7	22.7	23.8	24.0	24.1	24.0	23.5	23.5	23.3	22.7	21.6	19.5	18.5	20.1	23.5	26.2	27.7	27.7	26.9	25.8	24.6	23.7	23.8
23	23.5	23.3	23.4	23.4	23.5	23.7	23.7	23.6	23.5	23.4	23.0	21.2	19.9	19.3	21.4	24.6	28.5	28.3	28.8	28.8	28.2	28.5	28.0	28.8	24.7
24 D	25.9	26.9	21.4	7.5	24.4	22.4	43.3	17.4	18.9	24.8	33.9	28.5	17.2	18.8	22.2	25.6	30.0	31.9	30.6	30.2	28.2	31.1	24.6	24.3	25.4
25	11.1	15.7	21.6	22.4	18.2	17.0	21.9	23.5	24.8	24.6	23.6	22.7	20.5	19.8	18.4	21.0	23.5	26.0	27.7	28.3	28.4	27.9	26.9	25.5	22.5
26	25.2	24.6	15.9	22.3	24.3	24.4	24.8	24.9	24.0	24.0	24.6	25.4	22.6	20.9	20.6	22.4	25.6	28.8	29.4	28.5	26.9	25.7	25.5	23.8	24.4
27 Q	24.6	24.6	24.6	24.6	24.8	24.3	24.3	24.6	24.6	24.9	23.8	23.1	21.7	19.5	20.4	22.0	24.6	26.4	26.9	26.5	26.4	25.1	24.6	24.3	24.2
28	23.8	24.0	23.9	23.9	24.7	24.4	24.5	24.4	24.4	24.1	23.9	24.2	21.8	21.0	21.1	21.4	23.9	27.6	27.8	29.5	26.6	26.5	26.9	24.8	24.6
29 D	24.4	23.9	19.5	21.0	21.3	22.1	22.5	24.4	22.8	22.5	23.8	24.7	21.3	21.7	30.0	26.2	22.5	21.1	25.1	22.3	4.7	3.8	18.0	17.1	21.1
30 D	11.8	15.6	29.7	21.0	20.3	25.7	31.9	30.7	28.9	25.2	23.9	22.8	21.5	21.5	22.3	23.6	25.9	27.3	27.6	27.8	26.9	26.3	25.9	25.7	24.6
31	25.5	24.9	24.9	25.0	25.5	25.5	25.2	24.7	24.7	23.8	23.7	23.4	22.5	22.3	23.8	25.2	26.7	29.1	30.5	27.8	26.6	26.2	25.9	26.0	25.4
Mean	23.0	23.0	22.7	22.3	23.2	23.0	24.3	23.5	23.3	23.5	23.9	23.9	22.6	22.0	22.0	23.3	26.0	28.0	28.6	28.1	26.5	25.8	25.2	24.2	24.2

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 30 Agincourt — Z = 56,000 γ + — October 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	122	123	123	124	127	125	124	124	123	121	123	124	124	123	121	119	121	123	124	126	126	125	127	125	124
2 Q	124	124	124	120	121	121	122	121	118	117	117	118	119	121	119	114	116	119	124	126	125	121	119	118	121
3 Q	117	117	117	114	115	116	117	116	109	107	113	116	115	117	118	117	116	114	114	119	120	119	118	117	116
4	119	119	116	112	118	118	117	111	109	105	113	118	119	117	116	113	109	108	110	113	118	119	118	119	115
5	119	119	120	120	119	118	117	117	114	109	98	104	111	113	113	110	110	111	114	117	118	119	120	120	115
6	116	118	119	119	103	116	119	117	116	115	116	117	118	117	115	114	110	111	113	115	114	116	117	117	115
7	115	115	116	117	118	116	114	110	110	112	114	115	115	115	115	107	108	107	104	105	114	121	135	131	115
8	124	126	122	67	100	96	94	104	112	109	116	114	115	118	115	112	109	114	115	115	119	120	120	118	111
9	118	117	118	119	119	114	114	116	116	118	116	117	118	116	114	113	110	110	113	115	118	119	121	121	116
10	121	120	119	117	117	115	114	112	110	101	105	107	110	114	117	114	111	110	112	118	122	129	126	125	115
11	120	118	116	115	109	104	106	87	66	78	73	57	51	73	98	101	104	106	109	116	116	119	124	127	100
12 D	131	109	86	118	119	109	77	77	86	97	82	78	93	95	102	100	108	130	128	132	147	139	128	123	108
13	118	118	119	105	68	60	81	98	99	106	112	113	114	117	113	113	109	108	111	113	118	128	133	129	109
14 D	130	137	133	104	99	65	30	15	40	61	87	86	91	102	109	113	117	124	134	134	133	124	123	123	101
15	122	119	115	111	91	79	81	99	111	114	108	109	111	113	114	113	112	111	112	110	115	118	122	126	110
16	122	118	108	105	115	109	88	74	78	79	92	102	107	107	106	106	107	115	122	118	123	123	118	117	107
17	118	115	115	114	106	98	100	107	112	114	115	115	114	114	112	112	112	114	114	118	117	118	119	118	113
18	117	117	116	111	116	113	112	109	106	108	111	114	111	114	114	113	109	108	114	114	116	119	121	120	113
19	120	120	118	115	115	110	106	104	102	104	105	108	108	109	112	109	105	105	108	115	120	126	123	121	112
20	126	122	124	125	119	116	114	111	111	113	111	111	106	111	113	107	102	102	111	120	128	136	152	153	118
21	138	133	133	129	126	102	104	103	112	111	102	112	117	121	121	121	122	123	126	128	125	123	120	118	120
22 Q	116	117	117	117	117	116	116	117	115	115	115	116	118	119	123	118	115	115	117	117	117	116	113	113	117
23	113	114	115	115	113	113	113	113	112	110	113	113	114	116	117	113	112	113	118	121	121	118	118	122	115
24 D	180	192	279	140	41	44	10	77	-33	24	-146	59	124	116	117	113	114	122	131	136	135	152	151	145	101
25	145	117	135	138	131	130	114	125	127	128	124	129	129	126	122	120	121	123	129	130	131	134	131	129	128
26	126	131	119	125	124	119	125	125	123	124	121	121	124	125	124	118	115	119	123	126	128	126	125	121	123
27 Q	121	121	122	122	124	121	123	123	123	121	120	121	121	121	120	115	115	119	123	126	125	123	122	121	121
28	121	120	120	121	121	121	122	121	121	121	119	119	122	125	126	121	124	128	132	137	138	136	133	133	125
29 D	132	131	127	126	123	118	111	109	98	94	100	108	121	123	118	114	125	175	211	287	342	334	196	225	156
30 D	144	95	22	107	121	111	91	103	120	129	136	138	139	137	136	134	135	138	137	136	138	138	137	137	123
31	135	134	134	133	133	133	132	132	133	131	128	131	129	127	123	121	122	126	127	128	128	129	128	128	129
Mean	126	122	122	117	113	108	104	106	103	106	102	110	114	116	116	114	114	118	122	127	131	132	128	128	117

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 31 Agincourt — H = 15,500 γ + — November 1963

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		507	503	502	497	502	501	502	497	500	508	505	503	498	491	481	486	493	494	498	507	514	509	506	512	501
2		508	511	508	507	498	503	503	502	503	509	507	509	502	493	485	482	455	465	482	502	493	501	507	507	498
3		497	505	508	500	500	492	494	491	487	503	510	509	502	491	489	489	497	505	507	507	510	497	505	514	500
4		514	513	511	509	509	513	509	511	511	510	509	508	503	496	484	486	491	496	502	502	502	509	513	511	505
5	Q	512	510	510	510	508	509	509	513	513	514	513	510	503	495	482	476	478	487	498	509	514	518	520	522	506
6		523	516	515	518	518	519	519	519	520	519	523	522	516	503	480	484	497	500	505	508	507	499	507	513	510
7	D	514	507	496	498	489	478	487	503	509	507	480	482	508	496	482	456	422	444	469	485	478	499	492	492	486
8	D	513	471	507	495	491	470	455	471	501	508	508	491	478	489	475	464	452	466	491	497	482	491	500	503	487
9	D	524	491	499	491	502	502	496	478	509	505	502	512	487	477	493	458	459	469	470	470	476	481	488	491	489
10	D	487	484	498	491	493	503	504	497	503	485	504	509	501	491	491	480	473	481	487	501	502	513	509	491	495
11		501	513	507	503	497	495	497	485	488	507	508	513	514	507	498	487	480	492	496	484	496	510	510	498	499
12		508	503	504	509	498	496	498	496	492	508	503	509	509	502	493	473	465	473	489	502	507	508	509	508	498
13		513	512	513	512	513	510	512	510	509	513	510	509	507	503	500	492	497	502	508	510	514	516	516	514	509
14		514	513	513	511	511	509	509	513	514	519	518	516	513	508	502	496	498	503	513	516	516	520	519	513	511
15		506	506	512	513	513	511	512	512	512	516	520	519	517	506	494	486	490	497	506	513	518	518	519	519	510
16	Q	516	512	507	508	510	511	514	512	512	517	517	517	514	510	506	501	501	506	514	521	523	523	521	522	513
17		521	519	518	517	518	521	518	520	522	535	534	528	526	511	539	490	514	505	515	525	521	516	517	517	519
18	Q	515	514	515	515	515	511	511	512	512	515	513	513	511	508	502	498	495	498	504	506	517	520	520	520	511
19	Q	519	518	516	515	515	514	514	515	515	517	515	516	514	505	504	494	495	501	512	520	521	522	525	526	513
20		521	523	514	505	512	516	515	517	520	523	519	519	516	508	499	494	494	504	515	523	525	526	525	525	515
21	Q	511	504	503	510	516	515	515	515	525	520	515	516	514	509	504	492	493	498	507	514	519	520	521	521	512
22		521	519	519	519	519	519	521	523	525	526	524	523	525	521	514	506	502	492	494	508	521	516	519	516	516
23		510	504	502	508	514	514	514	514	524	520	514	515	513	508	503	498	496	499	507	513	509	514	520	520	510
24	D	518	515	511	511	507	508	509	519	511	509	514	519	506	481	486	475	455	470	489	491	487	483	469	471	496
25		481	485	481	485	486	484	496	499	502	502	500	502	502	496	494	491	479	485	490	497	506	508	513	513	495
26		514	513	512	513	514	512	513	513	515	508	513	513	514	512	507	502	496	496	503	509	515	517	518	516	511
27		514	515	516	514	513	513	507	512	508	512	513	512	517	514	508	501	501	504	508	518	519	514	515	519	512
28		518	519	514	502	506	506	513	515	518	518	517	517	515	512	507	503	503	506	511	514	518	519	521	521	513
29		521	520	523	512	508	511	512	514	519	524	524	529	530	525	518	523	517	517	519	519	522	514	513	518	519
30		502	505	512	512	512	513	516	516	516	517	509	502	500	533	514	496	482	487	486	500	512	513	511	511	507
31																										
Mean		511	508	509	507	507	506	506	507	511	513	512	512	509	503	498	489	486	491	500	506	509	510	512	511	506

DECLINATION
Mean values for periods of sixty minutes, Universal Time

Table 32 Agincourt D = 7° W + ... ′ November 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	24.7	24.8	25.6	25.6	26.4	26.1	25.4	21.9	23.5	23.5	23.0	23.1	22.6	21.3	22.7	25.4	27.3	29.2	30.6	28.3	26.4	25.8	25.6	25.6	25.2
2	24.8	25.0	25.4	23.8	22.3	23.8	24.0	23.5	24.8	24.6	21.5	20.9	20.7	20.1	21.5	23.9	27.7	31.2	29.8	27.8	27.9	25.8	24.9	24.6	24.6
3	19.9	19.9	24.6	24.1	31.1	22.4	21.2	23.3	29.6	25.8	21.7	22.2	21.6	21.5	22.7	25.6	27.7	28.8	27.7	27.2	26.6	25.7	23.3	23.5	24.5
4	23.7	23.7	24.3	24.3	24.1	22.7	24.3	24.2	23.7	23.5	23.4	22.4	21.4	20.6	21.4	23.9	26.5	27.9	27.9	27.7	26.5	25.6	25.2	24.6	24.3
5 Q	23.8	24.2	24.3	24.5	24.6	24.5	24.7	24.7	24.2	23.6	23.4	23.3	22.6	21.5	22.3	24.3	26.1	27.6	27.6	26.0	25.3	24.5	24.5	23.8	24.4
6	23.3	22.6	22.5	23.4	23.4	24.0	24.2	24.2	24.5	21.1	20.3	21.3	20.3	20.0	23.2	27.8	29.3	28.7	29.5	29.2	28.9	26.8	22.1	23.7	24.3
7 D	22.7	22.1	18.1	20.3	25.5	18.8	24.5	23.2	23.6	21.9	33.7	41.3	34.7	25.5	25.3	25.7	29.7	33.5	35.4	31.2	23.2	26.5	26.5	19.2	26.3
8 D	17.9	19.4	9.7	19.3	20.5	34.9	38.1	17.2	23.2	20.6	23.2	31.4	33.8	29.9	27.6	37.1	30.3	27.8	28.7	29.5	27.6	23.5	25.6	23.6	25.8
9 D	16.8	10.8	17.0	22.6	24.6	25.2	26.2	34.1	26.4	24.7	24.4	24.5	31.5	36.1	28.8	27.5	30.8	30.9	28.8	28.1	32.7	24.6	22.2	19.7	25.8
10 D	16.0	23.5	20.5	15.0	24.4	27.5	24.6	26.7	25.0	32.8	31.7	24.6	24.7	23.5	23.4	24.1	28.4	28.7	27.4	27.7	25.9	24.4	25.3	18.7	24.8
11	20.9	17.7	20.3	17.7	23.5	25.3	25.5	32.6	30.8	26.8	25.3	24.5	22.1	20.3	20.9	23.4	25.6	27.4	29.3	28.9	27.0	24.3	24.4	22.0	24.4
12	22.7	23.2	22.4	23.3	21.3	22.1	24.4	26.6	28.7	25.2	23.1	22.4	21.7	20.2	20.4	23.8	29.0	30.8	28.5	26.8	26.3	25.4	24.9	23.2	24.4
13	23.1	22.1	22.7	23.8	24.3	24.1	24.3	24.0	23.5	23.4	24.3	24.4	23.2	24.3	23.3	25.1	27.2	28.0	28.2	26.9	25.5	25.1	24.3	24.0	24.5
14	23.2	23.4	23.5	24.0	22.4	26.6	23.7	24.4	23.4	23.1	23.0	23.1	22.3	22.3	22.8	24.4	25.9	27.4	27.5	25.9	25.3	24.6	24.6	24.0	24.2
15	24.0	23.2	22.1	23.5	23.8	24.5	25.2	24.9	24.6	24.4	22.8	23.0	22.1	21.0	20.9	23.2	25.9	28.1	28.1	26.3	25.5	24.7	23.8	23.2	24.1
16 Q	22.9	22.8	20.9	23.0	23.7	24.3	26.1	25.5	24.5	23.0	23.1	23.1	22.5	22.0	22.4	25.1	26.7	27.4	27.4	27.0	25.3	24.4	24.0	23.4	24.2
17	23.0	22.7	23.2	23.4	24.1	24.8	24.8	24.5	23.5	23.4	21.1	20.5	20.3	16.9	19.0	29.7	32.2	32.9	32.6	28.6	27.4	26.1	24.5	23.4	24.7
18 Q	23.3	23.2	23.3	23.5	23.8	24.1	24.6	24.4	23.7	23.4	23.3	22.8	22.2	21.2	20.4	22.0	23.5	25.5	26.7	26.0	26.2	25.6	24.9	23.6	23.8
19 Q	23.3	23.2	23.3	23.5	23.6	23.7	24.1	24.0	24.2	23.3	22.5	22.4	21.8	21.0	21.4	23.3	25.5	27.0	27.3	26.2	25.2	24.9	24.6	24.1	23.9
20	23.6	23.5	23.4	21.1	24.8	24.8	24.6	24.5	24.2	23.5	23.3	22.6	22.3	20.5	22.1	23.4	24.7	27.6	27.6	26.7	25.4	24.7	24.0	23.5	24.0
21 Q	23.4	23.3	23.3	23.4	23.7	24.2	24.2	24.5	24.2	23.4	23.4	23.2	21.9	20.5	22.3	24.1	26.1	27.9	28.9	27.8	26.5	25.6	24.5	23.6	24.3
22	23.2	23.3	23.4	23.7	23.9	24.2	24.5	24.5	24.6	24.0	23.9	23.5	22.1	20.3	21.3	23.7	26.3	28.0	32.0	30.7	28.9	27.3	25.5	24.5	24.9
23	24.3	23.4	20.6	24.4	24.2	23.9	23.5	22.7	27.2	22.4	23.3	22.6	21.5	21.2	22.2	24.6	27.1	27.7	27.7	27.6	26.8	24.9	24.7	23.7	24.3
24 D	23.5	23.1	22.7	22.0	20.9	24.6	24.9	23.2	23.5	26.2	27.6	24.2	23.5	26.6	26.6	27.2	30.1	31.7	30.7	28.8	27.7	21.4	23.2	25.3	25.4
25	16.2	20.8	21.2	21.4	17.2	18.0	22.7	24.3	24.1	24.8	24.3	23.7	24.6	23.6	22.4	23.5	25.7	26.4	27.4	26.2	26.1	24.4	24.7	24.1	23.2
26	24.1	23.7	23.8	23.7	24.2	24.4	24.6	24.9	25.0	23.4	23.3	23.3	23.4	23.5	22.7	23.2	24.6	26.3	27.6	26.6	25.9	25.2	24.6	24.3	24.4
27	24.2	24.2	24.2	24.4	24.6	23.3	25.1	23.5	23.5	23.6	23.6	23.7	22.9	22.7	22.1	23.0	23.9	25.8	27.4	26.5	26.1	25.7	25.3	24.2	24.3
28	23.7	23.7	23.9	24.0	21.3	24.1	24.0	24.0	24.4	24.4	23.8	23.4	23.5	23.5	22.7	23.9	24.6	26.2	27.4	26.4	25.8	25.5	24.7	24.3	24.3
29	23.8	23.7	23.6	25,2	22.7	24.1	24.7	23.9	23.7	23.4	24.3	23.2	22.9	23.9	26.9	25.7	25.7	26.9	27.6	26.9	26.5	25.7	25.7	25.8	24.8
30	25.5	23.5	23.7	23.7	23.6	23,8	23.8	23.6	23.1	22.5	21.6	24.1	34.4	27.8	21.4	23.6	25.5	27.7	28.0	26.7	25.7	25.0	23.9	22.5	24.8
31																									
Mean	22.5	22.5	22.2	22.9	23.6	24.3	24.9	24.6	24.8	24.0	23.9	24.0	23.8	22.8	22.8	25.0	27.0	28.4	28.7	27.5	26.5	25.1	24.5	23.5	24.6

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 33 Agincourt — Z = 56,000 γ + — November 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	134	133	134	138	135	124	126	128	133	133	134	133	134	130	130	128	127	133	136	138	138	137	138	138	133
2	137	138	139	137	134	138	136	133	133	132	134	137	134	134	133	125	127	138	135	138	134	134	133	132	134
3	134	132	130	122	81	98	103	105	105	107	121	126	127	128	128	122	116	117	123	127	128	132	132	128	120
4	128	126	125	126	122	117	121	123	123	124	124	124	126	126	124	122	124	126	126	128	129	129	129	129	125
5 Q	129	129	128	128	128	127	128	128	128	128	127	128	131	133	131	129	129	133	135	135	134	131	129	128	130
6	128	126	128	128	126	126	124	123	116	112	116	113	122	122	121	117	121	122	127	128	133	139	139	132	125
7 D	129	129	132	125	109	71	82	119	129	123	99	74	86	98	110	114	126	149	164	194	210	158	147	155	126
8 D	137	165	136	126	128	50	−4	43	98	118	120	109	105	116	106	110	118	138	134	137	143	150	145	143	115
9 D	128	125	120	131	125	109	105	86	108	111	122	127	119	119	113	118	135	137	145	160	177	177	159	161	130
10 D	145	112	88	116	120	102	119	119	117	98	92	99	117	119	118	113	120	131	142	137	139	137	137	139	120
11	136	125	119	115	124	109	108	92	86	109	113	118	124	121	114	108	112	119	125	129	134	134	131	130	118
12	130	130	129	119	113	114	115	112	111	108	108	120	125	125	124	120	129	134	137	135	134	130	130	129	123
13	129	127	127	125	123	125	126	128	129	127	125	125	125	125	123	123	124	124	125	125	127	127	128	128	126
14	126	125	125	125	122	107	119	124	125	125	124	125	126	127	125	124	125	127	127	129	128	129	125	124	124
15	127	127	124	125	124	123	123	123	124	124	124	123	125	123	120	119	119	120	124	123	124	125	125	124	123
16 Q	124	123	123	123	123	123	119	119	120	121	123	123	122	120	119	118	119	119	119	120	123	124	123	121	121
17	122	120	120	120	119	119	119	119	119	118	113	113	114	114	115	109	107	112	114	114	119	119	123	119	117
18 Q	120	120	120	120	120	120	120	119	119	119	119	120	120	119	118	109	111	113	118	121	123	123	120	121	119
19 Q	119	119	119	118	119	119	119	119	119	118	120	120	121	123	119	116	119	121	123	123	123	120	121	120	120
20	119	119	119	122	123	120	120	120	119	118	119	121	120	118	116	116	119	122	123	122	123	119	119	119	120
21 Q	118	118	118	118	119	118	118	118	118	117	117	117	118	119	117	114	117	118	123	123	124	124	122	119	119
22	118	118	118	118	117	115	115	114	114	114	112	113	114	112	109	108	111	114	123	124	123	118	118	118	116
23	119	123	126	126	122	118	117	112	100	95	110	112	113	114	111	106	107	111	117	121	121	121	118	117	115
24 D	117	117	118	118	117	118	114	101	100	107	99	95	98	102	103	103	112	124	131	139	160	174	165	161	121
25	145	129	132	127	117	96	105	113	107	103	113	119	119	123	117	114	113	115	118	123	124	123	123	122	118
26	119	119	120	120	119	119	117	118	109	111	115	116	116	114	113	111	111	114	119	123	123	120	119	118	117
27	119	119	119	119	119	115	115	113	114	118	118	118	119	120	120	116	116	118	123	126	124	121	120	117	118
28	117	117	119	121	121	122	121	120	119	118	117	116	116	116	115	114	116	116	118	120	121	121	120	119	118
29	118	118	115	120	123	121	121	117	117	117	115	112	111	112	113	110	110	110	112	115	117	117	119	121	116
30	123	126	123	122	118	120	119	119	118	115	114	108	92	94	103	107	114	118	122	125	127	126	127	127	117
31																									
Mean	126	125	123	123	120	113	113	114	116	116	117	117	118	119	118	115	118	123	127	130	133	131	129	129	121

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 34 Agincourt — H = 15,500 γ + — December 1963

Day		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		513	513	512	513	513	513	514	516	517	518	517	518	520	516	506	492	502	502	505	511	518	520	523	527	513
2		528	524	522	516	512	513	509	506	516	521	518	519	516	512	489	484	495	502	507	518	518	523	528	525	513
3	D	513	504	506	489	511	512	507	495	496	518	509	502	496	495	486	482	475	468	480	486	490	484	506	511	497
4	D	508	507	512	522	506	502	495	512	512	512	520	518	511	501	494	471	465	465	494	500	496	479	472	486	498
5	D	514	493	501	506	507	513	506	513	502	500	508	518	518	501	471	475	468	477	477	475	494	486	496	512	497
6	D	513	507	503	502	499	517	513	508	504	512	518	518	495	496	479	486	475	469	476	492	501	505	512	518	501
7		514	503	508	512	513	508	509	508	507	502	512	514	502	512	507	489	483	490	496	506	506	508	511	514	506
8		506	517	518	512	508	503	506	501	503	513	512	517	508	506	506	485	485	490	492	500	508	512	519	519	506
9		517	517	516	513	514	516	511	508	512	508	504	522	522	516	508	498	495	498	505	512	519	522	524	523	513
10	Q	522	520	519	518	517	518	517	519	520	521	524	524	524	524	520	509	502	501	505	512	520	524	528	527	518
11	Q	523	522	522	519	520	522	522	523	524	527	526	528	529	525	519	513	506	508	512	519	526	529	528	524	521
12		519	517	519	519	521	519	518	520	522	524	525	524	528	528	524	518	510	508	514	518	523	529	528	512	520
13		510	517	514	513	503	509	516	520	521	524	529	530	527	522	518	512	509	512	518	508	525	526	530	530	518
14		527	525	522	518	520	521	520	515	518	524	525	529	526	531	514	517	527	520	524	521	525	528	522	520	522
15		518	514	511	509	514	509	514	516	516	514	518	519	517	516	514	504	502	506	514	522	529	529	528	527	516
16		519	515	518	519	517	519	520	521	524	524	524	524	520	519	518	508	511	515	518	522	527	529	531	523	520
17		521	524	523	523	523	524	522	523	525	529	527	526	525	519	509	496	945	503	509	516	520	527	532	531	520
18	Q	530	530	528	525	524	524	524	524	528	527	527	530	530	529	524	514	509	511	520	529	531	531	531	530	525
19		530	529	528	528	527	527	526	528	529	529	531	531	531	530	525	517	510	514	521	529	542	545	528	509	527
20	D	523	523	525	530	527	518	513	504	513	523	528	535	529	524	524	514	501	503	509	506	497	508	509	513	517
21		516	516	515	514	519	520	521	520	522	525	525	526	531	521	519	508	500	503	506	515	525	524	514	509	517
22		524	525	524	520	513	516	510	523	526	526	532	531	529	511	523	515	505	497	495	499	519	522	516	515	517
23		524	523	523	522	519	514	514	521	514	521	527	526	526	520	514	503	487	482	498	500	525	524	516	510	515
24		510	515	521	522	522	521	521	523	525	530	526	525	525	516	514	505	502	495	504	514	514	515	521	525	517
25	Q	528	527	524	521	520	524	525	524	524	522	522	530	528	525	519	507	500	502	501	510	520	526	531	531	520
26		530	526	525	525	525	521	524	524	525	524	526	531	530	528	519	504	499	505	515	523	528	525	523	521	522
27		519	519	515	510	515	525	531	528	528	530	531	531	531	532	534	521	515	517	519	521	529	532	534	531	525
28		526	520	521	521	520	525	533	531	532	534	536	536	532	528	521	514	512	514	521	528	508	521	526	531	525
29		533	527	522	532	530	525	527	526	531	532	532	519	504	499	503	499	484	493	504	516	527	527	523	522	518
30		526	520	524	524	520	520	517	520	521	522	521	522	522	521	515	509	511	511	515	521	523	527	526	523	520
31	Q	527	527	526	526	524	522	522	525	526	526	527	531	529	525	526	518	516	518	524	526	529	532	533	532	526
Mean		520	518	518	518	517	517	517	518	519	521	523	524	521	518	512	503	499	500	506	512	518	520	521	520	516

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 35 Agincourt D = 7° W + ... ′ **December 1963**

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	23.6	23.8	23.5	23.9	23.8	24.4	24.0	24.0	24.5	23.7	23.4	23.2	22.9	22.7	23.2	24.1	24.9	26.5	27.4	25.9	25.6	24.7	24.2	24.0	24.3
2	23.3	23.2	23.4	22.8	23.6	24.0	23.6	23.8	23.5	22.7	23.4	23.2	22.8	21.8	22.4	25.8	27.8	29.7	32.9	30.1	26.3	24.7	23.6	22.3	24.6
3 D	21.8	21.7	17.1	21.7	28.1	25.7	22.5	32.1	27.1	21.2	23.6	29.1	33.3	30.2	26.4	25.7	27.1	30.1	28.9	29.7	27.7	18.0	23.8	23.3	25.7
4 D	22.5	21.7	19.7	21.1	23.4	24.2	31.8	26.5	24.9	25.6	25.6	25.7	26.9	24.7	24.4	27.2	30.4	29.3	27.4	23.5	23.6	23.8	21.9	15.1	24.6
5 D	20.6	22.4	20.0	22.4	30.1	27.0	25.8	27.1	25.7	27.7	27.6	25.7	24.2	26.6	30.1	31.2	30.4	29.0	29.7	29.7	24.7	25.8	24.0	22.1	26.2
6 D	16.6	20.3	21.7	22.4	31.2	27.1	23.6	24.0	28.9	27.4	24.4	23.7	25.2	24.1	23.4	22.0	24.5	25.9	26.0	27.6	27.8	25.4	21.4	23.8	24.5
7	23.5	19.3	17.7	21.7	23.4	26.7	28.9	29.5	29.1	28.6	26.5	26.0	28.9	23.6	25.0	23.9	26.0	27.4	27.7	26.7	26.6	25.5	25.0	23.8	25.5
8	22.4	22.7	22.7	22.3	27.7	25.3	20.2	24.7	27.7	25.0	23.2	24.4	25.9	24.7	22.5	24.2	25.8	28.1	27.8	25.9	25.7	22.8	23.4	23.6	24.5
9	23.6	23.2	23.2	23.7	23.8	22.8	23.7	25.9	24.8	25.1	28.1	25.9	24.4	24.5	24.0	23.4	25.4	27.0	27.7	26.9	26.0	25.0	24.0	23.9	24.8
10 Q	23.9	23.8	23.8	23.9	24.0	24.5	24.8	25.1	24.7	24.5	24.5	23.8	23.5	22.4	21.1	21.7	23.2	25.4	26.4	25.8	25.5	24.7	24.2	23.7	24.1
11 Q	23.6	23.5	23.6	23.4	24.3	24.3	24.7	24.9	24.7	24.5	24.4	24.0	23.5	22.8	22.3	22.3	24.4	25.5	26.4	26.7	25.7	24.8	23.9	23.8	24.3
12	23.7	23.5	23.9	24.0	24.2	23.9	24.8	25.3	24.8	23.6	23.5	24.0	23.8	23.3	22.9	22.9	24.0	25.8	26.4	25.7	25.6	25.0	24.6	24.5	24.3
13	24.0	22.9	22.4	19.5	20.8	22.9	23.3	23.8	23.8	23.4	24.0	23.7	24.0	24.2	23.9	24.3	23.7	22.9	22.9	24.0	25.7	27.0	26.8	26.4	23.8
14	23.5	23.4	23.5	22.9	24.3	24.4	24.0	23.5	23.7	23.0	23.0	23.5	23.4	25.1	25.6	28.5	29.4	27.2	27.9	30.0	29.0	28.8	25.1	23.9	25.3
15	23.3	23.3	23.5	23.7	23.3	23.7	23.6	22.6	23.8	22.6	23.0	22.9	24.5	22.6	22.6	23.3	26.6	27.8	26.7	26.0	25.7	25.0	24.5	23.9	24.1
16	24.5	22.6	24.1	23.9	23.9	24.6	25.1	25.2	24.1	23.9	24.2	23.6	23.7	23.2	22.5	24.3	25.6	29.1	29.1	27.9	26.0	24.8	24.4	24.5	24.8
17	23.9	23.3	23.6	23.8	23.8	24.0	23.9	24.8	25.0	24.6	24.6	24.3	23.4	21.6	20.7	23.2	26.6	28.1	28.4	27.2	26.1	24.8	23.6	23.5	24.4
18 Q	23.2	23.2	23.5	23.8	24.0	24.5	24.5	24.6	23.9	22.8	23.4	23.6	22.9	22.1	21.6	23.5	24.9	26.0	27.0	26.6	25.8	25.1	24.8	24.0	24.1
19	23.6	23.5	23.7	23.8	24.2	24.7	24.7	24.9	24.5	23.1	23.0	22.7	23.0	22.0	21.0	23.0	26.0	28.0	28.0	26.8	26.1	26.0	27.1	25.9	24.6
20 D	25.1	22.3	23.1	23.8	24.1	23.8	19.8	14.3	20.0	21.6	23.8	23.0	22.7	27.2	26.0	25.6	26.9	29.4	30.3	29.9	30.3	29.1	25.8	24.2	24.7
21	23.1	22.5	22.7	23.0	23.4	24.4	24.9	25.9	23.7	23.4	23.8	22.0	22.7	22.6	23.6	27.1	28.6	28.8	27.9	26.9	26.9	25.8	26.8	25.8	24.8
22	23.7	23.0	23.6	24.0	24.7	21.7	26.9	26.5	24.0	26.2	25.6	26.2	25.8	30.1	27.3	26.2	28.1	30.0	30.3	28.8	28.0	25.8	24.2	22.7	26.0
23	23.6	23.3	23.7	23.8	24.1	23.9	25.5	25.2	28.0	28.4	23.7	24.0	23.8	22.2	21.6	22.6	25.9	30.0	29.3	27.7	26.2	26.7	25.7	22.0	25.0
24	22.0	23.0	23.1	24.2	24.5	25.3	25.6	25.3	25.1	25.0	25.0	24.8	23.7	23.9	25.0	24.1	26.8	29.0	29.2	28.2	26.8	25.0	25.7	24.3	25.2
25 Q	23.9	23.8	23.8	24.0	24.5	25.0	25.4	25.0	25.0	24.7	27.3	25.1	24.1	22.7	21.8	24.5	26.2	27.0	27.4	26.6	25.8	25.3	25.0	24.8	24.9
26	24.1	23.9	24.0	22.1	22.8	24.0	25.1	24.8	24.7	25.2	24.0	23.9	24.2	23.0	22.6	25.3	27.0	28.1	27.9	27.0	26.1	25.8	25.4	25.1	24.8
27	24.3	23.7	22.7	22.7	23.4	23.7	22.5	24.0	24.8	24.2	24.0	24.1	25.2	23.9	21.6	22.4	24.8	26.0	26.1	26.0	25.9	25.2	24.2	24.0	24.2
28	24.2	24.0	23.9	23.4	22.8	24.7	27.2	26.0	24.2	23.9	24.0	23.9	23.8	23.2	22.7	24.5	27.2	30.1	31.0	30.1	28.3	36.6	25.0	23.7	25.8
29	23.8	23.2	18.7	23.1	24.0	23.7	24.1	25.9	24.3	24.3	21.9	29.3	36.6	30.8	28.1	27.4	30.9	32.3	30.5	30.3	28.8	26.7	26.3	24.6	26.7
30	24.1	23.4	22.7	23.5	24.1	24.2	24.3	24.6	24.8	24.0	24.8	24.9	23.8	22.1	22.3	23.5	25.9	28.1	28.2	27.8	27.0	26.1	25.9	25.1	24.8
31 Q	24.2	23.5	23.5	24.0	24.2	24.3	25.1	25.1	24.8	24.5	24.8	24.0	23.8	23.3	22.9	24.8	26.4	27.4	28.1	27.3	26.4	25.5	25.1	24.3	24.9
Mean	23.3	22.9	22.6	23.1	24.5	24.4	24.6	25.0	24.9	24.5	24.4	24.5	24.9	24.1	23.6	24.6	26.5	27.9	28.1	27.4	26.5	25.7	24.7	23.8	24.8

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 36 Agincourt — Z = 56,000 γ + — December 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	125	124	124	126	123	122	120	119	118	118	119	119	119	119	118	115	116	114	119	123	123	123	120	118	120
2	119	119	119	119	121	119	120	119	120	119	119	118	118	118	114	120	120	117	120	122	124	124	124	125	120
3 D	128	128	123	124	110	106	97	62	48	101	104	108	102	107	112	120	124	128	134	137	149	155	137	132	116
4 D	131	130	125	109	117	116	105	111	118	118	119	118	116	118	117	119	124	129	132	132	135	137	152	153	124
5 D	138	135	130	120	109	104	99	105	113	117	113	119	120	116	118	121	122	130	135	143	146	139	138	133	124
6 D	127	125	125	120	101	98	107	112	114	113	114	113	113	121	122	126	124	124	131	133	133	132	131	129	120
7	128	128	127	125	118	107	104	96	91	99	112	114	114	120	117	114	117	117	122	127	126	127	125	125	117
8	124	123	120	119	108	91	99	100	97	100	110	114	114	121	120	118	122	121	126	126	126	127	126	121	116
9	122	121	121	121	119	116	113	111	102	108	111	110	111	110	107	111	111	113	115	118	120	121	118	116	115
10 Q	118	117	118	118	118	118	117	118	118	119	118	118	118	117	115	111	113	116	120	123	123	120	119	118	118
11 Q	119	118	118	119	119	117	117	117	116	117	117	117	116	115	115	112	114	119	120	123	121	120	119	118	118
12	119	120	120	120	119	117	117	118	116	117	116	116	117	116	115	112	111	111	111	112	116	115	114	114	116
13	118	117	118	116	117	117	117	116	117	112	113	112	112	111	109	105	108	113	117	122	119	121	119	119	115
14	120	118	120	123	122	122	119	119	120	120	119	119	118	116	112	114	114	115	117	121	129	129	129	126	120
15	127	126	126	126	127	125	119	121	123	123	124	121	125	122	119	121	122	123	126	125	127	126	124	123	124
16	126	127	128	127	126	124	124	123	123	123	124	123	124	124	122	119	119	122	126	127	125	123	124	124	124
17	127	125	125	124	123	124	123	124	123	122	124	123	124	123	120	119	120	125	127	126	125	125	124	123	124
18 Q	123	122	122	121	121	120	122	121	120	120	120	119	120	119	114	111	113	114	119	119	120	122	120	120	119
19	121	121	120	120	120	119	119	120	120	120	119	119	120	124	114	109	113	118	121	122	125	123	121	134	120
20 D	135	133	126	123	120	117	104	89	108	113	115	111	111	110	105	108	111	115	119	125	135	132	136	132	118
21	130	127	126	126	125	125	124	122	119	116	121	123	122	120	119	116	121	123	127	126	127	127	128	135	124
22	131	127	126	124	123	112	111	111	115	116	111	111	116	117	116	117	119	122	128	137	137	133	130	130	122
23	127	125	123	122	121	120	122	116	111	101	114	118	121	123	122	119	122	126	130	133	132	127	126	127	122
24	130	128	125	124	123	123	123	123	123	121	122	122	123	123	119	121	123	124	126	126	128	128	128	125	124
25 Q	124	123	121	121	118	121	120	120	119	117	117	117	119	118	118	115	117	119	123	123	123	122	118	118	120
26	117	117	118	118	117	117	118	118	117	117	116	116	117	117	116	116	118	118	123	125	124	123	124	123	119
27	123	122	121	122	120	117	107	111	116	117	117	117	117	117	110	105	113	117	115	118	121	119	117	116	117
28	117	117	117	117	116	116	106	108	112	113	116	113	113	113	112	109	110	113	117	118	121	127	122	118	115
29	119	119	121	120	117	117	115	115	113	114	116	106	102	107	106	107	116	120	123	128	127	124	126	128	117
30	127	128	127	124	124	121	121	120	118	119	119	118	119	117	116	117	118	123	124	124	123	122	123	123	121
31 Q	122	121	121	119	121	118	118	117	117	116	118	118	118	117	115	112	116	118	120	118	119	118	118	117	118
Mean	125	124	123	121	119	116	114	113	113	115	117	116	117	117	115	115	117	120	123	125	127	126	125	125	120

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (All Days)

Table 37 Agincourt 15,500 γ + 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	457	471	479	487	494	502	509	510	492	504	511	520	495	504	490	490
1-2	455	468	478	486	493	499	507	506	505	501	508	518	494	501	492	487
2-3	455	466	477	487	493	497	506	506	496	501	509	518	493	500	490	487
3-4	455	466	475	486	491	495	504	504	489	503	507	518	491	498	488	486
4-5	454	467	477	487	489	492	503	504	486	499	507	517	490	497	487	486
5-6	453	466	476	486	491	494	503	501	481	501	506	517	490	497	486	486
6-7	454	465	477	485	488	493	504	503	480	500	506	517	489	497	486	486
7-8	456	464	478	485	489	490	501	502	471	503	507	518	489	496	484	486
8-9	454	465	477	486	488	495	500	504	478	500	511	519	490	497	485	487
9-10	459	468	478	486	488	496	505	501	483	502	513	521	492	498	487	490
10-11	461	471	480	487	489	495	507	500	485	509	512	523	493	498	490	492
11-12	462	472	480	485	488	494	502	499	487	512	512	524	493	496	491	492
12-13	463	468	476	480	483	488	496	492	483	506	509	521	489	490	486	490
13-14	460	463	469	473	474	480	491	484	476	496	503	518	482	482	478	485
14-15	453	459	460	464	467	474	484	472	467	486	498	512	475	474	469	480
15-16	447	456	453	462	467	471	478	473	460	478	489	503	470	472	463	474
16-17	443	453	453	468	475	476	484	481	468	474	486	499	472	479	466	470
17-18	444	457	456	478	487	487	494	496	481	480	491	500	479	491	474	473
18-19	450	462	465	485	500	496	510	506	496	491	500	506	489	503	484	480
19-20	454	466	473	490	506	508	517	515	507	501	506	512	496	512	493	484
20-21	458	469	477	494	507	512	521	521	514	513	509	518	501	515	500	488
21-22	460	471	481	491	505	511	521	519	523	514	510	520	502	514	502	490
22-23	461	470	480	491	501	510	519	516	510	509	512	521	500	512	498	491
23-24	460	470	479	491	498	505	511	514	507	506	511	520	498	507	496	490
Mean	455	466	473	483	490	494	503	501	489	500	506	516	490	497	486	486

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (Quiet Days)

Table 38 Agincourt 15,500 γ + 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	465	472	483	489	499	501	509	516	508	511	515	526	500	506	498	494
1-2	464	471	481	489	500	501	509	515	509	509	512	525	499	506	497	493
2-3	464	469	481	488	498	499	509	512	512	507	510	524	498	504	497	492
3-4	461	468	481	488	497	498	508	512	513	506	512	522	497	504	497	491
4-5	462	468	481	488	496	497	508	513	512	505	513	521	497	504	496	491
5-6	462	468	481	488	496	498	507	512	512	507	512	522	497	503	497	491
6-7	463	469	482	490	495	497	509	513	510	508	513	522	498	504	498	492
7-8	464	470	482	490	495	494	510	511	511	510	513	523	498	502	498	492
8-9	465	471	483	491	494	497	509	511	509	512	515	524	498	503	499	494
9-10	466	473	483	490	495	499	510	510	508	514	517	525	499	504	499	495
10-11	466	473	484	489	496	500	512	508	507	515	515	525	499	504	499	495
11-12	466	473	482	486	495	498	511	504	504	512	514	529	498	502	496	496
12-13	468	471	480	479	489	490	504	496	497	508	511	528	493	495	491	494
13-14	467	469	473	471	481	482	497	497	482	500	505	526	488	489	482	492
14-15	461	465	464	463	476	478	499	477	469	488	500	522	480	482	471	487
15-16	457	464	456	461	479	474	483	483	469	486	492	512	476	480	468	481
16-17	452	462	454	468	487	480	489	492	480	489	492	507	479	487	473	478
17-18	454	463	458	478	499	490	499	506	490	496	498	508	487	498	480	481
18-19	458	469	469	486	508	490	511	515	509	504	507	512	495	506	492	486
19-20	462	472	476	489	512	507	519	522	518	511	514	519	502	515	498	492
20-21	466	475	480	491	511	510	523	524	527	514	519	525	505	517	503	496
21-22	469	477	483	491	506	510	525	522	523	515	521	528	506	516	503	499
22-23	470	476	484	492	503	507	524	520	513	515	521	530	505	514	501	499
23-24	469	475	485	495	502	504	520	517	514	516	522	529	504	511	502	499
Mean	463	470	477	485	496	496	508	509	504	507	511	522	496	502	493	492

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (Disturbed Days)

Table 39 Agincourt 15,500 γ + 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	451	465	466	481	488	507	509	510	441	482	511	514	485	504	468	485
1-2	441	455	465	480	492	505	505	494	504	466	494	507	484	499	479	474
2-3	440	449	463	485	484	498	506	495	457	469	502	509	479	496	467	475
3-4	442	450	458	484	481	484	494	492	420	497	497	510	476	488	465	475
4-5	436	459	466	488	472	468	497	492	413	471	496	510	472	482	460	475
5-6	423	453	466	487	478	478	501	472	387	483	492	512	469	482	456	470
6-7	427	443	460	485	473	479	510	481	386	466	490	507	467	486	449	467
7-8	432	438	468	483	478	466	505	482	327	477	494	506	463	483	439	468
8-9	425	440	460	481	473	489	493	491	385	445	507	505	466	486	443	469
9-10	434	454	463	487	470	496	506	492	420	453	503	513	474	491	456	476
10-11	447	462	471	489	476	493	503	485	453	482	502	517	482	489	474	482
11-12	449	464	471	483	472	488	501	489	468	498	503	518	484	488	480	484
12-13	449	452	468	480	471	478	490	480	453	491	496	510	476	480	473	477
13-14	443	446	456	471	461	476	495	471	455	476	487	503	470	476	464	470
14-15	432	442	444	457	454	479	493	474	452	473	485	491	465	475	456	462
15-16	432	436	437	461	456	473	476	470	435	463	467	485	458	469	449	455
16-17	425	430	441	473	458	475	473	479	451	442	452	477	456	471	452	446
17-18	427	443	442	484	471	484	488	496	475	449	466	476	467	485	462	453
18-19	437	448	455	487	489	487	498	499	493	472	481	487	478	493	477	463
19-20	445	445	467	491	497	510	509	510	515	499	489	492	489	506	493	468
20-21	450	452	470	495	500	509	518	517	520	534	485	496	496	511	505	471
21-22	452	458	470	485	497	509	523	519	572	536	493	492	500	512	516	474
22-23	455	460	468	489	498	513	528	518	526	520	492	499	497	514	500	476
23-24	452	457	466	489	495	498	509	525	521	488	490	508	492	507	490	477
Mean	439	450	461	482	479	489	501	493	455	480	491	502	477	490	470	470

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (All Days)

Table 40 Agincourt 7° W + ... ′ 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	20.1	20.8	21.5	21.2	21.7	21.5	22.4	20.7	22.6	23.0	22.5	23.3	21.8	21.6	22.1	21.7
1-2	19.3	20.5	21.4	21.0	20.9	20.4	22.3	20.3	21.8	23.0	22.5	22.9	21.4	21.0	21.8	21.3
2-3	19.6	20.6	21.2	20.8	20.4	20.8	22.0	20.2	21.9	22.7	22.2	22.6	21.2	20.8	21.6	21.2
3-4	19.3	21.2	21.4	21.5	20.3	21.2	20.4	20.8	23.0	22.3	22.9	23.1	21.4	20.7	22.0	21.6
4-5	19.9	21.4	22.2	21.6	21.4	21.4	22.0	20.3	24.4	23.2	23.6	24.5	22.2	21.3	22.8	22.4
5-6	20.4	21.7	21.6	21.5	22.1	21.8	21.9	21.5	24.1	23.0	24.3	24.4	22.4	21.8	22.6	22.7
6-7	20.5	22.4	21.5	21.1	22.8	23.0	23.7	22.6	23.3	24.3	24.9	24.6	22.9	23.0	22.6	23.1
7-8	20.5	22.2	21.0	21.0	22.1	22.8	23.3	22.9	22.1	23.5	24.6	25.0	22.6	22.8	21.9	23.1
8-9	21.1	21.9	20.6	20.4	22.0	22.7	24.1	22.5	22.6	23.3	24.8	24.9	22.6	22.8	21.7	23.2
9-10	21.8	20.5	20.7	20.4	21.8	20.7	22.3	21.8	22.2	23.5	24.0	24.5	22.0	21.6	21.7	22.7
10-11	20.9	20.4	20.7	19.4	20.0	18.8	19.6	19.7	22.8	23.9	23.9	24.4	21.2	19.5	21.7	22.4
11-12	21.0	20.2	20.6	18.4	18.0	17.2	19.2	18.3	21.8	23.9	24.0	24.5	20.5	18.2	21.0	22.4
12-13	20.4	20.5	19.6	17.8	16.9	16.5	19.2	17.1	21.0	22.6	23.8	24.9	20.0	17.4	20.2	22.4
13-14	19.8	20.3	18.5	18.4	17.7	17.5	19.5	18.0	21.7	22.0	22.8	24.1	20.0	18.2	20.2	21.8
14-15	20.0	20.5	19.1	20.4	20.2	19.0	20.3	20.7	23.9	22.0	22.8	23.6	21.0	20.0	21.4	21.7
15-16	20.9	21.7	21.2	23.5	23.3	22.5	24.0	25.8	27.3	23.3	25.0	24.6	23.6	23.9	23.8	23.0
16-17	21.9	23.5	23.9	26.5	26.5	25.8	27.0	28.4	29.5	26.0	27.0	26.5	26.0	26.9	26.5	24.7
17-18	23.7	24.5	26.2	28.2	27.9	27.8	28.8	30.2	30.6	28.0	28.4	27.9	27.7	28.7	28.2	26.1
18-19	24.4	24.7	27.0	28.6	28.0	28.6	29.3	30.1	29.8	28.6	28.7	28.1	28.0	29.0	28.5	26.5
19-20	24.4	24.2	26.6	27.5	27.2	27.7	29.1	28.8	28.3	28.1	27.5	27.4	27.2	28.2	27.6	25.9
20-21	23.7	23.0	26.1	26.1	25.7	26.5	28.0	26.7	26.7	26.5	26.5	26.5	26.0	26.7	26.4	24.9
21-22	22.7	22.1	24.8	24.7	23.9	25.4	26.4	24.9	24.4	25.8	25.1	25.7	24.7	25.2	24.9	23.9
22-23	21.8	22.0	23.8	23.2	22.2	23.4	24.8	23.3	23.4	25.2	24.5	24.7	23.5	23.4	23.9	23.2
23-24	20.4	21.4	22.9	22.0	21.5	22.5	23.8	21.8	22.3	24.2	23.5	23.8	22.5	22.4	22.8	22.3
Mean	21.2	21.8	22.3	22.3	22.3	22.3	23.5	22.8	24.2	24.2	24.6	24.8	23.0	22.7	23.2	23.1

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (Quiet Days)

Table 41 Agincourt 7° W + ... ' 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	20.5	21.0	22.2	21.8	25.3	22.3	23.7	22.9	22.5	24.5	23.3	23.8	22.8	23.6	22.8	22.2
1-2	20.3	20.9	22.0	21.8	24.1	22.0	23.3	22.7	22.8	24.5	23.3	23.6	22.6	23.0	22.8	22.0
2-3	20.2	21.0	22.0	21.8	24.8	22.4	22.8	22.3	23.2	24.4	23.0	23.6	22.6	23.1	22.8	22.0
3-4	20.5	21.2	22.0	21.9	25.0	22.8	22.9	22.8	23.3	23.6	23.6	23.8	22.8	23.4	22.7	22.3
4-5	20.7	21.2	21.9	21.8	25.0	22.7	22.9	22.7	23.5	23.7	23.9	24.2	22.8	23.3	22.7	22.5
5-6	20.8	21.2	21.8	21.7	24.8	22.3	22.8	22.2	23.2	23.7	24.2	24.5	22.8	23.0	22.6	22.7
6-7	21.0	21.3	21.6	21.3	24.5	22.4	22.8	21.5	23.0	23.7	24.7	24.9	22.7	22.8	22.4	23.0
7-8	21.0	21.2	21.5	21.1	24.0	21.3	22.9	21.3	22.2	23.5	24.6	24.9	22.5	22.4	22.1	22.9
8-9	20.6	21.0	21.4	20.7	23.8	21.7	22.7	20.4	21.7	23.9	24.2	24.6	22.2	22.2	21.9	22.6
9-10	20.7	21.1	21.3	20.5	23.3	20.6	21.7	19.6	21.2	22.9	23.3	24.2	21.7	21.3	21.5	22.3
10-11	20.6	20.8	21.1	19.5	22.0	18.7	19.7	18.1	20.1	22.5	23.1	24.9	20.9	19.6	20.8	22.4
11-12	20.3	20.7	20.6	18.9	21.0	17.9	19.8	16.4	18.4	22.0	23.0	24.1	20.3	18.8	20.0	22.0
12-13	19.6	20.1	19.0	18.3	20.3	16.2	18.5	15.8	17.8	21.2	22.2	23.6	19.4	17.7	19.1	21.4
13-14	18.7	19.7	17.7	18.8	21.1	17.8	17.2	17.1	19.3	20.6	21.2	22.7	19.3	18.3	19.1	20.6
14-15	18.4	19.8	17.8	20.3	23.2	21.2	19.3	19.9	23.2	21.3	21.8	21.9	20.7	20.9	20.6	20.5
15-16	19.7	20.8	19.7	22.9	23.5	24.6	23.2	24.9	27.5	23.6	23.8	23.4	23.1	24.0	23.4	21.9
16-17	21.2	22.4	22.7	25.8	26.0	27.1	26.6	28.2	30.4	25.9	25.6	25.0	25.6	27.0	26.2	23.6
17-18	22.6	23.6	25.4	27.4	27.1	26.6	28.9	30.1	30.9	27.7	27.1	26.3	27.0	28.2	27.8	24.9
18-19	23.1	23.8	26.4	27.9	27.1	28.4	29.0	29.3	30.1	27.9	27.6	27.1	27.3	28.4	28.1	25.4
19-20	22.6	23.3	26.7	26.8	26.2	26.9	28.3	27.9	28.0	27.0	26.6	26.6	26.4	27.3	27.1	24.8
20-21	21.9	22.4	26.1	25.3	24.5	24.8	27.2	25.9	25.7	25.7	25.7	25.8	25.1	25.6	25.7	24.0
21-22	21.4	21.9	24.7	23.8	23.2	23.1	25.9	23.8	24.4	24.8	25.0	25.1	23.9	24.0	24.4	23.4
22-23	20.9	21.8	23.7	22.7	22.4	21.9	25.0	22.4	23.1	24.3	24.5	24.6	23.1	22.9	23.4	23.0
23-24	20.5	21.7	22.7	22.2	21.9	21.6	23.7	22.4	22.1	24.2	23.7	24.1	22.6	22.4	22.8	22.5
Mean	20.7	21.4	22.2	22.3	23.9	22.4	23.4	22.5	23.6	24.0	24.1	24.5	22.9	23.0	23.0	22.7

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (Disturbed Days)

Table 42 Agincourt 7° W + ... ′ 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	19.2	18.6	18.7	21.2	20.9	23.0	18.8	17.5	24.2	19.7	19.4	21.3	20.2	20.0	21.0	19.6
1-2	19.3	17.8	19.0	19.6	16.3	16.3	21.8	17.6	24.7	21.4	19.8	21.7	19.6	18.0	21.2	19.6
2-3	17.6	18.6	19.1	20.3	15.6	17.2	21.8	17.7	18.2	23.0	17.6	20.3	19.0	18.1	20.2	18.5
3-4	15.3	21.9	20.5	21.4	17.3	18.7	17.2	17.1	22.5	18.7	19.8	22.3	19.4	17.6	20.8	19.8
4-5	18.4	23.4	21.5	23.1	20.6	18.7	19.1	15.0	26.1	21.2	23.2	27.4	21.5	18.4	23.0	23.1
5-6	18.1	23.3	20.9	22.6	23.9	18.9	22.0	19.3	24.2	23.5	26.2	25.6	22.4	21.0	22.8	23.3
6-7	18.4	26.7	21.6	20.1	24.2	24.2	24.4	22.2	21.8	29.9	27.7	24.7	23.8	23.8	23.4	24.4
7-8	17.6	26.6	20.5	19.7	24.2	26.8	21.6	26.0	19.8	23.5	24.9	24.8	23.0	24.6	20.9	23.5
8-9	18.3	24.7	19.6	22.2	24.7	25.2	23.5	24.6	23.1	24.4	24.3	25.3	23.3	24.5	22.3	23.2
9-10	26.0	19.2	22.4	19.7	24.5	19.7	21.8	23.5	19.3	26.0	25.2	24.7	22.7	22.4	21.8	23.8
10-11	20.7	19.5	20.6	19.6	22.0	18.1	20.6	21.5	21.2	27.0	28.1	25.0	22.0	20.6	22.1	23.3
11-12	22.1	19.9	22.2	19.6	20.4	16.8	21.3	23.1	21.4	26.7	29.2	25.4	22.3	20.4	22.5	24.2
12-13	21.8	22.8	21.9	18.4	17.5	16.1	21.9	19.8	25.4	24.5	29.6	26.5	22.2	18.8	22.6	25.2
13-14	23.5	22.4	20.2	19.9	17.8	18.0	21.2	21.6	25.4	26.0	28.3	26.6	22.6	19.6	22.9	25.2
14-15	25.8	21.8	21.1	22.7	19.9	19.2	19.8	21.6	26.3	26.5	26.3	26.1	23.1	20.1	24.1	25.0
15-16	25.5	23.2	23.3	25.8	23.5	22.2	22.5	26.3	28.7	25.3	28.3	26.3	25.1	23.6	25.8	25.8
16-17	24.8	24.4	25.5	27.5	26.6	25.4	25.5	26.9	29.6	27.2	29.9	27.9	26.8	26.1	27.4	26.8
17-18	26.8	24.7	27.8	28.0	27.8	29.0	27.8	29.6	30.2	28.4	30.5	28.7	28.3	28.6	28.6	27.7
18-19	27.6	24.4	27.4	29.0	27.0	28.6	29.8	30.1	28.8	27.9	30.2	28.5	28.3	28.9	28.3	27.7
19-20	26.8	24.8	27.4	27.3	25.9	27.5	30.7	28.7	27.3	26.5	29.1	28.1	27.5	28.2	27.1	27.2
20-21	25.3	23.1	26.1	26.6	24.3	25.9	28.9	26.4	26.6	22.6	27.4	26.8	25.8	26.4	25.5	25.6
21-22	23.7	21.3	23.7	25.5	23.2	26.7	27.0	25.2	22.0	22.3	24.1	24.4	24.1	25.5	23.4	23.4
22-23	22.3	20.9	23.4	22.9	20.2	24.0	24.3	23.5	19.5	23.7	24.6	23.4	22.7	23.0	22.4	22.8
23-24	19.9	18.7	21.2	20.3	20.3	23.3	21.2	20.4	23.7	23.0	21.3	21.7	21.2	21.3	22.0	20.4
Mean	21.9	22.2	22.3	22.6	22.0	22.1	23.1	22.7	24.1	24.5	25.6	25.1	23.2	22.5	23.4	23.7

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (All Days)

Table 43 Agincourt 56,000 γ + 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	141	140	135	130	129	126	124	126	134	126	126	125	130	126	131	133
1-2	142	139	134	127	127	126	121	124	126	122	125	124	128	124	127	132
2-3	141	136	133	125	122	118	120	113	110	122	123	123	124	118	122	131
3-4	138	132	132	125	118	113	113	109	107	117	123	121	121	113	120	128
4-5	134	132	129	120	113	109	101	100	101	113	120	119	116	106	116	126
5-6	133	131	129	120	111	106	98	92	89	108	113	116	112	102	112	123
6-7	130	128	128	121	106	104	92	93	93	104	113	114	110	99	112	121
7-8	128	127	126	120	110	102	95	96	88	106	114	113	110	101	110	120
8-9	127	126	126	118	112	108	98	102	95	103	116	113	112	105	110	120
9-10	122	128	127	120	113	112	109	103	97	106	116	115	114	109	112	120
10-11	125	131	128	121	116	112	113	107	100	102	117	117	116	112	113	122
11-12	129	131	128	122	118	112	114	108	105	110	117	116	118	113	116	123
12-13	132	132	128	122	118	110	110	109	105	114	118	117	118	112	117	125
13-14	132	131	129	120	117	110	110	109	109	116	119	117	118	112	118	125
14-15	131	130	128	117	115	109	110	107	113	116	118	115	117	110	118	124
15-16	130	128	125	115	114	109	107	106	113	114	115	115	116	109	117	122
16-17	132	129	124	116	113	110	108	106	116	114	118	117	117	109	118	124
17-18	136	131	127	118	115	112	107	111	122	118	123	120	120	111	121	128
18-19	140	134	131	123	120	117	111	116	128	122	127	123	124	116	126	131
19-20	141	136	133	127	124	122	113	121	133	127	130	125	128	120	130	133
20-21	142	137	136	132	127	127	123	126	135	131	133	127	131	126	134	135
21-22	141	136	137	133	130	130	127	130	141	132	131	126	133	129	136	134
22-23	142	137	137	132	132	131	129	131	143	128	129	125	133	131	135	133
23-24	143	138	138	132	132	132	129	129	141	128	129	125	133	130	135	134
Mean	135	132	130	123	119	115	112	112	114	117	121	120	121	114	121	127

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Quiet Days)

Table 44 Agincourt 56,000 γ + 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	137	134	130	126	124	119	117	113	119	120	122	121	124	118	124	128
1-2	136	134	130	125	122	117	116	113	117	120	122	120	123	117	123	128
2-3	135	133	129	124	121	115	116	112	116	121	122	120	122	116	123	128
3-4	135	133	129	124	121	115	116	113	116	119	121	120	122	116	122	127
4-5	136	133	129	124	121	114	116	112	114	121	122	119	122	116	122	128
5-6	135	133	129	124	121	113	116	112	113	120	121	119	121	116	122	127
6-7	135	133	129	123	121	112	116	112	113	120	121	119	121	115	121	127
7-8	135	133	128	123	121	109	116	111	114	120	121	119	121	114	121	127
8-9	134	133	128	124	121	113	116	112	115	118	121	118	121	116	121	126
9-10	134	132	128	123	122	117	117	114	115	116	121	118	121	118	120	126
10-11	134	132	128	123	123	119	118	113	115	118	121	118	122	118	121	126
11-12	134	132	130	123	123	117	117	113	116	119	122	118	122	118	122	126
12-13	135	132	130	123	121	115	116	112	115	119	122	118	122	116	122	127
13-14	133	131	129	122	117	113	116	112	113	120	123	117	120	114	121	126
14-15	131	130	127	119	115	113	113	111	110	120	121	115	119	113	119	124
15-16	130	128	123	116	115	110	110	108	108	117	117	112	116	111	116	122
16-17	131	128	122	118	112	110	111	106	109	117	119	115	116	110	116	123
17-18	133	129	124	120	113	110	110	109	114	118	121	117	118	111	119	125
18-19	136	130	128	123	119	114	110	113	117	120	124	120	121	114	122	128
19-20	137	133	129	126	121	117	116	118	122	123	124	121	124	118	125	129
20-21	136	132	131	128	122	120	118	120	124	123	125	121	125	120	126	128
21-22	135	131	131	129	123	121	122	120	124	121	124	120	125	122	126	128
22-23	134	131	131	128	123	121	123	119	122	120	123	119	125	122	125	127
23-24	134	132	130	126	124	118	123	115	122	119	122	118	124	120	124	126
Mean	134	132	128	124	120	115	116	113	116	120	122	118	122	116	122	127

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Disturbed Days)

Table 45 Agincourt 56,000 γ + 1963

G.M.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	151	167	149	138	131	149	127	152	169	143	131	132	145	140	150	145
1-2	158	161	148	127	124	140	123	150	152	133	130	130	149	134	140	145
2-3	156	149	149	128	126	117	127	92	67	129	119	126	124	116	118	138
3-4	141	125	144	125	118	92	98	101	73	119	123	119	115	102	115	127
4-5	119	126	128	108	104	92	89	82	68	101	120	111	104	92	101	119
5-6	123	121	129	113	91	104	85	58	12	89	90	108	94	84	80	110
6-7	115	103	124	120	86	79	63	64	38	64	83	102	87	73	87	101
7-8	104	101	114	118	95	78	80	53	5	76	94	96	84	76	78	99
8-9	101	100	121	112	91	93	80	72	37	62	110	100	90	84	83	103
9-10	75	119	128	117	87	108	104	69	71	81	111	112	98	92	99	104
10-11	81	132	129	121	100	118	110	86	92	52	106	113	103	104	98	108
11-12	100	132	129	122	108	117	110	89	106	94	101	114	110	106	113	112
12-13	113	132	127	121	115	114	95	93	93	114	105	112	111	104	114	116
13-14	119	136	131	119	117	113	96	99	100	115	111	114	114	106	116	120
14-15	123	138	134	116	117	116	99	100	113	116	110	115	116	108	120	122
15-16	124	136	134	114	116	117	100	102	121	115	112	119	118	109	121	123
16-17	130	142	135	113	118	117	99	108	127	120	122	121	121	110	124	129
17-18	142	145	140	116	123	120	105	116	134	138	136	125	128	116	132	137
18-19	149	146	148	122	125	125	115	126	139	148	143	130	135	123	139	142
19-20	152	147	150	129	127	135	102	135	148	165	153	134	140	125	148	146
20-21	150	150	155	139	130	151	134	140	156	179	166	140	149	139	157	152
21-22	148	148	155	140	134	157	138	148	193	177	159	139	153	144	165	148
22-23	151	146	154	139	139	159	139	163	175	147	151	139	150	150	154	147
23-24	160	147	155	142	138	157	143	157	148	150	152	136	149	149	140	149
Mean	129	135	138	123	115	120	107	106	106	118	122	120	120	112	121	127

THREE-HOUR RANGE INDICES, AGINCOURT, 1963

Table 46

January	D		H		Z		K		February	D		H		Z		K	
1	0211	1000	0100	1000	0100	0000	0211	1000		0044	4223	0022	2133	0042	2111	0044	4233
2	0000	1000	0000	0100	0000	0000	0000	1100		0000	1000	0000	1010	0000	0000	0000	1010
3	0100	1000	0000	0110	0000	0000	0100	1110		0100	1000	0100	1100	0000	0000	0100	1100
4	0100	1110	1000	2121	0000	0000	1100	2121		0000	1010	0000	0021	0000	0010	0000	1021
5	0121	1000	0111	1000	0000	0000	0121	1000		0011	2100	0001	1111	0000	1000	0011	2111
6	0000	0000	0000	0100	0000	0000	0000	0100		2110	1100	0111	1010	0000	0000	2111	1110
7	2210	1100	1100	0210	0110	0100	2210	1210		0001	1001	0011	0011	0000	0000	0011	1011
8	0011	0100	0010	0000	0000	0100	0011	0100		0000	0000	0100	0000	0000	0000	0100	0000
9	0000	0000	0000	0000	0000	0000	0000	0000		0000	1003	0000	0024	0000	0014	0000	1024
10	1100	0100	1000	0010	0000	0000	1100	0110		4664	4224	6464	4133	6564	4122	6664	4234
11	0000	2131	0000	1122	0000	0010	0000	2132		3443	3333	3233	2333	1332	1112	3443	3333
12	0100	0112	0100	0012	0000	0000	0100	0112		4443	2223	3341	2123	1233	1111	4443	2223
13	3554	4323	3434	3223	2443	2111	3554	4323		4453	3332	2442	3443	1342	2331	4453	3443
14	3334	3443	2324	3343	1224	1222	3334	3443		2451	2211	2331	2221	1342	1110	2452	2221
15	3554	3211	2433	2222	0443	1110	3554	3222		1222	2210	1211	2221	0101	1110	1222	2221
16	5142	3333	3122	3242	1132	1121	5142	3343		1012	1200	1001	1201	0000	0000	1012	1201
17	3442	2221	2242	1431	1330	0111	3442	2431		0111	1000	0101	0110	0000	0000	0111	1110
18	2212	1114	2222	2222	0111	0012	2222	2224		0011	1101	0000	1110	0000	0000	0011	1111
19	2333	3312	2232	4222	0222	1111	2333	4322		0000	1100	0000	1002	0000	0001	0000	1102
20	1022	1100	1020	1000	0021	0000	1022	1100		1022	2212	1012	1223	0001	0012	1022	2223
21	0102	1000	0000	0000	0000	0000	0102	1000		0011	2100	1001	1112	0000	0010	1011	2112
22	1011	1110	0000	1121	0000	0010	1011	1121		0332	1200	0201	1131	0111	0100	0332	1231
23	1331	3110	1111	2121	0110	0000	1331	3121		0021	2310	0021	1211	0020	0000	0021	2311
24	1221	1114	0211	1122	0000	0013	1221	1124		0000	1000	0000	0001	0000	0000	0000	1001
25	1211	1110	1300	1121	0100	0000	1311	1121		2100	2000	1100	0010	0000	0000	2100	2010
26	0011	0000	0100	0110	0000	0000	0111	0110		0023	2000	0211	1111	0001	0000	0223	2111
27	0001	1000	0001	0000	0000	0000	0001	1000		0001	0000	1000	0010	0000	0000	1001	0010
28	0010	0010	0100	0000	0000	0000	0110	0010		0213	3000	1111	1011	0001	1000	1213	1011
29	0000	1112	0000	0122	0000	0001	0000	1122									
30	4345	4235	3334	2344	2224	1225	4345	4345									
31	4455	5441	4445	5321	4454	4420	4455	5441									

March	D		H		Z		K		April	D		H		Z		K	
1	2342	2312	2441	2211	1320	0000	2442	2312		3523	1100	3422	1110	2212	0000	3523	1110
2	1132	2000	1112	1121	0001	0000	1132	2121		0000	1102	1100	0122	0000	0000	1100	1122
3	0242	3101	1222	2112	0111	0000	1242	3112		3221	0000	2211	0001	0210	0011	3221	0011
4	1121	1000	0000	0001	0000	0000	1121	1001		0023	4322	0232	3334	0022	1122	0233	4334
5	0101	1000	0100	1011	0000	0000	0101	1011		5533	3423	4422	3433	5623	2111	5633	3433
6	0200	1001	1100	1012	0100	0000	1200	1012		2353	2222	2233	3132	2143	1121	2353	3232
7	0100	0013	0100	0024	0000	0002	0100	0024		2244	2302	2222	2313	1132	1100	2244	2313
8	4445	4332	3243	2233	2143	3132	4445	4333		3112	2110	2101	2222	0000	0110	3112	2222
9	1543	3203	2222	2324	1411	1112	2543	3324		0221	2100	0210	1121	0300	0000	0321	2121
10	3443	4433	3334	4454	2333	2232	3444	4454		0010	1000	0000	0011	0000	0000	0010	1011
11	5432	3223	4311	2233	4311	0011	5432	3233		0002	1000	0111	0011	0002	0000	0112	1011
12	4423	1110	3212	2121	2111	0010	4423	2121		2033	3000	2112	2122	0011	0000	2133	3122
13	0022	2220	0011	2331	0011	0210	0022	2331		3113	3112	1203	3223	1001	1121	3212	3223
14	1000	1000	1000	0101	0000	0000	1000	1101		3212	3314	2211	2333	3101	1013	3212	3334
15	2300	0000	0100	0000	0000	0000	2300	0000		5233	3101	3243	1121	4231	0000	5243	3121
16	0000	0100	0000	0000	0000	0000	0000	0100		3212	1101	2101	1122	1000	0010	3212	1122
17	0000	1102	0000	0022	0000	0001	0000	1122		4221	1000	3111	1121	3100	0100	4221	1121
18	0232	3102	0221	1112	0111	0101	0232	3112		0012	3224	1001	2342	0001	1122	1012	3344
19	1311	2202	1310	1022	0210	0001	1311	2222		2431	2200	2331	1311	0230	0200	2431	2311
20	1101	1002	1010	0132	0000	0010	1111	1132		3022	2200	2220	1220	1021	0000	3222	2220
21	0220	1000	1210	0000	0100	0000	1220	1000		0001	1000	0101	1121	0000	0001	0101	1121
22	0000	1000	0000	1110	0000	0000	0000	1110		3100	2013	3000	1034	2000	0012	3100	2034
23	1014	4300	2113	4221	0003	2110	2114	4321		1341	2000	2230	0100	0232	0000	2342	2100
24	0001	2101	1000	1121	0000	1001	1001	2121		0000	2000	1001	0111	0000	0000	0001	2111
25	1001	1000	1100	0121	0000	0010	1101	1121		2310	0001	1210	0011	0100	0000	2310	0011
26	0000	1000	0000	1121	0000	2000	0000	1121		0300	1001	1200	1122	0200	0011	1300	1122
27	0010	0000	0000	0110	0000	0000	0010	0110		1323	1330	1121	2131	0122	1110	1323	2331
28	0031	1000	0011	1011	0010	0010	0031	1011		0000	1000	0011	0011	0000	1100	0011	1111
29	2212	2100	1111	1111	0000	0000	2212	2111		0311	0100	0210	0121	0200	0010	0311	0121
30	0012	0000	0010	0011	0000	0000	0012	0011		1002	2343	0001	1444	2101	2142	2102	2444
31	0121	1000	0100	1001	0000	0001	0121	1001									

THREE-HOUR RANGE INDICES, AGINCOURT, 1963

May	D		H		Z		K		June D		H		Z		K	
1	5334	3312	5334	3333	5444	1111	5444	3333	2324	3213	2223	3222	0113	2111	2324	3223
2	4334	3323	3233	3334	3444	2112	4444	3334	2423	3220	1231	2222	1311	1111	2433	3222
3	3232	2213	3231	2334	1220	0012	3232	2334	2222	3000	3232	2112	0121	0000	3232	3112
4	3344	3203	3333	2223	3445	0112	3445	3223	1032	3000	0010	1122	0020	0000	1032	3122
5	2332	1210	2321	1222	1321	0000	2332	1222	0000	0000	0100	0100	0000	0000	0100	0100
6	3421	1100	2411	1121	1310	0110	3421	1121	0000	1234	0100	1245	0000	0024	0100	1245
7	0122	1000	0012	1122	0000	0000	0122	1122	7653	3334	6562	2343	7652	2223	7663	3344
8	3332	2101	2122	1234	1120	0112	3332	2234	2223	2214	2212	1234	1222	1123	2223	2234
9	3344	2222	2322	1133	1242	0021	3344	2233	4323	2111	3212	2213	4322	1111	4323	2213
10	3323	2323	2232	2333	1132	1122	3333	2333	1113	2211	2203	1232	1101	0111	2213	2232
11	5524	3112	3322	2223	5422	1011	5524	3223	1301	1301	2311	1212	1210	1111	2311	1312
12	2131	3200	2121	1232	1020	0011	2131	3232	1312	0101	1201	0122	1200	0001	1312	0122
13	4424	3124	3424	3233	2633	2022	4634	3234	3123	1011	2111	0113	1011	0111	3123	1113
14	4453	2001	3432	1122	3332	0001	4453	2122	3013	1211	2002	2212	2010	1101	3013	2212
15	0240	1111	1220	1112	0220	0011	1240	1112	3421	1211	2320	0123	0430	0011	3421	1223
16	4000	0100	2000	0012	2000	0000	4000	0112	0000	0111	1001	0022	0000	0011	1001	0122
17	1112	2210	1012	2222	0011	0010	1112	2222	1233	2222	2221	2131	0222	1211	2233	2231
18	0000	2200	0000	1110	0000	1000	0000	2210	1432	4233	1313	4344	0320	1043	1433	4344
19	0010	2202	0001	1133	0000	0011	0011	2233	3310	1221	3320	2233	4410	0121	4420	2233
20	4220	0010	3210	0111	4300	0100	4320	0111	3243	2112	3322	1122	2241	1111	3343	2122
21	0000	1101	1000	1131	0000	0010	0100	1131	2333	0200	1312	1121	0322	0100	2333	1121
22	0011	0100	0100	0110	0000	0100	0111	0110	3220	1000	2111	1122	1110	0010	3221	1122
23	0012	1100	0000	0110	0000	0010	0012	1110	2212	0200	1111	0121	0000	0100	2212	0221
24	0000	1000	0000	0100	0000	0110	0000	1110	0221	1211	1221	2322	0220	0100	1221	2322
25	1012	3100	2122	3232	0000	2111	2122	3232	2552	3224	3331	3245	2451	0134	3552	3245
26	1201	1001	2100	1122	1200	0110	2201	1122	6443	2112	4442	2323	4553	1112	6553	2323
27	0111	0111	1100	1123	0100	0011	1111	1123	5532	2223	3532	1233	1432	0122	5532	2233
28	4454	2111	3232	2223	3233	0011	4454	2223	2244	2210	2122	2332	0133	1110	2244	2332
29	5641	1021	3431	2132	3340	0010	5641	2132	1132	2321	1121	2343	0020	0121	1132	2343
30	3442	2210	3332	1122	3451	0010	3452	2222	2332	2123	3222	2233	1331	1111	3332	2233
31	0113	3223	0210	2244	0111	1122	0213	3244								

July	D		H		Z		K		August D		H		Z		K	
1	3221	0000	2100	0000	2100	0000	3221	0000	3532	4333	3422	2234	4422	2223	4532	4334
2	0011	1000	0110	0111	0000	0000	0111	1111	3344	3223	2242	2233	1543	1122	3544	3233
3	2001	0000	2000	1002	1000	0000	2001	1002	3432	3113	2210	2123	3321	1112	3432	3123
4	0231	3323	0211	3335	0110	1134	0231	3335	2233	3213	2121	3234	1132	2122	2233	3234
5	3462	2112	4341	2144	2652	1022	4662	2144	4334	1110	3323	2233	3321	2121	4334	2233
6	3652	2110	2441	2233	3642	1011	3652	2233	3343	2112	1331	2123	1430	1112	3443	2123
7	3323	3211	2223	3222	0212	1121	3323	3222	3413	2100	3222	3123	2311	1011	3423	3123
8	3343	2222	2331	3333	3332	0111	3343	3333	3423	2000	2222	2111	1221	0100	3423	2111
9	5534	2213	4342	1223	3441	1111	5544	2223	2433	2210	2332	2322	0332	1111	2433	2322
10	2232	1221	3321	1233	0220	0111	3332	1233	0002	3200	1101	2211	0000	1100	1102	3211
11	2320	0100	2210	1122	1220	0000	2320	1122	1001	2100	2011	1113	1000	0002	2011	2113
12	0311	1000	2100	0022	0100	0000	2311	1022	0021	2100	0111	2112	0010	1111	0121	2112
13	0002	1000	3210	1122	1010	0000	3212	1122	1000	2100	2000	1022	0000	0111	2000	2122
14	2110	2200	1100	0102	0000	1000	2110	2202	2011	0000	1010	0011	1000	0000	2011	0011
15	1010	1101	1101	1112	0000	0111	1111	1112	0002	3211	0011	2323	0000	2122	0012	3323
16	2300	2211	3310	1122	2300	1111	3310	2222	3001	3100	2110	3222	0000	0011	3111	3222
17	4444	2320	2334	3323	2444	1110	4444	3323	1232	2110	2122	1243	0112	1132	2232	2243
18	1222	3311	1211	3334	0120	1222	1222	3334	2444	5322	2333	5233	2355	3212	2455	5333
19	3021	1000	3211	1121	2010	1100	3221	1121	3320	3336	2210	2347	2210	1246	3320	3347
20	0000	1211	1111	1332	0000	1122	1111	1332	6664	4322	6764	4333	8874	4222	8874	4333
21	1244	5521	3233	4433	0133	4211	3244	5533	5445	2211	4345	2233	5455	1112	5455	2233
22	1344	2321	1132	3323	0233	1121	1344	3323	2142	2103	2121	0033	1031	1022	2142	2133
23	2243	4235	2232	4344	1431	2234	2443	4345	3533	2201	3433	3122	5563	2112	5563	3222
24	5544	2313	3533	3334	4553	2212	5555	3334	5133	3100	3132	2122	2022	1222	4133	3222
25	1542	2110	2331	2223	1441	1112	2542	2223	1323	2102	3212	2133	3211	1112	3323	2133
26	2342	2223	2332	2233	1230	1232	2342	2233	5221	2110	2211	2232	2320	1011	5321	2232
27	4543	4211	3422	3233	2442	1212	4543	4233	0211	2333	1112	3344	1010	1133	1212	3344
28	3233	0100	3102	1101	2120	0011	3233	1111	5344	4334	4234	3344	2324	3232	5344	4344
29	0110	2102	0000	1212	0000	0012	0110	2212	4225	3111	2224	3233	2133	2121	4235	3233
30	3463	4333	3362	3333	1364	3232	3464	4333	1222	2222	2211	2123	1110	1112	2222	2223
31	4432	3215	3311	3334	3332	2123	4432	3334	4332	3203	3321	3323	2223	2211	4333	3323

THREE-HOUR RANGE INDICES, AGINCOURT, 1963

September	D		H		Z		K		October D		H		Z		K	
1	3334	3201	3233	3221	3223	1011	3334	3221	0210	2000	1110	0011	0000	0000	1210	2011
2	2110	1111	1100	1223	1100	1012	2110	1223	0000	1100	0000	1111	0000	1000	0000	1111
3	2333	1200	3222	3223	1221	1111	3333	3223	1231	1000	1101	1010	0111	0000	1231	1010
4	2211	1010	1111	1123	0110	1011	2211	1123	3233	2200	2321	1111	2212	0000	3333	2211
5	4003	3202	2002	2233	3001	2111	4003	3233	0113	1000	1102	1131	0002	0020	1113	1131
6	3022	2101	2111	2223	1011	1112	3122	2223	1300	1000	2200	0000	0300	0000	2300	1000
7	1020	0001	1100	1013	0010	0001	1120	1013	0122	1303	1211	1223	0111	0123	1222	1323
8	3543	3100	1332	3221	0441	2221	3543	3221	4533	3101	4422	1321	5431	1110	5533	3321
9	3523	3111	3412	3222	1412	2211	3523	3222	1221	0003	1111	0122	0110	0101	1221	0123
10	2241	1102	2222	2224	0121	1112	2242	2224	2033	2111	1011	2141	0001	1020	2033	2141
11	4324	2333	2213	2243	2123	1132	4324	2343	0345	4313	1223	3334	0233	4112	1345	4334
12	5343	1001	3322	2122	4332	1111	5343	2122	4443	4332	4433	5443	4333	2333	4443	5443
13	2011	1114	2010	1134	1000	0123	2011	1134	3533	3225	2422	3334	2432	2223	3533	3335
14	4577	5545	2487	5554	2577	5444	4587	5555	4444	3432	4344	3342	3444	3121	4444	3442
15	5443	4345	4434	4434	3543	3334	5544	4445	4433	3124	3332	2223	1331	1112	4433	3224
16	3444	4334	2444	3434	2444	4234	3444	4434	4333	2230	3222	2221	3233	1111	4333	2231
17	5556	3332	4456	4343	4556	4232	5556	4343	0221	1101	1211	0100	0210	0000	1221	1101
18	3223	2222	2213	3323	3212	2211	3223	3323	1112	3110	1210	1111	0101	1010	1212	3111
19	4545	3321	3334	4222	3334	4111	4545	4322	1230	1101	1220	0111	0111	0011	1221	1111
20	3433	4202	3213	3222	1321	1012	3433	4222	2222	3113	2112	3133	0111	1213	2222	3133
21	2522	4653	1311	4444	3321	2232	3522	4654	2323	1000	2322	1000	1322	0000	2323	1000
22	3864	3456	3894	3479	5884	3279	5894	3479	1100	1100	0001	1111	0000	1100	1101	1111
23	7844	3310	8734	3343	8843	2121	8844	3343	0000	1001	0100	1122	0000	0011	0100	1122
24	0111	2325	0122	2334	0011	1233	0122	2335	5777	3324	5778	4344	6767	2222	6778	4344
25	7544	3432	6565	3433	2322	2322	7565	3433	6431	2101	4321	1122	4131	1001	6431	2122
26	3432	3323	2432	3334	1542	1222	3542	3334	5212	1101	3210	1112	2100	1010	5212	1112
27	4323	2245	4212	3255	3311	1136	4323	3256	0001	1000	1111	1021	0000	0000	1111	1021
28	5642	3344	4642	4443	6642	3233	6642	4444	0001	1232	0001	0132	0000	0010	0001	1232
29	4343	3223	3223	2234	2322	2122	4343	3234	3232	4476	2212	4688	0222	2477	3232	4688
30	4243	1101	4122	2122	3122	1001	4243	2122	6532	2100	6422	1121	7531	0011	7532	2121
31									0002	2110	2103	2121	0001	1010	2103	2121

November	D		H		Z		K		December D		H		Z		K	
1	1231	2120	2211	2222	0210	1110	2231	2222	1011	1101	1011	1202	1011	0001	1011	1202
2	1233	3332	1212	2433	0110	2221	1233	3433	1211	2232	0121	3223	0111	1111	1221	3233
3	3444	2013	2331	2123	0422	1011	3444	2123	4454	4334	3333	3334	2352	2223	4454	4334
4	0211	3000	2211	1121	0210	1000	2211	3121	3442	3335	2332	3334	2221	1113	3442	3335
5	0110	0000	0100	0000	0000	0000	0110	0000	5432	4343	4223	3333	2322	2222	5433	4343
6	1013	3214	2112	3223	0011	1112	2113	3224	4443	4323	2322	3333	1322	2121	4443	4333
7	3435	4355	3334	3443	1444	3343	3445	4455	3322	3311	3223	3321	1223	1110	3323	3321
8	5664	4333	5443	3343	4662	3322	5664	4343	2443	3212	2322	2222	1312	2111	2443	3222
9	6653	4335	5343	3334	3332	2344	6653	4345	0233	2000	0123	1110	0011	0000	0233	2110
10	6534	3324	4343	2234	5423	1221	6544	3334	0000	0000	0000	0100	0000	0000	0000	0100
11	3443	2122	3432	2232	2332	1120	3443	2232	0000	1000	0100	1001	0000	0000	0100	1001
12	2333	2321	1222	2311	0222	0110	2333	2321	1111	0000	1010	0002	0000	0000	1111	0002
13	1101	1100	1100	0011	0000	0000	1101	1111	1311	1001	2211	0010	0100	0000	2311	1011
14	0411	1001	0311	1012	0200	0000	0411	1012	0211	3323	1211	3322	0000	0121	1211	3323
15	2011	1000	2001	1000	1000	0000	2011	1000	0032	2210	1121	2221	0011	1110	1132	2221
16	1120	1001	0000	0001	0010	0000	1120	1001	2001	1201	1100	1102	0000	0000	2101	1202
17	0113	4442	0002	3432	0002	1321	0113	4442	0010	1101	1000	1111	0000	0000	1010	1111
18	1000	1100	1100	0111	0000	0010	1100	1111	0011	1000	0000	0001	0000	0000	0011	1001
19	0010	1000	0000	1012	0000	0000	0010	1012	0000	1112	0000	1124	0000	0112	0000	1124
20	3300	2000	2100	0110	0000	0000	3300	2110	3143	3222	2232	3233	1131	2021	3243	3233
21	0100	2111	0000	1110	0000	0000	0100	2121	0122	2312	1110	2123	0010	1111	1122	2323
22	0001	2232	0001	1221	0000	0110	0001	2232	1432	3122	1232	3122	0212	1021	1432	3122
23	3132	1211	2121	0111	1022	0000	3132	1211	0144	1323	0121	0332	0023	0111	0144	1333
24	1333	3335	1222	3333	0121	1233	1333	3335	3000	3111	2100	1232	1000	1110	3100	3232
25	5422	2211	2311	2210	3322	1000	5422	2211	0013	1100	0102	1110	0001	1000	0113	1110
26	0020	0111	0011	0110	0011	0000	0021	0111	1301	1000	1111	1111	0200	0111	1311	1111
27	0221	1111	0110	1111	0010	0000	0221	1111	0220	2200	1220	2111	0120	1000	1220	2211
28	0311	1110	1211	1110	0100	0000	1311	1110	0231	1222	1221	2132	0020	0010	1231	2232
29	2211	1212	2101	1112	1000	0001	2211	1212	3224	4222	2113	2332	0001	2210	3224	4332
30	2013	5222	3112	4332	1001	2011	3113	5332	1000	1101	2000	1101	0000	0000	2000	1101
31									0101	0100	0000	1001	0000	0000	0101	1101

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COMPUTER-DETERMINED P-NODAL SOLUTIONS FOR THE LARGER EARTHQUAKES OF 1959-1962

J. H. Hodgson and A. J. Wickens

CANADIAN CONTRIBUTION NO. 56

TO THE INTERNATIONAL UPPER MANTLE PROJECT

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COMPUTER-DETERMINED P-NODAL SOLUTIONS FOR THE LARGER EARTHQUAKES OF 1959-1962*

J. H. Hodgson and A. J. Wickens

Abstract:—This paper continues the Dominion Observatory program of attempting P-nodal (fault-plane) solutions for all large earthquakes. In this case the solutions have been determined for 66 of the larger earthquakes of 1959-1962 using a computer program described earlier (Wickens, Stevens and Hodgson, 1963). This program does not define the possible variation of the planes from the "best" position determined by the computer, but an attempt has been made to supply this information by inspection of the solutions.

The solutions are summarized in the tabular form established in earlier papers of the series.

Résumé:—Cette étude fait partie du programme de l'Observatoire du Canada entrepris en vue de déterminer le nœud des ondes P (faille-surface horizontale) pour tous les principaux tremblements de terre. On a effectué ici ces déterminations pour les 66 principaux tremblements de terre enregistrés de 1959 à 1962, à l'aide d'une calculatrice décrite précédemment (Wickens, Stevens and Hodgson, 1963). La programmation ne définit pas la variation possible des plans par rapport à la "meilleure" position déterminée par la calculatrice, mais on a essayé d'introduire cette information en examinant les déterminations.

Les déterminations sont résumées sous la forme de tableaux établis dans les publications antérieures de la série.

INTRODUCTION

For many years this Observatory has published "fault-plane" solutions for all large earthquakes. These solutions have been made graphically, using data collected through questionnaires, and they represent the best fit the investigators could find to the available data. The observations have not been uniformly reliable; for many years reflected phases were used until experience proved that they were producing random observations; many stations were too insensitive or too badly located to produce reliable readings, a fact that could only be learned through experience; some stations had periods during which their galvanometers were reversed, a fact that was normally discovered only when they had produced a long series of observations inconsistent with our solutions. When these sources of error were discovered they explained much of the difficulties of the earlier work, but time never permitted the reappraisal of those earlier solutions. Even if it had been possible to re-work the corrected data, the solutions might still have been suspect because of their lack of objectivity—they merely represented the best fit that the analysist had been able to find.

One of us (Wickens) has recently perfected a program for the I.B.M. 1620 which permits a systematic search for the best position of the nodal planes for any set of data. To test the program it was given the first-motion observations for a large number of earthquakes solved earlier by graphical methods, and its solutions were checked against the earlier graphical ones. In the re-appraisal of 74 earthquakes solved earlier by us and 64 solved earlier by Ritsema, the machine produced as good or better solutions than the graphical ones in 97% of the cases. This establishes the validity of the program. The visual solutions, on the other hand, were sustained only 72% of the time, and only 39% of the solutions were closely defined by the data.

These findings were presented to the I.U.G.G. meetings in Berkeley (Wickens, Stevens and Hodgson, 1963) and to the Symposium on the Results of the I.G.Y. which preceded it (Hodgson and Stevens, 1964). These papers, as well as several others read at the meetings, cast so much doubt on the validity and the closeness of earlier solutions that all present were agreed that some means must be found to express the accuracy of published solutions. This might be done, for example, by giving the possible variation in the strike and dip of each plane, or by giving the solid angle traced out by possible positions of the pole of each plane. Such information is implicit in the computer program and we are currently searching for the best way to express the limitation. It is probable that the program as finally written will require a faster computer than the 1620. When this enlarged program has been perfected we propose to use it to re-analyse every earthquake for which the first-motion information have ever been published, either by ourselves or by someone else.

*Canadian Contribution No. 56 to the International Upper Mantle Project.

In the meantime data are available for the earthquakes from 1959 to 1962, and many people need the solutions in connection with other research. Nodal solutions have therefore been determined using the existing 1620 program. It is possible that these may be modified somewhat by the more sophisticated program being devised, certainly their reliability will be expressed in a more definite way, but the present publication should be useful. The solutions are certainly not less accurate than the graphical ones published earlier in the series.

Not all stations are equally reliable, and some way must be found of expressing this fact. Kasahara (1963) suggested the use of a weighted, running average, using the formula

$$\sigma_{i,j} = \sum_{p=1}^{6} (6 - p)N'_{i,j-p} / \sum_{p=1}^{6} (6 - p)N_{i,j-p}$$

where $N_{i,j}$ and $N'_{i,j}$ denote, respectively, the total number of reading and the number of proper readings at the i-th station in the j-th year and σ represents the probability that a station will be correct; to translate this probability into a weight, Kasahara proposed the scheme given below.

Predicted Score	Weight
$\sigma \geq 0.95$	5
$0.95 > \sigma \geq 0.85$	4
$0.85 > \sigma \geq 0.75$	3
$0.75 > \sigma \geq 0.65$	2
$0.65 > \sigma \geq 0.55$	1
$0.55 > \sigma \geq 0.0$	0

This system of weighting was used in the early tests of Wickens' program, but experience showed that the few stations of weight 5 were overweighting other stations and distorting the solutions. We now use weight zero to express the weights 0 and 1 of Kasahara, but use weight unity for all other values. This means that stations of proven lack of reliability do not effect the solution; by carrying them along however it will be possible to detect any improvement in the station operation.

Application of the probability formula given above requires a knowledge of the performance of stations over the five years previous to the year for which weight are being computed. Machine solutions are not available for the years 1955-1958; the scores have had to be based on the visual solutions. The weights used here may not be the same in all instances as those which will be used in the final re-appraisal forecast above.

In earlier publications it has been customary to list all the observations on which the solutions are based. In the present publication, which covers a period of four years, this would require a formidable amount of space, and seems unnecessary. All the data are available on punched cards, and a print-out will be sent to anyone who requests it.

Table I lists the earthquakes for which information is available; those for which solutions or partial solutions were obtained are listed separately from those for which no solution was possible. In the latter case an indication of the source of the difficulty has been given. Epicentral data are from the United States Coast and Geodetic Survey. In those cases where several earthquakes occurred on the same day, they have been designated A, B, C - -.

TABLE I – List of Earthquakes Considered

Date	H G.M.T.	Epicentre		Focal Depth, Km	Magnitude	Remarks
		ϕ	λ			
Earthquakes for which solutions have not been obtained						
January 13, 1959	01:15:25	13½ N	146 E	33	6¾	Too few and conflicting data.
February 15A, 1959	03:59:25	59½ S	25 W	33	6½	Too few data.
February 15B, 1959	04:42:35	59½ S	26 W	33	6¾	Too few data.
May 12, 1959	09:46:51	23½ S	64½ W	33	6¾	Conflicting data.
July 6A, 1959	09:10:17	26½ S	61½ W	600	6¾	Conflicting data.
July 6B, 1969	09:23:27	26½ S	61½ W	600	6¾	Too few and conflicting data.
August 17, 1959	21:04:40	7½ S	156 E	33	7¼	Conflicting data.
August 24, 1959	21:30:46	10½ S	161 E	33	7	Conflicting data.
September 7, 1959	04:03:20	1 S	23½ W	33	–	Too few data.
September 15, 1959	05:59:42	28½ S	177 W	33	7	Conflict of data. See text.
November 16, 1959	10:21:17	1 N	26½ W	33	6¼	Too few and conflicting data.
December 14, 1959	23:21:56	59½ S	31 W	33	7	Conflicting data.
January 13, 1960	15:40:34	16 S	72 W	200	7½	Conflicting and poorly distributed data.
March 23, 1960	00:23:22	39½ N	143 E	33	6¾	Conflicting data.
May 22C, 1960	18:55:57	38 S	73½ W	33	7¾	Confusion of data.
May 22E, 1960	19:11:20	38 S	73½ W	33	8½	Too few and conflicting data.
May 24, 1960	14:46:34	44½ S	167½ E	33	6¾	Conflicting data.
June 6, 1960	05:55:44	45½ S	73½ W	33	6¾	Conflicting data, but see text.
June 20B, 1960	12:59:40	39½ S	73 W	33	6¾	Conflicting data, but see text.
November 23, 1960	14:12:21	24.4 S	176.1 W	28	6¾	Too few and conflicting data.

Date	H G.M.T.	Epicentre		Focal Depth, Km	Magnitude	Remarks
		ø	λ			
Earthquakes for which solutions have not been obtained						
November 24, 1960	06:52:41	24.4 S	176.1 W	23	7	Conflicting data.
December 2, 1960	09:10:39	24.6 S	69.7 W	19	7	Conflicting data.
December 13, 1960	07:36:16	52.7 S	159.1 E	25	7	Too few data.
January 5B, 1961	17:57:51	21.2 S	169.5 E	53	6¾	Too few and conflicting data.
March 7, 1961	10:10:39	28.3 S	175.7 W	43	7¼	Conflicting data.
March 18, 1961	14:54:59	49.9 S	163.3 E	38	6¾	Too few and conflicting data.
September 8, 1961	11:26:33	56.3 S	27.1 W	125	7¾	Conflicting data.
September 13, 1961	21:19:20	41.7 S	75.2 W	40	7	Too few data.
December 30, 1961	00:39:27	52.3 N	177.6 E	56	6¾	Complete confusion of data.
March 12, 1962	11:40:13	8.1 N	83.0 W	58	6½	Conflicting data.
April 18, 1962	19:14:37	10.0 S	79.0 W	39	6¾	Conflicting data.
May 6, 1962	19:00:10	60.0 S	32.8 W	25	7	Too few and conflicting data.
May 15, 1962	05:23:46	7.3 S	128.3 E	34	7¼	Conflicting data.
May 19, 1962	14:58:13	17.2 N	99.5 W	20	7	Poor distribution of data. See text.
May 21, 1962	21:15:31	20.0 S	177.5 W	379	6¾	Conflicting data.
June 18, 1962	23:42:31	4.8 S	151.8 E	47	6¾	Conflicting data.
Earthquakes for which solutions have been obtained						
January 8, 1959	01:33:48	15½ N	61 W	100	6¾	
January 22, 1959	05:10:25	34 N	142 E	33	6¾	
February 7, 1959	09:36:51	4 S	81½ W	33	7¼	
March 1, 1959	16:49:13	½ S	134½ E	100	7	
April 24, 1959	17:57:58	31 S	178 W	33	6¾	Undefined central circles.
April 26, 1959	20:40:38	25 N	122½ E	150	7½	
April 28, 1959	11:09:30	15 N	93 W	33	6½	Undefined central circles.
May 4, 1959	07:15:42	52½ N	159½ E	60	8	
May 24, 1959	19:17:40	17½ N	97 W	100	7	
May 26, 1959	04:13:01	27½ N	126½ E	100	6½	
June 14, 1959	00:11:57	20½ S	68 W	100	7¼	
June 18, 1959	15:58:38	54 N	161 E	33	6¾	
July 9, 1959	16:05:18	20½ S	68 W	100	6¾	One plane only defined. Poor solution.
July 19, 1959	15:06:10	15 S	70½ W	200	7	One plane only defined. Poor solution.
August 15, 1959	08:57:04	23 N	121 E	33	7	One plane only defined. Poor solution.
August 26, 1959	08:25:30	18 N	94½ W	33	6¾	
September 14A, 1959	14:09:39	28½ S	177 W	33	7¾	One plane only defined.
September 14B, 1959	22:23:53	29 S	177 W	33	6½	One plane only defined.
September 29, 1959	15:31:57	29 S	176½ W	33	6½	
October 5, 1959	18:27:47	83½ N	112½ E	33	6	
January 15, 1960	09:30:24	15 S	75 W	150	7	
March 8, 1960	16:33:38	16½ S	168½ E	250	7	
March 20, 1960	17:07:30	40 N	143½ E	60	7	
May 21, 1960	10:02:50	37½ S	73½ W	33	7¼	One plane only defined. Poor solution.
May 22A, 1960	10:30:39	38 S	73½ W	33	6½	One plane only defined. Poor solution.
May 22B, 1960	10:32:43	37½ S	73 W	33	7¼	One plane only defined. Poor solution.
May 22D, 1960	19:10:47	38 S	73½ W	33	7½	Poor solution.
June 20A, 1960	02:01:08	38 S	73½ W	33	6¾	One plane only defined.
June 25, 1960	11:12:00	54 N	159 E	100	6¾	Only one plane well defined.
July 29, 1960	17:31:40	40.1 N	142.3 E	50	6¾	
October 7, 1960	15:18:31	7.4 S	130.7 E	45	6¾	
October 22, 1960	08:22:01	10.3 S	161.2 E	93	6½	
November 13, 1960	09:20:37	51.1 N	168.8 W	65	7	Undefined central circles.
December 3, 1960	04:24:19	42.9 N	104.4 E	60	7	Undefined central circles.
January 5A, 1961	15:53:56	4.1 S	143.0 E	108	6¾	
January 16, 1961	07:20:19	36.2 N	141.7 E	41	6¾	
January 20, 1961	17:09:16	56.6 N	152.3 W	46	6¾	
February 12, 1961	21:53:44	43.9 N	147.6 E	45	7	
February 26, 1961	18:10:49	31.6 N	131.2 E	54	7¼	
March 28, 1961	09:35:55	0.2 N	123.6 E	83	6¾	
June 1, 1961	23:29:21	10.4 N	39.9 E	33		Only one plane defined.
June 11, 1961	05:10:26	27.9 N	54.6 E	37	6½	
July 18, 1961	14:03:36	29.4 N	131.6 E	21	6¾	
August 11, 1961	15:51:35	43.0 N	145.0 E	50	7	
August 19A, 1961	05:09:50	10.8 S	71.0 W	649	7¼	Only one plane clearly defined.
August 19B, 1961	05:33:31	36.2 N	136.5 E	17	7½	

Date	H G.M.T.	Epicentre		Focal Depth, Km	Magnitude	Remarks
		ø	λ			
Earthquakes for which solutions have been obtained						
August 31A, 1961	01:48:38	10.6 S	70.9 W	626	7	Only one plane defined.
August 31B, 1961	01:57:08	10.4 S	70.7 W	629	7¼	
September 1, 1961	00:09:35	59.5 S	27.3 W	131	7¼	Undefined central circles.
February 14, 1962	06:36:01	38.1 S	73.1 W	44	7¼	
March 7, 1962	11:01:00	19.3 S	145.3 E	680	7	
April 12, 1962	00:52:47	38.2 N	142.3 E	68	7	
April 23, 1962	05:58:05	42.9 N	143.4 E	25	7¼	
May 7, 1962	17:39:50	45.3 N	146.7 E	25	6¾	
May 11, 1962	14:11:52	17.0 N	99.7 W	25	7	Only one plane defined. Poor distribution of data.
May 21, 1962	12:02:51	37.3 N	96.0 E	25	7	Undefined central circles.
July 6, 1962	23:05:32	36.6 N	70.4 E	203		See Metzger (1963).
July 26, 1962	08:14:42	7.5 N	82.7 W	21	6¾	One plane only, loosely defined.
July 30A, 1962	17:16:44	3.3 S	143.9 E	25	7	Undefined central circles.
July 30B, 1962	20:18:49	5.0 N	76.3 W	45	6¾	
August 3, 1962	08:56:12	23.2 S	67.5 W	71	7	Undefined central circles.
August 28, 1962	10:59:59	38.0 N	23.1 E	120	6¾	
September 1, 1962	19:20:39	35.6 N	50.0 E	21	7¼	
September 18, 1962	00:29:05	7.5 N	82.3 W	33	7	
December 7, 1962	14:03:37	29.2 N	139.2 E	411	7	
December 8, 1962	21:27:18	25.8 S	63.2 W	580		Epicentre after Espinosa.

NATURE OF THE COMPUTER SOLUTIONS

In the computer program, observations are referred to the focal sphere, and a pair of orthogonal planes in the focus takes up a succession of trial positions. Regarding each trial position in turn as a possible position of the nodal planes, the number of "consistent" and "inconsistent" observations can be added up, and a score established for that particular trial position. In evaluating the score the theoretical radiation pattern is taken into account. Having run its entire gamut of trial positions the machine then selects the ten best of these for up-dating in the second stage of the program; here the neighbourhood of each of the ten is searched to ensure that no maximum has been overlooked in the finite increments of the searching planes.

In the final print-out the machine gives a sheet of information for each of the final ten best solutions; this defines the position of each of the nodal planes and of their line of intersection (the null direction), gives the score of the solution and lists all the stations consistent and inconsistent with it. It would be a simple matter to have the machine print out only the solution with the highest score, but it is usually necessary to examine the other possibilities as well in order to decide on the reliability of the one selected. This may best be illustrated by some examples.

The first, provided by Table II, is for the earthquake of May 24, 1959, at 17.5° N, 97° W. The ten best solutions have been listed in order of decreasing score, with the number of inconsistent observations given in each case. These are out of a total of 111 observations. The table gives the trend and plunge of the null vector and the direction of dip and the amount of dip for each of the two nodal planes. Azimuths are measured in degrees clockwise from north, dips in degrees from the horizontal.

TABLE II

Null Direction		Plane A		Plane B		Number of Inconsistent Stations	Score
Azimuth	Plunge	Azimuth	Dip	Azimuth	Dip		
343	71	343	71	253	90	21	59.10
359	72	336	73	68	83	22	58.99
4	68	354	68	85	86	23	55.58
333	64	5	67	269	78	24	52.90
116	26	178	46	46	55	26	52.00
314	4	232	25	42	65	24	51.69
78	67	164	88	73	67	28	50.90
324	1	232	35	54	55	27	50.71
319	73	335	74	243	86	29	47.97
163	73	107	80	200	76	36	34.62

Examination of the table shows that the first two possibilities have about the same score, and that they represent about the same solution; the azimuth of plane B in the first instance might just as well have been written (253° − 180°) = 73°. As we go away from this optimum position the score decreases steadily and the number of inconsistencies increases. Clearly this is a case of a unique, reasonably well-defined solution.

TABLE III

Null Direction		Plane A		Plane B		Number of Inconsistent Stations	Score
Azimuth	Plunge	Azimuth	Dip	Azimuth	Dip		
250	24	338	85	235	25	10	72.95
252	23	340	84	237	24	11	71.38
249	19	337	86	236	20	11	71.23
63	5	333	85	199	7	12	69.58
243	5	333	85	197	7	12	69.53
42	22	311	87	34	22	15	63.65
358	67	304	76	39	72	15	61.62
359	70	307	77	41	75	15	60.76
17	69	317	79	51	72	15	59.83
293	57	280	56	14	84	18	56.49

Table III gives the results for the earthquake of May 26, 1959, at 27.5° N, 126.5° E. There were 78 observations available. In this solution plane A is very well defined, and the score deteriorates as the plane deviates from this best position. There is certainly a best position for plane B, that given by the best score, and this solution is supported by the next two in order. Note, however, that there follow two solutions, almost identical, with twelve inconsistent observations. This clearly represents a sub-maximum. Considering the fact that even the best stations are inconsistent about one time in nine, are we justified in discarding this alternative solution just because it has two more inconsistent observations than the best one? Probably not. We should list it as an alternative solution, although one with lower probability.

TABLE IV

Null Direction		Plane A		Plane B		Number of Inconsistent Stations	Score
Azimuth	Plunge	Azimuth	Dip	Azimuth	Dip		
347	82	311	84	41	85	13	44.64
9	84	304	88	34	85	13	44.25
343	63	314	66	50	79	13	41.66
27	79	303	89	33	79	14	39.04
23	81	304	88	34	81	14	38.87
279	80	315	82	225	84	14	38.17
297	64	344	72	247	72	14	38.16
27	73	22	73	112	88	14	37.48
81	10	357	61	154	31	15	35.10
261	7	346	55	181	36	16	33.83

The fact that even the best stations may be wrong must keep us from asserting dogmatically any solution defined by too few observations. This is illustrated by the next example which is the earthquake of January 8, 1959, at 15.5 N, 61 W. There were 48 observations in this case; the results are given in Table IV. The first three solutions, all yielding 13 inconsistent observations, are closely similar. Taking an average position between the extremes of the three solutions we might obtain the following values:

Null Direction

Azimuth	*Plunge*
356° ± 13°	73° ± 10°

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
309° ± 5°	77° ± 11°	42° ± 8°	82° ± 3°

they would suggest that the solution was rather closely defined. But note that, by admitting one additional wrong station the next five best solutions are available. This would suggest the following mean positions between extremes, and the following possible variations:

Null Direction

Azimuth	*Plunge*
336° ± 86°	38° ± 33°

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
323° ± 20°	77° ± 11°	40° ± 20°	90° ± 20°

Viewed in this way the solution is much less definite.

This example illustrates another fact—the "best" position is not the mean position between all possible ones. It is arrived at on the basis of the weights of the stations, and this depends on their distance from the nodal planes and the resulting theoretical amplitude. The plus-minus obtained for the average position cannot properly be applied to the best solution, although it certainly indicates the reliability of the solution in a quantitative way. In the following section, where the results of the studies are tabulated, the best position will be given in the Table, the mean position and its possible variations will be indicated in the text.

The kind of considerations discussed in the foregoing remarks are the sort which will be treated analytically in Wickens' new program.

A final example is provided in Table V, which gives the solutions for the earthquake of April 24, 1959, at 31° S, 178° W. There were 97 observations for this shock. Here the solutions range widely, without any very large range in the scores; there is even less variation in the numbers of inconsistent observations. Clearly this is a case where there is no unique solution.

The attentive reader may think to discern some system to the solution for Plane A. The reason for this will be apparent from the plot of the data given in Figure 1. This Figure was produced by the computer, using the Byerly projection. It is produced by the normal computer print-out, not by a plotter, and suffers from the limitations

TABLE V

Null Direction		Plane A		Plane B		Number of Inconsistent Stations	Score
Azimuth	Plunge	Azimuth	Dip	Azimuth	Dip		
44	10	138	67	292	25	20	58.49
112	63	165	73	69	70	20	56.70
63	3	154	73	324	18	21	57.63
85	18	167	67	30	30	21	56.91
92	23	151	39	16	60	21	56.19
107	62	157	71	59	70	21	55.67
144	31	187	40	68	68	21	55.52
152	45	185	50	80	73	21	55.21
351	34	317	43	65	67	21	54.30
319	32	265	47	28	60	22	52.78

of the printer spacing; the points are only approximate and closely grouped points fall on top of each other. To overcome this, the following convention is used:

N	(for negative)	represents one dilatation,
M		represents two dilatations,
L		represents three dilatations;
P	(for positive)	represents one compression,
Q		represents two compressions,
R		represents three compressions.

Where a dilatation and a compression occupy the same printer position this is indicated by *O*; where there are more than three observations of any kind or a mixture of three this is indicated by *J*.

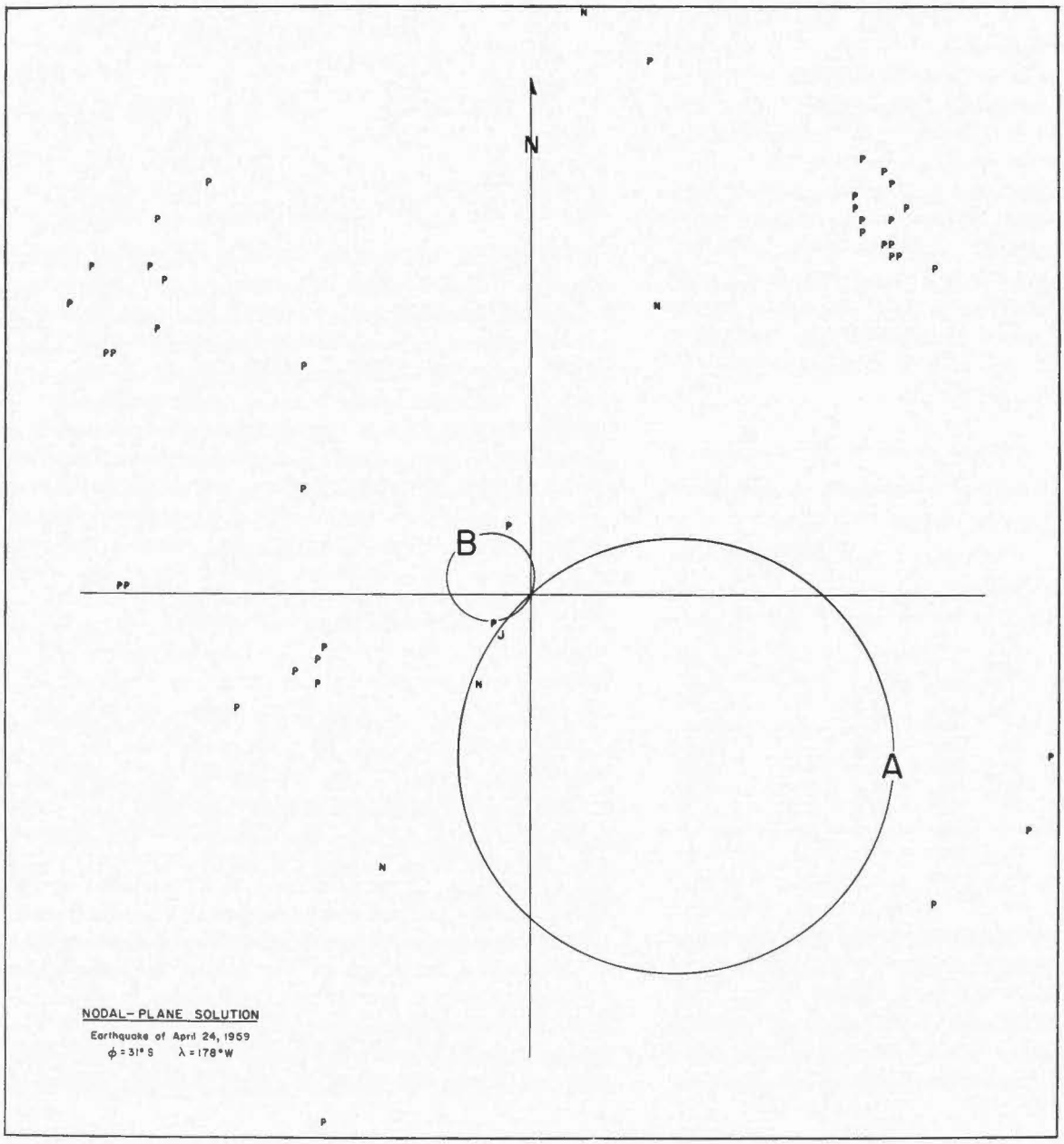

Figure 1

In Figure 1, there is a point marked "J" just south and west of the centre of the plot. This represents the superimposed values of Auckland (compression), Onerahi (compression) and Karapiro (dilatation). All the circles A in Table V (we have plotted the first one in the Table) are attempting to provide a separation of these points. We must ask ourselves whether any one station is sufficiently reliable to warrant this degree of confidence. The situation represented in Figure 1 is one in which almost all the observations are compressional, and there are not enough observations in the epicentral area to define the dilatational circles unambiguously.

TABLE VI — Summary of Solutions

EARTHQUAKE	NULL DIRECTION		PLANE A		PLANE B		Number of Observations	Number of Inconsistent Observations	Score
	Azimuth	Plunge	Azimuth	Dip	Azimuth	Dip			
January 8, 1959	347	82	311	84	41	85	48	13 (10)	44.64
January 22, 1959	33	10	123	89	28	10	103	23 (18)	67.22
February 7, 1959	136	71	112	73	204	83	110	20 (18)	65.62
March 1, 1959	104	65	119	66	27	84	53	14 (13)	49.98
April 24, 1959	Undefined central dilatational circles						97	20 (16)	
April 26, 1959	294	11	342	16	206	78	200	24 (20)	75.79
April 28, 1959	Undefined central dilatational circles						77	17 (14)	
May 4, 1959	44	30	318	83	60	31	191	30 (22)	70.25
Alternate solution	225	1	315	83	143	7	191	31 (23)	70.95
Balakina solution	230	15	315	35	130	50			
S solution	225	3	314	75	146	15	6		
May 24, 1959	343	71	343	71	253	90	111	21 (15)	59.10
May 26, 1959	250	24	338	85	235	25	78	10 (8)	72.95
Alternate solution	63	5	333	85	199	7	78	12 (10)	69.58
June 14, 1959	13	54	94	83	359	55	102	19 (15)	58.01
June 18, 1959	318	80	350	82	260	85	26	3 (3)	72.44
Balakina solution	310	70	2	76	268	76			
July 9, 1959	143	31	180	37	64	72	60	14 (12)	53.76
July 19, 1959	152	18	174	19	64	83	85	19 (13)	55.08
August 15, 1959			358	86			160	41 (34)	46.12
August 26, 1959	135	15	59	48	210	48	138	25 (19)	65.24
Alternate solution	116	80	111	80	201	89	138	24 (23)	68.30
September 14A, 1959			329	87			99	20 (18)	56.58
September 14B, 1959			329	87			41	9 (9)	58.71
September 29, 1959	287	89	285	89	15	90	44	11 (11)	56.73
Alternate solution	162	81	169	81	79	89	44	10 (10)	57.65
October 5, 1959	207	62	287	85	195	63	35	6 (5)	60.95
January 15, 1960	327	37	257	66	12	47	110	23 (17)	60.97
March 8, 1960	229	57	151	82	245	58	209	24 (20)	83.63
Alternate solution	239	35	165	56	307	41	209	21 (17)	83.00
March 20, 1960	351	2	261	84	62	6	172	36 (29)	57.16
May 21, 1960	189	20	274	76	151	25	135	24 (16)	63.22
May 22A, 1960	225	17	308	68	170	28	105	32 (26)	40.48

EARTHQUAKE	NULL DIRECTION		PLANE A		PLANE B		Number of Observations	Number of Inconsistent Observations	Score
	Azimuth	Plunge	Azimuth	Dip	Azimuth	Dip			
May 22B, 1960	35	2	306	69	120	21	81	19 (14)	49.78
May 22D, 1960	328	71	267	81	360	74	53	17 (13)	37.45
June 20A, 1960	189	71	257	83	165	73	94	21 (16)	55.05
July 25, 1960	212	21	297	78	179	25	161	29 (22)	65.06
Alternate solution	145	48	75	73	178	53	161	28 (20)	64.74
July 29, 1960	27	5	115	69	310	21	166	29 (23)	64.95
October 7, 1960	101	58	148	67	49	69	98	27 (23)	41.08
October 22, 1960	45	62	131	88	39	62	78	15 (15)	58.36
November 13, 1960	Undefined central compressional circles						167	24 (17)	
December 3, 1960	Undefined central dilatational circles						123	24 (18)	
January 5A, 1961	171	67	175	67	85	88	58	13 (10)	51.60
January 16, 1961	45	2	135	87	347	3	135	30 (24)	57.18
January 20, 1961	351	63	301	72	37	71	48	9 (7)	63.76
February 12, 1961	45	5	134	74	332	17	131	25 (18)	64.06
February 26, 1961	189	36	120	64	237	47	172	25 (19)	71.99
March 28, 1961			121	86			121	14 (10)	77.43
Alternate solution	143	55	189	64	87	68	121	16 (12)	74.36
June 1, 1961					246	84	46	14 (9)	35.48
June 11, 1961	98	45	149	58	39	62	65	14 (11)	53.03
Alternate solution	166	15	237	40	87	54	65	16 (13)	50.75
July 18, 1961	25	8	104	36	301	55	161	23 (19)	72.47
August 11, 1961	17	23	92	58	316	41	173	14 (9)	82.67
August 19A, 1961	109	49	87	51	186	79	126	21 (16)	68.43
Alternate solution	147	55	107	62	208	71	126	22 (18)	66.97
August 19B, 1961	359	13	81	60	289	33	116	16 (13)	74.89
Alternate solution	176	16	115	31	258	64	116	17 (14)	74.60
August 31A, 1961	219	65	135	87	227	65	113	20 (14)	66.28
August 31B, 1961			149	84			60	10 (5)	67.03
September 1, 1961	Undefined central dilatational circles						85	18 (13)	56.45
February 14, 1962	351	33	317	38	70	73	59	10 (9)	65.97
Alternate solution	333	82	300	83	30	86	59	11 (9)	61.91
March 7, 1962	135	9	218	54	57	38	142	29 (26)	59.85
April 12, 1962	229	5	139	87	260	6	116	22 (18)	66.03
April 23, 1962	239	23	154	77	272	27	157	26 (21)	67.57
Alternate solution	269	17	358	85	252	17	157	27 (22)	66.63
May 7, 1962	208	36	148	55	267	55	123	14 (11)	78.69
May 11, 1962	128	26	139	26	40	86	85	12 (9)	70.91
May 21, 1962	Undefined central dilatational circles						113	21 (17)	

EARTHQUAKE	NULL DIRECTION		PLANE A		PLANE B		Number of Observations	Number of Inconsistent Observations	Score
	Azimuth	Plunge	Azimuth	Dip	Azimuth	Dip			
July 6, 1962	273	3	352	15	183	75	164	15	
July 26, 1962					262	83	112	25 (22)	56.00
July 30A, 1962	Undefined central dilatational circles						83	17 (16)	
July 30B, 1962	21	76	110	90	20	76	75	16 (13)	53.77
August 3, 1962	Undefined central compressional circles						113	22 (18)	
August 28, 1962	271	20	335	40	194	57	128	21 (17)	66.89
September 1, 1962	150	17	227	53	80	42.	134	19 (14)	71.71
September 18, 1962	63	81	99	83	9	85	74	12 (9)	66.67
December 7, 1962	166	28	160	28	254	87	116	27 (25)	54.00
December 8, 1962	340	21	329	21	69	86	35	3 (3)	85.49

ANALYSIS OF THE DATA

The machine solutions will now be presented. The "best" solution in each case has been listed in Table VI, but each solution will be discussed to show its limitations.

Earthquake of 01:33:48, Jan. 8, 1959.
$\varphi = 15\frac{1}{2}°$ N, $\lambda = 61°$ W

This earthquake was discussed in the previous introductory section. It was shown there that the solution is not well-defined. This is indicated by the possible variations from the mean position:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
323° ± 20°	77° ± 20°	40° ± 20°	90° ± 20°

There were 13 inconsistent observations in the best solution but 3 of these came from stations with zero weight. This has been indicated in the Table by giving the number of inconsistencies as 13(10).

Earthquake of 05:10:25, Jan. 22, 1959.
$\varphi = 34°$ N, $\lambda = 142°$ E

Plane A is an essentially vertical one, for which the strike is defined within ± 5. Plane B is very shallow and depends for its definition on a number of near, Japanese, stations. These seem to define it exactly in the position given in Table VI, but recalling past experience with the tables of extended distances at short distances, one probably should not put too much dependence on this exact value. Certainly however, it cannot be far off.

Earthquake of 09:36:51, Feb. 7, 1959.
$\varphi = 4°$ S, $\lambda = 81\frac{1}{2}°$ W

The machine solutions cluster around the best solution as given in Table VI, but the solution is not at all closely defined. The mean of all the solutions, and the range, is as follows:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
88° ± 24°	65° ± 15°	244° ± 42°	62° ± 21°

Despite the wide range, the score is reasonably good; this simply reflects the lack of observations to control the exact position of the planes.

Earthquake of 16:49:13, March 1, 1959.
$\varphi = \frac{1}{2}°$ S, $\lambda = 134\frac{1}{2}°$ E

The first eight of the machine solutions are essentially the same as the one given in Table VI. Their spread defines the possible variation from a mean:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
107° ± 18°	85° ± 22°	22° ± 17°	84° ± 17°

Earthquake of 17:57:58, April 24, 1959.
$\varphi = 31°$ S, $\lambda = 178°$ W

This earthquake was discussed, as an example, in the introductory section, where it was shown to be a case in which the solution was in terms of undefined dilatational circles in the centre of the diagram. Interpreted in terms of faulting, this means thrust faulting on one of a pair of shallow, non-defined planes. Since this fact has geological significance, the earthquake has been listed as solved in Table I, although no entry can appear in Tables VI or VII.

Earthquake of 20:40:38, April 26, 1959.
$\varphi = 25°$ N, $\lambda = 122\frac{1}{2}°$ E

This earthquake has been treated by Ritsema (1962). Using 144 observations he obtained the following solution:

Null Direction		Plane A		Plane B	
Azimuth	*Plunge*	*Azimuth*	*Dip*	*Azimuth*	*Dip*
297	14	345	18	210	77

The same 144 observations were given to the computer and the following solution was obtained:

287	14	333	20	200	76

This is a reasonably good agreement. However we must present more disquieting figures. Data had been collected for this earthquake through our normal questionnaire. 151 observations so collected yielded the following solution:

217	42	155	68	266	54

This is markedly different than that given by Ritsema.

We combined the data from the two sources, obtaining a total of 200 observations. The two sets of data disagreed in nine cases. Where there were disagreements we took our own observations as correct. The solution was as follows:

222	45	158	66	267	55

We then did the solution once more; where there were disagreements between the two sets of data we this time took Ritsema's observation as the correct ones. We obtained:

294	11	342	16	206	78

which is in excellent agreement with Ritsema's original solution. This solution is given in Tables VI and VII.

It seems clear from the foregoing that the solution is very sensitive to the accuracy of the data and that even a relatively few incorrect observations may distort the solution. It seems certain that Ritsema's observations, which were for the most part based on the study of the actual records, must be more accurate than our own. The implications of these facts to our program of nodal-plane determination will be discussed in a separate paper.

Earthquake of 11:09:30, April 28, 1959.
φ = 15° N, λ = 93° W

This again is an earthquake in which the solution must be in terms of a pair of undefined, central, dilatational circles, representing thrust faulting on shallow, undefined planes.

Earthquake of 07:15:42, May 4, 1959.
φ = 52½° N, λ = 159½° E

In this earthquake there is complete agreement on the position of Plane A among all the solutions, but there is some vagueness about the position of Plane B. As shown in the Table there are two possibilities, one which makes the number of inconsistencies a minimum, the other which gives a maximum score. These more or less run the gamut of possibilities on Plane B.

Balakina, Shirokova and Vvedenskaya (1961) have published a solution for this earthquake; this has been given in Table VI. It will be seen that it agrees quite well with our alternative solution, particularly in regard to the dip directions of the planes; the dips do not agree so well, which probably reflects the limited distances of the stations they used. Stevens (1964) has used her program to determine the mechanism from S-wave data published by Stauder (1962). She finds a Type II mechanism to be appropriate; the directions of the intermediate force and of the nodal planes have been given in Table VI. The agreement with our alternative solution is remarkable.

Earthquake of 19:17:40, May 24, 1959.
φ = 17½° N, λ = 97° W

This solution was discussed in the introductory section. As shown there, it is a unique, closely defined, one.

Earthquake of 04:13:01, May 26, 1959.
φ = 27½° N, λ = 126½° E

This earthquake was also discussed in the introduction. It was there shown that, while there was one clearly defined plane, the second plane was less well defined and might be put in either of two positions. These alternative possibilities have been given in the Table; any position intermediate to the two is quite possible.

Earthquake of 00:11:57, June 14, 1959.
φ = 20½° S, λ = 68° W

No other solution of the ten best came close to that given in Table VI in the number of inconsistent observations. Examination of the plot shows the following possible variations from a mean position:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
94° ± 1°	81° ± 2°	358° ± 1°	55° ± 2°

Thus the solution is quite close, despite the rather low score.

Earthquake of 15:58:38, June 18, 1959.
φ = 54° N, λ = 161° E

There are very few data here; nevertheless Plane A is very closely defined by the observations and Plane B certainly seems to be fixed within ± 4° both in strike and in dip. However, with so few observations one hesitates to place too much credence in the solution.

As shown in Table VI, an independent solution by Balakina et al (1961) agrees closely with the Ottawa one. On the other hand a solution by Stevens (1964), using S-data published by Stauder (1962) shows no agreement whatever.

Earthquake of 16:05:18, July 9, 1959.
$\varphi = 20\frac{1}{2}°$ S, $\lambda = 68°$ W

For this earthquake all the solutions clustered around the value given for Plane B. There was so much variation given for Plane A however that it must be regarded as essentially undefined. The mean for this plane may be given as:

Plane A

Azimuth	*Dip*
242° ± 82°	52° ± 20°

Even with this limitation, the number of inconsistencies is so high and the score so low, that the solution is on the verge of being classed as a "no solution".

Earthquake of 15:06:10, July 19, 1959.
$\varphi = 15°$ S, $\lambda = 70\frac{1}{2}°$ W

The solution here is almost identical with that for July 9, above. Plane B is closely limited by the data, Plane A may vary as follows:

Plane A

Azimuth	*Dip*
245° ± 75°	31° ± 20°

Again, the solution is on the verge of "no solution".

Earthquake of 08:57:04, August 15, 1959.
$\varphi = 23°$ N, $\lambda = 121°$ E

All the computer solutions agree on an almost vertical plane striking approximately EW, but it is not possible to give any definite position for the second plane. Possible variations are as follows:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
362° ± 5°	86° ± 5°	182° ± 90°	20° ± 20°

Earthquake of 08:25:30, August 26, 1959.
$\varphi = 18°$ N, $\lambda = 94\frac{1}{2}°$ W

There are two possible solutions for this earthquake, one in terms of large circles (which on a fault interpretation would correspond to strike-slip faulting) the other in terms of small dilatational circles drawn in the central area (which would correspond to thrust faulting). While the former has the higher score, the latter has the fewer "weighted" inconsistencies and seems preferable.

Whatever the relative merits of the two solutions, each is exactly limited by the data.

Earthquakes of 14:09:39 and 22:23:53, September 14, 1959.
$\varphi = 28\frac{1}{2}°$ S, $\lambda = 177°$ W

These earthquakes might have been listed among the "no solutions" except that one plane, the same in each earthquake, was consistently defined. This plane has been listed *in its mean position* in Table VI. It varies from this mean position by ± 15° in azimuth, ± 2° in dip.

The later aftershock of 05:59:42, September 15, was also considered. There was too great a confusion of data to justify publication of even a partial solution, but it may be worth reporting that the best machine solution gave an azimuth direction of 303° and a dip of 88°, very similar to the two earlier shocks.

Earthquake of 15:31:57, September 29, 1959.
$\varphi = 29°$ S, $\lambda = 176\frac{1}{2}°$ W

This earthquake may probably be regarded as an aftershock in the series just considered. There are two possible solutions suggested by the computer. They have been listed in Table VI. Note that the first of these gives, for Plane A, a solution closely related to the ones found earlier in the series. However, this is probably without significance, since the earlier solutions would not have tolerated a second plane with the steep dip found here.

Both of the possible solutions are closely limited by the data, but these are not numerous. The solutions should not be depended on too strongly.

Earthquake of 18:27:47, October 5, 1959.
$\varphi = 83\frac{1}{2}°$ N, $\lambda = 112.5°$ E

Despite the small number of observations for this Arctic earthquake the solution given in the table scored 3.5 points higher than its nearest rival. This suggests a rather strong solution. It is not a tight solution however; Plane B is exactly defined by the data, but Plane A may best be given as:

Azimuth	*Dip*
297 ± 10°	74° ± 11°

Earthquake of 09:30:24, January 15, 1960.
$\varphi = 15°$ S, $\lambda = 75°$ W

The computer solutions are reasonably well clustered around the "best" solution given in Table VI; however, the data do not define the positions of the planes very closely. The mean position, and variations from this mean, may be expressed as follows:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
239° ± 25°	55° ± 15°	6° ± 6°	50° ± 4°

Even with these limitations the circles cannot be regarded as well-defined; the one circle lies in the Pacific, the other in South America, and there are too few stations in these areas.

Earthquake of 16:33:38, March 8, 1960.
$\varphi = 16\frac{1}{2}°$ S, $\lambda = 168\frac{1}{2}°$ E

The observations for this earthquake are almost entirely dilatational; the only consistent groups of compressions come from the New Zealand stations and from Rabaul. There are two ways of satisfying these data, and they

have been listed as alternative solutions in Table VI. Each solution is closely defined by the data, but there is not much basis for selecting between them.

Earthquake of 17:07:30, March 20, 1960.
$\varphi = 40°$ N, $\lambda = 143\frac{1}{2}°$ E

There was very good clustering of the machine solutions about the value given in Table VI, and the number of inconsistencies increased very rapidly as the values departed from the "best" position. However, inconsistent observations tended to occur in groups, rather than dispersed throughout the diagram, a phenomenon which is always disquieting. The solution given in the table was exactly limited by the data.

Chilean Earthquakes of May, 1960.

A questionnaire was circulated in June, 1960, seeking first-motion information on six of the earthquakes of this series. An attempt was made to solve the resulting diagrams graphically, but because of confusion of data and because of scarcity of observations in the Pacific and in South America no solutions emerged in which one could have confidence. A number of later aftershocks of the Chilean series were included in the general questionnaire for the years 1959-60; again there was much difficulty in making a pattern from the observations.

However, when the data are fed to the computer a pattern, consistent over the entire series, appears to emerge. This pattern bears considerable resemblance to that established on other grounds and seems to justify the publication of the results, even though they are not well defined. The entire Chilean series will be considered here.

May 21, 1960; 10:02:50

The solution given in Table VI is the computer solution with the highest score. Plane B, given in the Table in its "best" position is in fact almost undefined; the average direction of the dip azimuth is 118° ± 63°, and the average dip is 45° ± 25°. Plane A on the other hand was found repeatedly by the computer in about the position given in the Table, and while the observations defining it are not numerous they lie close enough to limit it within ± 2° in both strike and dip.

St. Amand (1961), from the study of aftershocks has postulated a fault striking N 9° E. Plane A of the computer solution strikes about N 4° E. If the nodal diagram is interpreted in terms of faulting and if Plane A is taken as the fault, the strike direction agrees very well with St. Amand's; the plane dips steeply to the west. Because the second plane is not well defined we can only say that the faulting is thrust with a possible *left-lateral* component which might be very large. This disagrees both with the findings of St. Amand and with the findings of Aki which he reports; they find the lateral displacement to be *right-lateral.*

May 22A, 1960; 10:30:39

As will be seen from Table VI, this solution is quite similar to that given above; Plane A is striking rather more east of north. Again Plane A is closely limited by the data, within ± 6° in azimuth and ± 3° in dip. Again Plane B is almost undefined; the mean azimuth direction is 161° ± 52°, the mean dip is 46° ± 22°. Again, interpreted in terms of faulting, the faulting is thrust with a possible strong left-lateral movement.

May 22B, 1960; 10:32:43

This solution is so poorly defined that it would have been listed among the "no solutions" except for the similarity it bears to the earlier ones in the sequence. The mean azimuth of Plane A is 300° ± 50° the mean dip 52° ± 17°. Plane B is still less well defined than usual; it may vary from a dip azimuth of 47, dip 62 (taken with A as a fault this would indicate right-lateral strike-slip faulting), through an azimuth of 126, dip 21 (indicating pure thrust faulting) to an azimuth of 205, dip of 68 (giving left-lateral strike-slip faulting).

May 22C, 1960; 18:55:57

No solution was possible in this earthquake. The ten different computer solutions all had the same number of inconsistent observations and made about the same score, but they were all completely different.

May 22D, 1960; 19:10:47

The computer found only one possible solution for this earthquake; while the number of inconsistencies is high and the score low the solution is closely limited by the data and one must accept it almost exactly as given in the table, or discard it completely. Again there is a north-south striking plane; regarding this as the fault, a fault-interpretation would insist on left-lateral movement.

May 22E, 1960; 19:11:20

Again the computer did not suggest any unique solution for this earthquake.

June 6, 1960; 05:55:44

The data for this earthquake were very confused, and no reliable solution can be given. Nevertheless it may be worth reporting that the solution which made the minimum number of inconsistent observations had a plane with dip azimuth of 276° and dip of 82°; this is very similar to the north-south striking plane characteristic of the series.

June 20A, 1960; 02:01:08

Plane A is closely limited by the data, but Plane B is not well defined. It can vary from the position shown in

the Table, to a position tangential to the large circle. That is to say, the mean azimuth of dip is 121° ± 44° and the mean dip is 40° ± 33°. The similarity of this solution to the earlier ones in the series is remarkable.

June 20B, 1960; 12:59:40

There were several widely differing solutions for this earthquake, all with the same number of inconsistent observations. There was no basis for selecting any particular one. However, one of the possibilities was for a plane with a dip direction of 273°, a dip of 76°, closely analagous to the pattern for the other earthquakes of the series. Another equally plausible solution would be in terms of two undefined dilatational circles drawn in the central region; this would correspond to thrust faulting on a plane of undefined direction.

In summary, none of the Chilean earthquakes has yielded a well-defined solution, but most of them have suggested a plane striking approximately north-south and dipping steeply to the west. The mean strike of the plane, as determined by the several nodal-plane solution, is N 10° E which agrees almost exactly with the over-all fault direction suggested by St. Amand; it is this agreement which has led to the decision to publish the solutions despite their low scores. As has already been pointed out, most of the solutions, interpreted in terms of faulting on a north-south plane, require either thrust or left-lateral movement. The lateral sense does not agree with St. Amand.

Earthquake of 11:12:00, July 25, 1960.
φ = 54° N, λ = 159° E

It will be seen from Table VI that the computer has suggested two alternative solutions for this earthquake. In the first, Plane A is closely limited although by only two points, but Plane B may have the following range of variations:

Azimuth	*Dip*
40	51
117	12
194	46

The middle position is for the circle tangential to Plane A, and the listing indicates that the plane may vary throughout the entire range.

In the second solution Plane A is again closely limited, but again by only two observations. Plane B is again undefined and may have the following range:

Azimuth	*Dip*
178	53
255	15
332	56

the middle observation again indicates the tangential position for the circle.

It was mentioned in the case of both possible solutions that Plane A was held by very few observations. It should also be noticed that the two planes are not drastically different; in the first solution Plane A strikes N 27° E and dips steeply to the west, in the second it strikes N 15° W and dips steeply to the east. If we admit that two stations are not enough to limit a plane beyond question, then we might take the mean of the two positions of Plane A. This would be a plane striking N 6° ± 20° E and dipping at 90° ± 15°. With this mean position Plane A would have the following gamut:

Azimuth	*Dip*
6	54
–	0
186	47

Earthquake of 17:31:40, July 29, 1960.
φ = 40.1° N, λ = 142.3° E

The solution given in the table is closely defined by the data; although there is some confusion in the Japanese stations, probably reflecting errors in the extended distance tables at short distances, the position of the planes cannot be much in doubt.

Earthquake of 15:18:31, October 7, 1960.
φ = 7.4° S, λ = 130.7° E

The score for this solution is low, and the number of inconsistencies is higher than normal, but the computer gives a unique solution. The best position for this is given in Table VI; the mean position may be expressed as follows:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
150° ± 2°	62° ± 5°	48° ± 1°	67° ± 2°

Earthquake of 08:22:01, October 22, 1960.
φ = 10.3° S, λ = 161.2° E

In this earthquake Plane A is defined within a very few degrees, both in strike and dip, but Plane B is not well defined. In its mean position it may be described as follows:

Azimuth	*Dip*
39° ± 0°	34° ± 34°

Earthquake of 09:20:37, November 13, 1960.
φ = 51.1° N, λ = 168.8° W

In this case the computer found a number of equally good solutions, all representing compressional circles drawn in the central area of the diagram. This indicates the lack of control in the epicentral area. In a fault interpretation normal faulting on an undefined plane would be indicated.

Earthquake of 04:24:19, December 3, 1960.
φ = 42.9° N, λ = 104.4° E

This solution was in terms of a number of equally valid but loosely defined dilatational circles drawn in the central area of the diagram. On a fault interpretation these would represent thrust faulting, on an undefined, shallow-dipping plane.

Earthquake of 15:53:56, January 5, 1961.
φ = 4.1° S, λ = 143.0° E

This solution is reasonably well-defined in terms of a vertical plane striking north-south, and a second plane striking east-west and dipping steeply to the south. Limits from the mean positions are as follows:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
178° ± 4°	70° ± 10°	90° ± 5°	90° ± 4°

Earthquake of 07:20:19, January 16, 1961.
φ = 36.2° N, λ = 141.7° E

The solution given in the Table provides the best score of a number of approximately similar ones. All of these solutions involve one steeply dipping plane, with a second very shallow one. The mean position may be expressed:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
135° ± 10°	90° ± 3°	358° ± 33°	0° ± 3°

Earthquake of 17:09:16, January 20, 1961.
φ = 56.6° N, λ = 152.3° W

In spite of the small number of observations for this solution, the planes are defined almost exactly in the position given in the table. Even slight deviation from the listed position increased the number of inconsistent observations.

Earthquake of 21:53:44, February 12, 1961.
φ = 43.9° N, λ 147.6° E

Most of the observations in this earthquake were compressional and it was only in the central area that there were consistent dilatations. By good fortune they suffice to define the circles in the positions given in Table VI. Any deviation from the listed position results in increased numbers of inconsistent observations.

Earthquake of 18:10:49, February 26, 1961.
φ = 31.6° N, λ = 131.2° E

The solution given in the Table is almost exactly defined; a variation of even one degree in either the strike or dip of either plane results in a substantial increase in the numbers of inconsistent observations.

Earthquake of 09:35:55, March 28, 1961.
φ = 0.2° N, λ = 123.6° E

There are two possible solutions suggested for this earthquake; because of lack of points in the epicentral area neither is well defined.

The first is in terms of an approximately vertical plane striking north-east; the strike of this plane might vary ± 3° and the dip ± 2°. The second plane is not defined at all; treating the defined plane as a fault, the second circle might be drawn to define anything between strong left lateral and strong right lateral motion, including thrust faulting as an intermediate position.

The alternative solution, which has a poorer score, is somewhat better defined. The mean positions of the planes may be given as

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
189° ± 10°	68° ± 5°	75° ± 15°	55° ± 15°

Earthquake of 23:29:21, June 1, 1961.
φ = 10.4° N, λ = 39.9° E

Only one plane can be defined in this earthquake, and even with this limitation the score is very poor. For the one plane defined the dip azimuth has a mean position of 230° ± 15°, and its dip a mean value of 90° ± 5°. If this plane were treated as a fault, the second circle could be drawn to indicate anything between mildly right-lateral to mildly left-lateral faulting, including an intermediate position indicating normal faulting.

Earthquake of 05:10:26, June 11, 1961.
φ = 27.9° N, λ = 54.6° E

Two solutions have been suggested for this earthquake. The preferred solution, listed first in Table VI, is exactly limited by the data. The second solution is less clearly defined. For it:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
220° ± 20°	50° ± 10°	87° ± 1°	54° ± 2°

Earthquake of 14:03:36, July 18, 1961.
φ = 29.4° N, λ = 131.6° E

The solution given in the table is very well defined; the possible variations in the strike are not more than 5° for either plane; for the dips not more than 1° could be tolerated.

Earthquake of 15:51:35, August 11, 1961.
φ = 43.0° N, λ = 145.0° E

The ten best solutions printed out by the computer were all variations on the solution given in the table. Even slight deviation from the published position resulted

in decreased score; the mean position and the most variation which could be considered is as follows:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
94° ± 15°	62° ± 5°	321° ± 5°	42° ± 7°

Earthquake of 05:09:50, August 19A, 1961.
φ = 10.8° S, λ = 71.0° W

Two alternative solutions have been given for this earthquake, but these are in fact variations on the same solution and reflect the fact that there are not enough observations in the epicentral zone to define the planes very accurately. One thing that is clear is that the solution demands a plane striking roughly east-west and dipping steeply to the south; its mean position is:

Azimuth	*Dip*
200° ± 15°	75° ± 5°

The second plane is not really defined. While the evidence all points to a circle about as follows:

Azimuth	*Dip*
85° ± 22°	45° ± 20°

the data are not conclusive. A dip azimuth ranging out to 290° cannot be positively excluded.

Earthquake of 05:33:31, August 19B, 1961.
φ = 36.2° N, λ = 136.5° E

Again two alternate solutions have been given; it will be seen that they represent, in each case, a pair of dilatational circles drawn in the central area of the map, each with an approximately north-south strike. They represent two extremes which fit the data, but any pair of planes between would do as well. In terms of a fault interpretation we would say that foulting was thrust on a north-south striking plane of indeterminate dip.

Earthquake of 01:48:38, August 31A, 1961.
φ = 10.6° S, λ = 70.9° W

The epicentre of this earthquake is very close to that of August 19A, and the solution is rather similar. Only one plane is unambiguously defined, an almost vertical one striking somewhat north of east. Its mean position is:

Azimuth	*Dip*
144° ± 10°	90° ± 2°

The second plane has been given in the table in the best position found by the computer, but there is only one point holding it there; if this point is wrong, then there is no control whatever on the position of the plane.

Earthquake of 01:57:08, August 31B, 1961.
φ = 10.4° S, λ = 70.7° W

Again we have a solution in which only one plane can be defined. The mean position of the plane is:

Azimuth	*Dip*
140° ± 10°	83° ± 2°

The similarity to the earthquakes with similar epicentres, of August 19A and August 31A will be noted.

Earthquake of 00:09:35, September 1, 1961.
φ = 59.5° S, λ = 27.3° W

There are too few stations in the epicentral area to permit the definition of the circles in this earthquake; we can say only "undefined central dilatational circles".

Earthquake of 06:36:01, February 14, 1962.
φ = 38.1° S, λ = 73.1° W

There are two possible solutions for this earthquake, each making the same number of weighted stations wrong. In the first solution listed in Table VI, plane B is exactly defined by the data, plane A is almost undefined. It may range from one extreme position: Azimuth 166°, Dip 66°; through a mean position: Azimuth 250°, Dip 17°; to the other extreme: Azimuth 329°, Dip 56°.

In the alternative position the planes are limited within 1°.

Earthquake of 11:01:00, March 7, 1962.
φ = 19.3° S, λ = 145.3° E

There can be no doubt that this solution is in terms of central compressional circles, and any deviation from the position given in the Table results in a greatly increased number of inconsistent observations. However, a disquieting number of inconsistent observations (12) came from stations in the central area of the map. This undoubtedly reflects the errors of the tables of extended distance at short epicentral distances, but must warn against a too exact acceptance of the results.

Earthquake of 00:52:47, April 12, 1962.
φ = 38.2° N, λ = 142.3° E

This solution is in terms of one well-defined vertical plane striking N 49° E; both the strike and dip are defined within 3°. The second plane is almost tangent to the earth and therefore is not very well defined. It might vary both in strike and dip by as much as 10° from the position given in Table VI.

Earthquake of 05:58:05, April 23, 1962.
φ = 42.9° N, λ = 143.4° E

Alternative solution have been given in Table VI, but they do not differ vey much; they might be regarded as the two extremes on a mean position of the solution. This would be given as:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
164° ± 12°	90° ± 12°	262° ± 10°	22° ± 5°

Earthquake of 17:39:50, May 7, 1962.
φ = 45.3° N, λ = 146.7° E

This solution is in terms of central dilatational circles; fortunately there are enough observations close to the epicentre to define these reasonably well. In their mean positions, the planes given in Table VI assume the positions:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
153° ± 3°	53° ± 2°	276° ± 10°	52° ± 3°

Earthquake of 14:11:52, May 11, 1962.
φ = 17.0° N, λ = 99.7° W

The score for this solution, as shown in Table VI, is quite high, and the number of inconsistent observations is low. Nevertheless the solution is not a very dependable one, because of the poor distribution of observations. This will be apparent from Figure 2. Plane B represents a plane which runs along roughly parallel to the coast of North America; the stations on the continental side of this plane received initial compressions, but there are too few observations on the Pacific side of the plane to convince us that the plane might not dip in the other direction. Plane A is essentially undefined, although it is constrained by the data to shallow dips. It may range between the extremes, and through the mean position, shown below:

Plane A		Plane B	
Azimuth	*Dip*	*Azimuth*	*Dip*
134°	46°		
220°	4°	40° ± 2°	86° ± 4°
302°	35°		

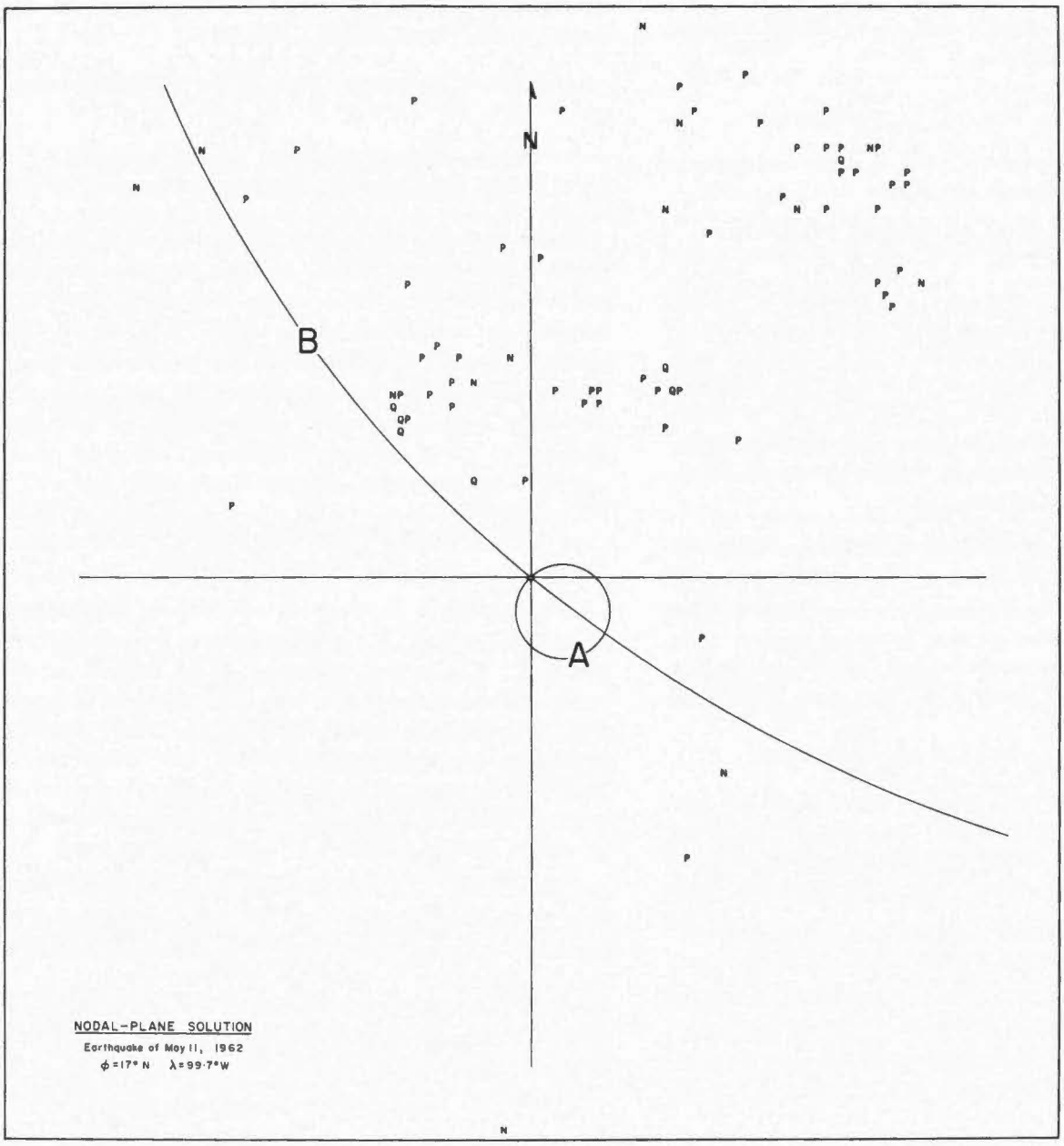

Figure 2

A somewhat analogous problem was created by the earthquake of May 19 (14:58:13), which had about the same epicentre. The computer solution for this earthquake is shown in Figure 3. It is clear that there is really no control on the Pacific side of the large circle; the solution has been listed among the "no solutions".

Earthquake of 12:02:51, May 21, 1962.
φ = 37.3° N, λ = 96.0° E

Almost all the observations in this earthquake are compressional, and the solution must be in terms of small, central, dilatational circles. Unfortunately these are undefined by the data.

Earthquake of 23:05:32, July 6, 1962.
φ = 36.6° N, λ = 70.4° E

This solution has been given by Metzger (1963) but the results have been included here for the sake of completeness. The best computer position has been shown in Table VI. The mean position and possible variation is as follows:

Plane A		Plane B	
Azimuth	*Dip*	*Azumith*	*Dip*
7° ± 55°	15° ± 7°	187° ± 5°	75° ± 7°

Earthquake of 08:14:42, July 26, 1962.
φ = 7.5° N, λ = 82.7° W

This earthquake would have been listed with the "no solution" ones except for the similarity of the pattern to

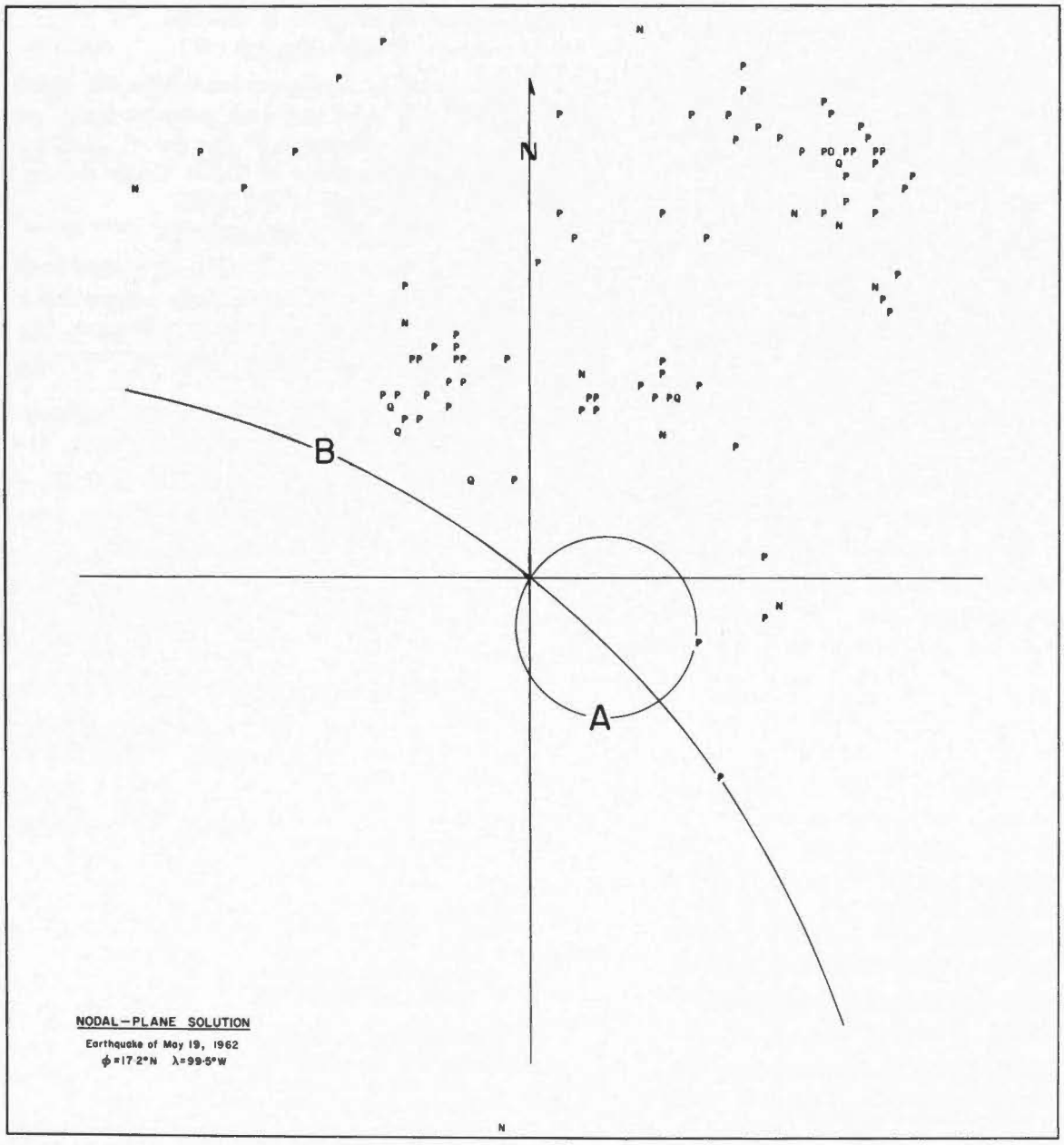

Figure 3

those in the Mexican earthquakes of May 11 and May 21. In those earthquakes the one defined plane ran parallel to the edge of the continent and was poorly defined because of the scarcity of the data on the Pacific side. In the present earthquake there is a similarly oriented plane suggested by all the machine solutions, except that in this case there is disagreement and confusion in the coastal stations so that the position cannot be given better than:

Azimuth	*Dip*
255° ± 7°	81° ± 2°

Earthquake of 17:16:44, July 30A, 1962.
φ = 3.3° S, λ = 143.9° E

Most of the observations in this earthquake were compressional and the best solution is probably in terms of undefined, central dilatational circles.

Earthquake of 20:18:49, July 30B, 1962.
φ = 5.0° N, λ = 76.3° W

Plane A in this solution is almost exactly defined by the data. Plane B is held in the position given in Table VI by only one point; if we were to ignore that point the plane might increase in dip to about 80°. It could not decrease.

Earthquake of 08:56:12, August 3, 1962.
φ = 23.2° S, λ = 67.5° W

The only possible solution for this earthquake is in terms of central compressional circles. The data near the epicentre are not sufficient to define them.

Earthquake of 10:59:59, August 28, 1962.
φ = 38.0° N, λ = 23.1° E

The solution given for this earthquake in Table VI is almost exactly defined by the data.

Earthquake of 19:20:39, September 1, 1962.
φ = 35.6° N, λ = 50.0° E

Most of the first-motion observations for this earthquake are compressional, and they crowd in so close to the epicentre that it is impossible to draw a pair of dilatational circles in the epicentral area; either one must make a number of observations inconsistent or one must ignore the orthogonality criterion.

The solution given in Tables VI and VII chooses the former alternative, making four observations in the epicentral area inconsistent. It had occurred to us that these near stations might have recorded a small foreshock but there is no evidence of this from the travel times. The case should be remembered as one in which a pair of orthogonal planes were not the best solution to the data.

Earthquake of 00:29:05, September 18, 1962.
φ = 7.5° N, λ = 82.3° W

Both planes given in Table VI for the solution of this earthquake are defined within about ± 2° in both strike and dip by the data.

Earthquake of 14:03:37, December 7, 1962.
φ = 29.2° N, λ = 139.2° E

The percentage of inconsistent observations in this solution is rather high, but some solution very like this must be the correct one. The more steeply dipping plane effectively divides the map into two zones, one predominately compressional, the other dilatational. The second plane is also reasonably well substantiated.

If the solution is accepted, then the possible variation on the positions of the planes is very small.

Earthquake of 21:27:18, December 8, 1962.
φ = 25.8° S, λ = 63.2° W

Espinosa is making a study of this earthquake and has collected data on first motion from 35 stations. He kindly supplied this to us for the purposes of a nodal solution. Plane B given in Table VI is exactly defined by the data; Plane A is less well defined. The dip might increase to 40°, with a corresponding variation in azimuth.

SUMMARY

Since it is hoped that the present solutions will shortly be re-worked in the more elaborate program being prepared, we postpone discussion of the results. However, the solutions are summarized in Table VII in the form established in earlier papers of the series.

ACKNOWLEDGEMENTS

We have been assisted by a number of people in the collection of first motion data and in its preparation for the program. To these assitants—Marlene Metzger, Peter Hodgson, Eden Windish and Bruce Compton—we express our thanks.

We are also grateful to those many station operators who, by supplying us with data on first motion, have made this study possible.

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TABLE VII

EARTHQUAKE				PLANE A					PLANE B					NULL VECTOR		DEXTRAL Solution	SINISTRAL Solution
Date	φ	λ	Focal Depth (km)	Strike Direction	Dip Direction	Dip	Strike Component	Dip Component	Strike Direction	Dip Direction	Dip	Strike Component	Dip Component	Trend	Plunge		
January 8, 1959	15.5 N	61 W	100	N 41 E	N 49 W	84°	.996	+.087	N 49 W	N 41 E	85°	.994	+.104	N 13 W	82°	a	b
January 22, 1959	34 N	142 E	33	N 33 E	N 123 E	89°	.172	+.984	N 62 W	N 28 E	10°	.994	+.100	N 33 E	10°	b	a
February 7, 1959	4 S	81.5 W	33	N 22 E	N 112 E	73°	.991	+.127	N 66 W	N 156 W	83°	.955	+.294	N 136 E	71°	a	b
March 1, 1959	0.5 S	134.5 E	100	N 29 E	N 119 E	66°	.993	-.114	N 63 W	N 27 E	84°	.912	-.408	N 104 E	65°	a	b
April 24, 1959	31 S	178 W	33	← Not defined →													
April 26, 1959	25 N	122.5 E	150	N 72 E	N 18 W	16°	.656	.754	N 64 W	N 154 W	78°	.185	+.982	N 66 W	11°	b	a
April 28, 1959	15 N	93 W	33	← Not defined →													
May 4, 1959	52.5 N	159.5 E	60	N 48 E	N 42 W	83°	.504	-.863	N 30 W	N 60 E	31°	.971	-.236	N 44 E	30°	b	a
Alternative solution				N 45 E	N 45 W	83°	.000	-1.000	N 53 E	N 143 E	7°	.000	-.999	N 135 W	1°	-	-
May 24, 1959	17.5 N	97 W	100	N 77 E	N 17 W	71°	1.000	-.000	N 17 W	N 107 W	90°	.945	-.325	N 17 W	71°	a	b
May 26, 1959	27.5 N	126.5 E	100	N 68 E	N 22 W	85°	.415	+.909	N 35 W	N 125 W	25°	.978	+.206	N 110 W	24°	b	a
Alternative solution				N 63 E	N 27 W	85°	.085	+.996	N 71 W	N 161 W	7°	.698	+.715	N 63 E	5°	b	a
June 14, 1959	20.5 S	68 W	100	N 4 E	N 94 E	83°	.816	-.577	N 89 E	N 1 W	55°	.988	-.148	N 13 E	54°	a	b
June 18, 1959	54 N	161 E	33	N 80 E	N 10 W	82°	.996	+.088	N 10 W	N 100 W	85°	.990	+.139	N 42 W	80°	b	a
July 9, 1959	20.5 S	68 W	100	N 90 E	S	37°	.858	-.513	N 26 W	N 64 E	72°	.542	-.839	N 143 E	31°	a	b
July 19, 1959	15 S	70.5 W	200	N 84 E	N 174 E	19°	.927	-.374	N 26 W	N 64 E	83°	.304	-.952	N 152 E	18°	a	b
August 15, 1959	23 N	121 E	33	N 88 E	N 2 W	86°	← Not defined →										
August 26, 1959	18 N	94.5 W	33	N 31 W	N 59 E	48°	.355	+.934	N 60 W	N 150 W	46°	.367	+.930	N 135 E	5°	a	b
Alternative solution				N 21 E	N 111 E	80°	.999	+.017	N 69 W	N 159 W	89°	.984	+.173	N 116 E	80°	a	b
September 14A, 1959	28.5 S	177 W	33	N 59 E	N 31 W	87°	← Not defined →										
September 14B, 1959	29 S	177 W	33	N 59 E	N 31 W	87°	← Not defined →										
September 29, 1959	29 S	176.5 W	33	N 15 E	N 75 W	89°	.999	+.017	N 75 W	N 15 E	90°	.999	+.017	N 73 W	89°	a	b
Alternative solution				N 79 E	N 169 E	81°	.999	+.017	N 11 W	N 79 E	89°	.987	+.156	N 162 E	81°	b	a
October 5, 1959	83.5 N	112.5 E	33	N 17 E	N 73 W	85°	.890	-.455	N 75 W	N 165 W	63°	.995	-.097	N 153 W	62°	a	b
January 15, 1960	15 S	75 W	150	N 13 W	N 103 W	66°	.665	+.746	N 78 W	N 12 E	47°	.831	+.556	N 33 W	37°	a	b
March 8, 1960	16.5 S	160.5 E	250	N 61 E	N 151 E	82°	.844	-.535	N 25 W	N 115 W	58°	.986	-.164	N 131 W	57°	b	a
Alternative solution				N 75 E	N 165 E	56°	.413	-.910	N 37 E	N 53 W	41°	.522	-.852	N 121 W	35°	b	a
March 20, 1960	40 N	143.5 E	60	N 9 W	N 99 W	84°	.000	-1.000	N 28 W	N 62 E	6°	.000	-.999	N 9 W	2°	b	a
May 21, 1960	37.5 S	73.5 W	33	N 4 E	N 86 W	76°	.357	+.934	N 61 E	N 151 E	25°	.819	+.572	N 171 W	20°	b	a
May 22A, 1960	38 S	73.5 W	33	N 38 E	N 52 W	68°	.305	+.952	N 80 E	N 170 E	28°	.602	+.797	N 135 W	17°	b	a
May 22B, 1960	37.5 S	73 W	33	N 36 E	N 54 W	69°	.000	+1.000	N 30 E	N 120 E	21°	.000	+.999	N 35 E	2°	a	b
May 22D, 1960	38 S	73.5 W	33	N 3 W	N 93 W	81°	.960	-.279	EW	N	74°	.986	-.162	N 32 W	71°	b	a
June 20A, 1960	38 S	73.5 W	33	N 13 W	N 103 W	83°	.955	+.294	N 75 E	N 165 E	73°	.991	+.127	N 171 W	71°	b	a
July 25, 1960	54 N	159 E	100	N 27 E	N 63 W	78°	.376	+.926	N 89 E	N 179 E	25°	.870	+.491	N 148 W	21°	b	a
Alternative solution				N 15 W	N 75 E	73°	.777	-.629	N 88 E	N 178 E	53°	.930	-.366	N 145 E	48°	b	a
July 29, 1960	40.1 N	142.3 E	50	N 25 E	N 115 E	69°	.000	+1.000	N 40 E	N 50 W	21°	.000	+.999	N 27 E	5°	b	a

EARTHQUAKE				PLANE A					PLANE B					NULL VECTOR			
Date	φ	λ	Focal Depth (km)	Strike Direction	Dip Direction	Dip	Strike Component	Dip Component	Strike Direction	Dip Direction	Dip	Strike Component	Dip Component	Trend	Plunge	DEXTRAL Solution	SINISTRAL Solution
October 7, 1960	7.4 S	130.7 E	45	N 58 E	N 148 E	67°	.921	+.389	N 41 W	N 49 E	69°	.908	+.418	N 101 E	58°	b	a
October 22, 1960	10.3 S	161.2 E	93	N 41 E	N 131 E	88°	.882	-.469	N 51 W	N 39 E	62°	.999	-.039	N 45 E	62°	a	b
November 13, 1960	51.1 N	168.8 W	65	Not defined													
December 3, 1960	42.9 N	104.4 E	60	Not defined													
January 5A, 1961	4.1 S	143.0 E	108	N 85 E	N 175 E	67°	.999	+.037	N 5 W	N 85 E	88°	.920	+.390	N 171 E	67°	b	a
January 16, 1961	36.2 N	141.7 E	41	N 45 E	N 135 E	87°	.000	+.999	N 77 E	N 13 W	3°	.000	+.999	N 45 E	2°	b	a
January 20, 1961	56.6 N	152.3 W	46	N 31 E	N 59 W	72°	.939	-.342	N 53 W	N 37 E	71°	.945	-.326	N 9 W	63°	b	a
February 12, 1961	43.9 N	147.6 E	45	N 44 E	N 134 E	74°	.101	+.994	N 62 E	N 28 W	17°	.333	+.942	N 45 E	5°	b	a
February 26, 1961	31.6 N	131.2 E	54	N 30 E	N 120 E	64°	.651	+.758	N 33 W	N 123 W	47°	.800	+.599	N 171 W	36°	a	b
March 28, 1961	0.2 N	123.6 E	83	N 31 E	N 121 E	86°	Not defined										
	Alternative solution			N 81 W	N 171 W	64°	.909	+.416	N 3 W	N 87 E	68°	.881	+.472	N 143 E	55°	b	a
June 1, 1961	10.4 N	39.9 E	33	Not defined					N 24 W	N 114 W	84°						
June 11, 1961	27.9 N	54.6 E	37	N 59 E	N 149 E	58°	.832	+.553	N 51 W	N 39 E	62°	.799	+.600	N 98 E	45°	b	a
	Alternative solution			N 33 W	N 123 W	40°	.404	+.914	N 3 W	N 87 E	65°	.321	+.946	N 166 E	15°	b	a
July 18, 1961	29.4 N	131.6 E	21	N 14 E	N 104 E	36°	.218	-.975	N 31 E	N 59 W	55°	.156	-.987	N 25 E	8°	a	b
August 11, 1961	43.0 N	145.0 E	50	N 2 E	N 92 E	58°	.456	+.889	N 46 E	N 44 W	41°	.589	+.807	N 17 E	23°	b	a
August 19A, 1961	10.8 S	71.0 W	649	N 3 W	N 87 E	51°	.969	-.245	N 84 W	N 174 W	79°	.767	-.641	N 109 E	49°	b	a
	Alternative solution			N 17 E	N 107 E	62°	.929	-.368	N 62 W	N 152 W	71°	.868	-.496	N 147 E	55°	b	a
August 19B, 1961	36.2 N	136.5 E	17	N 9 W	N 81 E	60°	.249	+.968	N 19 E	N 71 W	33°	.396	+.918	N 1 W	13°	b	a
	Alternative solution			N 25 E	N 115 E	31°	.524	+.851	N 12 W	N 102 W	64°	.300	+.953	N 176 E	16°	a	b
August 31A, 1961	10.6 S	70.9 W	626	N 45 E	N 135 E	87°	.906	-.423	N 43 W	N 133 W	65°	.998	-.057	N 141 W	65°	b	a
August 31B, 1961	10.4 S	70.7 W	629	N 59 E	N 149 E	84°	Not defined										
September 1, 1961	59.5 S	27.3 W	131	Not defined													
February 14, 1962	38.1 S	73.1 W	44	N 47 E	N 43 W	38°	.880	+.474	N 20 W	N 70 E	73°	.566	+.824	N 9 W	33°	a	b
	Alternative solution			N 30 E	N 60 W	83°	.997	+.070	N 60 W	N 30 E	86°	.992	+.122	N 27 W	82°	a	b
March 7, 1962	19.3 S	145.3 E	680	N 52 W	N 142 W	54°	.226	-.974	N 33 W	N 57 E	38°	.297	-.954	N 135 E	9°	a	b
April 12, 1962	38.2 N	142.3 E	68	N 49 E	N 139 E	87°	.090	+.995	N 10 W	N 100 W	6°	.865	+.500	N 131 W	5°	a	b
April 23, 1962	42.9 N	143.4 E	25	N 64 E	N 154 E	77°	.404	+.914	N 2 E	N 88 W	27°	.868	+.495	N 121 W	23°	a	b
	Alternative solution			N 88 E	N 2 W	85°	.280	-.959	N 18 W	N 108 W	17°	.954	-.298	N 91 W	17°	a	b
May 7, 1962	45.3 N	146.7 E	25	N 58 E	N 148 E	55°	.713	+.700	N 3 W	N 93 W	55°	.713	+.700	N 152 W	36°	a	b
May 11, 1962	17.0 N	99.7 W	25	N 49 E	N 139 E	26°	.987	-.159	N 50 W	N 40 E	86°	.433	-.900	N 128 E	26°	a	b
May 21, 1962	37.3 N	96.0 E	25	Not defined													
July 6, 1962	36.6 N	70.4 E	203	N 82 E	N 8 W	15°	.000	+1.000	N 87 W	N 177 W	75°	.000	+.999	N 87 W	3°	-	-
July 26, 1962	7.5 N	82.7 W	21	N 8 W	N 98 W	83°	Not defined										
July 30A, 1962	3.3 S	143.9 E	25	Not defined													
July 30B, 1962	5.0 N	76.3 W	45	N 20 E	N 110 E	90°	.970	+.241	N 70 W	N 20 E	76°	.999	+.017	N 21 E	76°	b	a

EARTHQUAKE				PLANE A					PLANE B					NULL VECTOR			
Date	ϕ	λ	Focal Depth (km)	Strike Direction	Dip Direction	Dip	Strike Component	Dip Component	Strike Direction	Dip Direction	Dip	Strike Component	Dip Component	Trend	Plunge	DEXTRAL Solution	SINISTRAL Solution
August 3, 1962	23.2 S	67.5 W	71	← Not defined →													
August 28, 1962	38.0 N	23.1 E	120	N 65 E	N 25 W	40°	.531	+.847	N 76 W	N 166 W	57°	.407	+.913	N 89 W	20°	b	a
September 1, 1962	35.6 N	50.0 E	21	N 43 W	N 133 W	53°	.366	+.930	N 10 W	N 80 E	42°	.437	+.899	N 150 E	17°	b	a
September 18, 1962	7.5 N	82.3 W	33	N 9 E	N 99 E	83°	.996	-.087	N 81 W	N 9 E	85°	.992	-.122	N 63 E	81°	a	b
December 7, 1962	29.2 N	139.2 E	411	N 70 E	N 160 E	28°	.993	+.111	N 16 W	N 106 W	87°	.467	+.884	N 166 E	28°	a	b
December 8, 1962	25.8 S	63.2 W	543	N 59 E	N 31 W	21°	.980	+.194	N 21 W	N 69 E	86°	.352	+.935	N 20 W	21°	a	b

CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS
Dominion Observatories

PUBLICATIONS

of the

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RECORD OF OBSERVATIONS AT VICTORIA MAGNETIC OBSERVATORY 1961-1962

D. R. Auld and M. J. Moseley

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VICTORIA MAGNETIC OBSERVATORY, 1961-1962

Geographic Latitude 48° 31′ North

Geographic Longitude 123° 25′ West

Geomagnetic Latitude 54.3° North

Geomagnetic Longitude 292.7° East

Officer-in-Charge: B. Caner

Assistant: D. R. Auld

Introduction

The Victoria Magnetic Observatory was established in 1957, on the grounds of the Dominion Astrophysical Observatory, Royal Oak, about 10 miles north of Victoria, British Columbia. Information on the site can be found in the publication containing the record of observations for the period 1957–1958 (Caner and Loomer, 1961).

The Magnetic Equipment

A permanent building for the absolute instruments was completed in September 1961, located about 100 feet north of the variometer and control buildings. The building consists of a single room, 10 feet by 18 feet: construction is completely non-magnetic. The entire building rests on a solid concrete slab floor, permitting maximum flexibility in location of instruments. A proton precession magnetometer built at the Dominion Observatory, Ottawa, was installed at the same time.

The remaining observatory equipment was unchanged from that described in the preceding publications (Caner and Loomer, 1961; Caner and Perry-Whittingham, 1962; Caner, Auld and Kissinger, 1963).

The adopted scale values for the Ruska magnetograms are as follows:

D:	0.93′/mm, or 5.09 ± 0.01γ/mm	
H:	Jan. 1, 1961 to May 8, 1961,	2.39 ± 0.02γ/mm
	May 9, 1961 to Nov. 21, 1961,	2.33 ± 0.02γ/mm
	Nov. 22, 1961 to Dec. 31, 1962,	2.37 ± 0.02γ/mm
Z:	Jan. 1, 1961 to Mar. 6, 1961,	3.76 ± 0.02γ/mm
	Mar. 7, 1961 to May 8, 1961,	Indeterminate
	May 9, 1961 to Aug. 8, 1961,	3.81 ± 0.02γ/mm
	Aug. 9, 1961 to Nov. 21, 1961,	3.67 ± 0.02γ/mm
	Nov. 22, 1961 to Dec. 31, 1961,	3.82 ± 0.02γ/mm
	Jan. 1, 1962 to Sep. 20, 1962,	3.84 ± 0.02γ/mm
	Sep. 21, 1962 to Oct. 24, 1962,	4.10 ± 0.03γ/mm
	Oct. 25, 1962 to Dec. 31, 1962,	4.35 ± 0.07γ/mm

Absolute Observations and Base-Line Values

The procedures used up to September 11, 1961 were essentially those described by Caner and Loomer, 1961.

After September 11, 1961, the proton precession magnetometer was used as the primary intensity standard of the observatory. The constant used to convert precession frequency to field intensity is 4257.60 cps per oersted, based on the internationally adopted provisional value of the gyromagnetic ratio for protons in water. The total force is measured with the precession magnetometer, and the inclination with the three-component saturable core magnetometer. The horizontal and vertical components are then computed from these measured values. The vertical component base-line control was significantly improved to about ± 2γ.

Declination

No discontinuities occurred during 1961. During 1962, discontinuities occurred on July 20 and September 20 (equipment shifts in both cases). The adopted declination baseline was obtained by least-squares fitting of straight lines to the observed values, using the reciprocals of the standard errors of the observations as weighting factors. The r.m.s. value of the observed minus adopted base-line values for the 1961–1962 period is ± 0.6′.

Horizontal Intensity

During 1961, discontinuties occurred on March 28 (equipment shift), May 8 (suspension adjustment), July 14 (suspension adjustment), and August 29 (mirror adjustment). During 1962, discontinuities occurred on January 23, May 6, July 26 (equipment shifts in all cases). Between discontinuities straight lines were fitted by least-square calculations to the observed values, using the reciprocals of the standard errors of the observations as weighting factors. Base-line drift was found to be low, about 3γ per month during the summer and less than 1γ per month during the rest of the year. The r.m.s. value of the observed minus adopted base-line values is ± 6γ up to September 11, 1961, and ± 4γ from September 11 to December 1962.

Vertical Intensity

As a result of rock blasting due to the construction of an access road to the Observatory, the vertical intensity baseline for the period March 7 to May 8, 1961 is indeterminate. During 1961, a discontinuity occurred on August 8 (equipment shift). During 1962, discontinuities

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occurred on July 26 and October 24 (equipment shift in both cases). Base-line drift was generally low, of the order of 1 to 3γ per month. The r.m.s. value of the observed minus adopted base-line values is $\pm$ 14γ up to September 11, 1961, and $\pm$ 2γ from September 11, 1961 to December 31, 1962.

Magnetic Reductions, Magnetic Activity and Disturbance Indices

The 1961 data has been processed by the routine methods previously described by Caner and Loomer, 1961. The 1962 data was processed on the semi-automatic magnetogram reader (Caner and Whitham, 1962). The 1962 tables in the present publication were obtained by direct photo-offset reproduction of the magnetogram reader output sheets.

The comparative accuracy of the two methods will be discussed in full detail in the publication describing the magnetogram reader (under preparation). Briefly summarized, the machine-processed data is slightly less *accurate* than the manually processed data, but more *reliable*. Up to about 2% of the machine-processed values can be in error by $\pm 2\gamma$ to $\pm 3\gamma$, whereas most manually processed values are usually $\pm 1\gamma$. On the other hand, the reliability of manually-processed data is highly variable, depending on operator performance in four separate processes (scaling, multiplication, addition, typing). By contrast, the single-step process and built-in double-checks of the machine-processed data ensure a high degree of reliability. Typically, up to 15 large (over 10γ) errors were found in one year's manually processed data, one as high as 100γ, in spite of the routine application of the usual cross-checking procedures. No large errors have been found in the machine-processed data. Since the inaccuracies in hourly mean value are randomly distributed, the daily mean values as well as the monthly means for each hour are accurate to within the resolution afforded by the rounding-off, i.e. $\pm$ 0.5γ or $\pm$ 0.05′.

In the present publication, summary mean value tables replace the Diurnal Inequality tables which were contained in previous publications. Definition of the seasons remains unchanged (Caner and Loomer, 1961). Underlined values in any of the tables have been obtained by interpolation from low-sensitivity records, with an accuracy of about 5γ.

Summary of Annual Mean Values

The mean values listed have been corrected to the new (post-1961) absolute standards.

Year	D ° ′	H γ	Z γ
1956.6	23 00.2	18689	53427
1957.75	22 57.1	18705	53408
1958.5	22 55.2	18713	53396
1959.5	22 52.8	18736	53377
1960.5	22 50.3	18748	53362
1961.5	22 47.8	18787	53322
1962.5	22 44.4	18804	53288

Declination continued to decrease at 2.5′ per year from 1960 to 1961, but decreased by 3.4′ between 1961 and 1962. The mean rate of decrease over the whole seven-year period is 2.6′ per year. The rate of increase in horizontal intensity continues the irregular trend shown in previous years—39γ from 1960 to 1961, 17γ from 1961 to 1962. The mean rate of decrease in vertical intensity showed a drastic change: 40γ from 1960 to 1961 and 34γ from 1961 to 1962, compared with a mean rate of decrease of only 17γ per year from 1956 to 1960. The mean rate of decrease over the entire seven-year period is 23γ per year.

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HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 1 Victoria 18,500 γ + January 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	250	256	257	254	251	247	246	255	260	260	261	268	268	270	271	271	268	265	262	265	265	263	259	263	261
2 Q	267	268	269	270	270	269	268	263	261	264	271	274	272	273	273	274	274	269	268	266	267	264	262	261	268
3	266	267	263	265	266	267	262	269	263	265	269	273	275	276	274	274	267	269	269	262	259	263	264	267	267
4 Q	272	274	275	275	271	265	266	268	269	269	270	271	273	276	277	279	274	269	265	261	263	265	272	273	271
5 Q	277	282	283	282	271	280	278	277	274	274	277	281	285	282	281	284	280	270	259	254	251	260	269	272	274
6	269	281	278	271	274	273	268	266	269	267	270	283	280	277	289	289	297	279	273	261	264	266	269	276	275
7	286	284	274	273	277	275	270	269	271	272	273	276	281	283	287	291	286	272	261	254	253	267	271	272	274
8 D	251	260	266	248	249	253	249	252	254	243	255	250	270	273	279	283	284	247	239	255	249	250	249	252	257
9 D	255	255	256	243	245	249	243	226	205	217	210	255	244	284	280	273	266	250	237	242	239	234	247	245	246
10	256	260	261	260	262	261	260	256	253	255	255	265	268	270	275	277	271	268	259	255	253	253	258	263	261
11 Q	268	269	270	270	269	262	264	265	264	264	267	270	270	273	274	273	272	265	256	251	254	261	268	273	266
12	278	279	278	276	280	280	276	273	274	276	279	279	279	285	283	282	274	268	260	258	257	272	272	274	275
13	277	281	283	284	283	279	278	275	275	254	259	264	274	269	274	277	275	273	266	266	265	276	280	284	274
14	285	280	280	278	271	273	271	272	271	271	274	276	275	276	276	275	270	263	262	261	264	262	268	274	272
15	277	272	276	276	279	276	280	276	268	277	274	277	281	281	283	280	277	268	264	261	263	263	217	240	270
16	275	280	275	259	240	224	235	244	247	257	264	269	270	271	272	273	272	271	268	268	277	279	274	279	264
17	275	274	264	268	271	264	261	263	261	265	267	270	272	270	269	281	280	274	270	264	264	269	276	277	270
18	276	278	285	284	280	280	277	281	274	255	263	274	279	286	275	278	280	270	256	242	249	261	268	270	272
19 D	277	281	266	269	273	273	270	268	267	270	272	287	279	278	266	249	242	228	238	200	194	218	203	204	253
20 D	210	238	235	245	228	230	243	243	238	239	217	247	251	262	268	236	244	243	238	245	252	259	265	268	244
21	266	265	261	253	233	251	244	279	256	247	230	253	253	265	271	259	257	265	255	247	248	254	259	266	256
22 D	267	265	266	268	270	268	244	273	246	256	254	243	267	263	272	277	250	265	261	252	248	261	266	270	261
23	265	260	261	258	250	264	264	264	272	265	264	265	268	269	270	275	273	269	260	254	257	264	273	279	265
24	277	276	278	270	266	253	241	273	267	275	273	267	269	281	280	282	280	266	230	245	249	257	265	265	266
25	249	261	270	268	245	262	270	267	273	274	258	267	265	261	279	277	275	263	253	255	256	261	269	274	265
26	277	277	277	277	273	264	266	273	271	273	283	275	260	274	289	278	276	263	249	247	251	250	259	267	269
27	267	264	272	274	272	270	266	270	287	268	269	271	275	277	276	285	286	279	271	270	270	270	274	279	273
28	264	261	265	270	274	270	267	268	266	263	274	275	273	270	284	284	266	272	248	240	248	255	263	263	266
29	270	264	263	260	271	268	265	266	268	271	272	279	277	275	272	267	264	265	253	252	253	253	253	256	265
30	268	274	273	268	263	271	273	272	275	277	278	282	283	283	284	285	283	277	270	262	252	255	263	267	272
31 Q	285	284	276	275	278	281	277	275	277	279	279	283	285	285	284	285	285	278	271	261	263	266	269	277	277
Mean	268	270	270	268	265	265	263	266	264	263	264	270	272	275	277	276	273	266	258	254	255	260	262	266	266

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 2 Victoria 22° 30.0' + January 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	18.3	20.5	19.7	19.4	19.6	21.4	21.6	18.8	19.6	19.6	20.0	20.7	19.7	19.5	19.6	19.6	20.5	20.7	20.5	20.1	19.7	19.6	19.4	18.6	19.9
2 Q	18.6	18.7	18.7	18.9	19.1	18.6	18.4	18.1	17.7	19.5	16.3	19.4	20.6	19.6	19.3	20.1	20.6	20.6	19.6	19.5	18.7	18.7	18.6	19.0	19.0
3	18.6	18.5	18.6	18.8	19.6	18.6	18.6	19.6	19.0	18.7	18.6	18.5	18.5	18.5	18.6	19.2	20.6	19.7	19.7	18.6	18.5	17.6	17.6	17.7	18.8
4 Q	17.8	18.5	18.6	19.0	19.1	19.0	17.7	17.7	17.7	18.4	18.5	19.3	19.6	20.5	20.4	20.8	21.6	21.9	21.3	20.1	18.6	18.5	18.1	18.6	19.2
5 Q	17.9	18.4	18.6	18.7	18.7	18.6	18.2	17.7	17.9	19.6	18.6	17.9	18.6	19.7	19.6	20.5	20.9	21.8	22.7	21.6	18.6	15.7	16.4	17.5	18.9
6	18.7	18.7	19.1	19.6	18.9	18.5	17.3	18.3	18.7	20.6	18.1	21.1	23.1	20.6	20.3	20.5	21.2	21.6	15.1	14.6	14.6	14.6	14.1	14.5	18.4
7	16.9	17.4	17.5	15.7	19.6	19.2	18.6	18.6	18.0	18.4	18.6	18.6	18.6	19.8	19.7	21.6	21.3	21.6	21.2	19.9	18.6	16.6	16.5	16.5	18.7
8 D	15.3	16.7	13.8	15.8	21.4	20.6	19.7	20.0	11.7	22.8	24.1	23.6	23.0	23.7	22.6	21.7	20.6	18.6	14.6	14.7	18.2	18.6	19.5	19.8	19.2
9 D	19.4	19.6	19.6	26.5	23.1	22.2	23.6	23.7	34.0	24.6	11.6	25.5	18.5	21.6	23.1	17.6	16.6	14.7	11.3	11.6	14.6	14.0	14.7	16.6	19.5
10	19.5	19.6	20.1	20.6	19.7	19.6	19.6	19.6	21.2	20.1	21.1	20.6	19.6	20.2	21.6	21.4	20.7	22.6	22.1	20.9	19.5	18.6	18.2	18.4	20.2
11 Q	18.7	18.6	18.7	19.2	19.1	19.6	18.6	18.6	18.8	18.6	18.3	18.4	18.5	18.6	19.3	19.7	21.2	21.6	21.1	20.1	18.6	17.6	17.5	17.6	19.0
12	17.6	18.4	18.7	18.8	18.6	18.6	18.6	18.5	19.6	17.8	18.3	18.6	18.6	19.2	19.6	20.4	21.6	21.6	20.6	19.6	18.1	16.8	16.1	16.6	18.8
13	17.0	17.5	18.4	18.6	18.6	18.6	18.7	18.8	20.5	23.5	22.6	22.6	28.6	25.6	23.1	22.6	20.9	20.6	20.1	17.6	15.6	14.6	14.7	16.5	19.8
14	16.4	16.6	17.6	18.6	19.6	19.6	18.8	18.4	17.8	18.4	18.6	18.6	18.6	18.6	18.8	19.6	21.1	21.2	20.6	18.9	16.6	16.4	14.8	14.6	18.3
15	15.5	15.6	17.6	17.5	17.9	18.7	19.6	20.4	20.1	18.6	19.4	19.7	19.6	19.1	19.4	20.4	20.6	20.5	19.7	18.6	16.6	15.9	13.0	13.6	18.2
16	16.5	17.0	18.4	19.7	20.0	22.1	23.6	21.4	18.8	18.1	18.4	20.1	19.5	19.5	19.4	19.4	19.7	20.1	19.0	18.6	17.4	16.6	18.3	18.6	19.2
17	18.9	19.7	20.6	19.6	18.6	18.7	19.1	20.7	19.6	18.6	14.2	15.6	19.1	15.7	18.6	20.2	20.6	20.6	19.6	18.7	16.6	16.5	16.6	18.0	18.5
18	17.9	18.6	18.6	18.7	19.1	18.6	18.6	18.4	19.5	27.4	21.0	20.6	15.6	17.1	23.8	22.6	23.6	21.6	20.6	17.7	14.8	15.6	17.6	18.4	19.4
19 D	18.4	18.6	18.6	19.7	19.6	19.4	18.6	18.1	17.7	17.6	17.6	17.0	17.6	18.7	18.5	13.4	4.7	9.6	11.4	14.8	11.6	11.5	10.3	16.1	15.8
20 D	18.4	17.1	22.6	24.8	23.6	23.8	19.0	12.6	15.6	18.7	19.7	14.6	13.7	10.1	8.4	5.1	9.6	14.9	21.1	19.1	16.6	16.1	17.5	18.6	16.7
21	19.3	19.4	19.6	20.6	27.8	20.6	20.8	24.7	20.4	24.0	20.6	16.5	23.6	20.6	22.1	16.1	11.6	15.6	18.3	17.8	16.6	16.7	17.6	18.6	19.6
22 D	19.0	19.1	19.6	19.6	19.6	19.4	21.6	23.1	21.6	16.6	17.1	10.3	24.5	22.6	21.6	21.1	17.6	20.1	19.6	19.6	17.6	15.7	15.7	17.6	19.2
23	18.2	18.8	20.6	22.1	21.1	20.1	20.1	19.8	18.6	19.0	18.6	18.6	18.5	17.8	18.6	20.2	22.3	22.6	21.6	19.7	17.6	15.6	15.5	16.4	19.3
24	17.0	16.9	18.6	19.6	23.6	20.6	26.7	20.6	20.1	18.5	19.5	13.6	12.5	17.2	18.5	19.6	21.1	20.7	22.3	18.6	18.4	16.6	16.6	16.0	18.9
25	18.1	17.8	19.1	18.6	25.2	20.3	19.6	19.6	19.6	18.6	16.7	17.8	16.6	13.6	20.5	22.7	22.6	22.6	22.6	20.5	18.6	17.7	17.6	17.8	19.4
26	17.9	18.6	18.6	19.1	19.6	19.9	21.4	19.6	19.6	17.6	16.6	21.1	14.4	16.1	19.6	20.6	21.0	21.7	19.6	18.6	16.6	15.7	15.6	16.0	18.5
27	17.9	18.4	18.7	18.6	18.6	18.7	19.4	19.5	16.6	20.7	18.6	19.6	18.6	17.6	16.6	19.7	21.0	21.6	20.6	19.7	18.6	17.6	17.6	17.6	18.8
28	17.6	18.6	18.5	18.6	18.8	19.1	18.8	19.8	20.6	19.1	19.2	20.6	19.6	17.6	16.3	19.5	19.6	19.0	18.4	17.1	15.1	14.7	16.6	17.1	18.3
29	17.9	16.7	19.2	20.6	20.1	19.6	18.6	19.6	18.7	18.6	19.6	18.8	21.4	20.6	18.6	18.7	20.6	21.4	19.7	18.6	18.6	17.7	17.8	17.1	19.2
30	17.9	18.5	18.6	19.3	21.5	18.5	18.6	18.7	19.0	18.6	18.4	18.6	18.6	18.4	18.6	19.1	20.7	21.6	22.5	22.6	21.4	17.5	15.7	16.3	19.1
31 Q	17.4	18.2	19.5	18.7	18.1	18.2	17.9	18.4	18.4	18.7	19.1	18.6	18.6	18.7	18.9	19.6	21.4	22.5	21.6	20.6	18.7	17.6	16.9	16.9	18.9
Mean	17.9	18.2	18.9	19.5	20.2	19.7	19.7	19.4	19.3	19.7	18.6	18.9	19.2	18.9	19.5	19.5	19.6	20.2	19.6	18.7	17.4	16.6	16.5	17.2	18.9

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 3 Victoria 53,000 γ + January 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	361	368	365	364	363	365	366	366	362	359	356	353	355	356	355	358	362	361	360	361	357	356	356	356	360
2 Q	354	353	354	354	354	354	354	353	354	354	348	344	348	351	352	354	354	353	356	358	353	352	351	350	353
3	351	350	350	352	353	354	353	351	344	350	352	351	352	351	352	354	356	354	354	351	348	348	350	350	351
4 Q	350	350	350	351	351	351	352	353	354	354	352	351	350	350	350	351	352	355	357	356	350	347	348	347	351
5 Q	347	346	346	346	346	346	347	347	347	348	348	347	344	343	344	347	350	352	353	352	348	348	346	348	347
6	344	346	348	347	348	350	351	354	352	353	350	330	346	352	352	352	354	356	358	356	354	354	352	353	351
7	352	350	349	353	355	354	355	354	352	350	350	349	346	339	337	337	339	345	345	346	345	348	349	350	348
8 D	349	356	367	381	387	376	377	373	352	339	357	355	350	346	345	346	350	340	345	342	346	351	353	356	356
9 D	356	356	359	367	365	365	360	344	331	324	287	276	280	276	291	298	300	302	314	321	333	344	356	361	328
10	363	360	359	356	353	352	352	352	353	341	343	348	348	344	349	351	351	354	356	358	356	354	353	353	353
11 Q	351	351	352	352	350	350	349	349	348	348	348	348	349	349	350	351	351	349	349	348	346	345	346	347	349
12	348	349	348	347	347	345	344	343	344	344	346	346	344	345	346	348	348	350	348	344	341	340	343	345	346
13	349	350	350	351	351	351	351	350	348	349	351	350	332	338	349	352	350	347	348	346	343	345	346	348	348
14	347	347	350	351	353	353	351	346	347	348	348	348	348	348	349	351	351	349	346	347	345	345	345	347	348
15	349	350	357	355	355	355	356	348	350	354	349	346	338	335	340	345	347	348	347	347	345	342	341	357	348
16	358	351	350	351	352	362	366	368	355	347	351	351	351	351	352	353	354	355	355	354	351	349	348	346	353
17	346	344	346	350	349	348	349	343	348	348	343	331	335	338	337	343	347	349	351	350	347	350	352	350	346
18	346	346	345	345	345	345	344	345	343	339	343	347	325	281	295	332	338	335	336	342	347	350	352	349	338
19 D	346	345	346	347	347	345	345	345	346	345	345	344	344	343	339	331	314	309	319	323	335	350	371	373	342
20 D	395	401	405	390	377	378	362	313	299	305	287	290	310	280	270	265	278	304	332	350	350	355	358	357	334
21	354	351	350	350	354	353	356	348	323	323	317	301	294	341	350	340	321	326	336	338	338	347	352	353	338
22 D	351	350	349	348	347	346	348	325	340	344	342	289	305	343	352	352	345	352	348	346	348	353	356	357	343
23	356	352	354	357	356	354	351	350	346	340	344	346	347	347	348	350	353	350	344	339	336	340	346	348	348
24	350	349	350	349	351	349	352	327	338	345	344	330	312	309	328	334	338	333	338	348	340	342	345	349	340
25	347	351	354	355	355	360	356	352	349	336	330	303	308	301	326	341	345	342	342	347	347	347	347	347	341
26	347	348	347	347	346	346	346	346	343	343	331	330	319	305	320	330	338	339	340	341	341	341	344	348	339
27	349	349	351	348	348	347	347	349	334	336	337	340	344	342	340	344	344	344	342	340	336	333	336	340	343
28	340	343	347	347	347	347	347	347	345	344	343	337	337	332	334	338	343	346	343	346	345	344	347	348	343
29	349	350	349	352	354	349	348	349	346	346	342	337	333	337	340	347	348	347	343	341	340	339	342	344	345
30	347	346	346	347	351	351	349	348	345	344	344	343	342	342	342	345	347	347	348	346	339	333	333	338	344
31 Q	339	340	341	343	342	342	342	342	342	340	340	340	338	338	339	342	343	339	336	338	336	338	338	342	340
Mean	351	352	353	353	353	353	353	348	345	343	341	336	335	334	338	341	342	343	345	346	345	346	349	350	346

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 4 Victoria — 18,500 γ + — February 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	284	286	287	285	285	280	280	280	279	280	283	284	284	284	285	285	286	282	284	283	277	271	275	286	282
2 Q	285	286	285	284	282	281	280	281	282	282	282	284	284	285	288	287	284	275	268	265	265	265	267	274	279
3	280	286	285	287	287	285	283	279	275	269	267	275	284	274	295	293	287	281	278	270	267	271	283	291	281
4 D	291	286	287	287	281	277	274	268	266	265	266	271	279	282	283	298	280	232	186	142	164	173	199	227	253
5	196	200	210	202	165	182	217	212	190	177	215	221	219	242	242	244	238	232	227	218	220	229	237	245	216
6	252	265	269	267	266	267	266	254	240	245	262	257	263	270	256	240	272	271	255	240	232	230	234	246	255
7	249	251	249	254	256	248	255	262	259	256	262	259	255	258	266	271	267	263	258	247	237	240	250	251	255
8	260	258	249	257	259	261	262	263	265	265	262	262	263	267	272	274	278	269	256	232	244	239	242	252	259
9	260	262	258	268	271	266	264	269	268	269	270	271	276	273	269	270	277	276	272	264	257	253	253	255	266
10	263	269	271	272	274	274	274	272	265	271	274	275	276	277	276	276	280	283	280	276	271	268	270	272	273
11	279	284	275	275	283	285	280	277	278	277	275	276	278	285	284	281	281	278	272	268	262	261	264	271	276
12 Q	272	271	270	270	269	270	272	273	274	265	268	279	280	281	281	279	278	281	280	272	265	264	262	266	273
13	273	279	283	284	277	275	276	276	279	257	238	225	225	253	258	232	234	258	254	241	237	244	248	261	257
14	264	268	269	271	269	271	270	271	271	270	270	272	276	276	275	276	276	274	272	265	254	260	257	255	269
15	262	272	273	272	271	266	269	272	272	272	269	263	272	277	276	276	275	267	266	247	244	249	257	266	267
16 D	274	262	264	274	274	273	273	256	291	231	215	242	235	240	279	275	256	248	248	241	231	243	245	264	256
17 D	267	268	269	269	268	263	265	266	268	278	266	264	273	289	295	278	279	275	273	252	244	240	212	225	264
18 D	227	195	217	221	211	215	233	236	243	261	226	241	243	231	268	270	263	237	229	244	240	240	245	258	237
19	253	264	268	268	269	264	250	257	266	279	269	269	268	275	282	274	256	261	244	237	242	249	258	264	262
20 D	267	262	266	252	261	265	280	268	278	270	265	258	246	261	283	268	253	262	252	230	234	236	242	252	259
21	266	266	263	264	265	264	264	274	276	267	273	271	263	262	268	281	266	248	242	227	223	221	232	251	258
22	265	270	265	255	267	270	267	286	267	265	263	267	273	273	268	257	264	265	264	253	251	248	254	248	264
23	264	274	280	276	271	265	265	265	267	276	276	278	279	281	284	281	277	273	261	252	242	254	263	267	270
24	270	274	276	278	265	242	253	275	284	274	275	277	278	279	279	277	275	268	261	255	253	253	258	267	269
25 Q	271	275	279	277	278	274	276	276	272	276	276	278	281	282	282	281	278	272	265	257	252	252	258	267	272
26 Q	266	275	274	276	278	280	278	279	280	283	284	286	287	288	288	286	284	281	274	272	265	266	268	272	278
27	282	284	284	277	271	270	285	283	284	286	283	283	285	293	288	287	286	276	266	260	263	268	273	279	279
28	284	278	279	277	270	275	274	277	273	265	269	269	276	279	284	279	273	269	249	235	237	249	259	272	269
29																									
30																									
31																									
Mean	265	267	268	268	266	265	267	268	268	265	264	266	268	272	277	274	272	266	258	248	246	248	252	261	264

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 5 Victoria 22° 30.0' + February 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	17.3	17.8	17.7	18.4	18.6	18.2	18.6	18.5	18.5	18.6	18.6	18.6	18.6	18.1	18.0	18.6	19.6	19.6	18.6	18.7	18.1	16.8	16.4	16.6	18.2
2 Q	17.7	18.6	18.7	18.9	18.9	18.6	18.6	18.1	17.7	17.8	18.4	18.6	18.6	18.6	18.6	19.6	20.7	21.8	21.7	20.8	19.3	17.2	17.1	17.4	18.8
3	17.4	17.7	18.5	18.1	18.2	18.0	17.7	18.6	18.2	19.1	22.8	24.1	24.6	18.8	17.6	21.7	23.1	20.7	20.6	18.6	17.4	15.7	14.7	15.7	19.1
4 D	17.0	17.7	18.2	18.1	18.2	17.1	19.5	17.4	16.1	18.7	20.2	20.6	21.9	23.6	14.6	24.6	21.6	22.6	18.1	21.6	20.1	13.6	13.8	6.6	18.4
5	13.9	18.1	21.1	19.6	26.9	30.1	22.7	24.1	26.7	28.4	27.9	24.1	18.6	17.5	16.6	20.4	22.6	23.2	21.6	20.5	18.6	17.1	16.8	17.6	21.5
6	18.6	18.4	18.1	18.7	19.4	19.2	18.4	19.6	17.4	21.1	20.5	21.6	19.6	20.5	17.6	9.1	18.7	22.6	21.1	19.6	17.6	15.6	14.6	17.4	18.5
7	16.7	15.8	16.4	17.6	18.1	20.2	19.4	19.6	19.4	19.0	19.4	23.8	23.6	21.4	19.6	19.6	22.5	22.4	21.8	20.8	19.6	16.1	13.8	12.9	19.2
8	14.9	13.7	16.3	18.6	18.9	19.0	19.4	19.1	19.6	19.6	19.6	19.4	19.6	17.7	18.7	18.8	21.6	23.1	23.0	20.8	18.6	17.5	15.6	14.6	18.7
9	15.2	15.6	15.7	16.6	18.1	18.1	17.6	17.7	18.5	18.5	18.1	18.5	18.6	18.9	19.4	17.6	19.4	19.8	19.6	18.8	18.2	17.6	16.7	16.5	17.9
10	15.7	15.9	16.5	17.4	18.0	18.5	18.6	17.8	18.9	20.6	18.7	18.5	18.1	18.1	18.6	18.9	19.6	21.1	21.1	19.6	17.6	16.6	16.5	15.3	18.2
11	15.0	15.4	15.4	17.6	18.6	18.7	18.6	18.4	17.7	18.1	16.6	22.1	23.1	20.5	18.8	18.9	19.6	19.7	19.5	19.1	18.6	17.1	17.6	17.7	18.4
12 Q	17.9	17.9	18.6	18.5	18.6	18.6	18.4	17.8	17.9	18.1	18.5	18.3	18.2	17.7	17.9	18.6	18.5	18.6	19.5	19.6	19.6	18.7	18.1	17.6	18.4
13	17.1	16.9	17.6	17.6	18.3	17.6	17.8	17.9	19.8	17.7	22.6	36.8	31.6	17.6	20.4	15.6	10.6	12.7	17.3	18.6	19.5	18.6	18.6	18.0	19.0
14	18.4	18.1	18.0	17.7	18.2	17.9	17.7	17.7	18.1	18.1	18.2	18.5	18.8	19.0	19.1	19.1	20.6	21.6	20.1	18.9	17.6	16.6	17.6	18.6	18.5
15	18.2	18.6	19.1	18.6	18.6	18.7	19.6	17.1	17.6	17.6	19.5	15.6	16.1	19.8	19.6	19.0	19.6	20.1	19.9	19.2	17.6	17.6	17.0	17.6	18.4
16 D	18.1	20.6	18.5	17.9	17.7	18.6	18.0	23.1	26.7	27.6	20.1	20.6	14.4	7.0	15.4	24.7	21.6	19.6	19.1	18.6	17.1	17.2	17.1	17.6	19.0
17 D	18.6	18.7	19.0	18.9	18.7	18.6	18.6	17.8	18.3	16.4	18.1	32.6	19.2	24.1	21.9	19.6	18.6	18.1	14.8	15.6	15.6	14.6	13.1	11.6	18.4
18 D	18.4	19.6	20.1	20.1	25.7	26.6	31.1	21.6	21.6	19.1	12.8	15.6	19.8	8.1	17.5	19.2	21.6	20.5	19.8	18.6	18.5	17.8	17.7	17.6	19.5
19	17.1	17.6	18.6	18.6	18.7	19.2	22.7	23.3	14.6	16.6	16.7	17.5	11.9	20.6	19.8	19.8	21.1	21.6	19.6	18.6	16.6	15.3	15.4	15.6	18.2
20 D	16.6	16.6	19.6	20.6	20.9	20.8	21.6	19.5	20.1	10.6	20.4	16.4	14.6	14.7	17.7	15.6	20.6	20.6	20.6	18.7	17.6	16.6	15.7	16.9	18.1
21	17.6	18.4	19.6	23.1	21.6	19.6	20.1	18.1	17.6	18.7	13.8	15.7	15.6	13.6	16.4	18.5	20.5	20.6	20.3	18.7	15.6	15.1	14.8	16.6	17.9
22	17.6	17.7	18.6	23.1	19.6	18.8	20.6	18.6	19.7	16.9	13.6	14.8	16.9	18.5	16.6	15.8	17.6	17.8	19.6	18.6	17.0	16.1	15.9	18.1	17.8
23	16.8	16.8	17.6	18.5	18.6	20.2	26.6	20.6	19.4	17.1	16.6	17.4	16.1	16.6	17.6	19.6	21.1	21.6	20.7	19.1	17.6	15.8	14.6	15.6	18.4
24	16.4	17.3	17.6	18.1	18.6	27.6	21.4	19.6	17.6	17.5	17.6	18.4	18.3	18.5	18.6	19.6	20.6	21.6	21.4	20.1	19.0	18.1	17.6	17.0	19.1
25 Q	16.2	16.7	17.6	18.1	17.7	17.7	17.8	18.0	18.6	18.6	18.5	17.8	18.5	18.6	18.7	19.6	20.6	21.5	20.6	19.5	18.0	16.7	15.6	15.1	18.2
26 Q	15.6	16.1	17.1	18.1	17.7	17.6	17.6	18.1	18.5	18.6	18.1	18.2	18.6	18.6	18.6	19.6	20.7	20.9	20.5	18.6	17.6	16.6	16.6	16.6	18.1
27	15.8	16.6	17.1	17.6	18.5	17.6	18.1	18.6	17.5	17.5	18.7	19.4	16.6	17.7	19.6	21.1	21.9	22.6	20.8	18.6	16.1	14.6	14.6	14.6	18.0
28	14.6	15.1	15.6	14.6	15.6	17.1	18.5	17.1	21.5	19.7	20.6	16.5	16.3	20.6	19.7	22.1	22.9	23.6	20.2	18.4	13.6	12.5	12.6	13.5	17.6
29																									
30																									
31																									
Mean	16.8	17.3	18.0	18.6	19.1	19.6	19.8	19.1	19.1	18.8	18.8	20.0	18.8	18.0	18.3	19.1	20.3	20.7	20.1	19.2	17.8	16.4	15.9	16.0	18.6

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 6 Victoria 53,000 γ + February 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	343	342	342	341	341	341	342	342	342	342	340	340	339	338	337	339	341	343	345	345	342	337	337	340	341
2 Q	340	341	339	339	339	339	339	340	340	339	339	339	338	338	338	339	341	342	342	341	338	339	343	344	340
3	342	341	340	340	339	339	339	340	341	340	331	340	338	323	295	316	329	331	335	338	337	339	341	340	335
4 D	339	336	337	338	338	341	344	345	346	348	347	345	330	334	293	287	297	298	290	303	333	358	391	438	336
5	413	391	384	387	435	428	409	383	355	311	298	333	357	366	361	365	365	362	360	358	357	355	355	356	369
6	359	359	356	353	352	350	349	348	302	297	346	353	354	351	342	315	327	332	333	334	338	342	347	351	341
7	353	355	355	356	359	364	367	363	359	357	354	349	349	351	351	351	352	347	345	344	344	347	348	353	353
8	358	356	356	357	355	353	352	352	350	345	348	350	348	345	343	339	345	346	344	340	345	342	343	345	348
9	349	350	352	355	354	353	353	351	349	348	348	345	342	342	344	344	341	342	342	343	342	339	341	345	346
10	348	349	349	350	350	349	348	347	346	348	348	347	346	346	346	345	344	343	339	338	338	336	335	335	345
11	339	344	345	346	347	345	344	341	340	338	330	310	321	330	336	341	341	341	340	340	341	341	341	342	339
12 Q	341	340	341	342	342	342	343	342	340	340	339	340	339	340	340	342	344	344	342	337	335	334	335	336	340
13	337	338	339	339	339	340	339	338	333	271	254	255	271	262	275	277	294	306	313	335	342	346	347	348	314
14	345	343	344	344	344	344	343	344	344	343	342	341	342	342	342	344	343	341	340	340	344	345	343	342	343
15	343	345	344	344	342	341	344	342	340	336	330	317	323	332	336	340	342	338	336	337	341	342	341	342	338
16 D	342	341	343	344	342	343	340	332	314	305	242	276	272	259	270	314	324	331	337	341	341	345	346	347	321
17 D	347	343	343	343	342	343	344	345	344	338	340	277	283	320	328	329	331	329	326	327	338	341	342	368	334
18 D	370	462	452	401	398	376	360	355	334	297	251	241	273	249	302	330	340	338	349	349	346	346	348	349	342
19	349	348	348	347	347	347	350	349	344	322	320	320	282	299	332	333	336	340	334	334	340	344	347	349	336
20 D	349	350	352	354	360	361	352	338	332	303	300	300	275	288	325	312	324	331	330	333	340	347	347	351	331
21	351	352	350	352	350	347	346	332	326	328	326	314	306	306	322	337	331	336	338	341	341	340	345	351	336
22	352	349	349	349	350	347	346	331	334	339	330	324	326	329	334	329	336	340	339	339	342	342	344	346	339
23	348	347	346	343	343	344	345	345	345	344	343	341	340	337	342	341	345	342	337	333	334	339	342	343	342
24	343	343	343	344	345	354	351	345	340	341	341	342	342	342	343	345	347	343	337	335	337	339	338	338	342
25 Q	341	342	345	343	343	342	342	341	341	339	339	341	342	341	342	343	344	342	335	331	331	334	336	339	340
26 Q	342	342	343	344	343	343	341	341	340	340	338	338	338	339	339	340	341	339	331	329	335	337	337	338	339
27	337	338	340	340	343	347	347	345	341	340	338	337	335	334	335	339	342	338	334	335	341	344	343	341	340
28	339	338	340	344	348	349	349	347	348	345	344	339	315	326	339	344	348	343	334	325	326	332	339	343	339
29																									
30																									
31																									
Mean	349	351	351	349	351	350	349	345	340	332	327	325	324	325	330	333	337	337	336	337	340	342	344	349	340

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 7 Victoria — 18,500 γ + — March 1961

Day	Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		275	277	278	278	266	268	274	279	268	269	281	281	280	284	284	283	278	270	257	248	250	255	261	263	271
2		272	270	270	266	264	264	271	271	279	283	284	286	288	290	290	287	283	279	269	254	254	256	261	265	273
3	Q	275	273	276	278	280	281	280	282	282	283	284	285	288	287	286	285	281	264	265	257	253	258	266	274	276
4	Q	284	289	290	289	286	282	286	288	290	290	291	293	294	291	290	288	284	274	261	251	251	255	263	274	281
5		280	284	284	276	277	284	285	285	284	287	292	290	286	289	294	296	289	282	272	260	238	232	221	234	275
6	D	218	231	242	210	200	197	193	204	212	216	239	246	231	259	279	276	263	251	245	239	238	245	253	263	235
7	Q	265	269	271	271	274	274	273	272	273	273	276	278	280	281	282	283	285	278	266	253	241	245	254	262	270
8	Q	264	268	273	273	274	273	271	270	270	274	275	278	283	285	280	280	274	269	259	251	254	259	250	259	269
9		269	273	271	267	273	276	269	258	271	278	282	278	279	288	287	286	293	285	275	265	273	277	266	286	276
10	D	287	287	290	286	281	265	260	256	248	191	67	129	146	258	260	258	249	249	255	257	257	257	262	264	243
11		264	262	259	256	253	254	258	257	260	257	260	265	265	263	261	267	265	259	254	238	246	250	255	262	258
12		260	249	263	268	269	267	266	266	266	266	274	274	275	273	274	271	262	256	254	250	251	255	267	262	264
13		263	253	258	264	266	267	270	261	273	270	279	288	285	285	279	275	274	272	264	260	258	258	261	269	269
14	D	278	258	244	219	253	258	244	257	259	280	284	266	266	269	273	265	262	229	232	238	247	255	261	266	257
15	D	273	280	280	276	272	281	272	279	280	289	281	259	280	278	246	280	277	271	263	264	266	242	251	270	271
16		260	246	248	267	268	270	255	303	260	268	277	277	281	285	285	276	269	266	258	256	258	264	268	272	268
17		278	278	272	275	278	277	272	245	267	271	279	280	282	282	284	280	277	268	259	249	247	251	261	273	270
18		279	283	277	282	282	284	284	284	283	284	286	288	289	284	279	272	257	259	252	263	261	261	250	266	275
19	D	280	281	285	286	273	238	233	264	278	286	284	283	269	263	279	290	261	231	247	245	274	246	249	252	266
20		249	268	267	277	279	279	272	280	278	287	292	279	279	280	268	275	282	268	254	236	242	253	259	268	270
21		275	272	273	275	275	279	281	282	285	283	291	290	289	289	284	277	272	273	248	235	238	242	250	259	272
22		270	275	261	271	274	280	277	280	269	270	281	273	270	284	283	278	276	268	262	260	257	256	257	268	271
23		279	284	284	283	281	286	293	282	275	281	285	286	284	275	268	293	291	276	267	262	257	261	269	276	278
24		281	281	284	286	284	278	285	286	291	291	291	300	294	293	289	288	283	277	272	267	264	263	265	269	282
25	Q	275	275	283	285	286	285	286	288	292	293	295	293	290	293	295	293	284	277	269	263	259	262	270	275	282
26		284	284	288	293	287	288	291	295	295	296	297	299	299	296	294	293	285	274	263	255	255	266	261	271	284
27		292	295	293	293	294	289	283	284	288	289	298	295	294	292	287	278	228	266	273	246	256	267	263	271	280
28		278	284	291	267	267	269	271	291	272	287	288	288	288	288	285	271	265	266	257	252	247	251	270	274	274
29		285	286	287	285	286	287	287	290	293	296	296	295	292	293	299	299	293	279	261	247	254	270	280	287	285
30		289	285	285	265	259	275	278	274	271	284	284	289	290	292	293	286	276	260	246	245	256	265	274	283	275
31		290	294	295	293	294	294	296	297	298	302	304	306	306	309	307	312	309	305	293	283	277	279	287	297	297
Mean		273	274	275	273	273	273	272	275	275	277	277	278	278	283	282	282	275	268	260	253	254	257	261	269	271

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 8 Victoria 22° 30.0' + March 1961

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	15.8	17.1	18.1	17.7	18.4	18.6	17.9	18.7	17.9	18.6	18.7	20.6	15.5	19.6	20.2	21.0	22.3	23.0	22.5	18.7	15.8	13.9	13.6	14.0	18.3
2	13.6	14.6	15.6	16.5	18.3	23.6	19.5	20.6	18.5	17.5	17.7	18.6	18.6	18.6	19.4	20.1	21.6	22.4	21.6	19.6	17.2	14.8	13.5	12.6	18.1
3 Q	13.8	15.6	16.6	17.6	17.8	17.9	18.0	18.7	18.6	17.6	17.7	18.0	18.6	19.0	19.6	20.6	21.7	23.2	22.0	20.1	17.2	15.6	15.2	15.5	18.2
4 Q	15.4	16.3	16.9	17.5	17.6	17.6	17.5	17.6	17.6	17.6	17.8	18.6	18.6	18.7	18.6	19.1	22.6	23.8	23.1	20.6	17.9	16.6	16.1	15.8	18.3
5	16.3	16.6	16.9	17.6	17.6	17.6	17.6	17.6	17.8	17.4	18.6	18.9	18.9	18.8	19.5	20.6	22.2	21.6	20.6	19.5	18.2	15.6	12.8	11.4	17.9
6 D	15.2	10.6	18.1	19.1	18.6	24.0	29.2	29.8	34.7	32.6	27.6	21.6	9.7	12.6	18.4	21.6	22.8	22.8	21.3	19.5	17.5	16.1	16.6	16.1	20.7
7 Q	16.2	17.1	17.6	17.6	17.7	17.9	18.1	18.0	17.8	17.7	18.1	18.5	18.3	19.1	19.6	21.5	23.2	23.6	23.5	21.6	18.3	16.1	16.1	14.9	18.7
8 Q	15.3	14.8	15.8	16.3	16.7	16.8	16.8	20.2	19.3	17.8	17.8	18.0	18.5	18.8	21.3	21.3	21.8	22.4	21.1	18.8	15.3	14.1	15.8	16.5	18.0
9	15.1	14.6	15.6	16.0	16.6	16.6	16.7	20.5	19.6	17.8	17.7	17.8	18.6	18.6	21.3	21.2	21.6	22.4	21.0	18.7	14.8	13.6	15.6	15.8	17.8
10 D	14.0	14.6	13.6	12.5	11.6	13.1	17.5	18.6	22.6	34.8	25.1	34.6	18.6	18.0	20.0	20.1	16.6	18.6	20.5	19.6	19.1	18.4	18.1	18.6	19.1
11	18.4	18.7	18.6	18.6	19.5	18.6	18.6	19.6	19.6	19.4	18.7	19.2	18.6	19.1	18.8	21.4	21.1	21.6	21.1	18.1	15.1	15.4	16.0	16.1	18.8
12	16.8	17.6	17.6	18.5	18.3	18.5	18.6	19.0	18.6	18.6	16.1	19.1	19.4	18.5	19.2	20.7	21.6	21.1	20.6	18.6	17.6	16.6	15.6	15.6	18.4
13	15.6	15.6	16.6	17.6	18.1	18.1	17.7	22.1	23.6	18.7	17.6	17.6	19.6	19.4	18.0	17.0	18.8	20.6	19.6	17.7	16.0	15.4	15.6	15.6	18.0
14 D	15.2	15.1	19.0	26.1	16.7	18.2	24.8	27.6	20.6	13.6	18.6	19.4	22.5	21.5	21.7	20.7	21.6	20.3	16.6	16.6	14.6	15.6	16.8	17.4	19.2
15 D	17.8	18.0	17.8	17.7	30.8	19.5	17.6	19.1	18.6	12.4	20.1	18.7	13.1	16.6	14.0	17.8	21.2	20.6	20.1	19.1	17.2	16.5	14.2	13.6	18.0
16	16.9	17.1	18.6	17.6	22.5	22.1	19.6	20.4	17.2	19.6	18.2	16.7	13.6	19.4	21.0	22.8	22.6	22.4	21.6	19.9	17.6	16.6	16.6	16.6	19.1
17	16.3	16.9	17.6	17.1	16.9	17.5	18.1	24.6	17.5	14.7	19.0	19.7	18.6	16.6	18.6	21.0	22.6	22.7	22.7	21.1	18.4	16.1	15.4	14.6	18.5
18	16.1	16.4	17.6	17.6	17.1	17.1	17.5	17.6	17.7	17.9	18.1	18.0	16.9	14.8	16.6	17.5	16.1	15.7	15.5	17.6	17.0	15.1	15.6	16.1	16.8
19 D	16.5	17.5	16.9	17.1	18.4	30.4	25.0	18.4	14.7	14.6	16.6	17.6	10.6	14.6	22.6	24.9	23.6	16.5	18.1	17.6	17.2	16.6	16.7	17.4	18.3
20	18.7	18.6	17.6	18.1	21.6	20.4	18.6	18.8	18.4	14.6	15.6	20.7	15.6	16.6	14.4	22.2	23.1	24.1	22.5	20.6	17.4	15.6	15.6	15.7	18.6
21	14.6	16.6	18.5	19.4	21.7	17.6	18.1	19.7	18.6	17.2	16.6	17.1	16.5	17.6	18.6	19.1	21.8	21.2	20.5	17.4	15.1	15.6	15.1	15.6	17.9
22	16.1	17.2	19.5	18.6	19.1	25.6	18.9	16.9	17.6	20.5	17.7	15.6	13.6	17.3	19.6	21.6	23.7	25.4	24.1	22.5	19.6	17.6	16.1	15.5	19.2
23	15.0	15.7	16.6	17.4	19.1	20.5	21.2	20.6	20.6	19.6	16.6	17.6	16.5	17.6	12.8	20.1	24.4	24.0	20.5	18.8	17.6	16.6	16.5	16.5	18.4
24	16.8	16.7	16.8	17.3	17.3	19.3	20.1	17.9	17.5	18.3	14.6	15.5	19.8	19.6	20.1	20.8	22.6	21.7	19.6	17.7	16.6	15.4	14.6	14.8	18.0
25 Q	16.1	16.6	17.1	17.6	17.6	18.0	17.8	18.6	17.7	17.6	18.1	18.5	18.6	18.5	19.6	22.6	25.3	24.6	22.6	20.4	17.2	15.1	14.5	14.6	18.5
26	14.9	16.1	16.6	16.9	18.5	19.5	21.6	20.2	17.6	19.7	19.0	18.6	18.6	19.6	20.6	22.6	24.4	23.8	22.6	20.1	17.3	14.8	14.0	13.6	18.8
27	14.1	15.4	16.4	17.0	17.4	17.1	18.6	18.6	17.6	19.6	19.7	19.3	16.6	19.1	21.6	20.2	14.8	13.7	19.6	19.6	13.2	12.9	13.6	15.4	17.1
28	16.1	15.6	13.4	16.6	20.4	16.1	18.5	15.6	13.2	17.6	20.1	19.8	18.6	20.6	23.4	23.6	23.1	22.4	21.1	18.6	17.6	16.6	16.1	15.9	18.4
29	16.7	17.1	17.4	17.2	17.5	17.6	17.7	17.7	17.8	18.6	20.7	19.6	19.1	19.6	20.8	23.0	24.2	23.6	22.6	17.6	13.9	13.5	13.6	14.6	18.4
30	15.6	15.7	15.6	19.6	17.9	16.6	16.6	19.6	25.6	19.6	18.6	18.7	19.6	19.9	21.6	23.8	24.6	23.6	20.6	17.1	14.6	13.6	13.8	14.6	18.6
31	16.1	16.9	16.7	16.8	17.1	17.1	16.6	16.8	17.1	17.6	16.9	18.6	18.6	19.8	20.9	23.9	24.6	24.6	21.9	19.4	16.7	14.9	14.6	13.8	18.3
Mean	15.8	16.2	17.0	17.7	18.5	19.0	19.1	19.7	19.1	18.7	18.5	19.1	17.4	18.3	19.4	21.1	22.0	21.9	21.0	19.1	16.7	15.5	15.3	15.3	18.4

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 9 Victoria 53,000 γ + March 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	346	346	345	345	347	351	350	347	345	345	343	339	329	327	341	345	347	347	344	342	344	345	347	347	344
2	350	353	351	356	360	363	361	361	355	351	347	345	345	344	343	346	346	343	339	332	331	339	342	343	348
3 Q	344	345	347	347	347	346	345	345	343	343	343	341	340	340	341	345	345	342	332	325	328	333	337	339	341
4 Q	340	340	340	340	339	339	341	344	341	341	340	340	338	337	337	337	339	337	343	342	343	335	341	344	340
5	343	341	341	342	345	346	345	344	344	343	335	337	339	340	342	343	341	339	337	334	333	337	346	372	342
6 D	393	415	440	449	423	422	410	388	354	327	337	345	302	263	331	355	362	362	357	354	353	353	355	357	367
7 Q	356	356	356	355	355	355	354	354	355	355	355	355	353	352	354	355	355	352	348	345	345	353	355	353	353
8 Q	353	354	356	357	358	358	360	360	359	357	354	351	349	349	350	351	348	346	340	337	338	344	350	354	351
9	352	354	356	359	361	362	364	369	364	356	354	355	355	357	351	345	341	335	325	325	329	335	348	353	350
10 D	353	354	357	358	362	375	375	377	321	215	29	73	188	315	354	355	349	351	355	356	355	355	359	363	317
11	362	363	361	361	362	362	361	361	361	359	359	361	362	361	359	360	359	358	353	350	355	359	363	367	360
12	369	365	365	366	363	361	359	360	360	359	353	356	359	359	361	362	361	357	351	349	352	353	359	360	359
13	363	362	363	363	361	359	357	357	355	355	357	355	355	359	359	356	355	350	343	341	345	349	354	357	355
14 D																									
15 D	360	359	359	360	367	359	360	360	359	335	311	319	325	329	321	346	351	352	352	353	353	352	361	367	349
16	374	379	383	379	373	367	364	347	336	355	359	355	331	344	355	357	357	359	357	354	352	353	356	355	358
17	356	357	357	359	359	359	359	361	357	320	339	351	353	351	353	358	357	351	345	345	345	350	355	359	352
18	361	361	358	358	358	358	358	358	359	357	357	355	352	340	338	336	341	339	343	345	346	352	358	362	352
19 D	361	358	355	355	357	361	363	363	335	320	323	343	329	299	325	351	344	337	347	350	350	360	363	367	347
20	372	371	366	364	364	359	358	360	347	331	308	303	307	317	323	337	343	339	337	337	344	348	352	356	344
21	360	359	359	359	360	358	357	358	357	355	354	353	353	353	351	351	351	349	351	349	348	351	352	354	354
22	356	362	363	364	363	361	354	348	326	347	354	346	344	344	352	357	355	348	344	346	348	348	349	352	351
23	355	357	357	357	358	357	351	350	347	350	349	350	351	344	337	345	351	347	344	344	346	349	353	357	350
24	360	358	358	358	357	358	361	359	357	353	351	335	343	351	354	357	354	347	342	342	345	347	350	353	352
25 Q																									
26																									
27																									
28																									
29																									
30																									
31																									
Mean	358	360	361	361	361	361	359	358	349	340	331	333	335	338	345	350	350	347	345	343	345	348	352	356	349

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 10 Victoria 18,500 γ + April 1961

Day	Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		298	287	255	250	275	283	274	268	269	272	291	299	292	299	304	297	288	276	263	264	255	259	277	296	279
2		295	295	296	292	283	275	263	271	297	260	283	296	286	287	283	287	281	275	267	257	246	238	253	274	277
3	D	285	281	280	286	251	237	274	277	237	233	272	275	280	275	262	272	272	264	261	264	264	263	266	271	267
4	Q	276	283	279	281	282	284	283	285	282	284	286	289	291	289	290	287	281	274	263	258	253	253	260	272	278
5	Q	282	287	283	286	283	289	291	285	286	291	295	298	294	295	296	295	291	282	274	272	269	271	276	283	286
6		284	284	285	285	287	287	288	293	294	297	297	298	300	302	306	296	292	266	267	268	264	257	269	279	285
7		280	287	282	270	285	288	289	292	297	293	309	303	306	295	305	304	302	292	282	276	271	270	278	280	289
8		288	291	295	294	294	294	292	294	292	300	302	306	306	304	305	304	298	294	290	290	286	281	275	291	294
9	D	295	300	295	297	297	298	307	301	307	301	273	236	303	310	296	296	295	282	277	275	280	283	283	277	290
10		278	288	293	290	285	293	286	289	285	293	306	300	293	285	287	296	299	291	284	286	283	282	286	285	289
11	D	295	300	280	288	291	270	278	292	293	302	300	303	301	290	300	284	251	241	276	277	273	275	283	294	285
12		297	298	293	291	287	287	275	308	286	290	291	296	298	297	284	288	286	279	277	277	277	274	282	287	288
13		290	292	293	290	291	292	294	298	299	301	301	302	306	301	297	299	321	308	289	279	280	278	288	300	295
14	D	302	302	307	305	307	309	298	293	294	279	254	281	280	281	277	285	245	207	196	187	194	182	196	260	263
15	D	275	280	235	245	223	238	255	240	252	265	276	275	276	273	272	259	273	271	259	242	234	237	261	270	258
16		276	282	275	274	273	274	278	278	279	284	283	287	276	277	282	280	272	264	259	245	237	239	241	260	270
17	Q	273	280	282	279	280	282	283	290	288	291	293	298	294	295	298	296	289	273	257	246	246	248	260	276	279
18	Q	284	285	285	288	289	287	281	283	297	301	296	298	299	302	304	305	290	276	268	265	264	267	270	277	286
19		288	293	288	282	291	294	294	299	300	297	298	298	299	300	302	304	291	275	258	260	264	270	273	274	287
20		283	282	287	292	290	298	295	302	302	299	301	302	302	302	300	298	294	287	280	276	274	275	279	284	291
21	Q	289	295	299	297	294	292	293	295	297	301	299	300	297	300	300	297	295	286	280	280	277	270	281	290	292
22		299	301	300	298	299	300	303	305	310	313	322	322	324	306	300	308	288	296	280	276	270	264	263	283	297
23		292	287	285	287	286	288	288	291	303	288	289	299	293	290	289	282	285	287	278	276	273	269	275	267	285
24		280	288	276	282	290	292	297	300	302	302	303	304	302	293	292	291	289	282	270	273	287	282	264	264	288
25		278	293	289	294	287	286	293	297	299	300	299	299	300	297	299	294	287	277	270	275	278	277	277	279	289
26		279	290	294	284	294	298	290	295	301	305	306	308	310	308	301	305	301	301	279	294	290	281	272	280	294
27		282	289	283	291	284	305	304	309	325	311	314	315	309	291	297	296	292	279	271	267	259	275	281	284	292
28		285	290	287	287	274	278	281	280	296	297	300	297	297	294	291	293	290	280	271	270	274	281	287	290	286
29		288	290	296	296	295	294	295	299	301	305	309	306	306	305	301	300	299	291	285	284	287	288	285	281	295
30		291	289	289	291	294	290	297	302	305	298	298	301	298	309	301	295	297	289	280	284	281	281	291	299	294
31																										
Mean		286	290	286	286	285	286	287	290	293	292	295	296	297	295	294	293	288	278	270	268	266	266	271	280	285

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 11 Victoria 22° 30.0' + April 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	15.2	15.6	14.6	17.1	15.8	16.4	17.8	24.9	24.8	23.4	18.6	25.6	23.5	21.6	22.6	23.4	23.6	21.8	20.6	18.8	15.7	14.6	13.6	13.4	19.3
2	14.4	16.6	17.2	16.8	19.7	22.1	19.8	20.1	12.6	25.5	19.6	21.1	24.1	23.6	23.3	23.8	25.4	22.8	20.6	19.6	16.6	13.4	10.8	11.2	19.2
3 D	12.0	13.0	12.5	25.6	16.6	19.6	23.8	22.1	23.1	24.2	20.1	16.6	18.0	19.7	21.7	18.4	20.6	19.6	17.9	16.9	16.2	15.6	14.6	14.6	18.5
4 Q	16.0	16.4	16.5	17.5	17.1	16.6	18.6	17.5	17.5	17.6	18.3	18.6	18.6	19.7	21.5	23.6	25.1	25.1	24.0	21.6	19.6	17.6	15.3	14.1	18.9
5 Q	14.1	15.0	15.6	16.6	17.6	16.8	17.6	17.8	17.9	18.5	17.7	16.7	19.6	20.2	20.6	22.3	23.6	24.1	22.4	20.1	18.5	16.6	14.9	13.7	18.3
6	14.4	15.4	15.4	15.6	16.8	17.6	17.6	17.6	18.2	18.1	18.6	18.7	18.6	19.4	19.7	22.6	25.6	25.5	19.5	17.7	16.6	12.8	10.6	10.6	17.6
7	9.7	12.6	14.7	19.5	18.8	17.6	17.7	17.6	18.0	18.6	20.1	18.6	17.6	18.7	19.6	21.6	24.1	23.6	22.3	20.6	18.6	17.1	15.6	14.6	18.2
8	15.0	15.8	16.6	16.6	17.6	17.1	17.6	17.6	19.6	18.5	18.1	18.6	18.4	18.9	20.1	21.6	23.1	22.6	20.6	18.7	17.6	16.2	15.5	13.6	18.2
9 D	14.4	15.4	16.4	16.3	14.7	15.8	17.5	17.6	18.6	14.6	16.6	34.8	24.6	22.6	23.5	23.8	23.9	23.6	19.7	16.5	16.3	16.6	15.8	15.6	19.0
10	15.6	16.5	16.6	17.1	19.2	26.6	22.1	19.2	18.5	17.1	16.6	19.8	19.1	16.8	18.8	20.6	21.4	22.4	21.0	20.1	19.0	17.1	15.0	14.6	18.8
11 D	14.4	14.6	20.6	21.5	26.8	23.5	20.1	21.1	17.6	13.6	18.6	18.6	15.6	15.6	20.1	20.6	19.5	16.8	17.4	17.3	16.8	16.6	15.6	14.7	18.2
12	15.4	15.6	16.7	17.6	17.1	17.6	20.6	18.6	19.6	18.5	18.6	18.6	16.9	20.0	19.4	19.6	22.1	22.5	20.1	18.5	17.4	15.9	14.9	14.8	18.2
13	15.6	16.6	17.6	17.7	17.9	16.8	16.6	16.3	16.6	17.6	18.6	19.1	19.4	17.9	17.8	15.6	17.9	20.6	21.5	18.7	15.6	13.8	13.2	12.6	17.2
14 D	12.9	13.7	14.6	15.1	14.6	14.9	15.6	16.6	19.0	20.6	22.6	23.1	29.5	24.6	26.6	22.9	18.1	15.9	8.4	6.6	11.9	12.5	8.7	8.6	16.6
15 D	8.1	15.6	9.7	27.6	18.6	27.3	13.8	19.6	18.4	16.6	13.5	14.6	17.1	18.1	18.6	17.7	21.6	22.5	22.6	20.7	17.6	15.4	14.6	14.6	17.7
16	15.6	17.3	18.6	18.6	17.6	18.4	18.6	18.3	18.5	18.5	16.6	16.2	13.6	16.7	20.1	21.6	23.3	23.1	20.6	18.8	16.7	14.5	13.6	13.9	17.9
17 Q	14.2	15.6	16.6	17.6	17.6	17.6	17.8	18.6	18.6	18.5	17.9	16.6	17.6	19.5	21.6	23.6	24.6	24.5	21.7	19.6	17.8	15.8	14.6	13.6	18.4
18 Q	14.2	15.5	16.9	16.9	17.5	18.6	19.5	18.6	18.5	17.3	18.8	18.4	17.5	18.3	20.8	22.6	23.4	24.0	21.6	19.1	17.6	16.6	14.9	13.7	18.4
19	13.6	14.6	16.5	18.6	17.5	16.7	16.9	17.6	19.1	18.6	17.4	17.6	18.5	19.6	21.5	22.6	24.5	24.6	19.6	17.6	15.6	15.1	13.4	13.1	17.9
20	13.4	14.6	16.6	17.5	18.9	18.6	18.5	17.0	18.6	18.6	17.7	17.9	18.5	19.8	20.1	21.6	23.5	24.3	22.4	19.5	17.6	16.5	15.1	14.1	18.4
21 Q	14.1	14.6	15.6	16.6	17.2	17.6	17.5	17.6	17.6	17.8	18.1	18.2	18.4	18.6	19.9	21.6	23.3	23.5	21.6	19.6	18.9	16.6	14.9	13.6	18.0
22	12.9	13.3	15.1	16.5	16.6	16.7	16.6	17.4	17.4	17.6	17.5	17.6	17.7	21.6	24.6	22.6	18.5	18.6	19.2	15.6	14.6	11.7	10.6	11.6	16.8
23	11.1	13.6	15.6	16.9	16.8	17.6	17.3	17.6	17.8	21.9	21.1	20.6	23.6	24.1	23.6	22.6	22.2	21.5	19.9	18.4	17.1	15.1	13.7	13.5	18.5
24	12.8	11.6	15.5	15.7	15.5	16.4	16.6	16.8	17.2	17.6	18.1	17.6	19.6	19.6	19.2	20.5	20.6	19.7	17.4	14.6	14.4	13.6	13.5	13.1	16.6
25	12.2	13.1	18.1	16.5	16.3	16.6	16.6	17.3	16.9	18.5	18.1	18.6	19.4	20.6	22.2	23.6	25.1	23.5	19.6	14.9	13.9	14.1	13.6	13.1	17.6
26	12.4	13.4	12.6	12.8	16.5	21.4	18.6	18.5	16.6	16.7	17.6	17.8	18.6	18.7	18.6	20.6	23.6	24.7	21.9	18.6	18.2	17.6	17.5	16.6	17.9
27	16.8	17.1	17.6	17.6	17.7	15.6	16.3	18.7	16.6	20.6	20.1	20.4	21.6	15.0	22.6	26.6	26.5	23.6	20.5	16.2	14.0	14.1	14.6	14.6	18.5
28	12.9	14.4	15.6	17.2	18.5	18.1	16.8	16.4	16.6	17.1	17.1	16.6	17.6	18.6	20.4	20.8	21.6	21.6	19.4	15.7	14.6	12.9	11.8	11.6	16.8
29	11.7	14.7	16.6	17.4	17.6	17.6	17.5	17.6	17.4	16.9	16.8	18.4	18.2	19.6	20.6	23.1	24.6	23.4	20.6	16.5	14.5	13.6	11.5	11.6	17.4
30	12.4	11.9	14.1	15.6	15.9	15.4	16.1	16.6	17.2	18.6	18.7	20.0	21.0	21.9	23.5	22.6	24.9	22.2	18.9	16.6	13.8	12.0	9.9	9.9	17.1
31																									
Mean	13.6	14.8	15.9	17.7	17.6	18.3	17.9	18.3	18.2	18.6	18.3	19.2	19.4	19.7	21.1	21.8	22.9	22.4	20.1	17.8	16.4	15.1	13.7	13.3	18.0

VERTICAL INTENSITY
Mean values for periods of sixty minutes, Universal Time

Table 12 Victoria 53,000 γ + April 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1																									
2																									
3 D																									
4 Q																									
5 Q																									
6	318	321	322	323	324	324	325	324	323	323	321	321	319	319	318	319	315	305	301	299	301	307	316	318	317
7	320	323	325	330	330	324	321	320	318	315	304	309	314	317	317	317	312	305	304	306	309	309	311	311	316
8	317	318	319	317	316	316	317	315	315	319	317	316	316	318	319	318	315	307	301	301	305	304	305	310	313
9 D	316	318	318	319	320	321	318	316	318	297	202	219	285	309	318	322	320	311	309	308	309	311	309	313	304
10	321	327	327	323	325	325	304	311	316	309	291	303	309	294	303	309	312	311	311	314	313	311	314	315	312
11 D	318	326	333	333	333	317	325	320	319	299	299	309	306	280	289	295	291	299	311	312	314	315	315	320	312
12	320	321	320	322	321	322	326	310	312	318	318	314	306	304	302	303	309	311	311	311	312	315	317	319	314
13	322	325	329	329	329	329	328	326	325	323	323	323	322	319	314	303	311	309	308	308	307	307	312	319	319
14 D	321	322	325	324	325	325	325	326	327	322	318	307	290	273	280	276	266	270	277	303	329	338	374	446	316
15 D	473	489	418	437	364	371	290	328	341	335	315	313	328	331	339	328	337	343	339	332	335	340	345	345	355
16	344	346	345	342	344	341	340	340	337	330	329	321	319	314	324	327	329	329	329	326	330	334	340	340	333
17 Q	335	336	337	337	336	335	336	333	332	332	333	330	326	329	330	332	333	329	322	318	322	325	327	332	331
18 Q	334	332	333	334	332	333	334	335	330	312	320	327	330	329	331	335	333	329	326	325	326	328	327	329	329
19	332	338	337	337	336	334	332	334	329	329	331	333	334	334	334	333	328	325	321	320	322	321	323	328	330
20	338	342	344	340	330	333	333	329	321	329	333	333	331	333	331	332	331	326	325	321	319	321	325	328	331
21 Q	329	333	334	333	331	330	331	331	332	331	331	331	331	332	329	329	327	322	320	319	318	320	323	325	328
22	328	331	333	333	333	333	333	333	334	334	331	325	312	304	301	303	299	297	296	303	305	311	318	326	319
23	331	335	339	339	339	341	341	342	329	327	332	327	321	327	332	328	326	320	314	318	321	327	333	335	330
24	343	347	358	357	347	342	339	347	335	337	334	328	329	329	328	325	322	319	317	319	325	328	328	333	334
25	340	350	362	355	351	351	348	344	341	333	336	337	338	337	340	339	337	333	326	323	327	329	336	343	340
26	350	351	359	362	359	346	347	349	345	342	341	340	340	341	338	334	335	333	327	330	331	331	331	336	342
27	338	343	343	347	345	347	346	345	320	312	327	331	327	308	310	321	323	318	314	318	320	323	326	331	329
28	334	341	345	349	351	354	353	347	340	336	337	333	332	332	331	334	335	331	322	320	323	326	329	333	336
29	337	338	343	341	339	337	337	337	337	337	337	335	337	336	337	340	339	333	325	320	323	326	330	336	335
30	344	346	348	346	345	344	342	340	339	337	334	329	328	333	329	325	322	318	317	318	315	313	318	323	331
31																									
Mean	336	340	340	340	337	335	331	331	329	325	320	320	321	319	321	321	320	317	315	316	318	321	325	332	326

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 13 Victoria 18,500 γ + May 1961

Day		Hour U.T. 0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		292	312	296	272	269	282	290	296	292	296	289	298	292	296	294	282	271	268	263	264	268	277	282	301	285
2		302	290	283	284	286	293	293	296	293	292	302	299	305	305	304	301	291	289	286	282	280	274	276	279	291
3	Q	287	292	295	291	293	293	293	293	315	299	301	304	307	309	312	309	303	292	280	269	269	277	280	289	294
4		298	302	303	300	298	297	298	299	302	301	303	301	301	304	310	310	304	291	276	256	256	272	280	253	292
5		281	292	291	291	296	294	291	279	289	302	310	307	314	319	307	314	281	329	326	312	299	288	294	296	299
6	D	287	300	289	299	298	282	265	275	295	292	277	289	294	270	286	302	289	285	285	278	271	279	291	293	286
7	D	300	290	298	302	295	301	319	311	301	289	292	287	295	291	292	291	303	302	302	292	288	284	280	277	295
8		289	294	298	293	286	292	312	305	305	310	309	306	307	301	302	301	297	292	286	292	292	279	283	292	297
9		296	300	303	290	290	277	292	282	283	295	291	298	300	299	285	281	288	287	287	284	288	284	279	283	289
10		281	291	291	292	291	292	297	298	294	288	299	302	300	299	293	288	290	290	290	291	291	287	290	295	293
11		275	299	295	290	294	294	298	291	294	308	308	301	294	309	307	307	300	284	285	290	289	274	281	294	294
12		285	282	278	276	286	287	283	279	288	297	299	299	301	305	304	299	291	287	285	273	265	279	290	308	289
13		311	309	264	274	257	270	281	285	298	296	295	293	291	300	298	282	287	273	260	263	272	281	291	297	285
14		299	295	296	284	275	282	286	288	291	289	299	294	293	294	286	286	281	275	274	272	271	278	282	284	286
15	Q	296	302	300	299	296	296	296	300	304	306	302	301	303	306	311	311	306	298	283	271	264	264	272	286	295
16	D	296	281	280	291	294	280	253	274	283	290	299	296	302	299	283	278	279	283	270	275	281	270	275	282	283
17		281	287	291	289	289	286	289	295	297	303	299	300	292	293	294	296	296	289	279	273	273	273	275	275	288
18	Q	291	293	298	298	295	296	296	298	302	305	301	302	304	308	312	316	313	302	289	278	273	271	279	289	296
19		293	301	293	297	302	295	296	298	296	294	303	300	305	317	320	314	304	294	286	286	282	278	292	296	298
20		301	285	301	316	275	269	284	299	303	289	289	294	293	298	302	292	291	284	286	273	273	281	284	280	289
21	Q	299	297	299	300	303	301	305	305	304	304	304	304	308	314	314	311	302	289	273	270	263	280	300	305	298
22		292	307	306	309	304	316	315	322	324	323	325	329	331	336	338	336	322	307	285	280	287	288	296	300	312
23		314	310	305	308	309	286	295	301	305	309	308	303	309	313	314	308	299	294	281	271	276	281	279	284	298
24		304	291	291	291	283	287	296	301	294	295	293	300	305	305	315	306	306	298	286	286	279	278	284	287	294
25	D	300	301	284	291	296	305	245	253	254	250	267	255	265	259	267	271	260	253	247	269	276	282	279	277	271
26		292	280	296	292	291	298	301	302	295	297	295	291	286	291	294	295	293	289	290	296	297	293	292	294	293
27		292	294	298	292	291	291	296	296	294	293	293	292	297	297	295	295	286	280	285	287	283	282	281	289	291
28		291	296	297	294	289	291	292	301	305	311	311	314	315	309	309	293	281	267	267	274	296	302	283	289	295
29	Q	290	296	295	296	288	286	296	302	303	306	308	309	311	312	314	309	300	286	280	281	283	285	298	299	297
30		304	300	294	301	308	306	312	318	310	311	314	326	326	334	334	329	314	307	303	304	298	302	305	319	312
31	D	306	318	291	307	301	298	290	296	278	260	271	296	312	314	318	314	301	296	289	297	295	297	289	292	297
Mean		294	296	294	294	291	291	292	295	297	297	299	300	302	303	304	301	295	289	283	280	280	281	285	289	293

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 14 Victoria 22° 30.0' + May 1961

Day \ Hour U. T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		12.5	13.5	16.9	18.4	17.6	16.8	16.2	16.2	16.9	18.2	16.2	17.7	22.7	23.2	22.5	22.8	24.2	21.5	19.9	17.1	14.7	12.2	10.6	8.2	17.4
2		6.6	5.5	18.6	20.2	13.5	14.5	15.9	18.6	18.6	16.9	17.2	17.6	16.6	17.2	20.1	22.6	23.6	22.2	20.5	18.2	17.1	15.6	14.2	13.6	16.9
3	Q	14.0	15.3	16.9	18.2	17.7	17.5	17.6	17.6	18.0	19.5	18.6	17.9	18.5	20.6	21.2	21.7	23.3	23.6	22.2	20.3	17.6	14.6	12.8	12.5	18.2
4		13.3	14.8	16.5	17.0	17.2	17.6	17.6	17.6	18.6	17.8	17.4	17.2	17.6	19.8	20.9	22.4	23.9	26.5	25.6	21.0	17.2	14.0	8.6	10.6	18.0
5		11.8	13.6	16.3	16.6	16.5	17.4	20.9	26.6	22.5	17.8	16.5	15.9	17.6	19.5	20.6	21.8	20.5	14.1	18.0	15.9	17.1	16.5	12.5	13.4	17.5
6	D	13.6	14.2	15.6	16.8	16.9	37.6	21.8	20.6	15.5	15.4	6.6	14.6	20.8	16.1	21.6	24.8	23.6	22.7	21.5	18.8	16.9	15.5	14.6	14.1	18.3
7	D	14.2	15.3	15.9	16.6	18.5	20.6	21.6	22.8	20.8	19.8	16.6	14.5	17.6	18.9	21.6	20.8	22.3	20.8	20.3	19.0	17.6	16.5	14.4	14.6	18.4
8		13.1	14.6	15.5	16.4	16.9	18.0	20.9	18.5	18.4	17.5	17.8	19.2	20.2	19.9	20.5	21.5	22.9	21.5	19.6	17.6	17.1	15.2	15.1	14.5	18.0
9		13.7	14.0	15.7	17.1	18.6	23.7	17.6	21.6	14.7	15.4	20.7	20.0	19.8	19.9	19.7	19.5	20.7	21.8	20.6	19.1	17.6	16.5	15.2	14.0	18.2
10		14.8	15.2	15.5	16.4	16.7	18.0	17.6	17.6	16.9	19.5	20.5	19.4	20.7	21.2	21.6	22.7	22.7	22.8	20.7	19.3	17.9	16.3	14.9	12.7	18.4
11		13.9	13.2	12.5	16.7	16.5	17.4	20.6	17.3	20.6	20.2	18.4	18.6	18.6	19.6	19.1	20.6	22.6	22.4	17.7	13.7	13.7	13.6	13.4	12.5	17.2
12		13.0	13.6	17.7	19.4	23.5	20.8	19.7	22.5	20.0	20.8	14.8	16.9	19.4	20.6	21.9	24.0	25.0	24.1	20.6	16.7	15.1	12.7	12.4	10.6	18.6
13		10.4	13.7	18.0	20.6	21.5	16.0	16.1	16.5	17.5	16.5	14.9	13.9	17.3	19.7	22.2	23.6	23.7	23.4	20.2	16.6	13.7	13.1	13.9	14.4	17.4
14		15.3	16.7	22.3	23.8	19.7	17.6	16.7	18.6	16.7	17.4	15.6	17.6	18.7	19.4	18.8	23.1	24.2	23.2	21.1	17.7	13.7	12.0	11.9	12.6	18.1
15	Q	14.1	15.7	16.6	16.6	16.5	16.6	16.9	17.2	17.5	18.3	17.9	17.6	18.6	19.7	21.7	22.8	24.9	25.5	23.5	19.5	16.3	12.6	11.1	10.5	17.8
16	D	10.3	11.4	14.4	14.9	15.6	22.6	28.9	20.3	20.8	17.3	20.9	14.7	17.7	21.5	21.6	21.5	24.6	24.4	21.6	17.6	15.9	14.7	13.8	12.9	18.3
17		14.7	15.7	16.7	17.5	17.6	19.1	17.1	17.5	16.6	16.7	16.7	15.5	16.2	17.2	21.6	23.6	24.3	23.7	22.5	19.3	16.6	14.9	13.8	14.0	17.9
18	Q	15.1	16.6	16.9	17.3	16.8	17.1	17.6	17.1	16.7	16.0	16.6	17.5	18.1	20.5	22.3	23.5	24.2	23.4	21.1	17.7	15.7	14.2	12.6	12.0	17.8
19		13.2	14.5	15.6	16.2	16.5	19.6	19.5	17.6	16.3	17.6	17.6	19.4	19.6	21.9	24.6	16.5	25.0	24.3	20.6	17.5	15.1	13.5	11.9	10.7	17.7
20		9.8	12.5	13.7	15.2	17.5	19.8	18.7	16.9	20.7	20.4	18.7	19.1	20.7	21.4	22.5	22.8	22.8	24.5	21.9	18.6	16.0	13.6	11.1	10.7	17.9
21	Q	11.6	12.9	15.3	15.6	16.3	17.3	17.6	16.1	17.2	17.5	17.4	16.6	16.6	19.9	21.7	22.9	24.1	23.3	21.6	15.6	10.9	9.6	7.6	7.7	16.4
22		11.1	12.2	12.5	13.3	14.6	14.7	15.6	15.6	16.2	16.8	17.5	16.7	18.6	20.6	21.5	23.1	23.6	23.2	22.0	15.6	14.6	11.6	11.1	10.5	16.4
23		11.1	13.6	16.7	17.7	18.6	17.3	16.5	16.6	17.2	18.3	16.6	17.6	19.9	21.6	22.3	23.0	24.6	22.3	20.5	15.7	13.7	13.4	11.7	11.6	17.4
24		12.9	18.1	21.0	18.8	18.8	17.6	18.3	16.7	16.8	16.8	16.5	15.7	17.0	18.3	21.6	23.8	23.5	22.3	19.6	17.3	15.7	14.6	13.3	12.5	17.8
25	D	12.0	13.7	15.2	16.6	22.5	24.7	23.8	24.6	22.7	21.8	19.6	13.9	14.8	20.7	23.6	24.6	25.3	24.9	18.7	10.8	11.9	11.9	12.5	13.6	18.5
26		13.9	18.5	18.6	16.6	16.7	16.7	17.5	16.5	16.7	16.9	17.1	16.0	15.5	19.7	22.8	25.6	25.3	22.6	18.6	15.9	14.3	13.6	13.5	12.6	17.6
27		13.0	14.6	14.8	19.6	16.7	15.8	18.7	17.7	19.2	17.7	18.5	19.6	20.7	20.8	19.4	21.4	22.6	22.3	20.6	18.2	15.7	13.3	12.5	12.6	17.8
28		13.3	14.0	15.5	14.6	15.7	15.9	16.5	15.7	16.3	17.1	18.6	19.8	22.9	21.9	24.3	26.6	25.1	23.9	16.0	11.4	9.9	11.4	10.7	12.7	17.1
29	Q	13.8	14.5	15.5	16.6	19.5	20.3	17.4	15.6	15.6	16.6	17.1	17.6	18.8	19.6	21.2	22.6	23.8	23.4	20.6	18.1	15.6	13.6	11.6	11.9	17.5
30		12.4	13.8	14.9	14.8	14.4	14.3	15.5	17.7	19.6	20.6	18.6	18.5	20.5	20.8	22.7	23.8	23.8	23.4	20.0	16.6	14.5	13.6	14.0	12.9	17.6
31	D	13.4	13.6	16.0	17.4	23.4	18.6	19.7	21.5	21.9	25.3	28.3	25.6	20.1	20.6	22.7	25.9	25.6	25.6	19.7	16.8	14.9	14.7	14.4	13.8	20.0
Mean		12.8	14.2	16.3	17.2	17.7	18.8	18.6	18.5	18.2	18.2	17.6	17.5	18.8	20.1	21.6	22.8	23.8	23.0	20.6	17.2	15.3	13.8	12.6	12.3	17.8

VERTICAL INTENSITY
Mean values for periods of sixty minutes, Universal Time

Table 15 Victoria — 53,000 γ + — May 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	332	344	362	368	365	355	348	345	343	340	323	309	309	315	324	325	325	324	323	323	323	322	325	334	334
2	348	346	401	357	354	345	340	339	338	326	329	332	332	333	334	336	332	329	325	325	327	329	329	329	338
3 Q	337	341	343	341	340	338	340	340	334	326	329	333	336	337	337	335	333	327	321	317	317	317	321	327	332
4	331	336	334	332	331	332	333	334	333	331	331	332	332	331	330	330	326	318	315	316	311	326	331	331	329
5	347	343	339	338	336	337	339	315	328	338	335	324	333	338	338	338	323	318	310	314	321	325	331	331	331
6 D	338	347	340	343	339	354	322	339	319	305	273	285	299	283	275	315	324	325	325	323	333	341	343	341	322
7 D	340	345	346	344	341	339	324	291	299	311	323	305	309	311	307	308	313	312	315	319	323	323	328	329	321
8	331	333	337	339	339	341	334	322	327	316	318	324	327	329	327	325	323	321	316	315	319	320	322	327	326
9	327	327	331	331	331	334	327	303	275	261	294	318	325	324	317	311	310	310	311	315	317	314	316	322	315
10	326	333	331	328	327	325	325	323	323	318	317	314	310	321	325	323	322	317	317	317	318	316	321	327	322
11	328	340	342	344	339	341	341	334	319	312	316	315	317	313	320	318	317	312	310	307	309	319	319	323	323
12	331	339	351	351	344	330	333	328	320	306	296	309	318	326	329	333	331	328	315	308	306	310	312	326	324
13	348	370	372	362	354	343	336	331	324	314	315	300	300	321	324	325	328	324	316	318	320	325	327	328	330
14	335	333	346	347	336	330	328	323	317	321	313	300	317	323	319	319	318	312	309	310	310	308	316	319	321
15 Q	321	325	325	324	321	321	321	322	323	320	317	319	322	323	324	325	324	320	312	307	307	316	320	328	320
16 D	342	355	345	337	334	346	355	337	327	309	300	313	319	322	311	303	308	315	308	311	316	323	330	334	325
17	334	335	334	330	328	329	326	325	322	316	321	320	314	310	309	318	317	317	313	312	314	311	311	317	320
18 Q	324	327	326	324	322	322	322	322	321	313	313	318	322	320	320	322	324	320	316	314	312	311	312	316	319
19	320	328	328	324	322	322	321	322	319	312	315	322	328	331	328	325	318	313	308	306	310	314	318	324	320
20	328	322	328	343	357	363	353	344	334	323	326	327	324	320	323	323	319	315	310	305	307	307	309	318	326
21 Q	328	330	334	330	326	326	323	319	319	322	321	320	317	321	318	318	313	308	305	300	305	310	319	325	319
22	322	329	324	321	315	316	316	316	316	316	316	318	320	322	320	319	318	315	300	300	307	306	311	319	316
23	326	324	324	321	323	321	321	321	316	317	316	313	314	321	326	319	311	296	288	293	298	306	313	317	314
24	327	332	339	332	328	324	320	313	314	315	315	318	321	318	322	320	318	312	303	302	303	299	314	319	318
25 D	333	343	343	340	343	303	288	319	330	317	311	301	277	254	267	282	303	299	303	319	330	332	331	330	312
26	336	346	347	333	325	324	322	310	309	316	320	319	312	312	317	315	313	310	309	309	310	312	315	319	319
27	320	322	327	328	325	323	323	316	316	319	317	318	321	318	314	311	311	307	298	293	295	299	304	312	314
28	321	326	329	326	326	328	327	326	325	322	317	309	308	312	315	314	302	293	287	286	292	301	304	308	313
29 Q	315	320	320	323	326	330	327	322	320	318	317	317	318	318	317	318	318	315	303	294	294	296	294	300	314
30	314	320	320	319	317	318	319	314	315	313	314	317	317	318	315	315	310	302	296	293	292	298	306	311	311
31 D	312	321	312	322	327	319	324	322	298	275	281	300	318	322	322	322	315	307	302	308	310	314	319	330	313
Mean	330	335	338	336	334	332	328	324	320	315	315	315	317	318	319	320	318	314	309	309	312	315	318	323	321

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 16 Victoria 18,500 γ + June 1961

Day	Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	278	299	293	294	287	298	301	307	297	290	301	307	300	318	319	316	308	313	295	288	285	281	292	292	298
2	D	299	295	300	296	290	294	298	301	296	298	304	296	299	304	289	306	299	272	291	297	284	281	289	293	295
3		303	311	307	310	301	287	286	300	295	293	297	305	309	312	314	314	312	310	301	296	286	275	286	289	300
4		293	300	307	298	304	302	295	299	306	312	306	312	316	316	322	317	310	302	300	297	290	285	286	293	303
5		295	297	299	300	298	287	292	300	299	301	307	312	313	314	314	312	299	282	282	278	292	292	296	297	298
6		297	298	299	295	307	304	311	309	299	313	319	319	325	325	327	325	317	289	319	325	330	307	302	311	311
7		303	301	295	293	295	301	314	310	317	304	308	317	311	310	310	310	294	280	272	282	286	298	306	302	301
8		314	295	297	287	290	303	317	298	290	293	308	298	305	305	298	292	291	287	287	292	287	296	297	296	297
9		306	302	293	294	295	296	298	302	308	303	302	303	306	306	298	297	292	286	293	283	284	290	295	301	297
10	Q	307	301	301	298	296	300	303	299	300	303	303	303	304	311	307	301	297	293	290	291	293	293	294	298	299
11	Q	305	307	305	305	305	305	304	306	309	312	312	316	321	317	324	317	306	297	288	286	284	291	303	310	306
12		317	323	316	311	309	282	277	298	303	310	320	309	315	315	310	318	311	311	292	281	276	281	289	292	303
13	Q	304	307	306	308	301	300	299	300	304	310	308	310	315	317	320	320	312	300	296	300	295	300	299	298	305
14		298	299	303	305	305	305	306	308	311	316	315	316	319	323	324	321	317	312	305	295	289	290	295	307	308
15		316	322	319	322	320	316	312	317	312	318	327	316	321	330	333	327	324	319	304	288	279	289	302	300	314
16		315	318	300	299	309	309	308	308	302	300	304	306	309	312	313	309	314	303	295	287	283	272	282	291	302
17		317	319	316	311	308	305	308	313	314	315	317	319	321	321	319	317	316	305	283	285	283	285	299	298	308
18		303	300	301	309	310	305	307	309	312	306	309	311	311	319	315	300	309	285	271	289	287	280	293	274	301
19		288	293	316	313	296	287	303	306	294	293	291	298	302	304	307	307	305	297	297	292	283	282	291	301	298
20		312	319	309	312	292	299	311	316	320	317	313	319	323	322	323	320	316	309	300	300	303	313	325	326	313
21	D	332	334	308	274	288	310	305	318	305	323	315	309	286	291	300	305	299	265	242	249	264	260	278	316	295
22	D	325	322	299	299	265	264	271	252	269	248	265	269	275	279	282	281	279	251	247	266	269	268	290	300	277
23		294	289	287	293	291	289	288	289	294	295	296	298	300	301	297	302	299	294	293	282	282	279	291	297	293
24		303	317	296	288	284	296	292	294	294	295	297	299	300	305	305	304	299	291	279	276	281	285	289	296	294
25		300	312	297	296	304	296	302	303	301	302	305	302	310	314	314	307	308	304	305	295	293	288	276	286	301
26		289	292	302	302	300	300	301	304	305	308	312	316	316	317	306	309	298	299	305	297	293	291	291	297	302
27		304	307	306	310	306	301	298	297	286	293	311	302	303	308	312	312	311	302	281	271	269	280	291	300	298
28	Q	307	307	302	301	297	293	296	304	306	313	313	314	314	315	319	321	322	309	291	275	269	271	281	301	302
29	D	325	314	333	295	286	285	266	288	299	299	298	300	307	313	324	314	308	300	283	280	271	271	282	295	297
30	Q	302	313	304	298	291	298	297	299	301	303	304	305	306	307	310	310	302	289	281	276	272	272	284	299	297
31																										
Mean		305	307	304	301	298	297	299	302	302	303	306	307	309	312	312	310	306	295	289	287	285	285	293	299	300

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 17 Victoria 22° 30.0′ + June 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	14.6	14.9	16.7	17.6	18.7	18.7	16.5	18.3	19.7	24.6	20.3	14.6	21.5	20.6	23.4	25.4	25.1	22.8	21.5	18.5	14.8	12.7	12.5	12.5	18.6
2 D	12.9	17.1	16.6	16.6	17.5	18.5	16.6	16.9	23.5	20.1	17.6	16.1	14.5	15.7	14.7	17.5	20.7	17.5	17.0	17.0	14.9	15.1	14.4	13.6	16.8
3	14.7	15.3	16.4	20.3	24.7	26.6	20.6	16.6	17.9	22.5	16.0	16.5	17.5	18.7	20.1	21.6	23.5	23.7	22.8	20.6	16.6	14.6	12.9	12.3	18.9
4	13.2	14.5	15.7	20.0	19.9	16.5	16.7	17.6	19.6	20.9	18.8	17.7	13.8	18.6	22.3	24.9	24.6	23.1	19.9	16.6	14.4	13.6	13.7	13.8	17.9
5	14.2	15.4	16.1	17.9	21.6	19.5	16.7	16.0	13.7	18.6	16.6	16.8	20.0	21.3	22.1	24.2	24.9	23.3	18.4	15.6	13.1	13.7	13.0	12.7	17.7
6	13.3	13.8	15.4	18.4	16.7	15.6	15.6	18.7	22.0	17.4	16.1	16.5	16.9	17.3	21.2	22.9	22.0	22.5	15.5	12.6	14.5	12.9	13.6	13.3	16.9
7	14.5	15.5	16.2	16.6	16.7	21.5	22.8	17.7	15.5	19.5	20.6	19.5	21.8	21.3	22.4	22.7	22.1	19.0	17.7	14.7	12.6	12.5	13.4	14.3	18.0
8	14.6	20.6	18.6	16.6	15.6	23.4	17.5	17.6	18.6	15.9	15.5	15.5	16.2	19.5	20.7	21.5	23.0	21.6	18.6	17.6	14.5	14.8	15.1	14.8	17.8
9	15.1	15.4	15.7	15.6	16.1	16.8	16.6	16.4	20.1	17.7	16.8	17.7	18.6	18.6	18.9	20.4	20.7	20.1	18.2	16.8	13.5	12.7	13.4	13.8	16.9
10 Q	14.6	15.0	16.6	17.7	17.6	17.1	17.8	17.6	17.6	17.6	16.1	15.3	20.5	21.4	22.0	22.5	22.6	22.8	21.0	18.4	16.6	14.7	13.6	13.4	17.9
11 Q	13.7	14.7	15.7	16.4	16.2	16.5	16.5	16.6	16.9	17.5	17.6	17.8	18.4	19.0	20.6	22.1	23.8	24.6	22.9	19.5	16.3	13.7	12.0	11.4	17.5
12	11.7	13.3	15.9	17.7	17.8	21.1	19.7	16.7	16.2	16.1	15.0	13.9	17.1	17.7	19.5	23.6	25.6	24.8	22.6	18.7	15.6	13.6	12.9	13.2	17.5
13 Q	13.0	13.6	15.7	17.1	17.7	17.3	16.6	16.3	16.5	17.1	16.2	16.6	17.5	18.7	21.5	22.9	23.3	22.6	21.0	17.8	15.2	14.1	13.7	13.0	17.3
14	13.0	14.1	16.0	16.6	16.6	16.4	16.5	16.5	16.3	15.7	16.6	16.7	17.9	19.0	21.3	23.2	25.5	23.8	22.3	20.0	16.7	14.3	12.7	11.9	17.5
15	13.0	14.5	15.3	15.7	14.7	15.6	15.9	15.0	16.6	16.5	16.0	17.7	21.6	24.5	25.3	24.9	22.7	18.8	16.6	15.6	14.4	12.7	11.8	11.9	17.0
16	11.6	14.5	14.9	16.5	15.7	15.6	15.7	15.9	17.7	16.6	16.7	16.7	19.1	19.5	20.8	22.7	22.4	26.0	23.0	19.1	16.0	12.6	10.7	10.5	17.1
17	11.2	13.5	14.9	15.9	16.2	15.6	16.5	15.7	15.7	16.4	16.5	15.6	17.7	21.4	23.4	24.0	24.5	23.1	19.9	16.5	13.3	11.1	10.0	10.7	16.6
18	11.2	13.5	14.7	15.3	15.4	17.5	18.7	18.6	17.9	11.6	17.5	20.3	19.5	22.4	27.7	29.6	26.2	28.4	23.4	17.9	13.4	10.3	9.5	10.2	18.0
19	11.2	12.5	13.5	15.5	15.9	16.0	15.9	15.8	16.6	16.1	16.4	17.5	18.9	20.8	22.8	23.7	23.8	22.6	19.8	16.7	13.7	12.4	12.8	12.9	16.8
20	12.6	11.9	14.0	15.5	17.2	15.8	15.8	17.4	16.7	17.9	17.8	18.4	19.6	21.6	24.4	25.1	26.5	24.7	22.9	15.9	13.9	10.6	8.6	6.9	17.2
21 D	3.7	8.5	7.6	11.8	13.0	15.5	12.6	14.8	17.2	16.4	16.5	11.6	23.6	27.5	22.0	25.5	28.8	22.5	17.5	16.5	10.6	12.2	13.8	10.6	15.9
22 D	12.6	12.6	20.3	14.7	19.3	19.5	18.9	31.6	28.6	20.6	19.6	20.4	24.8	26.2	25.7	26.2	23.7	25.5	22.2	18.6	15.7	12.5	10.9	11.5	20.1
23	14.0	15.5	16.4	16.3	16.4	16.7	16.7	16.6	16.7	17.4	17.6	17.8	18.6	20.6	21.6	23.8	25.3	23.4	20.8	17.1	14.7	13.7	11.5	10.5	17.5
24	12.1	13.5	15.6	17.4	17.3	17.3	17.4	16.0	16.6	17.5	17.6	17.8	18.8	20.3	21.8	23.8	25.3	23.8	20.5	18.0	15.6	15.1	13.8	13.2	17.8
25	13.6	14.0	16.4	16.8	17.3	16.5	16.7	18.6	18.4	17.4	15.6	14.7	19.2	20.0	21.4	24.7	25.0	24.8	21.9	19.6	17.0	15.6	13.5	12.8	18.0
26	13.5	15.3	16.5	17.1	16.6	16.7	16.6	16.6	16.7	17.0	16.5	16.8	18.6	20.4	21.7	24.1	23.6	21.6	19.6	17.8	14.7	13.9	12.9	12.7	17.4
27	14.4	15.7	17.0	18.0	18.5	16.6	21.5	25.7	23.1	19.6	18.7	18.8	21.5	23.0	23.4	24.7	24.5	22.1	19.6	18.5	16.5	13.6	11.6	11.6	19.1
28 Q	13.0	14.8	16.9	17.5	16.8	16.8	15.7	15.5	15.7	16.1	18.6	17.6	17.8	22.2	24.3	26.4	27.5	26.4	22.9	19.8	17.0	15.1	13.2	12.9	18.4
29 D	13.2	13.5	12.6	14.9	21.6	20.6	23.7	19.8	19.4	16.6	18.6	16.6	18.2	22.6	24.6	25.7	26.5	25.9	22.6	19.1	16.4	14.9	13.5	13.7	19.0
30 Q	15.6	17.1	18.5	17.6	17.6	18.5	15.6	15.8	15.9	16.5	16.6	17.5	18.6	19.6	20.6	23.4	25.6	25.6	22.5	17.2	13.5	10.6	9.7	10.4	17.5
31																									
Mean	13.0	14.5	15.8	16.7	17.4	17.9	17.4	17.6	18.1	17.7	17.2	16.9	18.9	20.7	22.1	23.8	24.3	23.3	20.5	17.6	14.9	13.3	12.5	12.2	17.7

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 18 Victoria 53,000 γ + June 1961

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	331	336	332	330	329	332	326	325	313	298	293	290	252	296	305	305	306	300	297	301	306	307	315	319	310
2	D	326	330	338	331	330	327	323	322	298	271	296	294	281	282	263	261	280	281	280	291	298	305	311	318	302
3		325	330	325	331	329	320	316	307	297	294	298	310	315	318	320	323	323	309	302	300	300	305	313	315	314
4		319	327	330	329	326	317	319	321	318	308	304	309	308	296	308	314	318	310	299	297	295	299	306	312	312
5		319	322	323	325	327	325	323	319	301	297	298	303	311	316	318	319	313	298	290	289	289	297	303	310	310
6		313	317	320	321	321	316	315	315	312	315	317	318	321	317	312	307	302	291	286	292	297	304	313	317	311
7		324	324	324	318	317	319	313	304	299	273	272	290	302	309	287	279	281	282	279	288	294	302	314	318	301
8		336	351	344	330	323	322	297	294	299	294	293	293	301	310	311	314	315	305	295	296	301	310	320	324	312
9		326	325	321	318	317	317	317	317	312	307	312	315	317	316	315	316	309	297	286	286	293	295	303	310	310
10	Q	318	321	320	319	317	315	309	311	309	309	309	300	299	309	311	314	310	305	300	294	296	303	303	309	309
11	Q	315	319	319	316	314	313	312	312	312	312	311	312	314	315	315	310	305	299	291	287	291	296	302	310	308
12		316	319	318	320	322	324	327	322	318	316	309	289	293	295	295	306	315	313	307	297	294	296	305	311	310
13	Q	317	321	322	319	316	313	313	312	314	311	307	311	316	317	319	319	315	305	296	291	290	292	298	305	310
14		313	317	319	315	313	313	313	314	314	305	308	311	315	317	319	318	316	303	290	290	288	294	300	301	309
15		309	318	319	319	315	313	314	315	316	314	316	311	312	308	310	303	302	297	285	279	281	289	300	305	306
16		323	342	335	327	323	317	315	315	313	312	308	311	311	309	308	304	308	303	299	292	290	297	307	315	312
17		322	328	330	327	326	321	318	315	313	313	313	314	305	308	310	310	305	299	291	279	285	297	309	316	311
18		319	322	324	325	320	316	318	316	314	298	291	296	306	301	306	300	294	276	268	269	270	278	302	316	302
19		328	327	335	332	334	330	325	320	320	317	313	311	312	314	317	314	309	308	293	292	296	303	306	310	315
20		318	325	321	324	323	321	320	307	304	311	312	316	316	317	317	314	309	290	278	286	286	289	297	306	309
21	D	323	376	384	367	347	335	325	327	330	324	306	267	201	285	308	326	324	304	283	291	303	317	369	418	323
22	D	480	442	432	392	421	395	381	331	298	273	251	267	235	233	260	282	298	302	305	309	306	307	314	318	326
23		343	347	348	339	328	324	324	324	323	323	323	324	323	319	314	315	315	311	306	304	304	312	326	329	323
24		325	349	345	339	331	326	323	323	322	322	321	319	325	330	329	324	322	316	311	311	307	313	318	326	324
25		325	331	331	329	329	324	323	322	319	313	301	284	304	314	316	312	311	308	300	296	301	304	307	315	313
26		334	344	345	335	336	324	321	320	320	318	319	317	319	319	312	316	309	308	306	298	291	290	296	304	317
27		314	322	324	325	326	322	324	306	301	312	293	298	301	305	311	316	318	315	314	312	308	307	310	319	313
28	Q	327	333	332	329	327	329	327	325	323	322	318	315	320	319	322	323	324	319	309	302	302	303	310	324	320
29	D	339	336	354	372	406	433	399	336	332	300	316	324	326	330	334	329	319	311	309	313	315	316	321	330	338
30	Q	340	345	337	330	326	325	324	326	327	326	326	327	326	327	328	326	322	314	311	310	312	312	314	319	324
31																										
Mean		329	335	335	331	331	328	324	317	313	307	305	305	303	308	310	311	310	303	296	295	296	301	310	318	313

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 19 Victoria 18,500 γ + July 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	308	316	300	291	296	304	301	292	290	304	308	304	320	324	326	318	299	290	281	285	292	290	289	292	301
2	296	300	308	301	303	304	299	294	302	307	312	313	321	326	331	319	310	316	307	304	303	299	301	302	307
3	302	307	313	313	314	313	305	302	302	313	316	306	306	311	313	312	315	321	314	307	293	283	291	300	307
4	302	308	307	306	308	308	314	321	322	327	325	334	339	336	339	327	321	321	311	310	311	305	299	285	316
5 D	262	322	293	265	252	262	259	270	270	283	291	298	285	300	303	283	304	313	301	286	293	287	288	284	286
6	285	303	291	305	298	299	298	298	302	300	299	293	298	305	305	289	271	303	327	319	303	286	285	283	298
7	269	296	317	295	298	309	314	307	301	301	302	303	303	301	295	299	298	303	299	299	298	297	299	301	300
8	305	300	299	290	297	304	308	303	291	297	295	297	299	306	307	296	293	288	291	286	286	279	278	279	295
9	290	302	311	313	300	292	306	284	300	305	308	306	307	311	311	306	300	314	313	297	285	281	277	281	300
10	301	307	304	303	304	285	282	280	300	304	292	291	303	318	320	308	309	299	284	268	260	266	282	294	294
11 Q	300	309	301	304	305	301	307	307	305	303	302	306	312	319	324	322	319	316	297	295	287	291	292	297	305
12 Q	289	300	314	316	313	315	314	303	304	303	314	316	315	319	326	322	306	290	289	291	289	285	291	295	305
13 D	303	310	313	315	317	315	319	320	323	321	320	359	352	375	285	223	331	266	249	274	282	286	304	306	307
14 D	307	295	297	290	299	290	297	293	296	145	121	41	123	215	185	198	204	201	202	246	266	289	291	301	237
15	294	304	295	279	254	250	256	264	272	276	267	270	279	283	279	284	281	274	272	255	223	244	272	305	272
16	328	368	310	258	271	284	282	286	286	279	282	284	284	278	283	303	291	267	256	270	273	278	289	286	287
17	290	276	280	285	301	310	301	304	300	302	313	301	293	291	307	302	293	282	266	225	251	261	264	294	287
18 D	332	322	286	277	282	283	239	273	292	300	299	281	271	274	292	255	250	240	219	220	233	257	295	303	274
19	355	344	309	280	244	263	273	274	278	279	278	280	284	282	287	274	266	269	274	281	270	275	282	279	283
20	282	296	300	294	301	295	302	286	291	297	300	302	301	306	314	314	303	286	270	276	283	302	287	303	296
21	305	331	277	270	283	268	262	277	267	284	279	278	271	274	262	252	264	261	272	274	274	276	291	299	277
22	318	313	319	304	302	302	298	296	282	294	305	296	302	305	302	310	312	301	296	294	281	276	280	284	299
23	296	299	307	305	302	305	309	313	318	324	329	316	324	315	315	312	324	304	309	299	275	274	272	278	305
24	280	278	289	292	292	294	292	303	306	288	287	300	302	311	312	312	322	317	313	316	304	301	302	296	300
25	296	321	323	305	281	285	302	297	292	292	303	313	312	316	322	323	321	309	296	285	277	284	295	309	303
26	301	297	299	291	289	300	304	306	312	318	314	306	304	305	311	318	306	290	284	285	281	274	315	315	301
27 D	326	329	328	332	319	313	314	316	198	21	-15	150	263	262	274	267	234	192	156	214	244	251	291	288	245
28	269	253	255	267	268	277	279	283	294	287	290	292	286	284	278	271	279	277	277	266	257	278	281	289	277
29 Q	282	282	287	286	282	277	282	285	296	301	300	299	301	302	304	301	297	294	293	284	276	275	279	284	290
30 Q	290	294	289	300	302	303	306	312	302	309	306	304	304	301	300	298	298	300	298	292	279	280	289	289	298
31 Q	291	303	304	306	307	304	303	303	310	308	309	315	310	314	315	310	300	289	283	271	273	278	284	294	299
Mean	299	306	301	295	293	294	294	295	294	286	286	289	296	302	301	295	294	287	281	280	278	280	288	293	292

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 20 Victoria 22° 30.0′ + July 1961

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	11.9	14.1	17.4	17.7	17.3	17.1	20.3	23.2	21.6	18.9	19.4	16.4	19.1	20.6	23.1	26.3	26.8	24.1	19.6	14.7	10.6	8.6	9.9	12.1	18.0
2	14.0	15.4	16.6	16.8	17.2	19.1	17.3	18.8	18.6	15.6	16.6	17.6	19.3	20.7	21.3	23.6	22.7	23.6	20.4	15.4	14.0	13.9	13.8	14.4	17.8
3	14.1	15.3	15.6	15.8	15.5	15.9	20.4	20.6	19.4	17.6	16.5	16.3	23.6	23.9	23.3	24.6	23.6	22.5	20.9	18.8	16.3	12.8	11.5	11.4	18.2
4	12.8	13.6	15.7	16.6	16.7	16.4	14.8	14.8	16.6	16.8	17.4	18.3	21.4	22.1	22.1	22.9	23.8	19.8	19.6	16.4	15.5	14.6	12.9	13.5	17.3
5 D	14.4	12.3	13.7	16.8	25.6	23.6	22.5	21.3	20.4	19.5	16.7	13.6	15.5	19.4	20.6	20.4	23.0	22.9	21.6	17.5	16.1	15.4	15.3	14.5	18.4
6	15.8	15.9	17.0	23.5	16.5	15.1	17.2	20.6	19.1	16.4	16.0	15.4	16.6	18.8	20.1	20.4	19.8	15.6	18.6	20.1	18.6	15.8	15.0	15.1	17.6
7	15.7	15.6	18.9	16.9	16.5	17.6	18.7	17.6	17.6	17.6	13.6	14.7	17.4	18.8	18.5	21.7	24.4	23.1	21.9	18.9	16.5	14.7	13.9	14.5	17.7
8	15.4	16.7	17.7	19.9	17.2	16.1	20.5	19.5	20.4	23.8	16.5	17.7	19.5	19.6	21.7	23.7	23.0	21.7	18.4	16.8	16.4	15.5	14.6	14.7	18.6
9	14.8	15.3	16.3	18.6	20.6	19.9	17.6	21.4	17.0	15.9	19.3	17.4	18.7	20.0	21.8	23.8	23.5	23.6	20.9	19.0	17.6	15.8	15.2	14.6	18.7
10	14.8	15.9	17.5	18.1	26.3	19.9	22.1	20.5	17.5	17.5	19.6	17.6	18.7	19.8	21.7	25.5	24.5	26.3	22.6	18.5	15.5	14.5	13.8	13.7	19.3
11 Q	14.9	16.4	18.5	17.6	17.5	17.5	17.4	16.8	16.9	16.6	16.7	17.5	17.6	20.6	22.6	24.0	25.6	25.5	20.9	16.3	14.6	13.5	12.6	12.6	18.0
12 Q	13.8	14.9	16.6	17.5	16.8	16.0	20.4	23.1	21.0	14.5	17.6	17.5	19.0	20.6	21.6	24.6	25.4	25.6	23.5	17.6	14.8	13.6	12.6	12.3	18.4
13 D	13.0	14.5	15.8	16.5	15.7	15.5	14.6	14.7	15.1	14.9	13.7	12.0	21.3	31.6	23.1	43.0	32.3	30.6	23.6	15.7	12.0	11.8	11.9	13.0	18.6
14 D	11.5	13.1	13.7	14.9	15.9	16.4	15.6	16.6	17.9	23.9	23.4	27.6	15.6	18.9	18.6	21.6	19.8	21.5	21.7	17.5	19.5	17.6	16.7	16.5	18.2
15	18.9	17.5	17.1	18.8	23.7	18.3	21.6	24.6	19.6	18.8	19.0	16.7	17.5	19.6	18.4	19.9	21.3	20.6	19.6	18.3	17.6	14.9	13.6	11.6	18.7
16	11.8	13.7	14.5	17.6	16.7	17.6	14.9	16.5	15.5	14.6	14.5	16.5	18.4	19.8	19.6	24.6	28.3	28.5	20.6	14.3	9.6	10.5	12.8	13.3	16.9
17	13.1	15.7	16.8	17.5	20.5	19.6	16.5	15.6	15.9	16.4	13.6	13.4	19.6	23.0	26.6	27.6	29.6	29.7	28.2	23.5	8.6	8.6	7.4	5.6	18.0
18 D	4.8	8.1	8.4	12.6	24.4	36.8	27.9	18.6	19.9	15.8	14.4	12.6	13.8	11.6	20.8	26.1	17.6	14.1	11.9	18.7	15.0	14.9	16.6	17.1	16.8
19	20.3	19.0	14.2	15.5	19.7	18.4	16.8	17.1	16.9	16.8	16.7	17.4	17.7	18.6	20.7	22.7	24.2	24.4	21.4	16.8	14.6	13.8	14.4	14.5	18.0
20	14.5	14.8	15.6	17.2	18.8	18.6	23.6	19.4	16.6	16.6	16.7	18.6	19.8	21.5	23.7	25.5	28.9	27.9	26.3	19.9	12.9	8.3	8.5	7.6	18.4
21	8.7	4.8	9.6	13.4	29.0	20.6	17.5	24.6	19.8	19.5	19.8	19.9	18.4	16.2	13.0	11.9	20.0	16.0	17.6	17.5	14.7	15.4	14.4	13.7	16.5
22	12.6	14.6	15.8	16.5	16.6	16.8	24.5	20.6	26.4	20.7	16.5	17.3	18.5	18.6	19.5	21.7	22.7	21.9	18.8	16.8	16.3	15.6	13.8	13.2	18.2
23	13.6	14.8	16.0	16.9	16.7	16.6	16.2	16.4	16.5	17.6	22.4	18.4	19.1	20.5	21.3	17.1	19.4	24.4	19.6	19.6	18.2	16.3	15.0	14.4	17.8
24	13.6	15.2	16.6	16.7	22.4	21.9	20.3	17.6	18.9	22.8	15.7	16.7	16.7	20.5	23.6	23.8	25.6	23.4	19.1	16.7	16.4	15.6	14.6	15.3	18.7
25	15.0	15.8	20.4	13.9	15.7	19.6	24.5	18.8	18.6	22.3	15.6	16.1	16.5	21.8	24.4	25.5	24.9	23.1	19.6	16.5	13.9	11.8	11.0	11.9	18.3
26	14.4	15.8	16.8	19.6	19.7	15.7	16.5	16.2	16.3	16.3	13.4	17.4	17.6	18.6	21.9	24.3	24.6	22.6	19.6	17.1	16.4	11.5	8.6	6.4	17.0
27 D	9.4	8.9	12.4	11.4	11.8	17.7	14.7	17.6	16.8	21.8	54.6	28.1	26.8	25.6	29.6	29.1	30.4	26.4	17.4	11.9	16.6	12.5	12.9	11.4	19.8
28	12.1	16.6	18.9	21.7	18.8	19.5	21.4	16.7	16.7	18.6	16.7	17.4	19.6	21.6	23.7	23.4	24.5	21.6	19.6	15.8	13.3	12.6	12.9	14.6	18.3
29 Q	15.9	16.7	17.6	17.6	22.5	19.9	17.9	15.6	14.9	14.6	16.4	17.6	18.5	20.7	24.0	25.6	26.6	23.6	19.5	15.4	13.6	13.6	13.3	12.3	18.1
30 Q	12.8	13.8	15.6	15.8	16.2	17.8	19.6	19.1	18.9	17.0	16.3	17.4	20.6	22.8	24.8	26.6	25.6	23.9	20.8	18.6	16.5	14.6	14.6	14.3	18.5
31 Q	15.3	16.3	16.6	16.4	16.5	16.4	16.7	16.9	16.7	18.4	16.9	16.6	15.9	19.8	23.4	25.6	25.5	23.7	20.6	16.8	14.4	14.6	13.0	11.7	17.7
Mean	13.7	14.6	15.9	17.0	18.9	18.6	19.1	18.8	18.2	18.0	18.2	17.4	18.7	20.5	21.9	24.1	24.5	23.3	20.5	17.3	15.1	13.7	13.1	13.0	18.1

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 21 Victoria — 53,000 γ + — July 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	325	333	335	332	332	332	311	313	320	324	317	309	316	327	329	331	327	318	307	310	311	309	315	323	321
2	328	330	332	329	327	323	316	323	315	318	322	323	325	324	322	319	313	305	293	292	295	301	313	321	317
3	323	325	324	321	319	317	321	314	316	324	322	289	284	303	308	308	305	304	296	295	299	305	310	315	310
4	324	330	325	324	323	321	320	320	322	322	318	317	318	319	318	314	306	304	304	300	297	298	314	331	316
5 D	347	387	424	431	420	376	347	338	316	314	322	301	278	300	308	301	313	319	311	310	317	315	313	333	335
6	338	345	345	348	335	328	329	328	320	322	320	319	321	325	327	316	295	287	310	310	312	314	319	323	322
7	325	347	360	346	338	327	315	296	304	315	310	304	309	312	313	315	319	314	308	312	313	312	313	316	319
8	321	327	334	337	331	324	320	311	299	297	302	315	316	317	317	311	310	304	298	295	295	303	311	320	313
9	331	332	334	337	334	331	304	308	321	319	312	310	316	319	319	319	313	311	308	305	301	297	303	311	317
10	325	336	339	343	344	330	329	305	297	302	285	288	287	311	322	328	321	302	294	289	292	300	310	317	312
11 Q	321	333	339	335	330	326	323	321	321	316	316	319	321	323	324	320	315	310	296	294	294	303	306	317	318
12 Q	322	330	335	331	325	322	324	321	311	284	305	316	323	326	328	325	318	310	306	299	298	302	304	308	316
13 D	316	323	327	326	326	325	325	324	324	321	304	305	256	299	239	215	277	279	276	279	305	309	319	354	302
14 D	363	365	362	344	342	338	332	331	288	64	-39	-45	70	142	174	221	233	252	267	300	338	364	350	353	255
15	372	378	378	385	393	337	332	335	332	332	326	323	324	323	312	320	327	331	331	332	327	352	374	390	344
16	411	433	420	386	362	354	345	344	340	330	320	328	333	327	318	326	326	320	314	318	309	306	310	322	342
17	342	344	343	346	343	332	329	333	332	329	310	284	267	263	286	318	334	330	315	302	314	325	341	353	322
18 D	386	416	396	411	407	359	318	358	336	326	329	304	163	157	126	189	201	214	269	312	340	369	414	439	314
19	476	456	433	431	391	364	352	345	341	339	339	338	339	339	342	338	330	325	321	324	320	308	317	327	356
20	338	343	342	337	343	339	341	341	336	338	339	338	339	340	341	340	336	325	313	312	300	302	306	325	331
21	330	347	369	377	394	384	369	291	262	300	309	307	299	281	260	259	275	297	299	312	325	337	340	344	320
22	344	341	343	339	334	338	339	319	302	319	333	332	338	336	324	319	327	325	318	313	310	312	317	325	327
23	331	335	339	338	334	331	330	329	328	327	311	309	323	322	304	291	291	298	303	306	311	317	324	333	319
24	345	351	355	357	357	341	339	338	328	303	294	304	301	321	331	324	334	332	327	323	321	319	321	332	329
25	339	359	376	372	378	377	346	332	331	318	312	328	330	333	336	340	338	335	325	319	314	315	318	326	337
26	339	341	346	351	353	345	342	338	335	329	304	312	320	325	328	335	333	322	310	307	306	318	330	335	329
27 D	349	347	345	343	340	348	349	346	104	-56	-60	97	289	326	330	344	318	297	288	314	336	373	378	360	284
28	348	354	358	361	354	350	341	338	329	314	328	335	337	339	337	333	334	322	316	311	309	321	325	329	334
29 Q	333	336	340	344	345	341	340	332	327	326	324	330	334	332	335	332	327	317	308	305	310	318	323	329	329
30 Q	336	337	333	334	333	335	332	324	320	318	309	311	320	324	325	323	315	307	301	307	313	317	321	325	322
31 Q	328	331	331	327	325	326	327	329	329	327	327	322	315	320	325	323	321	313	310	312	315	315	314	319	322
Mean	344	351	354	352	349	339	332	327	313	299	293	296	300	308	307	310	311	307	305	307	311	318	325	334	320

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 22 Victoria — 18,500 γ + — August 1961

Day	Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		297	300	299	294	310	310	312	310	311	313	315	315	313	315	317	319	313	293	279	278	279	287	296	307	303
2	D	337	290	311	327	298	289	303	272	272	270	290	292	290	281	311	301	279	287	278	254	272	286	294	299	291
3		299	295	305	297	294	285	293	298	299	305	306	307	298	302	305	304	303	294	292	291	292	283	297	298	298
4	D	309	300	287	282	295	311	305	296	307	310	294	300	310	306	298	298	305	328	343	336	321	315	311	310	307
5		313	315	310	311	314	310	305	306	312	307	294	300	306	303	301	300	291	270	269	267	281	294	303	302	299
6		297	307	311	310	309	313	313	312	317	313	313	312	310	308	311	305	292	277	270	272	285	292	291	307	302
7	Q	307	309	309	310	310	312	314	316	315	318	315	315	314	318	316	308	299	285	271	267	278	285	290	295	303
8		306	309	313	315	305	308	318	317	314	308	299	303	322	319	324	327	312	281	244	260	292	302	301	306	304
9	Q	303	307	300	298	300	300	303	304	307	308	310	313	310	313	316	312	302	290	282	278	286	293	296	297	301
10		306	312	298	299	304	295	287	291	291	289	289	291	291	287	290	307	300	289	287	294	292	291	299	306	295
11	D	325	298	300	288	287	314	320	322	321	319	310	315	283	298	325	331	322	301	293	295	281	283	294	289	305
12		304	303	297	296	297	299	306	311	311	313	313	311	310	310	308	306	300	280	278	279	282	305	298	307	301
13	Q	313	315	296	302	311	314	316	317	315	318	315	315	313	318	320	316	304	287	278	282	289	296	298	301	306
14		311	313	313	311	313	311	313	315	316	314	317	324	328	324	325	317	298	307	303	284	275	288	295	299	309
15		311	310	316	316	317	318	324	305	287	303	314	317	324	321	323	319	315	296	280	266	262	270	282	294	304
16		302	314	315	312	317	312	313	311	312	314	316	316	317	322	324	316	305	294	276	266	277	289	305	306	306
17		309	307	313	317	316	317	321	320	320	333	325	319	321	327	329	321	303	286	276	270	277	283	289	296	308
18		321	307	307	311	315	318	318	317	321	328	327	321	323	332	256	324	311	298	286	279	283	285	291	305	308
19		314	313	308	308	300	282	281	273	289	305	301	285	303	303	308	311	307	293	278	269	267	277	283	295	294
20		305	305	304	307	314	312	312	315	314	314	320	311	311	316	313	311	295	302	307	295	285	283	290	298	306
21		311	317	313	312	313	316	322	321	315	313	312	312	317	320	323	314	299	290	286	285	292	300	310	315	310
22	Q	318	315	313	317	319	321	321	321	319	320	320	319	319	321	317	308	298	297	293	294	298	303	313	315	313
23	Q	317	313	311	314	315	317	321	323	325	324	322	317	318	318	316	308	297	284	277	282	288	304	317	321	310
24		321	320	317	319	321	324	324	323	323	325	327	329	329	331	329	321	309	287	285	287	300	307	320	331	317
25		321	314	309	321	323	321	319	321	320	316	327	319	320	316	309	311	306	292	286	291	296	308	302	315	312
26		316	323	316	309	303	312	323	318	320	335	326	327	326	333	331	319	297	279	275	277	273	285	295	303	309
27		286	303	309	307	305	303	287	290	309	316	317	317	319	320	323	313	305	293	284	279	281	287	295	305	302
28		307	316	316	311	313	315	314	313	316	316	315	316	315	318	323	314	299	280	269	267	269	277	298	314	305
29		318	319	319	315	317	316	318	317	315	317	321	319	319	320	320	317	320	313	274	258	295	311	324	302	312
30	D	297	295	296	295	304	316	319	323	324	332	311	304	265	301	308	286	275	302	301	287	280	272	288	299	299
31	D	285	293	265	268	278	269	277	275	281	299	299	295	296	298	293	304	290	260	254	258	271	285	279	288	282
Mean		309	308	306	306	308	308	310	309	310	313	312	312	311	314	313	312	302	291	282	279	284	291	298	304	304

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 23 Victoria 22° 30.0′ + August 1961

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	12.6	14.4	15.9	18.9	16.9	15.8	15.8	16.3	16.0	16.6	17.4	17.5	18.0	20.5	21.4	21.9	23.0	21.8	21.2	18.6	13.5	10.8	10.9	11.5	17.0
2 D	7.4	8.5	10.4	9.8	20.4	25.4	28.9	25.9	27.6	22.9	21.5	15.8	16.5	17.4	22.5	22.6	22.7	22.9	19.8	15.8	13.5	10.9	12.8	14.4	18.2
3	15.5	16.6	17.0	21.8	20.5	22.0	17.7	18.8	14.6	17.5	18.3	15.9	15.9	17.7	22.6	23.7	24.8	23.5	20.3	17.4	15.4	14.0	14.5	15.9	18.4
4 D	14.3	20.6	17.6	15.5	16.5	22.5	19.6	19.6	15.6	16.5	12.6	13.7	18.4	19.6	19.6	20.8	21.9	21.6	18.9	18.2	15.5	14.5	13.6	14.4	17.6
5	15.0	15.6	16.5	16.8	19.3	21.5	19.4	16.9	17.7	21.3	17.5	20.4	20.0	21.4	22.6	24.4	24.6	23.6	19.4	14.4	11.6	11.7	13.4	14.5	18.3
6	15.7	16.4	16.4	16.5	15.6	16.3	15.8	16.7	18.5	17.6	18.6	19.6	19.5	21.6	20.5	22.7	23.5	23.6	19.9	13.9	12.5	12.7	12.9	13.7	17.5
7 Q	15.5	16.7	17.7	17.4	16.6	16.5	16.6	16.9	17.5	17.6	18.4	18.3	16.6	20.6	22.6	23.5	23.3	22.2	20.6	16.8	15.4	14.7	13.7	14.6	17.9
8	15.1	15.3	15.7	16.5	15.9	16.4	26.5	18.7	17.7	22.6	24.9	14.3	17.6	19.0	21.8	24.5	24.6	24.5	19.9	8.5	10.6	10.5	10.0	11.1	17.6
9 Q	14.5	16.7	18.5	17.7	16.7	18.9	19.5	16.6	15.9	16.8	17.5	17.5	17.8	19.5	21.5	23.6	24.5	23.6	19.8	15.6	12.9	13.2	11.9	12.7	17.6
10	13.4	15.3	17.4	16.7	17.5	18.6	20.0	26.3	25.5	22.9	20.9	22.8	20.6	21.9	19.0	26.4	26.5	24.8	20.1	16.3	13.8	13.5	13.6	13.7	19.5
11 D	13.4	16.9	15.6	16.7	18.9	15.6	14.7	15.3	20.3	23.4	19.6	19.5	17.6	23.8	26.6	27.7	28.5	26.7	20.3	15.7	12.5	10.5	10.3	11.7	18.4
12	14.0	15.4	16.4	16.6	17.1	16.3	16.4	17.4	15.8	16.5	17.4	18.0	18.9	20.5	22.7	25.5	27.7	28.6	23.4	18.8	12.3	9.9	10.5	11.4	17.8
13 Q	13.8	15.5	16.0	15.7	15.9	16.1	16.2	16.5	16.6	16.4	16.7	17.6	18.9	20.8	23.4	25.9	27.6	25.4	19.8	14.6	12.1	11.6	11.6	11.8	17.4
14	13.4	14.5	15.6	15.7	15.9	16.5	16.6	16.6	17.9	16.7	16.5	16.5	15.6	25.7	27.9	30.5	31.6	22.8	18.0	14.5	12.5	11.8	11.4	11.8	17.8
15	13.4	15.6	16.4	15.6	15.5	15.6	25.7	20.5	19.5	16.5	16.9	17.9	19.8	22.4	24.7	26.7	25.8	23.3	18.6	15.7	14.4	13.4	11.7	11.8	18.2
16	14.7	15.6	16.4	17.0	20.7	17.6	15.6	15.9	16.4	16.7	16.7	17.4	18.4	20.5	22.7	26.6	28.4	25.1	21.3	16.8	13.6	11.5	10.4	11.8	17.8
17	14.0	16.3	16.6	16.4	15.9	15.8	16.4	16.9	16.8	16.5	16.5	18.4	19.6	20.7	22.5	24.5	26.4	25.7	21.6	15.6	13.3	10.8	10.8	12.5	17.5
18	14.3	15.4	16.1	16.7	16.8	16.7	16.9	17.4	16.9	17.1	17.7	17.6	18.3	19.6	22.4	24.6	26.4	23.6	20.4	16.8	14.8	13.9	12.9	12.8	17.8
19	14.5	16.4	17.6	17.5	17.9	21.4	21.0	23.8	21.7	19.7	18.8	17.8	18.8	20.2	21.9	25.5	25.7	24.7	20.9	17.6	14.6	12.6	12.3	12.6	19.0
20	14.0	15.9	16.6	16.6	16.4	16.3	16.5	16.6	16.8	16.8	16.6	17.5	18.4	19.4	19.0	23.4	23.7	18.9	15.6	15.5	14.6	12.6	11.4	12.5	16.7
21	14.5	16.4	17.4	16.4	16.6	17.5	18.6	17.6	16.8	16.8	17.6	15.6	18.5	20.6	23.0	25.7	26.5	23.5	19.4	14.9	12.8	11.5	11.5	12.6	17.6
22 Q	13.9	15.0	16.1	15.9	15.9	16.4	16.5	16.5	16.9	17.4	18.0	18.6	19.0	20.6	21.7	23.7	24.5	22.5	17.4	12.6	11.3	11.0	12.2	14.4	17.0
23 Q	14.9	15.7	15.6	15.5	15.5	16.0	15.6	15.6	15.7	17.5	17.7	17.8	19.5	19.8	20.4	21.8	23.5	21.5	17.4	13.3	10.6	10.5	11.6	13.6	16.5
24	15.0	15.7	15.7	15.4	15.6	15.6	15.8	15.9	16.6	17.3	17.6	18.5	19.5	21.1	23.5	25.4	25.9	24.7	16.6	12.6	9.9	8.9	9.9	11.6	16.9
25	14.4	16.2	16.5	15.5	14.8	14.6	15.4	16.3	17.5	18.6	20.4	20.7	20.3	20.8	19.0	21.5	23.6	22.5	19.1	14.3	11.7	9.7	11.6	13.6	17.0
26	15.6	15.7	14.9	15.5	15.8	16.2	17.5	16.5	15.6	11.7	17.6	19.4	20.5	21.3	23.7	24.7	25.3	22.4	16.4	11.6	9.6	8.6	10.6	10.7	16.6
27	15.0	17.7	16.8	16.7	17.2	17.6	22.7	21.6	15.7	15.6	16.6	17.6	18.8	20.7	23.1	25.7	24.4	21.6	17.4	13.6	12.6	12.3	12.6	13.8	17.8
28	16.6	17.3	16.9	16.6	15.6	15.9	16.4	16.6	17.4	17.6	17.3	18.6	19.6	21.7	23.4	25.6	26.4	25.5	21.7	17.7	14.3	11.6	11.6	12.3	18.1
29	13.9	15.6	16.5	16.7	16.7	17.1	16.7	16.7	16.7	16.8	16.8	18.3	17.9	20.3	21.6	23.6	26.4	27.8	24.7	16.5	7.9	11.3	11.4	12.6	17.5
30 D	12.5	14.8	15.8	21.6	19.6	17.3	16.5	16.4	17.7	23.9	18.5	19.7	21.3	21.5	22.3	23.8	18.7	19.6	17.7	15.9	13.9	12.6	11.6	11.8	17.7
31 D	14.8	17.5	23.9	26.8	24.3	22.6	23.4	14.9	23.3	19.9	17.4	14.6	13.7	17.4	18.9	24.8	26.9	25.7	20.4	14.8	11.6	12.6	13.4	14.5	19.1
Mean	14.2	15.9	16.5	16.9	17.2	17.7	18.4	17.9	17.9	18.1	18.0	17.9	18.5	20.6	22.2	24.6	25.3	23.7	19.6	15.3	12.8	11.8	11.9	12.9	17.7

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 24 Victoria 53,000 γ + August 1961

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		327	336	341	342	334	330	329	327	326	326	325	326	326	329	326	324	322	313	297	288	282	292	305	315	320
2	D	341	349	349	351	402	419	324	317	277	307	325	321	305	284	299	316	316	311	308	307	312	321	331	347	327
3		354	352	353	347	349	358	332	330	304	297	322	331	316	313	332	331	330	322	312	315	316	317	334	342	330
4	D	353	365	364	354	346	341	318	327	323	321	312	305	323	326	326	328	324	320	317	323	326	328	330	332	331
5		331	336	341	339	341	337	332	331	329	310	289	306	319	328	327	328	330	326	322	321	318	318	320	327	325
6		331	333	334	333	330	331	331	329	327	328	324	326	326	323	327	324	323	317	307	301	303	306	310	319	323
7	Q	325	329	330	330	328	328	328	328	327	326	326	326	322	321	324	328	326	316	309	303	301	303	307	316	321
8		325	328	327	331	333	334	329	315	322	308	304	310	314	328	324	331	330	327	318	317	315	315	313	322	322
9	Q	329	332	334	333	330	330	330	326	324	321	320	320	320	315	320	322	315	302	297	296	295	302	308	315	318
10		323	329	329	331	334	337	341	314	298	297	305	307	310	302	276	292	302	302	308	314	313	314	319	325	313
11	D	345	347	353	365	365	345	336	331	327	309	298	305	245	245	273	279	296	288	284	297	300	313	325	331	313
12		337	328	325	332	336	336	334	325	327	324	323	324	326	326	323	323	320	313	304	293	298	301	305	317	321
13	Q	325	335	329	325	323	323	323	322	322	321	320	319	321	322	323	323	320	310	298	293	295	298	301	309	317
14		317	321	320	318	317	317	319	319	318	316	320	319	301	301	318	322	316	299	290	293	293	297	304	311	311
15		318	318	318	315	315	317	322	315	319	322	320	319	318	317	315	314	310	300	298	304	303	306	314	322	314
16		331	331	330	326	324	318	317	316	315	315	316	316	318	322	323	325	325	316	306	299	296	296	304	312	317
17		318	319	319	318	314	313	314	314	314	305	285	289	306	316	318	316	309	297	291	289	290	299	308	316	307
18		322	322	317	314	314	312	311	312	313	312	304	309	315	320	320	323	320	306	298	298	304	307	313	314	313
19		317	320	322	318	318	324	324	322	322	314	293	286	302	306	316	325	325	320	319	317	315	315	321	325	316
20		326	327	324	321	319	317	315	315	315	315	308	298	305	315	311	307	298	286	284	288	289	298	308	317	309
21		323	328	325	321	320	318	315	312	311	312	313	309	309	313	317	314	310	298	291	293	296	300	307	309	311
22	Q	316	316	314	314	313	312	311	311	310	310	310	310	310	313	312	310	306	300	294	291	294	298	300	306	308
23	Q	311	312	312	313	314	313	313	311	307	308	309	307	309	312	314	314	309	301	289	284	280	285	297	301	305
24		307	310	309	308	309	309	309	309	307	308	307	308	308	310	313	313	308	300	291	278	280	287	296	304	304
25		308	312	308	309	309	310	311	313	314	311	311	309	310	309	308	302	298	288	285	282	286	288	294	304	303
26		306	309	307	310	312	316	311	312	313	293	294	301	306	310	310	308	302	294	285	279	279	293	304	315	303
27		317	320	316	312	312	315	318	318	320	318	316	314	313	314	315	311	308	303	298	297	302	307	308	314	312
28		319	318	316	313	311	311	311	312	314	312	311	309	309	311	312	310	304	292	285	286	292	299	295	301	306
29		315	314	312	309	310	309	309	309	310	311	311	310	308	308	311	309	305	293	275	283	301	310	314	318	307
30	D	335	341	339	344	334	327	322	318	316	308	249	229	178	220	265	272	274	275	288	301	307	314	321	337	296
31	D	344	353	368	372	321	318	328	276	262	300	313	315	305	305	296	309	311	303	301	295	298	314	318	326	315
Mean		326	329	329	328	327	327	322	317	314	312	309	309	307	309	313	315	313	305	298	298	299	305	311	318	314

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 25 Victoria — 18,500 γ + — September 1961

Day		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	285	282	289	293	294	314	304	289	284	286	286	305	304	306	307	290	298	290	266	250	264	267	265	284	287
2		294	292	293	293	297	300	305	307	299	310	300	288	295	298	300	291	282	270	270	274	279	287	294	295	292
3		286	297	298	297	297	297	310	291	297	303	306	299	299	300	302	296	285	278	271	274	282	284	293	298	293
4		298	301	303	305	304	299	307	322	309	311	305	297	298	304	307	298	289	279	277	280	289	296	305	299	299
5		303	288	288	291	300	305	306	305	301	302	305	297	299	300	293	298	295	281	266	262	267	280	301	308	293
6		312	304	295	291	286	295	302	305	308	310	310	310	308	311	308	301	282	271	271	273	280	288	299	309	297
7	Q	310	302	298	303	304	306	308	314	312	314	316	318	321	321	316	302	284	271	270	272	277	292	309	312	302
8	Q	311	311	310	310	310	309	308	310	313	315	316	320	318	317	314	307	291	284	278	287	299	303	311	315	307
9		319	315	319	317	316	318	311	301	307	317	297	299	305	310	309	295	278	271	269	274	284	291	292	303	301
10		303	299	297	305	307	306	305	308	306	311	313	316	315	313	307	300	283	276	276	276	273	291	297	309	300
11		302	308	310	310	313	305	309	311	318	316	322	327	327	331	327	315	275	246	247	253	259	263	278	289	298
12		302	306	303	293	290	269	283	280	294	295	299	303	300	300	306	300	279	262	258	260	267	282	288	284	288
13		300	298	300	296	289	291	300	301	304	306	309	311	313	315	309	295	285	273	269	275	283	285	281	296	295
14	D	298	302	306	310	287	279	291	303	323	308	313	318	271	290	313	289	274	273	275	275	271	287	293	285	293
15		296	299	293	297	299	298	295	296	301	283	285	294	293	300	298	294	287	277	271	276	279	283	287	293	291
16		298	300	296	296	298	305	304	302	308	306	306	309	305	299	303	301	288	279	282	287	282	275	285	293	296
17		291	286	269	271	294	280	287	288	291	295	298	300	300	303	303	298	288	278	275	277	279	281	284	287	288
18		285	288	288	283	292	304	301	298	299	301	305	308	309	306	298	295	300	297	289	282	284	285	289	293	295
19	Q	299	305	305	298	301	304	305	306	307	309	310	312	310	308	310	307	299	292	288	293	300	301	301	302	303
20		298	295	293	289	285	287	291	285	291	297	306	308	313	310	312	304	312	313	307	299	297	299	311	311	301
21	Q	309	309	309	310	310	311	308	307	308	310	312	312	311	309	307	305	299	291	289	292	295	302	306	305	305
22		307	309	312	310	312	310	312	312	317	322	328	332	332	324	319	304	295	294	291	294	298	306	310	312	311
23	Q	306	305	308	308	308	308	312	310	311	314	315	316	316	316	313	308	300	288	290	296	307	318	319	318	309
24	D	315	316	315	315	314	313	311	313	314	308	302	288	325	342	309	305	297	254	268	276	272	267	249	268	298
25	D	278	281	255	281	283	288	292	276	264	300	289	285	278	283	306	285	283	281	278	274	279	288	284	289	283
26		279	279	294	286	298	300	294	291	294	303	296	300	293	298	289	276	274	260	266	266	272	278	281	288	286
27		280	273	275	271	296	272	284	279	273	280	281	271	284	308	301	296	294	280	274	272	276	283	296	300	283
28		301	301	297	295	295	295	298	296	296	299	300	303	306	303	302	299	291	283	272	267	268	276	284	288	292
29		301	304	301	301	296	296	295	299	300	302	304	306	305	308	306	299	288	281	278	278	284	291	303	304	297
30	D	300	298	301	295	284	281	288	289	292	299	301	303	299	306	309	304	296	287	280	282	280	259	310	336	295
31																										
Mean		299	298	297	297	299	298	301	300	301	304	304	305	305	308	307	299	289	279	275	277	281	286	294	299	296

96139—5½

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 26 Victoria 22° 30.0′ + September 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	15.8	16.3	19.3	17.7	25.9	25.7	29.8	25.6	19.5	23.3	11.8	14.4	20.5	21.8	22.4	21.4	20.7	22.5	19.8	17.5	13.4	13.6	12.0	14.5	19.4
2	15.3	16.6	17.5	19.5	18.8	18.3	17.7	17.0	18.9	10.9	16.6	18.8	17.4	17.4	20.4	22.3	22.9	22.4	19.4	15.7	14.4	13.6	13.8	14.0	17.5
3	16.9	16.3	15.8	16.9	25.3	21.5	17.4	18.8	17.4	16.9	15.9	20.6	20.6	21.3	22.6	24.6	25.5	22.8	18.4	13.8	11.6	11.6	13.6	15.3	18.4
4	16.1	16.6	16.5	16.6	16.6	17.5	17.1	16.8	15.8	16.5	18.5	14.5	18.7	22.3	23.6	24.8	23.8	21.6	17.8	15.4	14.0	13.6	13.6	15.2	17.7
5	14.7	20.3	16.6	15.4	16.6	19.4	18.9	18.5	16.9	17.5	16.9	18.0	16.5	18.0	20.6	23.9	23.4	20.6	17.6	13.6	11.7	10.7	11.4	13.8	17.2
6	15.8	17.5	17.9	19.4	18.5	17.4	16.5	16.4	16.4	16.4	16.6	16.9	17.4	19.8	21.7	24.9	27.4	23.8	18.4	14.1	12.9	13.6	14.7	16.4	18.0
7 Q	16.8	16.7	15.6	15.7	15.9	16.3	16.4	16.7	17.5	17.4	17.5	17.6	18.3	19.5	21.6	24.4	24.6	22.8	16.9	13.6	11.8	10.9	12.3	14.9	17.2
8 Q	16.3	15.8	15.8	16.1	16.1	16.6	16.6	16.6	16.6	17.4	17.1	16.6	18.4	19.6	21.6	23.5	25.1	22.9	19.6	15.6	13.5	12.6	11.6	12.9	17.3
9	13.5	13.9	14.4	14.4	14.8	14.9	16.3	16.6	17.1	16.2	23.6	21.7	22.5	22.7	22.9	23.4	23.4	19.5	16.4	12.9	12.3	11.7	12.9	14.4	17.2
10	13.9	15.4	15.8	15.5	16.3	16.6	16.6	16.7	17.1	17.5	17.7	18.7	19.7	20.7	22.8	24.5	25.6	19.5	14.8	10.9	8.6	10.9	13.4	14.7	16.8
11	17.0	16.8	16.4	16.4	15.5	17.9	15.7	15.7	16.1	17.5	17.5	14.6	19.0	22.4	23.7	25.3	26.6	23.3	16.7	11.5	10.6	9.5	8.7	11.5	16.9
12	14.6	15.8	16.4	16.4	15.4	18.8	23.9	19.8	16.5	16.9	17.3	18.3	24.6	24.6	25.7	25.6	24.4	21.9	18.4	15.4	13.5	12.7	12.8	14.6	18.5
13	14.8	15.9	15.9	15.6	15.7	16.6	17.6	17.5	17.3	17.6	17.6	18.6	18.9	20.6	23.0	25.4	25.7	21.9	16.0	11.5	11.3	10.9	11.8	11.6	17.1
14 D	12.8	13.7	15.5	15.8	19.9	19.6	16.4	21.5	25.8	21.6	18.9	18.8	8.6	15.9	25.8	24.9	24.8	21.5	17.8	13.8	11.6	12.4	12.5	11.4	17.6
15	15.8	16.4	17.1	17.6	17.1	16.9	17.3	17.5	20.1	20.9	19.7	19.4	22.7	20.7	19.4	21.2	20.9	20.6	18.6	17.3	15.9	15.3	15.2	15.6	18.3
16	16.4	16.4	16.6	16.6	17.4	19.9	18.4	17.4	17.3	17.6	16.8	15.3	18.8	18.4	17.6	22.8	23.9	21.7	16.6	15.2	14.9	14.3	15.1	15.6	17.5
17	15.6	14.8	16.4	14.7	18.5	18.8	18.9	18.6	18.0	17.6	17.5	15.3	16.6	18.5	19.9	22.4	22.7	20.6	17.6	15.6	15.6	15.6	15.7	16.4	17.6
18	16.8	16.7	16.8	17.6	16.8	17.4	16.7	16.6	17.8	18.1	17.8	17.4	17.3	17.6	16.5	16.3	18.6	20.8	20.6	18.9	17.3	16.4	15.8	15.7	17.4
19 Q	15.9	15.9	16.7	16.8	16.7	16.6	16.7	16.6	16.6	17.1	17.5	17.6	17.9	18.3	19.9	20.9	21.5	20.4	18.4	15.8	15.5	15.6	15.6	14.8	17.3
20	14.5	13.9	14.6	14.6	15.8	17.3	18.3	20.0	20.5	19.7	18.7	18.6	18.5	19.8	20.9	21.7	21.4	18.6	15.6	14.4	11.7	11.9	15.4	16.5	17.2
21 Q	16.9	16.5	16.4	16.4	16.4	16.4	16.3	16.8	17.5	17.8	17.9	18.7	18.8	19.6	21.3	23.3	23.9	22.5	18.8	16.5	15.6	15.3	15.6	16.5	18.0
22	16.5	15.9	15.7	15.8	15.8	15.9	15.9	16.4	16.5	16.8	17.6	18.4	19.3	21.3	22.6	23.8	21.8	19.3	16.7	13.6	12.8	13.6	15.3	16.5	17.2
23 Q	17.1	16.8	16.4	16.2	16.4	16.6	16.4	16.7	17.0	17.4	17.7	18.1	18.6	19.3	20.5	21.8	22.7	20.8	16.8	14.0	13.0	13.5	14.9	16.2	17.3
24 D	15.9	15.8	15.9	16.5	16.5	16.5	16.9	16.9	18.5	23.7	16.5	20.9	23.8	20.9	16.4	12.6	17.2	17.6	10.1	10.9	9.6	13.7	12.8	15.9	16.3
25 D	18.6	16.2	23.6	24.6	25.6	16.5	17.4	13.0	17.5	15.1	14.8	22.5	9.6	15.8	19.8	22.6	22.4	20.6	18.6	17.4	15.6	14.1	15.6	16.3	18.1
26	16.7	21.9	20.6	17.5	18.8	18.4	18.4	16.2	13.5	14.3	16.7	20.6	22.6	19.6	18.6	17.9	18.7	19.8	17.4	13.9	15.4	13.5	13.4	15.8	17.5
27	15.9	20.8	21.6	25.6	23.9	24.6	17.1	12.9	22.9	19.6	19.9	12.9	11.7	18.6	23.6	22.5	23.2	23.9	20.5	17.6	16.3	14.9	15.6	16.6	19.3
28	17.4	17.6	17.4	17.1	17.0	16.7	16.5	16.5	17.2	17.5	17.8	18.4	18.6	19.6	20.7	22.5	23.6	23.5	20.8	17.5	14.4	13.1	11.6	14.8	17.8
29	16.4	16.5	16.4	17.1	18.5	16.9	16.7	17.3	15.9	17.8	18.8	17.6	20.8	19.4	20.5	21.6	22.4	19.5	17.4	15.5	13.6	13.6	14.3	15.1	17.5
30 D	16.4	16.4	16.6	16.3	16.8	16.4	16.6	17.5	18.3	17.4	17.3	18.7	16.6	15.3	19.7	21.8	22.9	22.3	21.5	18.9	15.4	16.6	8.6	6.6	17.1
31																									
Mean	15.9	16.5	16.9	17.1	18.0	18.0	17.7	17.4	17.8	17.7	17.6	18.0	18.4	19.6	21.2	22.5	23.1	21.3	17.8	14.9	13.5	13.3	13.5	14.7	17.6

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 27 Victoria 53,000 γ + September 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	322	338	335	330	327	308	289	290	303	291	235	263	299	316	320	312	309	313	308	303	305	313	327	336	308
2	334	330	322	324	322	319	317	300	307	280	270	290	303	309	313	314	310	317	302	302	308	316	320	326	311
3	329	326	321	320	320	311	290	301	313	313	305	297	307	314	317	318	315	307	296	298	309	310	317	320	311
4	320	319	315	314	314	313	313	299	298	299	300	294	296	309	312	310	307	299	294	293	303	309	314	312	307
5	321	325	324	319	318	314	309	299	303	309	308	308	307	307	304	302	296	288	284	290	300	309	318	321	308
6	323	317	317	318	318	321	318	314	312	311	312	310	309	312	317	318	316	301	289	288	298	305	311	311	311
7 Q	311	309	308	310	311	311	311	310	308	309	310	310	311	311	313	313	310	300	290	295	302	302	303	303	307
8 Q	308	308	307	308	308	307	308	309	309	309	308	306	305	309	311	314	312	305	299	300	305	307	302	304	307
9	306	305	307	305	305	307	311	312	316	288	282	306	309	312	312	312	309	303	301	306	309	307	304	308	306
10	314	313	312	312	311	311	310	310	311	311	308	308	307	306	310	307	300	291	284	290	291	302	306	313	306
11	311	310	308	308	309	311	312	312	313	312	310	300	291	299	302	302	292	283	279	287	303	308	314	321	304
12	315	309	312	315	321	332	325	275	310	314	313	294	278	291	303	308	304	296	296	296	298	307	315	317	306
13	319	316	315	317	320	325	325	323	320	317	316	314	313	313	312	313	309	299	297	304	307	307	307	311	313
14 D	311	313	312	311	316	331	329	319	300	302	313	312	264	214	259	299	302	298	295	301	305	310	317	327	303
15	323	315	310	312	311	311	312	314	309	314	295	291	300	309	313	313	309	306	306	307	311	314	316	318	310
16	319	316	314	313	312	312	307	309	306	309	311	299	299	302	297	305	304	297	295	299	302	306	308	315	307
17	320	322	330	335	331	310	323	320	322	322	319	313	302	307	311	314	316	311	308	309	311	309	312	315	316
18	317	318	318	319	319	311	312	312	312	313	314	314	314	314	310	300	294	296	298	302	304	308	313	314	310
19 Q	316	314	314	312	311	309	308	308	308	308	309	309	309	309	310	311	308	303	299	301	304	306	308	310	309
20	310	310	313	317	321	324	321	322	318	317	314	312	307	306	306	304	300	293	289	291	297	305	312	314	309
21 Q	311	308	308	308	308	308	307	309	309	309	308	306	306	308	309	313	310	302	295	296	297	300	305	306	306
22	306	306	307	308	308	308	308	308	307	307	307	304	295	289	297	300	297	290	284	286	295	303	305	307	301
23 Q	304	303	304	306	306	306	306	308	308	306	306	305	305	305	306	310	308	298	293	292	301	307	310	308	305
24 D	306	303	302	303	304	304	304	301	299	294	273	210	290	294	272	254	264	262	270	277	292	303	316	327	289
25 D	334	327	339	341	333	307	288	256	287	282	273	287	265	264	282	300	306	306	313	310	311	314	314	319	302
26	318	325	323	317	317	311	312	315	307	285	278	273	278	296	299	297	300	298	300	300	307	312	317	325	305
27	324	330	328	329	317	317	315	274	282	250	210	196	222	275	288	301	303	304	303	305	307	309	312	312	292
28	312	311	309	309	309	309	310	312	311	313	311	312	311	310	309	311	309	306	299	295	298	303	308	298	308
29	315	313	311	311	310	312	311	309	299	301	303	300	301	307	310	310	310	306	300	296	298	301	306	309	306
30 D	307	307	309	309	311	317	318	317	316	315	313	309	309	300	309	312	311	312	310	307	305	303	327	375	314
31																									
Mean	316	316	315	315	315	313	311	306	307	304	298	295	297	301	304	307	305	300	296	298	303	307	312	317	307

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 28 Victoria 18,500 γ + October 1961

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	332	351	386	241	249	252	215	214	109	26	173	175	237	247	264	253	242	235	238	245	258	265	264	266	239
2		267	263	260	264	264	264	262	263	266	266	270	269	271	266	266	263	262	259	262	271	269	262	262	265	265
3		268	274	277	278	279	279	280	282	285	286	284	286	284	280	271	277	278	274	262	264	269	272	277	275	277
4		276	281	283	284	284	284	288	287	287	287	287	289	284	283	279	286	283	272	265	261	259	258	266	267	278
5		276	286	290	289	286	287	289	289	290	294	289	293	295	294	292	286	284	280	274	266	271	275	282	287	285
6		290	295	294	298	292	293	294	294	297	299	293	296	299	302	302	299	296	282	278	275	274	272	277	281	291
7		285	276	272	273	280	291	291	294	298	305	302	299	298	302	301	294	291	287	282	283	288	292	296	296	291
8		301	304	306	302	302	298	289	281	284	296	301	306	298	306	306	301	295	285	280	278	282	289	296	302	295
9		306	307	305	302	289	293	292	293	301	303	303	307	305	305	303	299	294	284	285	272	275	281	287	298	295
10	Q	299	300	301	301	301	300	300	302	304	305	306	308	309	308	308	304	299	289	278	277	276	281	292	300	298
11		304	302	303	309	310	309	310	310	306	304	302	303	310	306	302	302	296	284	274	269	259	272	287	288	297
12		287	261	260	260	270	282	277	282	290	302	296	300	302	302	295	304	287	281	271	270	271	270	278	277	282
13		276	273	276	279	263	271	280	282	290	289	295	296	300	300	304	301	292	286	290	286	281	281	282	274	285
14		266	278	286	292	293	291	294	299	291	293	294	294	295	292	302	295	289	282	275	269	271	275	282	285	287
15	Q	294	299	301	301	301	304	303	298	299	301	306	306	311	311	310	306	301	298	299	301	297	299	297	297	302
16	Q	299	303	305	305	305	303	303	303	302	303	305	307	308	308	306	303	300	294	285	281	282	283	287	293	299
17	Q	298	303	308	308	310	310	310	310	311	312	314	314	315	316	315	312	308	304	292	287	286	290	306	315	306
18	Q	317	316	318	317	314	308	306	311	312	314	315	316	316	318	317	315	310	301	294	287	284	286	292	300	308
19		304	307	299	291	290	293	292	296	304	309	308	309	310	309	308	307	306	301	297	292	286	289	300	302	300
20		280	273	279	275	271	288	282	276	293	293	294	295	294	294	295	291	284	273	270	273	281	287	296	298	285
21		293	291	293	294	295	295	294	296	300	301	310	312	308	304	302	294	285	277	273	277	281	275	271	281	292
22		285	286	290	290	290	289	291	296	297	300	305	300	302	301	296	288	282	277	276	278	280	286	290	297	291
23		301	303	304	304	304	304	300	304	301	302	302	303	307	305	300	299	298	298	296	295	294	286	290	299	300
24		302	302	301	292	293	291	294	294	295	297	303	301	302	303	306	302	297	293	283	281	285	289	294	300	296
25		303	304	305	306	301	302	301	300	303	303	303	305	310	311	316	311	306	289	277	279	279	284	279	285	298
26	D	299	295	288	280	278	273	278	282	268	250	272	285	290	304	309	302	309	294	282	266	242	244	258	290	281
27	D	285	287	281	227	240	248	250	251	260	267	283	292	292	291	302	296	283	263	244	248	253	247	255	267	267
28	D	272	274	273	273	276	283	285	285	317	311	236	66	34	34	2	48	34	2	39	7	50	200	215	211	168
29	D	222	203	197	197	213	227	276	260	257	265	281	270	271	274	274	275	273	266	263	258	254	253	252	263	252
30		270	273	273	273	273	272	270	272	277	279	277	280	280	282	280	273	276	258	264	261	259	259	265	269	272
31		275	281	280	280	278	275	284	287	283	286	286	287	286	281	283	282	276	270	262	261	263	266	276	281	278
Mean		288	289	290	283	284	286	287	287	286	285	290	286	288	288	288	286	281	272	268	265	266	273	279	284	283

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 29 Victoria 23° 30.0' + October 1961

Day \ Hour U. T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	9.6	5.6	-4.4	28.6	13.8	17.5	41.3	28.2	13.9	17.4	15.4	14.8	19.3	20.4	23.1	23.6	24.1	23.7	22.4	20.4	18.3	16.9	17.5	17.5	18.7
2		17.2	17.4	17.5	17.7	17.8	17.7	17.8	17.6	17.4	17.9	18.0	18.4	18.4	18.0	18.8	19.8	20.3	19.6	20.4	19.6	18.6	17.7	16.8	15.8	18.2
3		15.8	16.2	16.8	16.8	16.9	16.8	16.9	17.0	17.5	18.3	19.3	18.9	17.6	19.4	18.7	19.7	20.9	21.4	18.8	15.7	13.6	12.8	13.6	14.6	17.3
4		15.3	15.5	16.3	16.1	15.7	16.6	16.6	16.9	18.3	18.3	17.8	17.3	18.4	17.8	18.8	19.9	20.2	19.6	18.7	18.3	15.8	14.3	13.4	14.6	17.1
5		14.9	15.9	16.6	16.8	16.9	16.9	18.4	17.6	17.1	18.9	18.5	18.5	18.6	17.8	18.8	20.4	20.7	20.5	19.7	17.6	15.8	14.7	14.5	14.6	17.5
6		15.3	15.6	16.4	16.5	16.6	16.6	17.4	18.1	19.4	19.4	19.8	17.7	14.7	17.6	18.7	19.6	21.3	20.6	17.9	16.8	14.6	13.7	14.6	15.4	17.3
7		15.6	16.8	19.9	17.6	17.8	16.5	16.8	16.7	17.3	17.3	18.4	18.9	19.7	19.2	19.8	20.0	20.5	20.2	18.5	16.5	15.3	14.5	14.8	15.7	17.7
8		16.0	16.2	16.6	16.7	16.8	16.9	20.1	23.1	19.4	18.8	19.7	19.4	19.7	19.5	20.4	21.3	22.3	22.7	21.7	19.5	16.5	15.8	14.6	14.8	18.7
9		14.8	15.4	16.3	16.5	16.6	17.0	16.8	16.4	16.6	16.7	16.9	17.4	17.6	17.6	18.5	19.5	21.0	22.6	21.7	18.7	15.8	14.8	15.4	15.8	17.4
10	Q	16.1	16.1	16.7	16.9	16.9	16.8	16.7	16.6	16.5	16.7	16.8	17.4	17.5	17.9	18.7	20.5	21.5	21.5	20.8	17.7	14.4	13.5	13.5	13.9	17.2
11		15.4	16.2	16.5	16.6	16.7	16.3	16.1	16.5	18.6	25.7	24.8	24.7	23.5	18.6	18.9	20.7	21.5	22.6	20.7	17.9	14.6	13.6	13.4	13.5	18.5
12		12.7	15.9	20.8	15.7	16.8	20.8	18.9	18.7	21.5	18.9	18.8	18.4	17.8	18.4	14.1	15.8	21.6	22.3	18.6	16.6	15.3	13.3	13.0	13.8	17.4
13		13.5	13.5	15.7	17.6	20.6	19.8	17.3	17.5	24.6	20.8	17.3	17.4	16.9	17.5	18.4	18.9	18.8	15.4	16.4	16.4	14.9	14.4	15.4	15.6	17.3
14		15.3	14.9	16.5	16.6	16.7	16.7	17.7	17.8	18.8	17.7	16.9	16.9	18.7	16.7	17.5	19.9	20.6	21.4	20.5	18.5	15.8	14.4	14.2	14.9	17.3
15	Q	15.6	16.3	16.6	16.7	16.7	16.9	16.7	16.7	17.5	18.5	17.7	17.7	17.2	17.5	17.8	18.4	18.7	19.0	17.6	14.9	13.8	13.8	14.8	15.5	16.8
16	Q	15.6	15.7	16.4	16.7	16.8	16.8	16.9	16.7	16.9	17.2	17.4	16.8	17.4	17.7	18.4	18.8	20.0	21.6	20.8	18.3	16.3	14.7	14.6	14.7	17.2
17	Q	14.8	15.2	15.8	16.6	16.5	16.6	16.6	16.7	16.7	16.7	16.7	16.8	17.2	17.4	18.4	19.9	20.9	22.9	20.6	16.8	14.5	13.6	13.2	13.9	16.9
18	Q	14.7	15.4	15.7	15.9	16.4	16.3	16.4	16.8	17.4	17.4	17.4	17.4	17.3	17.5	17.8	18.6	19.7	21.7	21.5	19.3	16.6	15.3	15.4	15.4	17.2
19		14.9	14.7	15.5	14.5	16.0	16.7	17.4	17.7	17.6	18.3	17.8	17.6	17.5	17.7	18.4	19.6	21.4	21.7	21.0	18.9	16.5	15.4	13.6	13.8	17.3
20		15.3	10.9	9.5	8.7	11.8	16.6	15.9	22.8	17.8	17.5	17.6	17.7	17.8	18.5	18.6	19.8	20.4	20.3	18.7	16.7	15.9	15.8	16.3	16.5	16.6
21		16.4	16.7	16.7	16.7	16.7	16.8	16.9	17.4	17.4	17.3	17.3	17.9	18.5	15.5	17.3	18.8	19.6	16.8	14.6	13.7	14.6	15.3	13.8	14.6	16.6
22		14.7	15.8	16.5	16.8	17.5	17.4	17.3	16.5	17.1	17.5	16.3	18.3	18.8	18.6	19.8	18.9	19.8	21.6	20.3	18.4	16.6	15.9	15.7	15.8	17.6
23		15.8	16.4	16.7	16.9	16.8	16.6	16.7	17.8	15.9	17.3	17.6	18.4	17.9	18.0	18.9	17.6	17.6	18.6	17.9	16.2	15.3	14.4	14.7	16.4	16.9
24		16.3	16.4	16.4	16.6	18.4	19.8	18.7	17.8	17.6	19.4	17.7	18.8	18.3	18.8	18.6	18.5	18.5	18.4	17.5	16.4	14.6	14.5	14.9	15.5	17.4
25		15.4	15.7	16.5	16.8	16.6	16.6	16.5	16.7	17.4	17.4	18.4	18.6	18.5	18.4	17.6	17.7	18.8	18.8	14.5	12.6	13.6	14.6	14.6	15.5	16.6
26	D	16.2	15.9	16.8	17.7	16.8	20.6	19.9	22.4	9.5	27.5	30.8	28.7	28.4	23.8	22.6	19.6	18.4	18.8	16.7	15.7	13.5	9.9	9.8	8.8	18.7
27	D	11.9	15.5	13.7	26.1	23.8	20.8	21.5	19.7	19.5	20.6	16.6	18.5	18.5	17.4	17.6	19.6	17.7	17.3	15.6	14.5	14.6	11.4	11.3	12.7	17.4
28	D	14.2	15.4	16.5	17.7	18.6	17.7	17.5	16.8	18.9	26.6	22.4	34.6	20.6	2.6	13.7	11.6	-7.9	10.3	22.6	21.9	13.5	14.5	19.3	22.3	16.8
29	D	25.9	28.6	30.6	34.6	32.9	23.4	24.9	19.7	16.7	15.0	15.5	18.4	17.6	18.4	18.8	20.6	22.3	22.6	21.4	19.7	18.5	17.6	17.4	17.6	21.6
30		17.1	17.4	17.6	17.7	17.6	17.6	18.7	18.4	18.6	17.3	16.7	16.7	16.8	16.9	18.4	19.7	20.5	19.8	18.2	16.6	16.5	16.6	16.5	16.4	17.7
31		16.6	16.8	17.4	17.7	17.8	18.5	18.8	17.5	16.7	16.7	16.8	17.5	17.5	15.7	17.5	19.6	21.4	21.9	20.5	17.9	16.6	15.8	15.6	15.7	17.7
Mean		15.4	15.8	16.2	17.8	17.6	17.7	18.6	18.3	17.6	18.7	18.4	18.9	18.5	17.6	18.5	19.3	19.5	20.2	19.3	17.4	15.5	14.6	14.7	15.2	17.6

VERTICAL INTENSITY
Mean values for periods of sixty minutes, Universal Time

Table 30 Victoria 53,000 γ + October 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	448	540	550	474	383	374	290	272	120	54	215	182	270	288	333	341	348	346	345	345	344	341	337	333	328
2	332	331	331	331	331	331	331	331	328	329	329	330	328	326	323	323	327	323	323	321	321	322	323	323	327
3	325	327	327	327	327	325	324	325	323	321	323	324	322	318	316	320	322	322	317	313	314	318	323	325	322
4	327	330	329	328	326	325	324	323	323	323	320	311	307	306	305	319	319	319	315	308	304	309	317	322	318
5	327	327	326	324	323	323	322	322	321	315	317	320	320	320	322	323	323	322	318	314	314	316	320	322	321
6	322	322	323	321	320	320	319	319	314	315	314	315	310	305	310	313	315	313	313	310	307	306	311	315	315
7	321	322	328	331	334	330	329	329	327	321	320	318	315	314	318	318	320	319	316	311	311	312	312	316	321
8	319	318	318	318	317	319	323	320	323	323	323	323	321	320	321	320	320	318	314	306	303	305	308	310	317
9	314	315	315	315	316	318	320	320	319	318	317	315	315	315	317	319	321	318	308	303	303	306	308	308	314
10 Q	311	312	314	314	315	315	315	316	316	315	314	313	313	313	314	314	315	314	308	298	296	302	306	308	311
11	312	312	313	313	314	314	314	315	313	291	299	294	296	306	312	314	314	314	310	302	303	307	309	311	308
12	319	325	343	346	346	342	329	325	307	289	299	310	313	311	303	298	304	312	310	311	310	313	317	321	317
13	323	325	330	330	333	334	331	325	311	309	320	320	319	317	317	320	322	318	312	308	305	308	312	315	319
14	322	325	324	322	319	317	317	304	308	314	314	308	307	307	312	313	314	315	310	301	298	302	310	314	312
15 Q	315	314	313	312	311	311	312	313	313	311	312	312	311	311	311	313	315	313	306	297	296	302	305	308	310
16 Q	312	312	312	311	310	310	310	310	311	311	311	311	310	310	310	311	314	311	304	298	294	298	306	311	309
17 Q	313	315	314	312	310	309	308	308	307	308	309	309	309	309	310	314	315	310	304	301	301	304	308	308	309
18 Q	310	309	309	308	307	306	308	309	309	309	308	308	309	309	310	312	313	312	308	301	299	301	308	310	308
19	311	312	313	315	318	320	320	318	315	311	311	311	311	311	311	313	314	310	303	298	298	302	306	308	311
20	311	323	334	348	365	381	318	333	331	321	320	318	318	318	320	321	321	317	314	312	314	316	316	319	325
21	318	316	318	318	318	318	316	316	316	315	314	312	312	308	306	309	310	305	299	299	304	308	310	313	312
22	319	321	322	322	320	320	320	318	316	315	307	308	310	309	309	314	313	309	306	306	308	311	310	311	314
23	312	312	313	313	313	313	314	313	311	312	311	310	310	309	309	310	308	308	305	302	302	303	305	308	309
24	310	310	310	312	312	313	312	311	310	304	303	303	306	305	306	308	310	310	306	302	302	306	308	308	308
25	309	309	309	308	308	310	310	310	308	306	307	308	307	304	298	296	295	296	296	298	306	309	310	312	305
26 D	312	311	311	313	317	317	322	320	264	245	270	256	258	275	282	289	294	302	303	302	301	304	315	322	296
27 D	328	329	325	344	352	359	348	332	321	304	281	308	312	310	318	316	314	304	300	299	307	316	324	332	320
28 D	330	330	331	330	330	326	323	322	317	264	216	-99	-229	-189	-119	87	78	101	200	301	374	408	392	385	213
29 D	365	360	363	336	308	283	288	305	312	315	316	315	316	316	318	320	318	317	311	307	311	316	321	324	319
30	322	320	318	316	315	314	314	316	312	311	313	316	316	315	315	316	314	316	314	313	315	317	320	322	316
31	323	322	321	319	319	319	314	307	312	314	314	314	314	313	314	317	318	316	309	306	309	313	314	316	315
Mean	324	328	329	327	324	323	318	316	308	300	305	294	292	294	298	307	308	307	307	306	309	313	316	318	311

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 31 Victoria 18,500 γ + November 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	282	285	285	284	288	281	279	282	284	283	284	288	293	294	294	292	287	281	275	272	277	282	285	285	284
2	289	293	293	292	292	290	287	294	292	291	293	284	282	300	301	300	296	291	289	286	277	278	280	282	290
3	283	285	285	284	285	286	289	287	296	298	297	296	295	293	292	292	287	283	281	278	277	283	292	293	288
4	299	302	302	300	299	298	300	301	303	306	305	307	307	307	306	304	298	296	299	302	306	300	299	292	302
5 D	287	291	301	305	294	279	293	297	299	300	297	305	306	283	314	309	297	282	273	274	280	288	277	272	292
6	288	287	290	284	281	273	283	282	303	274	284	287	293	292	295	295	291	284	282	285	288	292	298	304	288
7 D	303	295	289	291	289	282	270	256	244	274	241	269	293	265	255	261	230	197	221	206	208	237	250	274	258
8 D	272	238	219	254	255	261	263	265	271	276	278	283	279	279	285	282	279	280	265	261	243	255	269	279	266
9	282	278	271	279	278	273	278	274	296	284	284	285	290	295	296	293	279	271	259	260	271	278	281	284	280
10	290	294	293	287	288	296	295	292	293	293	295	297	300	299	298	291	285	277	271	267	269	274	284	290	288
11	294	297	298	298	298	297	295	295	296	297	299	299	302	301	299	296	291	287	282	280	279	283	287	296	294
12	294	285	283	295	293	284	277	277	300	281	290	283	284	297	306	292	272	280	274	266	267	272	281	277	284
13	285	285	282	284	288	290	291	290	290	292	295	295	296	296	295	295	292	284	275	271	273	285	293	301	289
14	309	314	307	298	281	293	294	311	298	290	295	299	302	303	303	301	294	282	267	268	272	280	284	288	293
15 Q	294	297	298	298	297	297	295	294	293	296	297	299	300	301	302	299	292	286	280	275	276	281	288	296	293
16	303	305	306	306	303	301	299	298	301	300	302	303	305	305	305	303	300	297	290	285	284	286	284	286	298
17 D	302	303	306	306	304	300	301	302	303	304	306	306	308	307	298	312	310	302	285	281	266	271	276	286	298
18 D	291	290	270	259	270	277	285	276	263	272	275	265	239	296	307	301	292	269	251	235	237	263	267	259	271
19	263	263	277	273	262	271	280	287	287	288	288	288	287	291	292	296	294	290	282	277	275	282	288	296	282
20	299	301	298	294	284	278	274	290	285	289	289	288	284	286	284	291	282	270	264	257	265	274	273	274	282
21	280	269	265	261	263	260	279	283	287	291	293	294	295	294	295	296	297	295	289	280	279	281	280	281	283
22 Q	287	291	299	301	302	301	302	302	301	303	306	304	304	305	305	302	299	292	286	281	279	284	289	296	297
23 Q	301	304	302	302	302	301	302	302	302	302	304	305	306	307	306	306	304	300	290	282	280	286	295	301	300
24 Q	302	303	301	300	299	300	298	297	298	301	303	304	306	306	308	305	301	294	286	278	276	282	290	302	298
25	310	311	308	310	308	308	306	302	301	316	306	306	310	313	314	310	306	300	291	284	280	286	295	304	304
26	310	312	310	308	308	305	307	306	300	298	300	312	310	311	310	312	312	302	294	290	292	294	297	298	304
27	298	298	298	299	298	298	299	300	303	302	302	302	303	302	306	305	297	286	272	272	276	284	294	302	296
28	310	309	308	306	308	308	308	310	311	312	310	311	310	310	310	308	303	294	290	290	292	294	299	304	305
29	308	306	305	301	300	304	304	303	302	304	306	309	309	310	310	308	306	298	290	280	279	286	296	303	301
30 Q	307	308	308	307	305	303	303	307	309	308	308	309	309	311	312	313	309	308	302	291	287	291	301	301	305
31																									
Mean	294	293	292	292	291	290	291	292	294	294	294	296	297	299	300	299	293	285	279	274	274	280	286	290	290

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 32 Victoria 22° 30.0' + November 1961

Day \ Hour U. T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		15.9	16.4	16.7	17.3	18.8	16.9	17.7	18.5	18.8	18.7	17.9	15.3	18.3	18.6	18.6	18.9	20.4	20.5	18.6	16.0	14.9	14.8	15.5	15.8	17.5
2		15.8	16.4	16.8	16.9	17.2	17.0	16.8	19.3	19.9	23.1	24.8	21.4	12.9	18.5	20.7	20.8	20.8	19.8	18.6	16.7	16.2	16.4	16.5	15.9	18.3
3		15.4	15.8	16.5	15.9	18.9	16.9	17.9	17.9	17.6	17.4	17.7	17.5	17.7	17.7	17.9	18.4	19.3	18.8	17.8	16.4	15.6	15.7	15.7	15.7	17.2
4		15.7	16.5	16.7	16.9	16.9	17.4	16.9	17.1	17.3	17.3	17.6	17.5	17.6	17.8	18.4	18.8	19.8	18.4	15.8	14.3	14.1	16.2	16.8	16.6	17.0
5	D	15.2	16.2	16.7	16.8	16.7	18.8	19.2	17.6	21.6	21.6	21.8	20.6	20.6	12.0	10.9	18.4	18.8	19.2	17.8	15.5	14.6	14.8	15.7	16.3	17.4
6		16.9	16.9	17.7	21.5	22.9	19.9	18.5	19.3	27.4	20.4	19.7	20.3	18.8	18.3	17.7	19.3	19.7	19.3	17.4	16.3	15.7	15.7	15.8	16.4	18.8
7	D	16.0	15.8	15.4	16.7	17.0	19.6	19.6	22.7	25.9	24.6	18.4	21.1	17.4	9.8	5.3	12.5	11.8	8.8	6.3	8.9	11.4	12.4	14.8	15.9	15.3
8	D	15.3	16.8	24.3	17.4	19.4	20.7	24.2	21.3	17.9	17.4	16.9	15.8	15.8	14.3	18.4	19.7	20.7	20.6	18.7	17.3	14.8	13.4	13.9	14.9	17.9
9		16.4	17.3	19.6	18.5	18.8	19.6	18.7	17.8	13.6	18.4	18.8	18.0	20.6	18.9	20.3	20.8	20.6	20.1	18.4	15.6	13.8	13.8	14.3	14.8	17.8
10		15.5	16.5	17.2	18.9	20.8	17.8	16.4	16.7	16.4	16.7	16.7	17.6	17.5	17.8	17.9	19.4	20.6	20.6	18.4	16.7	15.4	14.4	14.7	15.4	17.3
11		15.8	16.5	16.9	17.3	17.3	16.9	16.6	16.4	16.3	16.5	16.4	16.7	17.3	17.6	18.6	19.8	20.9	21.5	20.4	17.9	16.3	15.5	15.6	14.6	17.3
12		15.0	15.0	15.3	16.4	16.8	17.6	18.5	24.8	18.4	16.6	19.5	18.6	17.8	21.6	17.2	19.3	15.4	17.7	19.3	16.7	14.6	13.6	14.6	15.6	17.3
13		14.0	15.6	16.8	17.6	18.4	18.3	17.4	17.2	16.8	16.4	15.7	16.4	16.6	17.1	17.7	18.7	19.8	20.8	20.3	17.3	14.8	14.4	14.2	14.5	17.0
14		14.2	16.5	17.4	15.8	19.2	21.2	17.9	20.9	22.6	15.6	15.9	16.3	17.4	17.5	17.7	18.6	20.3	20.7	18.9	14.4	13.8	13.8	14.8	15.6	17.3
15	Q	15.9	16.8	17.2	17.5	17.6	17.4	16.8	16.9	16.6	16.5	16.6	16.5	16.6	17.3	17.5	18.7	20.3	20.6	18.9	17.7	16.4	15.5	15.5	15.5	17.2
16		15.4	15.9	16.5	16.8	17.2	17.4	17.2	17.0	16.7	16.4	16.5	16.7	16.7	17.4	17.6	18.7	20.4	20.7	19.7	18.5	16.7	15.5	14.4	13.8	17.1
17	D	14.9	15.7	16.7	16.7	16.8	16.7	17.2	17.0	17.1	16.7	16.4	16.6	17.3	18.1	13.3	10.8	19.4	18.9	19.4	16.4	16.4	13.8	13.3	9.8	16.1
18	D	13.6	14.6	14.6	17.6	19.4	20.8	18.8	24.6	18.1	22.5	29.3	22.0	9.1	21.4	17.9	12.6	16.4	18.4	18.8	14.6	10.4	13.7	14.7	14.7	17.4
19		15.9	16.9	21.9	18.9	20.5	21.3	20.3	16.4	17.4	16.6	16.6	13.4	13.8	16.5	18.3	18.5	18.6	18.8	18.4	17.6	16.7	16.2	16.6	16.7	17.6
20		16.3	16.5	16.6	17.4	16.9	18.7	18.8	21.2	18.5	16.8	16.8	17.9	13.4	11.9	18.4	17.3	17.8	17.4	16.0	14.8	12.9	13.6	14.9	16.4	16.6
21		15.8	16.3	14.8	17.5	18.8	18.9	18.7	17.8	16.3	16.6	16.7	16.8	16.8	16.7	16.5	16.9	17.3	17.3	16.6	16.4	15.9	15.6	15.8	15.6	16.8
22	Q	16.3	15.9	16.6	16.8	16.6	16.6	16.4	16.5	16.5	16.4	16.5	16.7	16.6	17.5	17.7	18.4	19.3	19.4	18.5	17.5	16.4	15.8	15.8	15.6	16.9
23	Q	15.9	16.5	16.7	17.2	16.9	16.8	16.7	16.4	16.3	16.3	16.5	16.8	16.9	17.5	17.7	18.5	19.5	20.4	18.9	17.6	16.6	15.7	15.7	15.8	17.1
24	Q	16.1	16.1	16.5	16.6	16.5	16.5	16.5	16.5	17.0	16.6	16.6	16.5	16.8	17.4	17.6	18.3	18.9	20.0	19.8	18.5	16.6	15.5	14.6	14.4	16.9
25		14.9	15.9	16.7	16.9	16.8	16.8	16.6	16.8	18.6	18.8	16.6	16.7	16.8	17.6	17.8	17.8	18.5	19.3	17.9	16.5	14.7	13.9	14.6	15.3	16.8
26		15.7	16.6	16.8	17.4	17.4	17.6	17.6	17.9	16.6	16.8	17.8	16.5	16.6	16.8	17.7	18.5	18.7	18.7	17.6	15.9	15.3	14.6	14.6	15.1	16.9
27		15.4	15.9	17.1	17.3	17.5	17.3	17.3	16.8	16.5	15.8	15.8	16.6	16.6	15.6	16.6	18.2	19.6	20.7	19.6	17.8	15.8	14.4	14.2	14.6	16.8
28		15.4	16.6	16.8	16.8	16.7	16.7	16.4	15.8	15.7	15.7	15.7	15.9	15.9	16.5	17.0	17.9	18.6	18.8	16.3	14.8	13.6	12.7	13.6	14.7	16.0
29		15.4	16.4	16.8	17.5	17.5	18.2	16.8	16.6	16.2	15.9	16.6	16.6	17.7	17.6	17.7	18.4	19.4	19.9	19.7	18.7	16.6	14.7	14.1	14.4	17.1
30	Q	15.4	15.7	16.5	16.7	16.9	16.8	16.6	16.8	15.8	15.7	15.7	15.7	16.3	16.6	16.4	17.5	19.3	20.6	19.6	17.9	15.9	14.8	13.8	13.8	16.5
31																										
Mean		15.5	16.2	17.1	17.3	18.0	18.1	17.8	18.3	18.0	17.7	17.8	17.4	16.7	17.0	17.1	18.0	19.0	19.2	18.1	16.4	15.1	14.7	15.0	15.1	17.1

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 33 Victoria — 53,000 γ + — November 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	317	317	317	316	316	314	315	314	307	306	309	306	305	311	313	314	313	311	307	305	308	310	312	313	312
2	316	316	315	314	313	313	312	311	312	297	296	305	297	297	306	310	310	307	304	302	304	309	310	311	308
3	312	315	315	316	319	318	318	318	315	309	311	312	312	312	313	314	313	310	305	301	302	306	308	312	312
4	315	317	317	318	317	317	317	316	315	315	314	314	314	314	314	316	316	312	308	308	312	314	315	311	314
5 D	314	318	319	318	316	319	326	319	307	291	293	307	309	285	268	284	296	298	297	296	302	307	308	314	305
6	319	320	321	324	324	327	327	320	298	282	287	294	304	313	318	320	320	317	313	314	315	317	318	316	314
7 D	315	315	316	321	325	327	339	340	320	306	266	223	234	213	221	249	276	267	286	299	316	346	341	335	296
8 D	333	341	373	364	360	353	337	313	324	325	324	321	316	311	320	323	324	321	317	316	319	326	327	325	330
9	325	326	326	327	327	329	330	327	308	310	308	303	301	307	312	316	318	316	308	308	312	316	318	319	317
10	317	319	319	319	321	320	319	319	318	315	315	315	316	314	314	319	320	320	317	315	315	318	318	319	318
11	318	318	316	316	316	316	316	318	316	316	316	316	315	314	316	318	320	322	317	313	312	313	317	316	316
12	316	317	320	323	324	328	334	340	302	292	298	301	287	287	295	298	302	300	302	302	306	311	319	322	309
13	324	325	324	324	323	322	320	319	318	318	317	318	318	318	318	320	320	316	310	306	306	310	314	316	318
14	318	317	315	313	315	325	318	311	278	306	313	315	316	315	314	314	313	309	303	301	303	310	316	319	312
15 Q	320	319	317	315	314	314	313	313	313	314	314	315	315	315	315	317	317	315	310	310	311	316	317	318	315
16	318	317	316	315	313	313	312	312	312	312	313	314	314	314	314	316	316	312	308	304	303	305	308	312	312
17 D	316	316	316	315	314	312	312	312	310	310	310	310	311	310	306	292	297	301	302	303	303	310	312	316	309
18 D	326	331	332	336	333	324	314	294	258	223	241	239	174	202	251	260	278	286	299	300	308	321	323	325	287
19	326	328	324	329	326	324	316	294	308	312	311	304	302	306	314	317	316	316	314	314	314	315	315	316	315
20	315	315	314	314	314	318	319	312	300	310	311	310	299	281	300	313	314	316	314	314	312	312	314	316	311
21	320	321	329	336	336	332	328	321	315	316	316	315	314	313	314	316	320	320	316	312	313	316	317	315	320
22 Q	318	317	318	317	318	318	317	316	316	314	312	308	311	312	314	316	318	319	316	314	312	314	316	316	315
23 Q	316	316	314	314	314	314	315	315	314	314	313	313	311	311	311	313	317	319	315	313	311	311	313	313	314
24 Q	312	313	313	313	314	315	316	317	317	316	315	314	313	313	313	315	317	316	313	312	312	315	317	319	315
25	317	314	313	312	312	312	312	313	313	300	304	308	311	312	312	313	313	313	309	310	312	313	315	316	312
26	315	314	312	311	301	311	312	309	311	311	314	313	311	313	312	313	315	314	312	311	311	311	312	315	312
27	315	315	315	315	314	313	313	313	310	311	311	312	311	309	310	312	316	315	313	311	311	312	313	314	313
28	314	313	312	310	309	309	309	309	309	309	309	309	309	307	307	308	309	308	306	306	307	308	310	311	309
29	311	311	311	310	309	309	308	308	308	307	307	308	308	309	310	309	309	305	302	299	302	305	309	311	308
30 Q	312	311	310	308	307	307	307	304	305	305	306	307	307	308	308	309	309	307	304	301	303	307	309	311	307
31																									
Mean	318	318	319	319	319	319	318	315	309	306	306	305	302	302	305	309	311	310	308	307	309	314	315	316	312

96139—6½

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 34 Victoria 18,500 γ + December 1961

Day		Hour U. T. 0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	318	318	318	322	320	309	297	289	280	281	295	289	225	113	261	237	221	256	259	250	246	252	264	270	270
2	D	261	238	252	260	256	258	266	268	278	270	222	264	290	279	266	206	196	220	202	225	195	160	202	235	240
3	D	245	241	218	200	210	203	219	209	186	186	253	231	262	280	292	298	292	287	279	264	252	247	272	278	246
4		286	284	289	286	281	279	287	284	293	294	289	285	290	295	297	298	287	293	290	279	267	269	276	286	286
5		293	298	296	293	296	294	292	296	294	296	298	300	299	301	311	306	294	258	292	276	271	276	274	283	291
6		287	291	291	285	273	290	294	293	292	294	295	298	304	298	307	286	272	272	270	266	262	268	278	288	286
7		293	292	292	295	298	296	295	290	293	288	291	283	288	300	299	298	294	288	282	275	277	281	288	294	290
8	Q	299	301	300	300	300	300	300	299	300	300	302	306	307	308	309	307	307	304	307	287	283	288	294	300	300
9		304	304	302	302	303	302	304	303	300	300	302	301	305	305	304	306	306	300	294	283	280	288	299	306	300
10		310	312	311	307	300	303	304	303	304	305	302	304	307	302	302	309	308	300	294	282	274	283	288	294	300
11		295	288	286	289	284	284	284	281	269	294	293	290	295	305	306	307	308	304	288	282	282	290	290	288	291
12		288	290	287	280	288	291	293	292	293	294	295	299	298	300	304	299	299	296	289	285	284	289	297	304	293
13		308	308	308	306	305	304	304	304	304	304	306	308	309	310	310	308	306	310	306	296	291	288	286	290	303
14		302	302	301	300	301	298	299	299	299	299	299	303	308	309	311	313	313	309	303	292	288	291	301	302	302
15		307	308	305	300	287	293	298	300	304	307	301	305	302	309	311	315	315	315	307	297	291	283	288	303	302
16		310	308	307	304	301	301	299	301	301	305	305	305	309	307	309	310	313	311	303	293	288	291	296	301	303
17		304	301	299	301	298	297	300	304	307	306	307	306	309	310	311	311	314	314	309	301	296	298	302	308	305
18	Q	312	310	305	303	307	309	311	311	311	313	312	313	314	315	317	317	317	311	305	301	299	301	305	312	310
19	Q	318	317	316	314	312	311	312	311	313	315	316	317	318	317	317	317	315	311	309	303	297	299	305	313	312
20	Q	319	317	312	310	309	308	306	308	304	307	315	314	317	316	315	319	319	317	312	308	302	302	304	312	311
21		318	317	313	307	306	312	315	315	314	312	318	317	320	320	320	319	318	318	312	306	303	304	307	318	314
22		322	322	319	318	313	312	314	312	313	314	318	317	316	315	323	320	315	318	309	300	298	301	304	308	313
23		309	307	302	293	294	294	294	293	300	305	305	301	303	309	306	312	313	312	304	295	289	288	287	309	301
24		324	321	309	304	301	302	305	304	309	311	305	303	302	314	322	308	313	314	301	288	285	285	294	304	305
25	Q	312	313	312	312	310	309	308	306	306	308	305	308	312	314	314	317	314	312	303	296	292	293	301	311	308
26		319	322	319	316	311	312	310	310	312	313	312	313	313	314	315	318	322	318	306	293	287	291	300	311	311
27		313	327	314	306	308	309	299	302	296	294	300	302	312	314	313	316	318	314	307	297	300	303	307	309	308
28	D	313	311	304	305	302	299	300	306	304	295	277	310	312	306	302	286	298	309	300	286	278	283	287	286	298
29		288	294	296	289	298	299	299	301	300	300	297	308	308	304	307	308	306	305	304	301	295	294	278	292	299
30	D	309	311	308	290	287	298	294	300	302	296	308	294	303	308	300	282	280	298	297	286	274	282	290	292	295
31		298	302	300	298	295	295	296	302	301	300	304	308	307	304	308	306	311	308	297	285	293	291	297	299	300
Mean		303	302	300	297	295	296	297	297	296	297	298	300	302	300	306	302	300	300	295	286	281	283	289	297	297

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 35 Victoria — 22° 30.0' + — December 1961

Day \ Hour U.T.		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	15.4	15.9	16.6	17.0	17.4	17.6	17.4	17.5	20.3	23.0	18.8	23.7	19.8	5.6	9.4	13.4	14.3	21.6	21.4	18.6	18.4	16.4	16.3	15.4	17.1
2	D	15.6	18.4	18.8	20.2	22.4	24.4	20.8	18.8	19.0	23.3	10.6	15.9	17.7	2.2	0.4	4.1	5.9	3.3	9.1	13.6	16.6	15.8	17.8	13.9	14.3
3	D	15.3	15.6	16.7	27.9	24.6	27.4	25.8	28.7	15.0	17.7	29.8	19.6	12.8	13.8	15.4	12.5	13.8	18.6	18.4	18.8	17.7	18.9	15.5	15.6	19.0
4		16.4	18.6	18.7	18.1	17.8	18.7	17.5	17.6	16.6	16.4	18.5	17.2	15.8	17.6	17.4	15.4	12.6	15.9	17.5	17.1	16.8	15.9	15.9	15.7	16.9
5		15.9	16.4	16.8	17.7	17.5	16.6	16.4	15.7	15.7	15.7	15.8	16.6	16.7	16.6	16.8	17.6	16.5	11.5	10.6	12.6	13.6	14.5	15.5	15.8	15.6
6		15.4	16.8	17.4	18.4	20.7	17.1	17.3	16.8	16.7	16.3	16.6	17.6	19.7	16.6	16.9	17.3	11.5	13.4	15.5	14.5	14.8	14.9	15.5	15.8	16.4
7		16.7	17.4	17.8	17.8	17.8	17.4	16.6	16.6	17.5	17.3	17.2	17.6	13.5	18.5	17.9	18.5	18.8	18.6	17.7	16.8	15.8	15.6	15.6	15.7	17.1
8	Q	16.0	16.4	16.6	16.8	16.8	16.6	16.6	15.7	15.3	15.6	15.6	16.4	16.4	16.5	16.8	17.7	18.4	18.6	18.6	17.7	16.3	15.4	15.4	15.7	16.6
9		16.2	16.7	16.9	16.8	16.7	16.6	16.4	16.7	16.6	16.4	16.9	16.2	16.6	17.5	17.6	18.3	18.5	18.7	17.8	16.6	14.9	14.3	14.6	15.1	16.7
10		15.6	16.5	16.8	17.3	17.4	17.3	16.7	16.6	16.2	16.4	16.5	16.6	18.6	18.5	18.5	18.4	18.5	16.8	16.5	15.8	14.6	12.6	11.9	13.8	16.4
11		15.2	16.5	16.7	17.8	18.6	19.8	19.5	19.8	16.4	22.4	19.4	18.8	20.6	21.4	19.9	18.8	17.4	12.6	11.7	11.4	10.6	11.3	12.2	12.9	16.7
12		14.0	15.7	14.9	17.0	17.6	18.2	17.5	17.5	17.3	16.7	16.4	15.8	16.5	16.3	17.4	18.4	18.8	18.8	18.4	17.4	15.7	14.7	14.5	14.8	16.7
13		15.5	16.3	16.8	16.8	17.3	16.7	16.6	16.4	15.8	15.8	15.6	15.7	15.8	16.4	17.2	17.6	17.4	18.4	18.2	16.9	16.5	15.5	14.6	12.9	16.4
14		12.4	14.9	16.7	17.5	17.8	17.4	17.4	17.4	17.4	16.8	16.4	16.4	16.0	16.5	16.6	17.1	18.2	19.5	18.9	17.8	16.5	14.6	13.8	14.6	16.6
15		15.5	16.6	16.9	16.8	18.7	18.8	16.6	17.0	16.6	17.4	15.6	14.5	11.8	14.7	15.6	16.7	17.5	18.4	18.0	17.6	16.5	15.4	14.8	14.7	16.4
16		14.8	15.7	16.4	16.7	16.8	17.4	18.6	17.9	17.3	16.5	16.7	15.9	16.3	15.4	15.5	16.3	17.6	18.6	18.6	18.6	17.6	16.3	14.8	14.8	16.7
17		15.2	16.0	18.8	17.5	17.4	16.9	16.8	16.7	16.5	16.5	15.9	15.6	15.7	15.8	16.0	16.5	17.1	17.5	17.7	18.3	17.6	16.4	15.5	15.0	16.6
18	Q	15.6	16.4	16.8	17.4	16.4	16.5	16.3	15.8	15.8	15.9	15.8	15.9	15.9	16.5	16.4	16.7	17.5	17.9	18.0	17.6	16.6	15.6	14.8	14.7	16.4
19	Q	15.1	15.8	16.6	16.6	16.7	16.7	16.4	15.9	15.9	15.7	15.7	15.7	15.8	16.4	16.4	16.5	17.5	17.7	17.4	17.1	16.6	15.6	14.8	14.9	16.2
20	Q	15.4	16.4	16.6	16.6	16.5	16.5	16.7	18.4	17.8	16.7	14.8	16.8	16.6	16.5	16.4	16.7	17.5	18.4	17.6	17.5	16.3	15.3	14.9	15.6	16.6
21		15.6	16.4	16.6	16.7	16.8	15.9	15.7	15.7	15.9	15.5	15.6	16.5	16.4	16.2	16.4	16.7	17.3	17.4	17.6	17.2	16.8	15.8	15.5	14.8	16.3
22		15.5	15.9	16.5	16.5	16.9	16.6	16.3	15.6	15.7	15.9	15.6	16.8	17.6	14.1	17.5	16.7	16.9	15.8	16.4	15.6	14.5	14.6	14.6	15.0	16.0
23		15.5	16.4	16.6	16.6	16.7	18.7	18.1	18.6	19.4	16.3	16.8	17.8	18.6	21.7	18.6	17.8	18.4	18.8	17.8	16.6	15.7	14.9	14.1	12.4	17.2
24		13.9	16.1	17.0	17.5	17.4	18.6	17.8	16.8	15.8	15.6	16.6	17.6	17.3	14.4	17.7	16.6	15.5	18.6	18.4	17.6	16.8	15.6	14.7	14.4	16.6
25	Q	14.9	16.2	16.7	16.7	16.8	16.7	16.5	16.6	16.7	16.7	15.8	15.5	15.7	15.8	16.4	16.8	17.7	19.5	19.4	18.5	17.4	15.8	14.6	14.6	16.6
26		15.0	15.8	16.7	16.8	16.8	16.4	16.8	16.0	15.5	15.7	16.3	17.4	16.8	16.5	16.6	16.7	17.6	17.8	17.5	17.1	16.6	15.6	14.2	12.8	16.3
27		14.5	15.3	14.8	16.9	18.6	17.4	17.5	19.7	18.5	16.9	17.9	17.4	17.4	17.9	16.8	16.8	17.8	18.5	18.3	17.2	15.8	14.6	13.8	14.6	16.9
28	D	15.4	15.5	15.8	16.7	16.7	16.7	17.3	19.7	18.4	18.8	17.6	18.4	19.3	16.6	14.6	3.8	3.2	16.5	20.5	18.6	16.8	15.6	14.7	15.4	15.9
29		15.7	16.6	18.6	17.7	17.6	17.5	16.8	16.7	16.6	17.4	15.7	14.5	17.6	15.8	13.7	16.8	18.8	19.4	18.3	16.5	15.7	15.6	14.8	14.8	16.6
30	D	15.5	16.4	16.6	15.8	18.9	20.9	17.6	16.7	17.7	12.4	15.3	14.6	10.3	13.4	12.1	11.6	12.6	13.9	18.5	17.6	16.4	15.8	14.8	14.8	15.4
31		15.3	15.7	16.6	16.9	17.9	17.8	17.5	16.4	16.4	16.6	16.7	14.5	14.0	14.7	16.9	17.5	17.7	18.8	17.4	16.4	15.8	14.6	14.4	14.6	16.3
Mean		15.3	16.3	16.9	17.5	17.9	18.0	17.5	17.5	16.9	17.0	16.7	16.8	16.4	15.6	15.8	15.9	16.1	17.1	17.4	16.8	16.1	15.3	14.8	14.7	16.5

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 36 Victoria 53,000 γ + December 1961

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	311	311	309	309	306	304	303	307	304	300	259	214	180	-38	30	180	235	278	293	298	304	310	317	320	260
2 D	325	331	335	329	325	323	321	315	308	290	231	200	255	201	151	159	212	250	271	303	305	339	367	382	285
3 D	413	309	394	405	397	382	365	343	249	193	247	209	171	223	258	279	282	289	297	299	302	310	315	315	302
4	318	320	322	320	321	321	318	315	309	286	291	299	297	304	310	309	307	310	309	304	301	304	311	313	309
5	315	315	315	315	317	315	315	310	311	312	312	313	313	314	313	313	313	307	310	308	307	309	312	314	312
6	317	318	319	320	325	325	321	318	317	315	316	315	309	300	283	285	282	285	303	309	309	313	315	316	310
7	318	317	317	316	315	313	312	313	312	307	310	310	299	303	313	317	317	317	315	314	312	313	316	316	313
8 Q	316	314	314	313	314	314	315	313	312	313	313	312	312	312	312	313	315	315	311	307	305	309	311	312	312
9	312	311	310	310	311	311	312	312	311	310	310	309	309	310	311	312	314	311	310	310	311	311	313	313	311
10	312	310	309	309	309	311	311	312	312	313	311	301	300	305	309	313	314	313	312	311	310	313	315	315	310
11	317	316	318	319	323	324	323	318	293	271	284	287	287	286	286	288	288	283	282	288	295	299	305	310	300
12	314	317	318	321	319	317	315	315	315	314	313	313	311	312	311	312	311	308	307	308	310	311	314	315	313
13	315	313	311	310	309	308	308	308	309	309	310	310	310	309	309	309	309	308	306	300	299	301	306	309	308
14	314	315	315	314	313	312	312	312	311	312	311	313	313	312	311	310	311	310	308	307	305	305	307	309	311
15	312	313	312	311	311	313	311	309	305	295	299	298	294	299	302	305	307	307	307	308	307	305	308	313	306
16	314	313	313	312	312	310	310	308	307	306	304	304	307	308	308	311	311	310	306	305	305	305	304	305	308
17	309	309	311	312	311	309	309	308	306	305	303	303	305	307	308	308	307	307	305	303	301	300	303	306	307
18 Q	298	308	307	309	309	308	307	305	305	304	304	305	305	305	306	307	308	308	308	306	304	304	303	304	306
19 Q	306	305	305	305	306	305	305	304	303	302	301	302	301	303	303	305	307	307	306	305	305	305	304	303	304
20 Q	304	303	303	303	303	304	303	302	302	303	300	295	297	300	302	305	307	307	305	303	300	302	303	304	303
21	303	303	302	302	303	305	305	304	302	301	298	300	300	300	301	302	303	301	300	300	299	299	299	301	301
22	303	303	302	302	302	303	303	302	302	301	299	299	298	294	287	291	296	300	299	299	298	299	299	302	299
23	303	303	303	304	308	311	311	311	310	307	303	295	287	286	298	306	310	311	308	305	304	305	303	306	304
24	306	305	303	303	304	306	304	303	302	299	296	294	295	298	297	297	300	304	301	302	306	308	298	308	302
25 Q	307	307	305	305	305	305	305	305	304	303	303	303	304	304	305	306	307	306	305	304	302	301	306	307	305
26	307	305	304	303	303	301	301	301	299	298	298	297	296	295	296	300	302	302	300	301	301	301	301	305	301
27	306	305	303	305	309	306	305	305	305	305	307	305	297	295	299	303	306	303	301	299	301	301	302	303	303
28 D	304	304	303	304	304	304	303	302	297	289	270	269	278	292	292	272	270	282	290	293	299	303	304	306	293
29	299	314	315	314	314	311	309	307	305	303	298	294	298	299	299	303	303	302	301	299	303	300	296	305	304
30 D	309	308	308	308	312	315	312	313	308	300	294	296	284	284	287	290	297	305	303	305	304	308	310	312	303
31	313	312	311	310	310	310	309	308	308	305	304	301	295	297	301	304	307	306	302	301	301	300	302	306	305
Mean	314	311	313	314	314	313	312	310	305	299	297	292	291	285	287	294	299	302	303	303	304	306	309	312	304

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (gammas) (All Days)

Table 37 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	268	265	273	286	294	305	299	309	299	288	294	303	290	302	287	283
1-2	270	267	274	290	296	307	306	308	298	289	293	302	292	304	288	283
2-3	270	268	275	286	294	304	301	306	297	290	292	300	290	301	287	283
3-4	268	268	273	286	294	301	295	306	297	283	292	297	288	299	285	281
4-5	265	266	273	285	291	298	293	308	299	284	291	295	287	298	285	279
5-6	265	265	273	286	291	297	294	308	298	286	290	296	287	298	286	279
6-7	263	267	272	287	292	299	294	310	301	287	291	297	288	299	287	280
7-8	266	268	275	290	295	302	295	309	300	287	292	297	290	300	288	281
8-9	264	268	275	293	297	302	294	310	301	286	294	296	290	301	289	281
9-10	263	265	277	292	297	303	286	313	304	285	294	297	290	300	290	280
10-11	264	264	277	295	299	306	286	312	304	290	294	298	291	301	292	280
11-12	270	266	278	296	300	307	289	312	305	286	296	300	292	302	292	283
12-13	272	268	278	297	302	309	296	311	305	288	297	302	294	305	292	285
13-14	275	272	283	295	303	312	302	314	308	288	299	300	296	308	294	287
14-15	277	277	282	294	304	312	301	313	307	288	300	306	297	308	293	290
15-16	276	274	282	293	301	310	295	312	299	286	299	302	294	305	291	288
16-17	273	272	275	288	295	306	294	302	289	281	293	300	289	299	283	285
17-18	266	266	268	278	289	295	287	291	279	272	285	300	281	291	274	279
18-19	258	258	260	270	283	289	281	282	275	268	279	295	275	284	268	273
19-20	254	248	253	268	280	287	280	279	277	265	274	286	271	282	266	266
20-21	255	246	254	266	280	285	278	284	281	266	274	281	271	282	267	264
21-22	260	248	257	266	281	285	280	291	286	273	280	283	274	284	271	268
22-23	262	252	261	271	285	293	288	298	294	279	286	289	280	291	276	272
23-24	266	261	269	280	289	299	293	304	299	284	290	297	286	296	283	279
Mean	266	264	271	285	293	300	292	304	296	283	290	297	287	297	284	279

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (minutes) (All Days)

Table 38 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	17.9	16.8	15.8	13.6	12.8	13.0	13.7	14.2	15.9	15.4	15.5	15.3	15.0	13.4	15.2	16.4
1-2	18.2	17.3	16.2	14.8	14.2	14.5	14.6	15.9	16.5	15.8	16.2	16.3	15.9	14.8	15.8	17.0
2-3	18.9	18.0	17.0	15.9	16.3	15.8	15.9	16.5	16.9	16.2	17.1	16.9	16.8	16.1	16.5	17.7
3-4	19.5	18.6	17.7	17.7	17.2	16.7	17.0	16.9	17.1	17.8	17.3	17.5	17.6	17.0	17.6	18.2
4-5	20.2	19.1	18.5	17.6	17.7	17.4	18.9	17.2	18.0	17.6	18.0	17.9	18.2	17.8	17.9	18.8
5-6	19.7	19.6	19.0	18.3	18.8	17.9	18.6	17.7	18.0	17.7	18.1	18.0	18.4	18.3	18.3	18.9
6-7	19.7	19.8	19.1	17.9	18.6	17.4	19.1	18.4	17.7	18.6	17.8	17.5	18.5	18.4	18.3	18.7
7-8	19.4	19.1	19.7	18.3	18.5	17.6	18.8	17.9	17.4	18.3	18.3	17.5	18.4	18.2	18.4	18.6
8-9	19.3	19.1	19.1	18.2	18.2	18.1	18.2	17.9	17.8	17.6	18.0	16.9	18.2	18.1	18.2	18.3
9-10	19.7	18.8	18.7	18.6	18.2	17.7	18.0	18.1	17.7	18.7	17.7	17.0	18.2	18.0	18.4	18.3
10-11	18.6	18.8	18.5	18.3	17.6	17.2	18.2	18.0	17.6	18.4	17.8	16.7	18.0	17.8	18.2	18.0
11-12	18.9	20.0	19.1	19.2	17.5	16.9	17.4	17.9	18.0	18.9	17.4	16.8	18.2	17.4	18.8	18.3
12-13	19.2	18.8	17.4	19.4	18.8	18.9	18.7	18.5	18.4	18.5	16.7	16.4	18.3	18.7	18.4	17.8
13-14	18.9	18.0	18.3	19.7	20.1	20.7	20.5	20.6	19.6	17.6	17.0	15.6	18.9	20.5	18.8	17.4
14-15	19.5	18.3	19.4	21.1	21.6	22.1	21.9	22.2	21.2	18.5	17.1	15.8	19.9	22.0	20.1	17.7
15-16	19.5	19.1	21.1	21.8	22.8	23.8	24.1	24.6	22.5	19.3	18.0	15.9	21.0	23.8	21.2	18.1
16-17	19.6	20.3	22.0	22.9	23.8	24.3	24.5	25.3	23.1	19.5	19.0	16.1	21.7	24.5	21.9	18.8
17-18	20.2	20.7	21.9	22.4	23.0	23.3	23.3	23.7	21.3	20.2	19.2	17.1	21.4	23.3	21.5	19.3
18-19	19.6	20.1	21.0	20.1	20.6	20.5	20.5	19.6	17.8	19.3	18.1	17.4	19.5	20.3	19.6	18.8
19-20	18.7	19.2	19.1	17.8	17.2	17.6	17.3	15.3	14.9	17.4	16.4	16.8	17.3	16.9	17.3	17.8
20-21	17.4	17.8	16.7	16.4	15.3	14.9	15.1	12.8	13.5	15.5	15.1	16.1	15.5	14.5	15.5	16.6
21-22	16.6	16.4	15.5	15.1	13.8	13.3	13.7	11.8	13.3	14.6	14.7	15.3	14.5	13.2	14.6	15.8
22-23	16.5	15.9	15.3	13.7	12.6	12.5	13.1	11.9	13.5	14.7	15.0	14.8	14.1	12.5	14.3	15.6
23-24	17.2	16.0	15.3	13.3	12.3	12.2	13.0	12.9	14.7	15.2	15.1	14.7	14.3	12.6	14.6	15.8
Mean	18.9	18.6	18.4	18.0	17.8	17.7	18.1	17.7	17.6	17.6	17.1	16.5	17.8	17.8	17.9	17.8

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas) (All Days)

Table 39 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0–1	351	349	358	336	330	329	344	326	316	324	318	314	333	332	334	333
1–2	352	351	360	340	335	335	351	329	316	328	318	311	335	338	336	333
2–3	353	351	361	340	338	335	354	329	315	329	319	313	336	339	336	334
3–4	353	349	361	340	336	331	352	328	315	327	319	314	335	337	336	334
4–5	353	351	361	337	334	331	349	327	315	324	319	314	335	335	334	334
5–6	353	350	361	335	332	328	339	327	313	323	319	313	333	332	333	334
6–7	353	349	359	331	328	324	332	322	311	318	318	312	330	327	330	333
7–8	348	345	358	331	324	317	327	317	306	316	315	310	326	321	328	330
8–9	345	340	349	329	320	313	313	314	307	308	309	305	321	315	323	325
9–10	343	332	340	325	315	307	299	312	304	300	306	299	315	308	317	320
10–11	341	327	331	320	315	305	293	309	298	305	306	297	312	306	314	318
11–12	336	325	333	320	315	305	296	309	295	294	305	292	310	306	311	315
12–13	335	324	335	321	317	303	300	307	297	292	302	291	310	307	311	313
13–14	334	325	338	319	318	308	308	309	301	294	302	285	312	311	313	312
14–15	338	330	345	321	319	310	307	313	304	298	305	287	315	312	317	315
15–16	341	333	350	321	320	311	310	315	307	307	309	294	318	314	321	319
16–17	342	337	350	320	318	310	311	313	305	308	311	299	319	313	321	322
17–18	343	337	347	317	314	303	307	305	300	307	310	302	316	307	318	323
18–19	345	336	345	315	309	296	305	298	296	307	308	303	314	302	316	323
19–20	346	337	343	316	309	295	307	298	298	306	307	303	314	302	316	323
20–21	345	340	345	318	312	296	311	299	303	309	309	304	316	305	319	325
21–22	346	342	348	321	315	301	318	305	307	313	314	306	320	310	322	327
22–23	349	344	352	325	318	310	325	311	312	316	315	309	324	316	326	329
23–24	350	349	356	332	323	318	334	318	317	318	316	312	329	323	331	332
Mean	346	340	349	326	321	313	320	314	307	311	312	304	322	317	323	326

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 40 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	274	276	273	281	293	305	290	312	307	301	298	312	293	300	291	290
1-2	275	279	275	286	296	307	298	312	306	304	301	312	296	303	293	292
2-3	275	279	279	286	297	304	299	306	306	307	302	309	296	302	295	291
3-4	274	278	279	286	297	302	302	308	306	306	302	308	296	302	294	291
4-5	272	278	280	286	295	298	302	311	307	306	301	308	295	302	295	290
5-6	271	277	279	287	294	299	300	313	308	305	300	307	295	302	295	289
6-7	271	277	279	286	297	300	302	315	308	304	300	307	295	304	294	289
7-8	270	278	280	288	300	302	302	316	309	305	300	307	296	305	296	289
8-9	269	277	281	290	306	304	303	316	310	306	301	307	297	307	297	289
9-10	270	277	283	294	304	308	305	318	312	307	302	309	299	309	299	290
10-11	273	279	284	294	303	308	306	316	314	309	304	310	300	308	300	292
11-12	276	282	285	297	304	310	308	316	316	310	304	312	302	310	302	294
12-13	277	283	287	295	307	312	308	315	315	312	305	314	302	311	302	295
13-14	278	284	287	296	310	313	311	318	314	312	306	314	304	313	302	296
14-15	278	285	287	298	313	316	314	317	312	311	307	314	304	315	302	296
15-16	279	284	286	296	311	314	311	310	306	308	305	315	302	312	299	296
16-17	277	282	282	289	305	308	304	300	295	304	301	314	297	304	293	294
17-18	270	278	272	278	293	298	298	289	285	297	296	311	289	295	283	289
18-19	264	274	264	268	281	289	292	280	283	290	289	307	282	286	276	284
19-20	259	270	256	264	274	286	287	281	288	287	281	299	278	282	274	277
20-21	260	265	252	262	270	283	281	288	296	285	280	295	276	281	274	275
21-22	263	264	256	262	275	285	282	296	303	288	285	297	280	285	277	277
22-23	268	266	261	269	286	292	287	303	309	295	293	302	286	292	284	282
23-24	271	273	269	280	294	301	292	306	310	301	299	310	292	298	290	288
Mean	271	277	276	284	296	302	299	307	305	303	298	308	294	301	292	289

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (minutes) (Quiet Days)

Table 41 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0–1	18.1	16.9	15.4	14.5	13.7	14.0	14.5	14.5	16.6	15.4	15.9	15.4	15.4	14.2	15.5	16.6
1–2	18.5	17.4	16.1	15.4	15.0	15.0	15.6	15.9	16.3	15.7	16.2	16.2	16.1	15.4	15.9	17.1
2–3	18.8	17.9	16.8	16.2	16.2	16.7	17.0	16.8	16.2	16.2	16.7	16.7	16.8	16.7	16.4	17.5
3–4	18.9	18.4	17.3	17.0	16.9	17.3	17.0	16.4	16.2	16.6	17.0	16.8	17.1	16.9	16.8	17.8
4–5	18.8	18.3	17.5	17.4	17.4	17.2	17.9	16.1	16.3	16.7	16.9	16.6	17.3	17.2	17.0	17.7
5–6	18.8	18.1	17.6	17.4	17.8	17.2	17.5	16.8	16.5	16.7	16.8	16.6	17.3	17.3	17.1	17.6
6–7	18.2	18.2	17.6	18.2	17.4	16.4	18.4	16.9	16.5	16.7	16.6	16.5	17.3	17.3	17.3	17.4
7–8	18.1	18.1	18.6	18.0	16.7	16.4	18.3	16.4	16.7	16.7	16.6	16.5	17.3	17.0	17.5	17.3
8–9	18.1	18.2	18.2	18.0	17.0	16.5	17.7	16.5	17.0	17.0	16.4	16.3	17.2	16.9	17.6	17.3
9–10	19.0	18.3	17.7	17.9	17.6	17.0	16.2	17.1	17.4	17.3	16.3	16.1	17.3	17.0	17.6	17.4
10–11	18.2	18.4	17.9	18.2	17.5	17.0	16.8	17.7	17.5	17.2	16.4	15.5	17.4	17.3	17.7	17.1
11–12	18.7	18.3	18.3	17.7	17.4	17.0	17.3	18.0	17.7	17.2	16.4	16.1	17.5	17.4	17.7	17.4
12–13	19.2	18.5	18.5	18.3	18.1	18.6	18.3	18.4	18.4	17.3	16.6	16.1	18.0	18.4	18.1	17.6
13–14	19.4	18.3	18.8	19.3	20.1	20.2	20.9	20.3	19.3	17.6	17.3	16.3	19.0	20.4	18.8	17.8
14–15	19.5	18.4	19.7	20.9	21.6	21.8	23.3	21.9	21.0	18.2	17.4	16.5	20.0	22.2	20.0	18.0
15–16	20.1	19.2	21.0	22.7	22.7	23.5	25.3	23.7	22.8	19.2	18.3	16.9	21.3	23.8	21.4	18.6
16–17	21.1	20.0	22.9	24.0	24.1	24.6	25.7	24.7	23.6	20.2	19.5	17.7	22.3	24.8	22.7	19.6
17–18	21.7	20.5	23.5	24.2	23.8	24.4	24.5	23.0	21.9	21.3	20.2	18.4	22.3	23.9	22.7	20.2
18–19	21.3	20.2	22.5	22.3	21.8	22.1	21.1	19.0	18.1	20.3	19.1	18.2	20.5	21.0	20.8	19.7
19–20	20.4	19.4	20.3	20.0	18.2	18.5	16.9	14.6	15.1	17.4	17.8	17.7	18.0	17.1	18.2	18.8
20–21	18.6	18.5	17.2	18.5	15.2	15.7	14.8	12.5	13.9	15.1	16.4	16.6	16.1	14.6	16.2	17.5
21–22	17.6	17.2	15.5	16.6	12.9	13.6	14.0	12.2	13.6	14.2	15.5	15.5	14.9	13.2	15.0	16.5
22–23	17.5	16.8	15.5	14.9	11.1	12.4	13.2	12.2	14.0	14.3	15.1	14.9	14.3	12.2	14.7	16.1
23–24	17.9	16.7	15.5	13.7	10.9	12.2	12.6	13.4	15.1	14.7	15.0	15.1	14.4	12.3	14.8	16.2
Mean	19.0	18.3	18.3	18.4	17.6	17.7	18.1	17.3	17.4	17.0	16.9	16.5	17.7	17.7	17.8	17.7

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas) (Quiet Days)

Table 42 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	348	341	348	333	325	323	328	321	310	312	316	306	326	324	326	328
1-2	348	341	349	334	329	328	333	325	308	312	315	307	327	329	326	328
2-3	349	342	350	335	330	326	336	324	308	312	314	307	328	329	326	328
3-4	349	342	350	335	328	323	334	323	309	311	313	307	327	327	326	328
4-5	349	342	350	333	327	320	332	322	309	311	313	307	326	325	326	328
5-6	349	341	350	333	327	319	330	321	308	310	314	307	326	324	325	328
6-7	349	341	350	334	327	317	329	321	308	311	314	307	326	324	326	328
7-8	349	341	351	333	325	317	325	320	309	311	313	306	325	322	326	327
8-9	349	341	350	331	323	317	322	318	308	311	313	305	324	320	325	327
9-10	349	340	349	325	320	316	314	317	308	311	313	305	322	317	323	327
10-11	347	339	348	328	319	314	316	317	308	311	312	304	322	317	324	326
11-12	346	340	347	329	321	313	320	316	307	311	311	303	322	318	324	325
12-13	346	339	345	329	323	315	323	316	307	310	311	304	322	319	323	325
13-14	346	339	345	330	324	317	325	317	308	310	312	305	323	321	323	326
14-15	347	339	346	330	323	319	327	319	310	311	312	306	324	322	324	326
15-16	349	341	347	332	324	318	325	319	312	313	314	307	325	322	326	328
16-17	350	342	347	331	322	315	319	315	310	314	316	309	324	318	326	329
17-18	350	342	344	327	318	308	311	306	302	312	315	309	320	311	321	329
18-19	350	339	341	323	311	301	304	297	295	306	312	307	315	303	316	327
19-20	350	337	337	321	306	297	303	293	297	299	310	305	313	300	314	326
20-21	347	336	339	322	307	298	306	293	302	297	310	303	313	301	315	324
21-22	346	336	341	324	310	301	311	297	304	301	313	304	316	305	318	325
22-23	346	338	346	326	313	305	314	303	306	307	314	305	319	309	321	326
23-24	347	339	348	329	319	313	320	309	306	309	315	306	322	315	323	327
Mean	348	340	346	329	321	314	321	314	307	309	313	306	322	318	323	327

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 43 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0–1	252	265	267	290	298	312	306	311	295	282	291	289	288	307	284	274
1–2	260	255	267	293	298	313	316	295	296	282	283	284	287	306	285	271
2–3	258	261	268	279	288	307	303	292	293	285	277	280	283	298	281	269
3–4	255	261	255	284	298	292	296	292	299	244	283	275	278	295	271	269
4–5	253	259	256	274	297	283	294	292	292	245	282	275	275	292	267	267
5–6	255	259	248	270	293	290	293	300	295	257	280	273	276	294	268	267
6–7	250	265	240	282	274	288	286	305	297	261	282	275	275	288	270	268
7–8	252	259	252	281	282	293	294	298	294	258	279	274	276	292	271	266
8–9	242	269	255	277	282	293	276	301	295	242	276	270	273	288	267	264
9–10	245	261	252	276	276	292	214	306	300	224	285	266	266	272	263	264
10–11	242	248	231	275	281	297	203	301	295	249	279	271	264	271	263	260
11–12	256	255	237	274	285	296	226	301	300	218	286	278	268	277	257	269
12–13	262	255	238	288	294	293	259	289	295	225	285	278	272	284	262	270
13–14	272	261	265	286	287	301	285	297	305	230	286	257	278	293	272	269
14–15	273	282	267	281	289	303	268	307	309	230	292	284	282	292	272	283
15–16	264	278	274	279	291	304	245	304	295	235	293	262	277	286	271	274
16–17	257	266	262	267	286	299	265	294	290	228	282	257	271	286	262	266
17–18	247	251	246	253	284	280	242	296	277	212	266	274	261	276	247	260
18–19	243	238	248	254	279	272	225	294	273	219	259	267	256	268	249	252
19–20	239	222	249	249	282	276	248	286	271	205	251	262	253	273	244	244
20–21	236	223	256	249	282	275	264	285	273	211	247	249	254	277	247	239
21–22	244	226	249	248	282	272	274	288	274	242	263	245	259	279	253	245
22–23	246	229	255	258	283	286	294	293	280	249	268	263	267	289	261	252
23–24	248	245	263	274	284	299	296	297	292	259	274	272	275	294	272	260
Mean	252	254	254	273	287	292	270	297	291	241	277	270	272	287	265	263

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (minutes) (Disturbed Days)

Table 44 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	18.1	17.7	15.7	12.4	12.7	11.4	10.6	12.5	15.9	15.6	15.0	15.4	14.4	11.8	14.9	16.6
1-2	18.2	18.6	15.2	14.5	13.6	13.3	11.4	15.7	15.7	16.2	15.8	16.4	15.4	13.5	15.4	17.3
2-3	18.8	19.1	17.1	14.8	15.4	14.8	12.8	16.7	18.2	14.6	17.5	16.9	16.4	14.9	16.2	18.1
3-4	21.3	19.1	18.5	21.2	16.5	15.1	14.4	18.1	18.2	24.9	17.0	19.5	18.6	16.0	20.7	19.2
4-5	21.5	20.2	19.2	18.3	19.4	18.0	18.7	19.9	20.9	21.2	17.9	20.0	19.6	19.0	19.9	19.9
5-6	21.1	20.3	21.0	20.2	24.8	18.6	22.0	20.7	18.9	20.0	19.3	21.4	20.7	21.5	20.0	20.5
6-7	20.5	21.8	22.8	18.2	23.2	17.7	19.1	20.6	19.4	25.0	19.8	19.8	20.7	20.2	21.4	20.5
7-8	19.5	19.9	22.7	19.4	22.0	20.3	17.8	18.4	18.9	21.4	20.6	20.3	20.1	19.6	20.6	20.1
8-9	20.1	20.6	22.2	19.3	20.3	21.7	18.0	20.9	19.9	15.7	20.1	18.1	19.7	20.2	19.3	19.7
9-10	20.1	18.5	21.6	17.9	19.9	19.7	19.2	21.3	20.2	21.4	20.6	19.0	19.9	20.0	20.3	19.6
10-11	18.0	18.3	21.6	18.3	18.4	18.5	24.6	17.9	15.9	20.1	20.6	18.4	19.2	19.9	19.0	18.8
11-12	18.2	21.2	22.4	21.5	16.7	15.9	18.8	16.7	19.1	23.0	19.2	18.4	19.3	17.0	21.5	19.3
12-13	19.5	18.0	14.9	21.0	18.2	20.5	18.6	17.5	15.8	20.9	16.0	16.0	18.1	18.7	18.2	17.4
13-14	19.3	15.5	16.7	20.1	19.6	22.5	21.4	19.9	17.9	16.5	15.1	9.4	17.8	20.9	17.8	14.8
14-15	18.8	17.4	19.3	22.1	22.2	22.1	22.5	22.0	20.8	19.2	13.2	10.2	19.1	22.2	20.4	14.9
15-16	15.8	20.7	21.0	20.7	23.5	24.1	28.0	23.9	20.7	19.0	14.8	9.1	20.1	24.9	20.4	15.1
16-17	13.8	20.8	21.2	20.7	24.3	25.0	24.6	23.7	21.6	14.9	17.4	10.0	19.8	24.4	19.6	15.5
17-18	15.6	20.3	19.8	19.7	23.7	22.8	23.1	23.3	20.9	18.5	17.2	14.8	20.0	23.2	19.7	17.0
18-19	15.6	18.5	19.3	17.2	20.4	20.2	19.2	19.4	17.6	19.7	16.2	17.6	18.4	19.8	18.5	17.0
19-20	16.0	18.6	18.5	15.6	16.6	17.9	16.3	16.1	15.7	18.4	14.5	17.4	16.8	16.7	17.1	16.6
20-21	15.7	17.8	17.1	15.8	15.4	14.5	15.8	13.4	13.1	15.7	13.5	17.2	15.4	14.8	15.4	16.1
21-22	15.2	16.0	16.6	15.3	14.7	13.5	14.4	12.2	14.1	14.1	13.6	16.5	14.7	13.7	15.0	15.3
22-23	15.5	15.5	16.5	13.9	13.9	13.0	14.7	12.3	12.3	15.1	14.5	15.8	14.4	13.5	14.5	15.3
23-24	17.7	14.1	16.6	13.6	13.8	12.4	14.5	13.4	12.9	15.8	14.3	15.0	14.5	13.5	14.7	15.3
Mean	18.1	18.7	19.1	18.0	18.7	18.1	18.4	18.2	17.7	18.6	16.8	16.4	18.1	18.4	18.4	17.5

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas) (Disturbed Days)

Table 45 Victoria 1961

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	359	349	367	357	333	360	352	344	316	357	321	332	346	347	349	340
1-2	362	366	372	364	342	364	368	351	318	374	324	313	351	356	357	341
2-3	365	365	378	349	337	368	371	355	319	376	331	330	354	358	356	348
3-4	367	356	381	353	337	358	371	357	319	359	331	331	352	356	353	346
4-5	365	356	377	336	337	367	367	354	318	338	330	329	348	356	342	345
5-6	362	353	379	334	332	364	349	350	313	332	327	326	343	349	340	342
6-7	358	348	377	315	323	351	334	326	306	314	326	321	333	334	328	338
7-8	340	343	372	323	322	328	339	314	297	310	316	316	327	326	326	329
8-9	334	334	342	326	315	314	274	301	301	267	304	293	309	301	309	316
9-10	331	318	299	313	303	293	194	309	297	236	291	274	288	275	286	304
10-11	324	296	250	284	298	292	171	299	281	260	287	260	275	265	269	292
11-12	311	288	270	287	301	288	192	295	276	192	280	238	268	269	256	279
12-13	318	287	286	302	304	259	211	271	285	185	269	234	268	261	265	277
13-14	318	290	302	298	298	285	245	276	278	200	264	192	270	276	270	266
14-15	319	304	333	307	296	294	235	292	288	226	273	204	281	279	289	275
15-16	318	314	352	305	306	301	254	301	295	271	282	236	295	291	306	288
16-17	317	323	352	304	313	305	268	304	298	270	294	259	301	298	306	298
17-18	321	325	351	306	312	300	272	299	298	274	295	281	303	296	307	306
18-19	332	326	353	309	311	295	282	300	299	292	300	291	307	297	313	312
19-20	336	331	353	314	316	301	303	305	300	311	303	300	314	306	320	318
20-21	342	340	353	322	322	306	327	309	304	327	310	303	322	316	327	324
21-22	351	347	355	326	327	310	346	318	309	337	322	314	330	325	332	334
22-23	359	355	360	336	330	326	355	325	320	338	322	323	337	334	339	340
23-24	361	371	364	356	333	341	368	335	337	339	323	327	346	344	349	346
Mean	340	333	345	322	319	320	298	316	303	295	305	289	315	313	316	317

THREE-HOUR RANGE INDICES, VICTORIA, 1961

Table 46

January	D	H	Z	K	February D	H	Z	K
1	2332 2101	2222 1011	1011 0010	2332 2111	0100 1111	0100 0111	0000 0010	0100 1111
2	0013 2110	0022 1101	0002 1110	0023 2111	0010 0000	1000 1001	0000 0001	1010 1001
3	1221 1211	1131 0111	0020 0110	1231 1211	0024 5432	1023 3322	1003 4311	1024 5432
4	0111 1100	0210 0101	0000 0000	0211 1101	1233 5445	1222 4554	0111 5345	1233 5555
5	0012 1022	1022 1012	0000 1011	1022 1022	4544 3221	3444 1221	4454 2000	4554 3221
6	0235 3010	1212 1001	0013 2000	1235 3011	1165 5523	3155 4432	1065 3311	3165 5533
7	1311 2112	2202 2202	0010 2101	2312 2212	2313 3313	2322 2212	0212 0101	2323 3313
8	3455 2442	3333 2542	3243 1221	3455 2542	3121 2211	2122 2231	0011 1110	3122 2231
9	1456 5333	1345 4322	0245 3132	1456 5333	1222 1301	2212 1200	1011 0100	2222 1301
10	0122 1211	1122 1101	1102 1101	1122 1211	0133 0112	1020 0101	0000 0000	1133 0112
11	0121 1010	0110 0000	0000 0000	0121 1010	2114 4101	2212 2101	1003 3000	2214 4101
12	0130 1111	0120 1101	0000 0000	0130 1111	0000 1110	0110 0100	0000 0000	0110 1110
13	1133 4221	0133 3121	0022 3110	1133 4221	0036 6431	2225 4422	1035 4431	2236 6432
14	1010 1211	1100 0001	1010 0000	1110 1211	1010 0221	1111 1122	0000 0011	1111 1222
15	3143 3123	2132 2114	1022 2102	3143 3124	2234 3210	2223 2100	0013 2100	2234 3210
16	2343 1132	2432 0032	2232 0011	2443 1132	3255 6421	4256 4322	1135 4310	4256 6422
17	1234 3112	3221 2111	0022 1101	3234 3112	0126 5444	0124 4344	0005 4233	0126 5444
18	1134 5342	2133 3222	1012 5221	2134 5342	5566 6331	5454 4431	6445 5210	6566 6431
19	2211 3545	3111 2454	1000 1333	3211 3555	2253 4321	2233 3321	1032 5220	2253 5321
20	6555 5532	4444 4231	3454 4431	6555 5532	3345 3432	3344 4432	1233 4321	3345 4432
21	1455 4521	1344 4410	1234 4311	1455 4521	3344 4333	2242 3333	1133 3211	3344 4333
22	1154 4432	1254 2421	0045 5211	1255 5432	1344 3322	2342 2322	1132 2211	2344 3322
23	2322 1220	2121 1111	1121 0110	2322 1221	2342 2110	2321 1121	1011 1110	2342 2121
24	2344 4231	2342 3232	0133 3121	2344 4232	1441 1000	1430 0000	0220 0000	1441 1000
25	2534 4222	3334 3222	1224 4221	3534 4222	0012 0111	0011 0001	0001 0000	0012 0111
26	1234 5222	1222 4222	0002 3311	1234 5222	1000 0221	1000 0111	0000 0100	1000 0221
27	2033 3211	2132 2201	1022 1111	2133 3211	0222 3221	1221 2111	1110 1111	1222 3221
28	2123 3212	2112 3121	1002 1210	2123 3222	1344 4221	2221 2121	1112 3121	2344 4221
29	2322 3211	2212 2111	1102 2100	2322 3211				
30	0332 1011	1221 0001	0110 0001	1332 1011				
31	2201 1110	2111 0000	1000 0000	2211 1110				

March	D	H	Z	K	April D	H	Z	K
1	1232 4112	1331 2011	0111 3010	1332 4112	3255 3211	4424 2122	3233 3101	4455 3222
2	2431 0110	1321 0011	1211 0000	2431 0111	2464 2322	2354 3122	1243 3111	2464 3322
3	1111 1100	1110 0000	1000 0000	1111 1100	2644 3321	3554 3222	2543 2221	3654 3322
4	0000 1201	0100 1100	0000 0000	0100 1201	3140 1121	2030 0011	3020 1000	3140 1121
5	0102 1233	1202 1133	0002 1114	1202 1234	1213 0100	2221 0000	1102 1000	2223 1100
6	6545 6110	6344 4110	5553 6200	6555 6210	1110 1223	0011 1323	0000 0101	1111 1323
7	0000 1111	0000 1011	0000 0001	0000 1111	3313 2212	3312 1112	1202 1001	3313 2212
8	1112 1121	1111 1012	0001 0101	1112 1122	1132 1111	1122 0113	1011 0101	1132 1113
9	2132 3333	1230 2223	1121 2212	2232 3333	1226 4331	1226 3333	0016 4211	1226 4333
10	3357 5320	3358 6311	2358 7210	3358 7321	1544 4322	3433 2233	1223 3121	3544 4333
11	0122 2221	1111 2122	0001 0111	1122 2222	4644 4431	4533 3422	3413 3311	4644 4432
12	2013 2112	3001 1112	1102 0001	3113 2112	1242 3210	2141 3211	0032 1200	2242 3211
13	2244 3321	2133 2112	1121 1111	2244 3322	1211 3422	1101 2423	1000 2201	1211 3423
14	4555 3442	4444 2432	3344 3221	4555 3442	2134 5555	3234 4536	1113 3346	3234 5556
15	1525 4323	2424 4224	1204 3212	2525 4324	6773 2332	6573 2333	6653 2321	6773 2333
16	5464 4220	4352 1110	3342 3000	5464 4220	2233 4322	2222 2223	0112 3112	2233 4323
17	1154 3221	2153 1111	1033 1100	2154 3221	1022 2210	1011 1111	0011 1010	1022 2211
18	1100 3432	2100 2333	1000 3211	2100 3433	0222 2100	1132 1101	0022 1001	1232 2101
19	1553 5532	1552 3433	1243 4321	1553 5533	1222 0222	2231 0222	1110 0111	2232 0222
20	2434 4332	3233 3332	2224 3221	3434 4332	1242 1100	2231 0101	2121 0000	2242 1101
21	3323 2321	3212 1321	1001 0110	3323 2321	0001 1110	1100 1011	1000 1100	1101 1111
22	3543 3210	3442 2111	1242 2100	3543 3211	1003 4432	1012 3333	1002 3221	1013 4433
23	1333 4321	2231 3311	0020 3210	2333 4321	2233 2221	2233 3113	2022 2111	2233 3223
24	1444 2211	1223 2112	1113 2111	1444 2212	3203 2222	3211 2234	3302 1121	3313 2234
25	0020 2211	1001 1111	0000 1101	1021 2211	3212 1221	3221 1122	3111 0000	3222 1222
26	1243 2202	1232 1113	0122 1001	1243 2213	2421 2340	2321 2342	2311 1221	2421 2342
27	1133 3541	2212 2542	1022 2421	2233 3542	1343 5321	2432 3212	1143 3111	2443 5322
28	3453 3221	4442 2222	2343 2110	3453 3222	2331 1111	2321 0111	2221 0110	2331 1111
29	0002 2221	1112 1121	0001 1111	1112 2221	2002 1212	2002 1112	1001 0111	2002 1212
30	1453 2100	2341 1110	2221 0000	2453 2110	2212 2312	1112 2223	0001 1112	2212 2323
31	0000 1312	1101 1212	0000 1111	1101 1312				

THREE-HOUR RANGE INDICES, VICTORIA, 1961

May	D	H	Z	K	June D	H	Z	K
1	4424 2413	4323 1213	4213 3102	4424 2413	1335 3522	3333 3434	2124 5222	3335 5534
2	6643 2221	3422 1221	5421 1100	6643 2221	3344 3431	3233 3431	2234 3421	3344 3431
3	1122 1110	1131 0011	1021 0000	1132 1111	2444 2211	3333 1212	2233 1101	3444 2212
4	0022 1334	0011 1124	0000 0112	0022 1334	1443 4211	2332 2122	1212 3211	2443 4222
5	2243 2543	3232 1544	2132 2332	3243 2544	1334 1221	3322 0232	1132 1111	3334 1232
6	2655 4332	4444 4333	2334 4332	4655 4333	2342 3542	2331 2543	1121 2321	2342 3543
7	2444 3322	4343 2333	2243 1221	4444 3333	1454 3431	3333 3333	1133 3122	3454 3433
8	1243 2222	2231 2123	2132 0011	2243 2223	4554 3222	4443 2223	3232 2112	4554 3223
9	1455 2211	2344 3222	2254 2011	2455 3222	1133 2221	2222 1222	1021 1110	2233 2222
10	1323 2113	3122 2124	2112 2013	3323 2124	1223 3100	2221 2000	1102 1000	2223 3100
11	2443 3222	4322 2234	3231 2113	4443 3234	0000 1000	1010 1011	0000 0000	1010 1011
12	3444 2232	3342 1234	3333 2112	3444 2234	2343 2200	2433 2211	1123 0200	2443 2211
13	5533 3221	5432 2321	4423 3111	5533 3321	0112 1110	1111 1111	1101 0000	1112 1111
14	4433 2210	3332 1111	2223 2211	4433 2211	1012 0102	1022 0104	1002 1102	1022 1104
15	0011 1111	1112 1112	1001 0101	1112 1112	1223 3221	2223 2222	2211 1211	2223 3222
16	2554 4322	4343 3333	3343 3221	4554 4333	3132 2321	4311 1221	3200 1110	4332 2321
17	1333 3111	2222 2111	1112 1101	2333 3111	1312 2210	2201 1212	1201 1111	2312 2212
18	1022 1110	1121 0111	1011 0000	1122 1111	1335 4322	2212 2334	1213 2312	2335 4334
19	1332 2221	2222 2122	2112 1111	2332 2222	2222 1111	4322 0122	2211 1100	4322 1122
20	2343 2210	4431 1221	2331 1111	4443 2221	1221 1133	3322 0124	2121 0122	3322 1134
21	1232 1121	2111 1022	1110 0011	2232 1122	5445 5445	5454 3345	5436 6335	5456 6445
22	2211 2331	3322 1332	2211 0121	3322 2332	6564 5422	5544 3344	6454 4323	6564 5444
23	2323 3321	3422 2232	1111 2221	3423 3332	3110 1222	4110 1213	2200 0112	4210 1223
24	3232 2111	3231 2113	2211 1101	3232 2113	1222 1111	4200 1022	2201 1010	4222 1122
25	3555 5231	4443 4232	3444 4331	4555 5232	1123 2112	3212 1224	2113 2012	3223 2224
26	3122 3111	4121 2121	2221 1000	4222 3121	0101 2210	2100 2221	2200 1100	2201 2221
27	2441 2100	3221 1111	1120 1100	3441 2111	0243 2100	1333 1100	2133 2000	2343 2100
28	1113 3332	1222 1133	2002 2221	2223 3333	0113 2100	2212 1201	1002 0010	2213 2211
29	1320 1110	2320 0111	1210 0101	2320 1111	3543 2211	4543 3122	3554 1010	4554 3222
30	1133 2212	2223 2212	2021 1101	2233 2212	1310 0100	3210 0022	2210 0011	3310 0122
31	2444 3322	4344 1334	3244 2222	4444 3334				

July	D	H	Z	K	August D	H	Z	K
1	2443 1200	3233 1211	2222 2101	3443 2211	1312 2121	2321 1113	2210 0112	2322 2123
2	0341 1331	2232 2232	0222 0121	2342 2332	4674 4332	5564 4443	2574 3232	5674 4443
3	1243 3320	2233 3321	1124 3210	2244 3321	2453 4222	3331 2233	2243 3122	3453 4233
4	1122 2322	3123 1234	2101 1112	3123 2334	4544 2321	4433 2222	2323 2211	4544 2322
5	4545 5332	5433 4334	5544 4222	5545 5334	0334 2221	2333 1122	1123 2111	2334 2222
6	3532 2432	3422 2533	2321 1312	3532 2533	1223 3220	2221 1222	1101 1001	2223 3222
7	4433 2310	5332 2320	4332 1211	5433 2321	1112 3121	1111 1121	0000 1100	1112 3121
8	1334 2221	2333 2223	2233 1111	2334 2223	0255 3251	1333 2242	1133 3111	1355 3252
9	1343 1210	2342 2311	1132 1100	2343 2311	2430 2110	2110 1000	1110 1100	2430 2110
10	1554 3321	3343 3212	2343 4310	3554 4322	2254 5210	3332 3311	1143 4211	3354 5311
11	2221 2221	3222 1223	3211 0012	3222 2223	3344 4422	4422 5233	3323 5321	4444 5433
12	1144 1111	2223 1111	1234 1000	2244 1111	1230 1321	2230 0223	2120 0121	2230 1323
13	0104 6663	1105 6774	0104 5553	1105 6774	1000 0000	3201 0001	2100 0001	3201 0001
14	3257 6433	4378 6453	3268 7453	4378 7453	0022 5421	1011 2321	1001 3210	1022 5421
15	3543 2133	3422 3245	1511 2224	3543 3245	2241 1211	2241 1212	1130 0110	2241 1212
16	5322 2432	6321 3333	4412 2222	6422 3433	2410 1112	3310 1112	2200 0101	3410 1112
17	2434 4263	3323 3154	2314 4333	3434 4364	1013 1120	2123 1121	0103 2110	2123 2121
18	4666 7653	5555 5434	4546 5554	5666 7654	0012 2201	2113 2112	1002 0101	2113 2212
19	5410 1101	5510 1222	5520 1122	5520 1222	1334 2101	2333 2112	1213 3100	2334 3112
20	1342 1334	3441 1235	1220 0123	3442 1335	1102 3321	1102 2331	1102 2211	1102 3331
21	4673 5431	5452 3323	4363 4431	5673 5433	1232 2210	2120 1111	2111 1100	2232 2211
22	2254 2111	4233 2211	2233 3201	4254 3211	1000 0000	1010 0001	0000 0000	1010 0001
23	0014 3431	1123 2333	1103 3321	1124 3433	1121 1200	1011 0001	0010 0100	1121 1201
24	2535 3211	3334 2223	2323 4122	3535 4223	0000 1320	1000 1212	0000 0110	1000 1322
25	3545 3222	4433 1133	3233 2112	4545 3233	2112 3212	3222 2113	2000 1101	3222 3213
26	3413 2144	4313 2245	2213 2133	4413 2245	2344 2212	3233 2123	1123 1001	3344 2223
27	3578 5544	4488 5565	3288 6444	4588 6565	2251 1211	4231 1112	1011 0001	4251 1212
28	4343 2222	4332 2333	2323 1221	4343 2333	2212 1101	3101 1012	1001 0000	3212 1112
29	0433 2211	2332 2122	2222 1121	2433 2222	1001 2443	1001 0345	1000 1232	1001 2445
30	2233 1111	2233 1122	1022 1011	2233 1122	3335 5422	4314 5433	3215 6332	4335 6433
31	0013 2122	1112 1221	0002 2111	1113 2221	5665 3321	4552 2333	3553 2211	5665 3333

THREE-HOUR RANGE INDICES, VICTORIA, 1961

September	D	H	Z	K	October	D	H	Z	K
1	4555 2322	3435 2323	2435 3212	4555 3323		8778 4212	7887 4222	8778 5112	8888 5222
2	1245 2212	3233 2213	2134 2111	3245 2213		0021 1210	1121 1121	0010 1100	1121 1221
3	2533 1221	3442 0122	2233 1120	3543 1222		1021 2121	1011 3211	0001 1110	1021 3221
4	1134 2202	2133 2013	1031 2011	2134 2213		0113 2112	1101 2212	0002 2001	1113 2212
5	4432 2231	3222 2212	1220 0111	4432 2232		0022 1110	1112 0010	1001 0000	1122 1110
6	1302 2110	3200 1010	1110 1001	3312 2111		0013 3211	1122 1211	0010 1000	1123 3211
7	2021 1212	2010 0012	1010 0011	2021 1212		3211 2001	3221 2001	2011 1000	3221 2001
8	0002 1211	1111 0121	0000 0011	1112 1221		0242 2211	0232 2111	0011 1000	0242 2211
9	0035 1211	2134 1112	1024 0011	2135 1212		0210 1100	1320 0000	0000 0000	1320 1100
10	2101 2322	3112 1223	1001 0112	3112 2323		0000 0111	0000 0011	0000 0000	0000 0111
11	1224 3324	2212 2324	1102 2113	2224 3324		1024 4212	1122 2122	0023 3111	1124 4222
12	1553 4111	2451 2112	2353 3001	2553 4112		5543 4412	4432 2312	3343 2200	5543 4412
13	1221 1333	1210 1123	1110 0111	1221 1333		2444 1321	2321 0112	1232 0000	2444 1322
14	2453 6333	2433 5223	1333 5221	2453 6333		2022 3101	2131 2001	1121 1000	2132 3101
15	0124 3101	2123 1012	2023 2000	2124 3112		0112 0110	0002 0011	0001 0000	0112 0111
16	1333 3221	1221 2121	1112 1100	1333 3221		0000 0100	0000 0000	0000 0000	0000 0100
17	2633 2111	3520 1111	2412 1011	3633 2111		0000 0002	0000 0002	0000 0001	0000 0002
18	1321 2200	1310 1200	0200 0000	1321 2200		0110 1201	1200 1001	0000 1000	1210 1201
19	0100 1011	1100 1010	0000 0000	1100 1011		1211 1112	2220 0012	0110 0110	2221 1112
20	1233 2222	1222 1222	1111 1111	1233 2222		4652 0210	3441 0100	3440 0000	4652 0210
21	0010 0110	0010 0001	1000 0001	1010 0111		1001 3222	1001 2022	0000 1100	1001 3222
22	1012 2210	1111 1111	0001 2110	1112 2211		1113 2201	2112 1100	0002 0100	2113 2201
23	1000 1211	1000 0112	0000 0111	1000 1212		0031 1222	0110 1112	0000 0000	0131 1222
24	1036 5543	2125 5544	1026 4332	2136 5544		0332 2110	1212 1000	0011 0000	1332 2110
25	6675 5212	4554 3112	3453 4311	6675 5312		1021 3222	0121 2212	0010 1120	1121 3222
26	3334 3332	3222 3222	1133 3121	3334 3332		1365 4343	2344 2334	0154 3222	2365 4344
27	4655 5210	3445 4111	2345 5110	4655 5211		3643 3334	3533 2323	2344 2222	3644 3334
28	1021 0203	1010 0012	1010 0001	1021 0213		1236 8764	1249 8776	0149 8675	1249 8776
29	1333 2210	1122 0212	1021 2000	1333 2212		4663 1211	4463 1002	3542 1000	4663 1212
30	0222 4136	1212 2016	0111 2015	1222 4136		0012 2210	1011 2211	1011 0000	1012 2211
31						0241 2100	1131 0001	0020 0000	1241 2101

November	D	H	Z	K	December	D	H	Z	K
1	0323 2110	1211 1001	0121 2000	1323 2111		0145 6643	0234 8544	0135 8632	0245 8644
2	0034 4111	1022 3110	0022 2000	1034 4111		3337 6544	3325 4455	2236 6545	3337 6555
3	1322 1101	0221 0000	0110 0000	1322 1101		4476 4323	4465 4223	4475 5312	4476 5323
4	0000 1222	0000 0122	0000 0011	0000 1222		3233 3311	1222 1211	0032 2001	3233 3311
5	2343 5221	2422 4223	1233 4311	2443 5323		0220 2432	1120 2431	0010 1220	1220 2432
6	2455 2210	2334 2112	1143 2001	2455 2212		1312 3431	1311 2331	0110 3220	1312 3431
7	2345 5543	3345 5534	0235 4443	3345 5544		1124 3100	1113 3100	0001 2000	1124 3100
8	5442 4121	5341 2022	4331 2021	5442 4122		0021 1100	0011 0010	0000 0000	0021 1110
9	3142 3211	3231 1120	1032 2110	3242 3220		0012 1210	0011 1000	0001 0000	0012 1210
10	1411 1101	1311 1000	0100 0000	1411 1101		0003 1222	0101 1121	0002 2000	0103 2222
11	0001 0101	0000 0001	0000 0000	0001 0101		1144 2321	2133 2111	0143 0120	2144 2321
12	2253 3422	3342 3312	1142 2210	3353 3422		2101 2100	2201 1100	0000 0000	2201 2100
13	1111 0011	0000 0011	0000 0001	1111 0011		0000 0111	0000 0111	0000 0010	0000 0111
14	2451 1221	2352 0021	0242 0011	2452 1221		2121 0111	0011 0011	0000 0000	2121 0111
15	0101 0100	0101 0000	0000 0000	0101 0100		1233 3111	1332 2003	0121 1001	1333 3113
16	0001 1011	0110 0002	0000 0000	0111 1012		0132 2111	1111 0101	0000 0100	1132 2111
17	1101 5523	1110 3423	0000 2221	1111 5523		3211 0000	1111 0000	1000 0000	3211 0000
18	3465 5332	4355 5332	2265 5331	4465 5332		0100 1000	2100 0001	0000 0000	2100 1001
19	4343 3111	3341 2110	2231 2000	4343 3111		0110 0110	0100 0100	0000 0000	0110 0110
20	0232 5222	1331 2211	0130 3100	1332 5222		0023 1110	1012 1001	0001 1000	1023 1111
21	2231 0211	2220 0111	2120 0100	2231 0211		0102 0011	1111 0012	0000 0000	1112 0012
22	1001 1100	1001 0000	0001 1000	1001 1100		0102 3211	1101 2100	0000 2100	1102 3211
23	0000 1210	0000 0001	0000 0000	0000 1211		0232 4112	2122 3003	0202 3101	2232 4113
24	0111 0110	0010 0000	0000 0000	0111 0110		2332 3310	3222 3210	1101 1100	3332 3310
25	0032 1110	1122 1001	1002 0000	1132 1111		0002 1210	0001 0001	0000 0000	0002 1211
26	0123 1111	1122 0111	1011 0000	1123 1111		0221 1101	1210 1101	0010 0100	1221 1101
27	1011 2110	1010 1010	0000 0000	1011 2110		3332 2111	3221 2111	1111 1000	3332 2111
28	1100 1111	0000 0010	0000 0000	1100 1111		1134 3522	2124 4422	0013 3321	2134 4522
29	0212 1001	1111 0000	0000 0000	1212 1001		2114 3212	2203 2213	2102 0112	2214 3213
30	0020 1011	0120 0001	0010 0000	0120 1011		2333 3311	2323 3322	0113 1300	2333 3322
31						1123 2121	1212 2131	0001 1110	1223 2131

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 47 Victoria H = 18,500 γ + **January** 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	301	308	303	290	296	297	305	304	305	306	308	306	313	311	310	311	313	306	300	292	291	292	300	297	303
2	294	298	294	286	291	297	293	286	293	294	299	300	303	309	310	307	310	307	303	290	287	290	295	303	298
3	305	306	307	304	304	301	301	302	305	307	308	308	308	309	310	309	313	309	304	293	286	283	291	298	303
4 Q	304	307	307	304	305	306	307	305	308	311	309	315	313	314	312	314	317	314	303	292	287	291	300	308	306
5 Q	314	315	315	313	311	307	307	305	305	311	311	315	321	319	321	322	325	321	313	300	295	300	309	319	312
6	323	323	320	311	309	309	309	311	312	312	316	316	316	317	317	316	322	321	311	302	298	301	309	316	313
7	325	322	323	321	321	319	321	317	319	318	321	320	324	321	321	319	321	319	314	303	296	294	302	312	316
8	316	313	312	307	307	302	303	309	311	313	316	318	321	321	318	320	321	322	313	300	297	298	305	312	312
9	319	319	317	309	309	309	311	313	315	313	313	312	321	319	314	323	330	322	309	304	295	297	305	312	313
10 D	319	315	324	286	336	289	293	303	309	301	288	294	278	283	186	228	286	289	268	236	253	270	264	276	282
11 D	282	283	281	272	273	276	298	281	285	290	290	290	292	297	300	303	305	296	282	276	277	278	287	289	287
12	295	296	296	295	298	296	295	295	305	297	297	299	300	301	304	302	305	297	285	278	281	286	291	298	296
13	303	305	304	299	299	298	305	299	303	303	304	303	306	305	308	308	309	305	294	286	287	291	299	309	301
14	313	318	318	318	314	312	313	308	305	299	301	306	314	314	316	309	310	329	316	303	293	280	275	294	307
15	300	303	300	302	306	306	301	307	303	307	304	303	304	303	304	306	314	314	304	295	297	293	288	301	303
16 D	311	314	309	308	309	303	291	296	308	304	306	306	315	312	312	306	317	312	303	295	288	285	292	304	304
17	312	314	312	308	312	305	305	305	306	306	307	307	312	309	313	313	312	309	300	287	285	288	292	298	305
18	304	308	310	308	307	305	304	304	308	306	308	309	313	311	314	311	309	313	303	293	291	296	306	312	306
19 D	313	322	322	317	322	315	294	286	291	297	302	308	312	301	316	298	294	294	296	295	289	288	290	297	303
20	305	307	301	300	295	296	298	296	297	300	301	301	305	305	308	308	310	305	292	282	286	291	300	305	300
21	307	311	305	308	306	300	296	299	299	297	299	302	294	294	312	313	313	304	294	286	281	275	281	294	299
22 Q	303	306	307	303	304	299	297	294	299	300	302	304	306	306	308	307	306	293	284	277	279	287	298	305	299
23 Q	312	313	311	307	307	306	305	305	306	307	308	310	311	311	309	307	306	300	291	284	280	283	288	299	303
24 Q	304	308	308	306	305	301	304	303	305	303	306	305	305	307	309	306	302	294	287	280	277	282	287	294	300
25	307	309	311	309	310	312	312	311	308	305	303	312	313	314	315	313	313	304	298	287	288	295	307	315	307
26	319	318	312	306	306	302	302	305	307	305	309	310	312	311	317	311	318	305	284	281	283	288	289	296	304
27 D	301	301	309	310	302	285	287	289	300	287	289	302	306	307	310	309	310	303	294	290	284	280	279	295	297
28	302	308	308	305	299	293	292	298	301	309	305	304	307	308	309	311	312	305	300	288	284	285	291	296	301
29	298	304	305	301	294	299	300	300	302	302	307	308	311	321	314	315	316	313	308	299	296	292	294	294	304
30	289	299	300	293	295	297	293	299	304	305	306	303	309	307	300	310	313	311	306	297	290	282	289	297	300
31	304	306	307	305	305	304	305	304	303	304	308	307	310	311	312	311	311	308	302	294	290	288	291	299	304
Mean	307	309	308	304	305	302	302	301	304	304	305	306	309	309	307	308	312	308	299	289	287	288	293	301	303

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 48 Victoria D = 22° 30.0' E + January 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	15.0	16.0	17.1	19.5	18.4	17.2	17.2	16.9	16.6	15.8	15.9	15.7	15.5	15.7	16.2	16.9	18.4	19.5	20.4	18.6	17.2	15.7	15.2	15.3	16.9
2	15.4	16.1	17.0	17.2	17.6	18.1	19.5	21.8	20.9	13.6	14.5	17.1	15.0	15.8	16.4	15.9	16.4	16.5	18.2	18.7	17.8	15.7	15.6	15.1	16.9
3	15.3	15.8	16.3	16.1	17.0	16.4	16.7	16.2	16.5	15.9	15.6	16.5	15.4	15.7	16.3	16.4	17.9	18.2	19.5	19.2	18.7	16.2	15.1	14.9	16.6
4 Q	14.7	15.4	15.9	16.0	16.1	15.9	15.9	15.7	16.1	16.4	15.1	15.1	16.2	16.1	16.3	16.2	17.1	17.7	19.0	18.3	17.0	15.2	14.0	14.3	16.1
5 Q	15.0	15.4	16.2	16.2	16.7	16.1	16.2	15.6	16.0	15.8	15.8	14.4	15.1	15.1	15.6	15.6	16.5	17.6	19.2	18.7	17.9	15.9	14.4	13.1	16.0
6	14.1	16.4	17.0	16.3	16.5	16.4	16.7	16.2	16.0	15.6	15.7	16.3	17.0	15.9	15.9	15.7	16.4	16.4	16.8	17.1	16.9	14.8	13.9	13.3	16.0
7	14.0	15.1	15.9	15.9	16.4	16.4	16.3	15.8	15.6	15.2	15.8	15.8	16.0	15.6	16.0	16.6	17.6	17.0	18.1	17.0	16.4	14.4	13.1	14.1	15.8
8	15.5	15.7	16.2	16.1	16.6	17.0	16.9	15.5	15.7	14.9	15.7	15.9	15.1	15.6	15.6	15.2	17.3	16.8	17.8	17.1	16.1	15.0	14.9	14.5	16.0
9	14.8	15.1	16.4	17.0	17.0	16.1	16.2	16.0	15.9	15.2	15.4	14.4	13.1	16.6	14.4	15.0	18.6	17.8	18.5	16.8	15.4	14.1	14.2	14.1	15.8
10 D	14.2	15.0	14.2	12.5	31.6	15.3	17.7	17.3	16.4	16.6	22.6	26.3	21.7	18.2	6.9	1.3	14.2	20.7	20.0	17.6	14.9	13.7	12.7	14.6	16.4
11 D	17.2	16.4	18.5	20.6	20.8	20.2	17.6	18.8	15.8	14.5	15.5	15.1	13.4	12.4	15.1	16.9	19.1	19.7	20.2	18.8	17.5	15.4	15.1	14.8	17.1
12	15.1	15.8	16.8	17.8	18.3	17.3	17.7	16.7	15.1	15.6	16.0	15.6	15.4	15.2	15.8	16.2	18.4	19.3	19.5	17.7	15.8	14.5	13.9	14.2	16.4
13	14.6	15.5	16.6	17.1	17.4	19.3	17.7	16.2	14.5	15.3	15.9	15.5	15.6	15.7	16.1	16.2	18.5	19.9	20.3	19.4	17.5	15.4	14.3	14.2	16.6
14	14.7	15.0	16.3	16.2	16.8	16.6	16.7	16.8	17.0	17.1	16.5	16.9	16.6	16.1	16.6	16.2	15.3	19.1	19.2	16.8	16.5	14.0	9.9	10.1	16.0
15	14.6	16.1	16.7	17.1	19.8	16.8	17.4	17.5	17.1	16.1	16.4	18.4	16.4	15.3	16.0	16.0	17.8	18.6	18.7	17.7	17.1	15.3	16.1	15.5	16.8
16 D	14.8	15.2	16.9	16.8	16.4	17.1	21.1	20.7	17.4	17.1	17.7	18.2	13.4	17.1	17.1	17.4	18.8	19.6	20.3	18.7	17.7	14.7	14.4	13.8	17.2
17	13.8	15.0	15.6	17.0	16.4	15.4	16.1	16.1	16.3	16.5	16.5	16.3	15.5	15.7	16.6	16.5	17.8	19.1	20.0	18.8	17.8	16.1	15.7	14.8	16.4
18	14.6	14.6	15.6	16.2	16.4	16.3	16.3	16.2	16.1	16.0	16.2	15.7	15.8	15.7	15.7	15.6	17.4	19.8	20.5	19.3	17.4	15.2	14.5	14.0	16.3
19 D	14.3	14.4	15.4	15.4	16.7	16.2	17.0	17.3	18.5	17.1	16.3	15.9	15.0	8.9	6.8	10.4	9.4	13.1	17.1	18.4	18.0	15.8	15.5	15.6	14.9
20	15.5	16.2	17.5	17.2	17.6	17.2	16.8	16.0	15.9	16.0	16.3	16.3	16.2	15.7	16.3	16.2	17.4	18.5	19.5	18.9	17.6	15.3	14.5	14.8	16.6
21	14.5	15.1	17.0	16.9	16.7	16.3	16.2	15.9	16.9	16.1	15.7	17.1	14.7	8.5	16.0	17.3	18.1	18.0	18.0	17.1	15.8	14.5	13.9	14.0	15.8
22 Q	14.7	15.6	16.5	16.6	16.9	16.4	16.9	16.9	16.1	15.6	15.9	15.4	16.0	16.0	16.4	16.7	18.4	19.5	19.9	19.0	16.5	13.6	13.4	14.4	16.4
23 Q	14.7	15.5	16.3	16.9	16.7	16.3	16.4	15.9	15.8	15.6	15.9	15.6	16.0	15.9	16.7	17.0	18.6	19.4	19.8	18.2	16.6	14.8	14.4	14.4	16.4
24 Q	14.3	14.9	15.7	16.1	16.5	16.3	16.3	15.7	15.9	15.4	15.8	15.5	15.8	15.9	16.5	16.9	18.7	18.7	18.4	17.2	15.7	13.8	14.0	14.3	16.0
25	14.4	15.1	16.1	16.1	16.7	16.7	16.3	15.5	16.1	14.9	15.6	15.2	16.9	16.7	17.3	17.6	19.4	19.9	19.7	18.2	15.5	13.6	13.9	13.7	16.3
26	13.4	14.9	16.4	16.9	16.7	16.0	16.6	16.1	16.2	15.8	13.7	15.2	17.5	16.4	16.7	17.3	17.6	19.6	17.9	15.3	15.5	13.9	14.0	14.4	16.0
27 D	15.4	15.7	16.3	16.6	17.5	19.8	18.0	19.1	17.9	17.8	12.9	18.7	17.1	16.1	15.7	16.2	16.3	19.0	18.7	17.6	16.2	14.2	13.9	13.4	16.7
28	14.7	15.2	15.8	16.1	17.1	16.6	17.4	16.1	16.7	15.0	16.1	15.9	15.9	15.6	15.5	15.8	17.7	19.7	19.9	19.9	18.7	15.9	14.9	15.0	16.5
29	14.7	15.4	16.0	16.5	18.0	15.6	16.3	16.4	17.2	17.3	15.9	15.6	15.0	13.0	15.0	14.3	17.2	18.9	19.6	19.0	18.4	16.7	14.9	14.4	16.3
30	14.8	15.5	15.6	16.2	16.2	16.2	17.2	20.8	17.8	15.6	14.3	13.7	13.8	16.5	14.4	14.7	18.2	19.1	19.7	18.6	17.8	15.7	14.0	13.6	16.3
31	14.8	15.4	15.9	15.7	16.2	16.2	16.5	16.2	16.4	16.0	16.1	15.7	15.8	15.5	15.9	16.3	17.9	19.7	20.2	19.0	18.3	16.9	16.1	14.8	16.6
Mean	14.8	15.4	16.3	16.6	17.6	16.8	17.0	16.9	16.5	15.8	15.9	16.3	15.7	15.3	15.4	15.5	17.4	18.6	19.2	18.2	17.0	15.0	14.3	14.2	16.3

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 49 Victoria Z = 53,000 γ + January 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	310	310	309	309	313	313	311	308	307	305	304	305	304	305	306	308	310	308	305	302	302	304	306	306	307
2	306	308	309	310	313	312	311	307	298	277	265	291	295	298	300	304	310	306	304	300	301	304	305	306	302
3	306	306	306	306	307	306	306	305	305	303	301	299	301	299	302	303	308	308	305	302	300	300	300	304	304
4 Q	305	304	306	305	306	305	305	304	304	301	301	296	298	300	302	303	304	305	304	301	299	299	301	305	303
5 Q	304	304	303	303	304	302	304	303	303	302	302	300	299	300	302	303	306	308	305	303	302	303	302	298	303
6	299	301	304	303	305	306	306	307	306	304	303	302	301	303	302	303	305	304	303	303	302	300	303	304	303
7	304	303	303	303	303	303	304	302	303	301	302	300	298	297	297	300	302	304	305	302	301	301	306	303	302
8	301	303	305	305	306	306	307	305	304	304	299	299	301	299	299	299	302	304	299	297	298	301	301	302	302
9	302	301	301	299	302	301	302	301	300	300	301	299	292	290	293	294	296	298	297	298	298	299	301	304	299
10 D	304	303	304	310	370	333	324	316	308	306	280	198	163	131	061	160	245	290	295	299	312	308	310	317	273
11 D	322	319	318	321	322	318	310	307	307	300	304	306	305	297	298	304	306	308	309	309	309	309	308	310	309
12	311	312	310	311	311	309	309	308	304	304	308	307	309	308	310	310	313	311	312	309	308	305	309	309	309
13	311	311	313	311	310	308	308	306	305	302	305	306	307	307	309	311	315	316	313	314	311	308	309	310	309
14	309	310	310	308	307	305	306	305	305	307	307	308	311	308	307	305	305	298	293	295	296	294	295	305	304
15	313	315	314	314	315	310	308	302	299	297	296	295	301	304	307	309	314	309	304	304	303	299	304	311	306
16 D	311	311	310	312	312	310	311	312	312	310	307	301	279	287	294	301	307	308	307	306	304	298	302	305	305
17	308	309	311	310	312	308	310	308	308	305	308	305	304	305	306	307	310	312	309	308	309	305	306	307	308
18	307	308	308	307	308	307	307	306	306	305	306	304	302	304	305	306	310	313	310	308	305	302	305	307	307
19 D	307	309	307	306	308	307	308	311	311	311	309	305	305	291	275	277	290	296	306	310	308	304	309	312	303
20	311	312	311	312	313	313	313	311	309	308	310	309	309	308	309	310	313	311	308	308	311	307	310	313	310
21	312	311	310	310	310	307	310	309	301	297	302	303	302	292	300	306	310	312	312	310	307	305	307	309	306
22 Q	307	306	307	306	306	305	307	306	307	306	307	305	305	305	304	305	305	303	305	305	302	301	306	306	305
23 Q	306	306	305	303	304	304	304	304	306	305	305	304	304	302	302	303	307	306	308	307	305	305	303	304	305
24 Q	303	304	304	303	303	301	303	303	304	303	303	302	304	301	301	302	305	306	306	306	306	304	306	306	304
25	306	306	305	302	303	301	302	302	301	301	299	301	303	302	302	302	304	303	303	300	297	298	302	301	302
26	301	301	300	299	299	298	300	299	299	299	299	292	292	295	296	295	298	295	294	297	297	297	301	304	298
27 D	307	306	306	304	301	304	305	304	300	294	273	294	301	302	301	302	305	304	303	303	300	297	301	306	301
28	306	305	303	301	300	299	301	301	299	296	295	299	300	299	301	300	303	302	301	301	299	293	297	299	300
29	301	302	302	300	301	300	300	300	298	298	299	300	298	287	279	288	295	298	298	297	296	291	291	294	296
30	298	301	302	302	302	301	302	301	297	296	296	291	288	290	293	294	298	300	299	297	295	291	292	297	297
31	301	303	302	301	300	299	299	298	298	297	298	297	299	299	299	301	302	303	297	293	293	295	296	297	299
Mean	306	307	307	306	309	306	306	305	304	301	300	298	296	294	292	297	303	305	304	303	302	301	303	305	303

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 50 Victoria H = 18,500 γ + February 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	306	313	310	311	308	307	310	311	313	312	314	315	317	317	318	320	324	321	317	303	295	293	300	306	311
2	310	307	306	310	307	307	305	302	309	303	306	307	311	311	314	314	318	314	301	290	287	289	300	308	306
3	312	312	310	306	307	301	302	300	300	306	307	308	308	309	312	311	308	301	290	285	285	290	295	305	303
4 D	313	315	316	311	311	308	305	311	313	325	337	336	317	341	318	291	291	299	266	266	275	269	269	286	304
5	297	302	294	278	284	284	284	284	286	287	286	290	294	297	298	298	299	297	288	281	281	284	294	300	290
6	304	303	300	296	295	294	296	299	301	301	300	304	307	309	308	310	307	301	294	291	293	300	304	296	300
7 D	297	291	297	301	297	281	296	295	305	299	302	304	306	306	307	293	291	287	274	277	279	282	288	295	294
8 Q	299	305	305	304	304	301	300	301	303	302	306	301	309	310	310	309	309	299	293	287	290	294	297	303	302
9	304	308	305	310	313	311	308	301	299	304	299	301	303	306	313	310	305	293	284	280	282	285	292	299	301
10 Q	306	311	315	314	311	309	309	309	309	311	312	311	314	312	313	311	306	294	287	285	286	290	298	307	305
11	312	316	308	305	307	310	310	309	313	311	319	318	319	322	325	325	329	325	301	272	253	252	279	290	305
12 D	276	278	288	291	292	290	290	288	288	297	295	294	297	297	301	302	296	296	285	267	248	262	273	284	286
13	295	303	303	291	291	300	302	300	299	298	293	298	304	306	309	306	306	305	298	292	290	285	287	275	298
14	276	286	293	296	294	288	294	303	297	296	300	303	304	300	306	307	309	307	309	298	288	275	287	298	296
15	302	306	306	302	296	297	306	307	304	304	311	308	309	309	311	313	316	289	298	315	318	314	311	316	307
16 D	321	329	332	329	333	330	327	324	310	279	275	266	300	288	249	248	271	264	267	259	279	287	293	281	293
17	274	272	267	275	274	283	289	280	292	279	275	286	288	294	299	302	304	305	300	291	290	286	291	291	287
18	298	302	301	301	301	300	302	300	301	300	301	304	306	308	309	310	313	306	285	285	288	283	283	292	299
19 Q	298	304	304	303	304	299	302	298	300	304	305	307	309	309	312	310	307	302	295	289	287	289	295	297	301
20	299	305	306	309	307	306	305	306	297	298	302	307	310	315	315	319	313	308	299	293	296	297	301	313	305
21	315	316	314	312	310	305	297	302	306	309	310	314	319	318	315	324	312	287	285	292	287	292	294	301	306
22	308	312	327	321	307	291	303	303	303	307	304	305	313	318	320	313	313	300	285	281	281	284	287	296	303
23	300	309	306	302	292	297	298	301	305	304	309	299	312	316	302	311	300	295	275	266	267	271	278	285	296
24	292	306	308	308	301	300	298	301	316	303	299	298	310	306	307	315	309	296	275	274	263	277	274	287	297
25	295	307	305	305	302	300	295	302	301	305	305	310	309	308	308	312	310	305	296	286	273	281	284	284	300
26 D	288	297	303	302	302	300	300	305	307	314	318	322	338	348	354	352	334	309	268	275	288	288	288	289	308
27	293	291	301	304	305	309	310	305	300	289	283	278	287	297	311	287	300	301	287	268	267	272	276	283	292
28 Q	294	300	299	300	299	297	298	295	299	301	299	298	301	309	310	314	309	309	301	290	286	285	288	297	299
29																									
30																									
31																									
Mean	299	304	305	304	302	300	302	302	303	302	303	303	308	310	310	309	308	300	289	284	282	284	290	295	300

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 51 Victoria D = 22° 30.0' E + February 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	14.3	14.8	15.7	15.7	16.1	15.7	15.8	15.6	15.4	15.4	15.6	15.2	15.6	15.2	15.6	15.9	17.3	18.9	19.8	19.3	19.0	16.7	14.9	14.4	16.2
2	14.4	14.9	15.6	15.9	16.5	16.3	16.0	15.4	16.5	15.7	16.0	15.7	16.2	16.0	16.4	16.6	18.2	19.8	19.9	18.5	15.7	13.9	13.0	14.6	16.1
3	15.1	15.3	16.4	16.2	16.1	16.0	16.1	16.1	17.2	15.6	15.5	15.7	15.9	16.0	16.3	16.8	17.6	18.5	19.4	17.1	16.2	15.0	14.3	13.7	16.2
4 D	13.8	14.1	15.4	15.6	16.0	16.1	15.6	16.3	15.9	14.1	15.7	17.0	17.6	18.3	20.2	19.5	17.1	19.0	19.6	14.6	15.4	15.3	15.4	14.9	16.4
5	15.3	15.4	16.4	16.3	16.7	15.9	15.7	15.2	15.5	15.3	15.5	16.2	16.3	16.2	16.5	16.9	18.6	18.8	18.8	18.3	17.8	16.1	15.2	15.6	16.4
6	16.3	16.6	17.2	17.2	17.1	16.6	16.4	15.8	15.8	15.5	16.2	16.1	16.4	16.6	16.9	17.5	19.3	19.1	18.6	16.9	16.1	14.3	14.4	14.4	16.6
7 D	14.2	16.2	18.1	17.3	17.7	22.4	22.1	16.4	13.1	8.2	14.7	16.7	17.1	15.5	15.7	11.2	13.7	16.7	18.2	16.9	16.7	15.6	15.9	15.7	16.1
8 Q	16.0	16.4	16.7	17.1	17.1	17.1	16.3	16.3	16.0	14.8	15.2	14.0	15.0	17.0	17.2	18.3	18.9	18.9	17.6	16.0	14.9	14.4	14.7	14.7	16.3
9	14.7	15.2	16.5	16.5	16.6	16.0	16.2	16.4	16.6	15.4	15.3	15.4	15.2	14.5	16.9	18.5	20.1	19.3	18.0	16.3	15.4	15.0	14.9	14.7	16.2
10 Q	15.0	15.4	16.2	16.5	17.1	17.5	16.5	15.9	15.3	15.0	15.0	15.3	15.9	16.4	17.2	17.8	20.1	20.3	19.4	17.6	16.5	15.1	14.7	14.2	16.5
11	14.3	14.9	15.4	15.9	16.5	15.9	16.2	16.0	16.2	15.9	15.7	13.3	16.2	17.8	18.5	19.1	19.6	20.3	22.1	19.7	16.2	10.9	6.9	9.4	15.9
12 D	11.9	11.3	10.8	15.1	17.3	16.9	17.7	19.6	19.2	16.4	18.1	17.2	17.4	15.6	16.8	17.6	18.0	19.8	19.2	17.0	16.3	14.6	14.2	14.1	16.4
13	14.3	14.5	14.8	17.0	20.6	14.7	16.2	16.5	17.1	17.8	18.0	13.2	17.3	17.9	17.7	18.4	18.6	18.8	19.7	18.1	17.1	15.8	14.9	13.2	16.8
14	13.6	12.6	15.0	17.0	14.8	16.5	19.4	17.6	17.6	19.0	18.2	19.5	18.5	16.9	16.2	17.7	18.6	18.3	17.7	17.5	17.1	15.0	14.7	14.3	16.8
15	14.8	15.5	15.4	15.8	17.9	15.0	15.9	15.7	16.4	16.1	15.1	16.2	16.5	16.4	16.7	16.9	18.7	20.1	13.2	12.8	14.6	14.5	15.4	15.4	15.9
16 D	15.3	15.2	15.2	15.2	14.9	15.2	15.7	14.9	20.4	25.2	21.2	27.6	25.2	11.9	-0.3	9.0	10.2	10.5	8.3	5.1	2.9	10.7	13.9	15.1	14.1
17	16.4	14.1	14.2	15.7	17.4	17.1	15.1	17.5	17.6	19.4	21.6	18.7	17.3	18.1	18.0	16.9	17.8	17.0	16.3	15.3	14.5	14.9	15.8	15.3	16.8
18	15.5	15.8	16.1	16.1	16.5	16.3	16.4	16.0	16.0	16.9	17.7	16.7	16.7	16.4	17.1	17.0	17.9	18.1	17.7	14.4	15.6	14.9	15.2	14.4	16.3
19 Q	14.9	15.1	15.6	15.7	16.1	16.3	17.4	15.9	15.9	15.8	16.4	16.0	15.4	17.1	17.2	18.0	18.9	18.7	17.3	16.1	15.4	16.0	15.7	15.4	16.3
20	14.8	15.0	15.2	15.8	15.6	15.9	15.3	16.2	17.0	16.7	16.9	16.2	16.1	15.6	16.8	17.9	17.9	18.4	17.5	16.5	14.7	14.0	14.3	14.5	16.0
21	15.3	15.9	16.2	16.4	16.0	16.1	15.5	17.5	15.0	15.4	15.3	15.9	16.0	19.1	18.2	17.0	19.5	17.7	14.6	14.8	13.2	13.2	13.8	14.4	15.9
22	15.2	15.6	15.6	15.6	15.9	17.9	15.8	17.0	18.9	17.9	14.1	14.8	13.4	20.5	19.9	15.8	20.2	21.1	19.2	17.0	15.5	15.1	14.9	15.1	16.7
23	15.1	15.4	15.8	15.9	17.9	16.5	15.9	16.2	15.1	15.4	16.1	12.2	15.4	17.2	14.6	16.2	19.1	20.9	20.3	17.5	14.9	13.9	12.9	12.6	15.9
24	13.5	14.1	15.2	16.2	16.2	18.6	15.6	16.1	15.7	15.9	16.6	16.0	14.5	16.0	16.3	17.7	18.9	20.4	18.2	15.6	15.2	14.2	14.1	13.6	16.0
25	14.3	14.9	15.5	15.9	15.9	16.2	15.9	16.7	15.2	15.4	15.4	15.5	16.0	16.0	16.7	18.3	19.4	21.0	19.5	18.8	16.5	14.5	13.2	13.2	16.3
26 D	12.5	14.7	15.9	16.3	17.2	16.9	16.1	15.7	15.0	15.2	15.6	16.1	16.9	19.4	18.6	20.5	21.3	22.1	18.8	8.2	9.1	12.6	14.2	15.8	16.0
27	16.4	16.5	15.7	16.1	16.0	15.9	15.9	15.8	16.3	20.0	21.0	23.1	23.6	20.9	20.8	15.2	15.7	19.7	18.4	15.2	14.6	16.3	16.0	16.1	17.6
28 Q	15.9	16.2	16.1	16.2	16.3	16.6	16.6	17.8	16.1	15.9	15.6	15.0	14.9	16.9	17.0	18.0	18.1	18.5	18.3	16.8	14.4	13.8	13.6	14.0	16.2
29																									
30																									
31																									
Mean	14.8	15.1	15.6	16.2	16.6	16.6	16.4	16.4	16.4	16.3	16.6	16.4	16.7	16.8	16.6	17.0	18.2	19.0	18.1	16.0	15.0	14.5	14.3	14.4	16.2

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 52 Victoria Z = 53,000 γ + February 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 Q	300	302	300	299	299	297	298	298	296	295	296	295	296	296	298	298	302	303	298	297	294	292	290	292	297
2	296	297	298	298	298	298	297	296	294	295	295	296	297	297	298	299	301	300	299	294	291	289	291	295	296
3	296	297	298	298	299	299	299	299	299	296	297	296	296	297	297	298	301	303	303	302	303	300	298	299	299
4 D	298	298	298	298	299	297	299	297	295	297	297	294	280	220	216	226	248	250	259	274	287	293	297	301	280
5	303	302	302	302	305	304	306	305	306	304	303	302	303	303	303	305	306	306	309	311	310	305	302	303	305
6	303	301	301	301	301	303	304	304	303	303	301	301	302	299	300	301	306	305	304	306	307	302	301	300	302
7 D	301	302	306	303	303	304	308	303	297	260	278	292	295	295	293	288	288	288	291	294	297	296	299	303	295
8 Q	302	302	300	300	299	299	299	300	300	300	301	298	297	296	298	299	298	297	295	294	297	298	302	300	299
9	302	302	301	300	299	298	297	297	300	296	298	297	298	297	299	300	301	297	295	294	297	298	301	301	299
10 Q	301	301	300	298	297	296	297	296	297	296	297	297	296	297	298	299	300	297	296	296	297	296	298	297	298
11	296	296	296	296	297	297	296	295	296	295	296	290	282	288	291	294	293	288	278	279	283	289	296	299	292
12 D	317	316	321	316	313	312	312	312	303	300	295	299	303	301	301	305	304	302	297	295	298	303	301	304	305
13	305	306	306	309	316	311	306	302	301	300	296	279	283	294	299	301	302	307	303	297	299	297	296	295	301
14	300	305	311	315	312	313	311	302	303	303	303	300	300	301	301	302	303	302	299	299	297	294	294	293	303
15	295	299	301	302	305	306	304	301	299	298	294	290	291	292	296	299	300	291	293	291	292	288	289	289	296
16 D	292	291	291	291	291	291	292	293	300	294	263	203	213	216	182	193	231	261	272	285	288	297	303	303	268
17	310	309	317	317	319	318	311	307	279	269	284	296	302	304	306	302	306	305	305	299	297	299	297	297	302
18	299	301	301	300	302	301	302	301	302	294	296	298	299	297	299	299	301	299	295	297	298	297	295	296	299
19 Q	298	298	299	297	299	299	300	299	299	299	298	298	293	291	293	294	298	297	296	296	300	299	295	292	297
20	290	294	295	295	296	295	296	296	297	298	300	299	295	290	291	293	293	293	294	294	296	298	299	296	295
21	294	294	294	295	294	295	296	300	299	301	297	297	293	287	291	296	292	291	288	286	287	290	292	295	293
22	294	295	297	295	294	298	302	298	295	294	292	286	277	288	292	289	291	291	290	288	289	295	298	299	292
23	298	300	298	296	300	287	300	301	299	299	287	287	290	295	289	289	290	291	287	285	290	293	294	300	294
24	300	305	303	301	301	302	300	304	295	289	290	288	290	291	290	290	293	294	292	295	296	301	300	305	296
25	303	302	301	302	299	300	301	303	302	302	300	301	298	298	297	300	301	297	291	290	291	295	297	299	299
26 D	300	304	304	302	301	301	301	300	299	300	300	300	299	296	295	292	288	285	284	288	294	300	303	306	297
27	305	305	305	303	301	301	298	298	298	281	265	248	242	237	262	267	269	274	275	282	288	291	295	300	283
28 Q	301	302	302	301	299	299	300	299	297	296	297	297	296	298	299	299	297	296	286	285	287	291	298	300	297
29																									
30																									
31																									
Mean	300	301	302	301	301	301	301	300	298	295	293	290	290	288	288	290	293	293	292	293	295	296	297	298	296

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 53 Victoria H = 18,500 γ + March 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	305	308	306	307	305	304	305	301	301	303	304	312	313	317	312	307	307	305	301	290	291	295	298	304	304
2	299	296	301	304	301	304	305	307	305	303	304	304	310	312	314	311	302	297	281	288	285	284	285	292	299
3	300	314	315	312	308	311	307	310	315	317	319	321	328	323	308	301	303	304	295	287	281	273	278	287	305
4	290	288	296	301	299	301	305	303	306	308	309	312	309	309	310	308	301	301	294	290	290	291	300	301	301
5 D	309	310	310	314	313	312	312	315	313	316	308	307	305	276	310	311	286	265	285	284	287	283	285	298	300
6 D	301	304	307	291	271	272	289	293	318	311	307	294	296	317	316	299	293	288	282	276	283	287	293	299	295
7	301	300	293	295	298	297	315	304	298	306	302	306	304	303	304	305	301	287	283	280	279	281	290	300	297
8 Q	307	307	306	303	304	301	301	303	310	311	310	312	313	312	312	312	310	303	295	284	278	281	287	297	302
9 Q	304	308	308	310	310	307	310	310	310	312	313	314	316	317	315	315	316	310	300	294	292	292	296	304	308
10	310	311	301	300	302	295	300	310	305	300	303	299	297	300	306	309	312	295	286	270	266	275	279	289	297
11	289	300	294	298	290	284	293	289	294	299	292	304	313	310	308	304	296	282	290	287	283	288	289	295	295
12 D	302	295	298	304	305	305	299	306	302	305	303	310	310	291	291	291	298	286	276	258	264	276	286	287	294
13	285	289	293	295	298	298	301	301	307	309	302	300	304	310	309	309	309	304	295	284	286	289	295	298	299
14	301	306	305	305	306	308	310	305	302	305	310	311	312	314	315	313	312	307	295	289	290	294	298	302	305
15	307	307	304	290	290	289	299	300	310	315	319	318	318	322	321	319	313	312	306	301	299	286	288	305	306
16 Q	311	313	313	312	314	310	311	310	310	322	316	319	320	317	320	319	314	305	302	298	296	293	295	296	310
17	306	309	314	314	312	313	314	316	316	316	319	319	318	316	314	316	316	309	301	294	294	299	305	308	311
18	314	315	317	317	318	321	324	314	317	315	320	320	319	315	315	313	301	296	289	278	270	276	287	297	307
19 D	311	308	310	314	315	306	305	311	316	318	321	318	325	310	318	311	306	287	259	252	276	282	287	291	302
20	300	305	306	305	303	298	305	309	316	314	321	321	319	317	318	315	317	289	287	292	291	281	280	283	304
21 D	290	301	304	303	303	297	297	297	300	307	310	316	314	310	296	296	293	290	279	282	285	288	281	296	297
22	304	306	309	308	308	307	305	308	310	314	317	317	319	318	316	315	311	299	286	274	275	284	279	290	303
23	301	307	308	310	311	309	312	311	311	313	315	313	321	317	318	316	311	298	285	279	276	279	288	296	304
24	314	307	300	312	317	318	317	317	318	317	319	322	323	325	328	325	316	305	299	292	289	292	297	307	312
25	319	318	308	303	299	300	304	307	318	310	314	312	318	313	317	313	315	313	305	294	286	286	295	303	307
26	312	306	300	304	309	310	313	313	314	316	320	321	321	321	322	323	323	314	305	294	294	295	303	309	311
27 Q	314	318	316	321	323	320	322	319	320	322	326	330	333	331	331	331	330	319	306	298	292	294	304	309	318
28	315	318	323	325	325	324	327	327	330	331	334	332	336	336	331	331	327	316	313	295	283	286	295	305	319
29	299	296	284	293	297	305	295	296	310	319	320	321	324	325	325	326	322	311	300	294	294	293	295	302	306
30 Q	305	306	310	312	316	313	314	314	316	318	321	322	323	321	325	323	320	308	294	286	286	290	300	307	310
31	310	314	320	320	323	324	326	325	325	328	328	329	332	330	329	324	321	309	305	302	306	304	310	312	319
Mean	304	306	306	306	306	305	308	308	311	313	314	315	316	315	315	313	310	300	293	286	285	287	292	299	305

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 54 Victoria D = 22° 30.0' E + March 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	13.6	14.7	15.0	15.5	15.5	15.6	15.5	19.8	19.3	17.0	16.0	14.3	16.9	16.2	18.1	18.8	18.9	19.8	19.1	17.7	15.3	14.4	14.1	14.3	16.5
2	14.0	14.2	14.7	15.2	15.3	16.2	16.7	15.6	15.6	16.0	16.2	16.8	15.6	17.5	18.2	19.4	17.7	18.3	17.7	14.6	15.8	15.0	14.5	14.9	16.1
3	14.5	14.5	14.8	15.1	15.3	15.7	15.9	16.4	15.8	15.5	15.7	15.8	15.9	16.4	15.2	15.0	16.3	18.4	16.7	13.7	11.8	12.3	11.4	12.7	15.0
4	11.7	13.7	15.0	15.9	15.8	16.0	15.8	15.7	15.4	15.7	15.8	17.7	17.0	18.2	18.3	18.9	18.7	18.3	17.5	16.2	15.0	14.5	13.7	14.1	16.0
5 D	14.3	14.7	14.8	15.2	15.2	15.3	15.1	15.5	17.7	19.3	19.5	19.0	16.5	18.3	22.4	19.9	20.0	15.1	13.6	11.8	12.6	13.0	14.2	15.0	16.2
6 D	15.5	15.4	14.2	13.8	28.9	20.5	15.9	20.7	19.7	12.4	17.5	20.2	8.7	20.9	19.2	17.8	19.8	17.2	15.4	13.7	13.6	13.9	14.8	15.7	16.9
7	15.5	16.4	16.2	16.2	15.9	17.5	17.4	15.8	14.5	13.5	14.1	15.8	16.2	16.5	16.5	17.7	19.1	18.6	18.7	17.3	15.6	14.4	14.4	14.1	16.2
8 Q	14.7	15.5	15.9	16.9	16.5	15.6	16.0	16.2	14.2	15.8	15.7	15.6	15.9	16.0	16.4	17.8	19.2	20.3	20.0	18.6	16.5	14.4	13.8	13.7	16.3
9 Q	13.9	14.7	15.3	15.8	16.1	15.8	15.8	15.6	15.5	15.3	15.7	15.7	15.7	15.6	16.5	17.7	19.1	20.5	20.9	18.5	16.3	14.2	13.3	13.0	16.1
10	12.5	13.6	14.2	14.4	14.3	14.3	15.0	15.5	17.2	17.1	19.4	18.1	17.9	14.9	16.1	20.0	20.4	19.5	18.3	17.3	15.0	12.5	10.8	9.9	15.8
11	11.1	11.9	13.4	14.1	20.5	19.7	18.6	18.9	16.7	16.5	13.5	12.8	16.0	17.6	18.3	18.6	19.1	16.0	16.5	16.1	15.0	13.2	13.4	13.3	15.8
12 D	13.3	13.8	14.3	15.0	15.6	15.1	17.5	15.2	17.6	18.0	16.6	11.9	16.7	15.5	16.1	13.7	17.2	18.9	14.7	13.7	12.1	12.9	14.2	13.6	15.1
13	13.9	14.0	14.6	15.2	15.9	16.1	16.3	16.2	15.7	18.2	18.0	16.0	15.3	16.9	17.8	19.4	19.5	18.6	18.9	16.5	15.0	14.0	13.8	13.7	16.2
14	14.0	14.9	15.3	15.5	16.0	16.0	16.8	16.4	19.0	18.3	17.4	16.8	17.0	17.6	18.4	18.4	18.6	18.4	18.3	14.7	14.1	13.3	13.6	13.6	16.4
15	13.9	14.2	13.6	17.5	16.8	15.8	15.9	15.5	15.7	16.1	16.6	16.7	16.8	17.1	17.9	18.9	19.4	19.6	19.2	16.8	15.1	14.0	14.1	14.0	16.3
16 Q	13.7	13.9	14.8	15.0	15.4	14.8	15.4	15.9	16.2	15.3	16.0	15.8	15.8	15.2	16.7	18.8	20.4	20.5	20.3	17.9	16.1	14.7	14.4	14.2	16.1
17	13.5	13.8	14.3	14.5	15.2	14.8	15.2	16.7	16.9	16.5	13.3	15.6	14.3	17.0	18.0	18.0	19.6	19.6	19.3	16.8	15.4	14.0	13.4	13.1	15.8
18	13.5	13.8	14.1	14.8	15.0	14.6	14.6	14.7	15.6	15.1	16.2	15.5	14.2	15.7	18.9	20.4	20.6	19.0	17.9	15.7	13.8	12.6	12.9	12.6	15.5
19 D	12.6	13.3	14.2	14.7	15.3	14.9	15.2	18.4	15.0	15.1	16.2	16.2	12.9	14.7	16.7	19.5	20.5	21.2	16.7	10.3	10.6	12.1	13.0	13.0	15.1
20	13.0	14.3	15.6	15.7	16.0	16.7	15.6	14.7	15.2	15.7	16.4	16.3	12.9	16.6	18.7	20.0	21.4	19.9	13.2	14.5	15.8	13.5	13.1	12.7	15.7
21 D	13.2	14.0	15.2	15.5	16.1	15.7	23.0	20.6	18.2	16.3	15.3	15.1	15.4	16.7	15.4	15.9	17.4	18.8	17.4	14.6	13.1	12.4	11.7	13.1	15.8
22	13.4	14.2	15.4	15.2	15.7	15.6	16.1	15.6	15.5	15.3	15.6	15.2	15.6	16.2	17.7	19.1	21.4	22.3	22.2	19.0	16.0	13.4	13.3	13.4	16.3
23	13.5	14.1	14.8	14.9	15.3	15.3	15.5	14.9	15.9	15.6	15.7	11.7	15.4	16.4	17.6	19.1	21.0	21.6	21.5	19.3	16.8	14.3	12.9	12.2	16.0
24	11.3	12.7	14.3	14.6	14.9	14.9	15.2	15.1	16.2	16.9	16.1	15.7	16.3	16.5	17.5	19.5	22.0	21.4	19.9	17.8	15.5	13.5	12.9	12.5	16.0
25	11.7	12.7	14.0	14.5	14.0	14.8	18.8	14.8	19.5	19.2	17.5	18.0	21.6	18.2	18.2	18.6	19.9	19.8	20.5	19.4	17.3	14.5	13.2	12.7	16.8
26	12.5	13.2	15.2	14.2	14.7	15.2	15.4	15.2	15.7	15.6	14.6	15.4	15.9	16.1	16.8	18.0	19.9	20.5	20.6	17.5	14.7	12.4	11.9	12.4	15.6
27 Q	13.2	14.1	14.7	14.5	15.1	15.0	15.3	15.4	16.4	15.9	15.6	15.3	16.0	16.4	17.0	18.6	21.4	21.8	21.0	19.4	17.5	15.2	13.8	12.9	16.3
28	12.7	13.2	14.0	14.3	14.8	15.0	15.0	15.1	15.2	15.0	15.2	15.3	14.6	15.0	16.4	18.4	20.5	19.9	19.8	18.7	16.1	13.4	12.5	11.0	15.4
29	11.9	9.5	11.9	15.3	15.2	15.4	18.3	19.3	17.3	15.2	15.0	15.0	12.9	15.2	16.8	18.8	20.3	20.5	19.8	17.4	15.6	13.9	12.9	13.0	15.7
30 Q	13.0	13.2	13.8	14.0	14.9	15.1	15.4	15.2	15.6	15.5	15.5	15.4	15.3	15.9	16.8	18.0	20.6	21.9	21.5	17.8	14.5	12.6	11.8	11.7	15.6
31	12.1	12.6	13.4	14.6	14.8	14.2	14.8	14.8	15.5	15.4	15.8	15.6	15.6	16.2	17.7	18.9	20.7	20.6	19.3	16.4	13.8	12.1	12.2	12.5	15.4
Mean	13.3	13.8	14.6	15.1	16.0	15.7	16.2	16.3	16.4	16.1	16.0	15.8	15.6	16.6	17.5	18.4	19.7	19.6	18.6	16.4	14.9	13.6	13.2	13.2	15.9

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 55 Victoria — Z = 53,000 γ + — March 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	299	300	299	299	297	297	296	292	291	293	295	292	286	284	289	296	299	297	290	289	289	291	294	297	294
2	297	299	302	303	302	303	301	300	300	299	300	300	300	297	296	300	300	301	293	290	289	289	291	296	298
3	295	299	298	298	296	297	296	296	295	296	294	295	294	295	291	291	289	286	282	280	284	288	294	298	293
4	301	304	305	304	303	301	299	299	297	297	295	290	288	292	295	296	295	293	288	287	288	287	290	291	295
5 D	291	292	292	293	293	293	293	293	292	279	271	282	282	227	254	283	279	275	275	277	283	285	289	292	282
6 D	294	294	296	299	317	317	319	308	295	268	260	266	213	251	259	273	279	286	287	291	296	298	301	301	286
7	298	298	297	297	299	299	291	286	291	290	291	293	293	292	294	295	297	296	296	293	294	295	296	296	294
8 Q	297	296	295	295	296	296	297	299	293	294	295	294	295	293	294	296	298	297	293	291	293	295	296	295	295
9 Q	297	298	296	296	296	295	296	296	297	297	296	296	294	293	292	292	296	295	292	290	288	288	290	294	294
10	296	297	296	298	300	304	308	304	301	300	290	290	285	274	277	287	288	284	287	286	287	287	293	299	292
11	301	309	309	312	317	313	311	306	306	304	298	283	291	294	297	298	297	290	293	294	292	293	296	298	300
12 D	300	302	303	301	301	301	304	302	302	301	299	282	261	265	261	269	271	281	283	283	292	293	299	301	290
13	303	306	307	306	305	303	301	302	297	291	296	297	293	294	297	297	298	293	289	288	290	292	293	294	297
14	296	298	299	298	299	297	297	298	299	296	299	298	296	293	295	299	299	293	290	292	295	294	293	294	296
15	300	302	302	306	310	312	313	311	308	305	303	299	298	297	299	299	299	296	292	289	287	290	296	295	300
16 Q	296	298	299	298	299	297	301	298	300	296	295	295	296	296	296	297	300	297	292	289	293	293	292	293	296
17	296	297	296	297	298	297	297	295	294	292	293	290	288	289	292	296	299	296	291	287	287	289	291	292	293
18	292	294	294	295	295	294	295	293	297	296	295	294	282	270	281	286	290	291	290	286	286	289	293	295	291
19 D	297	297	297	298	298	298	299	298	298	294	294	291	271	241	250	268	280	283	276	282	290	287	288	291	286
20	291	298	298	297	298	300	300	299	298	296	295	293	282	271	276	285	293	291	289	290	290	286	292	297	292
21 D	299	301	303	301	301	301	303	295	300	301	299	294	293	292	292	292	294	293	289	292	296	299	300	306	297
22	301	302	301	302	299	299	300	300	299	298	296	295	294	295	296	300	301	297	293	287	288	290	290	296	296
23	296	297	296	297	296	295	296	296	296	297	295	284	280	288	293	295	298	298	296	290	288	288	290	292	293
24	297	298	303	301	300	297	297	297	297	293	295	296	295	294	295	294	291	291	289	285	285	285	286	291	294
25	291	294	297	298	301	306	304	299	291	290	293	289	278	288	293	292	291	290	289	285	284	281	285	286	291
26	292	297	302	300	301	300	299	296	298	297	296	292	295	294	294	296	295	290	290	287	286	288	290	290	294
27 Q	292	295	295	295	292	292	292	292	293	296	294	295	294	292	294	295	296	292	288	286	283	282	286	288	292
28	289	291	292	292	291	291	291	290	291	292	291	291	291	287	287	291	292	289	289	286	285	289	289	294	290
29	300	303	309	312	311	308	306	305	306	302	301	299	292	289	293	299	301	296	292	289	285	284	289	291	298
30 Q	293	297	299	296	297	294	295	296	294	293	294	294	294	293	294	295	297	291	286	282	279	281	286	288	292
31	291	293	294	293	293	291	291	290	290	290	290	291	291	292	293	293	294	287	284	280	277	280	284	284	289
Mean	296	298	299	299	300	300	300	298	297	295	294	292	287	284	287	292	293	291	289	287	288	289	292	294	293

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 56 Victoria H = 18,500 γ + April 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	322	328	325	320	305	304	303	312	312	299	321	318	310	321	325	317	308	299	293	291	296	300	307	313	310
2	315	315	314	312	309	316	319	320	325	326	329	328	326	323	323	321	316	306	303	288	288	293	307	292	313
3	300	315	320	320	319	309	293	300	312	316	317	320	322	320	321	316	308	290	279	278	287	288	300	304	306
4	312	311	316	314	309	300	323	307	311	300	302	314	318	317	317	316	309	293	288	288	292	297	303	287	306
5	289	293	288	289	301	306	312	311	315	316	319	316	319	319	320	319	318	307	296	288	286	290	304	312	306
6 D	319	330	333	331	307	306	309	308	308	313	334	313	312	310	310	313	309	289	255	266	269	262	297	305	304
7 D	293	275	291	288	284	310	278	269	259	252	313	288	290	310	293	277	290	284	282	257	250	265	268	273	281
8 D	272	286	297	282	280	288	307	313	306	313	314	313	296	308	315	300	235	265	278	276	277	285	293	290	291
9	276	286	302	302	303	303	316	311	301	306	310	310	309	308	301	309	310	300	298	290	286	288	291	292	300
10 D	295	307	318	300	302	310	312	312	317	328	289	294	301	310	274	268	301	280	245	245	256	264	276	294	291
11	306	294	287	274	274	294	309	309	301	285	291	292	298	305	308	304	296	291	294	292	284	279	279	282	293
12	294	308	299	295	303	304	306	307	308	309	312	311	314	303	312	312	306	300	295	294	290	281	282	290	302
13 Q	294	302	306	301	304	303	304	305	311	309	313	314	314	313	311	306	300	291	290	295	296	293	299	307	303
14 Q	306	308	310	308	310	310	312	314	316	319	317	317	317	318	318	316	311	301	295	288	288	285	287	291	307
15	304	313	317	305	301	310	314	319	322	324	328	325	327	334	347	335	323	317	322	314	310	304	309	304	318
16	304	310	307	307	310	313	318	319	324	323	327	324	327	324	327	322	323	309	301	299	300	298	309	309	314
17	312	314	310	293	290	298	312	314	318	319	327	326	328	323	323	316	314	306	302	296	292	292	292	297	309
18	305	308	310	308	295	298	292	294	300	299	307	316	323	319	318	327	321	316	299	299	290	295	295	297	305
19	297	309	294	297	303	310	312	309	317	321	321	324	323	320	321	321	315	308	304	304	304	300	292	294	309
20	299	295	301	310	313	313	317	320	320	323	325	329	329	330	329	326	317	321	314	307	300	293	297	310	314
21	331	327	332	333	330	329	333	325	329	330	339	340	336	331	329	331	297	260	265	290	289	293	296	295	316
22 D	273	279	289	275	274	273	263	281	283	297	302	294	296	308	305	283	283	280	278	286	273	271	281	289	284
23	285	285	287	283	280	287	289	297	296	308	300	303	313	314	311	305	292	289	290	290	290	292	292	292	295
24 Q	295	307	304	306	305	307	309	307	309	310	309	312	317	310	320	318	308	292	296	304	305	305	300	301	306
25	304	305	309	310	312	312	316	316	317	321	324	312	314	324	329	321	315	298	290	296	298	304	309	309	311
26	309	310	311	311	317	308	301	302	321	312	316	298	306	307	308	302	297	293	293	299	305	301	295	300	305
27	304	308	315	312	308	306	298	302	308	314	315	311	312	310	309	302	305	294	294	295	302	307	306	304	306
28	306	314	313	315	309	312	322	314	315	315	316	319	321	320	315	302	303	317	317	316	310	308	301	298	312
29 Q	309	318	310	310	315	315	319	318	315	321	320	320	311	309	307	313	307	301	303	306	307	303	301	302	311
30 Q	305	312	323	319	315	318	319	316	317	323	321	317	317	319	317	311	306	304	305	303	308	313	313	315	314
31																									
Mean	301	306	308	305	303	306	308	308	310	312	316	314	315	316	315	311	305	297	292	291	291	292	296	298	305

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 57 Victoria D = 22° 30.0' E + April 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	12.3	13.1	13.8	13.9	15.6	15.6	15.3	15.1	23.6	24.8	16.2	18.6	17.6	13.2	17.8	19.5	20.8	19.8	17.7	15.6	13.1	11.3	11.9	12.1	16.2
2	12.6	13.8	14.8	15.5	16.8	15.0	14.5	14.7	15.1	15.5	16.1	16.2	16.2	16.5	16.9	18.1	19.8	18.8	16.8	15.8	13.2	11.7	10.9	10.4	15.2
3	11.0	12.5	14.0	14.1	14.9	16.7	22.8	17.5	14.6	14.4	15.5	15.4	15.8	15.7	17.2	18.3	18.4	19.4	16.5	14.1	13.1	12.8	11.2	11.7	15.3
4	11.4	12.9	14.2	15.0	16.0	16.5	16.9	16.7	12.6	23.7	24.2	18.1	16.1	17.8	19.0	19.7	21.2	20.6	19.5	17.4	14.9	13.5	12.2	12.2	16.8
5	13.6	12.6	13.9	14.1	16.1	14.4	15.0	14.5	14.6	14.8	15.7	14.0	15.7	16.9	18.1	19.1	20.7	20.9	20.2	16.6	14.5	12.9	12.0	12.0	15.5
6 D	12.9	12.7	13.7	13.8	14.7	15.6	18.6	18.7	16.8	18.5	19.2	19.8	20.6	20.0	19.9	21.4	22.9	22.6	17.0	11.3	10.4	3.6	7.7	8.5	15.9
7 D	12.8	13.4	12.9	14.4	17.8	17.2	15.6	25.3	24.4	11.1	16.1	15.5	15.4	17.9	16.7	15.7	21.0	20.2	19.3	17.7	14.6	12.0	10.1	12.7	16.2
8 D	13.9	15.5	14.6	20.3	17.8	16.3	15.0	13.0	12.1	13.9	14.7	17.9	12.8	14.2	19.9	19.7	14.6	7.1	12.4	10.2	10.5	12.5	12.5	11.9	14.3
9	11.5	14.0	13.7	14.2	14.6	15.3	17.2	15.0	15.5	15.3	16.0	16.8	17.1	17.6	14.0	15.7	21.2	19.8	18.9	17.7	15.5	15.3	14.5	13.1	15.8
10 D	13.0	13.0	13.1	13.5	14.5	13.7	15.2	14.8	16.4	22.4	23.7	29.8	24.7	21.0	21.2	13.7	17.6	18.1	15.9	13.8	10.1	10.4	11.2	11.8	16.4
11	10.3	12.8	26.2	20.0	15.8	16.5	15.7	17.7	15.8	14.1	15.0	12.4	15.6	19.8	20.8	19.3	13.9	15.3	18.5	16.7	16.3	15.1	14.0	12.3	16.2
12	11.8	12.4	18.3	15.0	14.6	15.0	15.2	15.2	15.6	14.8	15.1	15.7	15.5	14.4	16.0	17.4	18.2	18.4	18.0	16.6	15.7	13.7	11.8	10.4	15.2
13 Q	11.4	11.6	12.3	13.9	14.9	14.8	14.8	14.7	14.6	14.4	15.5	15.4	16.0	16.0	16.3	16.8	17.9	16.8	14.9	13.7	13.0	12.4	12.2	12.0	14.4
14 Q	12.1	12.9	13.5	14.2	14.7	14.8	15.1	14.7	15.0	15.0	15.5	15.8	16.4	16.4	18.5	19.6	21.0	20.4	19.1	16.7	14.7	12.2	11.1	10.7	15.4
15	10.5	11.2	13.0	15.0	16.9	14.2	14.5	14.1	14.4	14.7	15.1	15.4	16.3	16.9	18.7	19.4	20.3	17.9	16.9	16.3	13.9	12.2	11.0	11.0	15.0
16	12.3	12.5	13.2	14.1	14.1	14.7	14.8	14.8	15.1	16.1	16.4	16.1	16.3	15.5	17.0	18.5	21.0	21.3	19.3	17.2	13.9	11.2	9.7	9.6	15.2
17	10.4	12.0	13.2	19.1	18.2	14.6	14.2	14.6	15.2	15.3	15.7	15.8	15.1	17.5	19.0	19.9	21.9	21.6	18.9	16.8	15.2	14.0	13.0	12.0	16.0
18	11.1	11.3	13.4	15.6	16.1	15.4	17.8	18.6	19.1	19.3	20.2	18.3	17.2	16.9	15.5	19.2	19.3	19.7	19.3	18.9	15.3	14.7	12.9	12.2	16.6
19	10.6	11.3	14.1	17.0	14.7	14.1	14.7	19.1	15.3	14.5	14.7	15.5	15.7	17.2	18.3	19.7	20.0	19.7	17.3	15.4	15.1	14.6	12.9	11.6	15.5
20	10.6	11.3	13.0	16.6	15.3	14.2	14.0	14.5	14.9	14.9	15.3	15.9	16.7	18.0	19.0	20.3	20.0	18.4	17.1	15.1	13.8	12.0	10.3	9.9	15.0
21	8.9	11.0	12.9	12.8	13.7	13.5	13.1	13.7	13.1	13.3	14.7	15.7	16.6	17.9	18.7	20.4	23.5	15.8	11.2	6.7	7.9	10.2	11.9	11.4	13.7
22 D	11.3	13.7	15.4	19.5	17.1	26.7	25.0	18.8	22.9	19.8	17.9	15.9	17.1	14.8	17.5	16.2	13.9	16.3	16.4	16.5	14.4	14.0	14.0	12.9	17.0
23	12.0	10.9	14.9	17.8	23.4	18.5	19.0	25.1	17.9	14.7	18.0	17.3	17.9	18.5	18.7	20.3	20.8	19.3	17.4	15.1	13.5	13.6	13.4	12.8	17.1
24 Q	12.8	13.4	14.1	14.3	15.0	15.2	15.2	14.9	14.5	13.7	13.9	14.8	14.0	15.0	17.5	19.9	21.3	21.4	18.1	13.6	12.2	10.9	10.6	10.8	14.9
25	11.9	13.0	14.1	14.5	15.0	15.0	17.8	14.9	16.5	14.9	10.7	18.0	17.7	18.3	20.3	20.0	20.0	19.9	16.2	11.9	9.6	10.8	11.1	11.4	15.2
26	11.2	12.4	14.1	14.8	15.0	19.3	21.3	14.6	15.8	17.5	18.0	17.4	18.1	20.9	21.2	21.1	21.9	19.0	16.5	14.3	13.3	12.7	11.9	11.4	16.4
27	11.1	11.3	12.4	13.7	17.6	16.8	16.3	15.7	14.4	11.2	16.6	17.3	19.2	19.8	20.3	18.5	19.8	18.6	15.9	13.6	12.7	11.8	11.7	10.9	15.3
28	10.4	10.3	11.4	12.4	12.8	15.8	19.8	16.8	15.8	15.8	17.1	17.6	17.4	19.0	20.6	21.0	18.1	17.0	16.3	14.7	13.9	12.8	11.0	11.1	15.4
29 Q	11.2	11.7	14.0	16.2	14.6	14.4	14.1	14.6	15.0	15.5	16.0	16.2	16.9	15.7	15.1	19.7	19.7	18.8	16.7	13.9	11.5	11.0	11.3	11.4	14.8
30 Q	11.8	11.7	12.7	13.5	14.0	14.2	14.1	14.2	14.5	15.2	16.5	16.7	16.8	17.8	19.5	20.9	20.0	17.8	15.0	12.3	10.6	9.5	9.5	10.2	14.5
31																									
Mean	11.6	12.4	14.2	15.3	15.7	15.8	16.4	16.2	16.0	16.0	16.5	16.8	16.8	17.2	18.3	19.0	19.7	18.7	17.1	14.9	13.2	12.2	11.6	11.4	15.5

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 58 Victoria Z = 53,000 γ + April 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	286	287	289	289	293	297	302	302	290	291	287	279	280	282	287	296	297	293	288	285	285	285	286	286	289
2	288	291	295	295	297	295	295	293	295	292	292	291	290	291	293	296	296	290	287	283	282	284	287	289	291
3	294	296	297	295	296	295	300	296	300	296	295	293	293	293	294	291	290	287	287	286	285	288	290	291	293
4	295	295	296	296	297	300	291	285	261	243	253	281	286	290	295	299	297	292	291	288	289	288	290	290	287
5	299	305	307	310	308	303	300	299	297	295	292	290	290	290	294	298	298	294	291	290	290	291	291	292	296
6 D	292	292	292	293	296	305	304	303	296	272	241	264	276	286	290	294	291	281	273	276	280	286	297	301	287
7 D	315	327	314	315	321	298	237	263	259	216	256	237	205	223	240	248	272	277	276	272	285	296	301	321	274
8 D	333	334	321	319	313	311	305	291	281	288	286	286	272	260	258	261	242	250	264	274	283	294	297	300	289
9	305	309	307	304	303	302	302	288	300	301	301	299	298	294	283	273	281	282	283	287	289	291	292	295	294
10 D	295	297	305	303	305	301	302	299	301	271	234	245	261	286	270	257	261	266	270	284	291	296	310	312	284
11	312	329	339	332	326	319	288	282	287	273	252	250	257	282	297	292	285	281	290	293	295	299	302	304	294
12	306	310	320	313	305	302	300	300	299	297	297	297	297	290	291	292	292	289	289	289	288	288	293	298	297
13 Q	305	301	302	301	300	300	299	298	297	293	293	295	295	295	292	294	295	289	288	287	287	288	290	292	295
14 Q	293	296	298	297	295	294	294	293	292	294	294	293	295	295	294	294	291	289	286	284	284	286	286	285	292
15	286	290	296	297	301	298	298	295	296	294	294	293	294	294	293	291	291	285	281	278	277	275	278	280	290
16	287	293	296	297	295	294	293	291	291	291	288	289	291	290	289	288	287	284	280	276	275	275	282	286	288
17	286	294	303	310	311	308	304	300	297	294	291	290	289	289	276	292	292	288	283	280	281	276	276	283	292
18	285	288	295	299	300	300	300	300	295	290	286	296	296	296	284	281	284	284	285	286	288	287	287	290	291
19	291	299	304	312	306	302	299	299	297	298	296	295	293	291	292	290	286	284	281	282	282	282	281	284	293
20	287	293	298	304	300	299	299	297	296	294	295	294	292	293	293	294	292	290	284	285	282	279	280	284	292
21	290	290	295	293	292	292	292	291	292	291	292	290	290	289	288	290	285	278	265	266	277	288	297	308	288
22 D	314	323	327	324	318	312	294	291	267	273	281	242	248	266	261	267	253	262	273	289	291	301	307	311	287
23	314	318	322	320	317	313	309	295	293	283	268	271	279	294	299	302	298	292	291	286	293	294	296	299	298
24 Q	296	298	298	297	296	296	296	296	296	296	298	299	298	293	294	294	293	289	286	283	283	284	285	287	293
25	290	293	296	295	296	295	295	292	290	294	283	270	292	297	298	292	283	275	267	270	279	287	290	292	288
26	293	297	299	297	296	294	296	288	244	267	288	281	281	287	291	290	288	281	279	282	285	286	290	293	286
27	295	297	302	301	303	300	303	306	305	294	289	293	292	293	292	288	286	279	271	270	276	278	284	287	291
28	289	297	299	304	302	301	296	293	295	295	295	295	296	294	292	290	287	285	280	276	279	283	286	288	292
29 Q	292	299	300	302	299	297	296	297	299	296	294	293	289	287	271	275	276	275	272	276	280	280	284	288	288
30 Q	289	292	296	296	294	295	294	294	294	292	289	290	292	293	291	291	287	282	278	278	285	285	286	290	290
31																									
Mean	297	301	304	304	303	301	296	294	290	286	283	283	284	287	286	287	285	282	281	281	284	287	290	294	290

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 59 Victoria H = 18,500 γ + May 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	326	306	312	314	312	315	304	313	316	320	324	323	321	319	314	309	297	284	280	289	302	300	307	305	309
2	313	313	308	303	295	304	302	311	318	317	319	323	320	318	319	309	293	287	285	287	287	284	293	297	304
3	308	315	313	303	306	309	306	311	309	319	323	320	317	323	317	313	305	296	290	289	296	304	313	320	310
4 Q	321	323	317	317	316	315	320	322	322	327	328	328	330	330	329	323	315	309	307	307	308	312	314	317	319
5	324	323	323	322	321	321	323	323	325	327	332	330	331	335	337	333	329	316	315	326	338	341	342	334	328
6 D	349	349	335	338	337	336	336	339	343	337	329	330	331	324	306	267	264	249	248	257	269	285	277	284	309
7	303	311	302	296	295	294	297	301	299	297	298	299	299	301	303	304									300
8	303	298	301	299	304	302	297	303	306	308	309	310	312	309	309	310	305	287	283	284	287	284	284	298	300
9	310	305	306	302	299	298	301	303	301	303	307	310	314	314	318	318	320	312	308	307	304	297	299	304	307
10	311	318	312	301	303	301	305	306	312	312	312	315	318	318	321	315	316	308	304	298	297	296	301	305	308
11	308	309	305	307	312	312	309	313	317	317	322	326	328	326	334	323	305	289	297	299	297	294	293	303	310
12	302	305	304	304	302	301	295	299	306	310	311	307	310	311	316	312	308	301	297	300	298	299	303	307	304
13 D	308	312	317	315	308	294	298	307	311	314	319	316	313	321	324	316	310	297	294	297	300	285	292	310	307
14 D	300	295	278	285	275	287	291	298	314	317	314	310	320	319	320	316	307	290	286	293	298	289	302	302	300
15 D	309	300	296	303	292	299	306	314	312	315	311	317	315	315	298	297	280	263	261	286	315	312	304	300	301
16	305	309	309	309	316	293	289	297	310	298	300	305	315	320	318	307	298	289	280	281	291	300	301	301	301
17	307	309	306	304	304	306	308	308	311	317	317	310	311	312	312	310	306	295	288	289	301	308	313	316	307
18 Q	318	319	312	306	305	306	308	310	316	318	319	322	323	323	325	317	311	303	297	293	297	297	305	311	311
19	321	327	327	316	314	315	311	310	321	306	310	323	321	329	328	326	324	315	307	296	292	294	299	310	314
20	313	326	312	311	308	311	312	315	315	319	316	319	325	329	328	318	311	303	299	293	291	293	299	304	311
21	312	316	309	311	312	311	311	312	313	315	318	321	324	326	329	327	317	304	297	294	294	302	308	319	313
22	325	319	309	310	311	311	313	313	316	318	320	323	326	327	326	323	315	307	296	292	299	299	297	309	313
23 Q	319	326	327	322	318	313	312	317	314	315	318	319	324	337	341	336	326	320	306	303	294	291	298	315	317
24 Q	321	325	324	319	310	310	313	315	314	317	319	320	324	331	331	328	316	310	305	306	303	302	304	310	316
25 Q	314	317	315	317	317	320	322	326	325	326	326	328	329	332	333	328	312	304	303	307	308	312	319	327	319
26	330	332	325	322	323	321	324	327	331	333	333	335	334	334	327	315	305	296	291	294	290	305	316	316	319
27	310	319	316	320	337	335	313	314	318	314	315	317	321	321	312	294	304	303	307	306	300	307	304	314	313
28	309	310	309	304	307	308	306	313	317	319	315	311	313	311	301	295	275	264	267	287	298	299	304	312	302
29	317	307	309	307	298	301	311	319	313	303	312	309	306	308	303	293	286	284	284	290	293	299	308	308	303
30	314	316	311	306	306	307	307	311	317	320	320	319	320	323	318	313	302	296	294	295	296	303	315	322	310
31 D	317	321	320	324	332	328	298	289	314	315	309	257	281	296	294	287	275	267	261	270	275	277	279	284	295
Mean	314	316	312	310	310	309	308	312	315	316	317	316	319	321	319	312	305	295	291	294	297	299	303	309	309

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 60 Victoria D = 22° 30.0' E + May 1962

Day \ Hour UT		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1		8.9	11.1	12.0	13.1	14.2	15.4	15.6	14.9	14.7	15.2	14.7	15.7	16.4	17.9	19.1	19.9	20.0	17.9	14.4	11.2	10.4	8.7	6.7	7.9	14.0
2		7.9	9.5	10.5	10.3	11.4	14.5	16.7	18.9	16.2	16.3	15.7	16.4	18.3	19.2	20.4	21.6	22.7	19.4	16.0	12.4	9.7	8.1	7.3	7.7	14.5
3		8.7	9.3	10.9	12.4	12.9	13.8	14.2	16.4	16.4	15.0	14.9	15.9	17.7	17.7	20.9	21.5	22.0	20.6	17.4	14.0	12.3	12.0	10.9	10.4	14.9
4	Q	10.5	12.0	14.1	14.1	14.4	14.6	16.8	16.3	14.9	14.7	15.4	15.4	16.6	17.9	20.1	21.6	22.5	21.0	18.0	15.1	13.7	12.6	10.9	10.8	15.6
5		10.6	11.5	13.0	13.7	14.0	14.6	15.3	14.9	15.3	15.0	15.2	16.1	17.0	17.7	19.1	19.8	20.6	20.0	18.9	15.2	12.7	10.8	9.0	8.8	15.0
6	D	8.0	8.8	12.1	12.3	11.9	12.1	12.7	12.9	14.1	14.8	15.9	15.0	17.9	16.8	8.3	15.2	12.5	17.3	11.8	9.7	8.7	9.6	8.5	8.6	12.3
7		9.5	14.4	13.9	15.5	14.0	14.7	14.7	15.0	15.2	14.6	14.3	15.0	15.9	16.5	18.5	20.0									15.1
8		10.8	12.2	14.2	14.8	14.9	15.0	16.5	16.1	14.9	14.0	14.2	14.7	15.4	17.5	19.3	20.3	20.0	19.2	16.6	14.1	11.6	9.6	8.7	8.0	14.7
9		9.0	11.5	13.2	13.9	15.6	15.1	14.8	14.5	14.8	14.8	14.8	15.0	15.8	17.2	18.8	19.7	20.8	20.1	18.2	15.5	13.9	12.0	11.5	11.1	15.1
10		11.1	11.5	13.5	15.5	14.5	14.0	14.7	16.0	17.3	17.1	15.6	14.1	15.4	18.2	20.6	21.0	20.9	19.8	18.1	15.0	13.1	11.3	10.3	10.5	15.4
11		11.5	13.3	14.6	14.6	14.1	13.5	14.1	14.9	14.9	14.6	14.9	14.5	14.0	20.0	23.2	23.1	20.3	16.4	13.1	10.2	10.7	9.9	10.4	11.0	14.7
12		12.2	13.8	14.6	15.0	14.9	15.3	16.7	15.8	14.5	12.7	14.7	15.5	17.0	17.8	18.9	19.3	20.3	18.8	16.0	13.6	12.2	11.0	10.6	10.4	15.1
13	D	11.4	11.8	12.9	14.1	15.6	16.6	14.7	13.7	14.0	13.7	15.1	14.2	12.5	19.3	21.4	21.5	20.9	18.7	16.2	12.7	12.8	11.1	9.8	9.4	14.8
14	D	8.9	8.2	13.1	15.8	16.9	15.6	18.8	16.5	15.5	12.1	13.8	13.9	15.3	16.7	18.7	19.9	20.3	19.6	17.4	13.5	11.4	9.8	9.6	10.6	14.7
15	D	11.6	13.4	17.9	23.1	15.5	14.1	14.0	15.9	15.0	14.2	14.1	13.7	15.6	17.7	18.8	21.1	19.9	19.3	15.1	9.0	10.7	11.1	12.0	12.6	15.2
16		12.9	13.7	14.0	14.4	15.2	20.1	16.2	16.0	14.4	13.1	17.1	19.9	19.0	20.2	20.7	21.9	20.7	19.1	16.8	13.7	11.8	10.5	10.3	9.6	15.9
17		10.2	12.0	13.8	14.2	14.6	14.1	14.6	15.4	15.1	14.1	14.6	15.0	16.5	17.6	19.4	19.8	19.3	18.4	17.2	14.9	11.7	9.9	10.2	10.6	14.7
18	Q	11.0	12.7	15.0	15.1	14.5	14.3	14.4	14.1	14.0	14.2	14.2	14.8	15.8	16.7	18.9	21.0	22.7	20.8	17.8	14.4	11.9	11.2	10.2	10.1	15.0
19		11.0	12.3	13.8	14.0	13.6	14.2	14.8	14.3	16.6	19.2	16.6	15.8	18.7	18.4	18.7	20.1	20.4	21.6	20.6	17.3	14.4	11.5	10.9	10.9	15.8
20		11.3	12.3	14.3	14.6	14.3	13.5	14.5	15.3	15.1	14.7	15.2	15.4	16.7	18.0	18.7	19.4	19.0	19.5	18.2	15.2	13.3	11.3	10.5	10.4	15.0
21		10.8	12.3	14.2	14.4	14.4	14.0	14.2	14.2	14.6	14.6	15.1	15.2	15.5	15.8	17.9	19.2	20.3	19.4	18.2	16.1	13.4	9.9	7.8	7.7	14.6
22		8.9	11.7	14.7	15.1	14.8	14.4	14.3	14.1	14.0	14.3	13.7	14.2	15.4	16.8	19.0	20.7	21.9	21.6	18.0	14.9	12.0	11.0	10.7	10.7	14.9
23	Q	11.0	12.8	14.3	14.9	14.7	14.5	13.8	13.4	14.1	14.6	14.4	14.9	16.3	18.8	20.6	21.7	22.3	20.9	18.9	17.2	14.2	12.6	11.5	10.9	15.6
24	Q	11.0	13.2	15.5	16.3	15.0	14.2	13.4	13.9	13.8	14.0	14.2	14.6	16.1	17.7	19.1	21.6	21.9	21.5	17.7	14.5	12.6	10.5	9.3	10.0	15.1
25	Q	10.7	12.2	12.8	13.2	13.1	13.3	13.4	13.4	13.7	14.0	13.9	14.8	16.0	18.1	20.1	22.3	21.8	19.8	16.1	12.9	10.5	8.6	8.3	8.8	14.2
26		10.0	12.1	13.2	13.3	12.7	12.8	13.0	13.7	13.9	14.2	14.5	15.5	16.4	18.6	20.6	22.6	21.7	20.2	17.0	11.6	8.1	7.0	6.4	7.0	14.0
27		8.8	10.5	12.2	12.7	11.1	11.8	11.0	12.8	13.4	15.7	15.9	16.1	19.7	21.1	21.5	23.9	18.6	19.2	15.1	12.4	9.0	8.0	6.6	7.3	13.9
28		8.4	11.5	13.2	14.3	14.1	13.9	13.5	13.9	14.0	15.3	17.2	16.9	17.6	19.1	20.1	21.2	20.6	17.6	12.3	11.4	11.5	10.0	10.1	10.5	14.5
29		10.7	12.1	13.5	15.5	14.1	14.9	13.8	14.2	19.5	17.3	15.4	15.9	15.9	18.5	21.3	23.4	21.7	18.0	14.3	12.0	11.1	10.3	9.7	9.0	15.1
30		10.2	11.9	13.8	14.6	14.6	15.0	14.0	14.0	13.5	13.8	14.9	15.7	16.4	18.1	20.1	21.6	20.8	19.5	15.3	12.4	10.1	9.3	9.3	9.6	14.6
31	D	10.9	12.6	13.1	13.1	12.5	11.9	16.3	14.8	13.0	15.3	23.7	20.4	19.5	20.8	26.1	23.5	24.8	23.9	18.0	13.6	10.0	8.3	7.4	8.7	15.9
Mean		10.3	11.9	13.6	14.4	14.1	14.4	14.7	14.8	14.8	14.8	15.3	15.5	16.5	18.1	19.6	21.0	20.7	19.6	16.6	13.5	11.7	10.3	9.5	9.6	14.8

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 61 **Victoria** Z = 53,000 γ + **May** 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	298	304	306	305	302	299	299	298	295	295	288	288	290	291	290	289	285	276	267	270	277	282	288	291	291
2	295	301	305	307	314	317	309	302	298	295	295	287	286	289	290	291	288	283	276	281	286	284	283	287	294
3	298	307	307	303	304	304	304	302	302	292	281	287	290	295	294	290	287	285	283	284	286	287	288	290	294
4 Q	291	294	297	296	296	296	298	294	294	294	294	293	294	295	295	292	289	284	279	285	287	285	285	287	291
5	288	289	292	293	292	292	293	293	294	293	294	290	291	290	288	287	287	287	277	269	266	266	269	270	285
6 D	276	277	277	281	285	285	286	289	290	290	287	277	257	241	212	194	195	223	237	257	281	290	292	295	266
7	308	318	314	308	303	301	299	298	295	296	296	297	296	296	295	295									301
8	302	304	303	298	296	294	296	296	295	296	296	295	297	294	294	289	286	284	282	282	284	284	291	300	293
9	302	302	305	301	298	296	297	296	296	296	297	296	297	296	295	290	287	274	264	273	276	276	282	287	291
10	291	301	301	299	294	294	295	294	292	286	288	292	292	293	294	293	290	288	286	285	284	277	280	285	291
11	289	296	297	293	293	292	290	292	291	290	292	293	291	285	287	286	281	269	269	267	272	276	281	292	286
12	296	298	297	295	293	293	295	295	293	290	287	290	295	294	294	293	290	284	276	276	283	285	289	293	291
13 D	293	295	296	295	296	298	299	297	295	294	286	281	261	269	279	282	280	272	267	270	275	280	291	306	286
14 D	309	318	325	324	319	310	302	301	291	275	286	285	290	292	296	296	295	289	284	285	282	286	295	305	297
15 D	307	305	307	312	301	300	296	290	283	290	291	289	289	294	293	291	285	276	277	280	282	279	279	285	291
16	290	297	294	297	296	301	302	300	302	275	253	266	284	292	291	294	290	287	284	277	279	277	282	288	287
17	287	294	296	293	294	294	293	292	292	288	283	283	288	291	292	291	289	285	285	284	284	285	285	286	289
18 Q	291	297	296	295	291	291	291	291	289	289	289	290	291	292	294	292	287	281	275	277	283	284	288	297	289
19	300	303	301	292	289	290	293	293	280	285	287	287	287	291	291	290	286	289	286	283	285	286	287	292	290
20	297	304	300	296	293	292	292	292	290	290	289	290	292	293	289	287	280	279	279	276	274	277	284	290	288
21	293	299	299	297	292	291	289	291	290	291	290	289	290	289	286	285	285	280	265	267	274	278	281	286	286
22	294	300	297	293	289	289	288	289	289	290	289	290	281	290	290	289	285	284	274	276	282	287	290	290	288
23 Q	295	298	296	291	290	289	289	289	288	289	289	289	292	294	294	292	286	280	279	284	285	285	286	291	289
24 Q	294	296	297	295	290	289	288	288	288	288	289	289	291	291	292	291	287	278	270	268	266	271	279	285	286
25 Q	289	290	288	286	285	284	285	285	286	286	287	287	288	289	287	286	277	267	261	261	264	271	279	287	281
26	289	289	286	284	282	282	282	284	283	284	283	285	285	285	285	275	268	263	257	254	266	275	284	289	279
27	289	294	290	286	288	287	292	297	294	293	293	286	283	289	291	282	273	272	265	259	262	274	286	291	284
28	295	300	297	291	289	288	288	287	285	284	274	270	271	268	270	268	263	259	255	257	269	280	291	299	279
29	302	300	303	303	297	297	295	291	279	282	289	288	288	287	290	286	280	269	261	265	270	274	280	287	286
30	290	294	294	290	289	289	289	289	288	287	285	284	288	288	288	286	283	270	268	274	279	283	283	288	285
31 D	288	291	288	288	290	290	300	304	298	294	269	224	203	193	235	269	283	285	283	284	287	300	303	310	278
Mean	294	298	298	296	294	294	294	294	291	289	287	285	284	285	286	284	281	277	272	274	278	281	285	291	287

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 62 Victoria H = 18,500 γ + June 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	300	312	296	296	297	296	294	317	321	311	309	305	309	313	309	304	291	278	273	272	276	291	315	321	300
2	312	311	302	299	299	302	305	304	307	314	313	312	312	313	313	307	295	282	277	291	299	302	310	311	304
3	306	309	310	313	311	312	312	315	317	319	324	325	323	326	319	313	302	302	302	312	301	297	297	304	311
4	320	309	302	301	309	312	316	321	314	316	307	299	307	316	313	292	290	290	291	292	292	311	311	310	306
5	320	318	317	303	302	306	307	317	317	314	312	311	311	314	313	306	291	286	289	295	307	313	312	318	308
6	309	299	272	281	293	299	306	308	296	302	304	295	305	308	311	307	298	294	284	291	290	290	299	306	298
7	315	321	317	316	316	324	332	323	320	322	311	313	314	325	327	327	320	302	291	290	293	293	288	292	312
8 Q	294	294	297	304	309	311	311	311	309	313	314	319	319	323	323	320	314	309	302	299	303	314	319	328	311
9 D	314	329	321	309	307	290	302	319	322	333	330	337	340	337	330	343	327	301	285	276	284	289	307	312	314
10 D	305	303	303	290	294	290	304	307	307	312	305	309	316	330	328	320	311	294	285	288	299	308	309	310	305
11	316	310	313	309	306	301	309	314	323	317	319	319	325	325	323	317	307	297	284	285	289	295	300	297	308
12	302	310	304	303	305	312	314	326	315	316	318	324	327	320	315	316	317	314	298	299	295	303	303	307	311
13	314	316	323	317	314	311	308	311	322	320	318	322	324	329	328	321	306	293	296	303	305	310	311	315	314
14	315	316	317	308	313	311	309	316	319	326	325	328	327	328	332	334	324	312	297	294	285	295	307	287	314
15	319	309	311	298	307	304	311	319	320	320	312	308	310	308	311	316	314	311	298	295	302	298	298	295	308
16	316	301	295	308	306	307	308	310	313	314	312	318	323	326	326	322	312	300	297	293	297	298	296	292	308
17 Q	295	305	308	308	311	312	314	314	315	317	317	322	326	332	332	329	315	302	296	301	304	312	317	320	314
18 Q	320	313	313	311	318	318	320	324	322	325	328	329	333	334	332	326	321	312	308	308	311	310	316	321	320
19 Q	322	321	317	316	319	318	318	323	325	327	331	334	333	336	339	340	326	321	305	299	299	301	308	314	320
20 Q	318	319	314	319	322	320	324	327	325	327	325	326	332	339	335	332	321	306	283	284	292	301	300	304	317
21	314	315	319	324	327	330	333	339	335	343	345	337	337	343	335	344	349	327	298	299	303	305	308	315	326
22	320	306	289	308	307	296	307	317	316	321	322	323	326	324	327	322	306	297	285	288	300	311	309	318	310
23 D	305	310	313	305	302	308	307	318	320	324	319	319	317	322	325	329	312	295	280	259	290	298	298	303	307
24		300	293	296	302	305	309	312	313	320	315	321	321	316	318	315	305	289	277	286	293	302	306	300	305
25	310	307	311	311	316	314	307	303	317	322	321	318	318	323	322	320	318	306	290	295	298	304	302	302	311
26	299	305	308	314	314	314	317	322	323	328	332	331	329	334	336	334	335	341	321	308	297	305	306	332	320
27 D	332	320	323	317	321	317	313	300	306	287	286	297	288	307	318	307	307	290	263	275	301	298	305	323	304
28 D	310	299	310	309	309	320	310	311	319	320	314	315	322	320	321	326	324	308	299	295	294	298	277	297	310
29	298	301	307	302	310	309	311	319	333	315	316	321	319	323	311	306	295	297	275	278	286	297	309	308	306
30	314	316	313	309	303	307	304	305	315	315	317	319	324	323	324	327	310	296	302	298	299	299	294	295	310
31																									
Mean	311	310	308	307	309	309	311	316	318	319	317	318	321	324	323	321	312	302	291	291	296	302	305	309	310

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 63 Victoria D = 22° 30.0' E + June 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	12.2	13.8	16.7	18.7	14.3	14.6	15.5	13.1	9.1	13.8	10.3	10.9	16.2	19.2	20.1	20.8	20.7	19.6	17.7	13.4	7.5	5.2	5.7	6.8	14.0
2	9.5	13.3	14.5	14.7	14.1	15.1	14.0	13.5	13.4	12.5	13.6	14.8	16.4	18.0	18.8	20.9	22.4	20.7	15.8	11.3	8.6	8.4	8.1	8.9	14.2
3	9.8	12.4	14.1	14.3	13.9	13.3	13.0	13.6	13.7	13.5	14.1	15.4	16.7	18.0	18.8	21.1	20.8	20.1	16.8	13.1	10.1	8.8	7.9	7.9	14.2
4	8.0	9.9	11.4	13.6	12.6	12.4	13.4	16.6	14.2	15.5	18.5	16.4	15.2	15.0	17.6	18.5	19.6	19.5	14.9	11.9	8.1	7.1	7.1	8.2	13.6
5	10.2	12.3	11.8	12.9	11.8	13.5	13.7	12.6	9.8	14.6	13.8	15.7	16.7	17.4	18.5	20.3	20.4	20.0	16.3	11.5	7.9	7.3	7.7	7.6	13.5
6	8.2	10.4	10.5	11.6	12.4	12.0	17.8	15.0	14.8	13.0	14.7	12.0	13.3	16.2	18.9	20.7	20.1	18.3	16.2	13.1	12.9	11.9	10.9	11.1	14.0
7	11.6	13.5	14.8	15.2	14.6	13.4	13.0	16.1	16.9	17.4	15.1	16.1	16.7	15.9	18.7	20.7	20.4	20.8	17.4	14.4	11.3	11.1	11.8	12.6	15.4
8 Q	13.4	14.4	14.9	15.1	14.9	15.5	15.2	14.7	14.2	14.4	14.7	15.2	15.7	16.5	17.0	18.2	19.0	18.6	15.7	12.6	10.1	9.6	9.6	10.4	14.6
9 D	11.2	11.5	11.5	14.4	17.2	20.3	17.2	14.0	15.4	23.6	16.4	15.3	14.7	18.7	19.0	20.8	20.4	19.6	17.5	12.9	10.8	9.2	8.2	8.2	15.3
10 D	11.7	12.5	12.8	17.3	17.4	17.5	14.1	9.4	15.0	16.9	16.9	16.7	19.7	20.8	19.9	19.8	18.6	17.4	13.7	12.5	11.1	11.0	11.9	11.9	15.3
11	11.8	12.6	13.4	14.1	17.5	16.6	13.5	13.2	15.2	13.9	13.5	14.6	15.1	17.0	18.7	20.6	20.3	19.4	17.0	13.2	10.7	10.4	10.4	11.5	14.8
12	12.9	14.3	15.0	15.0	13.7	13.3	14.1	18.7	14.6	15.3	14.1	14.9	17.9	20.0	19.8	19.8	19.7	19.9	19.8	17.5	14.0	12.8	11.6	11.5	15.8
13	12.1	13.6	14.2	14.6	14.5	14.1	15.3	13.6	12.5	13.8	13.5	15.0	15.8	17.0	18.1	19.2	19.7	19.3	16.7	13.6	11.9	11.0	11.9	12.2	14.7
14	11.7	11.9	13.1	13.0	16.0	16.9	13.4	12.7	13.0	14.4	14.9	15.4	17.7	20.8	21.8	20.8	19.1	18.7	15.1	11.0	11.8	10.7	9.4	9.7	14.7
15	10.0	10.9	13.6	15.2	17.6	14.1	12.7	11.9	12.3	13.7	15.0	18.1	18.8	18.9	19.4	17.6	16.8	15.9	14.5	11.7	10.2	9.9	10.1	11.9	14.2
16	12.2	14.3	15.7	14.9	14.3	13.4	13.8	13.7	15.1	14.7	14.6	15.4	16.3	18.5	19.9	19.6	19.7	18.4	16.7	13.7	12.1	12.5	11.9	12.0	15.2
17 Q	12.7	13.8	14.3	14.1	13.6	13.5	13.2	13.2	13.4	14.5	15.1	15.5	15.9	17.1	18.0	19.2	20.0	19.9	16.3	13.8	11.6	10.5	9.8	10.3	14.6
18 Q	10.8	12.2	13.8	13.9	13.5	13.1	12.9	13.0	13.3	14.1	14.3	15.1	16.1	17.6	19.4	21.3	21.5	21.6	17.8	13.7	11.2	9.8	9.5	10.4	14.6
19 Q	11.0	12.6	13.8	14.6	15.3	15.2	13.6	13.2	12.8	12.6	13.5	13.7	14.8	19.0	20.6	22.6	22.6	20.2	17.0	14.0	11.4	9.4	8.1	9.3	14.6
20 Q	10.5	12.7	14.3	14.7	14.0	13.4	13.0	13.2	15.3	15.3	14.3	15.0	16.6	18.5	19.7	21.5	21.4	19.9	14.9	9.8	6.4	6.1	7.3	9.2	14.1
21	9.4	11.1	12.1	12.2	12.3	12.0	11.7	11.8	12.2	12.9	13.1	16.4	19.7	20.5	19.5	20.8	20.3	21.6	20.9	13.8	10.6	8.9	6.0	4.9	13.9
22	6.9	7.3	10.1	12.7	15.8	22.6	15.1	12.4	12.2	12.7	13.8	15.1	16.9	18.4	20.8	22.4	22.4	22.9	18.5	13.1	9.5	8.9	8.8	8.9	14.5
23 D	10.8	11.6	11.5	14.0	16.1	13.4	12.9	13.7	19.1	14.6	14.5	15.4	16.9	17.6	18.4	20.7	20.9	19.6	13.8	10.9	7.3	7.2	7.4	8.9	14.0
24	10.9	12.1	12.4	13.0	13.0	14.1	15.7	15.9	14.0	13.9	12.4	14.3	15.8	17.8	19.7	20.5	20.6	20.3	16.7	13.0	10.8	9.0	7.9	8.9	14.3
25	9.2	11.0	11.8	12.4	13.1	14.6	17.9	14.1	13.6	12.9	13.5	14.1	12.7	15.6	17.4	18.6	18.9	19.1	16.9	13.9	11.2	10.2	9.8	9.8	13.8
26	11.2	12.3	13.5	14.4	14.3	14.7	14.5	15.3	13.9	13.9	14.4	15.5	16.5	17.6	20.0	20.8	21.2	19.1	18.6	14.7	10.9	8.7	8.4	8.8	14.7
27 D	8.9	11.7	11.7	14.9	20.6	17.5	13.9	18.6	15.6	18.7	19.3	21.9	21.9	22.5	18.9	21.3	23.4	23.2	17.6	13.3	11.4	10.1	9.8	9.6	16.5
28 D	11.1	12.0	12.0	13.6	15.3	12.6	22.9	15.0	13.9	12.1	15.0	16.4	17.6	19.5	18.5	19.3	20.3	19.5	16.1	12.0	8.7	8.6	9.3	10.8	14.7
29	10.7	11.8	13.2	14.7	12.5	12.6	13.8	13.4	16.3	16.1	12.0	10.1	13.5	18.8	18.0	19.7	19.3	19.9	18.5	13.7	11.0	8.3	6.6	7.8	13.9
30	10.5	12.5	13.6	14.5	15.2	18.0	16.4	14.6	11.0	12.4	15.2	15.1	15.2	19.1	20.8	22.9	22.3	20.0	16.5	14.7	12.2	10.8	9.7	9.9	15.2
31																									
Mean	10.7	12.2	13.2	14.3	14.7	14.8	14.6	14.0	13.9	14.6	14.5	15.2	16.4	18.2	19.2	20.4	20.4	19.8	16.7	13.1	10.4	9.4	9.1	9.7	14.6

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 64 Victoria Z = 53,000 γ + June 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	321	320	311	309	300	299	297	290	260	268	266	258	279	289	294	296	289	279	275	282	286	284	289	298	289
2	301	305	300	293	292	296	294	294	293	287	284	288	291	291	291	289	285	282	275	273	273	280	289	293	289
3	294	297	297	294	293	291	292	291	290	287	285	287	289	288	284	281	275	265	266	267	268	271	272	285	284
4	302	314	317	310	299	294	293	289	289	287	274	271	274	270	276	274	272	268	259	252	270	286	297	306	285
5	311	309	307	301	298	297	298	295	276	281	285	287	291	288	286	282	275	271	267	265	268	273	286	304	288
6	313	322	322	314	309	309	300	274	288	290	288	288	289	288	290	292	285	274	264	263	268	278	287	294	291
7	295	298	295	290	288	287	290	286	283	276	271	273	283	289	291	290	282	273	271	269	265	271	279	286	282
8 Q	289	292	295	292	292	291	288	289	289	289	289	290	290	292	291	285	278	268	261	256	254	260	268	282	282
9 D	286	294	296	292	304	305	300	295	289	276	276	285	288	289	290	288	286	276	263	262	270	278	285	297	286
10 D	318	319	317	320	315	302	296	265	283	265	253	276	273	284	292	294	293	287	279	274	283	292	292	294	290
11	300	301	297	295	297	295	292	291	285	284	288	291	295	294	290	292	286	279	271	270	279	289	297	300	290
12	305	311	306	299	294	293	293	290	281	284	289	288	285	291	288	289	284	283	278	278	278	282	285	291	289
13	298	301	302	299	298	294	293	289	273	281	282	286	290	292	291	289	285	281	271	264	274	282	287	291	287
14	290	293	296	289	295	291	290	289	289	288	286	287	286	285	286	287	284	276	272	267	274	279	285	280	285
15	293	299	308	309	305	297	295	290	288	286	282	282	289	284	285	283	278	274	264	257	262	267	276	283	285
16	295	304	303	299	293	292	290	289	288	287	286	289	290	293	292	287	283	269	263	259	261	266	272	283	285
17 Q	290	290	300	296	290	289	287	287	287	287	286	288	288	289	288	284	282	271	266	263	262	267	274	283	283
18 Q	289	296	300	294	292	290	288	288	288	288	288	287	289	286	286	284	277	270	265	271	275	279	277	286	285
19 Q	288	288	287	290	292	291	291	290	290	289	288	288	284	283	286	288	287	281	263	257	257	271	277	284	283
20 Q	286	292	291	290	289	286	286	286	286	287	284	287	288	286	286	287	287	283	272	265	262	261	270	281	282
21	284	284	285	285	285	285	285	286	284	286	285	284	284	284	281	274	266	260	254	257	254	256	263	275	276
22	292	298	298	304	307	304	299	294	290	290	289	290	291	291	289	287	282	274	260	256	259	271	278	289	287
23 D	297	302	300	297	299	298	296	296	286	269	282	287	287	288	287	286	284	282	268	264	276	283	292	301	288
24	309	305	298	293	289	292	295	291	292	288	278	282	289	290	291	291	288	279	270	270	271	274	280	289	287
25	295	301	298	291	290	293	293	290	292	289	284	288	287	288	293	293	289	285	280	277	275	280	283	288	288
26	294	298	298	295	293	291	290	289	289	289	290	289	288	288	284	281	279	277	270	266	264	272	277	289	285
27 D	298	306	305	306	305	296	296	292	275	269	270	270	263	263	285	301	303	289	271	275	284	286	292	297	287
28 D	302	308	311	306	305	299	298	290	290	256	258	272	286	289	290	287	286	281	274	267	269	278	283	300	287
29	311	316	319	318	306	300	301	298	279	283	286	271	265	269	278	286	289	285	273	267	262	267	284	299	288
30	306	306	306	302	308	314	295	298	281	267	279	284	282	285	290	290	287	280	277	270	273	277	285	293	289
31																									
Mean	298	302	302	299	297	295	293	289	285	282	281	283	285	286	288	287	284	277	269	266	269	275	282	291	286

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 65 **Victoria** H = 18,500 γ + **July** **1962**

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	297	300	306	305	302	310	312	317	325	322	323	318	328	327	323	314	296	280	284	292	298	298	301	312	308
2	309	313	308	313	316	312	320	316	318	323	318	328	326	331	329	329	319	296	263	275	286	291	294	289	309
3	296	302	306	304	305	310	315	328	326	321	324	326	332	330	324	316	306	312	307	296	292	289	289	297	310
4 D	301	308	308	306	307	318	321	322	325	327	325	331	326	328	345	343	342	326	311	294	285	243	285	311	314
5 D	303	318	313	302	299	288	326	312	310	321	317	315	326	316	324	331	338	320	316	309	287	289	300	306	312
6	319	319	313	320	302	297	310	313	315	317	326	324	324	330	330	334	326	307	293	293	298	300	294	306	313
7	311	315	317	315	317	319	319	321	325	331	326	328	333	338	345	337	327	306	285	301	306	303	298	309	318
8	316	320	315	302	306	312	325	328	320	321	321	324	327	330	333	337	331	321	305	293	286	280	292	290	314
9 Q	297	312	309	301	303	302	305	313	317	315	315	316	319	322	330	327	325	314	305	297	292	284	285	297	308
10	307	303	314	312	312	311	315	321	328	326	327	326	329	330	334	338	325	315	317	319	313	305	302	305	318
11	308	312	318	314	311	313	316	314	326	328	326	327	324	328	335	336	328	321	308	295	293	294	299	300	316
12	304	307	309	312	311	316	318	314	317	321	321	325	328	327	320	322	324	311	300	298	296	308	313	315	314
13	319	311	309	310	308	314	322	318	316	322	320	328	331	336	335	330	306	299	300	302	305	307	304	290	314
14	300	304	307	303	307	300	308	300	314	314	314	319	317	322	313	313	312	308	307	305	305	297	298	300	308
15	305	304	300	309	311	313	312	316	319	320	318	321	321	326	326	325	315	307	301	299	296	306	312	305	312
16 Q	298	312	312	309	311	314	315	319	317	321	321	326	327	325	328	326	325	315	305	313	317	315	312	310	316
17 Q	311	314	315	322	320	324	323	323	326	329	328	330	332	334	333	332	335	334	320	309	312	318	318	317	323
18 Q	320	322	314	316	321	322	323	325	325	330	328	333	334	331	329	332	332	329	321	313	310	313	317	318	323
19	316	323	331	327	330	335	329	331	335	331	325	332	341	338	341	340	330	314	307	293	299	302	314	327	325
20	332	315	319	311	304	308	301	349	322	314	318	315	327	327	324	320	316	300	299	301	305	312	320	330	316
21	317	308	305	312	316	317	314	317	319	324	318	327	323	325	321	324	319	303	310	309	298	300	301	309	314
22	295	298	315	318	319	319	325	313	314	319	322	320	322	323	323	319	318	308	298	299	300	296	298	309	312
23	312	319	318	317	322	314	306	302	317	324	320	321	318	319	324	321	317	311	296	282	289	301	302	310	312
24	311	301	300	315	320	320	324	324	326	328	331	332	332	329	327	328	319	294	289	304	297	299	297	316	315
25	317	308	287	286	279	276	284	281	294	306	307	307	319	327	326	317	310	305	309	320	323	325	322	326	307
26 D	339	344	356	342	350	330	308	303	279	317	310	273	323	313	302	300	290	290	286	302	296	284	299	311	310
27 D	285	298	282	289	299	297	304	317	314	315	314	312	310	300	299	273	280	284	288	288	282	277	287	303	296
28 D	320	318	314	296	304	304	295	305	307	310	310	306	302	305	303	288	279	292	291	292	288	277	286	288	299
29	305	315	312	295	302	306	302	323	310	309	309	307	312	315	316	310	292	282	285	286	289	283	297	313	303
30 Q	318	323	312	307	305	309	316	310	309	310	308	308	312	317	315	304	307	288	283	281	292	300	310	320	307
31	320	317	315	309	314	318	319	317	317	323	322	323	324	330	332	335	327	309	294	308	315	327	325	324	319
Mean	310	312	312	310	311	311	314	316	317	321	320	320	324	325	325	323	317	306	299	299	298	298	302	308	312

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 66 Victoria D = 22° 30.0' E + July 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	11.8	13.6	14.6	15.2	16.9	15.5	14.0	13.9	13.4	15.4	14.5	10.9	16.4	18.2	19.7	23.6	23.5	20.9	16.4	12.0	9.2	8.8	9.1	8.8	14.9
2	10.6	13.5	14.2	14.0	13.5	13.5	13.4	17.4	13.5	13.6	13.3	14.7	16.6	18.0	19.4	19.0	20.5	21.2	16.4	10.5	9.8	9.2	8.0	7.4	14.2
3	8.1	9.9	12.3	14.0	14.2	14.4	14.8	17.9	15.7	15.0	14.6	14.3	16.4	18.2	20.5	20.5	21.8	19.7	16.4	12.6	10.7	10.1	10.7	11.2	14.8
4 D	11.8	12.3	13.5	14.7	13.9	16.8	16.1	13.4	14.4	14.6	15.3	10.7	15.3	17.5	20.2	20.4	21.8	20.5	17.4	13.7	12.1	8.2	5.7	6.2	14.5
5 D	7.3	10.9	13.8	19.5	23.7	18.5	13.9	15.4	17.6	16.6	13.7	14.1	13.5	13.0	18.0	20.7	23.0	22.3	17.0	14.8	12.8	11.3	9.7	9.2	15.4
6	8.5	10.1	16.9	18.0	17.0	19.3	17.0	17.2	15.9	13.7	9.9	15.1	17.7	17.6	20.0	20.6	22.5	23.9	20.0	15.4	11.8	8.4	7.3	8.9	15.5
7	10.8	11.9	13.0	14.4	14.3	14.4	14.7	14.0	13.9	14.9	14.0	14.0	15.9	17.8	19.4	20.5	20.4	20.1	18.6	14.0	13.0	11.0	8.9	9.2	14.7
8	9.9	10.4	12.0	16.0	14.4	14.8	16.5	13.1	15.2	14.1	13.4	13.7	15.2	16.9	19.4	20.6	21.5	22.9	20.8	16.8	12.5	9.4	9.2	8.7	14.9
9 Q	10.2	11.6	13.2	15.1	14.8	14.8	15.6	15.8	13.4	14.5	12.7	13.9	15.7	17.1	18.9	19.9	20.2	19.7	17.9	15.5	13.0	12.0	10.9	10.6	14.9
10	10.7	11.6	12.4	13.3	14.1	14.9	14.1	14.5	15.1	14.8	14.7	15.1	15.6	14.9	17.0	19.9	21.0	21.3	16.6	12.6	10.8	10.3	10.6	10.6	14.5
11	10.6	11.8	12.9	14.4	14.1	15.9	16.1	17.3	16.4	16.0	14.6	14.1	15.3	17.4	19.7	19.9	20.7	21.2	19.1	15.6	12.1	11.4	11.4	11.2	15.4
12	11.0	12.2	13.5	14.0	13.9	19.6	18.3	14.4	16.5	18.5	13.9	14.3	14.9	15.7	16.7	20.1	20.5	20.9	19.1	15.8	12.2	10.4	9.7	10.0	15.2
13	10.9	12.8	16.0	15.5	14.1	13.0	14.8	13.2	13.4	13.7	14.5	14.2	15.5	17.5	18.0	20.7	23.1	19.6	16.8	9.9	6.6	8.3	9.3	10.8	14.2
14	10.7	14.0	15.3	14.3	14.6	17.9	18.1	16.0	14.6	13.8	13.7	15.7	16.5	18.9	17.1	17.2	16.4	15.0	15.2	14.7	12.3	11.6	10.6	11.2	14.8
15	12.4	14.1	13.1	13.1	13.5	13.7	14.0	14.0	13.7	13.7	14.3	15.4	16.0	17.4	18.0	19.6	19.5	18.2	16.4	14.3	12.0	11.1	10.0	10.4	14.5
16 Q	11.8	13.0	13.9	14.8	15.1	13.6	13.5	13.4	13.3	14.1	15.0	15.2	16.1	17.4	18.6	18.8	18.7	18.3	16.7	14.1	12.4	11.5	11.8	12.5	14.7
17 Q	12.7	12.2	12.7	13.2	13.4	13.5	14.0	14.2	14.2	14.5	14.6	15.4	15.8	16.6	17.3	18.0	18.5	18.3	16.8	15.1	13.2	11.7	11.8	12.8	14.6
18 Q	13.2	13.4	13.2	13.2	13.6	13.6	13.3	13.8	14.0	14.3	14.9	15.3	16.4	18.7	19.0	19.7	19.4	18.1	15.9	15.9	13.9	12.8	12.7	12.5	15.0
19	11.5	11.5	11.9	12.5	12.1	12.2	12.3	12.7	12.7	17.7	17.0	17.4	17.5	22.1	22.0	21.4	21.9	22.2	18.6	14.6	9.7	7.1	7.1	8.3	14.7
20	8.8	9.4	8.6	8.7	13.4	14.4	13.5	11.6	14.2	17.8	15.8	14.6	16.2	17.8	18.4	18.9	19.9	17.9	14.3	12.3	9.8	8.5	7.1	7.6	13.3
21	9.1	10.1	10.8	12.2	15.9	14.0	12.4	13.1	13.0	12.3	15.3	13.8	14.9	17.5	18.3	21.6	23.5	20.4	16.0	14.5	12.8	10.9	9.9	9.4	14.2
22	9.0	10.2	10.4	11.9	12.6	13.2	16.1	15.0	13.1	12.7	10.6	10.3	14.3	16.1	17.2	18.7	19.8	19.2	17.3	15.9	13.7	11.5	10.5	9.7	13.7
23	9.6	10.5	12.0	13.2	13.4	17.9	19.3	17.0	14.4	15.6	14.3	14.6	14.5	16.3	16.2	16.3	16.4	17.4	15.8	14.3	10.1	8.4	8.9	9.7	14.0
24	11.0	11.1	11.9	11.8	12.2	12.7	13.7	13.5	13.5	13.6	13.8	14.5	15.5	15.8	15.7	18.5	18.6	20.6	10.6	13.2	11.9	10.9	9.5	9.7	13.5
25	8.8	13.0	12.6	14.7	19.7	17.7	23.5	18.2	17.8	16.9	16.0	12.2	13.9	15.7	17.7	19.2	19.9	18.7	15.2	13.5	11.7	10.7	9.7	9.3	15.3
26 D	8.7	8.8	7.9	8.7	9.6	15.2	27.0	17.7	22.2	15.7	11.5	10.2	20.0	22.7	23.9	25.7	23.2	20.2	16.0	12.0	10.9	9.5	11.7	11.7	15.4
27 D	15.3	18.0	12.8	16.4	16.3	14.5	13.6	9.3	7.7	12.5	11.8	12.2	15.6	12.0	13.7	18.7	16.8	16.4	14.4	11.1	9.6	8.7	8.6	9.2	13.1
28 D	14.2	12.6	17.1	12.1	18.2	16.1	15.4	11.0	13.7	12.6	12.0	10.3	12.3	18.5	21.5	20.9	20.1	17.2	14.0	12.1	12.6	11.9	11.3	10.2	14.5
29	10.5	13.9	12.9	12.0	12.5	12.8	14.3	15.1	13.4	12.6	12.9	13.5	15.0	16.8	18.9	20.2	20.8	19.3	15.6	12.6	11.1	9.4	8.9	9.9	14.0
30 Q	11.5	11.6	13.5	14.2	11.9	14.7	15.5	12.9	12.5	12.7	13.7	14.7	15.9	16.3	17.3	18.5	19.1	18.6	15.3	11.5	9.7	8.1	8.5	10.0	13.7
31	12.2	13.1	13.8	13.4	13.6	12.5	12.7	12.9	13.4	13.3	14.2	14.6	15.2	16.2	18.1	19.6	21.2	20.9	17.4	9.6	9.0	4.7	6.3	8.9	13.6
Mean	10.8	12.0	13.0	13.8	14.5	15.0	15.5	14.5	14.4	14.6	13.9	13.8	15.7	17.2	18.6	19.9	20.5	19.7	16.6	13.6	11.4	9.9	9.5	9.9	14.5

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 67 Victoria Z = 53,000 γ + July 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	290	304	306	304	303	301	296	297	289	279	281	270	275	282	287	292	289	282	272	267	271	278	286	295	288
2	296	303	305	300	297	296	296	292	294	290	286	288	290	293	291	290	288	285	277	270	270	276	290	300	290
3	308	313	314	305	298	297	297	292	284	285	288	288	290	289	287	286	286	283	273	268	266	264	270	283	288
4 D	294	305	308	310	306	304	299	297	295	287	287	276	273	267	270	278	283	281	279	267	261	268	294	310	287
5 D	311	312	307	312	318	311	277	283	289	279	282	287	290	287	292	295	287	287	282	275	270	280	283	293	291
6	301	305	314	318	316	311	304	303	296	293	267	262	285	291	294	296	296	287	278	270	275	283	284	294	293
7	299	304	302	299	296	295	295	293	292	287	281	288	294	295	299	297	289	283	278	284	282	284	288	300	292
8	300	303	306	308	304	300	289	266	270	284	289	288	287	292	296	295	294	287	285	282	282	287	291	296	291
9 Q	301	310	309	305	302	299	296	295	286	288	288	286	291	295	297	297	296	290	276	266	273	273	279	286	291
10	292	295	296	294	292	290	289	289	284	285	287	289	290	289	283	283	281	286	277	267	266	269	277	287	285
11	293	300	304	301	300	298	295	290	290	280	284	287	286	287	290	286	281	279	260	264	270	276	286	290	287
12	293	297	299	298	296	295	287	286	285	286	284	289	293	294	292	283	275	270	268	268	269	273	278	282	285
13	293	296	303	303	299	296	290	289	288	288	287	284	279	273	283	288	285	276	271	271	276	282	290	296	287
14	307	318	321	316	306	304	293	286	293	293	291	290	289	287	284	278	271	271	274	276	280	283	286	290	291
15	294	308	306	303	298	294	294	293	291	290	289	290	292	294	291	289	283	280	273	268	273	281	287	290	290
16 Q	293	297	302	302	301	297	296	294	292	290	290	290	289	288	286	286	283	280	279	279	272	272	277	277	288
17 Q	284	290	291	291	291	291	289	290	288	287	286	287	288	287	285	282	282	284	284	276	271	272	278	286	285
18 Q	290	296	293	291	292	291	289	290	289	289	287	289	287	285	285	286	283	279	269	259	265	274	279	284	284
19	284	288	289	286	286	288	287	290	291	289	285	281	285	285	286	282	278	271	269	264	265	270	276	283	282
20	290	294	302	304	317	311	308	275	248	266	280	283	290	294	295	295	295	293	288	282	277	277	280	289	289
21	296	302	303	306	304	298	295	294	293	289	284	285	287	293	292	292	293	290	285	277	272	268	277	291	290
22	293	294	295	291	288	289	287	285	290	289	285	280	287	296	298	297	295	293	287	280	274	276	285	292	289
23	294	299	297	288	287	286	285	286	288	273	273	280	287	290	290	287	284	281	275	276	274	273	281	288	284
24	296	297	293	292	288	286	286	285	286	287	288	288	288	288	282	275	271	268	267	274	278	284	293	314	286
25	329	343	343	331	323	314	302	283	286	291	289	285	283	300	306	306	302	296	293	287	288	290	290	290	302
26 D	289	288	285	278	283	310	322	313	323	302	305	232	295	309	303	301	296	293	287	293	290	288	301	305	295
27 D	309	325	321	318	300	294	289	275	256	269	275	276	280	264	244	231	243	256	259	262	274	279	285	296	278
28 D	316	314	314	306	307	285	285	254	282	285	282	276	267	270	275	273	277	277	271	269	265	269	284	291	283
29	294	306	302	291	286	286	288	282	279	282	281	284	285	288	287	285	284	281	277	276	277	275	281	287	285
30 Q	292	294	294	296	290	292	285	284	286	285	285	284	286	288	288	290	289	285	281	278	275	280	283	292	287
31	290	290	290	287	286	284	283	282	284	285	282	283	284	287	288	288	285	279	269	269	272	270	268	281	282
Mean	297	303	304	301	299	296	293	288	287	286	285	282	286	288	288	287	285	282	276	273	273	277	283	292	288

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 68 **Victoria** **H = 18,500 γ +** **August** 1962

Day \ Hour UT		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	347	287	286	289	276	287	288	297	307	260	289	318	325	331	321	321	317	301	291	284	284	294	306	313	301
2		318	309	310	306	303	316	311	319	322	322	326	322	324	327	323	315	297	288	287	280	292	300	310	322	310
3		321	312	311	306	311	315	301	319	318	316	318	313	302	313	318	309	295	279	271	265	272	274	302	308	303
4		313	309	305	303	305	307	308	316	312	316	315	311	321	326	325	320	310	293	298	302	306	308	312	313	310
5		314	314	307	308	313	313	330	322	320	321	323	312	317	321	326	320	312	294	282	289	302	305	315	322	313
6		325	310	306	308	321	304	290	299	325	317	321	323	318	334	336	323	320	316	321	312	303	297	293	316	314
7		303	311	310	302	313	301	301	311	314	310	326	319	313	311	326	311	309	285	290	306	305	303	305	315	308
8	D	318	301	281	296	298	309	324	300	305	299	317	311	311	309	301	304	298	306	303	295	301	304	295	302	304
9		308	294	273	294	306	302	326	300	312	314	310	316	314	303	315	315	306	303	296	291	279	278	294	295	302
10		295	305	302	305	313	295	296	315	298	294	308	309	294	317	316	304	285	280	291	294	291	295	302	302	300
11	Q	298	299	294	301	304	308	310	309	312	311	312	312	313	313	314	311	303	289	278	279	288	301	310	312	303
12	Q	311	307	307	308	310	309	313	312	313	315	320	319	317	320	316	310	304	300	294	294	297	302	312	312	309
13	Q	312	314	314	317	316	315	317	316	320	322	326	326	324	325	326	312	302	286	279	292	306	312	329	312	313
14		317	321	325	313	302	315	317	320	325	330	328	326	328	331	330	321	312	300	297	294	299	306	309	308	316
15		316	312	305	308	314	321	280	303	319	315	312	315	313	315	317	312	291	276	283	290	292	286	303	308	304
16		289	291	267	281	300	297	305	314	301	308	309	308	313	318	319	312	298	287	279	278	293	307	308	307	300
17	D	289	292	295	294	301	309	310	314	305	303	311	309	305	314	303	291	283	282	278	285	295	309	288	299	298
18		305	290	301	306	309	340	328	295	303	306	320	317	317	315	318	313	289	284	285	296	306	301	306	318	307
19		289	307	312	307	297	304	313	302	314	314	318	315	316	319	310	307	300	287	279	283	285	292	296	305	303
20	Q	304	311	307	310	310	312	311	314	314	313	314	315	315	312	310	312	301	290	287	286	285	290	296	298	305
21		295	307	310	311	311	313	312	315	316	323	323	322	324	321	320	319	314	309	306	308	312	309	324	305	314
22	D	313	293	300	281	299	302	309	334	308	315	311	318	319	311	318	315	309	301	300	287	273	274	305	315	305
23		308	303	300	299	307	309	316	308	312	315	322	322	312	311	312	304	295	289	275	283	292	301	316	312	305
24		308	304	306	305	295	303	316	341	298	304	300	308	306	279	315	320	303	287	297	298	292	284	274	292	302
25		296	306	305	310	315	313	312	323	319	322	320	315	312	312	310	304	289	275	290	298	300	298	311	311	307
26		306	303	309	304	310	309	318	315	328	319	318	318	321	315	318	311	301	294	298	297	305	308	315	322	311
27		324	312	320	315	315	317	327	322	321	320	322	323	324	325	325	317	306	298	294	293	292	299	309	313	314
28	Q	316	322	318	311	318	320	322	322	324	322	325	327	332	325	324	319	310	293	282	281	283	297	312	325	314
29		325	321	321	318	317	308	294	298	330	324	326	320	324	331	328	318	306	296	292	286	273	281	295	294	309
30		304	297	296	298	298	305	297	302	310	313	314	310	307	308	290	300	291	284	279	295	309	312	315	325	303
31	D	324	288	278	256	250	265	273	270	266	298	299	299	293	303	308	305	291	275	277	283	289	302	308	306	288
Mean		310	305	303	302	305	308	309	311	313	312	316	316	315	317	317	312	302	291	289	290	294	298	306	310	306

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 69 **Victoria** **D = 22° 30.0' E +** **August 1962**

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	9.8	13.5	14.6	13.4	27.6	21.6	17.4	17.1	18.4	−0.2	20.9	19.2	16.8	17.3	17.4	18.7	19.4	18.2	14.1	10.9	10.6	9.1	9.4	11.1	15.3
2	13.3	12.9	13.5	12.6	19.5	13.4	12.1	11.9	12.1	12.0	13.3	9.8	11.3	17.1	19.7	19.9	21.5	18.7	14.9	12.1	10.7	8.2	8.0	10.0	13.7
3	12.1	13.5	14.6	15.6	19.5	16.1	15.6	12.0	11.9	12.8	13.5	13.1	8.9	14.0	19.3	20.2	21.9	20.6	17.7	13.0	8.0	5.9	6.8	8.5	14.0
4	10.4	12.1	13.1	14.0	14.2	13.2	14.4	13.2	14.0	11.0	11.4	10.9	14.5	16.5	18.1	19.3	19.8	16.8	13.5	10.6	8.2	7.3	7.8	10.3	13.1
5	12.4	13.3	14.6	13.9	13.8	12.8	12.6	11.7	14.4	12.9	10.9	11.5	19.2	20.2	21.4	21.6	22.1	20.4	16.8	11.8	8.3	7.3	7.5	9.3	14.2
6	11.6	12.6	12.6	11.1	11.7	14.0	19.7	15.8	15.8	16.2	15.3	13.0	11.6	15.9	19.2	18.6	18.5	17.2	15.6	14.4	11.1	9.1	8.8	9.6	14.1
7	11.1	13.2	12.9	16.2	17.9	14.6	16.6	14.0	12.7	13.7	13.0	9.6	11.7	13.0	15.8	17.5	16.4	15.5	14.1	11.4	10.2	10.5	9.9	9.8	13.4
8 D	9.9	9.9	17.6	12.8	13.4	22.3	17.9	16.4	7.9	19.5	15.5	14.9	8.4	13.9	15.4	19.4	15.1	15.6	11.6	10.0	8.6	8.1	7.3	7.6	13.3
9	9.9	12.0	19.6	11.8	11.4	15.4	19.2	17.7	8.3	13.2	7.9	12.3	14.4	12.2	14.7	18.8	18.7	16.8	14.2	12.5	11.1	9.5	9.2	9.6	13.4
10	12.3	12.7	13.1	19.4	17.6	14.7	15.3	17.6	17.1	14.6	10.0	14.0	11.8	14.8	18.6	19.1	19.9	16.3	13.4	12.4	11.3	10.6	10.9	12.0	14.6
11 Q	13.5	13.6	14.4	14.9	14.2	13.2	13.5	13.5	13.6	13.9	14.4	14.6	15.4	15.8	17.5	17.3	17.3	15.3	12.3	10.3	10.1	10.1	10.8	11.3	13.8
12 Q	12.4	13.0	12.9	12.7	13.5	14.2	14.0	13.4	13.5	13.8	14.2	14.2	15.0	16.6	19.1	20.5	20.3	16.8	14.2	12.8	11.5	10.1	9.8	10.9	14.1
13 Q	12.1	12.7	12.7	11.9	12.1	11.9	12.3	12.6	12.9	13.5	13.8	14.1	16.7	17.9	18.4	18.0	18.5	17.9	13.9	9.7	7.7	7.3	7.5	9.3	13.1
14	11.9	12.7	11.6	11.7	14.4	11.1	11.6	11.7	12.2	12.5	14.4	14.9	17.0	18.9	20.6	22.0	23.3	21.2	17.4	13.0	10.5	9.2	9.2	10.2	14.3
15	11.0	11.0	11.3	11.4	13.2	26.8	21.0	20.8	13.2	16.1	15.0	15.5	17.3	18.2	20.3	21.9	22.0	17.3	14.5	11.4	8.9	7.3	6.7	6.1	14.9
16	8.2	5.3	9.7	11.3	12.4	13.8	19.7	18.2	12.3	11.9	13.4	14.6	15.6	17.1	20.1	21.8	21.8	18.3	13.9	9.6	6.4	5.2	5.6	6.1	13.0
17 D	5.2	9.1	9.4	10.1	8.3	9.1	10.8	12.2	13.0	10.8	9.5	7.1	8.6	14.6	15.6	15.1	14.8	14.8	9.1	5.1	2.5	3.3	4.8	8.3	9.6
18	9.3	9.4	10.4	10.1	12.6	14.1	13.6	15.2	10.9	6.0	10.4	11.6	13.1	14.9	14.9	19.5	19.1	14.4	10.5	8.3	7.1	7.0	8.0	8.0	11.6
19	14.3	14.4	12.8	18.6	17.7	17.2	13.0	13.3	13.7	15.8	9.7	14.7	15.2	17.2	16.5	19.1	19.5	19.5	15.9	12.1	10.4	9.4	8.8	10.1	14.6
20 Q	11.0	12.3	13.5	13.1	13.1	12.8	12.9	13.4	13.0	12.8	12.5	13.1	14.0	14.6	16.9	19.5	20.6	18.7	15.3	13.2	12.1	11.6	10.4	10.2	13.8
21	10.5	11.7	12.3	12.2	12.9	12.9	12.7	12.9	13.7	13.9	13.8	14.2	15.2	16.3	17.7	19.2	19.3	16.8	14.4	11.5	9.8	8.4	6.7	7.2	13.2
22 D	4.8	8.3	6.0	13.6	15.7	11.3	13.6	33.4	16.6	11.4	13.5	14.1	16.6	15.3	16.5	18.4	18.7	17.3	15.0	13.5	9.4	7.3	7.5	8.3	13.6
23	9.9	9.2	11.2	13.9	9.6	12.2	12.7	14.1	14.8	13.6	12.7	10.6	16.5	19.3	18.7	17.8	18.9	16.6	14.8	12.2	10.0	9.4	9.2	11.1	13.3
24	12.7	11.8	14.7	16.4	13.6	12.1	14.3	14.2	17.5	14.6	8.9	10.1	14.1	11.2	16.4	19.9	20.8	17.9	14.4	13.6	12.6	11.2	11.3	10.6	14.0
25	10.8	11.8	10.3	15.2	16.3	10.7	11.2	9.9	7.1	7.5	10.6	12.8	12.3	13.1	14.7	15.9	17.3	16.3	11.7	7.8	6.7	6.4	6.4	8.3	11.3
26	12.5	12.6	13.1	13.4	12.9	16.1	17.1	13.5	11.6	11.8	13.6	10.9	11.6	15.7	17.9	19.0	20.0	17.8	14.8	11.6	10.5	9.5	10.0	11.0	13.7
27	12.7	14.4	12.7	12.0	12.5	16.7	13.2	12.5	12.7	13.2	13.6	13.8	14.8	15.9	18.1	20.0	20.7	18.4	16.6	14.1	11.9	10.2	9.8	10.6	14.2
28 Q	11.9	12.7	13.0	13.5	13.4	12.2	12.4	12.7	13.8	13.4	13.8	14.6	14.8	16.3	16.4	18.6	18.8	17.5	14.6	12.0	9.9	8.6	8.6	9.8	13.5
29	11.7	12.9	13.0	12.4	12.7	18.5	19.5	16.7	11.6	12.9	15.8	16.9	17.2	18.3	19.5	18.7	19.3	18.0	13.6	11.0	8.2	5.9	5.5	8.9	14.1
30	11.4	13.1	13.6	13.6	13.6	18.0	14.6	13.5	13.4	11.9	12.5	14.0	13.9	17.0	15.1	18.6	19.3	15.3	9.5	8.0	7.1	8.2	9.8	11.5	13.2
31 D	10.6	15.0	15.6	24.9	22.0	21.9	20.8	18.5	13.7	19.5	17.5	16.4	10.4	19.9	21.3	22.0	20.6	17.1	12.9	11.0	10.2	10.1	10.8	12.4	16.5
Mean	11.0	12.0	12.9	13.8	14.6	15.0	15.0	15.0	13.1	12.8	13.1	13.3	14.0	16.1	17.8	19.2	19.5	17.4	14.0	11.3	9.4	8.4	8.5	9.6	13.6

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 70 Victoria Z = 53,000 γ + **August** 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	300	300	315	307	339	311	308	289	247	134	191	227	256	266	264	265	265	267	274	278	283	289	301	315	275
2	319	307	301	295	296	290	289	289	289	289	287	285	277	285	286	286	286	281	273	278	281	282	288	296	289
3	296	293	291	289	290	282	286	283	284	282	283	280	271	272	278	280	279	276	273	274	278	283	297	298	283
4	297	295	291	288	288	288	287	281	279	283	279	278	283	285	285	281	277	267	261	264	270	274	284	290	281
5	290	291	290	287	288	286	282	262	279	280	263	249	262	277	282	283	282	276	273	270	272	276	282	290	278
6	296	296	294	288	287	295	312	301	273	275	276	268	239	252	269	271	272	272	273	272	273	269	278	293	278
7	301	308	298	296	294	290	292	290	286	284	273	267	255	265	275	276	270	264	268	273	274	281	286	292	282
8 D	297	306	329	311	301	298	280	278	215	243	269	275	260	251	245	264	264	254	261	263	270	275	284	293	275
9	301	314	328	308	296	296	280	273	256	261	246	266	278	277	276	285	286	284	283	284	281	281	284	287	284
10	294	297	295	300	291	288	290	280	269	274	266	262	267	275	285	286	283	274	271	271	268	270	279	283	280
11 Q	286	289	289	289	289	287	286	284	283	283	283	282	282	284	286	287	285	274	269	270	276	276	284	290	283
12 Q	287	284	281	285	286	284	281	282	281	282	283	281	279	279	279	279	275	270	261	263	270	271	275	281	278
13 Q	286	288	285	284	282	281	282	281	281	280	279	274	276	279	282	281	275	270	262	262	263	268	275	275	277
14	282	284	287	288	290	286	284	284	285	283	283	280	277	277	279	279	276	272	266	266	271	274	279	287	280
15	291	292	289	287	292	283	254	271	219	254	275	282	285	286	286	283	275	267	267	269	267	270	281	293	276
16	308	327	336	311	302	304	298	270	286	289	289	289	290	294	293	292	289	281	270	269	275	280	287	297	293
17 D	299	302	300	296	291	290	293	282	279	286	284	282	271	284	285	284	279	272	264	264	264	274	285	290	283
18	285	288	290	290	289	278	242	249	264	260	275	282	284	281	275	273	268	260	259	267	272	277	287	298	275
19	300	301	295	295	288	282	257	262	257	262	251	266	280	280	274	274	274	271	266	264	267	277	285	297	276
20 Q	291	289	287	284	283	282	281	283	282	280	282	281	281	282	281	282	278	274	272	272	273	272	276	283	280
21	284	285	282	280	281	279	280	280	280	280	282	280	281	278	276	276	271	268	265	265	267	266	275	275	277
22 D	290	307	314	320	308	297	292	270	261	283	286	286	285	282	282	278	279	274	274	271	274	282	294	298	287
23	299	296	298	302	293	288	279	278	276	277	273	261	274	275	281	279	276	274	269	272	278	280	289	291	282
24	297	293	297	295	293	292	286	262	259	270	267	263	263	243	258	262	260	257	261	263	261	268	277	289	272
25	293	299	290	289	285	283	284	277	263	267	275	280	283	285	286	286	280	275	275	273	275	282	292	298	282
26	294	290	289	285	286	285	279	277	276	270	275	272	268	270	277	281	276	272	269	271	272	276	284	288	278
27	292	290	288	283	282	281	275	273	274	277	277	278	279	280	283	281	278	273	271	275	276	276	282	287	280
28 Q	288	285	282	282	283	281	281	280	279	280	279	279	278	278	279	278	277	272	270	269	271	271	275	282	278
29	283	282	280	280	280	285	287	291	292	286	274	281	284	285	285	282	277	273	266	254	266	275	283	289	280
30	292	292	291	287	287	287	278	275	278	282	283	281	275	269	269	276	267	263	265	276	284	289	294	293	280
31 D	298	296	312	327	319	321	310	272	215	251	258	276	251	259	275	281	279	276	276	282	270	290	291	292	282
Mean	294	296	297	294	292	289	284	278	269	270	272	274	273	275	278	279	276	271	269	270	272	277	284	291	280

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 71 Victoria H = 18,500 γ + **September 1962**

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	302	293	301	306	307	301	288	278	279	297	310	313	311	319	315	311	306	277	287	307	292	282	297	306	300
2 D	308	310	307	274	270	281	312	277	298	323	307	301	307	293	310	303	309	295	274	279	268	281	285	304	295
3 D	303	294	266	277	294	308	297	304	309	312	269	311	322	324	315	321	317	300	270	257	290	275	290	271	296
4 D	268	283	289	272	267	305	304	287	285	304	269	286	303	308	299	290	272	285	275	265	268	278	291	298	286
5	297	293	297	292	293	289	291	299	291	306	292	302	312	309	308	295	286	287	290	288	285	286	287	290	294
6	263	285	283	278	284	284	257	288	302	307	306	284	308	308	311	309	294	274	266	267	270	276	278	290	286
7	296	297	286	272	287	291	300	306	303	290	300	306	313	311	313	311	300	283	281	280	287	300	306	304	297
8	295	311	298	273	292	303	305	299	275	271	293	306	306	313	316	314	305	293	289	289	296	304	313	312	299
9	306	297	295	297	301	301	308	313	314	317	317	311	318	316	313	308	302	301	290	282	287	295	300	308	304
10	297	301	286	300	295	298	291	303	301	304	309	311	313	318	316	306	290	283	284	291	299	310	319	321	302
11	310	301	304	309	312	312	313	313	309	307	313	313	313	317	312	301	287	280	272	278	292	303	316	318	304
12 D	322	321	318	318	321	329	311	370	278	292	260	318	318	306	300	289	254	234	198	211	247	283	291	285	291
13	286	293	291	292	294	294	293	288	305	301	306	304	304	305	301	284	274	235	232	246	289	300	309	308	289
14	308	298	294	298	317	307	303	311	302	302	308	311	314	312	311	301	281	267	274	278	287	297	310	317	300
15	313	306	308	301	305	295	319	329	305	306	306	314	317	318	317	311	300	281	274	263	284	302	318	311	304
16	305	305	306	304	301	307	307	306	309	311	316	313	315	318	317	309	300	279	275	273	266	273	301	305	301
17 Q	310	306	308	308	306	305	317	310	311	312	337	315	317	316	320	312	299	286	280	282	290	295	301	296	305
18 Q	304	309	306	306	310	307	308	309	310	308	312	313	317	315	318	309	296	289	284	280	284	292	304	311	304
19 D	313	318	318	313	306	285	262	264	272	293	302	293	302	309	297	290	271	279	253	232	268	286	279	269	286
20	260	265	281	293	300	297	298	307	302	306	304	299	302	305	300	297	291	281	286	286	292	296	302	302	294
21	304	296	296	299	309	297	308	300	303	304	305	306	307	307	310	306	291	301	309	301	301	307	312	313	304
22	315	295	297	292	294	299	303	309	321	308	290	304	313	306	292	304	301	294	288	292	295	312	316	318	302
23	316	304	299	302	311	321	301	306	305	310	308	308	311	309	302	297	295	288	290	297	306	310	311	310	305
24 Q	306	307	302	297	307	313	303	310	309	310	310	312	312	311	309	306	302	299	292	293	291	298	304	307	305
25 Q	306	306	305	308	305	309	308	309	311	316	322	323	318	316	306	294	297	303	299	303	305	305	303	301	307
26	301	271	246	260	270	269	272	283	296	292	294	295	301	308	312	291	256	287	298	283	281	294	299	302	286
27	299	286	290	296	293	301	292	290	295	299	299	298	303	309	307	297	287	289	290	290	293	301	299	308	297
28 Q	307	304	293	297	304	304	301	302	305	309	310	312	314	319	314	314	302	306	313	311	312	312	305	302	307
29																									
30	279	289	278	279	266	255	261	261	262	268	279	291	299	310	312	309	308	306	300	295	294	302	304	309	288
31																									
Mean	300	298	295	294	297	299	298	301	299	303	302	306	311	312	309	303	292	285	280	279	287	295	302	303	298

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 72 Victoria D = 22° 30.0' E + September 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	13.7	15.6	14.8	13.3	13.0	13.1	24.1	15.0	12.5	17.0	15.6	14.5	16.2	16.8	16.1	14.9	15.2	11.8	6.8	7.3	7.8	7.8	9.8	12.3	13.5
2 D	13.5	13.6	14.0	17.8	25.5	15.7	12.8	14.5	13.9	15.6	14.5	12.9	10.5	13.2	14.4	16.6	21.2	19.7	14.6	10.3	9.6	9.2	9.3	10.8	14.3
3 D	12.5	13.9	20.7	18.2	22.8	16.9	13.7	11.2	9.7	11.3	5.5	10.5	18.4	17.4	15.6	18.7	17.6	18.3	14.0	5.7	7.0	8.6	7.2	14.6	13.8
4 D	11.4	11.3	12.5	27.9	23.1	18.7	12.4	20.4	15.5	15.5	7.4	14.0	16.7	18.3	17.1	18.6	19.1	18.0	15.0	11.5	10.6	9.7	8.9	11.1	15.2
5	12.6	14.6	14.6	17.9	15.1	17.8	14.9	14.0	7.5	14.2	14.9	13.5	13.3	15.3	15.1	11.4	11.6	12.1	11.7	10.5	11.3	9.8	9.5	10.1	13.1
6	12.4	12.8	12.9	15.4	19.7	18.1	21.7	18.4	15.0	12.9	11.3	9.7	13.3	14.6	16.3	18.9	17.6	14.8	12.0	11.9	10.1	9.3	8.9	10.1	14.1
7	13.6	14.0	15.2	19.9	15.0	15.4	12.9	18.4	17.3	14.1	16.1	12.5	15.4	12.8	14.9	17.9	18.8	18.0	14.4	10.5	8.3	9.7	10.8	11.8	14.5
8	13.5	13.3	13.1	16.4	13.0	12.4	12.5	17.3	21.4	18.4	13.7	15.1	15.1	15.0	15.0	16.6	17.5	17.0	13.6	12.2	11.0	10.8	10.7	11.5	14.4
9	12.8	13.6	12.5	12.7	13.7	16.9	12.9	12.3	12.7	13.2	13.6	14.7	17.4	20.0	20.0	20.7	18.8	14.5	12.2	10.9	9.2	8.6	9.9	11.4	14.0
10	11.8	10.8	11.5	19.9	19.9	12.9	12.4	13.4	17.3	17.4	15.0	14.3	15.4	15.7	17.5	20.3	20.9	17.7	13.7	11.0	9.5	9.3	9.8	11.8	14.6
11	12.6	13.0	12.8	12.0	12.1	12.1	12.9	12.5	14.2	8.4	10.0	18.1	17.6	18.1	19.4	20.0	19.2	17.2	15.2	12.7	10.7	9.7	10.8	12.5	13.9
12 D	13.8	13.5	12.6	11.7	11.1	11.2	13.0	11.1	22.6	13.8	10.3	14.1	19.4	21.7	21.6	20.9	20.1	14.3	13.1	8.8	5.3	8.7	7.5	9.7	13.7
13	10.8	11.7	12.5	12.5	13.3	17.7	17.5	17.2	7.9	12.0	14.1	15.6	13.7	14.9	17.8	18.7	19.2	15.2	8.8	5.6	9.3	8.4	9.6	12.4	13.2
14	13.8	14.7	14.2	14.8	17.7	15.2	15.7	14.6	14.8	13.6	14.0	15.0	15.1	17.1	19.0	21.0	21.9	18.7	13.9	10.6	8.3	8.6	10.6	12.5	14.8
15	13.6	14.9	13.5	17.2	20.7	12.7	18.1	10.5	11.8	13.0	12.6	14.2	15.6	16.5	18.5	20.1	20.8	18.5	14.0	9.9	5.9	7.3	9.5	11.9	14.2
16	14.4	14.4	14.0	14.1	15.2	13.3	13.1	13.3	13.2	13.2	11.7	15.1	15.3	17.3	19.0	19.4	20.4	17.5	12.0	10.5	9.4	7.6	7.5	10.6	13.8
17 Q	13.1	13.5	13.3	13.3	13.3	16.0	15.5	11.9	12.8	12.9	13.4	13.9	12.9	13.2	17.9	20.4	20.9	18.1	14.9	11.7	10.7	10.2	10.8	12.0	14.0
18 Q	12.9	13.5	13.3	13.0	13.1	13.0	13.6	13.8	13.6	13.0	13.7	13.6	14.5	15.8	17.4	19.2	19.9	17.4	15.2	12.9	11.2	9.5	9.4	8.5	13.8
19 D	10.4	10.9	10.8	11.4	9.8	13.6	16.9	19.3	5.9	10.4	14.4	12.7	15.8	17.8	17.1	19.0	19.2	14.0	13.8	10.2	8.4	9.9	7.9	12.4	13.0
20	16.0	13.5	13.0	16.5	14.6	12.2	12.5	11.1	13.8	13.2	13.2	10.4	14.4	16.8	17.8	17.6	18.6	16.8	14.4	12.4	11.3	11.4	11.8	12.3	14.0
21	12.0	12.3	12.1	12.1	11.4	11.5	14.9	12.5	12.8	13.1	14.5	14.6	14.0	15.9	12.4	14.2	10.4	10.0	9.5	9.1	8.9	9.6	10.2	11.0	12.0
22	10.4	10.9	12.2	15.6	14.7	12.7	11.6	12.2	11.3	14.9	11.0	10.6	16.1	16.4	13.8	15.2	14.6	13.3	11.5	8.5	9.0	9.3	10.5	11.6	12.4
23	11.6	13.4	16.0	18.0	17.6	11.6	13.2	9.4	8.2	13.3	14.4	10.1	14.9	14.6	15.4	16.6	16.3	14.8	12.4	11.0	10.4	10.6	11.3	11.9	13.2
24 Q	12.4	12.2	12.1	11.8	13.7	12.1	13.0	13.1	12.7	13.1	13.2	13.5	13.8	14.5	15.4	16.4	16.6	15.9	13.8	11.0	8.9	7.8	9.3	11.1	12.8
25 Q	11.4	12.2	12.1	12.5	12.4	12.6	12.5	12.9	13.1	13.1	13.4	14.2	16.0	15.2	16.0	15.7	14.1	12.0	11.9	10.5	8.9	9.0	9.8	9.9	12.6
26	10.5	10.9	13.7	17.0	15.6	12.9	13.6	15.0	10.5	13.4	13.8	11.3	11.6	14.2	17.0	17.5	16.4	11.9	12.2	10.5	9.3	9.6	10.8	12.4	13.0
27	12.1	14.9	15.5	13.1	15.6	14.7	13.2	12.5	13.3	13.4	10.3	9.6	11.5	14.9	16.2	15.4	14.3	15.5	13.9	12.9	12.0	11.7	11.8	12.2	13.4
28 Q	12.5	13.3	16.4	14.0	12.6	12.6	12.7	12.9	13.4	13.6	13.4	13.3	12.8	13.8	14.7	15.7	14.8	10.9	12.0	10.8	10.6	10.2	10.4	11.9	12.9
29	11.1	11.4	11.4	13.2	13.1	17.1	17.9	19.4	15.7	20.6	8.9	14.6	17.4	12.9	12.5	14.3	12.4	11.4	5.9	6.1	5.5	8.6	8.9	9.9	12.5
30	13.0	11.7	13.8	11.2	11.2	13.9	14.3	15.7	14.5	18.7	13.1	13.7	10.9	10.8	11.8	14.2	16.9	17.1	15.2	12.8	10.0	8.5	9.4	10.0	13.0
31																									
Mean	12.5	13.0	13.6	15.1	15.3	14.2	14.5	14.2	13.3	14.0	12.7	13.3	14.8	15.7	16.4	17.5	17.5	15.4	12.7	10.3	9.3	9.3	9.8	11.4	13.6

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 73 Victoria — Z = 53,000 γ + — September 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	293	291	293	288	288	288	285	267	255	250	281	293	295	297	283	267	259	248	251	259	268	281	292	299	278
2 D	295	292	289	304	314	307	282	266	249	253	256	254	247	207	240	233	255	263	269	273	276	289	295	301	271
3 D	297	298	307	317	300	276	289	281	261	255	190	202	265	273	268	277	276	269	268	273	283	288	300	325	276
4 D	315	306	305	315	310	297	246	270	268	258	199	215	250	276	286	287	287	291	282	283	289	293	292	293	280
5	297	297	298	298	296	296	294	291	266	249	258	281	284	281	272	253	247	250	258	268	275	277	285	295	278
6	301	308	305	306	302	283	268	278	289	290	268	233	247	268	272	280	277	275	275	285	289	299	305	306	284
7	305	300	300	303	303	300	297	288	260	261	253	274	285	282	285	289	289	284	284	283	285	293	299	299	288
8	297	300	305	316	308	298	294	290	271	272	272	277	285	292	291	289	285	283	280	284	286	291	298	302	290
9	301	298	298	298	298	298	294	292	291	290	289	282	269	269	274	275	272	270	273	283	292	294	299	309	288
10	305	306	302	314	303	304	311	305	299	303	291	297	295	297	297	294	292	282	278	281	286	291	294	294	297
11	297	291	290	291	291	290	292	293	295	276	258	284	290	292	292	288	285	285	282	283	282	290	296	296	288
12 D	292	287	289	287	287	289	290	176	232	282	240	280	303	298	296	296	286	277	266	277	295	308	303	307	281
13	313	301	296	297	297	300	300	292	282	289	296	289	290	284	288	281	281	275	277	286	301	296	296	296	292
14	295	294	293	295	292	289	287	276	271	289	290	289	289	289	289	289	285	279	280	279	283	289	296	294	288
15	291	290	289	291	290	292	293	266	282	289	288	286	289	289	290	292	290	280	278	273	279	290	296	296	287
16	294	289	289	290	291	292	291	292	293	292	288	285	285	285	289	291	289	281	279	279	281	291	302	301	289
17 Q	298	292	289	289	289	290	286	286	290	289	290	289	287	283	285	287	282	275	275	281	284	288	294	293	287
18 Q	289	286	286	285	285	284	287	287	288	288	288	288	286	286	288	287	283	277	274	276	281	284	289	291	285
19 D	287	285	284	285	291	315	330	296	229	261	288	288	285	294	286	281	280	273	270	280	294	294	298	309	287
20	319	321	311	310	300	294	294	287	286	283	285	272	282	287	288	290	290	290	286	287	291	294	293	292	293
21	295	292	292	291	294	293	293	291	293	293	291	291	289	284	280	274	270	268	273	274	277	285	291	293	286
22	297	290	302	309	304	300	303	296	282	278	274	268	282	282	275	278	275	274	275	278	281	290	293	294	287
23	295	293	295	297	297	275	284	285	272	276	279	273	278	284	287	288	288	284	279	278	281	283	288	292	285
24 Q	290	292	292	291	294	288	290	289	288	287	286	286	285	287	287	289	286	280	275	274	273	277	281	285	286
25 Q	285	284	286	287	286	287	286	285	286	286	283	279	277	282	283	285	281	276	277	279	279	280	278	277	282
26	283	295	325	367	316	312	312	301	275	284	290	288	280	285	284	282	276	277	278	276	286	293	296	294	294
27	293	295	296	295	294	290	289	291	288	280	276	272	273	281	285	286	281	281	279	284	285	289	291	294	286
28 Q	289	290	291	293	291	290	290	289	289	288	286	286	283	280	280	281	279	276	275	275	276	277	280	286	284
29	290	293	294	295	294	292	292	283	279	273	268	251	268	275	272	275	275	274	274	275	283	292	306	313	283
30	312	310	312	310	319	324	323	313	309	297	293	267	258	257	278	283	292	293	290	285	284	288	289	292	295
31																									
Mean	297	296	297	300	298	294	292	283	277	279	273	274	279	281	282	282	280	276	275	278	284	289	293	297	286

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 74 Victoria H = 18,500 γ + October 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	301	282	296	294	282	295	281	263	266	280	285	266	312	314	302	293	288	259	274	274	199	256	275	293	280
2	295	275	280	286	288	283	287	294	292	296	296	295	293	285	277	295	280	255	273	278	280	286	291	291	285
3	294	297	300	300	298	297	296	295	290	288	293	299	304	299	296	306	296	289	282	283	292	297	295	295	295
4 Q	289	290	283	277	282	294	293	294	296	297	303	305	306	308	308	308	296	280	271	278	282	294	287	291	292
5	299	306	304	308	307	303	301	310	312	315	322	320	321	321	318	314	306	296	273	263	248	280	297	291	301
6	295	294	259	268	266	263	285	293	301	302	303	307	308	302	301	307	300	291	283	286	287	292	286	291	290
7	299	305	303	289	290	305	298	296	304	300	310	313	315	313	311	309	300	289	288	293	302	310	291	307	302
8 D	309	298	287	296	300	301	299	313	316	314	299	308	313	307	308	310	303	284	271	285	293	290	292	288	299
9 D	276	243	272	298	292	294	295	320	314	294	305	304	275	282	292	291	283	282	278	279	289	287	287	291	288
10	286	299	298	300	312	313	305	302	303	306	300	300	304	312	312	296	278	273	268	263	290	301	296	290	296
11	293	295	299	298	329	288	288	301	300	307	301	308	307	292	310	306	293	285	280	288	275	280	291	299	296
12 Q	303	295	307	307	304	303	306	316									295	281	282	282	289	299	306	309	299
13	310	310	315	314	311	308	309	306	307	314	310	302	291	308	305	295	285	272	257	262	270	284	300	300	298
14	284	270	289	294	286	306	291	263	295	295	281	304	303	302	291	288	291	273	242	240	264	282	295	304	285
15 Q	308	306	306	300	297	303	300	294	290	303	301	309	311	308	303	294	288	278	276	274	280	289	297	294	296
16	292	301	305	304	306	306	304	304	309	310	306	240	277	298	295	307	301	285	267	270	281	284	293	290	293
17 Q	292	303	306	297	296	300	298	305	302	301	306	299	304	309	307	301	293	284	278	286	286	291	295	297	297
18	293	290	264	265	286	297	296	300	305	304	308	308	313	312	304	302	300	279	273	276	295	298	296	302	294
19	308	315	317	319	314	316	307	312	340	314	302	307	273	290	316	298	291	293	289	279	272	270	291	294	301
20	295	303	307	304	304	305	307	310	309	308	310	312	313	312	298	298	297	296	292	297	305	301	305	299	304
21	303	306	299	306	319	306	302	309	305	308	311	310	309	312	313	307	304	278	278	285	300	305	299	295	303
22	297	304	299	287	281	271	277	282	297	300	312	300	321	328											297
23	309	305	266	282	295	308	302	306	305	315	311	300	315	304	305	304	303	294	288	292	281	273	296	305	298
24	312	302	294	285	294	301	299	310	306	308	315	316	309	308	310	305	302	271	240	260	272	274	277	282	294
25 D	283	298	304	298	285	297	292	289	304	310	299	287	300	308	319	301	272	293	271	266	254	261	274	290	290
26 D	295	288	291	293	316	306	304	284	287	266	288	282	297	284	261	284	272	272	227	239	244	267	286	294	280
27	291	295	284	288	294	314	297	280	294	289	299	296	281	308	282	286	297	290	276	287	280	290	295	288	291
28	295	297	303	300	310	296	303	316	311	299	294	298	301	302	294	293	287	278	273	266	270	280	283	300	294
29	301	298	289	292	299	302	300	300	297	303	308	303	300	308	308	305	297	281	287	290	287	289	297	293	297
30	298	305	309	300	286	291	299	299	303	300	302	299	310	310	309	304	299	291	286	288	285	291	302	302	299
31 Q						289	300	298	296	300	302	296	312	311	316	316	309	303	286	284	288	286	289	302	299
Mean	297	296	294	295	298	299	297	299	302	302	303	300	303	305	302	301	294	282	274	276	278	286	292	296	295

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 75 Victoria D = 22° 30.0' E + October 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1 D	10.9	12.6	12.1	12.4	18.9	14.6	11.4	20.3	24.5	12.8	18.8	13.7	8.1	14.4	12.6	12.7	10.9	9.5	8.2	11.3	12.2	7.4	10.7	12.0	13.0
2	13.4	16.4	26.4	18.1	13.1	20.2	19.3	10.3	14.2	14.1	7.5	10.6	6.8	5.0	10.9	14.9	14.3	11.1	10.7	13.0	12.6	11.4	11.4	11.9	13.2
3	12.7	13.4	13.3	13.8	17.3	14.8	13.6	14.5	15.3	17.2	16.8	16.0	14.0	9.1	8.8	15.3	15.4	16.1	14.6	11.9	9.5	9.3	9.9	11.4	13.5
4 Q	11.5	12.2	12.8	16.5	16.7	14.6	15.1	18.7	17.6	18.4	16.7	14.4	12.2	13.2	15.0	16.5	17.7	14.6	9.8	7.6	7.8	8.5	9.6	11.0	13.7
5	12.0	13.1	13.1	13.5	13.1	13.8	13.0	12.8	12.7	13.0	12.1	13.6	13.7	14.8	16.0	17.3	16.0	16.6	12.9	8.4	6.6	5.9	9.4	10.4	12.7
6	12.1	10.0	16.1	14.2	15.7	16.0	15.0	10.0	12.0	12.3	13.0	13.0	12.6	12.0	7.3	15.5	17.0	16.5	14.0	12.0	11.0	10.8	11.2	10.7	12.9
7	11.6	12.3	12.5	13.0	14.1	13.4	12.7	14.3	15.0	9.5	13.7	14.0	14.3	13.7	14.6	15.5	15.5	14.5	13.1	13.2	12.2	9.7	10.4	8.0	12.9
8 D	7.4	6.5	9.7	11.4	11.3	11.8	11.8	13.7	13.4	16.2	16.2	14.0	14.9	18.1	18.7	18.4	18.1	17.1	11.1	10.5	9.6	9.0	10.0	8.0	12.8
9 D	14.0	11.2	12.0	11.4	19.6	13.0	13.6	18.3	15.8	16.3	12.0	13.5	8.0	6.7	10.5	12.1	16.3	15.8	14.0	12.1	10.6	9.7	10.7	9.7	12.8
10	13.7	10.4	11.3	12.2	15.4	12.9	12.8	12.2	13.5	9.7	11.7	12.4	6.9	16.5	16.4	16.2	15.8	14.1	12.7	11.0	9.6	10.0	10.8	12.1	12.5
11	11.2	12.8	13.9	18.7	18.2	19.5	13.4	9.6	9.0	13.2	10.7	12.3	12.5	9.6	14.6	17.1	17.0	16.0	14.3	11.9	10.7	10.8	11.6	10.7	13.3
12 Q	11.7	11.7	12.3	11.4	11.9	12.4	13.2	13.3									15.1	14.4	13.5	11.6	10.8	10.4	11.0	11.6	12.3
13	12.0	11.9	11.8	12.0	11.6	11.9	12.2	12.5	13.1	15.2	12.3	20.0	12.0	11.0	14.7	16.1	16.7	16.2	14.2	10.5	8.2	7.5	7.8	8.0	12.5
14	10.5	9.9	10.5	11.4	13.9	25.1	21.2	13.2	11.3	12.7	4.1	8.2	16.5	15.7	14.8	15.2	16.2	15.8	12.6	9.3	8.0	9.1	9.8	11.3	12.8
15 Q	11.8	12.0	12.4	11.7	13.1	11.9	12.8	15.3	12.9	12.3	11.4	12.5	13.8	14.2	14.3	17.1	17.9	17.7	16.0	12.4	10.2	9.7	9.5	9.2	13.0
16	9.9	11.9	12.1	12.7	13.0	13.2	13.1	14.0	13.2	13.1	13.4	2.9	14.2	16.3	13.1	17.7	18.4	17.6	13.9	11.7	10.7	9.7	9.4	9.3	12.7
17 Q	11.8	12.5	11.4	12.5	13.4	13.0	13.9	12.6	9.5	11.6	12.5	12.8	13.1	14.0	14.8	16.9	17.7	17.1	15.3	13.2	12.1	11.4	11.6	11.6	13.2
18	11.4	12.0	10.9	12.3	12.7	12.2	11.7	12.3	12.4	13.2	13.0	13.2	13.5	13.6	14.0	16.9	17.3	16.5	12.7	11.7	11.5	11.2	10.9	11.4	12.8
19	11.3	12.0	12.3	12.5	12.5	12.5	12.5	14.6	11.3	7.8	15.8	18.6	10.9	5.6	13.1	14.6	14.4	15.2	15.0	12.9	11.0	10.4	10.9	10.9	12.4
20	11.1	11.9	12.7	12.5	13.1	13.3	13.2	12.2	12.7	13.1	13.4	13.7	13.1	13.3	13.7	13.7	14.7	15.4	14.4	11.1	10.2	9.6	10.2	10.6	12.6
21	11.1	11.3	14.7	16.2	16.2	13.2	12.4	12.5	11.7	10.0	11.6	12.8	11.0	11.2	10.9	12.7	14.6	12.8	7.3	6.3	7.2	9.7	11.1	12.2	11.7
22	12.0	12.8	14.1	15.0	15.9	17.0	16.5	15.0	12.0	11.0	12.1	19.0	16.3	11.2	16.2	16.7	16.5	15.9	13.8	12.1	11.1	11.0	14.1	11.8	14.1
23	11.5	11.3	16.8	14.1	16.8	13.2	13.4	15.1	12.9	12.9	14.2	12.4	12.7	14.3	10.7	6.6	10.7	13.1	12.2	11.3	10.5	10.3	10.1	11.7	12.4
24	12.4	12.1	12.3	14.3	15.8	13.2	13.7	12.5	12.7	13.0	13.7	13.1	8.4	15.1	9.8	14.0	12.6	13.0	8.3	7.8	7.8	9.9	11.9	11.9	12.1
25 D	11.6	14.1	12.7	13.0	14.7	26.3	16.6	11.9	10.4	15.7	15.2	6.4	3.6	9.6	16.6	14.1	5.3	7.2	10.0	9.9	8.0	11.6	11.0	12.0	12.0
26 D	12.8	19.0	13.4	14.9	14.4	12.1	12.4	17.8	15.8	16.4	12.1	6.6	8.3	1.0	-0.3	6.6	10.3	9.9	12.1	5.9	7.9	10.6	12.8	14.2	11.1
27	14.4	15.0	18.4	14.1	18.8	18.8	22.5	15.8	12.5	8.7	9.6	12.5	5.6	8.9	8.8	6.8	13.0	14.5	11.5	10.6	10.3	10.4	11.0	13.1	12.7
28	12.1	14.6	13.0	19.6	16.1	13.1	13.4	10.7	10.8	13.0	10.3	9.9	10.7	12.7	12.9	15.5	16.6	16.3	13.4	11.0	10.7	10.7	12.4	11.8	13.0
29	12.7	13.0	15.1	17.4	14.0	13.0	14.1	16.3	12.1	9.2	9.9	13.4	11.3	11.2	14.6	16.5	16.5	15.2	13.5	12.6	12.1	12.0	11.6	12.2	13.3
30	11.5	12.0	13.0	13.0	16.1	14.4	13.3	10.4	9.1	15.5	10.8	7.2	8.9	12.5	13.3	13.3	15.4	16.1	12.9	11.4	10.2	11.1	11.8	11.0	12.3
31 Q						17.3	14.6	15.7	15.3	13.1	13.5	8.5	10.2	12.7	13.3	13.4	15.1	16.5	14.7	12.6	11.3	10.5	10.7	11.1	13.2
Mean	11.8	12.4	13.4	13.9	14.9	14.9	14.1	13.8	13.2	13.0	12.6	12.4	11.3	11.9	12.8	14.5	15.1	14.8	12.7	10.9	10.1	10.0	10.8	11.1	12.8

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 76 Victoria $Z = 53{,}000\ \gamma +$ October 1962

Day \ Hour UT		0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	D	293	297	303	303	305	299	259	255	255	241	205	174	204	247	267	272	277	272	283	283	285	319	323	322	273
2		308	304	312	308	304	298	291	263	271	283	268	264	246	245	251	281	282	283	286	287	286	289	293	297	283
3		296	294	293	292	292	288	289	287	261	258	256	262	278	274	263	283	288	287	284	283	287	292	295	298	282
4	Q	295	298	298	300	301	302	290	281	282	275	266	273	275	283	289	292	289	284	278	274	280	285	290	295	286
5		292	294	292	291	290	290	292	293	291	292	286	288	288	288	286	291	288	281	269	263	271	288	292	295	287
6		296	300	306	319	327	323	306	282	295	299	297	298	295	291	273	273	285	281	277	280	284	291	294	298	295
7		296	298	297	298	300	300	295	298	293	280	280	289	291	292	293	293	289	287	287	286	283	282	285	293	291
8	D	291	304	343	313	303	300	305	307	305	305	290	262	270	283	291	292	288	283	284	288	288	290	294	298	295
9	D	309	318	328	315	315	304	305	290	276	275	291	286	260	241	264	276	283	288	286	283	286	285	289	302	290
10		307	309	306	304	303	294	295	296	296	284	266	249	225	260	282	281	283	284	283	285	294	290	289	289	286
11		297	302	304	299	283	281	297	285	270	276	273	279	279	277	287	291	291	288	284	283	283	290	295	296	287
12	Q	297	299	302	299	299	298	298	296										292	288	282	284	286	288	287	293
13		287	288	290	290	291	294	296	296	296	291	264	251	254	262	262			260	279	279	282	287	292	295	281
14		297	302	307	307	309	305	281	283	297	284	230	232	262	278	282	292	295	288	281	285	295	303	304	303	288
15	Q	300	299	298	300	303	301	295	301	307	303	298	298	300	296	298	301	304	305	298	298	298	298	298	299	300
16		298	299	301	302	301	300	300	301	301	299	293	208	232	266	280	292	297	295	293	291	292	295	295	300	289
17	Q	300	306	304	307	307	307	308	292	306	287	293	302	300	300	300	304	304	303	301	297	296	298	299	305	301
18		301	304	315	334	329	320	314	308	305	305	304	303	303	301	302	303	302	297	294	291	294	297	298	298	305
19		297	297	299	295	295	296	297	298	270	221	255	275	258	245	265	262	278	280	282	283	288	294	301	300	280
20		298	300	301	299	297	297	297	295	297	297	296	294	293	293	291	293	295	290	277	276	281	286	290	292	293
21		293	299	304	304	298	295	298	294	289	285	286	288	289	287	288	285	290	284	280	283	287	291	293	297	291
22		296	300	299	302	305	308	308	305	298	282	252	261	274	254	240	261	275	283	285	285	288	292	297	302	286
23		302	300	304	313	311	306	300	298	295	284	275	254	267	273	277	277	277	282	282	282	281	288	295	296	288
24		297	298	298	300	304	302	300	299	296	294	287	270	254	261	273	278	285	280	280	278	282	289	300	298	288
25	D	300	307	299	295	295	299	291	280	264	252	263	255	220	218	253	267	263	266	263	268	275	290	298	295	274
26	D	293	301	303	301	295	292	288	285	264	226	233	216	206	212	187	216	245	257	264	275	280	298	303	297	264
27		292	293	298	299	298	286	277	285	285	272	273	266	240	255	252	258	269	276	276	283	287	294	289	293	279
28		291	293	294	295	291	292	290	280	267	262	259	265	273	276	283	283	286	286	281	280	284	290	295	292	283
29		289	290	291	293	296	294	290	284	281	278	270	278	276	276	280	286	285	283	285	282	284	285	290	287	285
30		287	289	289	287	291	295	292	277	265	265	265	251	251	265	269	270	271	277	278	282	285	290	289	287	278
31	Q						290	283	282	279	278	266	261	263	269	271	274	274	276	278	281	281	285	287	291	277
Mean		296	299	303	302	301	299	294	290	285	278	271	265	264	269	273	280	284	283	282	282	286	292	295	297	286

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 77 Victoria H = 18,500 γ + November 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1																									
2	299	305	303	301	308	309	307	311	311	310	317	315	299	315	314	311	314	303	287	287	280	274	278	271	301
3	284	299	300	302	300	299	302	293	295	308	291	305	313	300	299	305	301	311	301	289	279	280	283	290	297
4	295	304	307	307	298	307	305	303	300	290	302	300	307	309	303	290	308	303	294	287	276	271	299	303	298
5	308	312	316	317	314	308	296	301	290	302	302	306	305	308	313	311	307	303	298	292	290	293	301	311	305
6 D	315	323	320	322	303	310	311	312	312	320	316	319	318	319	318	310	314	304	276	284	277	255	279	302	306
7	309	298	285	309	296	301	305	311	309	309	304	306	294	303	311	309	309	305	303	299	295	297	300	299	303
8	305	314	316	316	310	310	312	311	312	311	308	313	310	311	311	310	305	309	305	296	289	296	304	310	308
9	310	305	308	310	307	307	306	307	309	309	311	311	311	310	310	312	307	299	297	301	298	298	296	301	306
10 Q	310	316	312	311	315	313	311	312	313	313	316	316	315	317	315	312	305	299	293	295	298	305	307	313	310
11	315	321	322	317	313	308	316	315	304	301	307	309	309	311	312	303	298	297	291	291	290	292	302	305	306
12 Q	309	310	311	310	309	310	308	306	308	309	310	311	312	314	311	305	300	289	282	284	291	303	310	312	305
13 Q	307	315	315	312	311	312	311	311	309	311	313	315	317	315	317										313
14	318	318	319	315	314	314	315	311	315	314	317	317	317	317	318	316	304	297	295	288	283	295	304	311	310
15 D	315	320	319	318	318	319	299	310	306	306	309	289	293	305	299	295	285	276	263	262	274	269	268	281	296
16 D	279	295	291	297	297	285	297	287	281	292	286	277	294	307	299	277	281	262	256	256	264	278	287	286	284
17	295	307	303	301	306	307	305	304	297	300	304	303	304	303	299	299	295	295	288	282	283	294	301	306	299
18 Q	313	315	315	313	313	312	310	310	309	308	309	311	312	311	311	307	303	304	301	298	298	301	308	309	308
19	311	317	316	316	315	315	313	314	314	314	311	315	313	316	316	313	311	314	310	304	295	295	304	308	311
20 Q	316	320	321	320	318	322	315	322	316	322	323	324	322	326	321	320	319	319	320	315	313	316	316	317	319
21	326	323	318	307	307	300	290	275	281	289	294	297	290	314	318	306	304	298	300	307	304	310	315	306	303
22 D	311	308	292	286	280	295	267	277	278	274	279	305	302	313	304	296	295	298	281	293	288	279	301	301	292
23	296	298	293	299	303	297	315	293	287	298	293	297	305	298	303	302	301	298	298	295	291	297	292	297	298
24	300	306	311	307	306	306	306	303	287	308	308	298	301	314	310	306	309	307	292	302	300	299	302	301	304
25	300	303	301	295	301	307	314	306	298	298	292	310	299	314	310	307	296	291	297	294	292	295	306	309	302
26	302	301	313	311	309	311	309	307	309	308	311	307	312	309	313	310	306	302	296	291	297	303	308	309	306
27	306	305	306	301	296	294	303	316	313	307	308	309	312	308	313	317	307	308	305	301	290	299	307	308	306
28	305	310	310	308	306	301	306	304	306	303	301	310	313	317	319	320	314	306	305	304	303	305	306	310	308
29	310	313	313	312	312	311	311	312	308	309	301	306	310	311	314	313	313	314	297	288	302	307	315	321	309
30 D	319	313	276	272	274	280	261	277	268	265	276	295	301	298	298	306	303	300	301	298	298	295	295	300	290
31																									
Mean	306	310	308	307	306	306	304	304	302	304	304	307	307	311	310	307	304	300	294	292	291	293	300	304	303

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 78 Victoria D = 22° 30.0' E + November 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1																									
2	10.5	12.1	13.1	13.1	13.9	13.5	13.1	12.4	12.0	12.5	13.1	13.2	13.1	11.7	15.1	14.6	16.5	17.5	15.9	12.3	10.6	8.0	8.6	7.5	12.7
3	10.8	12.2	13.1	13.7	14.5	13.5	15.7	15.1	14.3	12.6	6.5	5.9	10.4	13.5	13.4	13.7	14.1	14.7	14.3	12.5	11.5	11.0	10.3	12.1	12.5
4	12.2	12.2	12.8	12.8	14.9	16.6	13.1	14.7	15.1	11.8	12.5	6.6	11.6	13.5	10.8	10.5	13.3	15.0	14.7	12.7	11.8	8.1	10.3	10.9	12.4
5	11.4	12.4	12.9	13.2	12.7	12.7	21.0	18.1	14.6	13.4	13.1	13.1	13.4	13.1	13.7	14.6	15.4	15.9	15.1	13.6	12.3	10.9	10.7	10.9	13.7
6 D	11.2	11.6	10.4	12.1	14.3	13.3	12.9	14.3	15.2	13.3	13.7	13.2	13.1	12.9	13.5	11.6	14.9	16.2	14.5	12.3	11.1	10.3	10.9	9.6	12.8
7	11.3	10.5	15.5	12.6	14.3	18.1	12.7	12.3	12.3	14.0	7.3	10.7	15.7	9.4	14.0	15.3	15.3	15.8	15.6	15.2	13.4	12.3	12.2	11.7	13.2
8	11.8	12.3	12.7	12.5	12.9	13.2	12.4	12.5	13.1	13.2	12.4	12.6	15.4	15.2	14.7	14.4	15.0	13.7	12.9	12.0	11.4	10.2	10.5	11.1	12.8
9	11.3	11.9	11.9	12.3	12.5	12.6	12.5	12.4	12.6	12.6	12.7	13.0	13.1	13.2	13.6	14.3	15.1	15.7	14.1	12.6	12.2	11.9	11.9	11.7	12.8
10 Q	11.6	12.0	12.8	12.6	12.7	12.3	12.7	12.4	12.5	12.5	12.1	12.9	13.3	13.4	13.9	14.8	15.8	15.5	14.6	13.4	11.9	11.5	11.6	11.7	12.9
11	11.8	12.5	12.9	12.6	12.7	15.4	17.0	16.8	14.1	10.7	11.8	13.1	11.8	14.4	15.6	16.3	14.9	14.2	13.1	11.7	10.8	10.6	11.1	10.8	13.2
12 Q	11.4	13.2	13.0	12.8	12.9	12.8	12.6	12.2	12.3	12.5	12.7	13.2	13.4	13.8	14.3	15.2	15.9	15.5	14.5	12.6	11.0	10.4	10.7	11.0	12.9
13 Q	11.5	12.6	13.2	13.1	13.1	12.8	12.5	12.4	12.2	12.1	12.0	12.4	12.8	13.2	13.8	15.4	16.6	15.7	14.2	12.6	11.3	10.4	10.0	10.9	12.8
14	11.5	12.0	13.3	13.8	13.3	13.1	12.6	12.2	12.0	12.0	12.5	12.7	13.0	13.5	14.3	16.2	15.2	15.3	13.6	12.7	9.7	9.9	10.3	10.9	12.7
15 D	11.4	12.3	13.0	13.3	13.3	15.4	11.1	11.2	13.1	12.0	11.8	7.7	6.1	24.9	20.3	21.0	20.4	17.7	14.0	8.8	7.7	6.0	3.4	7.5	12.7
16 D	9.2	10.5	15.5	14.3	14.6	18.1	17.8	13.9	13.0	11.3	7.5	4.1	8.2	14.4	15.5	14.1	14.2	12.5	10.1	9.7	10.5	11.4	11.1	11.1	12.2
17	13.1	12.2	12.4	15.6	13.6	13.2	13.1	12.9	12.7	12.5	12.3	11.7	13.1	14.3	12.1	15.0	16.6	15.9	14.2	12.4	11.6	11.1	11.1	11.5	13.1
18 Q	11.6	12.5	12.8	12.8	12.9	12.8	12.7	12.6	12.5	12.4	12.6	12.6	12.8	12.7	12.9	13.6	14.2	13.9	12.5	11.5	11.0	11.0	10.9	11.6	12.5
19	11.9	12.5	12.6	12.6	12.6	12.7	12.7	12.5	12.4	12.3	12.1	12.0	12.3	12.1	13.5	13.7	14.3	13.9	12.6	11.0	10.4	9.6	10.2	11.1	12.2
20 Q	11.6	11.9	12.2	12.4	12.5	12.7	12.8	12.1	11.9	12.5	12.4	12.5	12.8	12.6	13.4	14.0	15.0	14.6	13.8	12.8	12.3	12.3	12.4	11.9	12.7
21	11.5	12.1	12.8	13.0	13.0	13.4	24.2	22.1	17.3	13.7	15.5	14.7	12.7	10.6	15.2	13.8	12.3	10.1	8.3	5.0	7.4	8.3	10.7	9.7	12.8
22 D	11.6	11.0	12.4	14.8	20.2	18.0	19.5	16.7	11.8	12.2	12.5	9.2	10.1	14.3	15.1	13.7	13.9	11.5	11.2	9.8	8.7	11.7	11.7	12.8	13.1
23	13.1	13.9	16.5	18.5	17.2	14.2	9.1	10.2	8.5	12.6	8.0	8.0	14.0	12.6	12.6	15.0	15.1	15.3	13.8	12.5	11.4	11.3	11.7	12.8	12.8
24	12.5	13.4	13.6	14.4	16.0	13.7	12.8	15.0	10.3	15.5	13.2	8.8	7.8	12.0	15.2	15.6	14.3	13.6	9.8	9.4	9.8	11.3	12.7	12.7	12.7
25	13.5	13.9	14.8	15.2	15.5	14.1	9.7	14.9	14.5	8.4	6.1	14.3	12.2	8.3	14.7	14.8	15.6	16.0	13.7	12.3	11.1	10.9	11.6	12.1	12.8
26	12.6	13.7	13.6	13.4	13.2	12.9	12.6	12.1	12.3	12.4	11.6	12.0	11.9	10.3	13.4	13.9	15.7	15.0	13.4	12.0	11.2	11.0	11.9	12.2	12.7
27	12.0	12.8	12.8	14.3	14.3	13.5	12.5	9.3	11.7	11.8	11.1	13.2	12.5	12.6	12.9	14.2	15.0	10.1	10.1	9.5	9.3	8.9	10.7	11.5	11.9
28	11.9	12.7	13.3	14.1	13.7	14.8	13.9	11.6	11.3	11.6	12.1	8.2	14.0	14.9	15.5	14.3	14.1	12.1	10.1	9.7	9.6	10.6	11.2	11.9	12.4
29	12.5	13.3	13.4	13.2	13.2	13.2	12.4	12.2	12.3	13.0	13.0	15.6	17.5	15.9	15.5	15.2	14.3	13.6	12.6	10.5	8.5	10.0	10.5	11.0	13.0
30 D	11.1	11.0	11.9	16.3	14.8	24.7	19.7	18.0	17.6	8.8	10.7	17.8	16.1	10.8	9.7	14.8	15.7	14.6	13.5	11.8	11.5	11.0	10.4	12.1	13.9
31																									
Mean	11.3	11.9	12.7	13.2	13.5	13.9	13.6	13.2	12.5	11.9	11.2	11.2	12.1	12.8	13.6	14.1	14.6	14.0	12.7	11.2	10.4	10.1	10.4	10.8	12.4

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 79 Victoria — Z = 53,000 γ + — November 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1																									
2	287	287	285	285	285	282	283	283	282	283	271	264	265	269	274	280	283	282	273	275	275	280	287	292	280
3	300	297	293	290	289	287	285	280	275	274	263	248	250	257	267	274	277	279	275	272	275	281	288	292	278
4	294	291	289	288	286	288	282	281	272	263	257	246	252	263	260	263	272	272	271	271	275	280	284	285	274
5	285	286	286	283	283	284	289	277	283	283	284	287	287	287	287	288	285	286	280	274	276	276	280	282	283
6 D	282	283	282	285	288	294	287	284	279	278	276	281	279	280	278	276	275	271	261	266	269	272	281	285	279
7	286	288	294	291	290	295	288	284	283	281	260	240	248	257	262	277	278	279	277	275	273	271	277	276	276
8	278	280	281	280	281	282	282	282	280	279	275	268	269	276	275	280	280	280	272	265	267	270	277	281	277
9	280	281	283	283	283	282	282	280	279	279	277	277	278	279	280	282	284	283	278	277	275	276	278	280	280
10 Q	282	284	284	285	285	284	284	283	282	280	280	278	279	279	282	285	286	282	278	274	275	279	278	281	281
11	278	280	280	280	282	283	282	268	267	269	266	266	270	269	277	279	282	277	270	272	273	275	277	279	275
12 Q	277	282	282	284	285	285	284	284	283	283	281	281	281	280	281	284	285	282	283	283	283	285	285	282	283
13 Q	279	282	281	281	281	281	282	281	282	281	280	280	279	279	280	281	282	277	274	276	281	283	284	283	280
14	278	279	279	279	280	280	279	280	280	280	279	280	279	280	279	281	283	283	281	277	282	284	284	283	280
15 D	283	281	281	280	283	283	281	286	280	283	284	260	178	160	233	272	280	273	269	272	278	280	282	292	268
16 D	299	304	328	318	298	296	293	280	282	282	272	249	261	278	279	278	281	275	274	275	280	287	286	289	285
17	293	292	291	291	291	287	285	285	286	283	284	282	281	284	283	285	288	285	281	283	285	287	286	287	286
18 Q	287	287	287	282	282	282	283	281	281	283	283	283	283	284	283	284	282	281	277	274	273	275	281	281	282
19	281	284	285	281	281	281	280	279	278	279	279	281	280	280	280	279	280	277	273	274	273	279	283	283	280
20 Q	281	283	280	279	279	277	277	271	280	277	278	277	277	276	277	278	277	274	268	266	268	270	272	273	276
21	274	275	260	274	276	277	273	267	262	257	254	251	249	264	267	273	275	277	277	273	271	273	276	275	269
22 D	281	285	291	304	306	275	268	243	232	254	232	241	237	223	234	255	270	273	274	282	281	288	296	291	267
23	289	290	290	294	290	285	282	275	260	259	254	236	252	265	267	276	274	275	274	275	277	281	281	282	274
24	283	285	285	286	284	283	284	279	266	268	276	263	237	250	256	268	271	271	270	274	278	279	283	282	273
25	282	283	286	288	290	286	273	264	269	267	239	261	257	254	263	275	273	278	279	280	280	285	285	283	274
26	280	281	283	282	283	282	283	282	280	279	280	277	276	275	276	281	283	279	278	278	281	283	285	281	280
27	280	278	279	281	283	285	282	273	267	272	273	275	277	277	278	280	278	276	271	271	272	276	281	278	277
28	278	281	280	282	283	281	282	280	278	278	279	270	271	275	276	278	276	272	269	269	274	276	277	278	277
29	278	280	280	279	278	279	280	279	278	277	267	260	268	273	275	275	276	277	272	276	281	283	281	279	276
30 D	279	278	282	297	303	304	257	241	237	226	192	247	255	235	238	271	278	279	279	280	282	282	284	284	266
31																									
Mean	283	284	285	286	286	284	281	276	274	274	268	266	264	266	271	277	279	278	274	274	276	279	282	283	277

HORIZONTAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 80 Victoria H = 18,500 γ + December 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	305	303	295	299	302	304	302	300	301	306	306	308	307	311	310	301	302	303	298	285	292	296	301	308	302
2 Q	310	313	312	310	304	301	300	302	302	302	310	307	310	309	306	304	306	304	300	296	292	289	296	305	304
3	312	312	310	308	304	309	311	308	309	310	311	315	316	320	317	318	316	312	296	290	296	300	309	314	309
4	334	331	328	332	334	332	327	313	302	315	305	300	310	319	325	325	301	307	309	321	308	293	297	304	316
5	295	306	309	307	303	304	303	296	300	304	308	304	304	304	303	309	314	311	304	293	288	292	298	310	303
6 Q	313	310	311	307	306	299	300	304	311	306	308	309	312	310	313	316	313	309	301	294	296	305	307	311	307
7 Q	314	315	314	310	310	309	310	310	314	309	312	314	316	318	317	319	316	316	310	302	300	306	313	317	312
8	318	322	321	316	310	306	303	312	315	310	300	306	307	306	308	316	319	319	311	304	299	297	298	301	309
9	309	309	301	293	288	292	297	302	306	304	304	313	313	315	315	319	317	320	313	306	302	309	307	312	307
10	320	322	317	317	313	315	316	316	316	318	311	314	315	314	312	309	308	303	298	296	296	295	287	286	309
11 D	302	309	307	300	308	289	293	287	285	287	303	308	310	310	308	329	310	300	277	266	294	292	277	283	297
12	290	297	291	290	300	296	292	293	295	295	298	301	303	299	294	292	296	285	275	274	276	298	298	294	293
13	304	304	284	304	296	294	294	297	295	293	298	294	299	297	306	311	306	293	291	292	301	295	284	294	297
14	305	304	301	286	307	300	299	303	298	304	299	301	303	302	302	297	309	307	300	292	288	300	293	304	300
15	309	301	304	285	295	291	301	301	299	299	304	304	306	308	311	311	309	303	299	294	290	288	294	299	300
16	304	310	313	310	307	306	306	305	307	306	306	308	310	312	313	318	314	315	309	300	298	300	301	304	308
17 D	306	316	317	312	316	312	313	312	316	319	308	308	311	317	317	318	289	253	312	272	262	242	230	249	297
18 D	230	240	226	260	273	277	276	280	290	286	285	287	289	285	258	274	277	275	266	239	198	242	278	288	266
19 D	259	235	258	269	294	308	294	269	285	294	290	274	276	285	302	287	276	281	252	244	273	282	271	283	277
20 D	284	282	279	285	275	279	287	280	304	279	269	289	301	298	284	298	287	269	262	264	279	257	272	275	281
21	279	291	296	300	307	296	300	285	286	289	297	294	287	290	300	301	305	295	281	266	264	279	293	305	291
22	308	303	302	300	305	305	303	306	315	307	303	312	314	318	311	313	309	307	296	290	281	283	290	294	303
23 Q	305	311	307	302	303	304	303	310	310	314	304	311	317	318	316	321	320	316	311	300	297	295	295	301	308
24	304	302	302	308	308	302	303	295	298	298	306	310	310	308	314	306	308	311	308	311	294	298	307	312	305
25 Q	309	312	313	311	308	305	309	312	312	314	316	316	315	318	316	319	324	322	319	306	304	312	314	314	313
26	316	323	322	321	316	307	306	305	315	329	308	306	309	314	342	330	320	310	299	293	279	278	286	288	309
27	309	313	310	306	303	302	300	300	305	305	307	308	312	309	312	308	310	314	304	294	295	297	306	315	306
28	315	318	314	310	310	311	307	308	308	311	314	316	317	315	320	318	317	316	304	299	293	296	305	311	311
29	316	318	316	313	304	300	299	302	305	307	308	314	317	314	318	317	317	321	311	304	300	301	304	312	310
30	318	320	316	317	311	309	309	308	309	310	313	315	317	318	320	322	324	319	313	309	309	310	310	310	314
31	317	323	324	323	320	317	316	310	311	320	296	299	309	313	314	318	325	319	310	308	304	298	305	312	313
Mean	304	306	304	304	304	303	302	301	304	305	303	305	308	309	310	311	308	304	298	290	289	291	294	300	302

DECLINATION

Mean values for periods of sixty minutes, Universal Time

Table 81 Victoria D = 22° 30.0' E + December 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	12.8	13.3	14.2	13.9	13.4	13.2	12.8	12.7	12.3	10.1	11.5	13.4	13.3	13.9	13.6	12.3	12.7	13.5	11.5	10.7	9.4	10.3	11.0	11.7	12.4
2 Q	11.7	12.4	12.8	12.9	12.9	13.0	12.5	12.1	12.2	9.5	11.4	12.4	12.4	12.7	12.8	12.5	14.1	14.1	12.3	11.5	10.9	10.2	10.4	10.8	12.1
3	11.5	12.2	12.9	12.9	13.6	12.4	12.5	12.3	12.1	11.8	11.8	12.0	11.9	12.2	12.8	14.3	14.7	16.1	15.3	13.4	12.1	11.0	10.8	10.7	12.6
4	10.5	11.7	12.3	12.5	12.4	12.4	12.0	12.4	15.1	13.4	14.8	13.8	16.7	13.6	4.2	5.9	7.9	7.9	10.5	11.5	9.3	10.6	10.6	9.0	11.3
5	9.7	11.1	10.9	12.8	13.4	13.4	13.4	13.4	12.4	11.6	11.7	11.5	13.6	13.2	12.1	12.1	14.6	15.0	14.2	13.3	12.5	11.5	11.3	11.2	12.5
6 Q	11.4	11.8	12.1	12.9	13.0	13.0	12.9	12.8	12.0	11.8	12.0	11.8	12.3	12.6	11.9	12.7	13.9	14.7	14.2	13.5	12.4	11.2	11.4	11.4	12.5
7 Q	11.5	11.4	11.8	12.4	12.2	12.7	12.7	12.6	12.6	12.7	12.3	13.1	13.2	13.1	12.3	12.4	12.9	13.0	12.5	11.6	11.2	10.3	10.6	11.2	12.2
8	11.3	11.9	11.7	12.3	12.6	12.6	13.1	13.7	14.7	14.0	15.5	14.4	14.9	12.8	8.5	11.0	11.8	10.8	9.0	8.9	9.1	9.6	10.1	10.0	11.8
9	11.0	12.0	12.4	13.2	13.9	18.2	13.7	13.4	12.6	12.8	12.3	11.4	12.2	12.2	12.6	12.6	12.6	13.0	12.7	12.7	12.2	11.1	12.0	11.6	12.7
10	11.4	12.0	12.6	12.5	12.4	12.2	12.2	11.9	11.9	12.2	12.5	12.5	12.7	13.0	13.3	13.6	14.2	12.7	11.1	9.6	9.7	10.6	10.2	9.8	12.0
11 D	11.4	10.1	10.1	13.1	16.1	10.5	13.1	14.1	14.8	7.0	10.4	14.4	15.9	15.3	4.8	7.3	7.2	8.0	10.4	8.9	8.2	9.2	9.6	8.4	10.8
12	11.5	12.4	11.7	13.5	12.0	12.4	12.7	12.8	12.5	12.8	12.6	12.4	12.3	12.6	12.8	13.4	13.9	13.8	13.4	7.6	5.8	6.9	6.6	8.9	11.6
13	10.2	10.2	13.8	11.7	13.4	14.3	13.7	13.5	12.7	9.0	16.2	17.5	17.4	9.2	14.5	16.5	14.7	14.1	12.6	11.2	9.5	9.5	8.7	10.7	12.7
14	11.0	10.7	11.8	14.0	12.6	13.6	13.8	13.4	13.3	11.3	12.8	16.6	17.4	14.7	14.5	13.0	13.9	13.1	12.1	11.4	10.4	10.2	9.9	10.0	12.7
15	10.0	11.0	12.4	13.9	18.4	16.3	13.6	8.7	11.1	12.4	10.8	12.6	12.8	12.8	12.9	13.2	14.0	14.5	13.2	11.7	11.2	10.4	10.6	11.1	12.5
16	11.3	11.8	12.6	13.1	13.1	13.0	12.9	13.2	12.5	12.4	12.0	13.6	13.1	10.8	10.2	11.7	13.0	13.9	13.2	13.0	12.3	11.5	11.4	11.5	12.4
17 D	11.6	12.1	12.6	13.2	13.2	13.1	12.9	12.9	14.2	13.2	12.6	13.1	12.2	10.5	11.6	9.4	8.0	-0.7	-2.2	9.3	10.0	8.6	2.8	10.8	10.2
18 D	12.4	13.2	24.8	16.5	15.2	15.3	17.2	16.4	13.6	11.6	10.1	7.2	10.0	11.5	2.7	4.7	10.3	8.7	10.9	10.1	8.7	6.2	9.3	11.4	11.6
19 D	12.6	14.8	16.5	18.0	15.4	19.9	16.3	21.2	13.3	14.1	13.2	12.8	10.9	6.0	10.4	9.9	8.1	9.7	11.5	11.3	8.8	9.9	12.4	12.4	12.9
20 D	12.6	14.1	16.8	17.4	21.3	15.3	13.8	15.1	19.5	14.3	16.3	10.6	12.0	12.0	7.5	11.2	9.0	9.9	8.5	8.0	10.7	13.0	13.4	10.9	13.0
21	12.7	13.7	13.1	13.6	16.0	15.3	20.2	17.5	14.0	12.4	12.6	12.4	11.1	6.3	6.1	10.8	10.7	11.8	11.2	12.8	10.2	10.1	11.7	12.0	12.4
22	11.6	12.4	13.6	14.4	14.9	13.8	13.1	13.7	10.9	12.5	9.8	10.3	13.2	12.5	11.7	11.6	12.3	14.3	14.6	14.1	12.9	11.7	11.1	12.1	12.6
23 Q	12.1	12.2	12.8	13.1	14.2	13.6	13.2	13.1	13.0	12.1	13.0	12.7	11.8	11.7	11.9	12.7	13.4	14.2	14.7	14.5	14.3	13.3	12.4	11.9	13.0
24	11.6	12.2	12.6	13.0	12.6	12.4	12.3	12.5	13.1	12.9	13.0	12.4	13.6	12.0	12.4	11.2	13.1	13.8	14.3	14.1	13.3	12.2	11.8	11.4	12.7
25 Q	12.0	12.9	12.7	13.1	13.1	13.2	12.7	12.1	11.9	11.7	11.8	12.0	12.0	11.9	12.0	12.3	12.8	13.3	13.6	13.5	12.1	11.1	10.7	11.3	12.3
26	12.0	12.3	12.6	13.1	13.1	12.8	13.1	14.2	10.8	9.2	12.2	14.0	14.2	8.2	10.0	12.6	11.2	11.8	12.7	12.6	10.1	9.6	10.1	11.7	11.8
27	11.6	12.7	13.3	13.9	13.8	13.5	12.9	13.6	12.8	12.2	12.1	11.8	12.3	12.4	12.5	12.4	13.3	13.7	13.1	11.3	9.9	10.1	10.5	11.2	12.4
28	11.9	12.5	13.1	13.3	13.1	12.7	12.4	12.1	12.4	11.9	12.0	12.5	13.0	10.1	10.3	13.6	14.0	14.8	13.8	12.2	10.7	9.4	9.2	9.4	12.1
29	11.5	12.6	13.3	13.5	14.5	14.5	13.3	12.7	11.7	11.9	12.1	11.6	12.4	10.4	11.7	13.7	13.0	13.5	13.4	12.4	11.5	10.9	10.8	11.1	12.4
30	11.5	12.0	12.5	13.1	13.2	12.9	12.5	12.1	11.9	11.5	10.5	11.5	11.8	11.9	11.8	11.9	12.7	13.6	13.4	12.5	10.8	9.6	9.6	10.2	11.9
31	10.4	11.6	11.2	12.0	12.6	12.7	13.1	13.5	12.9	12.9	19.4	22.1	17.0	14.3	12.9	12.3	14.7	13.0	11.6	12.6	12.5	10.4	10.5	11.4	13.2
Mean	11.5	12.2	13.2	13.5	13.9	13.7	13.4	13.4	12.9	11.9	12.6	12.9	13.2	11.8	10.9	11.8	12.3	12.4	12.0	11.7	10.7	10.3	10.4	10.9	12.2

VERTICAL INTENSITY

Mean values for periods of sixty minutes, Universal Time

Table 82 Victoria Z = 53,000 γ + December 1962

Day \ Hour UT	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	283	283	281	284	281	282	281	282	281	276	272	275	278	279	279	278	275	273	273	274	279	282	285	284	279
2 Q	283	282	280	279	278	278	280	281	282	279	276	280	280	279	280	280	280	280	276	278	279	283	285	286	280
3	284	284	282	279	280	280	280	280	279	280	279	281	280	279	278	279	280	280	277	281	284	286	287	287	281
4	280	278	278	276	273	271	271	270	268	243	241	220	231	257	244	237	240	239	246	263	267	272	279	281	259
5	282	287	286	282	284	281	280	281	279	278	270	272	278	280	275	276	279	280	276	279	279	278	280	282	279
6 Q	287	287	286	283	283	283	283	283	280	279	280	282	282	281	282	284	285	283	280	277	279	279	281	281	282
7 Q	282	282	284	284	283	283	283	281	281	280	279	279	279	279	280	280	282	280	278	274	273	277	279	280	280
8	281	280	280	280	281	279	279	277	270	261	264	268	271	273	274	274	275	273	269	268	271	273	277	278	274
9	282	284	285	286	289	294	290	288	284	281	279	275	275	278	278	280	278	274	272	270	270	271	273	275	280
10	275	276	275	277	277	278	277	277	276	274	276	275	274	274	275	278	278	276	274	276	276	277	276	280	276
11 D	285	287	288	289	291	293	301	295	293	276	268	271	272	265	252	249	245	246	255	268	287	285	285	289	277
12	290	294	296	301	299	294	291	290	289	288	288	286	285	284	284	285	288	286	285	284	280	285	283	285	288
13	291	293	296	302	301	303	305	300	293	278	278	284	283	267	262	272	280	279	280	282	283	284	286	292	286
14	291	290	291	294	296	296	295	293	291	287	278	270	273	282	278	282	284	278	279	280	281	285	288	290	286
15	288	290	293	294	301	291	289	271	279	284	284	287	285	285	284	285	285	285	285	284	286	290	291	291	287
16	288	289	286	286	284	285	284	285	283	282	281	283	282	281	280	283	284	285	283	284	283	283	286	286	284
17 D	284	285	283	283	281	280	281	279	274	263	268	274	277	277	272	270	266	259	248	261	276	289	321	327	278
18 D	336	347	376	346	322	305	297	294	287	286	284	266	259	265	240	249	269	276	282	288	296	313	310	306	296
19 D	307	323	329	325	306	285	283	269	244	278	275	253	250	255	273	271	281	282	282	292	297	295	294	303	286
20 D	300	303	300	297	290	287	294	288	274	262	239	262	268	269	270	276	277	279	284	288	293	297	306	302	284
21	301	307	304	303	303	298	293	286	285	277	277	283	278	274	267	281	282	282	284	287	294	296	290	287	288
22	291	291	291	292	294	295	292	289	276	273	270	265	274	280	280	280	285	287	285	286	285	283	286	288	284
23 Q	293	292	291	292	293	292	291	287	283	281	281	281	280	281	283	284	285	286	283	282	279	281	282	282	285
24	285	287	288	286	287	288	286	287	286	287	285	281	279	282	279	282	285	285	284	281	278	279	279	282	284
25 Q	285	284	283	282	284	286	285	283	283	280	281	279	279	279	281	282	285	287	287	285	281	279	278	279	282
26	280	281	281	280	280	279	280	281	282	266	251	261	249	238	221	248	261	266	271	276	276	276	283	288	269
27	288	287	285	284	283	283	283	285	285	283	283	282	280	281	281	283	285	286	284	284	284	286	287	287	284
28	284	283	282	283	282	282	282	282	282	283	282	282	279	278	277	278	282	281	278	280	279	279	283	282	281
29	282	283	282	282	280	282	283	284	285	283	283	281	281	276	274	275	278	278	277	278	280	282	281	282	280
30	282	282	283	280	280	279	280	280	280	281	278	279	280	278	278	279	281	280	278	278	277	279	281	281	280
31	281	280	279	278	277	279	281	282	281	266	239	243	264	271	265	257	263	261	265	269	271	271	276	279	270
Mean	288	290	290	289	288	286	286	284	280	277	273	273	274	274	272	274	277	276	276	279	281	283	286	287	281

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (gammas) (All Days)

Table 83 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0–1	307	299	304	301	314	311	310	310	300	297	306	304	305	311	301	304
1–2	309	304	306	306	316	310	312	305	298	296	310	306	306	311	302	307
2–3	308	305	306	308	312	308	312	303	295	294	308	304	305	309	301	306
3–4	304	304	306	304	310	307	310	302	294	295	307	304	304	307	300	305
4–5	305	302	306	303	310	309	311	305	297	298	306	304	305	309	301	304
5–6	302	300	305	306	309	309	311	308	299	299	306	303	305	309	302	303
6–7	302	302	308	308	308	311	314	309	298	297	304	302	305	311	303	303
7–8	301	302	308	308	312	316	316	311	301	299	304	301	307	314	304	303
8–9	304	303	311	310	315	318	317	313	299	302	302	304	308	316	306	303
9–10	304	302	313	312	316	319	321	312	303	302	304	305	309	317	308	304
10–11	305	303	314	316	317	317	320	316	302	303	304	303	310	318	309	304
11–12	306	303	315	314	316	318	320	316	306	300	307	305	310	318	309	305
12–13	309	308	316	315	319	321	324	315	311	303	307	308	313	320	311	308
13–14	309	310	315	316	321	324	325	317	312	305	311	309	314	322	312	310
14–15	307	310	315	315	319	323	325	317	309	302	310	310	313	321	310	309
15–16	308	309	313	311	312	321	323	312	303	301	307	311	311	317	307	309
16–17	312	308	310	305	305	312	317	302	292	294	304	308	306	309	300	308
17–18	308	300	300	297	295	302	306	291	285	282	300	304	297	299	291	303
18–19	299	289	293	292	291	291	299	289	280	274	294	298	291	293	285	295
19–20	289	284	286	291	294	292	299	290	279	276	292	290	288	294	283	289
20–21	287	282	285	291	297	296	298	294	287	278	291	289	290	296	285	287
21–22	288	284	287	292	299	302	298	298	295	286	293	291	293	299	290	289
22–23	293	290	292	296	303	305	302	306	302	292	300	294	298	304	296	294
23–24	301	295	299	298	309	309	308	310	303	296	304	300	303	309	299	300
Mean	303	300	305	305	309	310	312	306	298	295	303	302	304	309	301	302

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (minutes) (All Days)

Table 84 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	14.8	14.8	13.3	11.6	10.3	10.7	10.8	11.0	12.5	11.8	11.3	11.5	12.0	10.7	12.3	13.1
1-2	15.4	15.1	13.8	12.4	11.9	12.2	12.0	12.0	13.0	12.4	11.9	12.2	12.9	12.0	12.9	13.7
2-3	16.3	15.6	14.6	14.2	13.6	13.2	13.0	12.9	13.6	13.4	12.7	13.2	13.9	13.2	14.0	14.5
3-4	16.6	16.2	15.1	15.3	14.4	14.3	13.8	13.8	15.1	13.9	13.2	13.5	14.6	14.1	14.9	14.9
4-5	17.6	16.6	16.0	15.7	14.1	14.7	14.5	14.6	15.3	14.9	13.5	13.9	15.1	14.5	15.5	15.4
5-6	16.8	16.6	15.7	15.8	14.4	14.8	15.0	15.0	14.2	14.9	13.9	13.7	15.1	14.8	15.2	15.3
6-7	17.0	16.4	16.2	16.4	14.7	14.6	15.5	15.0	14.5	14.1	13.6	13.4	15.1	15.0	15.3	15.1
7-8	16.9	16.4	16.3	16.2	14.8	14.0	14.5	15.0	14.2	13.8	13.2	13.4	14.9	14.6	15.1	15.0
8-9	16.5	16.4	16.4	16.0	14.8	13.9	14.4	13.1	13.3	13.2	12.5	12.9	14.4	14.1	14.7	14.6
9-10	15.8	16.3	16.1	16.0	14.8	14.6	14.6	12.8	14.0	13.0	11.9	11.9	14.3	14.2	14.8	14.0
10-11	15.9	16.6	16.0	16.5	15.3	14.5	13.9	13.1	12.7	12.6	11.2	12.6	14.2	14.2	14.5	14.1
11-12	16.3	16.4	15.8	16.8	15.5	15.2	13.8	13.3	13.3	12.4	11.2	12.9	14.4	14.5	14.6	14.2
12-13	15.7	16.7	15.6	16.8	16.5	16.4	15.7	14.0	14.8	11.3	12.1	13.2	14.9	15.7	14.6	14.4
13-14	15.3	16.8	16.6	17.2	18.1	18.2	17.2	16.1	15.7	11.9	12.8	11.8	15.6	17.4	15.4	14.2
14-15	15.4	16.6	17.5	18.3	19.6	19.2	18.6	17.8	16.4	12.8	13.6	10.9	16.4	18.8	16.3	14.1
15-16	15.5	17.0	18.4	19.0	21.0	20.4	19.9	19.2	17.5	14.5	14.1	11.8	17.4	20.1	17.4	14.6
16-17	17.4	18.2	19.7	19.7	20.7	20.4	20.5	19.5	17.5	15.1	14.6	12.3	18.0	20.3	18.0	15.6
17-18	18.6	19.0	19.6	18.7	19.6	19.8	19.7	17.4	15.4	14.8	14.0	12.4	17.4	19.1	17.1	16.0
18-19	19.2	18.1	18.6	17.1	16.6	16.7	16.6	14.0	12.7	12.7	12.7	12.0	15.6	16.0	15.3	15.5
19-20	18.2	16.0	16.4	14.9	13.5	13.1	13.6	11.3	10.3	10.9	11.2	11.7	13.4	12.9	13.1	14.3
20-21	17.0	15.0	14.9	13.2	11.7	10.4	11.4	9.4	9.3	10.1	10.4	10.7	12.0	10.7	11.9	13.3
21-22	15.0	14.5	13.6	12.2	10.3	9.4	9.9	8.4	9.3	10.0	10.1	10.3	11.1	9.5	11.3	12.5
22-23	14.3	14.3	13.2	11.6	9.5	9.1	9.5	8.5	9.8	10.8	10.4	10.4	10.9	9.2	11.4	12.4
23-24	14.2	14.4	13.2	11.4	9.6	9.7	9.9	9.6	11.4	11.1	10.8	10.9	11.3	9.7	11.8	12.6
Mean	16.3	16.2	15.9	15.5	14.8	14.6	14.5	13.6	13.6	12.8	12.4	12.2	14.4	14.4	14.5	14.3

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas) (All Days)

Table 85 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	306	300	296	297	294	298	297	294	297	296	283	288	295	296	297	294
1-2	307	301	298	301	298	302	303	296	296	299	284	290	298	300	299	296
2-3	307	302	299	304	298	302	304	297	297	303	285	290	299	300	301	296
3-4	306	301	299	304	296	299	301	294	300	302	286	289	298	298	301	296
4-5	309	301	300	303	294	297	299	292	298	301	286	288	297	296	301	296
5-6	306	301	300	301	294	295	296	289	294	299	284	286	295	294	299	294
6-7	306	301	300	296	294	293	293	284	292	294	281	286	293	291	296	294
7-8	305	300	298	294	294	289	288	278	283	290	276	284	290	287	291	291
8-9	304	298	297	290	291	285	287	269	277	285	274	280	286	283	287	289
9-10	301	295	295	286	289	282	286	270	279	278	274	277	284	282	285	287
10-11	300	293	294	283	287	281	285	272	273	271	268	273	282	281	280	284
11-12	298	290	292	283	285	283	282	274	274	265	266	273	280	281	279	282
12-13	296	290	287	284	284	285	286	273	279	264	264	274	280	282	279	281
13-14	294	288	284	287	285	286	288	275	281	269	266	274	281	284	280	281
14-15	292	288	287	286	286	288	288	278	282	273	271	272	283	285	282	281
15-16	297	290	292	287	284	287	287	279	282	280	277	274	285	284	285	285
16-17	303	293	293	285	281	284	285	276	280	284	279	277	285	282	286	288
17-18	305	293	291	282	277	277	282	271	276	283	278	276	283	277	283	288
18-19	304	292	289	281	272	269	276	269	275	282	274	276	280	272	282	287
19-20	303	293	287	281	274	266	273	270	278	282	274	279	280	271	282	287
20-21	302	295	288	284	278	269	273	272	284	286	276	281	282	273	286	289
21-22	301	296	289	287	281	275	277	277	289	292	279	283	285	278	289	290
22-23	303	297	292	290	285	282	283	284	293	295	282	286	289	284	293	292
23-24	305	298	294	294	291	291	292	291	297	297	283	287	293	291	296	293
Mean	303	296	293	290	287	286	288	280	286	286	277	281	288	285	289	289

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 86 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	307	301	308	302	319	310	309	308	307	298	311	310	307	312	304	307
1-2	310	307	310	309	322	310	317	311	306	299	315	312	311	315	306	311
2-3	310	307	311	311	319	310	312	308	303	301	315	311	310	312	307	311
3-4	307	306	312	309	316	312	311	309	303	295	313	308	308	312	305	309
4-5	306	305	313	310	313	316	312	312	306	295	313	306	309	313	306	308
5-6	304	303	310	311	313	316	314	313	308	298	314	304	309	314	307	306
6-7	304	304	312	313	315	317	316	315	307	299	311	304	310	316	308	306
7-8	302	303	311	312	318	320	318	315	308	301	312	308	311	318	308	306
8-9	305	305	313	314	318	319	319	317	309	296	311	310	311	318	308	308
9-10	306	306	317	316	321	322	321	317	311	300	313	309	313	320	311	309
10-11	307	307	317	316	322	323	320	319	318	303	314	310	315	321	314	310
11-12	310	306	319	316	323	326	323	320	315	302	315	311	315	323	313	311
12-13	311	310	321	315	326	329	325	320	316	308	316	314	318	325	315	313
13-14	311	311	320	314	331	333	326	319	315	309	317	315	318	327	315	314
14-15	312	313	321	315	332	332	327	318	313	309	315	314	318	327	315	314
15-16	311	313	320	313	326	329	324	313	307	305	311	316	316	323	311	313
16-17	311	311	318	306	316	319	325	304	299	296	307	316	311	316	305	311
17-18	304	305	309	298	309	310	316	292	297	285	303	313	303	307	297	306
18-19	296	299	299	298	304	299	307	284	294	279	299	308	297	299	293	301
19-20	287	291	292	299	303	298	303	286	294	281	298	300	294	298	292	294
20-21	284	289	289	301	302	302	305	292	296	285	300	298	295	300	293	293
21-22	289	290	290	300	303	308	306	300	300	292	306	301	299	304	296	297
22-23	296	296	296	300	308	312	308	312	303	295	310	305	303	310	299	302
23-24	305	302	303	303	316	317	312	312	303	299	313	310	308	314	302	308
Mean	304	304	310	308	316	316	316	309	306	297	311	309	309	314	305	307

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (minutes) (Quiet Days)

Table 87 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	14.7	15.2	13.7	11.9	10.8	11.7	11.9	12.2	12.5	11.7	11.5	11.7	12.5	11.7	12.5	13.3
1-2	15.4	15.6	14.3	12.3	12.6	13.1	12.4	12.9	12.9	12.1	12.4	12.1	13.2	12.8	12.9	13.9
2-3	16.1	16.1	14.9	13.3	14.3	14.2	13.3	13.3	13.4	12.2	12.8	12.4	13.9	13.8	13.5	14.4
3-4	16.4	16.2	15.2	14.4	14.7	14.5	14.1	13.2	12.9	13.0	12.7	12.9	14.2	14.1	13.9	14.6
4-5	16.6	16.5	15.6	14.6	14.3	14.3	13.8	13.3	13.0	13.8	12.8	13.1	14.3	13.9	14.3	14.8
5-6	16.2	16.6	15.3	14.7	14.2	14.1	14.0	12.9	13.3	13.8	12.7	13.1	14.2	13.8	14.3	14.7
6-7	16.3	16.5	15.6	14.7	14.4	13.6	14.4	13.0	13.5	13.9	12.7	12.8	14.3	13.9	14.4	14.6
7-8	16.0	16.3	15.7	14.6	14.2	13.5	14.0	13.1	12.9	15.1	12.3	12.5	14.2	13.7	14.6	14.3
8-9	16.0	15.7	15.6	14.7	14.1	13.8	13.5	13.4	13.1	13.8	12.3	12.3	14.0	13.7	14.3	14.1
9-10	15.8	15.4	15.6	14.8	14.3	14.2	14.0	13.5	13.1	13.9	12.4	11.6	14.0	14.0	14.4	13.8
10-11	15.7	15.6	15.7	15.5	14.4	14.4	14.2	13.7	13.4	13.5	12.4	12.1	14.2	14.2	14.5	14.0
11-12	15.2	15.1	15.6	15.8	14.9	14.9	14.9	14.1	13.7	12.1	12.7	12.4	14.3	14.7	14.3	13.9
12-13	15.8	15.4	15.7	16.0	16.2	15.8	16.0	15.2	14.0	12.3	13.0	12.3	14.8	15.8	14.5	14.1
13-14	15.8	16.5	15.8	16.2	17.8	17.7	17.2	16.2	14.5	13.5	13.1	12.4	15.6	17.2	15.0	14.5
14-15	16.3	16.8	16.7	17.4	19.8	18.9	18.2	17.7	16.3	14.4	13.7	12.2	16.5	18.7	16.2	14.8
15-16	16.5	17.6	18.2	19.4	21.6	20.6	19.0	18.8	17.5	16.0	14.6	12.5	17.7	20.0	17.8	15.3
16-17	17.9	18.7	20.1	20.0	22.2	20.9	19.2	19.1	17.3	16.7	15.5	13.4	18.4	20.4	18.5	16.4
17-18	18.6	19.1	21.0	19.0	20.8	20.0	18.6	17.2	14.9	16.1	15.0	13.9	17.8	19.2	17.8	16.7
18-19	19.3	18.5	20.7	16.8	17.7	16.3	16.5	14.1	13.6	13.9	13.9	13.5	16.2	16.2	16.3	16.3
19-20	18.3	17.2	18.4	14.0	14.8	12.8	14.4	11.6	11.4	11.5	12.6	12.9	14.2	13.4	13.8	15.3
20-21	16.7	16.0	16.2	12.4	12.6	10.1	12.4	10.3	10.1	10.4	11.5	12.2	12.6	11.4	12.3	14.1
21-22	14.7	15.2	14.2	11.2	11.1	9.1	11.2	9.5	9.3	10.1	11.1	11.2	11.5	10.2	11.2	13.1
22-23	14.0	14.7	13.4	10.9	10.0	8.9	11.1	9.4	9.9	10.5	11.1	11.1	11.2	9.9	11.2	12.7
23-24	14.1	14.5	13.1	11.0	10.1	9.9	11.7	10.3	10.7	10.9	11.4	11.3	11.6	10.5	11.4	12.8
Mean	16.2	16.3	16.1	14.8	15.1	14.5	14.6	13.7	13.2	13.1	12.8	12.4	14.4	14.5	14.3	14.4

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas) (Quiet Days)

Table 88 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	305	300	295	295	292	288	292	288	290	298	281	286	292	290	295	293
1-2	305	301	297	297	295	292	297	287	289	301	284	285	294	293	296	294
2-3	305	300	297	299	295	295	298	285	289	301	283	285	294	293	297	293
3-4	304	299	296	299	293	292	297	285	289	302	282	284	293	292	297	292
4-5	305	299	296	297	290	291	295	285	289	303	282	284	293	290	296	293
5-6	303	298	295	296	290	289	294	283	288	300	282	284	292	289	295	292
6-7	305	299	296	296	290	288	291	282	288	295	282	284	291	288	294	293
7-8	304	298	296	296	289	288	291	282	287	290	280	283	290	288	292	291
8-9	305	298	295	296	289	288	288	281	288	294	282	282	290	287	293	292
9-10	303	297	295	294	289	288	288	281	288	286	281	280	289	287	291	290
10-11	304	298	295	294	290	287	287	281	287	281	280	279	289	286	289	290
11-12	301	297	295	294	290	288	287	279	286	284	280	280	288	286	290	290
12-13	302	296	295	294	291	288	288	279	284	285	280	280	288	287	290	290
13-14	302	296	293	293	292	287	289	280	284	287	280	280	289	287	289	290
14-15	302	297	294	288	292	287	288	281	285	290	281	281	289	287	289	290
15-16	303	298	295	290	291	286	288	281	286	293	282	282	290	287	291	291
16-17	305	299	297	288	285	282	287	278	282	293	282	283	288	283	290	292
17-18	306	298	294	285	278	275	284	272	277	292	279	283	285	277	287	292
18-19	306	294	290	282	273	265	278	267	275	289	276	281	281	271	284	289
19-20	304	294	288	282	275	262	272	267	277	286	275	279	280	269	283	288
20-21	303	295	287	284	277	262	271	271	279	288	276	278	281	270	285	288
21-22	302	295	288	285	279	268	274	272	281	290	278	280	283	273	286	289
22-23	304	297	290	286	283	273	279	277	284	292	280	281	285	278	288	291
23-24	304	296	292	288	289	283	285	282	286	295	280	282	288	285	290	291
Mean	304	297	294	291	287	283	287	279	285	292	280	282	288	284	291	291

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 89 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	305	299	303	290	317	313	310	318	303	293	308	276	303	315	297	297
1-2	307	302	304	295	315	312	317	292	305	282	312	276	302	309	297	299
2-3	309	307	306	306	309	314	315	288	300	290	300	277	302	307	301	298
3-4	299	307	305	295	313	306	307	283	291	296	299	285	299	302	297	298
4-5	308	307	301	289	309	307	312	285	292	295	294	293	299	303	294	301
5-6	294	302	298	297	309	305	307	294	302	299	298	293	300	304	299	297
6-7	293	304	300	294	306	307	311	301	297	294	287	293	299	306	296	294
7-8	291	305	304	297	309	311	312	303	300	294	293	286	300	309	299	294
8-9	299	305	310	295	319	315	307	298	288	297	289	296	301	310	298	297
9-10	296	303	311	301	320	315	318	295	305	293	291	293	303	312	303	296
10-11	295	305	310	310	316	311	315	305	281	295	293	291	302	312	299	296
11-12	300	304	309	300	306	315	307	311	302	289	297	293	303	310	300	299
12-13	301	312	310	299	312	317	317	311	310	299	302	297	307	314	305	303
13-14	300	316	301	309	315	323	312	314	308	299	308	299	309	316	304	306
14-15	285	306	306	299	308	324	315	310	304	296	304	294	304	314	301	297
15-16	289	297	302	288	297	325	307	307	299	296	297	301	300	309	296	296
16-17	302	297	295	284	287	316	306	300	285	284	296	288	295	302	287	296
17-18	299	291	283	280	273	298	302	293	279	278	288	276	287	292	280	289
18-19	289	272	276	268	270	282	298	290	254	264	275	274	276	285	266	278
19-20	278	269	270	266	281	279	297	287	249	269	279	257	273	286	264	271
20-21	278	274	279	265	291	294	288	288	268	256	280	261	277	290	267	273
21-22	280	278	283	269	290	298	274	297	281	272	275	263	280	290	276	274
22-23	282	282	286	283	291	299	291	300	287	283	286	266	286	295	285	279
23-24	292	287	294	290	296	309	304	307	285	291	294	276	294	304	290	287
Mean	295	297	298	290	302	308	306	299	291	288	294	283	296	304	292	292

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (minutes) (Disturbed Days)

Table 90 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	15.2	13.5	13.8	12.8	10.2	10.7	11.5	8.1	12.3	11.3	10.9	12.1	11.9	10.1	12.6	12.9
1-2	15.3	14.3	14.2	13.7	11.0	11.9	12.5	11.2	12.6	12.7	11.3	12.9	12.8	11.7	13.3	13.5
2-3	16.3	15.1	14.5	13.9	13.8	11.9	13.0	12.6	14.1	12.0	12.6	16.2	13.8	12.8	13.6	15.1
3-4	16.4	15.9	14.8	16.3	15.7	14.8	14.3	15.0	17.4	12.6	14.2	15.6	15.2	15.0	15.3	15.5
4-5	20.6	16.6	18.2	16.4	14.5	17.3	16.3	17.4	18.5	15.8	15.4	16.2	16.9	16.4	17.2	17.2
5-6	17.7	17.5	16.3	17.9	14.1	16.3	16.2	17.2	15.2	15.6	17.9	14.8	16.4	16.0	16.3	17.0
6-7	18.3	17.4	17.3	17.9	15.3	16.2	17.2	16.1	13.8	13.2	16.2	14.7	16.1	16.2	15.6	16.7
7-8	18.6	16.6	18.1	18.1	14.8	14.1	13.4	19.5	15.3	16.4	14.8	15.9	16.3	15.5	17.0	16.5
8-9	17.2	16.7	17.6	18.5	14.3	15.8	15.1	13.9	13.5	16.0	14.1	15.1	15.6	14.8	16.4	15.8
9-10	16.6	15.8	16.2	17.1	14.0	17.2	14.4	12.2	13.3	15.5	11.5	12.0	14.6	14.5	15.5	14.0
10-11	17.0	17.1	17.0	18.3	16.5	16.4	12.9	15.4	10.4	14.9	11.2	12.5	15.0	15.3	15.2	14.5
11-12	18.8	18.9	16.5	19.8	15.4	17.1	11.5	14.3	12.8	10.8	10.4	11.6	14.8	14.6	15.0	14.9
12-13	16.1	18.8	14.0	18.1	16.2	18.2	15.3	12.2	16.2	8.6	10.7	12.2	14.7	15.5	14.2	14.5
13-14	14.5	16.1	17.2	17.6	18.3	19.8	16.7	16.2	17.7	10.0	15.5	11.1	15.9	17.8	15.6	14.3
14-15	12.3	14.2	18.0	19.0	18.7	18.9	19.5	17.2	17.2	11.6	14.8	7.4	15.7	18.6	16.5	12.2
15-16	11.9	15.6	17.4	17.3	20.2	20.4	21.3	18.7	18.8	12.8	15.0	8.5	16.5	20.2	16.6	12.8
16-17	15.6	16.1	19.0	18.0	19.7	20.7	21.0	17.7	19.4	12.2	15.8	8.5	17.0	19.8	17.2	14.0
17-18	18.4	17.6	18.2	16.9	19.8	19.9	19.3	16.6	16.9	11.9	14.5	7.1	16.4	18.9	16.0	14.4
18-19	19.3	16.8	15.6	16.2	15.7	15.7	15.8	12.5	14.1	11.1	12.7	7.8	14.4	14.9	14.3	14.2
19-20	18.2	12.4	12.8	13.9	11.7	12.3	12.7	10.1	9.3	9.9	10.5	9.5	11.9	11.7	11.5	12.7
20-21	16.9	12.1	12.4	12.0	10.7	9.9	11.6	8.3	8.2	9.7	9.9	9.3	10.9	10.1	10.6	12.1
21-22	14.8	13.8	12.9	10.5	10.0	9.2	9.9	7.6	9.2	9.7	10.1	9.4	10.6	9.2	10.6	12.0
22-23	14.3	14.7	13.6	11.1	9.5	9.3	9.4	8.0	8.2	11.0	9.5	9.5	10.7	9.1	11.0	12.0
23-24	14.4	15.1	14.1	11.6	10.0	9.9	9.3	9.5	11.7	11.2	10.6	10.8	11.5	9.7	12.2	12.7
Mean	16.5	15.8	15.8	16.0	14.6	15.2	14.6	13.6	14.0	12.3	12.9	11.7	14.4	14.5	14.5	14.2

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas) (Disturbed Days)

Table 91 Victoria 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	310	302	296	310	295	300	304	297	297	297	285	302	300	299	300	300
1-2	310	302	297	315	297	306	309	302	294	305	286	309	303	304	303	302
2-3	309	304	298	312	299	306	307	314	295	315	293	315	306	307	305	305
3-4	311	302	298	311	300	304	305	312	302	305	297	308	305	305	304	305
4-5	323	301	302	311	298	306	303	312	300	303	296	298	304	305	304	305
5-6	314	301	302	305	297	300	301	303	297	299	290	290	300	300	301	299
6-7	312	302	304	288	297	297	294	297	287	290	277	291	295	296	292	296
7-8	310	301	299	289	296	288	284	278	258	283	267	285	286	287	282	291
8-9	308	299	297	281	291	285	289	243	248	273	262	274	279	277	275	286
9-10	304	290	289	264	289	267	284	239	262	260	265	273	274	270	269	283
10-11	295	287	285	260	284	268	286	258	235	256	251	267	269	274	259	275
11-12	281	278	283	255	271	278	269	269	248	239	256	265	266	272	256	270
12-13	271	278	264	252	260	279	281	265	270	232	242	265	263	271	255	264
13-14	262	266	255	264	258	283	279	268	270	240	235	266	262	272	257	257
14-15	246	257	263	264	263	289	277	270	275	252	252	261	264	275	264	254
15-16	269	261	277	265	266	291	276	274	275	265	270	263	271	277	271	266
16-17	291	272	281	264	268	290	277	273	277	271	277	268	276	277	273	277
17-18	301	277	284	267	269	283	279	269	275	273	274	268	277	275	275	280
18-19	304	281	282	271	270	271	276	270	271	276	271	270	276	272	275	282
19-20	305	287	285	279	275	268	273	272	277	279	275	279	279	272	280	287
20-21	307	293	291	286	281	276	272	272	287	283	278	290	285	275	287	292
21-22	303	298	292	295	287	283	277	282	294	296	282	296	290	282	294	295
22-23	306	301	295	302	292	289	289	291	298	301	286	303	296	290	299	299
23-24	310	303	298	309	300	296	299	298	307	303	288	305	301	298	304	302
Mean	298	289	288	284	283	288	287	280	279	279	273	284	284	285	283	286

THREE-HOUR RANGE INDICES, VICTORIA, 1962

Table 92

January	D	H	Z	K	February	D	H	Z	K
1	0311 1100	1200 0001	0100 0000	1311 1101		0000 0000	0000 0000	0000 0000	0000 0000
2	1145 2210	1232 2210	0033 1100	1245 2210		1120 0112	2120 0011	0010 0001	2120 0112
3	0002 1000	0011 1000	0000 0000	0012 1000		0120 1220	1110 0010	0000 0110	1120 1220
4	0013 0000	0011 0000	0001 0000	0013 0000		1023 5432	1123 4433	0012 5331	1123 5433
5	0002 1000	0001 0000	0000 0000	0002 1000		2201 1221	3300 0111	1100 0011	3301 1221
6	0112 1110	1101 0100	0000 0000	1112 1110		0010 0122	1011 1013	0000 0001	1011 1123
7	0001 1122	0000 0111	0000 0000	0001 1122		2465 3320	3333 3220	1133 0210	3465 3320
8	0012 1200	1111 1100	0001 0000	1112 1200		0111 2110	0011 1000	0000 1000	0111 2110
9	0213 3321	1110 2211	0000 2010	1213 3321		1122 2110	2122 2000	0000 0000	2122 2110
10	3625 6743	3634 6643	1635 6631	3635 6743		0211 1000	0100 0000	0000 0000	0211 1000
11	3342 3221	2331 1110	1121 1110	3342 3221		0113 3133	1111 1133	0002 2111	1113 3133
12	0231 0001	1120 0001	0011 0000	1231 0001		4333 2222	3132 1132	3122 0112	4333 2232
13	1332 1100	1221 0000	0011 0000	1332 1100		1414 1222	2313 2113	0113 3111	2414 3223
14	0022 2333	1121 1323	0001 0212	1122 2333		3333 3322	2232 2222	2121 0111	3333 3322
15	2323 2112	2232 1222	1121 1111	2333 2222		1323 1341	1212 1442	1112 1221	1323 1442
16	2242 3212	2231 2211	1012 3101	2242 3212		0156 7444	2336 5443	0126 4531	2356 7544
17	1301 1001	1200 1001	0100 0100	1301 1101		3354 1210	2342 1010	1143 1100	3354 1210
18	0012 1210	1001 0100	0000 0100	1012 1210		0023 1231	0011 0132	0001 0011	0023 1232
19	2122 4431	2232 3321	1011 3321	2232 4431		0132 2101	0220 0000	0000 1001	0232 2101
20	1121 1110	1120 0111	0010 0001	1121 1111		0022 2001	0022 1002	0010 1001	0022 2002
21	2122 4101	2221 3112	1022 2100	2222 4112		0021 3331	1221 2321	0010 2110	1221 3331
22	1020 0000	1010 0000	0000 0000	1020 0000		2224 4411	3422 2211	1122 3100	3424 4411
23	0000 0000	0000 0000	0000 0000	0000 0000		1314 3422	2213 3211	0102 2111	2314 3422
24	0000 0000	0000 0001	0000 0000	0000 0001		0323 3222	2232 2222	0021 1121	2333 3222
25	0113 0312	0022 0101	0001 0100	0123 0312		0120 1211	1110 0121	0000 0100	1120 1221
26	2123 2222	2011 1212	0002 1111	2123 2222		1212 3452	1012 3433	0001 2231	1212 3452
27	0335 2211	1323 1112	0113 0101	1335 2212		2124 3430	3224 3321	1014 4220	3224 4431
28	1122 0111	1122 0010	0001 0000	1122 0111		0032 1100	0021 1001	0011 0000	0032 1101
29	0322 3302	0211 3102	0001 3101	0322 3302					
30	1142 3312	1121 2101	0011 1101	1142 3312					
31	0000 0000	1000 0000	0000 0000	1000 0000					

March	D	H	Z	K	April	D	H	Z	K
1	0033 3312	0132 2212	0021 2101	0133 3312		0255 4210	1324 3111	0133 2100	1355 4211
2	1221 2231	2121 2232	1000 1110	2221 2232		0300 1222	1201 1224	1100 0111	1301 1224
3	1021 3231	2121 3221	0000 1111	2121 3231		2352 2223	3332 0323	1011 0111	8352 2323
4	2102 1121	2112 1021	1101 1000	2112 1121		2255 2221	2343 1213	1144 2100	2355 2223
5	1043 5432	1133 5432	0013 5221	1143 5432		3313 1211	2211 1111	2101 0000	3313 1211
6	3645 6432	2444 4321	1333 4221	3645 6432		1334 3344	2334 1334	0233 2122	2334 3344
7	1342 2210	2130 2211	1020 1000	2342 2211		5665 4423	4455 5343	3545 4433	5665 5443
8	0231 1000	1120 0000	0011 0000	1231 1000		4544 5532	4432 3523	3332 3321	4544 5533
9	0000 1121	0000 0111	0000 0000	0000 1121		2131 3321	3131 2211	2020 3100	3131 3321
10	1233 3212	2233 1213	0112 2101	2233 3213		1235 5432	3334 5433	1115 3232	3335 5433
11	1424 1320	3323 1221	2213 1100	3424 1321		5444 3422	4443 3322	4333 4211	5444 4422
12	0134 4322	2223 3322	0013 2221	2234 4322		4301 2211	3211 2112	2200 1000	4311 2212
13	2134 3111	3112 2001	2011 1000	3134 3111		1121 1100	2010 0110	1000 0000	2121 1110
14	0032 2121	0021 1021	0000 1010	0032 2121		0000 0000	1000 0001	1000 0001	1000 0001
15	1321 2211	2222 1002	0211 0001	2322 2212		1310 2322	2210 2223	2100 0011	2310 2323
16	0023 2111	1122 1001	0002 0000	1123 2111		1121 2111	3211 0212	2000 0000	3221 2212
17	0133 2100	1111 1100	0011 1000	1133 2100		2412 2200	2212 1111	2111 1111	2412 2211
18	0011 3211	0021 2121	1001 3100	1021 3221		1223 3221	0222 2222	1022 2111	1223 3222
19	1132 3232	2221 3231	0001 4320	2232 4232		3330 1101	3220 0002	2200 0000	3330 1102
20	0211 3332	1222 1323	0101 3212	1222 3333		1321 0313	2211 0314	1110 0103	2321 0314
21	1242 3222	2231 3123	0021 1122	2242 3223		2222 1532	2222 1433	2011 0222	2222 1533
22	0011 1112	0010 0013	0000 0001	0011 1113		4454 4421	3433 3222	2344 3321	4454 4422
23	0014 1110	0013 1000	0003 2000	0014 2110		3454 2210	2223 1211	1223 3100	3454 3210
24	2012 2311	3101 1212	1000 0110	3112 2312		0001 2210	0011 2221	0000 1010	0011 2221
25	1342 3200	2222 2101	1122 2000	2342 3201		0045 2331	0013 2322	0014 2120	0045 2332
26	1202 0101	2101 1001	1001 0100	2202 1101		1552 3210	2333 1122	1143 2000	2553 3222
27	1011 1110	1111 1000	1000 0000	1111 1110		1334 2211	3221 1122	1112 0110	3334 2222
28	0000 2221	0000 1212	0000 1100	0000 2222		1442 2212	2231 0222	2120 0001	2442 2222
29	3131 3000	3230 1000	2100 2000	3231 3000		2211 3100	3111 1112	1101 2000	3211 3112
30	0000 1000	1100 0000	0000 0000	1100 1000		1002 1111	1011 0112	1001 0011	1012 1112
31	0000 0201	1121 0112	0000 0100	1121 0212					

THREE-HOUR RANGE INDICES, VICTORIA, 1962

May	D	H	Z	K	June D	H	Z	K
1	2111 0222	3221 0123	1111 0011	3221 0223	3443 2211	3242 1113	2233 2101	3443 2213
2	1442 1211	2231 0212	1222 1111	2442 1212	2212 0100	2211 0111	1101 0000	2212 0111
3	2132 2110	2222 2010	1013 1000	2233 2110	1111 1211	1010 1122	0000 0002	1111 1222
4	1030 0000	1121 0001	1010 0000	1131 0001	3234 4221	3223 2223	2213 2111	3234 4223
5	0020 0112	0010 0023	0000 0011	0020 0123	1242 1223	2231 1123	1131 1011	2242 1223
6	2113 5532	3223 5433	1103 4442	3223 5543	3353 0112	4342 0122	2231 0101	4353 0122
7	3312 1111	3221 1112	2210 0001	3322 1112	1244 3110	2243 1211	1122 1110	2244 3211
8	2130 0102	2210 1113	1100 0001	2230 1113	0220 1101	0120 0011	0010 0001	0220 1111
9	1201 0000	2111 0010	1100 0000	2211 0010	1355 3233	4443 2334	2332 2112	4455 3334
10	1223 2100	2222 1100	1111 0000	2223 2100	2353 2211	3333 2122	2243 2101	3353 2222
11	0120 3321	1120 1222	1000 2211	1120 3322	1432 2111	2321 1112	1111 1001	2432 2112
12	0123 0010	2121 0011	0001 0000	2123 0011	2242 2110	2232 2211	1122 2000	2242 2211
13	1313 4122	2322 2133	0113 3111	2323 4133	1142 1121	2221 0110	1131 0010	2242 1121
14	3333 2221	4332 2223	2322 2111	4333 2223	0322 2121	1221 1123	1111 0012	1322 2123
15	4552 1330	3231 2242	1231 1111	4552 2342	3422 2221	4322 2231	3211 1120	4422 2231
16	1444 2110	2332 1022	1224 2010	2444 2122	2111 1110	4101 1121	2100 0100	4111 1121
17	0122 1110	1101 0121	1001 0000	1122 1121	0100 1100	1000 0111	1000 0000	1100 1111
18	0111 1000	2100 1010	1000 0000	2111 1010	1100 0000	2110 0000	1100 0001	2110 0001
19	1144 3211	2232 2212	1132 2111	2244 3212	0211 2111	1110 1112	1100 0110	1211 2112
20	2222 1200	3212 1111	2100 0100	3222 1211	1132 0101	2111 0111	1100 0001	2132 0111
21	0000 1001	2100 1001	1100 0000	2100 1001	1103 2332	2112 2333	1001 0212	2113 2333
22	2001 1100	3000 1011	1000 0100	3001 1111	2431 1211	4321 1122	1210 0121	4431 1222
23	0111 1000	1210 1000	1000 0000	1211 1000	2353 2431	3222 1332	2133 0121	3353 2432
24	0201 0000	1200 0000	0100 0000	1201 0000	1122 1220	2212 1122	2102 1201	2222 1222
25	0000 0000	0000 0001	0000 0000	0000 0001	2242 2200	2231 1112	1121 0000	2242 2212
26	1000 1112	1110 0013	0000 0002	1110 1113	0021 1211	2121 1213	1000 0011	2121 1213
27	1232 3311	2323 3322	1212 2111	2333 3322	2444 3331	3333 4343	2232 3311	3444 4343
28	0102 2121	1112 2223	1102 0021	1112 2223	2354 3322	3333 2224	2233 2112	3354 3324
29	0332 1110	2232 1121	1122 0000	2332 1121	3334 3221	3232 2223	3333 2201	3334 3223
30	0211 0000	1111 0011	1001 0000	1211 0011	1554 3311	3333 1322	1343 2110	3554 3322
31	0334 5322	1335 4233	0125 5311	1335 5333				

July	D	H	Z	K	August D	H	Z	K
1	1334 2221	1233 1222	1122 2110	1334 2222	3657 4322	5345 3223	3456 4222	5657 4323
2	2132 0231	2222 0322	2111 0111	2232 0332	1514 4221	2312 1222	3201 1011	3514 4222
3	1032 2221	3131 2321	2121 0101	3132 2321	1432 4321	2331 2213	2221 2112	2432 4323
4	2434 2223	2322 3235	2213 1124	2434 3235	1233 1121	2231 1121	2121 1010	2233 1121
5	3544 3222	2442 3332	2342 2121	3544 3332	2243 2100	3233 1211	1033 3100	3243 3211
6	4334 2221	3422 1223	2223 2111	4434 2223	2343 3321	3342 3223	2243 3112	3343 3323
7	0013 1132	1102 1233	0002 1022	1113 1233	3444 3231	3332 2343	2113 3221	3444 3343
8	1342 2212	3331 2223	1231 2112	3342 2223	4565 5332	4444 3323	3355 3322	4565 5333
9	1232 1111	3331 0012	2221 0011	3332 1112	4564 3221	4242 2223	3343 1111	4564 3223
10	1111 2320	2130 1322	0010 0111	2131 2322	2334 3210	3343 3211	2232 3000	3344 3211
11	1233 2221	2232 1132	2022 1111	2233 2232	0100 1000	2100 0000	0000 0000	2100 1000
12	0444 1211	1222 2222	1212 1101	1444 2222	0221 1101	1100 0001	0000 0000	1221 1101
13	2231 2231	3221 2223	2110 2111	3231 2233	0013 1112	0111 1023	0001 1002	0113 1123
14	3342 2211	3231 2112	2220 1100	3342 2212	2311 2222	3312 1123	1100 1011	3312 2223
15	2010 0221	2110 0122	2100 0010	2110 0222	1563 2322	3352 1223	1454 0112	3564 2323
16	1210 1100	2100 1001	1000 0101	2210 1101	4351 2222	4341 1134	3240 0112	4351 2234
17	1000 0000	1000 0101	0000 0001	1000 0101	3333 3333	4332 3323	2122 2112	4333 3333
18	0000 1021	1110 1011	1000 0010	1110 1021	2654 3321	4543 1323	2433 2111	4654 3323
19	0123 3222	2222 2223	0012 1011	2223 3223	2444 2211	3331 1211	2333 2110	3444 2211
20	2453 2221	3352 2213	2353 1101	3453 2223	0012 2101	1020 0101	1000 0000	1022 2101
21	2413 2222	4312 1233	2202 1012	4413 2233	1011 1212	2011 0114	0000 0002	2011 1214
22	1333 1111	3231 0112	1111 1001	3333 1112	4562 3232	4452 2233	3341 1112	4562 3233
23	1343 1220	2232 1021	1112 0010	2343 1221	3433 3322	3333 2333	2322 2111	3433 3333
24	1020 1352	3210 1333	1100 0222	3220 1353	4454 3322	3352 4324	2242 3112	4454 4324
25	4453 2000	4332 1012	3332 2000	4453 2012	4432 2223	3332 2122	2232 1111	4432 2223
26	2666 4322	3555 4233	1555 4212	3666 4333	1443 2111	2222 1112	1122 1001	2443 2112
27	5443 4322	4431 2333	3342 3212	5443 4333	2320 0110	3231 0011	1010 0000	3331 0111
28	4553 2322	3432 2332	3442 1211	4553 2332	0211 2100	2211 1001	0000 0000	2211 2101
29	4232 1210	4241 1211	3121 0001	4242 1211	1444 3322	1344 2133	0112 1110	1444 3333
30	3430 0000	3220 0001	1110 0000	3430 0001	2422 3321	2332 3222	0221 2110	2432 3322
31	0112 0142	1111 0133	0000 0022	1112 0143	4554 5101	5442 2122	3263 4001	5564 5122

THREE-HOUR RANGE INDICES, VICTORIA, 1962

September	D	H	Z	K	October D	H	Z	K
1	3264 3332	3343 2442	1044 2332	3364 3442	3575 4433	3454 4454	2246 5332	3576 5454
2	2554 4442	3444 4333	1353 5431	3554 5443	5455 4431	4342 3321	2243 3210	5455 4431
3	5536 3344	4426 3354	3436 3233	5536 3354	1333 5211	1223 3112	0132 3101	1333 5212
4	2655 3222	4544 3322	3435 4211	4655 4322	2343 1220	2332 0122	0132 1010	2343 1222
5	2353 3321	1233 3223	1043 3221	2353 3323	1122 2233	1221 0233	0001 0111	1222 2233
6	2554 4122	3354 1123	2344 3112	3554 4123	4361 3302	4230 2102	3230 3201	4361 3302
7	3444 3121	4333 1122	1243 1101	4444 3122	1334 1133	2322 0133	0212 0012	2334 1133
8	2344 2122	4344 1013	2232 1001	4344 2123	6333 3433	4334 2433	4214 3313	6334 3433
9	2311 3222	3312 2213	1102 2101	3312 3223	4554 4323	5443 3232	3233 3111	5554 4333
10	2544 2100	3422 1002	2322 0000	3544 2102	4333 5321	3322 2333	2214 4211	4334 5333
11	2125 1111	3123 1012	2014 0001	3125 1112	3643 4322	2532 3232	2432 2111	3643 4332
12	2165 3443	3365 3444	2165 2232	3365 3444	322- -201	313- -111	102- -000	323- -211
13	2453 3332	3232 2342	3131 2121	3453 3342	0015 4322	1112 3222	0004 2211	1115 4322
14	2451 0211	3332 0212	1231 0001	3452 0212	3555 3332	3453 2332	1335 3121	3555 3332
15	2554 1222	2342 1233	1231 0211	2554 1233	2333 2211	2222 1212	1322 0000	2333 2212
16	1313 2222	1201 1123	1002 0101	1313 2223	1125 4222	1125 4222	0005 4211	1125 4222
17	1331 2211	2220 1112	1010 1100	2331 2212	3242 1101	2122 1011	1032 0000	3242 1111
18	1021 0102	1111 0012	0000 0001	1121 0112	3211 1322	4411 2222	3210 1111	4411 2322
19	2464 3433	3442 3344	1464 2232	3464 3444	0045 5321	0144 4323	0044 3312	0145 5323
20	4433 2110	4322 1001	3223 2000	4433 2111	1121 2222	1110 2222	0000 0111	1121 2222
21	1331 3321	2220 2322	0010 2111	2331 3322	3423 2221	3322 2322	2211 0110	3423 2322
22	3345 3322	3334 3222	3233 2111	3345 3322	2335 5322	2333 3---	0133 4311	2335 5322
23	4644 1111	4522 1112	1432 1001	4644 1112	4343 3321	4333 2223	3223 2102	4343 3323
24	1310 1110	2310 0011	1100 0000	2310 1111	2323 4333	3322 2432	0113 3222	3323 4433
25	0101 2221	1101 1121	0001 1002	1101 2222	3655 5532	3434 3432	2233 4221	3655 5532
26	3643 2311	4341 2422	4542 1210	4643 2422	4445 5453	3444 4343	2243 3432	4445 5453
27	3323 2210	3222 1102	1122 3100	3323 3212	3453 5422	3443 5433	1233 3411	3453 5433
28	3112 2222	3111 1312	0000 1101	3112 2322	3543 2222	3433 2222	1232 2111	3543 2222
29	1346 4232	1333 2332	0024 2012	1346 4332	3343 3211	3222 2122	1122 1011	3343 3222
30	3424 3201	3423 2112	1233 3200	3434 3212	1344 4321	2322 0222	0133 2110	2344 4322
31					1324 3111	1322 2012	1113 2001	1324 3112

November	D	H	Z	K	December D	H	Z	K
1	1224 2211	---- ----	---- ----	1224 2211	1023 1210	2101 1120	0001 0000	2123 1220
2	1202 3232	2102 3222	0003 2111	2203 3232	0113 1100	0111 0001	0001 0000	0113 1101
3	1224 4212	3123 3222	1023 3110	3224 4222	0200 0110	0100 1010	0000 0000	0200 1110
4	0334 3313	1323 3323	0123 2301	1334 3323	0245 5432	0333 3331	0114 4111	0345 5432
5	1152 1101	2231 1011	0031 0000	2252 1111	2012 2210	2221 1110	1001 1000	2222 2210
6	2423 2322	2422 2334	0322 1221	2423 2334	1121 1001	0120 0000	0010 0000	1121 1001
7	3514 4012	4322 3022	2214 3111	4524 4122	0001 1101	0001 0001	0000 0000	0001 1101
8	1122 2110	1112 1200	0002 1010	1122 2210	1043 4111	1222 1111	0022 1100	1243 4111
9	1000 1111	1000 0112	0000 0000	1000 1112	1422 0011	2312 0011	0111 0000	2422 0011
10	1100 0121	2100 0021	0000 0010	2100 0121	1100 0112	1221 0112	0000 0001	1221 0112
11	1343 3211	1233 1211	0032 2200	1343 3211	2534 5332	2333 3333	0123 3131	2534 5333
12	2000 0211	1010 0111	0000 0000	2010 0211	3201 0233	2201 1223	1100 0111	3201 1233
13	1000 0100	1000 0000	0000 0000	1000 0100	3334 5232	3332 2123	2123 3201	3334 5233
14	1001 1230	1100 0130	0000 0020	1101 1230	2314 3211	2312 2212	0203 2110	2314 3212
15	0335 6333	1233 4133	0124 5222	1335 6333	2453 1111	2441 0111	0331 0000	2453 1111
16	4454 4222	4333 3322	3334 3210	4454 4322	0012 2100	0101 1001	0000 0000	0112 2101
17	2302 2200	3212 1100	1101 0100	3312 2200	0022 2664	1112 2554	0013 1334	1123 2664
18	0000 0100	0000 0001	0000 0000	0000 0101	6433 5434	5322 4344	4423 3332	6433 5444
19	0001 1100	0000 1110	0000 0000	0001 1110	4654 4433	4543 3443	3443 3332	4654 4443
20	0020 0100	0120 0000	0010 0000	0120 0100	4644 4343	3543 3343	1334 1222	4644 4343
21	1153 4233	2243 4222	0032 3111	2253 4233	3443 3333	3433 3332	2332 3221	3443 3333
22	3454 4333	3444 3233	3444 3322	3454 4333	2234 1212	2133 2212	0032 2201	2234 2212
23	4444 3212	3343 3212	1233 3100	4444 3212	0212 1000	1112 0000	0010 0000	1212 1000
24	2355 5232	2232 3222	1133 3211	2355 5232	0021 2210	0021 2100	0000 0000	0021 2210
25	2345 4210	2333 3222	1134 2100	2345 4222	1102 1110	1100 1110	0000 0000	1102 1110
26	2112 3211	2111 2111	1000 0000	2112 3211	0044 5322	1224 4323	0023 4311	1244 5323
27	1233 1311	1230 1211	0030 0100	1233 1311	0120 1201	1010 1102	0000 0000	1120 1202
28	1343 2200	2212 0100	0002 1000	2343 2200	1001 3301	0000 2201	0000 0100	1001 3301
29	1014 2221	0023 1021	0003 1000	1024 2221	0321 2100	0211 0000	0000 1000	0321 2100
30	2646 5221	4544 3122	2535 4200	4646 5222	1001 0101	1001 0001	0000 0000	1001 0101
31					1115 3322	1124 1211	0004 2210	1125 3322

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SUMMARY OF OBSERVATIONS AT MAGNETIC OBSERVATORIES IN NORTHWEST TERRITORIES FOR 1963

(With a Summary of Earlier Observations at Mould Bay)

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ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1965

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SUMMARY OF OBSERVATIONS AT MAGNETIC OBSERVATORIES IN NORTHWEST TERRITORIES FOR 1963

Introduction

The Division of Geomagnetism of the Dominion Observatory operates four magnetic observatories in the Canadian northern territories, three of which are located within the polar cap. The geographic and geomagnetic coordinates of the observatories and the dates of commencement of continuous photographic recording in three elements are shown in Table 1.

TABLE 1

Observatory	Geographic coordinates Lat. North	Geographic coordinates Long. West	Geomagnetic coordinates* Lat. North	Geomagnetic coordinates* Long. East	Date of commencement of continuous recording in three elements
	°	°	°	°	
Alert	82.5	62.5	85.7	168.7	October 1961 (X Y Z)
Baker Lake	64.3	96.0	73.9	314.8	March 1951 (H D Z); July 1957 (X Y Z)
Mould Bay	76.2	119.4	79.1	284.7	July 1962 (X Y Z)
Resolute Bay	74.7	94.9	83.1	287.7	November 1953 (X Y Z)

*Based on geomagnetic pole position 78.3° North, 69.0° West.

Magnetic Equipment

The magnetic equipment, observatory procedures, and techniques used in data reduction at Alert, Baker Lake, and Resolute Bay magnetic observatories are discussed in detail in previous publications; similar information for Mould Bay magnetic observatory to the end of 1963 is included in this publication. A summary of the equipment in operation during 1963 at Alert, Baker Lake and Resolute Bay magnetic observatories together with the scale values adopted for the variometers and other relevant data is included with the tables of mean hourly values for these observatories.

Magnetic Reductions

This report presents a summary only of the observations obtained at the four northern magnetic observatories during 1963. Should there be a requirement for more detailed data, copies of standard-run magnetograms and mean hourly values for specific days may be obtained on request from the Division of Geomagnetism, Dominion Observatory, Ottawa, Canada. Photostat copies of standard-run magnetograms together with monthly lists of provisional base-line and scale values are also available at the World Data Centre A, Washington, D.C., U.S.A., for the period September to December, 1963.

Disturbance Indices

Tables of R-indices in the principal horizontal magnetic field component for each observatory follow the mean hourly value summary tables. R-indices are defined as the hourly ranges expressed in 10-gamma units. The adoption of these indices in two horizontal components for measuring magnetic disturbance in geomagnetic latitudes above 65° was recommended by I.A.G.A. Berkeley Assembly, August 1963.

Summary of Annual Mean Values

Observatory	Year	X	Y	Z	D East	I North	H	F
		γ	γ	γ	° ′	° ′	γ	γ
Alert	1962.5	720	−3776	55379	280 48	86 01.8	3844	55512
	1963.5	722	−3751	55392	280 54	86 03.3	3820	55524
Baker Lake	1951.6	3637	162	60237	2 33	86 32.5	3640	60347
	1952.5	3651	167	60224	2 37	86 31.6	3655	60335
	1953.5	3674	175	60232	2 44	86 30.3	3678	60344
	1954.5	3706	168	60238	2 36	86 28.5	3710	60352
	1955.5	3741	168	60299	2 34	86 26.8	3745	60415
	1956.5	3803	164	60322	2 28	86 23.3	3807	60442
	1957.5	3840	172	60341	2 34	86 21.3	3844	60463
	1958.5	3875	179	60346	2 39	86 19.3	3879	60471
	1959.5	3916	197	60379	2 53	86 17.1	3921	60506
	1960.5	3937	208	60402	3 01	86 16.0	3942	60530
	1961.5	3963	213	60415	3 05	86 14.5	3969	60545
	1962.5	3996	222	60420	3 11	86 12.6	4002	60553
	1963.5	4022	233	60408	3 19	86 11.0	4029	60542

Summary of Annual Mean Values—Concluded

Observatory	Year	X	Y	Z	D East	I North	H	F
		γ	γ	γ	° ′	° ′	γ	γ
Mould Bay	1962.8	983	2203	57951	65 57	87 37.0	2412	58001
	1963.5	1001	2208	57940	65 37	87 36.3	2424	57991
Resolute Bay	1954.5	−86	−920	57981	264 40	89 05.2	924	57988
	1955.5	−59	−911	58009	266 18	89 05.9	913	58016
	1956.5	−31	−909	58030	268 03	89 06.1	910	58037
	1957.5	−14	−908	58075	269 07	89 06.3	908	58082
	1958.5	19	−889	58045	271 13	89 07.3	889	58052
	1959.5	42	−866	58042	272 47	89 08.7	867	58048
	1960.5	64	−855	58062	274 17	89 09.3	857	58068
	1961.5	82	−849	58086	275 31	89 09.5	853	58092
	1962.5	95	−832	58113	276 31	89 10.5	837	58119
	1963.5	118	−820	58130	278 11	89 11.0	828	58136

Reports of Northern Magnetic Observatories

Record of Observations at Alert Magnetic Observatory 1961–1962, by W. Darker. *Dom. Obs. Pub.* vol. XXVIII, no. 9.

Record of Observations at Baker Lake Magnetic Observatory 1957–1958 (with a summary of earlier observations), by E. I. Loomer and F. Andersen. *Dom. Obs. Pub.* v. XXVI, no. 3

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Summary of Observations at Baker Lake Magnetic Observatory 1960–1962, by A. E. Evans, E. I. Loomer and F. Andersen. *Dom. Obs. Pub.* v. XXIX, no. 6

Record of Observations at Resolute Bay Magnetic Observatory 1957–1958 (with a summary of earlier observations), by E. I. Loomer. *Dom. Obs. Pub.* v. XXVI, no. 2

Record of Observations at Resolute Bay Magnetic Observatory 1959, by E. I. Loomer. *Dom. Obs. Pub.* v. XXVII, no. 7

Summary of Observations at Resolute Bay Magnetic Observatory 1960–1962, by E. I. Loomer. *Dom. Obs. Pub.* v. XXIX, no. 5

ALERT MAGNETIC OBSERVATORY

1963

The Magnetic Equipment

No changes were made in the station equipment in 1963. A summary of the equipment in operation during 1963 is provided below:

The Photographic Variometers

A set of three-component photographic Ruska variometers is aligned to record the geographic components X, Y and Z of the earth's magnetic field. The time scale of the Ruska magnetograms is 20 mm/hr.

Scale values adopted for the Ruska variometers for the period 1963 were:

X	January—April	6.43 gammas/mm
	May	6.45
	June	6.48
	July 1—Aug. 5	6.51
	Aug. 6—Dec. 31	6.45
Y	January—April	6.02
	May	6.04
	June	6.07
	July 1—Aug. 5	6.10
	Aug. 6—Dec. 31	5.97
Z	Jan. 1—Mar. 31	6.59 increasing linearly to 6.68
	Apr. 1—May 13	5.75 " " 6.31
	May 14—Aug. 5	6.32 gamma/mm
	Aug. 8—Sept. 30	5.82 increasing linearly to 6.21
	Oct. 1—Oct. 31	6.21 " " 6.34
	Nov. 1—Dec. 31	6.34 " " 6.41

All variometers had to be readjusted Aug. 6 following a sudden displacement of the piers. The Z trace was not recorded for some hours of Aug. 6 and Aug. 7.

Thermostatically controlled electric heaters maintain the temperature in the variometer room constant to 1°C. Temperature coefficients of the variometers are small and temperature corrections to the measured values were not required.

The Stand-by Variometer and Storm Recorder

A three-component electrical magnetometer with an inked output records X, Y and Z. Chart speed is 20 mm/hr. Full-scale sensitivity is 1000 gammas normally, with automatic switching to 2000 gammas at times of heavy disturbance.

Absolute Instruments

A proton precession magnetometer is the primary standard of total intensity (F). A portable three-component electrical magnetometer of the saturable core type is used for the determination of declination (D) and inclination (I).

Base-line Values

The r.m.s. differences of the observed minus the adopted base-line values were: 3 gammas for 28 observations in X; 4 gammas for 28 observations in Y; and 2 gammas for 30 observations in Z. The scatter in any one set of base-line determinations (each a mean of eight) was of the order of a few gammas.

The Magnetic Reductions

A summary for 1963 by month, season and year of the mean hourly values of X, Y and Z for all days and for the international quiet and disturbed days, is given in Tables 1–9. The daily mean values of the three elements are given in Tables 10–12.

R_y indices of magnetic disturbance are given for each hour of 1963 in Tables 13–24. The R_y indices are the hourly ranges in Y, the principal horizontal magnetic field component recorded at Alert, expressed in 10-gamma units.

96268—3

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (All Days)

Table 1 Alert 1963

U T	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	727	729	736	750	743	737	747	756	744	744	742	740	741	746	743	734
1-2	729	734	738	746	756	755	763	765	771	754	742	741	749	760	752	736
2-3	733	737	744	750	767	768	780	779	789	759	751	745	758	773	760	742
3-4	739	739	749	754	778	773	778	778	790	763	749	751	762	777	764	744
4-5	751	743	747	762	778	796	802	781	798	765	754	746	769	789	769	748
5-6	750	744	749	766	784	796	793	784	813	762	760	755	771	789	772	752
6-7	744	742	752	753	781	803	795	779	786	761	755	753	767	790	763	748
7-8	746	743	747	755	769	796	792	775	778	753	747	755	763	783	758	748
8-9	738	739	745	752	753	777	772	765	767	749	743	751	754	767	753	743
9-10	735	739	736	739	755	749	736	755	741	736	735	740	741	749	738	737
10-11	725	725	727	733	733	742	740	755	745	731	725	733	734	742	734	727
11-12	715	716	719	723	737	733	749	736	722	712	718	727	726	739	719	719
12-13	712	697	709	714	714	718	722	729	709	700	697	704	710	721	708	702
13-14	696	696	699	705	700	699	709	721	695	690	697	697	700	707	697	696
14-15	675	691	684	692	683	668	683	698	678	685	691	691	685	683	685	687
15-16	688	689	680	683	682	651	669	685	656	678	676	689	677	672	674	686
16-17	678	678	692	676	664	635	666	668	650	654	665	694	668	658	668	679
17-18	676	691	687	668	648	625	656	669	655	656	673	693	666	650	666	683
18-19	684	688	691	669	649	612	664	658	651	667	685	697	668	646	670	688
19-20	686	691	693	668	667	633	664	679	648	678	700	699	676	661	672	694
20-21	696	699	705	687	678	637	664	676	678	695	708	708	686	664	691	703
21-22	702	710	709	703	694	679	686	686	696	706	716	718	700	686	703	712
22-23	713	720	723	724	710	706	701	716	741	727	722	727	719	708	729	720
23-24	723	722	727	732	726	716	731	746	738	726	736	735	730	730	731	729
Mean	715	717	720	721	723	717	728	731	727	719	720	725	722	725	722	719

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 2 Alert 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	722	729	727	745	733	729	741	729	744	729	731	737	733	733	736	730
1-2	720	728	731	742	756	744	744	742	743	731	729	735	737	746	737	728
2-3	723	729	731	739	742	742	752	742	744	734	730	738	737	744	737	730
3-4	722	724	732	738	738	751	760	742	745	745	729	734	738	748	740	727
4-5	721	726	732	736	748	761	755	734	743	736	728	735	738	750	737	728
5-6	723	730	733	734	749	767	749	737	755	729	731	735	739	750	738	730
6-7	722	725	728	727	743	773	761	743	738	738	733	735	739	755	733	729
7-8	725	725	732	726	753	786	761	725	740	733	731	736	740	756	734	729
8-9	723	727	733	732	737	745	756	706	730	734	729	739	733	736	732	730
9-10	721	721	729	732	753	742	731	709	734	728	728	738	730	733	731	727
10-11	720	720	725	728	733	711	729	723	727	724	724	730	724	724	726	723
11-12	717	718	718	720	717	714	736	735	722	715	723	733	722	725	719	723
12-13	713	714	713	711	712	710	723	725	727	713	720	724	717	717	716	718
13-14	712	712	707	709	707	709	709	722	717	706	715	722	712	712	710	715
14-15	709	711	705	709	700	691	689	705	718	702	707	722	706	696	709	712
15-16	705	709	694	705	693	682	684	700	709	705	712	724	702	690	703	713
16-17	704	712	700	706	690	665	675	682	711	707	712	724	699	678	706	713
17-18	708	711	705	689	675	655	680	680	711	705	714	720	696	673	702	713
18-19	711	707	691	682	673	651	671	683	700	705	713	719	692	670	694	712
19-20	713	714	696	695	684	677	679	678	698	704	716	722	698	680	698	716
20-21	714	714	705	706	704	692	697	686	692	713	720	727	706	695	704	719
21-22	715	720	719	714	720	698	693	707	695	716	719	731	712	704	711	721
22-23	715	718	728	725	728	698	720	720	720	723	726	732	721	716	724	723
23-24	716	723	729	727	731	703	744	722	733	726	728	731	726	725	729	724
Mean	716	719	718	720	722	716	722	716	725	721	723	730	721	719	721	722

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 3 Alert 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	741	743	756	765	771	787	775	797	738	780	779	749	765	782	760	753
1-2	741	768	763	746	802	830	796	777	780	798	761	753	776	801	772	756
2-3	763	771	771	745	797	812	773	834	923	807	800	759	796	804	812	773
3-4	794	785	783	767	826	815	787	824	872	798	774	775	800	813	805	782
4-5	848	793	778	774	810	876	839	821	892	803	772	767	814	836	812	795
5-6	811	798	783	780	805	819	820	805	942	797	791	793	812	812	826	798
6-7	788	796	802	739	800	843	861	806	858	809	796	778	806	827	802	790
7-8	788	781	778	765	788	861	800	802	851	791	771	785	797	813	796	781
8-9	766	767	772	742	772	804	798	802	802	790	760	782	780	794	777	769
9-10	761	782	733	741	798	720	742	802	721	753	736	745	753	766	737	756
10-11	742	732	727	710	718	683	766	749	768	740	720	737	733	729	736	733
11-12	708	709	705	691	720	724	776	713	720	704	702	712	715	733	705	708
12-13	729	653	694	696	706	710	705	719	654	669	640	665	687	710	678	672
13-14	664	687	669	685	682	685	695	687	627	634	651	664	669	687	654	666
14-15	609	666	657	641	630	626	698	647	620	633	674	634	645	650	638	646
15-16	666	662	633	640	663	637	654	639	573	629	600	669	639	648	619	649
16-17	629	635	658	640	622	644	632	624	570	551	542	649	616	630	605	614
17-18	631	678	631	647	614	622	591	622	636	551	605	654	623	612	616	642
18-19	648	658	664	673	631	569	614	546	634	631	640	651	630	590	651	649
19-20	657	631	666	613	682	597	637	625	621	656	660	659	642	635	639	652
20-21	683	653	701	646	683	573	624	651	673	685	691	667	661	633	676	674
21-22	686	702	706	712	715	646	656	641	673	714	692	698	687	665	701	695
22-23	729	724	718	743	696	663	675	689	787	755	704	714	716	681	750	718
23-24	729	734	744	730	727	735	760	724	749	731	762	759	740	736	738	746
Mean	721	721	720	710	727	720	728	723	737	717	709	717	721	724	721	717

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (All Days)

Table 4 Alert 3000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	791	782	790	812	833	847	830	837	833	800	776	773	809	837	809	781
1-2	784	778	782	793	818	841	816	825	818	791	773	764	799	825	796	775
2-3	779	772	777	779	810	826	815	809	814	780	768	759	791	815	788	770
3-4	772	769	772	770	793	800	790	788	794	769	765	760	778	793	776	766
4-5	769	761	758	763	768	791	786	774	767	751	755	750	766	780	760	759
5-6	757	754	754	755	760	761	761	767	744	739	745	747	754	762	748	751
6-7	749	746	748	741	735	754	738	747	726	725	735	738	740	743	735	742
7-8	742	739	737	731	718	728	718	736	711	717	723	728	727	725	724	733
8-9	724	722	728	723	703	704	703	720	694	707	718	723	714	707	713	722
9-10	718	731	725	709	696	690	691	707	681	698	711	720	706	696	703	720
10-11	715	730	718	708	684	682	691	702	664	698	704	716	701	690	697	716
11-12	718	728	718	707	684	670	676	694	656	698	707	716	698	681	695	717
12-13	724	715	717	708	688	663	646	677	656	704	697	701	691	668	696	709
13-14	721	719	719	711	686	666	649	677	669	706	706	701	694	669	701	712
14-15	713	727	719	710	701	671	655	685	687	720	716	709	701	678	709	716
15-16	731	737	728	708	717	694	683	703	698	734	722	726	715	699	717	729
16-17	742	748	750	717	720	697	702	720	717	741	735	741	728	710	731	742
17-18	755	761	759	736	729	726	728	733	743	756	749	752	744	729	749	754
18-19	769	766	769	758	740	742	759	749	762	774	765	765	760	748	766	766
19-20	774	776	780	771	775	779	772	787	786	794	780	779	779	778	783	777
20-21	782	781	793	796	800	793	794	804	818	802	789	784	795	798	802	784
21-22	786	787	796	803	820	830	811	822	842	810	789	787	807	821	813	787
22-23	793	791	802	805	838	860	833	825	862	819	783	787	816	839	822	788
23-24	793	786	795	802	836	853	832	844	843	798	781	784	812	841	809	786
Mean	754	754	756	751	752	753	745	755	749	751	746	746	751	751	752	750

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (Quiet Days)

Table 5 Alert 3000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	762	775	772	776	802	798	788	782	795	768	756	749	777	792	778	761
1-2	762	766	767	763	802	781	790	789	779	763	753	748	772	791	768	757
2-3	762	762	762	756	779	762	775	756	768	763	754	746	762	768	762	756
3-4	761	757	759	748	765	763	765	747	759	765	753	743	757	760	758	553
4-5	759	754	754	745	767	765	755	736	753	752	751	744	753	756	751	752
5-6	757	757	752	740	754	763	735	742	761	745	751	744	750	748	750	752
6-7	757	754	748	732	742	758	743	745	745	749	748	744	747	747	743	751
7-8	756	752	749	733	746	739	732	731	742	743	747	742	743	737	742	749
8-9	752	751	745	737	728	717	724	723	733	737	744	735	736	723	738	746
9-10	749	749	740	739	727	721	715	726	731	737	739	728	733	722	737	741
10-11	751	748	739	733	711	707	719	722	730	740	741	718	730	715	736	739
11-12	748	747	737	738	712	712	708	710	733	741	743	730	730	711	737	742
12-13	747	751	739	732	717	704	700	706	738	742	744	729	729	707	738	743
13-14	751	750	740	735	713	713	707	711	738	746	743	731	732	711	740	744
14-15	751	755	745	741	733	710	708	709	748	747	737	739	735	715	745	745
15-16	752	758	747	744	730	716	726	715	748	760	743	743	740	722	750	749
16-17	754	763	762	767	749	714	736	703	755	765	746	744	747	726	762	752
17-18	758	765	768	763	734	732	763	714	758	765	750	743	751	736	763	754
18-19	763	766	763	769	725	748	764	730	764	774	751	747	755	742	767	757
19-20	762	766	778	769	761	772	777	741	775	775	759	751	766	763	774	759
20-21	762	768	784	782	778	783	793	754	788	777	757	753	773	777	783	760
21-22	763	765	785	787	790	787	793	774	808	774	757	753	778	786	788	760
22-23	765	766	780	789	789	806	804	788	826	774	760	753	783	797	792	761
23-24	762	768	776	782	784	802	822	786	817	771	759	750	782	799	787	760
Mean	757	759	758	754	752	749	752	739	762	757	749	742	753	748	758	752

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (Disturbed Days)

Table 6 Alert 3000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	848	843	831	824	851	922	916	897	900	861	818	805	860	897	854	829
1-2	835	830	815	795	854	948	874	834	873	841	812	784	841	877	831	815
2-3	817	808	801	767	850	894	831	803	939	803	787	767	822	844	827	795
3-4	806	802	796	763	810	874	797	819	868	766	783	774	805	825	798	791
4-5	796	768	755	750	764	833	797	765	788	717	757	746	770	789	753	767
5-6	750	751	748	754	739	740	761	741	704	696	727	744	738	745	726	743
6-7	724	719	736	733	731	736	747	711	693	660	701	717	717	731	705	715
7-8	712	695	704	737	701	714	693	686	655	646	688	691	693	698	685	696
8-9	675	639	696	703	678	655	692	680	589	629	706	686	669	676	654	677
9-10	625	710	695	696	664	639	669	666	602	608	677	697	662	659	650	677
10-11	621	713	687	685	623	681	680	640	590	610	640	691	655	656	643	666
11-12	632	701	672	676	635	698	660	633	610	626	627	677	654	657	646	659
12-13	677	643	680	675	658	622	563	605	554	628	599	647	629	612	634	641
13-14	653	684	690	677	659	618	566	652	594	600	617	648	638	624	640	650
14-15	624	698	691	662	687	661	647	701	684	636	691	669	671	674	668	671
15-16	687	716	702	685	727	677	666	719	691	677	694	722	697	697	689	705
16-17	727	743	742	694	720	667	683	747	730	676	705	736	714	704	710	728
17-18	753	772	758	741	754	724	697	763	771	710	772	778	749	734	745	769
18-19	785	771	790	793	759	714	764	721	778	756	808	781	768	739	779	786
19-20	803	798	797	804	811	792	787	798	788	818	831	823	804	797	802	814
20-21	813	804	833	852	833	796	849	839	859	841	877	840	836	829	846	833
21-22	807	819	831	841	856	889	851	877	905	839	850	849	851	868	854	831
22-23	822	824	821	856	874	942	874	869	929	839	843	834	861	890	861	831
23-24	839	821	825	829	891	929	877	867	850	776	852	814	847	891	817	832
Mean	743	753	754	750	755	765	748	751	748	719	744	747	748	755	742	747

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (All Days)

Table 7 Alert 55,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	387	385	383	380	362	330	359	398	426	434	435	430	392	362	406	409
1-2	389	383	384	381	364	341	362	400	430	433	435	428	394	367	407	409
2-3	391	383	385	383	370	350	362	398	430	434	434	427	396	370	408	409
3-4	386	383	384	384	373	352	357	398	430	433	436	425	395	370	408	407
4-5	386	382	384	382	369	361	360	401	428	432	435	424	395	373	406	407
5-6	387	381	384	382	368	347	362	403	430	433	435	423	395	370	407	407
6-7	386	382	383	382	365	345	367	401	429	434	434	423	394	369	407	406
7-8	384	381	383	381	363	342	362	402	428	433	432	423	393	367	406	405
8-9	383	382	383	379	364	330	362	405	426	431	431	424	392	365	405	405
9-10	383	385	382	381	358	330	366	410	422	428	429	422	391	366	403	405
10-11	384	382	380	379	371	335	357	411	421	426	429	422	391	368	401	404
11-12	385	379	382	379	369	339	345	409	415	428	431	422	390	365	401	404
12-13	383	377	381	379	358	332	338	403	412	428	431	422	387	358	400	403
13-14	381	380	381	378	360	320	324	404	419	429	435	424	386	352	402	405
14-15	384	379	379	378	358	317	341	398	416	426	435	428	387	354	400	407
15-16	387	381	378	377	354	312	347	393	415	424	436	431	386	351	398	409
16-17	388	383	376	375	360	324	349	391	415	424	439	431	388	356	398	410
17-18	389	383	374	375	360	328	350	395	415	429	441	432	389	358	398	411
18-19	388	381	376	376	358	324	352	399	417	431	440	433	390	358	400	411
19-20	387	384	376	375	366	335	352	397	418	433	440	435	391	362	400	411
20-21	390	386	377	375	365	340	356	397	419	433	441	436	393	365	401	413
21-22	391	385	379	374	360	342	359	404	421	436	441	436	394	366	403	413
22-23	391	385	382	374	360	337	361	408	419	436	439	434	394	367	403	412
23-24	389	384	382	377	360	333	362	408	421	434	436	433	393	366	403	410
Mean	387	382	381	379	363	335	355	401	422	431	435	428	392	364	403	408

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Quiet Days)

Table 8 Alert 55,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	376	381	376	376	351	329	351	384	407	426	427	422	384	354	396	402
1-2	376	378	377	375	353	338	352	377	410	423	427	421	384	355	396	401
2-3	376	379	378	378	357	347	352	372	407	427	426	421	385	357	398	400
3-4	377	377	380	379	364	349	356	379	405	426	425	420	386	362	397	400
4-5	375	379	379	379	370	356	355	384	406	428	425	421	388	366	398	400
5-6	375	379	378	377	374	350	355	390	406	430	427	420	388	367	398	400
6-7	375	377	379	379	374	354	354	386	406	429	426	419	388	367	398	399
7-8	375	376	379	377	372	340	343	391	409	427	426	417	386	362	398	398
8-9	375	375	377	370	381	327	341	403	409	423	425	415	385	363	395	397
9-10	375	376	375	370	369	314	360	414	410	425	426	417	386	364	395	399
10-11	375	375	375	368	363	309	361	423	413	425	426	417	386	364	395	398
11-12	374	377	376	369	377	329	338	423	418	427	426	419	388	367	398	399
12-13	375	376	377	373	380	337	335	422	417	427	424	416	388	368	398	398
13-14	373	376	374	383	374	341	331	416	414	426	422	415	387	366	399	396
14-15	373	377	372	384	364	348	351	391	412	422	424	415	386	364	397	397
15-16	373	374	368	377	355	344	340	373	403	421	425	416	381	353	392	397
16-17	374	373	362	373	356	344	338	377	406	422	424	417	381	354	391	397
17-18	374	375	361	368	350	343	343	381	405	418	426	419	380	354	388	398
18-19	374	373	361	366	350	332	342	390	400	418	426	417	379	354	386	397
19-20	373	373	368	362	355	335	335	389	398	418	427	418	379	353	386	398
20-21	373	372	368	360	356	339	337	391	395	421	424	419	380	356	386	397
21-22	373	372	368	363	357	347	337	395	398	418	424	417	381	359	387	397
22-23	375	374	370	364	355	349	342	391	404	420	425	417	382	359	389	398
23-24	375	375	372	370	358	350	347	386	407	422	424	417	384	360	393	398
Mean	375	376	373	373	363	340	346	393	407	424	425	418	384	360	394	399

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Disturbed Days)

Table 9 Alert 55,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	402	407	398	378	357	341	345	382	467	461	452	448	403	356	426	427
1-2	409	403	401	379	360	341	324	381	494	465	450	444	404	352	435	426
2-3	410	401	401	387	362	327	334	381	494	463	450	442	404	351	436	426
3-4	400	399	398	384	367	331	334	385	503	461	460	437	405	354	436	425
4-5	406	392	394	380	364	340	337	385	486	452	455	431	402	357	428	421
5-6	414	392	399	382	374	331	338	387	474	450	446	431	402	358	426	421
6-7	412	399	393	388	388	328	323	388	481	461	449	433	404	357	431	423
7-8	406	399	396	387	385	313	332	384	464	462	452	435	401	353	427	423
8-9	399	403	397	388	378	304	344	372	461	460	450	444	400	350	426	424
9-10	399	416	396	381	370	306	347	383	453	444	438	435	397	351	418	422
10-11	407	403	392	365	355	355	328	384	450	440	441	433	396	355	412	421
11-12	418	391	392	367	357	350	310	385	421	452	445	431	393	350	408	421
12-13	412	385	388	364	358	341	295	349	399	453	451	436	386	336	401	421
13-14	405	396	389	360	348	298	252	354	430	452	467	444	383	313	408	428
14-15	410	390	392	359	334	286	298	352	412	449	462	455	383	317	403	429
15-16	420	397	394	367	341	296	332	347	420	450	459	460	390	329	408	434
16-17	421	407	395	371	341	349	320	351	439	455	474	454	398	340	415	439
17-18	421	397	400	383	352	356	345	354	430	472	478	459	404	352	421	439
18-19	417	388	404	391	354	327	369	374	438	465	470	458	405	356	425	433
19-20	412	408	394	374	361	338	345	380	443	470	466	469	405	356	420	439
20-21	420	418	397	373	352	367	361	371	455	473	476	475	411	363	424	447
21-22	414	413	404	364	336	359	356	388	474	493	483	481	414	360	434	448
22-23	408	403	410	370	358	344	361	403	447	468	479	477	411	367	424	442
23-24	409	401	402	362	367	352	368	405	428	450	471	458	406	373	410	435
Mean	410	400	397	375	359	333	333	376	453	459	459	449	400	350	421	430

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 10 Alert 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	713	693	724	743	717	744	727	733	729	724	717	723
2	714	719	729	705	731	703	716	756	717	722	705	714
3	712	712	724	726	736	722	721	752	724	726	736	717
4	700	716	724	699	738	725	705	758	726	731	719	713
5	718	716	721	725	734	712	731	792	727	720	723	714
6	716	721	709	712	718	665	755	803	725	720	710	724
7	713	716	714	729	724	735	748	---	725	718	698	724
8	718	721	714	717	726	718	716	---	741	726	722	731
9	717	712	725	726	746	738	734	747	736	723	703	734
10	717	725	713	724	713	719	731	702	731	708	720	731
11	702	720	726	721	734	707	---	699	709	716	727	728
12	713	727	722	722	727	701	723	720	742	696	720	731
13	720	709	717	713	724	740	734	713	731	725	718	731
14	698	725	721	718	744	707	728	724	734	714	731	716
15	731	716	723	745	718	724	737	692	702	724	723	729
16	707	710	721	720	725	710	665	722	716	718	726	724
17	716	722	712	724	723	733	761	723	760	724	707	724
18	719	714	720	711	715	708	716	741	715	711	724	730
19	702	718	726	716	698	696	734	657	718	721	724	723
20	723	712	725	717	726	738	726	760	718	705	725	719
21	716	708	727	716	696	753	735	742	707	731	716	722
22	714	721	718	713	724	722	734	724	763	720	710	720
23	720	717	709	760	726	713	696	751	733	710	727	726
24	707	719	713	720	719	713	723	724	705	748	704	720
25	716	720	723	723	713	712	720	727	737	725	740	731
26	721	719	717	715	715	719	737	729	725	718	730	732
27	719	720	716	738	724	727	731	707	711	713	728	734
28	718	725	719	718	726	692	747	714	716	695	731	720
29	707		726	721	727	688	710	736	729	671	719	718
30	727		726	694	715	722	739	712	738	756	725	726
31	730		725		709		746	724		722		731
Mean	715	717	720	721	723	717	728	721	727	719	720	725

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 11 Alert 3000 γ + 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	759	746	756	755	740	737	755	754	725	742	745	752
2	759	759	752	756	753	738	738	798	754	746	752	746
3	757	755	752	750	725	749	753	801	732	746	750	741
4	753	759	749	770	758	749	735	779	740	735	753	759
5	748	748	752	757	752	746	735	826	749	741	754	747
6	760	751	760	741	758	758	738	---	748	752	743	747
7	755	757	769	744	748	754	716	---	753	753	744	735
8	760	757	745	752	748	737	737	776	741	741	738	743
9	756	766	756	745	752	758	739	724	733	753	748	731
10	757	740	754	749	745	723	736	719	748	754	754	752
11	759	758	759	750	736	772	---	731	752	738	750	750
12	760	767	747	747	749	749	739	733	738	740	739	751
13	749	745	741	722	763	775	752	740	765	767	746	753
14	747	754	760	725	752	740	740	751	708	730	753	740
15	751	740	755	746	751	758	747	745	758	765	749	744
16	755	750	762	758	760	753	771	740	749	738	751	747
17	751	757	757	751	749	751	686	773	715	758	731	751
18	765	757	745	744	755	729	736	763	740	758	749	748
19	749	758	757	784	752	768	737	760	733	749	749	755
20	752	760	767	731	772	740	771	751	746	763	751	739
21	756	747	758	753	746	795	711	742	755	757	745	752
22	757	757	758	763	749	753	735	762	782	756	745	743
23	760	752	751	747	745	743	767	748	734	756	746	747
24	757	761	761	756	754	743	743	760	760	745	737	755
25	754	759	755	753	725	777	757	768	770	765	731	743
26	755	751	754	758	764	807	748	745	770	754	744	747
27	754	760	756	743	754	759	752	746	781	761	748	746
28	754	753	758	762	774	746	777	742	776	768	747	752
29	759		753	753	763	749	781	733	760	772	744	735
30	733		759	753	774	737	742	750	768	740	736	747
31	734		760		751		774	740		749		748
Mean	754	754	756	751	752	753	745	755	749	751	746	746

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas)

Table 12 Alert 55,000 γ + 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	385	405	391	381	351	265	330	439	417	431	447	429
2	381	389	385	367	352	263	335	425	405	426	443	429
3	380	387	378	372	365	303	343	451	417	421	448	453
4	380	385	381	366	392	317	377	421	410	417	439	452
5	379	380	383	377	354	338	418	462	410	414	429	461
6	377	383	376	374	355	345	408	444	407	413	427	453
7	378	382	382	376	349	396	405	---	405	418	454	447
8	379	379	384	381	376	378	368	---	408	426	472	450
9	377	375	383	375	393	381	413	377	410	419	467	435
10	376	401	415	375	408	397	375	337	406	411	465	424
11	376	400	410	384	398	338	---	360	402	427	453	419
12	378	398	388	392	396	350	385	380	424	447	446	420
13	393	405	380	388	387	380	374	404	408	436	433	426
14	407	398	378	396	404	280	368	401	410	447	431	428
15	409	393	384	384	370	294	354	377	403	435	425	424
16	417	381	377	394	389	290	268	420	400	440	422	422
17	401	379	382	392	350	339	325	400	409	425	433	420
18	396	373	389	396	341	321	324	339	415	421	429	416
19	409	369	388	363	317	294	405	367	400	423	424	416
20	390	372	382	365	317	363	387	376	396	428	423	423
21	380	379	375	358	368	368	277	382	404	420	422	419
22	378	375	376	368	348	380	311	395	480	417	420	427
23	375	368	365	388	369	373	298	389	435	424	424	422
24	377	371	368	387	368	363	334	388	458	463	438	422
25	380	371	374	390	384	316	320	415	471	446	442	415
26	377	371	370	392	395	328	346	421	453	438	424	416
27	371	371	362	399	386	311	351	416	442	424	420	412
28	368	370	372	360	315	316	377	416	466	428	421	417
29	370		377	361	314	326	318	425	445	467	415	426
30	398		376	363	329	345	353	404	442	473	429	422
31	446		373		312		420	429		452		416
Mean	387	382	381	379	363	335	355	401	422	431	435	428

Table 13 Alert Ry (Hourly Ranges in 10 γ units) January 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	2	3	2	2	1	2	2	2	3	4	5	4	5	3	3	3	4	2	1	2	1	2	2	3
2	1	1	2	2	2	1	1	1	1	1	1	1	2	1	1	2	3	2	2	2	1	1	1	1	1
3	1	1	1	2	1	2	1	1	2	2	2	2	4	2	2	1	2	2	3	2	2	1	1	2	2
4	4	5	2	2	2	1	2	1	1	1	1	3	3	5	9	4	5	4	5	4	4	2	1	2	3
5	1	2	1	1	1	2	1	2	6	2	4	2	6	5	3	3	3	2	1	2	1	3	2	2	2
6	2	2	2	1	1	1	1	2	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1
7	1	4	4	5	2	2	1	1	2	1	1	2	3	5	3	3	3	3	3	2	2	1	1	1	2
8	1	2	2	2	1	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	2	3	3	2	2
9	1	1	2	2	1	1	1	1	1	1	1	1	2	1	2	2	2	2	1	1	1	1	0	1	1
10	3	2	2	2	1	1	2	2	2	2	2	2	2	3	4	2	2	2	1	1	1	1	1	1	2
11	1	1	1	1	1	1	1	1	1	1	1	2	3	5	5	3	4	2	3	5	2	2	3	2	2
12	2	1	2	2	2	1	2	1	2	2	2	2	1	2	2	3	4	4	3	2	3	4	5	7	3
13	7	21	14	5	13	7	4	9	10	14	33	41	16	12	9	7	4	5	6	8	9	6	14	8	12
14	11	10	9	15	14	7	8	6	12	10	27	43	6	9	20	26	8	9	8	11	7	6	5	9	12
15	14	11	12	7	8	10	7	8	8	18	11	14	19	16	16	18	12	6	8	7	8	6	7	9	11
16	12	30	20	6	7	8	5	8	8	13	8	12	14	10	13	17	17	5	6	5	11	9	7	12	11
17	13	5	5	8	7	9	7	7	20	8	9	8	11	5	8	6	11	12	5	14	7	5	6	4	8
18	8	7	7	7	7	3	3	3	4	6	5	6	9	11	5	9	8	5	6	11	7	6	6	16	7
19	11	5	12	8	4	6	5	3	11	15	9	10	11	10	13	9	8	10	3	4	8	8	7	8	8
20	7	5	2	5	2	5	5	4	4	6	7	6	7	4	6	4	2	1	2	2	2	3	2	2	4
21	2	1	1	2	4	2	1	2	1	2	2	4	5	2	3	3	2	2	2	2	2	1	1	2	2
22	2	1	2	1	1	3	4	3	2	2	1	2	5	3	3	1	1	3	5	2	2	2	4	5	2
23	6	8	8	4	5	4	2	3	2	4	5	4	8	7	4	3	5	4	3	3	4	5	8	3	5
24	5	3	3	2	5	5	2	3	3	6	9	9	7	4	7	3	8	8	6	5	6	8	8	4	5
25	5	3	5	4	3	2	2	2	2	3	6	7	5	8	7	7	2	4	5	3	3	2	2	2	4
26	2	2	2	3	2	1	1	2	2	4	2	2	2	3	2	2	2	2	1	2	2	1	1	2	2
27	1	1	2	2	2	1	2	2	2	2	2	2	5	2	2	1	2	1	2	1	1	1	1	1	2
28	4	1	3	1	1	1	1	2	1	1	1	1	2	2	1	1	2	1	1	1	1	2	2	1	1
29	2	1	1	1	1	1	1	1	1	1	1	4	3	2	2	3	2	4	2	4	3	8	5	3	2
30	5	5	9	10	7	5	3	4	6	17	9	5	8	7	8	11	12	6	5	9	14	10	5	11	8
31	11	7	10	5	7	5	7	4	14	5	6	5	8	26	14	17	9	16	5	2	4	5	4	5	8
Mean	5	5	5	4	4	3	3	3	4	5	6	7	6	6	6	6	5	4	3	4	4	4	4	4	4

Table 14 Alert — Ry (Hourly Ranges in 10 γ units) — February 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	1	2	2	2	1	2	1	2	7	3	5	8	16	10	14	5	5	7	3	5	10	7	6	6	5
2	2	2	2	4	1	1	2	1	1	1	1	1	3	1	2	1	1	1	2	1	2	1	1	1	1
3	2	2	2	2	1	2	1	1	1	1	1	4	4	3	5	4	1	2	3	2	2	2	1	1	2
4	2	1	2	1	2	2	1	1	1	1	1	1	1	2	3	3	3	4	2	3	5	2	3	2	2
5	1	1	1	2	2	1	2	1	2	3	3	7	9	4	2	6	3	2	2	1	2	2	2	1	3
6	1	2	3	3	2	2	1	1	1	2	3	3	2	3	4	5	5	3	3	2	2	2	2	2	2
7	1	2	2	1	3	2	2	1	0	2	4	4	3	1	2	3	1	2	1	1	3	5	4	2	2
8	2	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	1
9	1	1	1	1	2	4	1	1	1	1	1	2	2	2	6	2	1	1	3	1	2	4	15	9	3
10	12	6	10	7	6	6	8	21	10	16	18	20	19	29	12	9	8	9	10	7	22	23	8	8	13
11	13	9	11	12	9	12	3	6	7	11	8	20	16	9	14	12	12	8	10	8	7	13	7	10	10
12	16	11	18	17	14	10	6	8	19	11	10	9	8	12	5	13	5	5	8	9	11	17	14	11	11
13	13	14	11	9	8	7	12	12	12	10	17	14	18	23	18	8	15	12	9	18	6	5	10	5	12
14	9	8	13	9	9	4	5	9	28	7	6	14	14	11	12	6	3	5	5	7	5	4	5	10	9
15	6	9	6	6	10	4	2	5	5	6	8	10	6	12	25	4	6	9	5	5	4	2	2	2	7
16	6	2	5	4	2	3	3	1	3	3	5	4	12	7	4	5	10	3	3	2	2	2	2	1	4
17	2	2	1	2	3	4	2	2	2	2	5	5	4	3	4	4	3	5	2	4	1	3	1	2	3
18	2	2	5	1	3	2	1	2	1	1	4	5	4	3	4	4	7	5	3	2	2	2	2	2	3
19	2	1	2	1	1	1	1	1	1	1	1	4	3	7	2	3	4	3	1	1	1	3	2	2	2
20	1	2	2	2	3	5	3	4	2	4	5	4	8	7	5	7	4	3	4	3	4	4	14	14	5
21	7	2	8	2	2	2	2	3	2	2	4	6	6	7	4	9	7	6	5	2	4	5	5	2	4
22	2	5	3	4	4	4	3	2	6	6	4	5	4	3	5	5	4	5	8	4	2	5	2	3	4
23	2	1	2	2	5	2	4	3	3	4	7	8	11	5	2	5	6	5	3	3	2	4	1	3	4
24	2	1	2	1	1	2	1	1	1	2	3	3	2	2	3	4	4	3	4	2	2	2	4	4	2
25	3	7	6	6	3	1	2	1	1	2	3	3	7	6	6	4	3	3	2	2	3	2	2	2	3
26	2	2	2	2	4	3	3	3	3	2	5	7	9	8	5	4	3	2	4	4	2	2	3	2	4
27	2	9	2	1	1	1	1	1	2	1	1	1	1	1	2	2	1	2	3	1	1	2	2	2	2
28	4	3	1	2	3	2	2	1	3	5	3	3	6	6	14	3	2	2	2	2	2	4	4	3	3
29																									
30																									
31																									
Mean	4	4	5	4	4	3	3	3	4	4	5	6	7	7	7	5	5	4	4	4	4	5	4	4	5

Table 15 Alert — Ry (Hourly Ranges in 10 γ units) — March 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	3	4	4	10	8	7	8	15	5	5	5	6	4	7	8	7	3	8	2	2	2	2	4	5
2	4	3	5	2	4	5	2	2	2	3	6	13	9	8	14	4	4	6	2	4	2	2	2	4	5
3	2	1	2	2	2	2	4	5	5	3	3	4	10	4	8	2	2	3	3	3	3	8	8	4	4
4	4	4	4	2	4	3	2	2	3	2	3	4	4	7	7	4	2	2	3	3	2	2	1	2	3
5	2	1	1	2	1	2	1	2	2	2	4	4	5	5	4	2	3	1	4	2	4	5	3	5	3
6	4	5	5	2	4	2	2	1	1	1	2	2	3	4	4	5	4	4	4	3	4	3	2	3	3
7	2	3	4	2	2	3	1	2	2	2	2	1	1	1	1	1	1	1	3	5	4	9	18	24	4
8	17	13	5	13	4	8	9	6	5	6	15	21	24	13	17	9	9	17	9	11	17	11	11	10	12
9	14	11	10	8	14	13	7	2	6	4	16	11	15	23	10	9	9	7	8	6	10	10	7	6	10
10	9	11	14	7	10	6	7	5	10	13	15	18	10	7	15	28	17	25	11	22	12	11	9	12	13
11	14	19	12	11	7	6	5	4	6	5	4	4	7	8	17	11	15	11	13	13	9	8	12	8	10
12	11	8	7	9	5	8	5	5	8	8	12	11	10	10	14	7	17	3	6	10	8	3	3	3	8
13	4	5	2	2	3	3	2	4	4	3	7	4	10	13	20	36	6	6	6	6	3	2	3	3	7
14	7	3	2	2	1	2	1	1	1	1	1	2	2	3	2	2	2	5	3	5	2	4	3	4	2
15	2	2	2	2	3	3	1	3	2	2	2	2	2	1	1	2	2	2	2	2	1	1	2	2	2
16	2	1	1	1	1	1	1	1	2	1	2	1	1	2	4	2	2	3	2	1	2	2	3	2	2
17	2	4	1	1	1	1	1	1	1	2	1	2	4	4	2	2	4	2	7	6	7	5	11	4	3
18	5	3	3	5	6	2	2	3	2	5	2	4	5	6	5	5	5	5	5	5	3	5	3	5	4
19	5	3	3	6	5	4	6	3	2	3	2	3	4	4	4	4	5	3	3	11	2	2	8	9	4
20	2	2	4	2	2	2	2	1	1	1	1	2	2	1	3	4	4	2	4	5	4	7	8	9	3
21	5	4	5	4	5	4	5	2	2	2	2	2	3	3	2	4	2	2	2	1	1	2	2	2	3
22	1	1	2	1	1	1	1	1	1	3	2	1	2	4	3	7	3	2	4	2	2	1	2	2	2
23	4	10	8	3	2	4	4	4	2	5	14	7	11	8	20	13	7	6	4	4	2	4	5	3	6
24	2	6	3	2	2	2	2	2	3	2	3	6	5	2	8	7	4	9	2	2	2	3	5	6	4
25	4	2	2	2	1	2	2	1	1	2	2	2	5	4	4	3	4	6	2	4	4	2	2	2	3
26	2	2	2	2	1	1	1	1	1	1	2	3	2	4	8	4	3	6	8	5	5	3	2	1	3
27	2	3	3	2	1	1	1	1	1	1	1	2	3	2	2	2	2	3	2	4	2	1	1	2	2
28	1	1	2	1	2	2	1	2	2	3	3	2	2	4	2	2	3	2	2	2	4	4	5	6	3
29	5	3	2	6	2	7	2	2	2	2	2	3	4	4	4	5	5	5	8	4	5	4	3	3	4
30	3	5	2	1	3	2	2	2	1	1	3	2	4	2	1	2	3	1	2	3	3	5	1	1	2
31	1	2	1	3	2	2	2	2	2	2	1	3	3	3	6	2	2	2	1	2	3	3	9	5	2
Mean	5	5	4	4	4	4	3	3	3	3	4	5	6	5	7	7	5	5	5	5	4	4	5	5	5

Table 16 Alert — Ry (Hourly Ranges in 10 γunits) — April 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	4	8	5	9	7	5	6	3	2	3	2	2	4	12	5	6	6	5	5	6	3	2	1	1	5
2	3	4	4	3	1	2	1	2	1	1	1	1	3	2	2	5	4	7	3	7	5	2	2	3	3
3	6	3	2	5	4	2	1	2	4	3	3	2	4	5	3	5	3	2	2	2	2	2	1	2	3
4	1	2	2	1	3	3	4	5	6	5	7	6	13	9	15	20	7	13	11	10	12	12	21	15	8
5	23	29	11	16	13	11	13	8	10	7	9	8	12	13	18	17	12	16	9	7	7	8	8	12	12
6	9	14	9	8	9	13	9	11	14	9	11	19	9	11	9	11	12	8	11	18	12	13	5	8	11
7	8	5	8	15	6	8	11	13	11	16	9	14	7	15	12	10	12	6	5	5	3	6	8	8	9
8	8	7	11	8	4	4	3	4	5	8	7	11	15	3	3	6	7	5	11	7	8	5	5	5	7
9	2	2	3	3	7	5	5	5	5	4	4	4	10	9	8	8	5	10	5	4	6	6	2	3	5
10	1	2	2	2	1	1	1	2	1	3	2	2	5	6	4	3	2	1	6	5	6	2	3	2	3
11	1	2	3	1	1	1	2	3	6	5	2	2	2	5	5	2	4	2	4	5	3	1	5	6	3
12	14	14	3	9	4	3	3	6	4	5	9	8	3	16	8	3	8	9	5	4	3	7	2	3	6
13	2	2	2	4	2	2	4	2	5	8	5	2	4	5	9	5	3	8	9	4	13	5	7	4	5
14	7	7	8	7	3	8	7	7	5	12	9	7	15	7	7	12	11	8	8	10	7	9	8	14	8
15	8	6	10	8	9	5	13	5	4	5	3	9	8	15	5	7	3	5	4	3	3	7	6	6	7
16	4	2	5	8	10	7	9	4	5	5	3	3	6	8	5	10	4	4	8	5	11	6	4	8	6
17	5	5	2	5	6	4	2	3	4	3	3	3	5	8	3	4	4	4	7	10	4	3	2	2	4
18	4	2	2	2	6	6	2	4	5	2	2	6	7	9	9	16	15	8	9	5	18	7	5	9	7
19	8	6	7	8	11	9	12	11	5	4	5	4	5	3	7	9	15	8	21	16	13	7	7	3	8
20	21	6	3	6	15	11	7	5	2	6	7	5	8	3	4	11	14	5	3	2	6	4	2	2	7
21	1	1	2	3	5	2	1	1	2	2	3	4	5	3	5	4	4	5	8	4	4	4	3	6	3
22	6	18	16	7	5	3	5	8	7	3	3	6	9	3	8	9	7	4	7	9	12	11	4	4	7
23	3	5	7	6	5	4	5	3	5	3	4	4	2	4	3	4	3	7	10	4	6	2	2	2	4
24	2	1	1	4	2	4	3	2	2	3	2	2	4	3	4	2	8	4	5	3	3	2	2	2	3
25	2	1	4	2	3	3	5	5	3	3	1	2	2	2	3	2	4	5	2	2	3	7	2	6	3
26	3	5	5	2	4	4	3	3	2	2	2	2	4	5	6	4	4	3	2	3	6	4	5	6	4
27	5	7	13	6	3	5	3	4	9	3	4	5	8	18	14	17	10	12	8	8	3	2	2	5	7
28	7	2	1	1	2	2	4	3	5	3	2	4	1	3	2	2	5	2	2	2	3	3	4	3	3
29	2	4	1	12	4	3	5	3	2	2	1	4	2	2	2	4	2	2	3	4	5	3	3	3	3
30	2	1	4	5	4	3	4	3	2	5	6	4	5	6	8	11	27	8	34	33	20	25	23	58	13
31																									
Mean	6	6	5	6	5	5	5	5	5	5	4	5	6	7	7	8	7	6	8	7	7	6	5	7	6

Table 17 Alert — Ry (Hourly Ranges in 10γ units) — May 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	21	25	21	27	10	18	23	14	15	7	9	12	18	15	17	18	14	16	7	11	10	13	19	19	16
2	18	12	16	7	14	16	18	10	11	19	11	24	30	14	18	15	11	17	12	10	8	6	31	18	15
3	9	16	19	12	13	12	10	16	15	14	7	9	14	12	7	15	12	15	18	17	13	11	10	9	13
4	7	8	9	14	11	8	5	4	19	12	21	10	19	9	10	10	10	14	9	7	6	9	18	9	11
5	8	17	19	18	14	11	10	16	6	6	6	10	6	9	7	9	13	14	14	9	7	3	5	8	10
6	8	4	9	8	9	8	10	9	3	5	3	6	3	8	5	9	12	14	8	7	10	6	6	5	7
7	5	3	6	4	8	8	6	11	4	9	12	7	6	10	6	4	5	11	14	4	7	14	8	8	7
8	14	18	12	11	12	11	9	10	17	10	6	9	5	11	13	9	14	5	9	12	15	30	8	8	12
9	6	7	9	8	13	9	13	8	6	11	5	11	10	11	21	25	16	8	19	16	7	10	7	10	11
10	4	8	11	21	15	8	9	7	7	9	10	8	22	13	13	10	15	9	6	20	7	7	8	10	11
11	13	5	15	12	17	8	6	10	11	6	7	8	19	9	12	9	9	4	13	10	6	5	11	7	10
12	8	7	12	7	6	8	7	9	4	4	6	4	10	15	10	7	6	17	17	18	8	7	11	8	9
13	6	8	20	30	21	11	12	7	8	9	9	18	15	9	15	18	8	11	8	5	11	29	22	21	14
14	22	9	4	8	7	11	15	7	10	9	2	5	9	7	5	10	9	8	11	13	8	11	7	8	9
15	7	8	11	7	6	4	7	6	5	4	4	4	5	5	10	6	8	6	5	5	5	9	5	6	6
16	7	6	8	4	3	3	2	2	3	2	2	2	2	3	3	5	2	3	2	2	3	5	4	2	3
17	2	2	2	4	3	5	17	3	9	7	10	4	3	8	7	5	9	13	13	3	5	4	3	3	6
18	1	5	2	6	6	2	3	10	5	5	2	5	9	5	2	5	4	4	8	10	6	3	2	5	5
19	2	6	2	5	2	2	7	6	2	6	5	2	7	9	6	5	16	12	12	4	8	4	5	8	6
20	6	8	4	7	9	5	5	7	5	5	2	2	2	4	2	4	2	4	3	2	5	8	7	2	5
21	3	5	5	6	8	4	1	4	3	4	5	3	3	10	9	4	9	10	8	6	10	4	2	7	6
22	5	5	2	5	4	6	5	6	3	3	1	2	2	5	7	7	4	7	2	2	4	3	2	3	4
23	1	1	2	2	6	3	2	6	6	3	3	2	5	6	9	4	6	6	5	4	4	2	1	2	4
24	4	2	2	3	1	2	4	5	2	2	2	1	4	3	3	2	4	8	7	2	3	2	1	1	3
25	3	6	6	2	5	5	13	8	16	13	10	11	20	6	13	17	10	9	9	10	6	8	4	4	9
26	8	6	5	6	3	5	4	4	4	3	5	6	6	13	7	7	5	7	7	8	5	6	5	12	6
27	6	4	5	3	8	9	8	3	7	3	5	7	5	7	5	3	10	19	13	8	5	9	8	12	7
28	13	21	18	15	23	23	23	25	17	12	8	18	17	6	11	7	15	6	11	10	14	16	21	26	16
29	14	16	28	18	28	15	15	17	13	8	12	11	12	13	22	21	13	18	36	19	13	9	7	6	16
30	14	9	14	10	11	7	19	10	10	7	20	18	7	9	8	11	12	9	8	14	13	14	8	8	11
31	7	2	5	5	3	21	11	12	9	6	12	12	22	25	9	13	9	10	13	12	19	20	7	8	11
Mean	8	8	10	9	10	9	10	9	8	7	7	8	10	9	9	10	9	10	11	9	8	9	9	8	9

Table 18 Alert — Ry (Hourly Ranges in 10γ units) — June 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	7	11	10	8	13	11	12	6	10	12	16	16	13	16	27	15	28	15	6	6	10	10	8	11	13
2	12	11	8	9	10	11	15	19	14	20	12	4	13	10	7	7	13	19	12	18	17	3	8	5	12
3	15	9	11	18	15	8	10	9	8	7	10	10	18	17	17	9	6	15	9	20	13	17	5	15	12
4	7	6	4	9	8	8	11	8	7	9	9	7	3	4	13	7	5	6	9	12	5	9	3	5	7
5	7	3	3	2	7	8	3	5	3	3	2	2	2	2	2	2	2	3	2	3	2	2	3	1	3
6	5	3	2	2	5	10	2	6	5	4	2	4	2	4	2	12	7	11	17	11	15	8	25	31	8
7	11	23	10	16	9	14	10	13	11	17	9	14	16	16	22	9	8	15	13	9	22	20	18	6	14
8	10	12	9	12	7	10	18	14	11	19	17	17	8	12	18	15	6	16	18	11	11	10	27	12	13
9	10	5	11	15	20	18	14	10	12	7	8	14	10	10	17	11	7	14	5	6	8	8	8	4	11
10	10	9	11	5	6	4	13	16	4	5	7	8	4	13	8	7	9	9	9	7	7	8	6	8	8
11	7	5	6	13	21	19	7	7	10	6	3	5	7	14	8	15	8	12	4	2	5	4	6	3	8
12	8	9	9	5	4	3	6	5	2	3	6	3	5	2	5	7	3	6	6	16	3	5	4	3	5
13	3	4	6	8	5	8	7	4	6	7	5	8	7	11	5	2	10	9	5	4	10	6	5	3	6
14	9	12	5	4	5	7	9	10	15	7	7	5	5	7	17	19	18	14	6	2	4	2	5	13	9
15	7	9	10	10	8	8	6	6	2	4	5	7	6	4	5	6	11	5	14	9	5	21	3	5	7
16	8	4	3	2	4	4	5	5	4	4	5	4	3	3	4	10	4	11	8	8	6	5	3	8	5
17	6	17	5	12	14	4	10	12	13	5	6	3	6	6	5	7	6	8	7	8	6	15	5	8	8
18	7	4	5	8	9	14	23	26	8	12	15	46	27	18	29	12	11	4	10	20	8	12	7	8	14
19	10	7	5	9	8	8	18	5	5	4	3	3	2	3	17	9	22	18	18	14	8	9	8	7	9
20	11	16	24	14	14	10	11	8	6	8	14	14	10	11	9	5	8	9	10	4	9	5	15	10	5
21	14	10	2	10	4	6	7	14	6	7	4	5	4	4	5	11	13	11	8	8	6	5	5	5	7
22	4	10	6	8	13	6	2	10	9	2	8	3	4	5	5	5	11	8	5	7	8	5	7	8	7
23	8	10	4	8	7	13	7	2	11	10	5	5	3	5	3	3	4	9	7	8	18	7	7	3	7
24	3	2	3	3	7	15	8	4	2	5	9	3	8	11	10	17	11	8	2	8	13	6	8	4	7
25	8	9	9	9	24	13	12	13	11	4	9	5	6	27	46	40	31	16	40	43	42	28	32	29	21
26	41	44	37	20	17	14	25	26	20	17	11	14	15	17	11	12	10	12	19	19	17	13	24	30	20
27	14	15	17	16	22	15	15	20	13	15	18	12	15	19	16	15	22	20	26	17	14	18	8	10	16
28	12	10	8	7	12	13	9	14	17	10	8	5	13	14	12	19	5	12	24	22	24	12	4	11	12
29	9	15	20	25	9	15	22	9	11	6	11	8	5	8	15	18	16	15	13	18	12	15	9	5	13
30	8	4	19	7	24	11	13	14	12	9	8	5	12	15	14	13	17	7	19	14	5	6	19	11	12
31																									
Mean	10	10	9	10	11	10	11	11	9	8	8	9	8	10	12	11	11	11	12	12	11	10	10	9	10

96268—5½

Table 19 Alert — Ry (Hourly Ranges in 10γ units) — July 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	9	9	15	22	13	9	6	12	12	9	6	4	3	3	4	4	3	4	7	5	3	4	3	1	7
2	2	2	4	3	4	7	5	4	5	4	3	5	4	3	9	4	7	13	10	2	5	5	7	4	5
3	7	7	4	3	7	2	3	2	8	2	3	3	4	6	4	2	2	1	3	4	2	3	5	2	4
4	2	1	6	3	2	5	4	8	13	6	3	11	15	15	14	18	12	15	15	13	8	11	16	16	10
5	24	25	11	19	37	30	27	39	15	10	4	16	11	8	26	8	7	16	12	17	24	19	15	11	18
6	13	14	23	26	8	11	20	18	7	7	12	13	15	11	14	15	8	11	11	16	9	9	9	7	13
7	7	7	12	8	10	7	5	10	12	5	13	6	10	7	20	14	16	18	14	16	12	5	17	10	11
8	10	11	15	16	17	14	24	12	9	7	4	6	12	12	16	20	17	23	5	15	17	13	12	13	13
9	12	9	19	14	24	14	18	6	12	13	12	16	17	15	21	13	16	13	14	10	12	9	7	13	14
10	9	9	12	11	11	17	10	9	5	8	7	13	9	8	8	19	23	20	11	16	7	8	14	11	11
11	7	8	12	11	14	14	9	5	4	2	4	2	5	6											
12	5	5	6	2	3	9	9	4	7	5	4	5	5	6	3	8	5	13	5	10	9	6	5	3	6
13	5	6	4	4	9	3	5	6	2	4	4	4	10	5	5	10	6	6	4	3	4	5	4	5	5
14	4	3	6	3	3	3	2	2	5	2	2	3	2	8	9	9	5	5	5	4	5	3	2	2	4
15	4	2	2	1	6	5	3	6	3	3	2	5	7	4	3	10	2	5	1	2	2	9	6	5	4
16	5	4	11	5	11	11	4	8	8	7	5	8	12	8	22	5	6	17	14	6	5	4	8	9	8
17	7	10	5	8	7	5	7	3	5	12	3	13	7	3	5	6	9	11	8	8	4	2	4	6	7
18	4	5	10	17	7	12	18	7	13	7	10	11	5	12	21	13	16	13	7	21	17	9	16	13	12
19	5	3	3	15	8	9	8	7	3	2	3	6	7	12	12	7	9	8	5	7	6	4	6	9	7
20	4	4	3	5	16	7	7	9	5	3	3	8	9	8	6	5	29	16	7	16	9	9	8	5	8
21	9	9	9	7	12	13	16	17	10	11	14	10	25	25	14	28	43	44	9	9	9	6	6	5	15
22	6	4	5	9	16	19	9	7	12	6	7	8	8	14	13	12	13	8	20	5	5	8	13	15	10
23	10	6	10	11	14	7	13	10	4	7	10	9	16	21	42	28	18	14	22	13	18	26	26	38	16
24	19	15	21	11	9	13	18	17	13	9	12	14	38	37	17	11	15	16	15	7	16	41	15	11	17
25	10	10	7	13	20	10	9	18	5	6	8	7	7	16	18	8	16	13	28	6	4	8	8	10	11
26	9	19	8	20	19	9	12	20	13	10	11	13	15	10	14	10	10	12	22	16	13	8	14	8	13
27	8	30	16	20	13	13	21	13	10	8	6	9	9	16	18	15	16	15	5	12	18	12	13	8	13
28	16	8	10	12	11	5	6	6	6	7	3	5	5	6	6	5	5	5	9	6	2	2	4	2	6
29	2	3	3	2	3	4	5	4	2	2	4	3	2	5	6	9	9	7	3	5	6	6	10	8	5
30	10	19	9	7	18	10	13	8	6	10	10	6	31	15	29	33	13	24	21	21	39	20	17	7	17
31	22	35	15	11	13	14	18	10	7	5	6	9	27	17	17	13	11	14	15	9	11	19	14	24	15
Mean	9	10	10	10	12	10	11	10	8	7	7	8	12	11	14	12	12	13	11	10	10	10	10	9	10

Table 20 Alert — Ry (Hourly Ranges in 10γ units) — August 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	18	14	15	24	16	20	16	9	6	15	12	16	17	23	17	20	12	12	14	30	15	9	15	18	16
2	16	8	14	16	24	8	10	14	15	12	9	9	18	15	25	21	9	13	15	13	19	14	15	13	14
3	8	7	10	11	16	12	9	12	9	5	4	6	7	9	9	15	8	9	10	6	8	12	10	20	10
4	13	5	19	11	6	20	13	13	10	12	7	11	10	13	12	7	4	7	12	13	16	16	10	18	12
5	10	9	5	6	9	4	13	12	11	5	12	11	23	7	9	8	16	5	7	21	10	9	7	6	10
6																									
7																	4	7	13	11	9	7	9	7	
8	5	4	6	8	5	6	7	7	6	5	3	6	9	5	10	5	7	6	4	3	3	2	2	5	5
9	3	3	5	9	6	10	11	7	7	5	4	6	8	10	9	7	4	10	8	8	5	4	6	6	7
10	4	3	6	2	8	3	4	5	4	3	3	6	8	7	7	16	6	4	9	6	4	4	2	7	6
11	5	11	6	4	4	7	14	4	2	2	1	4	2	5	8	8	7	8	6	3	5	6	7	9	6
12	5	3	8	8	5	8	6	4	3	1	4	6	4	4	5	6	2	4	5	4	6	5	5	3	5
13	2	3	2	2	1	4	5	2	2	2	1	3	1	3	2	5	4	4	3	3	3	4	2	4	3
14	3	2	4	4	3	3	6	4	3	1	1	2	4	4	7	6	2	7	7	4	4	3	4	6	4
15	2	2	2	1	2	2	3	3	4	3	3	4	7	12	24	13	6	11	10	3	10	10	11	7	6
16	11	7	4	4	8	11	6	3	3	2	6	8	15	9	16	13	10	7	12	5	5	6	6	7	8
17	9	7	13	5	8	2	5	4	3	4	4	5	4	4	5	10	13	8	7	10	22	10	19	6	8
18	8	4	6	6	11	5	7	6	22	21	15	11	24	21	36	18	17	11	7	24	16	19	14	7	14
19	15	14	6	8	4	10	4	4	7	3	2	4	5	6	14	16	27	15	17	23	16	21	16	13	11
20	16	15	10	28	13	17	9	9	8	21	20	19	37	23	8	9	14	18	17	7	9	14	6	16	15
21	22	6	15	12	12	11	16	19	10	13	15	16	16	8	19	11	24	18	15	5	9	12	10	10	13
22	10	9	7	4	4	12	13	6	11	5	5	8	5	11	4	6	10	4	5	6	9	10	17	12	8
23	10	9	6	6	7	5	8	5	6	4	7	9	11	9	10	16	3	10	9	7	6	2	2	6	7
24	10	10	12	8	4	8	6	7	11	7	7	6	7	3	13	8	7	5	7	6	7	9	6	5	8
25	6	5	4	5	6	7	7	10	8	8	7	5	7	7	12	6	8	4	12	10	6	13	12	9	8
26	4	9	7	13	9	12	10	7	7	8	7	7	13	15	8	11	5	10	9	10	10	3	7	7	9
27	6	4	11	7	5	8	9	8	6	4	2	8	8	13	10	10	19	27	10	11	13	22	21	10	11
28	14	9	7	19	15	9	9	7	8	15	16	11	15	16	19	14	13	13	15	14	16	8	16	10	13
29	7	6	7	14	12	7	6	12	11	10	20	10	11	16	10	6	7	10	13	8	5	6	7	9	10
30	9	10	6	10	13	7	5	11	5	3	8	10	14	8	14	9	6	8	11	4	14	5	7	14	9
31	13	9	8	5	16	8	8	5	4	4	4	5	10	10	13	6	13	7	3	8	4	13	9	9	8
Mean	9	7	8	9	9	8	8	8	7	7	7	8	11	10	12	11	10	9	10	9	9	9	9	9	9

Table 21 Alert Ry (Hourly Ranges in 10 γ units) September 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	9	8	12	6	7	6	9	6	14	8	11	12	11	19	10	5	7	7	7	7	10	7	4	8	9
2	5	4	4	4	4	8	4	2	4	3	3	2	2	3	5	3	7	11	10	9	14	13	9	4	6
3	9	8	7	13	16	13	6	4	3	4	6	6	4	8	4	11	4	7	4	4	7	5	6	7	7
4	1	5	7	4	3	2	3	3	4	4	5	4	3	5	7	3	4	6	7	6	5	8	8	8	5
5	7	6	4	2	3	3	2	2	3	5	3	7	7	10	14	16	10	11	7	11	8	6	5	12	7
6	5	8	6	5	3	8	10	4	4	4	4	3	5	4	6	6	4	3	3	3	4	7	5	9	5
7	4	3	2	5	4	5	5	4	4	1	2	2	3	2	2	5	2	5	3	3	3	3	5	10	4
8	4	5	4	4	8	9	4	4	4	2	8	12	12	11	11	5	5	6	5	6	1	5	4	2	6
9	6	8	5	8	9	7	7	4	5	7	5	8	15	17	19	7	9	7	6	3	7	6	4	3	8
10	2	5	10	3	3	4	7	7	3	5	7	8	4	12	6	11	12	8	7	4	10	10	11	7	7
11	6	8	5	8	10	7	7	5	7	10	4	14	17	13	10	11	6	13	7	16	7	7	7	11	9
12	11	7	13	8	5	7	9	6	8	6	6	8	13	10	10	4	5	9	11	4	7	9	3	2	8
13	4	3	6	3	4	2	3	4	4	2	2	2	4	2	5	4	3	4	5	10	7	14	5	12	5
14	16	7	6	8	13	8	9	9	11	26	36	18	4	35	20	19	20	24	21	19	13	28	21	5	18
15	13	14	3	10	10	8	10	10	8	6	8	19	18	35	28	11	19	35	15	20	14	17	14	22	15
16	19	6	14	10	9	12	12	10	16	10	12	28	24	16	13	15	17	11	15	17	15	8	14	10	14
17	20	11	7	10	14	12	17	16	10	7	14	27	20	17	13	18	10	10	16	18	10	5	8	16	13
18	15	17	16	12	13	11	7	11	13	7	8	22	11	10	9	7	15	21	11	6	6	7	12	8	11
19	9	12	16	14	11	16	10	14	7	15	10	27	30	9	10	6	11	9	7	7	6	6	5	5	11
20	4	7	4	4	4	4	1	2	6	9	4	12	8	16	13	12	6	5	4	7	7	3	12	8	7
21	12	10	6	4	7	4	6	7	6	10	7	7	3	6	60	35	21	22	44	16	13	5	35	16	15
22	10	12	19	11	26	10	10	24	26	16	39	20	17	16	10	7	32	26	26	22	36	22	23	44	21
23	45	35	38	30	19	34	20	16	19	16	25	29	21	60	43	51	21	26	12	19	13	7	6	4	25
24	2	4	6	13	12	8	4	5	3	4	10	17	10	20	9	4	7	4	14	15	8	11	8	14	9
25	11	12	19	41	15	17	7	10	16	13	12	16	18	12	14	10	11	25	10	13	20	10	13	8	15
26	9	6	6	17	8	8	7	5	9	11	13	11	13	15	7	15	21	15	11	9	14	13	13	18	11
27	18	20	12	20	13	9	10	6	9	12	8	10	14	20	20	15	10	12	19	22	33	17	26	31	16
28	20	16	20	11	14	5	7	7	15	8	10	16	17	9	19	8	9	10	17	17	21	11	11	14	13
29	8	9	7	5	13	6	9	10	11	6	10	11	19	15	13	10	14	19	9	12	8	10	10	8	11
30	5	8	11	4	8	7	7	6	4	14	17	9	14	12	6	5	4	7	12	5	5	12	5	2	8
31																									
Mean	10	9	10	10	10	9	8	7	8	8	10	13	13	15	14	11	11	13	11	11	11	10	10	11	11

Table 22 Alert Ry (Hourly Ranges in 10 γ units) October 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	6	7	4	4	2	3	2	4	5	1	1	2	4	4	2	2	2	4	3	3	3	3	2	3
2	3	2	2	3	2	2	2	2	2	1	2	2	5	4	5	4	3	3	3	5	2	2	4	3	3
3	2	2	1	3	3	2	2	2	3	4	2	2	3	5	4	4	3	2	2	3	4	2	2	4	3
4	3	4	2	4	4	4	2	1	4	6	10	2	7	4	6	2	7	3	2	1	3	2	2	2	4
5	2	3	3	1	6	5	1	1	4	11	10	7	7	6	6	4	3	3	6	7	6	2	4	1	5
6	5	4	5	4	4	4	2	1	1	1	1	1	1	2	2	4	2	3	2	4	5	2	1	2	3
7	2	2	4	6	4	2	3	1	2	6	6	7	3	5	4	4	4	5	2	3	4	17	11	11	5
8	8	13	5	9	8	7	7	4	4	4	8	9	8	9	6	7	4	5	3	3	3	5	2	2	6
9	2	2	2	4	2	2	4	4	2	3	3	4	6	5	2	4	5	4	5	6	2	3	7	5	4
10	8	1	2	4	2	2	3	3	3	7	3	5	7	5	5	3	2	3	11	9	15	5	8	3	5
11	4	5	5	6	4	2	3	13	5	15	7	9	23	14	5	7	10	5	7	8	6	9	6	11	8
12	11	10	16	13	8	6	7	4	11	8	10	13	32	33	24	16	13	14	10	12	19	15	11	5	13
13	13	5	16	8	5	10	5	3	12	10	7	10	15	10	9	14	7	7	15	8	14	10	8	16	10
14	6	13	11	12	8	9	8	14	16	20	15	10	13	7	21	10	12	13	14	11	12	7	5	10	12
15	8	4	6	8	4	5	7	3	3	7	9	11	7	16	7	3	5	5	9	11	6	8	16	16	8
16	13	10	13	5	8	7	13	3	4	5	10	8	12	5	5	3	10	13	5	11	6	4	3	6	8
17	3	2	2	4	3	3	2	2	2	2	1	7	3	2	2	2	5	4	2	2	2	1	2	2	3
18	2	5	1	2	4	2	1	2	1	2	2	8	11	7	4	4	5	3	4	4	2	1	3	2	3
19	8	6	2	4	2	2	2	3	2	2	2	3	5	4	3	7	5	4	2	2	4	2	2	4	3
20	5	2	1	4	1	1	2	2	2	10	8	13	13	18	15	4	3	4	6	4	2	2	18	15	6
21	2	2	4	9	3	1	9	4	3	3	7	4	4	4	5	2	3	1	2	1	2	1	3	1	3
22	4	2	1	1	1	1	1	1	2	3	1	2	3	3	4	6	3	2	2	3	2	1	1	2	2
23	1	1	2	2	2	1	1	1	1	1	1	3	5	8	1	2	3	4	3	3	5	4	4	4	3
24	12	10	14	11	4	4	4	17	9	9	21	16	16	19	10	9	8	9	5	11	7	10	8	11	10
25	19	17	7	10	4	5	2	3	3	8	7	9	5	4	6	5	5	5	3	4	7	4	4	6	6
26	9	5	8	9	3	3	3	2	1	2	4	6	2	5	6	7	4	4	6	2	3	6	2	4	4
27	3	3	4	3	2	4	2	1	1	1	1	1	3	2	3	2	2	1	2	6	5	1	0	1	2
28	2	1	2	2	1	1	1	1	1	2	3	5	2	2	1	4	8	10	16	21	6	6	4	4	4
29	8	5	7	6	4	5	3	5	2	2	3	10	10	8	25	10	37	28	33	19	20	47	30	21	15
30	9	15	11	23	11	15	15	15	16	8	10	11	7	6	6	5	3	3	4	2	3	2	2	3	8
31	3	2	2	3	4	2	2	2	3	5	2	8	4	8	2	6	9	4	5	4	5	5	4	4	4
Mean	6	5	5	6	4	4	4	4	4	6	6	7	8	8	7	5	6	6	6	6	6	6	6	6	6

Table 23 Alert — Ry (Hourly Ranges in 10 γ units) — November 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	2	4	3	4	6	3	7	4	4	5	10	5	11	9	14	7	5	9	4	4	4	3	3	5
2	6	4	5	7	7	5	5	4	3	5	11	13	7	13	11	9	10	7	8	8	4	8	7	8	7
3	4	6	10	5	4	7	4	4	7	8	10	9	5	7	3	2	3	3	7	5	6	17	16	1	6
4	5	6	6	3	2	4	3	3	4	9	9	3	8	4	4	2	4	6	3	4	2	3	2	3	4
5	2	1	2	4	2	1	1	1	1	3	2	2	2	1	2	3	4	2	2	1	1	2	1	1	2
6	3	4	5	3	2	2	3	3	7	4	3	8	10	10	9	9	6	2	5	7	5	13	13	4	6
7	8	5	6	6	10	4	5	2	5	7	13	13	16	12	10	17	13	16	20	12	18	12	9	13	10
8	18	16	10	12	9	17	9	6	8	7	14	17	24	12	17	13	10	7	5	12	12	12	10	9	12
9	8	7	12	10	5	6	3	19	8	10	14	11	23	22	12	7	18	14	10	5	9	11	13	8	11
10	8	6	14	14	10	6	4	7	10	13	20	13	13	7	13	10	6	19	7	8	6	9	7	9	10
11	10	8	10	7	8	8	3	11	4	7	10	16	7	2	8	8	8	7	14	8	11	7	8	4	8
12	8	7	6	5	3	3	3	11	8	5	10	15	4	4	8	7	9	12	8	4	4	3	4	4	7
13	1	4	2	5	3	1	2	1	1	3	4	6	6	5	3	4	4	2	4	1	3	3	2	1	3
14	4	4	4	2	1	4	3	2	1	2	2	2	9	7	4	2	3	2	1	2	1	3	3	1	3
15	3	4	1	5	4	2	2	1	2	3	2	4	4	6	4	3	2	2	1	2	1	1	1	1	3
16	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	2	2	1
17	3	1	1	1	1	1	1	1	3	12	7	13	4	16	16	25	4	10	19	5	4	4	3	4	7
18	2	1	1	2	2	3	1	1	1	1	1	2	2	2	4	4	2	2	6	1	1	1	1	1	2
19	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	2	3	2
20	1	3	5	11	4	2	1	1	1	2	1	2	4	5	2	3	3	1	1	2	1	1	1	1	3
21	1	1	1	1	1	2	1	1	1	2	1	1	3	3	6	3	1	1	1	1	1	1	1	1	2
22	1	1	1	1	3	1	1	1	1	4	4	4	3	2	3	7	7	4	4	9	2	3	3	4	3
23	4	5	6	4	1	3	1	5	7	9	4	6	4	5	4	6	4	1	2	2	3	3	2	1	4
24	2	2	3	2	4	5	3	4	3	4	5	3	16	14	6	7	7	7	6	6	7	4	11	9	6
25	6	10	4	6	5	7	6	6	5	8	5	8	5	8	8	6	7	3	3	1	1	1	1	1	5
26	1	1	1	2	1	1	1	2	7	4	4	2	4	2	2	2	1	1	1	1	1	1	1	1	2
27	1	1	2	2	1	1	3	2	1	7	3	5	4	4	3	1	2	2	2	3	2	5	4	1	3
28	2	2	6	2	3	6	2	1	1	2	3	4	4	2	3	2	1	1	2	1	1	1	1	1	2
29	2	1	2	2	1	2	2	1	1	2	5	4	2	5	4	10	2	1	1	1	2	9	10	7	3
30	7	5	4	1	2	2	3	1	1	5	7	5	34	19	8	4	4	4	6	3	2	5	4	2	6
31																									
Mean	4	4	5	4	4	4	3	4	4	5	6	7	8	7	6	7	5	5	5	4	4	5	5	4	5

Table 24 Alert — Ry (Hourly Ranges in 10γ units) — December 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	2	2	4	2	2	2	2	2	2	3	2	2	2	2	9	3	2	2	2	2	2	3	3	3
2	6	5	2	4	6	4	2	2	6	5	3	4	5	4	14	11	6	4	4	3	4	7	7	6	5
3	3	7	8	8	7	5	4	32	34	14	13	10	8	12	14	12	8	9	6	11	14	20	13	5	12
4	8	9	6	7	4	7	12	6	4	8	7	9	17	13	11	10	8	8	5	8	6	11	8	12	8
5	19	16	10	8	6	5	5	5	6	13	13	10	12	9	8	17	9	11	6	17	7	9	7	7	10
6	8	7	7	8	6	4	7	4	8	8	7	12	10	11	12	6	6	10	6	8	5	10	7	9	8
7	5	7	8	4	8	8	4	5	10	9	8	17	13	15	12	10	8	5	6	6	4	4	4	4	8
8	3	5	4	4	4	6	3	3	4	9	8	10	12	7	8	6	5	4	6	3	3	7	6	3	6
9	6	2	3	4	4	4	3	6	7	8	6	6	8	6	8	4	4	2	1	2	1	1	1	1	4
10	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	2	3	2	3	2	2	1	1	2	1	2	1	2	1	1
12	1	3	1	2	2	2	1	2	2	2	4	2	2	1	2	2	2	1	2	2	2	2	2	8	2
13	7	3	2	3	4	5	2	1	3	2	2	2	2	4	2	5	1	1	2	1	2	2	2	2	3
14	2	2	2	2	2	2	2	2	1	2	5	7	7	13	4	12	3	3	4	7	5	6	5	5	4
15	4	6	4	4	4	3	2	2	4	4	8	7	5	6	5	5	4	3	2	4	6	2	2	4	4
16	3	4	4	4	4	3	1	1	2	2	4	4	4	6	5	3	4	6	1	2	2	2	2	4	3
17	8	4	2	1	2	2	2	1	1	1	1	2	1	2	3	4	3	2	2	2	2	2	3	2	2
18	2	3	2	2	1	1	1	1	2	2	2	2	1	2	2	2	2	2	1	2	1	1	1	1	2
19	2	1	2	1	2	1	1	1	1	1	1	1	2	1	3	2	3	2	2	2	2	3	15	12	3
20	5	6	2	4	2	5	7	7	4	3	4	5	8	7	8	4	2	2	2	11	10	6	6	9	5
21	2	2	1	1	1	1	1	2	2	2	2	1	8	9	8	10	4	3	4	3	2	3	12	14	4
22	4	2	3	3	2	3	9	8	4	5	2	5	3	15	12	4	4	4	5	9	5	3	5	4	5
23	4	6	2	5	3	2	2	3	8	10	4	4	4	1	2	11	6	10	14	7	4	5	2	8	5
24	6	6	4	5	5	1	2	2	1	1	1	1	4	9	12	4	4	2	3	4	10	2	6	3	4
25	1	2	4	2	2	1	2	2	3	5	10	5	4	4	4	4	2	1	2	2	1	2	2	1	3
26	2	2	2	4	2	2	2	1	2	3	2	5	4	4	2	2	3	2	1	1	2	5	5	3	3
27	2	2	3	3	1	2	2	2	2	2	4	2	4	6	8	2	1	2	1	1	1	1	2	1	2
28	2	2	2	2	5	2	2	1	4	4	4	5	4	4	4	4	3	3	2	4	10	7	4	5	4
29	4	3	5	5	2	3	4	2	1	6	4	10	5	4	8	4	9	6	6	7	4	3	6	8	5
30	6	4	3	5	2	2	2	1	1	1	2	2	2	2	4	4	3	4	2	2	2	2	4	4	3
31	2	3	2	2	2	1	1	1	2	1	2	2	2	4	2	2	2	2	1	1	2	1	4	4	2
Mean	4	4	3	4	3	3	3	4	4	4	4	5	5	6	6	6	4	4	3	4	4	4	5	5	4

BAKER LAKE MAGNETIC OBSERVATORY
1963

The Magnetic Equipment

In November 1963 a field-type proton precession magnetometer manufactured by Barringer Research Limited was put into operation to facilitate accurate determination of the Z variometer base line. No other changes were made in the station equipment during 1963. A summary of the equipment in operation during 1963 is provided below.

The Photographic Variometers

A set of three-component photographic Ruska variometers is aligned to record the geographic components X, Y and Z of the earth's magnetic field. The time scale of the Ruska magnetograms is 20 mm/hr. Scale values adopted for the Ruska variometers for 1963 were:

X	Jan. 1—July 29, 01 hrs	4.19 gammas/mm
	July 29, 01 hrs—Sept. 30, 0530 hrs	4.92
	Sept. 30, 0530 hrs—Dec. 31	8.33
Y	Jan. 1—Sept. 30, 0530 hrs	5.95 gammas/mm
	Sept. 30, 0530 hrs—Dec. 31	6.28
Z	Jan. 1—July 29, 01 hrs	6.84 increasing linearly to 7.26
	July 29, 01 hrs—Aug. 31	4.70
	Sept. 1—Sept. 15	4.61
	Sept. 16—Sept. 30	4.50
	Oct. 1—Oct. 28, 01 hrs	4.33 increasing linearly to 5.03
	Oct. 28, 01 hrs—Nov. 30	6.55 " " 7.70
	Dec. 1—Dec. 31	7.75

The scale value of the Ruska Z variometer again drifted considerably.

Thermostatically controlled electric heaters maintain the temperature in the variometer room constant to 1°C. Temperature coefficients of the variometers are small and temperature corrections to the measured values were unnecessary.

A set of three component photographic la Cour variometers, aligned to record H, D and Z, serves as a low sensitivity recorder with the following approximate scale values:

H, 32.5 gammas/mm
D, 9.5 mins/mm (or 11 gammas/mm.)
Z, 34 gammas/mm

The Stand-by Variometer and Storm Recorder

A three-component electrical magnetometer with an inked output records X, Y and Z. Chart speed is 20 mm/hr. Full-scale sensitivity is 2000 gammas normally, with automatic switching to 4000 gammas at times of heavy disturbance.

Absolute Instruments

Quartz horizontal magnetometer No. 257 is the primary standard of horizontal field intensity (H). A portable three component electrical magnetometer of the saturable core type is used for the determination of declination (D) and inclination (I). Absolute determinations of F were made in July using a Varian, and in November and December using a Barringer field-type proton precession magnetometer.

Base-line Values

The Z base line was calculated from the relation $Z = F \sin I$, using the absolute values of F obtained in July, November and December. For the remainder of the year the Z base lines were estimated from these calculated values, using information on trace discontinuities and quiet day trends obtained from examination of the magnetograms. The Z base lines determined in this way are believed to be good to within 25 gammas.

The r.m.s. difference between the observed and adopted base line values for 19 observations in X and Y was 2 gammas.

The Magnetic Reductions

A summary for 1963 by month, season and year of the mean hourly values of X, Y and Z for all days and for the international quiet and disturbed days, is given in Tables 25–33. The daily mean values of the three elements are given in Tables 34–36.

R_x indices of magnetic disturbance are given for each hour of 1963 in Tables 37–48. The R_x indices are the hourly ranges in X, the principal horizontal magnetic field component recorded at Baker Lake, expressed in 10-gamma units.

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (All Days)

Table 25 Baker Lake 3500 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	521	528	542	539	553	569	563	543	510	529	527	544	539	557	530	530
1-2	511	525	529	535	537	547	549	537	505	511	525	541	529	542	520	525
2-3	513	522	522	527	539	543	551	531	492	507	508	536	524	541	512	520
3-4	514	522	520	529	526	539	551	537	504	505	508	526	523	538	517	514
4-5	492	508	507	523	538	550	548	538	497	508	503	517	519	544	509	505
5-6	474	515	522	526	542	547	564	553	493	507	490	524	521	552	512	501
6-7	492	519	530	539	544	555	561	545	511	513	510	528	529	551	523	512
7-8	504	523	532	544	547	563	562	552	540	522	528	525	537	556	535	520
8-9	512	521	532	541	557	556	568	549	539	522	528	530	538	558	534	523
9-10	500	526	533	540	550	549	569	541	536	525	519	530	535	552	534	519
10-11	501	520	526	537	542	555	564	542	530	516	514	527	531	551	527	516
11-12	499	519	515	527	539	543	564	534	513	506	510	516	524	545	515	511
12-13	490	509	509	516	532	534	543	523	498	505	491	507	513	533	507	499
13-14	485	497	504	490	503	518	516	486	475	485	481	489	494	506	489	488
14-15	468	482	488	467	472	493	486	453	456	476	463	465	472	476	472	469
15-16	459	472	469	444	459	460	484	449	448	480	458	467	462	463	460	464
16-17	469	487	477	457	481	470	481	460	482	480	478	482	475	473	474	479
17-18	495	506	495	493	504	478	508	492	491	489	498	500	496	496	492	500
18-19	509	519	513	522	528	513	535	507	527	506	505	526	518	521	517	515
19-20	520	531	527	550	568	554	550	541	529	525	532	538	539	553	533	530
20-21	523	541	547	562	585	565	569	564	548	539	538	553	553	571	549	539
21-22	527	542	556	555	591	585	582	557	544	548	541	558	557	579	551	542
22-23	523	545	545	557	573	591	578	555	533	535	545	559	553	574	543	543
23-24	523	534	541	547	564	583	565	559	513	535	541	552	546	568	534	537
Mean	501	517	520	524	536	540	546	527	509	511	510	522	522	537	516	513

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MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 26 Baker Lake 3500 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	530	546	538	544	561	575	575	573	542	538	541	550	551	571	541	541
1-2	528	536	528	537	545	548	577	557	541	530	539	552	543	557	534	539
2-3	525	532	527	533	544	529	556	537	532	529	533	546	535	542	530	534
3-4	522	526	526	529	538	530	548	537	532	530	531	537	532	538	529	529
4-5	518	526	526	528	531	537	548	538	523	528	529	539	531	539	526	528
5-6	515	527	527	529	534	540	550	540	536	531	528	537	533	541	531	527
6-7	522	526	532	532	536	538	555	545	531	535	528	536	535	544	532	528
7-8	523	532	531	532	545	519	561	545	539	535	531	539	536	543	534	531
8-9	523	533	529	532	551	546	558	541	535	535	528	537	537	549	533	530
9-10	520	529	527	536	555	547	555	535	532	532	527	534	536	548	532	528
10-11	517	525	524	537	555	549	553	532	530	528	525	520	533	547	530	522
11-12	514	522	523	530	547	541	551	523	521	525	525	531	525	540	525	523
12-13	509	520	519	521	523	518	538	509	511	521	522	525	520	522	518	519
13-14	506	516	502	505	493	493	503	477	501	505	514	510	502	492	503	512
14-15	503	513	491	477	445	472	471	458	481	480	499	515	484	462	482	508
15-16	497	510	479	473	469	469	475	470	479	484	492	512	484	471	479	503
16-17	503	507	485	493	505	493	494	468	497	499	502	518	497	490	494	508
17-18	512	513	502	512	506	501	512	504	512	505	508	524	509	506	508	514
18-19	521	521	511	526	530	511	525	524	529	524	519	532	523	523	523	523
19-20	522	528	524	537	554	540	543	553	542	539	533	539	538	548	536	531
20-21	528	534	541	549	557	562	563	574	579	550	542	547	552	564	555	538
21-22	531	536	550	562	575	578	582	578	593	560	549	551	562	578	566	542
22-23	532	544	541	559	575	604	584	582	558	546	548	553	560	586	551	544
23-24	536	541	542	555	575	608	591	577	539	539	548	548	558	588	544	543
Mean	519	527	522	528	535	535	545	532	530	526	527	535	530	537	527	527

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 27 Baker Lake 3500 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	496	486	526	529	537	562	548	503	418	478	463	518	505	537	488	491
1-2	474	492	492	535	494	526	560	542	472	465	506	528	507	530	491	500
2-3	490	494	507	516	523	567	560	512	410	442	446	519	499	541	468	487
3-4	495	512	514	528	488	569	561	535	483	480	493	482	512	538	501	496
4-5	406	438	440	510	555	582	555	513	504	501	513	440	496	551	489	449
5-6	362	469	496	502	525	588	577	563	451	468	456	520	498	563	479	452
6-7	462	485	525	531	531	569	573	567	472	453	468	515	513	560	495	483
7-8	473	489	510	548	547	599	571	546	570	498	509	450	526	566	532	480
8-9	503	492	515	535	550	532	585	542	510	517	535	510	527	552	519	510
9-10	450	521	533	550	532	553	578	534	541	516	521	531	530	549	535	506
10-11	455	521	526	542	539	559	587	551	528	502	481	527	527	559	525	496
11-12	472	515	508	533	542	554	620	494	517	512	478	515	522	553	518	495
12-13	450	495	592	537	556	538	549	499	512	502	453	488	506	536	511	472
13-14	461	489	514	495	525	545	497	512	501	479	413	465	491	520	497	457
14-15	419	482	501	492	511	507	499	518	499	445	412	442	477	509	484	439
15-16	402	460	489	425	467	407	488	484	486	499	485	451	462	462	475	450
16-17	430	500	518	423	502	409	480	496	478	465	510	492	475	472	471	483
17-18	492	545	516	490	502	404	524	501	465	458	545	530	498	483	482	528
18-19	507	521	524	565	527	451	531	444	498	446	487	546	504	488	508	515
19-20	508	542	527	603	574	506	533	474	464	440	518	531	518	522	508	525
20-21	488	536	544	609	590	526	568	524	464	452	489	538	527	552	517	513
21-22	512	529	545	542	575	562	578	503	502	479	488	514	527	554	517	511
22-23	519	567	532	541	561	589	577	470	513	498	508	540	535	549	521	534
23-24	498	522	517	517	562	539	535	513	495	517	503	549	522	537	512	518
Mean	468	504	513	525	534	531	551	514	490	480	487	506	508	532	502	491

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas) (All Days)

Table 28 Baker Lake 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	226	232	233	215	202	214	203	209	186	209	226	225	215	207	211	227
1-2	224	230	226	207	186	180	187	191	177	205	219	227	197	186	204	200
2-3	223	228	220	203	173	175	184	178	160	194	216	225	198	177	194	223
3-4	215	221	217	204	164	170	173	176	152	187	218	220	193	171	190	218
4-5	191	217	208	197	170	164	153	175	142	182	204	193	183	166	182	201
5-6	181	214	213	193	184	182	175	189	135	174	180	183	184	183	179	190
6-7	195	199	209	209	205	195	188	203	154	180	195	194	194	198	188	196
7-8	206	226	226	229	217	211	204	222	208	216	218	203	215	213	220	213
8-9	225	229	235	236	230	213	229	235	241	231	233	214	229	227	236	225
9-10	229	241	248	250	234	225	241	244	258	249	237	230	240	236	251	234
10-11	238	248	254	250	245	239	248	251	265	252	249	237	248	246	255	243
11-12	246	248	254	252	250	252	253	257	271	252	255	240	252	253	257	247
12-13	244	253	252	259	263	263	265	270	277	255	258	247	259	265	261	251
13-14	249	254	2602	267	277	277	274	284	290	258	259	251	267	278	269	253
14-15	252	255	266	272	274	284	284	289	283	260	252	253	269	283	270	253
15-16	248	248	264	265	263	275	281	278	279	264	256	247	264	274	268	250
16-17	241	242	249	250	249	264	269	259	280	260	256	238	255	260	260	244
17-18	240	237	241	244	240	255	254	249	271	254	253	230	247	249	252	240
18-19	237	239	238	241	248	261	249	251	284	249	243	230	247	252	253	237
19-20	238	240	244	250	261	270	257	254	284	250	239	230	251	260	257	237
20-21	234	244	245	249	269	269	263	273	283	248	240	230	254	269	256	237
21-22	232	243	248	245	254	259	253	262	255	239	233	228	246	257	247	234
22-23	230	242	239	236	241	250	239	240	223	226	236	230	236	242	231	235
23-24	228	238	235	222	226	238	217	229	207	218	233	228	227	228	221	232
Mean	228	236	238	235	230	233	231	236	232	230	234	226	233	233	234	231

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 29 Baker Lake 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	233	238	236	235	229	240	232	235	231	233	239	230	234	234	233	235
1-2	233	238	233	232	204	220	229	226	237	228	240	231	229	220	232	236
2-3	233	238	234	230	214	209	221	217	226	221	236	232	226	215	228	235
3-4	232	234	233	230	214	197	215	216	222	207	233	231	222	211	223	233
4-5	228	233	233	231	208	198	213	219	212	209	228	229	220	210	221	230
5-6	225	229	232	232	208	197	214	224	223	212	227	225	221	211	225	227
6-7	223	225	234	235	220	198	216	223	223	219	226	223	222	214	228	224
7-8	226	233	236	236	225	200	227	226	238	233	234	225	228	220	236	229
8-9	229	236	241	236	227	220	234	238	246	241	234	228	234	230	241	232
9-10	232	241	242	240	230	230	234	245	251	247	239	231	239	235	245	236
10-11	233	241	244	241	240	238	245	250	250	244	239	237	242	243	245	238
11-12	234	244	244	241	238	250	247	254	254	241	239	231	243	247	245	237
12-13	236	243	242	249	262	262	257	260	256	241	241	230	248	260	247	238
13-14	238	244	248	258	269	262	265	270	259	241	243	231	252	266	251	239
14-15	237	245	252	259	273	264	271	261	261	245	244	232	254	267	254	240
15-16	236	245	248	248	253	255	252	259	251	240	244	230	247	255	247	239
16-17	233	239	245	235	238	242	240	249	238	235	234	228	238	242	238	234
17-18	229	236	233	235	229	222	228	229	229	228	228	224	229	227	231	229
18-19	229	233	233	230	228	222	224	223	237	221	228	218	227	224	230	227
19-20	227	230	232	227	230	223	222	235	238	229	226	216	228	228	232	225
20-21	229	234	231	229	228	236	229	248	263	234	229	219	234	235	239	228
21-22	231	235	234	243	235	239	249	250	283	239	235	223	241	243	250	231
22-23	234	240	232	238	237	259	238	248	228	236	239	228	238	246	234	235
23-24	236	242	235	232	235	255	225	248	215	234	241	228	235	241	229	236
Mean	232	237	238	238	232	231	234	240	240	232	235	227	235	234	237	233

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 30 Baker Lake 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	202	203	211	197	180	170	174	185	85	128	180	204	177	177	155	197
1-2	189	204	198	185	141	106	176	159	82	122	171	220	163	146	147	196
2-3	188	193	189	194	122	135	179	135	-2	114	163	206	151	143	124	187
3-4	157	173	183	200	141	113	154	140	53	120	206	202	154	137	139	185
4-5	82	161	145	188	141	98	129	145	85	138	197	83	133	128	139	131
5-6	82	169	166	162	164	170	170	179	7	131	118	107	135	171	116	119
6-7	170	100	175	187	204	177	183	206	87	52	141	131	151	193	125	136
7-8	143	216	199	221	223	228	182	223	190	184	185	173	197	214	199	179
8-9	225	203	207	241	246	172	223	226	238	224	215	193	218	217	228	209
9-10	204	219	256	263	228	224	257	233	279	260	244	237	242	235	265	226
10-11	236	253	263	265	267	264	263	260	294	268	258	243	261	263	272	248
11-12	283	258	277	270	276	256	261	233	312	274	276	257	269	256	283	268
12-13	274	277	276	270	282	263	266	266	315	278	294	272	278	269	285	279
13-14	285	273	285	274	292	288	285	296	337	298	312	290	293	290	299	290
14-15	285	280	299	299	282	305	304	316	312	294	265	296	295	302	301	282
15-16	278	266	306	287	282	294	298	295	309	312	314	276	293	292	304	283
16-17	266	267	277	264	269	287	302	267	316	315	331	271	286	281	293	284
17-18	280	239	282	272	268	279	297	283	290	314	314	263	282	282	290	274
18-19	265	279	260	258	272	290	279	293	300	280	275	260	276	283	275	270
19-20	252	266	280	297	275	300	289	269	313	262	260	258	277	283	288	259
20-21	235	260	267	267	278	285	304	285	301	232	246	243	267	288	267	246
21-22	230	254	259	249	258	264	248	272	200	195	207	217	238	261	226	227
22-23	231	258	237	230	258	276	236	218	174	192	207	220	228	247	208	229
23-24	216	228	223	196	235	232	197	190	181	194	193	217	209	214	199	214
Mean	219	229	238	239	233	228	236	232	211	216	232	222	228	232	226	226

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (All Days)

Table 31 Baker Lake 60,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	389	381	353	329	311	305	273	274	290	362	402	383	338	291	334	389
1-2	397	387	365	348	333	319	287	301	322	375	403	391	352	310	352	394
2-3	401	394	369	368	357	338	309	340	360	392	418	398	370	336	372	403
3-4	410	403	376	379	387	368	338	365	371	408	419	410	386	364	383	411
4-5	426	408	379	399	419	420	397	397	411	430	425	423	411	408	405	420
5-6	434	411	393	420	437	446	409	416	440	454	445	423	427	427	427	428
6-7	449	444	412	424	466	474	450	428	438	464	465	451	447	454	435	452
7-8	469	454	431	431	464	474	444	434	436	464	476	486	455	454	441	471
8-9	480	477	434	444	446	479	438	428	442	470	485	481	459	448	448	481
9-10	486	458	414	436	461	479	428	439	437	470	491	475	456	452	439	478
10-11	484	444	420	438	483	484	424	441	442	484	490	470	459	458	446	472
11-12	477	445	433	443	481	502	426	445	458	476	492	478	463	464	453	473
12-13	477	448	437	453	480	514	454	462	487	462	502	492	473	478	460	480
13-14	472	459	434	469	479	503	495	486	484	467	495	494	478	491	464	480
14-15	475	461	429	450	467	490	468	480	461	469	496	493	470	476	452	481
15-16	454	441	409	426	428	466	427	437	430	446	478	466	442	440	427	460
16-17	439	421	385	403	394	426	386	398	409	421	429	438	412	401	404	432
17-18	421	410	375	395	387	418	357	359	381	403	406	415	394	379	389	413
18-19	403	400	372	391	383	394	352	355	360	391	402	399	384	371	379	401
19-20	389	399	373	375	378	384	335	347	329	378	387	384	372	361	364	390
20-21	391	385	363	341	354	345	316	309	309	356	378	379	352	331	342	383
21-22	391	376	348	343	318	330	286	266	266	342	380	376	335	300	325	381
22-23	387	370	344	335	308	309	265	269	266	343	382	372	329	287	322	378
23-24	386	376	345	325	309	302	269	266	283	350	386	375	331	286	326	381
Mean	433	419	391	399	405	415	376	381	388	420	439	431	408	394	400	431

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Quiet Days)

Table 32 Baker Lake 60,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	411	386	381	383	365	357	329	301	302	375	411	407	367	338	360	404
1-2	411	390	380	385	356	349	323	317	303	383	410	407	368	336	363	404
2-3	411	390	376	383	363	358	329	329	332	381	411	405	372	345	368	404
3-4	405	392	374	384	373	374	336	337	341	397	408	401	377	355	374	401
4-5	407	393	377	384	389	391	345	346	364	398	409	407	384	368	381	404
5-6	408	394	378	388	395	415	361	353	366	407	415	411	391	381	385	407
6-7	411	407	387	389	404	438	362	355	377	406	436	417	399	390	390	418
7-8	424	410	391	396	400	485	371	372	367	399	437	426	406	407	388	424
8-9	422	404	389	398	404	460	373	371	364	411	438	433	406	402	391	424
9-10	422	406	393	398	422	431	381	374	368	414	432	442	407	402	393	425
10-11	421	405	398	410	426	430	380	374	373	410	427	449	409	403	398	425
11-12	420	409	403	412	436	441	387	380	380	401	424	442	411	411	399	424
12-13	423	405	411	423	443	440	405	391	385	399	427	434	416	420	405	422
13-14	422	404	418	432	458	432	428	394	377	409	431	432	420	428	409	422
14-15	413	400	409	411	434	396	377	393	361	410	428	414	404	400	398	414
15-16	409	394	399	391	374	389	340	374	342	388	419	405	385	369	380	407
16-17	400	391	383	376	364	387	334	350	338	384	407	398	376	359	370	399
17-18	404	390	374	384	369	393	335	332	344	381	405	402	376	357	371	400
18-19	400	391	377	391	371	393	345	348	343	386	414	407	380	364	374	403
19-20	404	392	376	386	368	394	356	353	354	389	417	408	383	368	376	405
20-21	407	392	387	391	376	395	364	341	337	384	417	412	384	369	375	407
21-22	407	391	385	386	374	395	329	327	268	378	416	405	372	356	354	405
22-23	406	391	386	379	373	375	313	324	258	381	411	403	367	346	351	403
23-24	405	383	381	364	358	346	302	314	289	383	415	404	362	330	354	402
Mean	411	396	388	393	391	403	354	352	343	394	419	415	388	375	379	410

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Disturbed Days)

Table 33 Baker Lake 60,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	357	349	326	336	303	291	214	292	294	358	436	345	325	275	328	372
1-2	372	369	371	344	349	315	253	311	343	384	421	376	350	307	360	384
2-3	383	397	381	357	344	328	316	394	472	454	477	403	392	345	416	415
3-4	428	444	384	386	369	387	357	413	425	456	438	453	412	382	413	441
4-5	443	457	399	402	435	494	423	463	516	488	464	467	454	454	451	458
5-6	475	439	400	405	483	458	421	441	600	529	546	435	469	451	483	474
6-7	518	544	442	432	527	506	528	480	564	626	561	480	517	510	516	526
7-8	525	569	543	423	502	512	497	510	533	605	628	601	537	505	526	581
8-9	547	617	513	476	483	560	471	482	570	601	545	570	536	499	540	570
9-10	638	547	429	448	515	507	431	527	497	596	529	533	516	495	492	562
10-11	643	492	447	435	560	465	424	491	463	635	605	530	516	485	495	568
11-12	595	487	480	437	543	463	435	542	476	568	636	547	517	496	490	566
12-13	581	500	507	461	518	541	535	582	526	501	652	585	541	544	499	580
13-14	556	530	481	531	504	558	658	592	532	552	637	599	561	578	524	581
14-15	595	544	455	532	520	551	526	567	474	596	667	564	549	541	514	592
15-16	543	490	411	520	506	496	457	518	460	535	563	556	505	494	482	538
16-17	499	470	394	467	476	412	474	474	442	432	471	495	459	459	434	484
17-18	445	448	373	445	440	432	434	456	406	407	417	431	428	441	408	435
18-19	396	416	352	422	394	396	421	371	317	379	399	379	387	395	368	398
19-20	351	413	353	417	397	397	332	339	271	348	332	319	356	366	347	354
20-21	362	345	308	288	360	267	282	315	249	332	337	312	313	306	294	339
21-22	370	335	291	302	305	237	242	258	221	346	337	330	298	261	290	343
22-23	374	320	288	273	263	252	204	259	245	334	328	338	290	245	285	340
23-24	370	331	306	294	261	251	208	252	294	357	357	358	312	243	338	354
Mean	474	452	401	410	432	420	398	430	425	476	491	459	439	420	428	469

96268—7½

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 34 Baker Lake 3500 γ + 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	514	511	506	529	549	551	538	502	527	525	507	533
2	517	521	520	529	541	543	534	529	533	526	511	517
3	517	509	526	524	519	544	543	528	520	525	501	508
4	511	517	515	553	495	527	522	523	523	516	511	501
5	512	515	524	528	534	537	537	528	528	522	524	498
6	530	512	530	522	524	496	529	536	534	521	510	505
7	507	526	521	525	548	523	520	530	534	522	483	513
8	515	534	523	528	545	525	535	535	519	515	468	515
9	515	516	554	519	534	540	534	552	525	531	486	506
10	510	502	488	523	517	531	537	551	526	526	509	536
11	513	505	484	526	528	546	554	528	519	495	495	534
12	510	495	522	517	545	551	558	537	516	500	497	534
13	495	506	515	462	534	532	560	537	533	505	514	534
14	483	514	525	488	535	563	549	532	515	505	522	509
15	463	515	518	520	557	557	548	527	535	507	520	530
16	478	526	523	524	537	539	578	529	499	487	533	525
17	492	528	511	519	544	568	575	549	507	516	477	534
18	481	522	517	505	539	476	555	555	498	526	528	537
19	475	528	519	542	543	559	530	491	525	514	532	530
20	509	526	529	526	548	513	547	534	489	514	523	518
21	513	519	524	526	534	539	563	508	515	530	518	528
22	515	526	520	519	532	537	555	525	448	529	514	515
23	517	516	525	523	529	537	587	538	489	529	521	522
24	487	526	526	529	541	534	551	520	480	471	486	524
25	494	513	514	533	528	557	560	538	514	500	498	527
26	518	513	521	542	532	538	544	519	494	515	523	520
27	517	526	521	529	530	562	544	492	474	525	535	532
28	517	519	529	535	563	562	533	482	488	525	519	528
29	511		525	534	551	562	545	516	483	442	527	505
30	447		522	533	531	552	521	534	493	478	510	528
31	451		524		539		533	529		513		539
Mean	501	517	520	524	536	540	546	527	509	511	510	522

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 35 Baker Lake 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	225	252	230	225	245	232	221	234	241	229	228	239
2	228	235	236	241	242	224	234	235	241	233	237	239
3	231	231	239	235	245	236	229	230	240	228	212	227
4	233	233	235	251	233	229	232	239	236	234	234	227
5	228	237	242	219	235	232	216	223	236	239	234	208
6	230	242	239	238	225	221	211	234	246	226	243	214
7	227	239	238	235	214	209	227	224	238	239	233	222
8	231	240	244	235	211	231	225	233	222	230	218	209
9	227	233	255	231	195	219	213	232	233	236	233	224
10	229	226	244	232	235	235	231	243	240	246	230	226
11	236	222	218	233	230	233	219	241	247	230	238	224
12	235	232	242	243	242	232	229	238	226	245	226	226
13	221	247	245	232	222	223	230	247	241	207	231	223
14	246	219	238	238	216	250	233	233	250	221	228	233
15	194	238	231	230	236	232	228	255	244	227	232	225
16	216	248	238	234	221	236	232	240	226	224	232	230
17	226	238	245	233	239	264	234	250	203	225	239	230
18	219	236	235	239	233	256	237	242	248	235	233	228
19	226	241	237	222	248	236	223	241	251	235	239	224
20	230	243	242	244	222	218	235	226	229	243	234	233
21	232	242	233	239	241	223	257	216	251	224	239	226
22	235	239	240	237	229	222	236	241	173	232	243	227
23	227	233	244	219	232	234	242	224	182	239	236	220
24	232	235	244	239	247	240	231	234	243	206	248	228
25	228	229	236	235	228	234	265	235	222	230	219	230
26	233	233	241	228	225	204	236	228	227	233	239	226
27	234	236	232	238	236	239	226	243	222	236	238	226
28	238	236	241	244	230	241	217	237	226	246	234	228
29	236		239	238	222	253	248	238	230	226	238	240
30	210		234	250	216	245	235	244	231	181	241	229
31	224		235		244		224	243		232		230
Mean	228	236	238	235	230	233	231	236	232	230	234	226

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas)

Table 36 Baker Lake 60,000 γ + 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	424	479	395	383	427	469	358	363	377	385	403	428
2	411	422	401	373	448	494	368	348	350	377	395	433
3	409	426	416	388	381	434	357	344	351	394	425	485
4	417	412	393	402	463	433	368	381	344	404	380	460
5	437	423	375	420	414	399	336	362	335	393	407	448
6	410	417	360	440	433	366	405	370	341	385	433	434
7	419	392	368	436	382	412	412	377	346	363	451	494
8	413	376	411	391	374	408	371	389	385	407	508	485
9	406	380	357	422	409	423	367	387	368	381	503	488
10	399	454	445	399	387	387	368	378	346	383	492	428
11	400	434	398	383	413	397	371	372	365	478	447	429
12	395	441	429	384	396	386	360	362	379	440	457	426
13	456	465	422	412	389	409	355	341	333	423	418	411
14	442	465	390	417	413	404	349	344	431	471	415	430
15	454	430	388	432	391	436	351	337	410	422	422	428
16	473	445	388	370	382	399	363	340	415	475	419	406
17	455	410	370	378	428	485	412	350	472	430	447	414
18	441	407	388	365	389	404	382	446	414	452	421	417
19	454	395	386	411	393	411	356	379	450	471	415	405
20	459	416	376	440	389	396	350	494	424	429	424	466
21	439	416	390	412	382	407	461	444	419	419	433	430
22	424	410	385	398	398	394	452	395	416	401	419	454
23	435	421	404	438	396	389	423	462	467	383	436	442
24	433	396	386	386	392	426	427	408	353	498	500	411
25	443	392	388	383	393	391	364	357	405	413	502	419
26	430	419	381	358	379	441	371	380	391	415	456	408
27	415	391	396	403	381	451	406	342	353	413	433	413
28	414	392	386	382	423	417	369	389	404	377	423	383
29	394		388	381	431	398	347	384	380	481	436	419
30	474		386	369	433	399	340	378	428	488	458	383
31	541		386		461		336	403		392		385
Mean	433	419	391	399	405	415	376	381	388	420	439	431

Table 37 Baker Lake R_x (Hourly Ranges in 10γ units) January 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	2	1	2	17	17	1	1	1	1	3	3	2	3	5	4	8	13	4	6	5	3	2	1	4
2	1	1	0	1	0	0	1	1	0	1	1	2	4	5	4	5	3	2	2	4	2	1	1	1	2
3	1	2	1	1	1	2	1	4	2	1	1	3	4	5	7	4	5	3	3	3	5	3	3	1	3
4	3	1	1	1	12	2	1	1	1	1	3	3	4	6	5	4	4	11	9	8	2	2	2	3	4
5	2	1	0	1	0	1	2	1	5	4	6	4	9	10	8	7	5	3	5	2	2	2	1	1	3
6	3	2	1	0	1	0	0	0	0	1	1	1	2	1	3	2	2	12	1	2	1	1	2	2	2
7	1	2	3	1	1	49	16	4	2	2	1	1	2	5	5	5	5	9	5	6	3	1	2	1	6
8	2	2	0	2	2	1	2	8	3	1	3	3	3	2	4	4	2	1	2	3	1	2	2	2	2
9	1	1	1	1	2	3	2	1	1	1	0	0	2	2	2	4	4	3	2	3	1	2	2	1	2
10	2	1	1	2	1	2	1	1	1	1	1	1	1	4	10	10	5	6	5	7	1	1	1	1	3
11	0	1	1	0	1	1	3	6	6	2	1	2	3	5	9	6	6	6	13	14	6	4	4	2	4
12	1	1	1	1	4	17	4	3	1	0	0	2	3	5	5	6	8	5	3	9	8	7	6	7	4
13	7	3	4	27	60	17	7	9	22	23	12	11	17	15	16	21	39	14	16	22	11	6	8	6	16
14	6	6	2	3	80	53	17	5	4	6	12	16	29	23	37	21	21	28	17	34	24	19	8	7	20
15	4	3	3	69	62	42	43	43	13	29	17	7	13	7	14	28	26	34	23	20	12	11	7	7	22
16	11	10	9	2	5	3	4	23	23	14	16	13	13	10	11	11	25	10	21	17	24	10	10	4	12
17	4	6	5	4	3	39	71	20	11	9	7	7	10	7	15	21	21	22	21	20	14	9	8	11	15
18	3	5	3	3	20	46	12	18	12	8	4	11	12	8	6	16	13	10	13	13	13	16	6	10	12
19	4	4	4	4	2	56	54	16	5	6	8	10	12	7	35	39	49	11	9	12	16	14	9	7	16
20	2	1	1	1	1	1	1	18	16	16	3	4	7	6	5	3	5	4	10	4	3	4	4	2	5
21	2	1	1	1	1	8	4	5	3	4	3	3	5	3	5	4	5	5	3	4	4	3	1	3	3
22	3	1	2	1	1	1	2	3	3	2	3	3	3	5	7	12	4	3	6	5	8	4	8	7	4
23	1	1	2	2	4	4	2	5	3	2	4	4	7	14	8	10	12	8	6	9	10	3	5	4	5
24	4	1	1	4	5	15	19	5	5	3	3	3	6	5	9	5	9	11	10	14	13	13	5	6	7
25	2	2	2	12	36	17	7	5	2	3	2	4	5	4	12	18	10	8	7	5	5	3	6	1	7
26	1	3	1	0	1	0	1	1	4	2	3	2	5	3	3	2	2	1	2	3	3	1	3	2	2
27	1	1	1	1	1	1	2	1	2	2	1	3	4	1	3	2	4	1	1	1	1	1	3	1	2
28	4	1	0	1	0	2	1	3	2	1	1	2	2	3	2	3	3	2	2	0	1	0	1	1	2
29	1	1	1	1	0	0	1	0	1	1	1	1	2	5	3	5	5	6	3	2	5	7	3	1	2
30	5	5	8	5	22	41	14	11	3	45	33	10	9	7	10	26	19	8	19	18	25	5	2	9	15
31	1	6	8	8	44	47	49	49	13	41	19	18	22	14	7	14	9	3	4	23	10	2	2	4	17
Mean	3	3	2	5	13	16	11	9	6	8	6	5	7	6	9	10	11	8	8	9	8	5	4	4	7

Table 38 Baker Lake R_x (Hourly Ranges in 10γ units) February 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	1	1	0	1	0	1	1	1	19	6	9	10	9	19	15	17	6	16	11	21	8	3	5	3	8
2	1	1	1	1	0	0	1	1	0	0	1	1	3	3	6	5	9	4	3	2	2	1	2	1	2
3	1	0	1	2	1	6	8	11	3	1	1	3	1	6	5	8	3	8	5	4	6	3	3	3	4
4	1	1	1	0	1	1	0	1	1	0	0	1	1	3	5	4	6	7	3	9	3	2	4	2	2
5	1	1	1	1	1	1	1	1	1	1	6	4	3	4	7	8	8	3	4	5	2	2	2	1	3
6	1	2	3	2	3	1	1	1	2	1	4	2	2	4	13	8	7	10	6	3	2	4	4	1	4
7	1	1	2	1	1	0	0	0	1	4	2	1	2	4	4	4	2	1	3	1	2	2	3	4	2
8	3	2	1	1	1	1	0	0	0	0	0	1	1	4	3	3	2	1	0	1	2	0	1	3	1
9	1	3	1	0	1	0	1	1	1	1	1	2	2	5	6	5	2	2	5	3	3	7	13	11	3
10	6	8	7	5	33	17	5	47	27	9	5	6	20	7	26	17	30	27	23	8	16	18	11	10	16
11	4	5	3	3	65	81	54	9	6	8	7	5	8	19	25	16	16	17	22	13	12	21	4	6	18
12	6	14	10	52	38	12	10	11	20	12	9	5	6	13	11	12	18	9	12	22	13	22	8	17	15
13	6	5	4	18	19	6	37	19	18	11	6	8	5	13	13	10	39	18	19	27	13	13	8	11	14
14	4	5	4	8	78	63	5	8	44	12	7	6	13	10	22	12	8	13	18	11	7	9	5	6	16
15	7	2	2	2	2	3	3	21	4	6	8	5	7	15	16	19	8	19	10	5	5	3	8	3	8
16	6	1	1	0	0	2	1	0	0	1	4	4	4	6	9	9	8	4	2	2	2	2	4	2	3
17	2	1	0	1	1	2	10	2	4	5	5	2	3	3	5	6	7	4	6	8	3	4	1	1	4
18	1	1	1	1	1	1	8	5	3	3	4	3	2	5	10	5	5	6	5	5	2	2	2	2	3
19	2	1	1	0	1	1	1	2	2	1	1	1	1	6	5	4	3	1	1	3	1	8	2	1	2
20	0	1	1	0	1	2	4	3	3	3	4	1	10	6	6	6	5	10	8	4	6	14	6	11	5
21	6	1	3	1	0	1	3	3	3	8	3	4	5	6	4	14	4	8	9	5	11	9	7	4	5
22	2	3	1	2	2	3	1	1	8	2	3	5	5	6	15	8	10	8	6	5	8	4	2	5	5
23	1	1	2	1	1	1	28	18	13	2	2	7	4	8	5	6	11	6	3	3	2	4	1	5	6
24	2	1	1	0	1	1	10	0	1	1	2	2	1	2	4	3	5	2	4	1	2	4	8	5	3
25	2	2	2	2	1	2	1	1	2	3	1	5	2	4	7	6	4	5	4	3	4	6	3	2	3
26	2	0	1	1	2	13	12	4	4	5	3	2	5	5	13	13	11	5	3	7	4	9	6	2	5
27	2	4	0	0	1	1	0	0	2	3	1	1	1	2	4	2	2	4	5	4	0	1	2	3	2
28	3	0	0	3	2	3	3	2	3	10	5	2	4	9	10	4	3	3	3	1	2	5	3	9	4
29																									
30																									
31																									
Mean	3	3	2	4	9	8	8	6	7	4	4	4	5	7	10	8	9	8	7	7	5	6	5	5	6

Table 39 Baker Lake R_x (Hourly Ranges in 10γ units) March 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	1	2	2	9	30	5	37	30	3	2	4	3	16	22	9	9	8	17	4	5	4	4	2	10
2	2	2	1	1	1	1	10	1	1	2	10	8	9	9	15	6	5	5	3	8	6	4	2	4	5
3	2	2	1	2	2	3	33	7	20	6	3	4	2	16	24	8	6	4	13	6	4	4	3	3	7
4	1	2	2	2	4	10	1	1	6	7	3	3	4	6	6	3	2	3	3	3	3	4	2	2	4
5	1	1	1	1	2	2	5	1	1	2	3	2	4	2	5	4	3	2	4	2	6	4	4	5	3
6	5	2	3	2	1	20	18	6	2	3	2	1	3	2	4	6	4	3	6	3	4	6	8	2	5
7	2	1	3	3	2	4	16	0	1	1	1	1	1	2	2	3	2	3	4	6	2	6	24	15	4
8	8	3	4	2	7	4	7	59	6	4	8	35	32	21	18	18	28	33	30	35	25	14	14	7	18
9	7	6	2	4	73	21	3	2	5	8	14	4	11	12	17	21	33	10	10	7	7	29	12	6	14
10	9	8	10	4	14	21	25	21	28	31	37	31	9	8	8	13	27	42	50	55	26	23	14	8	22
11	9	6	33	57	62	35	6	18	9	5	3	3	6	11	14	23	16	12	16	18	15	11	8	9	17
12	4	8	13	3	5	12	14	6	6	4	7	9	6	9	11	18	15	9	10	19	4	13	3	3	9
13	3	2	1	1	0	1	4	2	6	4	4	8	7	7	6	21	9	9	17	9	6	2	2	5	6
14	8	3	1	0	1	1	0	0	0	0	0	2	4	6	4	3	2	5	3	3	2	2	2	2	2
15	2	2	2	14	14	2	2	1	1	2	1	1	1	1	2	2	2	2	1	2	2	2	2	2	3
16	1	1	0	1	0	0	0	0	1	2	2	2	1	2	3	3	4	3	1	2	2	2	4	2	2
17	1	2	1	0	0	0	0	0	1	0	1	2	1	2	13	4	4	13	4	4	6	8	7	7	3
18	3	2	2	2	2	1	1	3	3	2	3	2	2	2	3	19	7	12	4	4	3	7	4	4	4
19	3	3	2	4	4	8	3	12	3	1	2	3	4	6	8	8	8	4	5	10	4	3	6	5	5
20	2	4	2	2	1	1	3	2	1	1	2	3	3	3	4	6	9	3	3	4	10	4	6	6	4
21	6	3	2	12	11	2	2	4	2	2	1	1	2	2	2	3	3	3	1	2	2	2	3	1	3
22	1	1	0	0	0	0	0	0	0	1	3	2	2	6	4	2	3	4	2	2	4	2	3	2	2
23	3	4	2	1	1	1	2	2	2	2	21	20	18	6	20	14	8	5	2	7	4	3	3	3	6
24	2	2	2	1	0	0	0	0	1	1	2	2	4	2	14	9	5	6	6	6	8	6	5	2	4
25	1	2	1	1	1	2	2	2	2	2	2	2	4	3	8	7	6	3	4	6	13	5	3	2	3
26	1	1	0	0	0	0	0	0	1	1	1	2	2	4	4	3	3	7	4	7	6	6	2	1	2
27	2	2	1	1	0	2	2	1	1	1	1	2	2	4	2	5	2	3	3	3	1	2	1	2	2
28	0	1	0	1	1	1	2	20	4	4	4	2	3	4	3	6	7	3	3	6	6	3	4	4	4
29	1	1	4	3	6	1	3	2	1	2	2	3	8	7	4	5	3	3	3	3	2	2	2	2	3
30	2	3	2	2	1	1	0	2	1	1	4	2	2	1	1	3	3	1	1	5	2	3	1	1	2
31	1	1	0	1	1	1	3	1	1	3	1	3	3	6	7	3	2	2	2	2	3	10	6	6	3
Mean	3	3	3	4	7	6	6	7	5	4	5	5	5	6	8	8	8	7	8	8	6	6	5	4	6

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Table 40 Baker Lake R_x (Hourly Ranges in 10γ units) April 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	3	4	4	1	3	5	1	2	3	2	2	2	6	9	5	6	2	2	4	4	1	1	2	3
2	2	1	2	1	0	1	1	1	0	0	1	2	3	5	5	8	5	4	7	6	5	7	4	4	3
3	5	4	4	1	3	1	2	2	5	2	2	1	4	3	2	5	1	2	2	3	3	3	1	1	3
4	1	2	2	1	1	2	1	2	5	6	7	4	9	12	10	17	30	30	16	32	11	20	17	12	10
5	7	7	18	4	84	47	24	7	3	3	5	11	9	14	15	29	22	25	25	7	31	10	12	6	17
6	4	3	3	39	6	2	8	4	24	5	6	8	14	15	13	15	14	20	16	12	21	9	10	9	12
7	4	3	2	4	3	5	9	9	6	13	4	6	7	16	27	18	18	29	15	2	3	8	6	12	10
8	3	3	4	2	3	8	2	1	2	2	4	6	4	6	15	10	6	8	8	12	6	4	5	8	6
9	1	1	1	1	45	11	2	6	6	2	2	2	7	10	12	15	4	20	12	3	10	3	2	3	7
10	2	2	1	1	1	0	1	8	10	2	1	2	4	6	4	2	2	3	7	4	5	4	2	2	3
11	1	2	2	1	0	1	1	1	2	1	4	3	2	2	4	2	2	1	2	7	2	2	8	9	2
12	2	3	1	1	2	1	3	7	3	3	15	12	2	19	14	6	6	6	4	6	9	7	2	2	6
13	2	1	4	8	10	16	6	2	1	4	7	6	8	7	14	20	9	21	20	20	8	11	4	6	9
14	5	3	2	4	2	2	2	2	1	4	4	4	15	12	6	50	55	8	6	9	8	6	18	11	10
15	6	6	13	4	2	6	6	24	16	5	4	9	5	21	8	7	6	3	2	4	4	4	6	4	7
16	4	1	6	5	2	2	2	2	3	2	3	4	8	6	3	6	4	2	7	3	6	4	7	6	4
17	2	4	9	6	2	2	2	2	2	2	2	2	3	7	8	6	4	4	6	5	4	6	5	5	4
18	1	2	1	1	1	2	2	1	2	6	3	3	6	9	9	10	10	5	12	26	33	17	6	10	7
19	9	3	3	2	3	21	12	8	13	4	4	4	6	5	8	25	18	14	11	6	6	7	5	5	8
20	3	3	3	2	2	2	2	3	13	6	6	6	6	4	4	16	17	10	5	2	2	4	2	2	5
21	2	1	1	0	2	0	0	0	0	1	2	4	5	4	11	4	11	6	4	4	7	7	8	3	4
22	10	19	5	2	3	1	2	2	2	1	3	5	12	12	2	8	5	6	6	8	14	17	6	9	7
23	3	4	2	4	5	2	3	4	5	7	3	8	5	8	6	8	5	3	6	4	3	1	1	2	4
24	2	2	1	1	0	1	1	0	1	1	2	1	6	2	3	2	3	4	4	3	2	2	2	2	2
25	2	3	1	6	29	48	21	2	2	1	2	1	1	4	2	4	3	2	1	2	6	4	2	4	6
26	4	3	2	33	28	16	8	3	1	3	2	1	4	7	3	3	5	3	3	5	7	7	6	6	7
27	4	2	4	2	1	2	2	3	2	2	7	6	13	6	10	20	5	7	18	15	3	1	2	6	6
28	2	2	1	1	1	0	1	0	2	1	2	5	2	6	2	3	4	6	2	2	2	4	3	2	2
29	1	1	1	3	1	11	2	2	2	2	2	3	3	6	2	6	1	4	1	4	7	3	2	4	3
30	2	2	2	1	1	1	1	2	1	2	4	5	3	6	9	17	19	17	17	44	48	60	20	17	13
31																									
Mean	3	3	3	5	8	7	4	4	5	3	4	4	6	8	8	12	10	9	8	9	9	8	6	6	6

Table 41 Baker Lake R_x (Hourly Range in 10 γ units) May 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	4	12	11	16	17	5	4	6	8	4	5	5	8	8	19	21	24	21	16	10	10	12	9	10	11
2	8	22	14	8	10	12	27	4	3	5	12	10	6	10	13	30	15	25	26	13	6	11	21	8	13
3	8	4	6	3	6	4	13	30	6	6	3	5	5	6	8	12	10	14	14	10	12	17	13	13	10
4	38	30	6	3	4	23	22	20	11	34	11	6	15	8	14	31	16	20	9	11	7	6	11	7	15
5	7	4	3	49	57	12	5	13	6	3	2	5	4	10	5	19	10	13	10	5	7	6	9	8	11
6	4	4	9	59	59	5	15	2	3	4	4	3	4	7	5	12	10	7	5	8	6	8	3	6	12
7	5	2	3	1	2	1	23	5	1	6	6	5	6	10	9	5	7	8	7	10	3	5	8	12	6
8	3	3	1	3	3	4	5	2	5	7	5	4	5	6	14	12	5	4	7	10	6	18	7	7	6
9	6	3	4	4	4	6	43	14	8	8	10	7	5	6	15	12	9	7	11	15	11	13	17	7	10
10	5	7	3	5	5	2	5	6	5	4	8	5	14	5	24	18	19	19	14	12	7	9	16	7	9
11	4	4	14	6	25	2	2	3	3	9	3	9	11	8	20	14	9	5	5	6	5	12	10	5	8
12	3	3	5	4	4	4	3	4	4	3	6	7	6	14	12	17	17	8	6	12	6	5	7	4	7
13	7	12	13	8	25	51	3	2	3	3	8	8	5	9	11	12	12	13	9	13	22	13	20	5	12
14	5	5	15	40	8	4	3	23	5	15	9	5	6	8	7	5	5	6	6	8	4	12	8	4	9
15	2	3	3	5	4	14	3	3	2	3	3	2	5	6	7	6	5	4	5	5	7	9	12	6	5
16	3	26	6	3	9	15	16	13	4	2	2	1	3	3	3	2	1	2	3	3	5	2	2	3	5
17	1	3	2	2	5	3	4	2	2	3	4	5	5	6	5	16	13	10	9	2	2	5	2	1	5
18	4	2	2	2	1	1	1	1	1	2	1	3	5	5	3	8	7	7	3	6	4	1	2	2	3
19	1	3	0	1	1	0	3	2	3	3	3	3	6	6	5	12	6	7	13	9	8	7	5	4	5
20	3	2	5	11	6	1	2	2	1	3	3	5	3	3	3	4	3	4	5	2	1	3	6	3	3
21	4	4	1	1	1	1	1	0	1	1	1	2	4	11	4	5	3	3	4	8	3	4	3	2	3
22	1	2	1	1	2	1	1	1	1	1	2	2	1	8	5	5	4	4	3	2	3	2	1	1	2
23	1	1	1	1	1	0	0	2	2	3	3	3	4	4	4	3	3	2	2	2	2	1	1	3	2
24	1	6	5	1	1	1	2	2	3	4	3	2	6	9	26	14	10	6	12	7	1	7	5	4	6
25	3	1	1	1	1	1	2	1	1	1	4	2	4	3	4	5	6	3	2	2	2	1	1	1	2
26	7	4	3	5	2	3	4	3	1	2	3	1	4	8	10	6	8	9	3	5	4	8	6	6	5
27	6	2	4	1	1	3	2	3	2	2	4	6	5	7	3	14	13	9	4	4	6	15	7	14	6
28	5	6	7	19	5	13	10	4	5	10	5	8	9	9	6	17	6	7	7	16	9	11	11	8	9
29	8	6	10	38	18	6	8	12	3	5	3	6	4	4	9	11	4	5	13	8	8	7	8	10	9
30	14	6	6	8	8	20	18	10	8	5	8	5	6	6	6	10	8	5	17	8	5	5	3	2	8
31	3	2	2	1	1	6	19	8	1	6	16	20	7	15	10	16	16	8	10	9	18	35	16	5	10
Mean	6	6	5	10	10	9	9	7	4	5	5	5	6	7	9	12	9	8	8	8	6	9	8	6	7

96269—8½

Table 42 Baker Lake R_x (Hourly Ranges in 10γ units) June 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	5	4	5	6	5	9	4	4	4	25	26	39	10	12	12	7	10	8	8	7	6	5	6	5	10
2	6	5	3	16	5	61	14	5	3	6	4	17	20	28	6	31	32	10	14	7	10	5	4	7	13
3	8	3	6	4	4	4	6	7	5	3	6	4	5	13	14	6	5	11	9	7	7	13	4	6	7
4	5	2	1	2	3	2	5	29	8	5	2	2	3	13	8	11	5	5	7	5	5	7	5	3	6
5	4	2	2	0	2	1	1	1	2	1	2	2	2	4	3	3	5	3	1	1	2	3	2	1	2
6	0	2	1	2	1	2	1	1	1	2	2	2	3	5	6	5	6	8	6	25	14	19	18	14	6
7	4	12	6	6	5	3	5	5	5	6	8	13	13	12	12	38	39	12	20	11	8	17	12	7	12
8	5	5	4	3	5	4	11	2	6	13	17	10	8	14	11	10	5	26	10	20	23	14	21	6	11
9	7	8	9	5	7	13	10	4	4	5	8	10	13	13	23	17	8	7	7	5	7	9	8	4	9
10	6	9	4	2	4	2	1	1	1	6	14	4	9	13	11	7	5	9	9	15	7	7	4	5	6
11	8	8	4	3	24	35	5	1	1	3	2	3	6	6	7	15	9	4	8	5	7	6	6	5	8
12	6	3	5	6	2	1	2	2	1	3	5	6	3	3	3	5	3	4	7	4	7	4	4	6	4
13	3	4	5	1	3	3	1	4	2	4	5	7	10	5	4	2	4	10	5	5	6	8	9	9	5
14	10	4	1	1	1	1	1	1	3	6	5	5	4	5	14	27	11	6	5	5	7	4	9	4	6
15	6	3	4	4	30	34	7	4	4	4	5	12	10	2	21	10	10	9	7	14	13	5	5	2	9
16	2	3	1	3	1	6	2	1	1	2	1	3	4	2	3	5	2	8	11	5	4	3	14	12	4
17	9	7	3	3	7	7	8	5	23	11	16	10	5	8	10	8	9	17	12	20	6	7	5	7	9
18	6	4	4	3	9	5	3	5	6	4	6	16	16	19	32	8	8	19	23	7	10	4	4	5	9
19	11	7	6	5	3	3	3	3	2	2	3	3	3	5	7	9	16	9	17	12	7	6	6	12	7
20	10	11	11	8	5	5	9	18	3	4	5	18	10	9	11	11	11	9	9	8	5	5	10	7	9
21	4	4	5	3	24	32	29	5	8	10	6	4	4	4	1	8	14	5	5	3	6	6	9	5	8
22	4	5	1	2	8	8	21	16	7	2	2	3	4	10	5	5	5	3	2	3	4	12	6	6	6
23	4	8	1	3	3	10	6	2	2	3	2	3	3	2	6	4	5	5	3	6	8	6	2	2	4
24	4	5	2	1	2	5	22	2	2	1	3	4	3	13	19	40	20	10	9	4	7	3	11	6	8
25	4	6	3	8	8	5	24	14	5	7	6	2	13	13	8	11	14	5	24	16	24	61	41	29	15
26	15	35	14	6	56	11	9	15	25	27	8	6	11	12	13	9	9	14	12	12	12	12	11	6	15
27	5	9	11	10	12	16	11	5	31	10	10	14	9	13	20	14	16	19	11	23	23	12	11	9	14
28	8	3	5	4	7	15	13	5	10	5	5	3	8	9	11	10	12	12	7	12	8	8	7	3	8
29	5	4	4	6	2	3	6	6	4	4	4	3	8	9	10	16	18	32	22	22	9	12	10	7	9
30	8	6	3	4	5	19	16	10	17	4	6	7	7	5	6	24	11	9	11	20	10	11	13	13	10
31																									
Mean	6	6	4	4	8	11	9	6	7	6	6	8	8	9	11	13	11	10	10	10	9	10	9	7	8

Table 43 Baker Lake R_x (Hourly Ranges in 10 γ units) July 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	6	4	44	43	7	4	4	4	3	3	4	4	5	3	8	8	3	3	3	2	3	3	2	2	7
2	2	3	2	1	1	1	2	1	4	3	2	3	3	5	8	3	7	5	4	2	2	2	4	8	3
3	6	3	5	3	3	1	1	1	2	1	3	3	2	5	4	3	1	1	1	3	1	6	4	3	3
4	1	1	3	3	3	10	11	5	4	5	4	5	9	20	19	26	13	6	15	37	13	7	28	7	11
5	12	13	2	5	12	5	6	5	8	4	6	4	5	5	12	5	8	12	13	5	15	8	26	10	9
6	4	6	6	7	69	31	8	36	36	6	4	5	10	6	12	18	15	14	19	6	10	12	10	6	15
7	2	2	8	3	6	5	4	3	3	22	22	8	9	8	13	20	18	7	2	5	7	10	12	7	9
8	7	6	8	6	30	24	5	4	6	3	6	6	8	18	18	12	14	10	10	10	7	10	16	11	11
9	9	15	9	56	55	5	4	3	3	8	5	7	7	10	13	14	17	10	10	18	9	14	6	6	13
10	5	5	3	69	29	3	11	4	6	7	6	6	5	9	21	29	22	18	16	12	19	11	4	8	14
11	5	11	5	5	18	22	26	13	3	3	2	5	4	6	7	11	14	4	4	6	8	3	4	5	8
12	2	4	3	3	2	26	12	3	2	2	3	4	3	6	3	3	5	3	3	6	2	4	4	5	5
13	4	5	2	3	4	2	1	11	5	2	4	4	4	8	3	6	3	5	3	4	5	4	5	4	4
14	7	3	2	1	2	2	2	2	2	1	2	2	3	8	6	9	7	3	2	3	2	6	1	2	3
15	2	2	1	2	2	2	1	1	2	1	3	3	3	8	5	5	1	2	1	2	2	5	2	4	3
16	6	5	3	5	2	4	7	3	3	3	2	1	5	10	8	13	18	8	13	8	7	9	9	8	7
17	7	11	7	6	4	4	3	2	2	8	10	15	11	7	6	18	37	42	4	5	3	3	10	4	10
18	5	3	2	2	3	4	7	9	3	3	2	4	3	16	7	16	21	10	10	10	5	13	5	5	7
19	5	2	4	4	1	1	3	3	2	1	3	4	4	11	18	5	5	6	5	4	3	5	4	4	4
20	4	3	2	1	1	1	1	1	1	1	1	3	4	5	4	4	12	11	5	10	4	6	3	4	4
21	6	4	3	3	5	3	4	21	7	8	5	9	72	43	11	33	30	22	10	21	8	3	5	6	14
22	3	5	3	3	3	6	33	46	5	6	3	6	12	5	9	19	12	14	14	9	4	6	5	4	10
23	9	2	5	3	3	6	16	4	11	5	7	5	10	8	26	18	15	20	33	36	30	47	14	30	15
24	6	81	20	29	22	4	21	20	6	10	7	9	8	12	25	31	37	43	18	5	15	19	6	5	19
25	7	4	5	8	37	24	4	12	15	5	6	9	7	8	6	31	19	16	13	10	10	6	8	5	11
26	8	5	10	9	7	16	14	9	6	6	10	13	8	5	18	13	15	21	8	19	26	9	9	5	11
27	11	20	12	6	39	13	6	5	6	5	5	8	6	20	13	11	17	11	8	7	10	15	9	6	11
28	25	25	9	3	3	4	29	7	2	9	6	3	5	4	5	6	3	4	3	3	3	3	4	2	7
29	2	3	2	3	1	1	1	1	2	1	2	2	3	8	7	14	8	6	5	5	7	7	14	6	5
30	16	8	4	5	15	11	6	4	9	9	5	14	28	28	13	14	14	14	16	27	40	33	8	11	15
31	18	11	5	4	4	5	34	27	8	4	3	5	17	10	14	17	13	29	10	11	6	11	16	15	12
Mean	7	9	6	10	13	8	9	9	6	5	5	6	9	10	11	14	14	12	9	10	9	10	8	7	9

Table 44 Baker Lake R_x (Hourly Ranges in 10 γ units) August 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	10	4	14	7	7	22	6	4	2	6	4	11	6	11	18	30	21	24	26	21	18	24	28	11	14
2	7	5	9	4	3	24	81	27	6	3	8	8	11	10	17	18	4	9	13	15	11	15	8	10	14
3	9	2	3	13	24	4	4	5	3	4	5	3	5	4	6	9	8	8	6	7	11	10	9	13	7
4	13	6	7	3	1	3	2	17	8	6	4	3	13	24	18	12	27	9	14	12	23	13	17	7	11
5	10	5	9	10	37	37	26	5	4	10	8	6	8	9	6	6	7	10	6	7	14	17	5	7	11
6	4	1	4	5	7	7	7	9	2	2	4	5	10	6	5	11	9	15	5	9	12	11	6	9	7
7	15	11	10	46	15	4	2	2	2	3	5	8	8	8	10	13	5	2	4	6	8	5	6	5	9
8	4	2	3	7	5	5	3	2	3	3	4	5	4	10	11	5	5	6	3	2	3	4	4	5	4
9	3	5	6	3	2	1	3	3	3	6	6	3	6	6	7	16	9	7	5	10	3	6	5	5	6
10	4	1	3	1	2	1	1	1	1	1	3	4	7	7	14	16	18	11	8	5	3	2	2	2	5
11	6	5	2	1	0	1	2	1	1	1	1	4	3	5	5	7	6	8	7	3	5	7	7	2	4
12	2	2	6	4	2	1	3	2	1	1	3	5	3	3	5	5	7	6	5	4	6	6	4	1	4
13	2	4	1	1	1	1	1	1	1	1	2	2	3	3	5	3	3	3	2	4	3	4	4	4	3
14	4	3	2	1	2	1	1	2	3	2	3	2	2	5	2	4	1	3	3	2	1	1	4	5	3
15	1	1	1	0	1	1	0	0	1	1	1	3	7	7	13	10	10	4	13	13	23	19	17	6	6
16	7	3	2	1	1	1	1	1	1	1	2	5	7	5	12	5	7	7	8	4	5	6	6	6	4
17	8	4	3	1	1	2	4	11	4	2	8	6	9	5	5	5	8	5	7	9	11	12	9	5	6
18	5	9	6	5	22	5	4	3	31	33	7	14	11	30	30	22	18	14	8	17	9	17	7	4	14
19	7	6	2	3	2	9	8	2	2	1	2	3	8	5	16	5	19	46	13	11	7	10	6	18	9
20	9	18	51	37	21	20	35	5	6	9	11	7	24	19	14	26	19	35	30	7	7	9	10	18	19
21	28	8	67	46	59	10	10	53	28	13	6	7	10	8	26	11	23	7	17	11	8	20	8	8	21
22	4	3	2	1	1	2	16	8	19	7	7	6	3	8	7	8	4	7	5	6	11	16	6	4	7
23	4	5	12	13	6	4	11	9	5	12	10	8	13	8	22	5	6	14	10	12	5	4	5	12	9
24	9	11	5	4	1	2	1	3	12	14	5	4	5	9	6	8	10	8	8	4	8	10	10	4	7
25	6	3	2	3	2	5	9	2	3	3	4	5	5	8	7	4	8	3	4	5	10	6	20	13	6
26	12	12	2	2	30	19	14	3	3	2	4	4	5	5	18	14	16	10	7	7	13	6	5	6	9
27	2	1	3	3	1	1	2	2	2	2	5	7	6	20	22	17	19	37	25	17	25	17	15	7	11
28	5	5	3	4	4	3	3	3	3	5	11	52	44	12	22	28	26	28	44	38	18	17	15	11	17
29	4	8	24	7	2	3	4	2	10	10	13	8	10	12	20	24	21	16	10	8	12	5	8	4	10
30	5	4	3	3	2	1	1	3	1	2	3	5	6	8	15	17	23	9	17	9	7	3	9	17	7
31	5	4	3	2	4	5	7	3	6	6	5	6	5	11	7	24	23	35	6	9	9	15	12	6	9
Mean	7	5	9	8	9	7	9	6	6	6	5	7	9	9	13	13	13	13	11	10	10	10	9	8	9

Table 45 Baker Lake R_X (Hourly Ranges in 10 γ units) September 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	7	4	3	3	3	2	7	4	5	10	9	11	9	14	16	7	16	13	6	15	6	7	4	6	8
2	6	4	2	2	6	2	18	1	1	1	1	2	3	11	11	5	9	10	11	5	13	18	7	7	6
3	7	6	10	3	3	2	19	19	1	2	2	3	5	6	4	14	5	17	6	6	4	6	7	6	7
4	2	3	4	3	22	7	1	3	3	4	4	3	4	7	9	4	4	5	4	4	7	13	6	7	6
5	5	6	2	2	2	1	1	1	1	3	4	4	15	8	7	10	9	6	8	9	5	8	4	15	6
6	6	6	2	1	1	2	2	1	3	2	3	4	4	4	12	7	9	9	6	5	7	14	10	8	5
7	3	2	2	1	1	1	2	2	2	1	1	2	4	5	2	4	1	3	2	4	4	3	6	12	3
8	5	4	1	2	5	29	38	5	4	1	2	8	34	29	9	8	6	9	10	5	3	4	3	2	9
9	5	4	4	5	46	36	3	1	1	11	6	6	8	10	18	21	30	15	8	6	5	6	6	2	11
10	2	2	3	5	2	1	3	2	7	5	5	3	5	6	5	7	6	3	4	2	8	18	14	7	5
11	6	3	2	2	4	5	5	1	3	31	25	19	9	10	14	22	33	34	19	39	18	9	7	8	14
12	3	15	6	6	2	68	53	2	13	13	6	5	5	10	11	11	9	9	6	6	6	4	5	1	12
13	5	2	6	2	1	1	1	2	1	2	2	3	3	4	5	3	2	1	3	17	12	12	8	14	5
14	10	2	5	2	92	32	36	32	14	16	12	7	26	27	11	22	41	47	44	27	10	19	21	4	23
15	5	29	6	2	42	74	89	8	7	8	8	10	14	51	45	33	47	30	27	26	52	20	21	13	28
16	9	10	5	62	79	16	26	28	17	8	3	42	53	22	38	28	25	24	30	65	15	11	22	15	27
17	9	5	4	25	58	28	62	30	29	38	34	31	16	16	18	29	22	20	20	18	13	15	10	7	23
18	4	7	32	18	9	2	2	2	2	4	4	6	7	14	6	28	12	22	18	10	3	9	8	7	10
19	20	14	3	6	54	41	32	6	8	6	7	10	14	17	5	7	15	8	13	4	4	7	7	6	13
20	6	5	3	4	6	36	20	2	3	7	4	6	4	18	20	16	6	16	9	4	7	4	10	4	9
21	3	4	2	23	25	3	2	3	4	3	3	2	3	9	93	44	56	37	57	34	46	11	27	17	21
22	6	5	4	9	66	60	89	17	62	10	14	18	42	20	12	7	26	29	57	67	42	37	25	48	32
23	41	34	16	36	32	69	15	12	30	14	13	21	13	11	9	7	22	10	16	8	9	5	5	2	19
24	2	1	2	2	2	3	2	3	1	3	4	3	14	18	7	11	8	5	21	9	17	7	5	5	7
25	9	9	48	11	11	4	3	2	7	15	7	7	11	22	14	27	29	47	26	15	16	24	11	6	16
26	4	1	3	3	73	76	35	9	3	4	8	5	10	8	12	23	44	32	29	17	19	22	15	6	19
27	9	5	51	28	6	14	4	3	8	8	5	9	16	8	15	23	20	16	21	27	52	22	16	9	17
28	9	5	76	31	53	52	53	20	8	5	6	12	9	7	6	13	26	16	30	18	16	20	11	14	22
29	6	12	8	72	25	15	6	6	8	12	7	5	8	28	23	18	12	15	14	15	11	23	9	13	16
30	2	55	13	15	1	2	5	18	5	9	8	3	6	14	12	20	10	8	4	4	7	20	7	2	10
31																									
Mean	7	9	11	13	24	23	21	8	9	9	7	9	12	14	16	16	19	17	18	16	15	13	11	9	14

Table 46 Baker Lake R_x (Hourly Ranges in 10 γ units) October 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	1	2	3	3	3	3	2	2	2	3	3	2	7	11	9	3	4	3	5	4	4	4	3	4
2	2	1	1	1	1	1	2	0	2	2	2	3	5	9	8	3	3	4	6	6	3	2	1	3	3
3	1	2	1	7	9	3	2	1	3	3	6	2	3	8	5	3	3	3	3	3	3	3	2	2	3
4	3	2	4	3	3	2	3	2	6	3	5	2	6	2	8	10	16	5	4	3	4	4	3	3	4
5	2	2	2	1	1	2	1	1	2	9	8	5	4	8	10	7	8	3	5	7	15	13	3	2	5
6	4	2	1	3	46	2	1	1	2	2	2	2	4	5	5	6	5	3	5	8	4	3	2	3	5
7	2	2	2	3	1	2	2	2	3	3	4	2	3	7	11	8	18	6	4	8	11	12	9	8	6
8	5	5	11	58	30	3	2	3	5	5	4	6	6	8	11	13	11	12	5	5	12	4	3	3	10
9	2	2	2	3	2	7	3	2	9	3	3	1	5	5	3	8	4	4	5	7	8	7	5	3	4
10	2	1	2	1	1	1	1	1	4	8	7	4	8	9	9	10	6	3	9	10	9	11	3	3	5
11	4	3	2	2	49	28	3	35	25	12	13	56	35	5	8	19	20	10	8	8	10	9	11	7	16
12	3	66	60	15	11	28	31	8	5	4	5	8	23	9	17	26	19	41	27	27	26	21	10	3	21
13	6	3	7	9	85	76	85	14	6	5	6	4	9	7	18	27	25	13	15	17	22	19	8	13	21
14	10	5	8	8	13	70	58	20	9	16	7	5	7	10	18	20	9	17	16	15	13	12	10	6	16
15	3	9	7	8	56	41	20	16	5	5	8	10	10	18	11	20	11	6	5	17	12	13	12	9	14
16	5	3	48	43	3	8	38	55	21	23	13	6	18	25	33	7	14	17	17	11	11	6	7	4	18
17	4	1	1	2	38	27	22	15	3	2	3	5	3	3	3	6	8	5	3	4	4	3	4	4	7
18	2	2	2	14	5	3	3	2	3	2	2	15	10	9	5	6	7	13	9	3	3	3	4	3	5
19	4	3	3	3	3	4	3	5	3	3	9	3	5	13	8	6	7	7	7	3	5	3	2	4	5
20	2	3	3	3	2	2	1	3	8	4	4	8	6	5	15	10	7	9	10	8	3	4	10	14	6
21	3	3	3	3	4	3	3	3	2	6	5	5	3	5	5	5	4	5	1	1	2	2	3	2	3
22	2	1	1	2	2	1	2	2	1	1	2	2	3	3	3	6	3	3	2	2	2	2	2	2	2
23	2	1	1	2	2	2	2	2	1	2	1	3	3	7	3	4	1	3	2	5	3	7	14	3	3
24	12	8	7	10	11	3	48	41	27	31	57	37	11	15	8	14	21	12	17	28	18	17	8	5	19
25	30	94	4	5	2	18	22	7	5	4	4	4	5	13	12	6	11	13	8	9	4	8	5	7	13
26	3	5	5	10	6	2	1	1	2	2	3	5	3	8	17	18	10	12	10	8	8	12	5	4	7
27	3	2	3	2	1	2	1	1	1	2	3	2	4	7	8	6	5	4	5	3	3	4	1	1	3
28	3	1	2	1	1	1	3	3	2	1	7	8	3	3	2	8	7	17	21	20	5	5	4	6	5
29	5	3	7	4	13	6	9	6	15	7	5	6	6	8	24	27	46	13	5	12	12	24	21	26	13
30	8	16	49	23	22	28	22	24	11	10	5	6	4	4	5	4	4	3	5	8	4	3	3	3	11
31	3	3	2	2	1	2	1	1	3	3	3	5	6	5	4	8	10	3	3	4	3	3	4	2	3
Mean	5	8	8	8	14	12	13	9	6	6	7	7	7	8	10	11	10	9	8	9	8	8	6	5	8

Table 47 Baker Lake R_x (Hourly Ranges in 10 γ units) November 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	2	4	1	3	36	15	4	4	5	2	6	5	9	17	22	11	7	10	9	8	2	3	2	8
2	8	3	3	8	5	3	2	1	5	12	12	9	7	9	9	12	8	19	26	17	17	10	6	7	9
3	5	3	2	5	57	33	19	3	10	12	8	6	7	8	11	7	4	12	13	10	14	10	17	2	12
4	4	3	2	2	6	35	42	7	9	4	4	2	12	7	18	10	9	9	5	4	6	5	3	2	9
5	3	1	1	2	1	2	8	9	2	2	3	2	2	1	3	4	4	2	2	2	2	3	2	2	3
6	2	4	3	1	2	2	1	3	9	12	5	8	5	11	7	22	15	7	14	11	11	7	6	3	7
7	2	3	2	2	35	47	52	7	2	2	13	15	21	7	16	20	8	13	17	22	17	19	7	17	15
8	46	3	18	9	10	122	72	47	8	5	4	13	15	35	57	22	17	27	12	22	12	22	8	8	26
9	44	20	14	7	32	8	4	18	25	7	6	15	16	26	38	21	47	41	23	24	21	12	7	6	20
10	5	17	141	10	12	40	10	5	7	12	17	13	9	15	23	20	15	25	15	9	10	10	17	7	19
11	3	23	30	16	29	27	10	7	4	12	6	5	12	9	17	9	8	15	14	14	17	10	7	4	13
12	4	2	4	37	36	15	15	12	40	27	7	11	18	28	33	26	12	24	21	8	12	11	6	6	17
13	2	3	2	5	27	6	6	2	2	2	4	3	4	11	5	4	7	7	6	6	8	5	5	2	6
14	2	2	1	2	4	112	10	17	3	1	3	3	6	5	10	5	9	2	3	5	4	8	4	3	9
15	2	5	5	3	2	2	2	3	5	3	2	4	5	4	2	5	4	5	4	4	2	2	2	2	3
16	2	2	2	1	1	1	12	3	6	4	2	2	3	3	4	3	2	2	1	2	2	3	2	2	3
17	2	1	1	2	1	3	5	2	3	4	5	7	9	11	21	21	22	37	42	12	6	4	3	4	9
18	2	2	1	2	2	2	2	1	1	1	2	2	2	2	5	7	4	4	3	2	1	2	1	1	2
19	1	1	1	1	1	1	1	2	1	2	3	2	3	3	5	5	3	2	2	3	2	2	2	3	2
20	2	2	4	4	2	2	1	2	1	1	1	1	2	3	2	3	5	4	2	3	2	1	1	1	2
21	1	2	1	1	2	2	1	1	2	1	2	1	3	2	11	10	2	4	5	4	4	2	2	2	3
22	1	1	1	1	1	1	1	2	1	3	2	2	5	5	6	12	7	12	12	17	9	2	2	4	5
23	4	2	3	2	2	2	2	2	18	5	2	6	3	4	6	7	6	4	5	2	3	3	2	2	4
24	4	2	3	7	7	11	3	6	7	7	4	10	6	23	25	11	6	11	11	4	3	7	8	4	8
25	6	4	7	9	6	54	22	13	15	20	6	4	8	17	13	6	14	7	7	6	7	3	2	3	11
26	1	1	1	1	1	0	1	2	16	11	3	2	5	5	6	5	3	3	3	3	2	2	1	1	3
27	1	0	1	1	1	2	3	7	2	3	4	2	4	3	5	3	3	8	4	9	6	6	2	2	3
28	2	2	2	2	34	10	13	16	2	1	2	2	5	2	7	7	2	3	2	1	1	1	1	1	5
29	2	3	3	9	6	6	2	2	2	2	3	3	2	6	15	11	5	5	4	5	3	2	5	8	5
30	3	2	2	1	1	1	1	5	5	2	5	5	71	51	15	10	18	12	6	3	7	5	4	2	10
31																									
Mean	6	4	9	5	11	20	11	7	7	6	5	6	9	11	14	11	9	11	10	8	7	6	5	4	8

Table 48 Baker Lake R_x (Hourly Ranges in 10 γ units) December 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	2	2	2	2	2	2	2	2	3	3	4	6	5	6	15	16	6	6	3	4	8	5	4	5
2	3	2	2	3	11	13	2	3	9	9	4	2	3	9	8	8	14	12	11	11	6	14	13	6	7
3	4	3	9	3	48	58	14	76	36	10	9	5	12	12	14	19	15	20	22	8	7	15	12	5	18
4	7	4	8	60	11	3	21	9	8	6	6	5	6	24	25	40	22	23	25	10	12	10	9	14	15
5	15	6	4	4	52	77	44	28	10	6	7	13	22	10	12	17	29	32	36	19	12	6	5	6	20
6	9	5	5	2	65	69	12	7	9	11	13	18	7	16	14	27	24	21	14	18	10	10	9	9	17
7	8	4	4	3	4	12	20	21	14	6	6	9	9	15	14	31	40	15	14	14	12	6	4	4	12
8	6	5	2	4	65	82	23	17	19	8	5	9	10	15	12	12	12	8	8	7	5	8	4	2	14
9	4	1	2	1	1	18	13	42	14	5	12	8	9	8	6	6	10	2	4	6	2	2	0	1	7
10	1	0	0	0	0	0	1	1	0	0	1	1	1	1	2	1	2	4	1	1	2	0	0	0	1
11	0	1	0	1	0	1	0	2	2	1	1	2	4	3	4	2	2	2	1	1	2	2	2	2	2
12	1	3	1	1	1	2	2	2	2	4	3	2	4	2	5	4	4	4	3	1	2	4	4	2	3
13	4	2	1	4	8	4	1	3	1	1	1	1	1	3	4	10	6	4	3	3	2	3	3	3	3
14	2	1	3	4	2	2	4	1	2	3	3	2	10	20	15	9	12	9	8	16	17	14	5	7	7
15	5	3	2	2	1	2	4	2	9	5	5	6	4	11	21	18	14	10	6	8	6	3	2	2	6
16	4	3	3	2	2	2	2	2	1	2	2	1	2	13	14	29	14	5	5	8	5	2	4	3	5
17	5	3	2	1	1	1	1	1	1	1	1	1	1	4	5	8	8	6	6	5	2	5	7	2	3
18	2	2	1	1	0	1	1	1	1	2	1	2	2	3	5	2	3	2	2	3	3	3	2	1	2
19	1	1	1	1	0	0	0	0	0	0	0	1	2	2	4	6	4	8	6	4	7	6	6	8	3
20	3	3	2	2	1	1	5	48	3	4	6	4	6	8	12	9	6	8	8	5	9	4	3	4	7
21	1	2	1	2	1	1	2	2	4	3	2	1	5	4	5	17	8	6	6	4	6	4	9	5	4
22	2	2	2	1	1	2	14	15	4	6	6	6	8	12	15	10	9	17	18	9	4	4	3	2	7
23	2	3	0	2	2	1	44	10	33	24	5	4	4	4	3	9	15	22	9	9	11	6	4	5	10
24	3	3	5	2	2	1	1	1	0	1	1	1	2	8	5	11	6	4	10	7	5	5	6	3	4
25	1	1	1	1	1	0	2	2	2	2	10	2	2	3	7	8	3	7	4	4	2	2	3	1	3
26	3	2	1	3	4	26	13	1	2	2	4	8	4	6	4	6	7	4	2	4	6	4	2	2	5
27	2	2	2	1	2	1	10	9	3	2	2	2	2	9	11	7	3	2	2	2	2	3	2	2	4
28	1	2	1	2	1	2	12	12	3	4	4	2	3	5	11	10	7	6	7	8	6	7	6	6	5
29	4	3	4	4	3	2	1	38	5	2	2	24	16	8	10	7	12	18	17	14	5	5	8	5	9
30	5	3	3	3	2	2	2	2	1	1	2	2	4	6	4	10	13	6	5	4	6	4	3	3	4
31	1	1	3	3	2	1	0	1	1	2	4	1	2	4	4	6	5	3	2	2	3	2	3	1	2
Mean	4	3	3	4	10	13	9	12	6	4	4	5	6	8	9	12	11	10	9	7	6	6	5	4	7

MOULD BAY MAGNETIC OBSERVATORY
1962-63

Introduction

In the summer of 1961 the Division of Geomagnetism of the Dominion Observatory established a combined magnetic and seismic observatory in the vicinity of the Joint Arctic Weather Station, Mould Bay, Prince Patrick Island, N.W.T. The observatory serves principally as a control station for magnetic and seismic surveys mounted by the Polar Continental Shelf Project and the Dominion Observatory.

The Site

The station is underlain by sandstones, siltstones and shales of the Devonian Melville Island formation. A building site was suggested by the Meteorological Office of the Department of Transport, and a magnetic survey of this site was subsequently carried out in the spring of 1959 using a Varian portable proton precession magnetometer. The magnetic field intensity gradients were found to be very small, of the order of a few gammas in 100 feet. Owing to problems of construction relating to the drainage of the area, and for reasons of accessibility to power and convenience of operation, the site finally selected for the magnetic-seismic observatory was somewhat closer to the Joint Arctic Weather station than originally planned. The building is situated north of the weather station and about 225 feet from the nearest building.

The Building

An insulated wooden building of non-magnetic construction, 24 feet by 16 feet in size, and resting on a gravel pad, serves as the magnetic observatory building. This building is situated with its long axis approximately geographic east-west and is connected by a 20-foot corridor to the seismic observatory. The magnetic components of the instruments and the power distribution facilities are located at the end of the corridor remote from the magnetic observatory. A light-tight room, 14 feet by 9 feet, is partitioned off in the magnetic observatory building for a set of Ruska photographic variometers. The photographic variometers and absolute instruments are mounted on concrete piers set into the permafrost. Care was taken to ensure that the piers were decoupled from the wooden floor. Unfortunately, gradual pier movements have occurred. These are reflected in the observed drifting of variometer base-line and scale values, and have necessitated occasional relevelling of the variometers.

The building is electrically heated by thermostatically controlled glass heat panels, capable of maintaining the temperature in the building constant to within 2 degrees under normal conditions.

The Magnetic Equipment

The Photographic Variometers

A three-component Ruska variometer is aligned to record the geographic components X, Y, Z of the geomagnetic field. Initially there was considerable difficulty in obtaining a satisfactory recording of the X component, owing apparently to the instability of the system magnet. As a result continuous recording in three elements began only in July 1962, following the installation of a new magnet in the X variometer. The time scale of the magnetograms is 20 mm/hr. Hour marks correct to within a few seconds are provided by a Mercer chronometer. Parallax corrections to be applied to times measured on the magnetograms are less than one-half minute.

Scale values adopted for the Ruska variometers were:

X	Aug. 1—Oct. 31, 1962	5.19 gammas/mm
	Nov. 1—Nov. 30	5.27
	Dec. 1—Dec. 31	5.41
	Jan. 1—Jan. 27, 1963	5.53
	Jan. 28—Apr. 13	5.26
	Apr. 14—Apr. 30	5.65
	May 1—May 31	5.63 decreasing linearly to 5.42
	June 1—Sept. 30	5.36
	Oct. 1—Oct. 31	5.33
	Nov. 1—Dec. 31	5.24
Y	Aug. 1, 1962—Sept. 30, 1963	5.79 gammas/mm
	Oct. 1—Dec. 31	5.76
Z	Aug. 1—Aug. 31, 1962	5.50 gammas/mm
	Sept. 1—Sept. 30	5.56
	Oct. 1—Oct. 26 (0800 UT)	5.60
	Oct. 26 (0900 U.T.), 1962—Jan. 31, 1963	5.40
	Feb. 1—Mar. 31	5.40 increasing linearly to 5.64
	Apr. 1—July 31	5.66 decreasing linearly to 5.62
	Aug. 1—Sept. 30	5.62 " " 5.42
	Oct. 1—Dec. 31	5.42 increasing linearly to 5.52

The temperature coefficients determined in February 1963 were +3 gammas/°C in Z, − 1.5 gammas/°C in Y, and less than −0.5 gammas/°C in X. The sensitivity of the Ruska temperature trace was 1.4°C/mm. Since temperature variations in the variometer room were normally very small, temperature corrections were not applied to base-line and mean hourly values, except for periods of power failure when temperature changes were large.

The Stand-by Variometers and Storm Recorder

A three-component electrical magnetometer built commercially to an Observatory design (Serson 1957) is used as a stand-by variometer. The inked output chart moves at 20 mm/hr and the scale value is normally 8.3 gammas/mm, corresponding to a full scale sensitivity of 1000 gammas in all components. X, Y and Z are again recorded and the chart values used to interpolate for missing values of the Ruska record. By means of limit switches and a relay, the sensitivity of the electrical magnetometer is halved whenever any one element goes off scale, thus converting the instrument into a storm recorder.

Absolute Instruments

A proton precession magnetometer built at the Dominion Observatory, Ottawa is the primary standard of total intensity. The value adopted for the gyromagnetic frequency is 4257.60 +0.03 cycles/second/oersted. A portable electrical magnetometer of the saturable core type (Serson and Hannaford, 1956) is used to determine declination (D) and inclination (I).

Base-line Values

The r.m.s. differences of the observed minus adopted base-line values were 4 gammas for 49 observations in X, 4 gammas for 50 observations in Y, and 3 gammas for 46 observations in Z. The scatter in any one set of base-line determinations (each a mean of 6) was of the order of a few gammas in each component.

The Magnetic Reductions

A summary by month (1962) and by month, season and year (1963) of the mean hourly values of X, Y and Z for all days and for the international quiet and disturbed days is given in Tables 49–57 for August to December 1962, and in Tables 61–69 for 1963. The daily mean values of the three elements are given in Tables 58–60 for August to December 1962, and in Tables 70–72 for 1963.

R_y indices of magnetic disturbance are given for each hour of the period August 1962 to December 1963 in Tables 73–89. The R_y indices are the hourly ranges in Y, the principal horizontal magnetic field component recorded at Mould Bay, expressed in 10-gamma units.

References

SERSON, P. H. and HANNAFORD, W. L. W., 1956. A portable electrical magnetometer. Can. J. Technol. v. 34, p. 232

SERSON, P. H., 1957. An electrical recording magnetometer. Can. J. Phys., v. 35, p. 1387.

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (All Days)

Table 49 Mould Bay 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								941	951	956	963	964				
1-2								947	958	959	965	967				
2-3								954	961	969	965	973				
3-4								973	969	983	972	979				
4-5								989	990	994	975	986				
5-6								1012	1002	1001	982	986				
6-7								1027	1019	1015	985	985				
7-8								1037	1033	1030	990	994				
8-9								1048	1044	1034	1007	991				
9-10								1043	1046	1049	1014	1013				
10-11								1051	1049	1054	1012	1014				
11-12								1047	1038	1039	1008	1006				
12-13								1046	1034	1028	991	1000				
13-14								1041	1026	1016	990	990				
14-15								1032	1016	1006	981	974				
15-16								1011	1011	988	961	968				
16-17								994	994	985	954	957				
17-18								963	967	975	951	943				
18-19								961	955	942	941	936				
19-20								961	937	941	942	929				
20-21								927	944	928	936	926				
21-22								927	935	942	932	936				
22-23								921	934	945	939	946				
23-24								951	938	957	953	955				
Mean								992	990	989	971	972				

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 50 Mould Bay 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								985	962	949	967	974				
1-2								968	963	967	966	974				
2-3								970	964	984	968	978				
3-4								977	979	987	977	978				
4-5								986	986	993	977	981				
5-6								985	994	1008	977	984				
6-7								991	991	1013	978	982				
7-8								989	993	1033	980	986				
8-9								998	999	1049	979	991				
9-10								999	1002	1053	981	1000				
10-11								1011	1004	1045	980	1001				
11-12								1021	1004	1017	978	995				
12-13								1022	1006	1015	975	988				
13-14								1021	1007	1010	972	986				
14-15								1010	989	1017	970	977				
15-16								990	990	1002	968	975				
16-17								973	985	1002	967	974				
17-18								953	949	982	968	974				
18-19								960	958	954	964	972				
19-20								971	948	978	961	965				
20-21								962	955	958	959	965				
21-22								971	938	957	960	962				
22-23								941	950	947	953	977				
23-24								945	934	966	960	978				
Mean								983	977	995	970	980				

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 51 Mould Bay 1962

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								878	969	932	958	933				
1-2								930	961	909	951	941				
2-3								939	958	939	946	962				
3-4								985	947	994	971	983				
4-5								993	983	998	976	1001				
5-6								1028	1008	1001	1003	987				
6-7								1047	1056	1028	998	980				
7-8								1086	1078	1050	1031	1017				
8-9								1101	1086	1032	1035	945				
9-10								1086	1077	1062	1028	1020				
10-11								1093	1084	1069	1022	1029				
11-12								1077	1088	1049	1004	1014				
12-13								1058	1066	1039	968	1008				
13-14								1056	1058	1016	1006	1005				
14-15								1030	1045	997	989	960				
15-16								1029	1020	974	952	947				
16-17								979	1016	940	953	906				
17-18								985	975	942	929	833				
18-19								979	930	911	904	849				
19-20								956	852	907	908	846				
20-21								878	891	843	897	844				
21-22								869	898	882	883	859				
22-23								841	888	913	889	889				
23-24								922	911	945	939	907				
Mean								993	994	974	964	944				

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (All Days)

Table 52 Mould Bay 2000 γ + 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								169	157	157	182	179				
1-2								145	156	151	180	180				
2-3								135	133	152	175	176				
3-4								138	129	151	178	179				
4-5								129	130	148	174	178				
5-6								127	138	148	170	174				
6-7								132	139	157	163	181				
7-8								147	144	170	159	185				
8-9								176	173	175	173	176				
9-10								191	189	195	193	199				
10-11								216	219	223	223	207				
11-12								227	236	249	230	213				
12-13								245	240	264	231	221				
13-14								264	253	261	234	240				
14-15								268	271	271	231	251				
15-16								275	290	266	232	246				
16-17								288	302	268	225	240				
17-18								279	289	279	230	238				
18-19								264	286	266	220	229				
19-20								256	263	239	207	211				
20-21								231	235	217	202	204				
21-22								220	191	194	183	191				
22-23								195	180	177	175	182				
23-24								193	161	173	175	178				
Mean								205	204	206	198	202				

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (Quiet Days)

Table 53 Mould Bay 2000 γ + 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								204	161	151	185	192				
1-2								173	167	155	187	189				
2-3								178	165	175	185	192				
3-4								175	169	158	196	188				
4-5								175	180	158	196	184				
5-6								176	174	161	190	187				
6-7								183	175	154	189	193				
7-8								189	185	156	190	194				
8-9								192	191	181	195	195				
9-10								204	195	213	196	208				
10-11								212	203	208	201	206				
11-12								216	217	241	203	209				
12-13								228	228	228	203	214				
13-14								239	241	225	205	215				
14-15								245	234	242	207	216				
15-16								253	240	242	206	219				
16-17								250	247	232	209	213				
17-18								232	258	246	208	214				
18-19								221	236	241	205	222				
19-20								227	225	238	199	213				
20-21								217	220	207	196	200				
21-22								214	163	199	192	203				
22-23								206	172	172	187	195				
23-24								176	157	169	185	196				
Mean								208	200	198	196	202				

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (Disturbed Days)

Table 54 Mould Bay 2000 γ + 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								140	165	140	186	133				
1-2								91	165	103	156	138				
2-3								69	115	143	147	114				
3-4								104	102	165	166	141				
4-5								71	75	143	139	152				
5-6								84	91	145	126	147				
6-7								114	100	150	117	155				
7-8								114	106	144	154	168				
8-9								171	151	135	166	95				
9-10								162	183	164	191	205				
10-11								193	229	232	248	216				
11-12								228	227	295	244	215				
12-13								274	237	313	244	242				
13-14								267	280	280	231	264				
14-15								293	302	293	235	303				
15-16								306	345	294	246	298				
16-17								304	353	312	234	301				
17-18								295	325	313	234	310				
18-19								265	345	275	238	267				
19-20								281	337	251	210	205				
20-21								228	265	212	212	202				
21-22								229	207	151	164	166				
22-23								141	169	157	157	155				
23-24								138	101	179	165	137				
Mean								190	207	208	192	197				

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (All Days)

Table 55 Mould Bay 57,000 γ + 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0–1								906	911	919	925	923				
1–2								894	910	912	926	922				
2–3								898	907	921	926	921				
3–4								905	910	921	926	923				
4–5								909	920	928	927	926				
5–6								914	933	938	933	931				
6–7								935	938	952	944	937				
7–8								949	955	958	959	939				
8–9								970	971	982	969	935				
9–10								971	975	1000	971	967				
10–11								975	976	1001	985	979				
11–12								969	994	1005	995	977				
12–13								974	977	1016	998	970				
13–14								982	966	1005	997	971				
14–15								982	971	1003	981	984				
15–16								978	978	997	971	980				
16–17								984	984	986	963	974				
17–18								981	979	967	961	969				
18–19								966	971	965	965	968				
19–20								953	955	946	955	954				
20–21								947	918	929	943	949				
21–22								943	893	910	933	937				
22–23								922	890	912	932	929				
23–24								916	901	917	928	926				
Mean								947	945	958	955	950				

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Quiet Days)

Table 56 Mould Bay 57,000 γ + 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								911	923	922	933	930				
1-2								911	920	910	929	925				
2-3								908	924	924	924	924				
3-4								910	927	923	924	923				
4-5								911	933	925	924	924				
5-6								923	931	934	925	927				
6-7								933	933	954	925	933				
7-8								938	936	955	929	936				
8-9								938	936	966	930	938				
9-10								943	937	987	930	946				
10-11								940	940	995	933	961				
11-12								939	945	977	932	955				
12-13								947	950	970	934	948				
13-14								953	951	963	937	948				
14-15								961	954	957	933	946				
15-16								963	960	959	934	947				
16-17								967	965	953	935	944				
17-18								969	983	949	933	947				
18-19								959	981	966	938	952				
19-20								953	963	944	934	946				
20-21								927	928	924	935	935				
21-22								920	931	921	933	930				
22-23								919	910	922	929	929				
23-24								916	891	929	929	930				
Mean								936	940	947	931	938				

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Disturbed Days)

Table 57 Mould Bay 57,000 γ + . 1962

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1								926	953	898	931	917				
1-2								864	939	897	922	923				
2-3								858	901	920	921	919				
3-4								887	897	924	920	931				
4-5								892	907	920	919	946				
5-6								912	938	939	939	965				
6-7								930	945	966	978	975				
7-8								938	976	957	982	961				
8-9								1009	1003	1014	997	913				
9-10								1035	1013	1057	993	1016				
10-11								1018	1025	1009	1023	1022				
11-12								985	1069	1016	1036	1014				
12-13								987	1009	1064	1082	1010				
13-14								987	1000	1060	1081	1011				
14-15								988	1000	1037	1035	1024				
15-16								999	1013	1024	1004	1032				
16-17								1011	1005	1006	978	1026				
17-18								1008	964	1007	970	1040				
18-19								962	986	987	973	1043				
19-20								950	978	974	971	978				
20-21								964	930	971	965	973				
21-22								957	880	919	946	954				
22-23								931	886	903	947	938				
23-24								930	902	918	944	933				
Mean								955	963	974	977	978				

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 58 Mould Bay 1962

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								1035	1024	983	988	975
2								1027	1021	1002	975	973
3								1012	1007	1010	987	967
4								1017	1002	998	982	966
5								1036	1026	986	980	970
6								1042	1006	1000	953	975
7								1023	1034	992	973	983
8								1054	1014	961	972	974
9								1003	999	978	974	981
10								1035	---	982	973	961
11								981	999	987	979	956
12								1007	976	984	965	950
13								964	966	989	968	979
14								945	979	981	968	974
15								956	963	980	952	975
16								925	976	987	960	985
17								933	980	995	975	944
18								994	967	972	974	956
19								996	960	990	964	926
20								974	980	976	971	943
21								942	960	987	955	960
22								948	974	1008	969	988
23								978	985	989	967	989
24								985	967	973	961	986
25								960	986	972	963	979
26								1005	981	976	978	973
27								974	994	998	977	986
28								991	986	997	979	985
29								987	982	1011	980	989
30								1020	1005	1001	987	987
31								994		1018		991
Mean								992	990	989	971	972

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY

Table 59 Mould Bay 2000 γ + 1962

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								196	238	218	205	203
2								245	228	215	199	203
3								224	237	206	210	202
4								226	190	204	207	222
5								238	240	221	187	197
6								240	229	193	198	199
7								241	222	201	199	202
8								248	216	190	198	214
9								216	225	185	195	194
10								233	---	193	195	203
11								206	204	185	202	204
12								233	190	184	191	191
13								193	196	204	197	189
14								164	180	189	203	199
15								174	166	185	190	189
16								176	197	209	189	206
17								173	196	201	197	209
18								193	187	186	198	198
19								187	192	214	208	179
20								200	184	213	202	195
21								185	183	230	199	201
22								164	190	209	192	202
23								177	184	221	194	203
24								211	185	221	197	210
25								192	212	215	181	205
26								210	199	232	201	218
27								194	210	212	201	206
28								206	222	205	201	209
29								208	219	218	204	207
30								222	203	217	193	207
31								170		216		211
Mean								205	204	206	198	202

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY

Table 60 Mould Bay 57,000 γ + 1962

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								929	928	960	938	953
2								913	959	973	938	949
3								940	953	963	967	933
4								942	976	948	963	986
5								936	939	930	949	952
6								922	933	934	939	941
7								915	928	921	964	937
8								919	912	962	954	953
9								928	925	974	927	926
10								951	---	966	928	933
11								940	907	958	949	957
12								933	976	949	928	942
13								934	956	979	928	950
14								959	952	970	930	950
15								970	951	951	982	937
16								974	944	975	979	934
17								994	936	936	952	966
18								967	942	938	940	985
19								957	952	990	942	993
20								938	950	931	929	988
21								951	963	945	958	987
22								970	955	954	1006	959
23								951	956	950	982	939
24								976	957	938	986	944
25								976	937	990	993	926
26								946	947	986	942	958
27								937	953	975	967	935
28								933	926	962	950	931
29								942	960	952	949	930
30								933	934	981	981	923
31								966		951		944
Mean								947	945	958	955	950

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (All Days)

Table 61 Mould Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	970	984	981	963	958	991	959	938	926	969	991	993	968	961	960	984
1-2	972	990	981	964	965	961	969	951	943	978	991	1000	972	962	966	988
2-3	980	993	987	977	966	984	989	971	954	986	996	1002	982	975	978	993
3-4	985	994	993	991	985	990	998	983	977	997	999	1005	991	989	989	996
4-5	983	997	997	1002	1006	1014	1009	998	994	1002	1003	1005	1001	1007	999	997
5-6	989	999	1002	1009	1022	1040	1026	1016	1016	1004	1008	1004	1011	1026	1008	1000
6-7	997	1002	1010	1016	1042	1053	1044	1028	1021	1014	1009	1005	1020	1042	1015	1003
7-8	1001	1013	1016	1025	1043	1069	1055	1037	1032	1027	1025	1016	1030	1051	1025	1014
8-9	1005	1002	1022	1033	1050	1078	1066	1049	1054	1036	1031	1024	1037	1060	1036	1015
9-10	1015	1021	1023	1032	1063	1078	1062	1057	1058	1045	1035	1028	1043	1065	1040	1025
10-11	1016	1024	1028	1029	1059	1084	1071	1059	1060	1042	1035	1028	1045	1068	1040	1026
11-12	1008	1016	1025	1023	1059	1086	1076	1057	1056	1028	1029	1026	1041	1070	1033	1020
12-13	1009	1008	1017	1028	1055	1088	1080	1060	1048	1016	1020	1018	1037	1071	1027	1014
13-14	997	1005	1010	1024	1046	1085	1082	1052	1028	1010	1010	1009	1030	1066	1018	1005
14-15	978	1000	1004	1018	1035	1083	1056	1041	1019	1007	1007	1006	1021	1054	1012	998
15-16	985	997	1003	1011	1024	1069	1041	1023	1009	1003	993	995	1013	1039	1007	993
16-17	976	984	997	999	998	1034	1020	1005	993	992	976	989	997	1014	995	981
17-18	960	984	989	985	988	1024	998	972	970	971	972	978	983	996	979	974
18-19	956	982	983	978	975	1008	985	959	952	967	965	973	974	982	970	969
19-20	950	972	979	964	967	987	972	950	940	961	964	967	964	969	961	963
20-21	951	973	979	959	978	967	957	944	942	959	963	967	962	962	960	964
21-22	954	976	974	964	976	987	957	920	931	956	972	971	961	960	956	968
22-23	959	980	973	964	978	1018	969	933	939	953	981	978	969	975	957	975
23-24	966	981	974	957	978	994	969	945	923	966	987	986	969	972	955	980
Mean	982	995	998	996	1009	1032	1017	998	991	995	998	999	1001	1014	995	994

Mean Hourly values for April 6 are incomplete and have not been included in this table.

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 62 Mould Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	983	996	981	983	980	1002	988	947	956	992	1002	1005	984	979	978	996
1-2	984	998	986	980	978	978	993	976	978	992	1002	1004	987	981	984	997
2-3	986	999	992	983	988	982	995	983	987	995	999	1004	991	987	989	997
3-4	987	996	996	990	992	995	1004	985	997	1001	1003	1005	996	994	996	998
4-5	986	996	997	997	999	1009	1008	998	999	998	1002	1006	1000	1004	998	998
5-6	986	997	998	1000	1008	1023	1010	1007	1008	999	1006	1005	1004	1012	1001	998
6-7	988	998	999	1001	1012	1028	1020	1009	1003	1006	1006	1005	1006	1017	1002	999
7-8	988	999	1001	1004	1020	1053	1030	1006	1010	1011	1007	1007	1011	1027	1006	1000
8-9	990	1002	1004	1010	1023	1050	1043	1008	1014	1019	1010	1013	1016	1031	1012	1004
9-10	991	1004	1009	1015	1035	1051	1037	1011	1022	1022	1014	1023	1020	1034	1017	1008
10-11	991	1006	1012	1020	1036	1053	1040	1017	1018	1015	1013	1025	1020	1036	1016	1009
11-12	990	1004	1009	1017	1027	1046	1051	1020	1012	1009	1010	1018	1018	1036	1012	1006
12-13	990	1001	1006	1016	1025	1042	1054	1014	1008	1005	1008	1011	1015	1034	1009	1002
13-14	988	1000	1007	1008	1032	1039	1048	1011	997	1006	1004	1006	1012	1032	1004	1000
14-15	985	997	1008	1005	1018	1036	1031	1021	997	1006	998	1003	1009	1026	1004	996
15-16	983	1001	1014	1002	1006	1034	1031	1014	999	999	1000	1004	1007	1021	1004	997
16-17	980	999	1016	1001	999	1021	1013	998	987	1006	999	1003	1002	1008	1002	995
17-18	976	1000	1002	1006	994	1004	1005	968	988	1009	997	1000	996	993	1001	993
18-19	978	1003	1000	1002	979	999	1005	946	991	1003	992	996	991	982	999	992
19-20	981	995	989	1006	991	999	1019	919	988	998	990	993	989	982	995	990
20-21	981	996	992	1011	994	991	1033	898	984	998	991	996	989	979	996	991
21-22	979	998	1004	1010	1010	1008	1010	924	964	1002	989	998	991	988	995	991
22-23	980	994	1004	1004	997	1017	990	962	949	994	991	999	990	992	988	991
23-24	979	999	994	968	981	987	993	961	936	991	994	1001	982	980	972	993
Mean	985	999	1001	1002	1005	1019	1019	983	991	1003	1001	1005	1001	1006	999	998

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 63 Mould Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	940	938	970	953	986	967	993	959	799	913	967	965	946	976	909	952
1-2	941	971	970	954	968	945	1007	955	863	937	971	994	956	969	931	969
2-3	965	983	978	968	948	1003	991	995	866	963	987	996	970	984	944	983
3-4	977	988	994	1002	986	1004	1012	999	923	992	992	1000	989	1000	978	989
4-5	963	993	990	1011	1019	1039	1024	1019	1020	1006	1014	1001	1008	1025	1007	993
5-6	992	1000	1003	1013	1023	1054	1049	1042	1051	998	1022	996	1020	1042	1016	1002
6-7	1024	1012	1025	1014	1051	1095	1097	1057	1051	1007	1003	973	1034	1075	1024	1003
7-8	1026	1054	1042	1020	1054	1145	1078	1080	1079	1052	1040	1024	1058	1089	1048	1036
8-9	1057	953	1050	1028	1071	1123	1096	1096	1126	1084	1034	1038	1063	1096	1072	1020
9-10	1043	1039	1034	1055	1091	1096	1094	1099	1090	1100	1053	1046	1070	1095	1070	1045
10-11	1068	1048	1045	1046	1080	1078	1112	1094	1086	1089	1060	1045	1071	1091	1066	1055
11-12	1050	1038	1052	1038	1078	1094	1123	1088	1082	1043	1064	1046	1066	1096	1054	1049
12-13	1060	1014	1041	1046	1067	1109	1144	1119	1063	1030	1042	1022	1063	1110	1045	1034
13-14	1029	1018	1016	1048	1045	1118	1162	1094	1030	1021	1031	1020	1053	1105	1029	1024
14-15	969	1013	1012	1046	1035	1121	1088	1070	1016	1015	1028	1007	1035	1078	1022	1004
15-16	997	993	995	1018	1038	1081	1062	1051	998	993	992	993	1018	1058	1001	994
16-17	968	965	967	996	1013	1023	1076	1029	977	939	923	973	987	1035	970	957
17-18	931	969	944	954	981	1045	993	1014	967	907	913	946	964	1008	943	940
18-19	910	971	950	946	990	1021	982	949	904	918	912	938	949	985	929	933
19-20	899	920	947	960	996	991	957	979	922	909	901	916	941	981	934	909
20-21	922	915	944	906	1029	903	909	968	898	899	901	909	925	952	912	912
21-22	937	949	934	910	1012	931	903	908	853	909	918	921	924	938	902	931
22-23	959	974	949	901	927	969	941	930	939	925	936	947	941	942	928	954
23-24	943	960	963	909	1020	940	962	914	932	969	956	982	954	959	943	960
Mean	982	987	992	989	1021	1037	1036	1021	981	984	986	987	1000	1029	986	986

Mean hourly values for April 6 are incomplete and have not been included in this table.

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas) (All Days)

Table 64 Mould Bay 2000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	182	181	173	162	161	190	156	146	153	170	189	194	171	163	164	186
1-2	182	182	171	162	153	133	142	142	141	167	189	199	164	143	160	188
2-3	181	183	170	165	137	139	142	144	134	167	188	198	162	140	159	188
3-4	179	180	173	170	143	131	143	145	141	165	187	196	163	140	162	186
4-5	169	178	175	168	148	121	123	143	135	167	181	194	158	134	161	180
5-6	167	176	174	168	150	133	134	147	127	161	174	189	158	141	158	176
6-7	172	173	173	176	154	135	138	158	150	164	180	183	163	146	166	177
7-8	175	178	177	184	166	153	154	170	167	175	189	181	173	161	176	181
8-9	183	154	183	190	185	169	173	185	184	186	194	188	181	178	186	180
9-10	182	187	195	208	198	182	191	199	218	210	207	204	198	192	208	195
10-11	205	204	209	215	214	200	207	209	231	219	219	216	212	208	218	211
11-12	212	211	214	223	222	216	226	231	257	233	233	223	225	224	232	220
12-13	218	231	223	237	244	235	256	243	265	241	241	243	240	244	242	233
13-14	229	232	226	246	259	253	266	255	273	247	243	253	248	258	248	239
14-15	243	231	237	251	271	274	275	270	276	252	247	251	256	272	254	243
15-16	233	229	243	254	275	291	286	279	284	252	252	246	260	283	258	240
16-17	233	232	241	261	284	289	279	281	296	267	255	241	263	283	266	240
17-18	230	234	241	268	287	311	293	267	287	265	250	239	264	290	265	238
18-19	222	233	232	265	273	308	277	269	283	256	231	227	256	282	259	228
19-20	218	221	232	252	255	280	268	249	277	246	217	218	244	263	252	218
20-21	200	208	217	238	254	267	259	236	251	223	205	205	230	254	232	204
21-22	191	198	205	210	240	248	236	197	225	205	197	199	212	230	211	196
22-23	183	186	185	194	216	256	220	159	177	180	194	194	195	213	184	189
23-24	181	183	176	166	193	209	196	164	157	179	192	193	182	190	170	187
Mean	199	200	202	210	212	213	210	204	212	208	211	211	208	210	208	205

Mean hourly values for April 6 are incomplete and have not been included in this table.

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 65 Mould Bay 2000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	198	189	180	183	178	196	186	155	172	204	204	204	188	179	185	199
1-2	199	192	186	186	161	157	169	163	188	200	208	205	184	162	190	201
2-3	199	194	184	187	170	147	174	167	185	196	205	207	185	165	188	201
3-4	199	192	191	193	173	157	177	169	201	190	207	209	188	169	194	202
4-5	199	192	194	198	166	153	184	185	194	194	206	208	189	172	195	201
5-6	199	191	193	199	177	162	186	181	195	195	202	208	191	176	196	200
6-7	201	192	194	205	180	150	189	189	198	195	203	206	192	177	198	200
7-8	196	194	193	206	182	154	193	182	205	202	202	204	193	178	202	199
8-9	198	192	195	206	186	184	192	194	210	201	204	204	197	189	203	200
9-10	200	196	198	209	189	202	196	199	220	207	208	203	202	196	208	202
10-11	204	202	203	213	203	217	208	206	226	212	215	225	211	208	214	212
11-12	209	207	208	219	211	219	221	212	228	218	215	217	215	216	218	212
12-13	213	206	210	232	222	224	243	222	226	224	218	222	222	228	223	215
13-14	210	207	215	233	242	230	252	231	241	230	221	223	228	239	230	215
14-15	211	207	223	237	256	239	264	240	241	237	230	219	234	250	234	217
15-16	214	213	231	235	254	244	278	244	243	235	224	219	236	255	236	218
16-17	214	213	243	246	250	250	286	252	246	239	224	216	240	260	244	217
17-18	210	220	245	264	246	266	274	241	243	253	218	220	242	257	251	217
18-19	204	228	246	271	239	253	266	216	253	244	215	218	238	244	254	216
19-20	204	214	238	260	235	233	272	210	252	241	209	216	232	238	248	211
20-21	200	211	225	252	216	205	265	181	260	225	209	211	222	217	240	208
21-22	197	198	225	240	207	227	253	158	230	222	207	207	214	211	229	202
22-23	197	195	200	212	176	232	207	174	177	201	202	205	198	197	198	200
23-24	199	192	195	177	183	199	206	156	160	203	203	206	190	186	184	200
Mean	203	202	209	219	204	204	223	197	216	215	211	212	210	207	215	207

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 66 Mould Bay 2000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	146	144	144	123	178	187	213	140	72	107	156	174	149	180	112	155
1-2	148	158	147	150	139	104	175	133	49	90	157	189	137	138	109	163
2-3	144	150	144	161	115	121	136	120	-26	92	152	186	125	123	93	158
3-4	123	139	143	168	129	72	125	105	19	108	166	178	123	108	110	152
4-5	71	126	137	149	125	38	104	119	31	103	164	170	111	96	105	133
5-6	95	126	146	157	100	98	129	125	-20	81	145	152	111	113	91	130
6-7	122	106	135	169	103	105	117	142	54	71	127	135	115	117	107	122
7-8	137	141	143	183	160	136	137	166	100	104	150	139	141	150	132	142
8-9	163	16	158	189	185	140	160	178	148	152	167	169	152	166	162	129
9-10	115	160	201	217	181	176	205	179	228	211	216	200	191	185	214	173
10-11	201	199	216	238	244	215	214	233	232	221	216	212	220	226	227	207
11-12	231	224	241	240	258	221	231	240	290	254	267	239	245	238	256	240
12-13	225	283	250	271	264	235	321	253	319	270	286	271	271	268	278	266
13-14	274	268	256	282	279	277	313	290	327	296	302	295	288	290	290	285
14-15	321	265	267	306	308	329	288	326	317	308	272	295	300	313	300	288
15-16	270	257	279	305	309	316	295	323	319	286	309	264	294	311	297	275
16-17	262	268	269	298	351	286	300	332	360	324	340	275	305	317	313	286
17-18	260	260	265	276	343	346	345	354	319	325	316	262	306	347	296	274
18-19	236	273	245	259	314	342	318	365	269	283	256	255	285	335	264	255
19-20	232	241	252	308	292	312	290	331	327	230	243	228	274	306	279	236
20-21	189	206	206	264	324	328	282	291	236	180	188	202	241	306	222	196
21-22	179	194	174	132	277	288	226	244	200	146	181	174	201	259	163	182
22-23	164	169	157	226	199	266	242	162	152	146	170	170	185	217	170	168
23-24	161	166	157	140	224	133	226	171	148	154	157	171	167	188	150	164
Mean	186	189	197	217	225	211	225	222	186	189	213	209	206	221	197	199

Mean hourly values for April 6 are incomplete and have not been included in this table.

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (All Days)

Table 67 Mould Bay 57,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	916	920	915	905	884	849	859	895	921	928	942	930	905	872	917	927
1-2	919	920	916	905	888	849	861	893	919	929	942	930	906	873	917	928
2-3	919	920	919	904	884	859	866	895	913	933	941	929	907	876	917	927
3-4	918	921	920	905	887	871	871	895	919	933	941	928	909	881	919	927
4-5	920	922	924	908	893	877	877	900	924	939	945	931	913	887	924	929
5-6	926	927	928	915	902	888	889	907	943	943	951	940	922	897	932	936
6-7	931	939	929	921	915	899	903	919	954	950	969	943	931	909	938	946
7-8	935	936	932	928	930	913	919	932	963	967	968	955	940	924	948	948
8-9	949	955	940	931	934	927	929	940	971	971	974	964	949	933	953	961
9-10	965	961	945	939	941	930	935	954	986	977	982	965	957	940	962	968
10-11	973	956	952	944	951	929	932	960	991	980	991	973	961	943	967	973
11-12	970	950	956	943	950	934	933	962	998	984	993	972	962	945	970	971
12-13	963	956	955	945	950	942	941	964	1002	980	997	977	964	949	970	973
13-14	961	959	952	951	954	941	954	968	1002	984	1001	987	968	954	972	977
14-15	973	959	955	952	954	944	954	975	992	984	994	992	969	957	971	980
15-16	975	957	959	962	952	947	953	979	993	974	996	982	969	958	972	978
16-17	965	954	960	972	958	949	951	975	995	974	992	975	968	958	975	972
17-18	958	949	958	970	965	951	963	976	996	980	990	975	969	964	976	968
18-19	949	948	952	960	962	951	949	977	993	968	987	965	963	960	968	962
19-20	947	941	943	952	944	948	939	963	976	953	972	958	953	948	956	954
20-21	939	931	925	929	913	937	926	943	936	943	958	947	936	930	933	944
21-22	928	913	919	902	900	909	906	923	902	929	951	937	918	910	913	932
22-23	921	907	911	904	885	881	884	905	888	925	946	931	907	889	907	926
23-24	916	914	916	907	886	862	871	907	915	928	941	931	908	882	916	926
Mean	943	938	937	931	924	912	915	938	958	956	970	955	940	922	946	952

Mean hourly values for April 6 are incomplete and have not been included in this table.

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Quiet Days)

Table 68 Mould Bay 57,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	924	915	922	937	906	899	901	898	916	938	947	937	920	901	928	931
1-2	923	920	922	934	892	895	880	899	918	942	945	934	917	891	929	930
2-3	921	923	929	924	888	898	883	899	907	941	942	933	916	892	925	930
3-4	921	925	928	921	891	902	890	900	913	936	939	932	916	896	924	929
4-5	920	925	930	925	890	898	897	903	920	939	942	933	918	897	928	930
5-6	921	926	930	926	900	900	902	900	924	944	942	935	921	900	931	931
6-7	922	928	931	930	909	899	904	907	926	946	944	935	923	905	933	932
7-8	922	929	931	929	913	914	906	908	932	950	948	936	926	910	935	934
8-9	924	928	932	929	919	931	911	915	937	950	952	937	930	919	937	935
9-10	928	930	934	926	924	929	919	921	942	954	953	940	933	923	939	938
10-11	930	932	938	927	926	926	916	923	947	953	953	963	936	923	941	944
11-12	931	937	939	930	928	926	919	924	947	951	950	957	937	924	942	944
12-13	933	935	939	936	931	927	923	936	942	951	950	952	938	929	942	942
13-14	931	934	936	938	939	926	927	948	943	951	952	955	940	935	942	943
14-15	932	935	940	939	945	931	928	945	936	953	957	950	941	937	942	944
15-16	931	934	941	940	937	945	929	945	937	950	958	948	941	939	942	943
16-17	933	934	939	947	937	952	928	960	941	951	958	944	944	944	945	942
17-18	930	932	937	940	949	951	921	967	943	957	963	947	945	947	944	943
18-19	927	938	942	928	970	937	920	967	947	950	964	947	945	948	942	944
19-20	926	923	940	931	961	943	923	959	940	936	958	948	941	946	937	939
20-21	922	916	933	918	940	928	904	949	931	926	950	941	930	930	927	932
21-22	920	911	927	918	928	913	900	914	925	921	951	933	922	914	923	929
22-23	919	912	917	904	913	909	889	899	913	924	946	932	915	903	914	927
23-24	920	914	923	913	923	877	869	897	904	931	946	932	912	891	918	928
Mean	925	927	932	929	923	919	908	924	930	944	950	942	929	918	934	936

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Disturbed Days)

Table 69 Mould Bay 57,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	900	911	913	897	893	839	802	866	954	919	934	921	896	850	921	916
1-2	907	903	918	896	879	837	817	870	954	918	935	925	897	851	922	918
2-3	912	908	924	908	854	819	850	885	920	927	939	927	898	852	920	922
3-4	907	911	919	910	881	819	858	872	941	936	949	930	903	858	926	924
4-5	920	922	931	908	896	846	868	900	937	952	955	939	914	877	932	934
5-6	935	945	943	931	916	880	879	910	1002	955	968	967	936	896	958	954
6-7	952	1003	942	922	936	895	906	930	1008	947	1062	976	957	917	955	998
7-8	965	981	950	924	945	920	937	964	1009	1008	1040	998	970	942	973	996
8-9	981	1069	974	929	954	949	931	961	1042	1025	1038	1028	990	949	992	1029
9-10	1054	1058	982	940	953	954	944	991	1062	1043	1013	1012	1000	960	1007	1034
10-11	1077	1008	984	954	982	934	938	999	1038	1039	1077	1024	1004	963	1004	1046
11-12	1072	982	998	953	981	924	929	1014	1051	1041	1093	1017	1005	962	1011	1041
12-13	1031	1002	1004	951	975	937	958	1014	1050	1027	1110	1025	1007	971	1008	1042
13-14	1024	1003	991	972	966	944	1019	994	1063	1058	1129	1058	1018	981	1021	1053
14-15	1079	992	988	979	959	964	978	983	1021	1075	1096	1055	1014	971	1016	1056
15-16	1093	996	985	1003	935	961	964	971	1006	1033	1057	1024	1002	958	1007	1042
16-17	1023	977	989	1010	949	970	954	947	1008	1038	1058	1015	995	955	1011	1018
17-18	1001	953	979	984	959	970	984	943	1024	1075	1044	998	993	964	1016	999
18-19	974	942	963	914	934	986	958	958	1005	1025	1005	980	970	959	977	975
19-20	967	928	950	893	902	962	957	962	1013	983	982	971	956	946	960	962
20-21	956	904	911	857	880	956	928	921	923	948	956	943	924	921	910	940
21-22	930	882	910	795	880	920	919	889	860	929	946	933	899	902	873	923
22-23	912	873	912	850	865	845	875	895	833	933	943	930	889	870	882	914
23-24	907	895	923	865	841	827	853	936	896	950	934	931	896	864	908	917
Mean	978	956	953	923	921	911	917	941	984	991	1011	980	955	922	963	981

Mean hourly values for April 6 are incomplete and have not been included in this table.

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 70 Mould Bay 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	984	985	996	993	1011	1074	1022	968	1006	1010	1006	956
2	984	998	1007	988	1027	1064	1017	979	997	1011	1009	952
3	981	988	1003	996	1009	1039	1013	963	994	1022	1024	970
4	973	989	--	994	1015	1022	991	983	987	1010	1016	978
5	989	995	995	1000	1027	1002	957	976	992	1009	1024	987
6	979	990	992	--	1004	966	990	1015	1000	1002	1020	995
7	972	988	986	1013	999	982	999	1006	1008	990	1001	1005
8	976	993	1001	994	999	982	975	1029	1010	1002	1004	1002
9	977	983	999	1009	1012	1012	985	1007	993	995	996	1018
10	984	992	985	1001	974	986	1004	1031	995	1000	1003	1006
11	972	989	980	986	978	1044	984	1005	993	1013	1012	1007
12	983	979	1004	990	993	1016	985	992	998	993	1016	1008
13	979	988	1004	960	996	1049	1003	967	994	987	1010	1002
14	974	986	994	980	986	1073	1005	992	1028	1009	997	1001
15	976	1000	992	1021	987	1057	1020	980	995	1008	1005	1008
16	952	997	1003	981	976	1061	1067	961	1008	1019	1002	1001
17	987	999	990	995	1024	1080	1045	998	1021	1019	985	1004
18	977	1002	990	988	1017	1043	1020	1066	1003	1012	985	1007
19	976	1001	993	1041	1017	1057	986	961	1021	1011	988	998
20	994	996	1002	1004	1035	1006	1029	1066	995	979	987	1006
21	991	996	1005	1019	996	1029	1106	1022	1003	1006	981	999
22	988	1005	1003	1006	1015	1005	1067	1007	928	983	975	1003
23	986	1004	1010	1012	1009	1002	1039	1045	991	965	986	1005
24	977	1002	1001	980	1009	1024	1066	1015	949	979	976	998
25	986	1002	1003	971	974	1052	1051	985	969	972	1004	1014
26	990	1007	1000	959	972	1048	1045	977	977	982	992	1007
27	987	1001	1004	1008	1007	1061	1031	974	952	995	989	1013
28	995	1002	996	1022	1063	1049	1019	990	963	979	986	999
29	984		996	1004	1058	1037	1038	986	980	941	984	1004
30	992		1003	983	1037	1040	1001	988	983	979	987	1003
31	989		994		1052		967	996		974		1008
Mean	982	995	998	996	1009	1032	1017	998	991	995	998	999

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 71 Mould Bay 2000 γ + 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	206	215	194	182	243	244	205	176	231	228	191	210
2	206	198	199	213	233	248	218	182	230	218	206	216
3	207	198	199	199	211	216	217	182	228	210	189	204
4	217	195	184	225	207	207	215	200	227	200	203	211
5	210	206	199	212	226	204	164	180	231	210	204	212
6	207	195	206	---	213	215	157	213	236	210	214	201
7	205	198	193	221	224	161	181	195	246	207	212	213
8	201	196	203	212	208	179	187	209	219	195	193	204
9	201	200	201	215	192	181	180	175	222	205	210	215
10	198	184	205	215	188	169	194	233	237	220	203	211
11	204	191	183	205	179	234	175	216	245	209	207	216
12	199	180	207	203	200	205	190	199	221	217	211	212
13	196	201	219	210	203	220	201	189	243	199	212	205
14	204	191	208	199	177	252	216	202	244	213	201	223
15	174	192	197	201	201	226	212	217	243	203	215	211
16	188	210	210	202	183	244	297	179	212	213	210	215
17	194	200	210	203	222	235	179	211	174	215	223	213
18	188	209	196	212	225	226	231	237	220	221	207	211
19	199	205	194	237	251	241	183	242	221	221	207	210
20	197	206	206	213	229	172	239	213	210	217	207	216
21	201	205	200	232	213	199	281	211	235	216	216	212
22	200	192	213	230	208	182	241	221	124	211	220	216
23	197	207	226	181	202	184	253	206	164	206	208	209
24	203	206	215	209	203	211	240	225	195	170	226	212
25	203	199	207	190	203	239	231	206	165	197	199	214
26	195	204	207	183	178	205	222	191	195	209	211	208
27	201	204	207	198	208	225	203	209	184	219	223	209
28	199	199	198	236	229	242	197	207	185	231	226	213
29	203		194	215	238	230	253	178	189	227	235	219
30	181		189	233	211	205	182	212	185	135	231	209
31	175		190		258		168	204		201		206
Mean	199	200	202	210	212	213	210	204	212	208	211	211

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas)

Table 72 Mould Bay 57,000 γ + 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	937	977	940	915	940	891	902	960	954	952	984	946
2	929	935	934	926	909	915	906	945	918	945	969	955
3	929	942	942	927	947	903	901	934	939	939	979	993
4	935	932	936	893	939	927	926	959	934	947	963	975
5	940	939	930	915	926	930	916	957	909	948	952	993
6	923	934	927	---	910	927	937	926	916	939	967	982
7	929	930	930	932	924	949	933	921	905	943	999	989
8	928	923	954	927	932	952	924	937	928	951	1039	982
9	924	922	945	936	931	944	940	902	944	944	1025	980
10	922	965	964	931	954	943	936	915	936	942	1003	945
11	931	959	944	927	962	888	919	919	936	971	988	952
12	928	945	950	947	938	921	918	923	947	990	988	940
13	950	966	953	981	927	899	910	922	915	946	968	934
14	978	947	939	975	943	902	913	924	963	997	954	959
15	968	956	934	943	936	898	915	924	959	956	952	947
16	969	944	934	937	924	913	856	933	959	987	946	946
17	962	929	939	941	907	897	882	915	989	950	982	938
18	949	924	952	953	909	930	913	881	979	943	952	935
19	981	923	942	898	917	867	939	942	981	952	947	935
20	948	928	918	930	889	924	901	943	985	943	945	958
21	933	947	930	927	935	904	920	948	959	930	955	941
22	933	930	933	922	926	917	919	945	1006	941	958	967
23	927	936	934	926	932	908	882	941	991	959	948	954
24	943	926	926	930	925	904	915	943	991	991	987	943
25	940	929	929	939	935	895	916	928	991	964	977	947
26	934	932	935	935	915	898	919	946	973	958	951	942
27	928	926	928	938	922	902	914	967	975	940	945	936
28	923	932	929	927	888	901	928	988	994	951	946	939
29	925		934	926	884	900	904	979	1001	1006	949	966
30	970		928	907	900	926	924	942	963	971	969	951
31	1025		929		924		944	963		951		940
Mean	943	938	937	931	924	912	915	938	958	956	970	955

Table 73 Mould Bay Ry (Hourly Ranges in 10 γ units) August 1962

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	48	18	17	15	19	10	11	16	12	71	24	11	16	10	14	9	8	3	11	8	11	21	9	11	17
2	22	10	9	12	7	9	3	3	3	3	5	10	13	6	5	6	5	6	5	6	17	21	19	19	9
3	22	9	13	8	13	5	6	3	3	3	7	8	12	6	3	4	7	8	9	16	14	12	28	12	10
4	7	4	8	7	3	6	2	10	6	5	6	9	6	4	3	7	7	12	9	12	10	16	11	9	8
5	6	14	4	3	9	5	7	6	7	6	11	17	5	7	5	6	4	4	6	7	7	12	11	24	8
6	15	15	14	10	8	6	5	7	8	5	7	8	11	12	16	8	10	13	6	15	15	32	29	10	12
7	14	13	9	7	6	4	4	6	3	3	2	11	5	16	4	6	16	11	10	28	25	48	18	26	12
8	15	12	13	9	6	7	7	8	17	10	9	8	14	6	13	7	22	11	13	12	16	15	31	43	14
9	34	12	25	23	13	15	7	5	22	8	17	10	19	10	7	5	6	8	20	18	41	22	28	24	17
10	11	12	10	10	7	8	4	6	9	8	12	9	14	8	5	6	11	8	10	8	11	5	11	9	9
11	14	7	3	5	5	2	2	2	1	2	1	2	2	3	3	2	2	3	4	6	4	4	5	5	4
12	7	4	4	4	2	3	2	1	2	1	2	3	4	6	7	3	4	4	3	11	7	8	8	4	4
13	7	5	4	2	3	3	2	2	1	2	1	2	4	3	2	3	2	4	7	5	11	19	24	16	6
14	10	14	16	3	14	7	3	5	1	6	3	2	12	7	2	4	4	5	28	38	56	51	34	22	14
15	14	10	6	7	11	9	8	5	16	7	3	3	5	4	5	7	6	9	10	29	34	26	20	10	11
16	11	10	7	14	6	6	9	8	5	3	5	5	6	3	5	4	5	5	30	30	44	47	34	8	13
17	20	8	15	11	7	15	3	6	5	4	6	15	15	3	3	15	23	17	18	20	36	49	22	19	15
18	8	14	9	14	12	10	8	11	10	14	4	6	5	12	10	6	11	9	14	26	33	27	27	34	14
19	11	6	11	7	3	4	4	10	5	15	18	5	5	4	9	10	9	9	10	16	24	20	13	14	10
20	9	8	5	3	4	5	3	2	4	5	6	3	3	8	9	4	3	4	10	9	7	9	9	16	6
21	3	5	4	3	5	3	6	3	3	4	3	2	4	5	4	3	5	5	9	9	16	25	26	24	7
22	12	18	18	7	11	12	15	7	9	10	3	3	3	9	10	7	8	16	28	35	16	22	27	25	14
23	19	18	16	13	18	15	7	9	4	6	11	7	6	9	13	14	12	8	25	26	16	38	33	22	15
24	28	12	15	14	12	9	9	11	11	4	15	11	9	26	15	9	10	26	9	11	31	28	18	18	15
25	15	8	11	15	5	11	5	4	4	7	6	5	4	6	8	6	4	5	17	14	16	13	21	13	9
26	22	9	7	8	7	6	3	4	3	5	3	11	8	5	3	2	3	3	10	14	23	14	15	12	8
27	9	6	6	3	4	3	4	3	5	2	3	1	2	2	1	1	2	4	6	7	12	8	10	7	5
28	6	7	6	3	4	1	4	3	3	1	1	2	1	5	4	5	2	5	2	8	4	2	5	3	4
29	8	5	6	11	12	6	2	10	4	15	6	4	6	5	4	4	8	10	17	17	10	19	29	7	9
30	8	6	3	5	5	5	5	4	6	4	4	5	6	4	12	9	3	4	4	10	22	10	16	9	7
31	12	17	6	9	9	6	4	14	12	6	3	3	7	6	3	2	3	4	5	9	4	14	10	6	7
Mean	14	10	10	8	8	7	5	6	7	8	7	6	8	7	7	6	7	8	12	16	19	21	20	16	10

Table 74 Mould Bay R_y (Hourly Ranges in 10 γ units) September 1962

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	5	4	7	6	4	9	6	6	10	8	8	4	4	10	20	20	25	25	8	20	34	34	23	13
2	11	26	12	10	6	13	11	10	14	7	9	18	10	27	16	16	19	9	18	31	27	29	41	10	17
3	22	11	8	13	14	20	5	9	12	6	34	74	15	15	13	18	22	15	9	41	23	23	25	29	20
4	20	16	17	6	10	8	12	12	13	-	52	25	9	7	4	7	10	9	17	12	15	16	8	12	14
5	5	4	7	14	12	4	6	5	11	7	7	10	6	9	12	12	9	11	6	3	8	18	20	16	9
6	4	6	6	8	11	6	19	16	8	4	20	16	7	10	7	6	6	5	8	6	8	15	11	10	9
7	27	10	8	4	9	4	3	3	8	4	7	6	8	5	4	5	4	7	6	16	11	9	19	9	8
8	6	21	7	10	12	2	6	14	8	11	4	4	4	6	4	8	6	3	10	6	8	12	18	10	8
9	7	6	8	4	2	6	1	1	1	2	2	10	9	4	6	3	4	5	4	7	8	7	13	4	5
10	7	8	10	14	16	9	5	4	4	5	4	3	4	2	3	1	3	3	-	-	-	-	-	10	-
11	14	12	7	4	2	4	3	2	4	8	12	6	3	2	2	2	4	4	9	5	17	16	12	18	7
12	9	7	16	6	6	8	15	14	16	11	13	7	6	10	4	8	17	9	11	8	28	15	26	26	12
13	16	11	16	7	6	6	9	10	9	4	4	5	8	8	9	7	4	13	9	21	27	9	16	10	10
14	16	5	9	12	6	9	5	14	15	3	2	3	3	2	4	4	4	6	18	16	10	16	12	10	9
15	5	7	16	13	18	8	9	13	11	2	10	5	3	3	4	2	3	19	14	10	17	17	19	14	10
16	12	9	5	4	5	3	1	2	2	2	3	4	7	4	2	5	5	6	6	12	6	3	8	13	5
17	8	11	4	8	3	5	5	2	2	2	2	4	4	8	6	3	9	5	15	7	15	19	21	8	7
18	15	7	8	4	4	2	3	3	2	3	2	5	3	2	4	2	2	3	2	9	7	15	19	13	6
19	18	14	26	6	8	10	8	11	13	5	6	9	5	7	9	10	17	19	20	16	32	32	19	24	14
20	8	19	18	9	6	2	2	2	3	4	10	11	4	3	4	3	3	2	4	9	11	14	10	8	7
21	12	7	4	5	7	4	3	6	3	2	5	1	4	4	13	9	18	13	21	21	35	19	24	19	11
22	16	10	15	9	8	6	6	6	7	6	24	20	3	10	9	7	7	11	12	15	20	20	26	16	12
23	10	14	10	4	12	7	5	9	10	6	12	29	3	3	4	3	2	5	6	6	5	19	17	15	9
24	5	12	10	8	6	3	4	2	4	2	2	1	1	2	2	2	2	1	5	13	8	7	6	6	5
25	6	3	6	7	5	2	1	1	2	1	3	2	2	3	3	4	4	5	5	6	23	16	12	9	5
26	12	8	5	12	2	4	3	5	3	4	5	12	9	6	4	6	10	9	11	17	12	11	15	13	8
27	7	4	6	3	6	3	3	4	7	5	3	15	8	4	2	5	7	10	16	6	6	4	10	4	6
28	5	3	4	3	3	1	4	1	2	4	1	6	6	6	9	6	10	16	8	17	12	15	9	6	7
29	6	4	3	2	2	6	5	9	4	4	16	8	1	13	11	8	4	7	7	10	5	12	4	6	7
30	2	4	5	3	4	2	5	4	5	2	13	8	10	13	8	4	4	7	5	9	10	12	8	8	6
31																									
Mean	11	10	9	7	7	5	6	7	7	4	10	11	6	7	6	7	8	9	10	12	15	15	16	13	9

Table 75 Mould Bay R_y (Hourly Ranges in 10 γ units) October 1962

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	8	6	17	12	9	6	13	9	10	19	10	19	41	5	14	9	12	25	10	16	8	17	26	13	14
2	12	12	11	13	10	13	6	14	28	10	21	10	7	11	14	15	7	16	24	18	20	19	10	17	14
3	10	6	3	5	8	6	4	5	9	9	11	8	4	20	28	12	7	10	19	16	13	16	13	12	11
4	6	11	5	4	5	4	6	7	5	5	4	4	4	3	2	2	8	9	9	10	4	6	9	6	6
5	4	4	2	1	4	4	4	3	2	4	2	2	2	4	4	5	4	4	6	6	11	24	12	8	5
6	12	6	11	6	5	6	8	11	3	3	5	1	4	13	16	8	5	8	7	8	9	16	16	9	8
7	5	12	6	2	2	4	3	4	4	12	6	6	2	1	2	6	3	5	10	2	18	33	18	16	8
8	20	14	24	5	8	6	11	5	11	13	10	5	7	4	6	6	14	26	18	15	20	31	30	14	14
9	11	9	14	13	11	6	5	5	18	11	9	6	14	12	10	10	6	12	18	17	14	13	20	13	12
10	12	11	11	9	5	6	4	5	5	9	9	6	54	19	7	4	9	9	6	18	14	11	11	8	11
11	8	12	10	8	10	6	12	6	7	7	4	5	7	13	6	5	5	12	14	18	15	12	7	9	9
12	11	7	4	4	5	5	3	4	1	13	10	9	6	2	2	2	3	4	7	9	8	14	16	6	6
13	5	3	3	3	3	4	2	3	3	4	6	6	12	5	7	7	8	17	19	24	19	5	6	10	8
14	14	13	13	9	6	7	6	6	4	8	10	13	5	7	6	6	17	21	8	15	16	10	8	6	10
15	13	16	10	11	4	7	12	8	3	4	7	4	2	3	5	4	4	8	8	6	13	20	18	6	8
16	10	6	4	8	3	2	4	3	2	2	22	35	14	12	14	3	4	18	17	9	18	17	9	8	10
17	5	10	6	8	2	6	5	5	7	8	2	5	4	1	1	2	4	5	7	10	16	8	13	9	6
18	2	8	8	10	6	3	3	4	5	3	2	3	5	6	4	8	6	9	10	25	11	15	7	5	7
19	3	2	4	3	1	2	2	3	8	16	8	7	18	9	9	13	7	9	19	17	15	11	6	4	8
20	6	2	3	5	5	2	1	1	2	3	2	1	5	3	6	4	8	8	11	6	12	20	4	6	5
21	12	6	5	6	5	4	4	2	7	13	6	7	8	6	8	9	9	17	22	8	8	10	13	2	8
22	2	6	8	3	3	4	4	7	2	8	7	6	11	17	18	12	9	17	27	19	21	16	16	9	10
23	11	10	9	7	6	3	4	3	3	3	5	9	11	4	5	8	13	6	13	11	9	10	4	3	7
24	10	6	9	6	8	8	6	5	6	2	5	14	24	11	8	12	6	9	10	21	16	15	12	6	10
25	11	13	5	12	4	5	10	14	38	42	10	24	14	20	8	10	22	27	21	12	14	14	8	7	15
26	13	13	12	5	5	4	5	8	34	20	11	16	7	11	7	20	18	10	9	7	14	22	13	5	12
27	9	11	8	12	10	6	10	11	8	5	8	10	27	8	14	22	10	10	12	29	34	33	23	10	14
28	10	15	11	15	10	9	5	7	36	64	5	16	17	5	5	6	8	7	8	9	16	19	5	4	13
29	8	9	9	9	4	2	6	4	6	8	5	9	6	6	6	5	9	11	17	23	23	20	13	7	9
30	12	12	10	8	5	3	7	5	13	6	6	12	11	4	4	3	11	15	9	22	9	5	6	4	8
31	4	5	3	4	3	6	6	3	4	6	3	9	6	4	4	5	9	9	7	8	8	8	3	6	5
Mean	9	9	8	7	6	5	6	6	9	11	7	9	12	8	8	8	9	12	13	14	14	16	12	8	9

Table 76 Mould Bay R_y (Hourly Ranges in 10 γ units) November 1962

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	6	4	5	4	4	2	2	2	2	9	5	2	2	3	3	2	5	6	5	7	15	7	4	4	5
2	10	6	8	1	3	2	1	2	3	2	3	3	9	8	9	6	10	19	15	9	10	9	5	4	7
3	7	3	4	3	2	1	6	4	3	4	12	8	12	4	4	8	8	12	17	12	8	6	5	10	7
4	7	3	3	5	4	4	4	2	3	8	5	15	4	5	2	10	3	11	6	7	8	11	8	4	6
5	6	11	2	3	3	4	6	5	7	3	3	5	7	4	2	2	2	4	4	9	8	7	3	4	5
6	3	4	4	9	8	4	5	4	4	4	3	2	3	3	4	8	8	10	11	19	10	8	8	7	6
7	10	5	5	10	5	8	2	3	1	1	16	16	8	5	6	3	7	8	5	12	10	10	5	6	7
8	8	3	6	6	2	3	3	3	2	4	8	3	5	2	3	6	4	6	6	7	5	2	2	3	4
9	5	5	4	2	3	3	1	3	2	2	4	1	2	1	2	2	4	8	4	4	3	3	3	3	3
10	8	6	2	2	2	1	1	2	1	2	1	1	1	1	2	2	1	4	3	4	3	4	3	2	2
11	3	2	4	2	2	6	4	4	5	7	9	7	5	10	7	7	8	8	5	7	5	3	4	5	5
12	5	5	7	4	2	3	4	1	2	2	2	2	2	2	1	2	3	3	7	2	3	7	4	2	3
13	5	3	2	2	1	2	1	2	2	3	1	1	1	1	2	2	4	4	3	3	5	2	2	3	2
14	2	3	2	2	2	1	2	1	0	1	1	3	3	1	4	3	4	13	9	8	9	3	3	2	3
15	1	2	3	5	3	16	14	5	4	2	4	20	59	44	7	6	3	5	12	10	11	10	9	8	11
16	11	13	11	7	9	4	8	5	9	5	13	11	26	12	10	9	13	8	5	9	12	6	5	5	9
17	9	4	12	8	4	4	2	4	2	2	6	8	6	5	6	7	3	4	3	3	5	2	2	1	5
18	1	1	1	1	1	1	1	1	1	1	1	4	2	1	1	1	1	1	2	3	2	2	1	2	1
19	4	1	2	1	1	1	1	1	1	1	1	3	4	3	1	2	3	5	3	5	2	4	3	2	2
20	1	2	3	1	1	5	3	4	1	1	1	1	1	2	1	2	3	4	4	3	2	3	4	1	2
21	5	3	2	1	2	3	9	8	6	8	4	6	10	5	6	6	3	4	9	13	14	6	9	4	6
22	7	10	9	4	7	6	12	16	14	10	19	16	14	7	9	6	7	4	12	12	9	6	7	9	10
23	12	10	9	8	6	8	7	9	26	8	28	14	6	12	10	13	11	10	12	6	13	8	8	9	11
24	11	3	4	3	4	4	3	4	158	11	7	25	15	10	8	12	8	9	18	12	14	8	5	4	15
25	7	10	11	7	2	4	35	60	8	20	47	42	20	29	4	8	11	8	13	12	10	8	4	4	16
26	9	6	6	4	4	3	2	2	2	3	4	7	4	10	4	4	3	5	8	11	11	7	4	2	5
27	4	3	4	3	3	3	6	21	15	8	4	2	3	2	4	4	4	13	8	7	8	4	3	4	6
28	9	4	4	3	2	5	5	3	4	3	4	10	4	5	3	4	2	3	3	4	3	4	2	2	4
29	3	2	1	2	2	4	3	2	2	3	12	7	5	5	2	2	2	9	4	7	8	5	3	4	4
30	6	12	12	6	5	13	6	8	6	18	21	9	7	8	14	4	5	4	4	15	7	6	3	4	8
31																									
Mean	6	5	5	4	3	4	5	6	10	5	8	8	8	7	5	5	5	7	7	8	8	6	4	4	6

Table 77 Mould Bay R_y (Hourly Ranges in 10 γ units) December 1962

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	10	6	2	1	2	1	1	3	4	4	2	6	5	4	5	5	8	8	6	7	8	3	1	1	4
2	1	0	1	2	2	3	2	2	2	7	5	2	2	2	2	5	3	7	4	4	4	4	4	2	3
3	2	2	2	2	3	2	2	2	1	1	1	1	1	2	2	2	4	4	6	4	1	2	3	2	2
4	1	2	1	8	2	2	3	4	11	19	17	8	15	8	22	23	5	16	8	6	6	2	2	4	8
5	3	5	8	2	4	1	3	2	2	3	6	5	3	4	3	9	5	6	6	5	4	4	3	2	4
6	2	3	1	2	4	1	1	1	3	1	2	2	1	1	2	1	3	2	2	4	1	4	2	1	2
7	1	2	3	1	2	3	1	2	2	2	2	3	2	2	2	3	3	4	4	4	3	3	5	1	2
8	2	2	3	2	1	2	2	2	3	6	5	2	3	3	6	2	5	3	5	4	2	2	2	2	3
9	3	3	2	2	9	10	5	1	2	1	1	1	1	2	2	3	2	2	3	3	2	7	2	1	3
10	3	2	1	2	2	1	2	2	2	2	1	2	2	1	1	1	2	2	5	2	5	5	4	4	2
11	6	3	2	4	4	4	3	5	6	9	4	3	4	6	7	9	5	9	4	9	10	9	7	4	6
12	9	10	8	6	2	6	3	3	4	3	1	2	1	1	1	1	2	3	8	16	10	4	5	6	5
13	4	4	6	4	1	3	10	1	2	5	4	7	2	20	3	8	5	4	2	5	19	7	4	4	6
14	11	4	3	6	8	5	2	3	2	4	6	6	5	4	3	3	8	12	7	8	5	7	6	6	5
15	5	2	4	3	6	7	7	7	5	3	3	3	3	3	2	2	3	2	5	2	2	3	3	3	4
16	2	2	2	4	3	1	1	2	2	3	8	6	1	7	3	4	4	6	5	4	3	4	3	2	3
17	2	3	4	5	4	2	1	2	4	7	5	4	6	4	3	10	9	39	34	9	6	9	17	5	8
18	8	5	17	16	4	4	3	4	3	3	6	8	7	12	8	10	8	6	7	8	5	9	9	12	7
19	14	21	18	7	10	13	15	34	109	15	8	9	10	14	7	6	13	7	9	12	9	5	9	7	16
20	8	11	12	6	11	8	3	6	8	44	17	37	21	10	7	9	6	8	7	11	19	11	10	8	12
21	5	13	12	9	7	4	6	8	10	25	38	17	5	11	4	12	11	8	7	9	16	11	8	4	11
22	10	5	6	3	4	4	2	4	4	5	15	59	5	4	3	11	8	8	8	8	4	4	9	7	8
23	6	5	5	3	3	1	1	2	1	3	3	2	4	2	3	3	4	2	1	1	1	1	3	2	2
24	1	1	1	1	1	2	2	5	9	5	3	3	1	2	6	3	3	3	4	6	7	4	2	4	3
25	5	4	4	4	4	2	1	1	2	2	4	5	3	4	2	2	4	1	3	5	5	4	3	3	3
26	2	2	2	1	3	2	4	4	4	6	6	8	9	22	27	8	10	9	3	6	6	4	4	9	7
27	2	3	2	2	2	2	2	2	2	3	2	2	2	2	1	1	2	5	2	3	4	6	5	4	3
28	3	3	3	2	3	2	1	1	1	1	3	1	3	10	14	5	2	2	2	4	3	4	3	2	3
29	3	4	1	2	4	3	3	2	2	3	1	2	2	4	2	3	4	6	3	4	2	2	2	2	3
30	4	6	2	1	0	1	1	1	1	3	6	3	2	1	1	1	1	2	1	2	2	4	3	3	2
31	4	6	4	5	4	3	2	2	1	2	8	6	5	7	10	10	9	4	12	3	4	6	3	2	5
Mean	4	5	5	4	4	3	3	4	7	6	6	7	4	6	5	6	5	6	6	6	6	5	5	4	5

Table 78 Mould Bay R_y (Hourly Ranges in 10 γ units) January 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	4	2	3	2	3	2	3	2	3	3	3	2	2	3	3	5	2	5	3	3	1	2	2	2	3
2	1	1	1	2	1	1	1	1	1	1	1	0	2	1	1	1	1	1	1	3	1	2	1	1	1
3	1	1	1	1	1	1	2	1	2	4	3	2	2	1	1	1	1	2	5	3	2	2	2	2	2
4	4	3	2	1	2	2	2	1	1	2	3	2	2	2	5	3	6	6	4	8	3	2	1	2	3
5	1	2	1	1	0	2	1	1	8	4	4	2	5	2	2	3	3	4	4	5	1	2	2	1	2
6	2	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	1	2	1	2	2	1
7	1	3	2	4	1	6	4	3	2	1	2	2	1	2	2	5	4	3	4	3	5	3	2	2	3
8	2	2	2	1	2	2	2	2	3	2	1	2	1	1	2	2	1	1	1	2	1	3	2	1	2
9	1	1	2	2	1	1	2	1	1	2	2	1	2	1	1	2	1	2	2	2	1	3	2	2	2
10	1	2	1	1	2	2	1	1	1	1	1	1	2	4	5	2	3	2	2	2	1	1	1	1	2
11	1	1	1	2	1	1	1	1	1	1	1	2	2	2	2	3	4	4	5	8	7	6	4	2	3
12	2	2	1	4	2	2	2	1	1	1	2	2	1	3	1	2	4	3	6	4	4	6	5	4	3
13	9	12	14	7	14	4	7	6	26	9	36	38	6	8	2	7	8	7	11	14	8	14	7	6	12
14	8	10	8	12	8	3	6	5	5	6	21	61	10	8	14	24	12	11	7	10	12	8	8	8	12
15	11	10	12	14	6	6	12	15	12	143	22	10	9	5	9	8	12	9	17	13	8	12	4	6	16
16	10	9	16	6	9	8	6	6	66	6	16	15	9	6	13	8	8	13	10	12	8	3	6	8	12
17	10	7	6	6	7	10	8	8	18	7	15	6	6	6	5	4	10	10	8	16	8	3	6	4	8
18	8	7	5	5	5	5	3	2	5	4	8	27	4	6	3	11	10	6	10	7	5	6	6	10	7
19	10	4	12	7	4	7	4	4	11	40	6	6	8	8	18	5	11	11	6	12	17	7	5	4	9
20	6	3	2	3	3	4	3	2	4	4	8	7	4	5	5	3	2	2	4	4	5	3	3	2	4
21	2	2	2	2	2	2	1	1	2	2	2	4	3	2	2	2	3	3	5	3	5	3	3	2	2
22	2	1	1	2	1	2	3	2	4	5	2	2	1	2	4	2	2	3	4	6	12	5	7	5	3
23	4	5	9	3	3	2	2	3	3	2	2	2	8	4	2	2	7	6	7	7	7	8	4	6	4
24	5	4	4	2	3	3	2	4	5	3	11	7	2	4	3	4	5	6	9	11	4	5	5	3	5
25	4	2	4	4	2	1	1	3	2	4	4	4	3	4	4	4	2	6	6	3	6	6	6	1	4
26	3	4	2	2	1	1	2	2	2	5	3	1	2	1	1	2	2	1	2	3	4	2	2	1	2
27	1	1	1	1	1	1	3	2	2	2	1	2	2	1	1	2	2	1	2	3	4	3	2	2	2
28	3	1	2	1	1	2	1	1	1	1	3	2	1	2	1	1	2	1	1	1	1	1	1	1	1
29	1	1	1	1	1	1	3	1	1	0	1	4	2	1	1	2	5	9	11	4	5	7	3	3	3
30	8	5	9	7	10	4	8	6	4	14	16	13	12	7	7	13	6	4	6	16	10	7	4	7	8
31	7	2	8	9	8	5	4	5	13	12	12	5	9	22	13	17	12	19	4	6	8	6	4	3	9
Mean	4	4	4	4	3	3	3	3	7	9	7	8	4	4	4	5	5	5	5	6	5	5	4	3	5

Table 79 Mould Bay R_y (Hourly Ranges in 10 γ units) February 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	1	1	1	1	2	1	3	4	9	7	3	16	10	8	6	4	8	3	6	10	3	2	3	5
2	2	1	3	5	2	1	1	0	1	1	2	1	1	1	1	2	2	2	5	1	4	3	2	1	2
3	3	2	2	2	1	2	1	1	1	2	2	2	2	4	4	5	3	2	2	4	3	2	2	3	2
4	2	2	1	1	1	1	1	1	1	1	1	0	0	1	1	1	3	3	4	6	11	6	4	3	2
5	2	2	2	3	2	1	1	2	2	2	3	8	8	2	3	4	4	3	4	7	5	2	2	3	3
6	3	2	3	2	3	3	2	2	2	3	2	1	1	3	5	5	7	5	5	3	4	2	3	1	3
7	2	3	3	1	2	1	2	1	1	4	6	6	4	1	2	2	2	2	4	3	3	4	2	3	3
8	2	1	2	2	2	1	1	1	1	1	3	4	2	1	2	1	1	1	1	2	2	2	1	2	2
9	2	1	2	1	1	2	2	2	1	1	1	1	2	2	1	2	2	5	6	2	4	11	8	7	3
10	7	9	9	5	4	9	5	12	47	17	11	10	12	14	10	14	16	6	14	16	20	15	13	6	13
11	14	10	7	8	11	9	9	10	10	18	10	12	10	11	11	11	8	12	22	13	20	20	8	7	12
12	15	13	15	12	7	10	8	6	140	11	6	6	7	7	8	8	6	13	14	22	10	23	6	10	16
13	9	14	9	6	12	9	37	18	16	13	8	6	5	10	9	8	10	11	9	12	19	14	12	5	12
14	9	7	9	9	11	5	2	7	114	42	5	4	8	5	7	6	6	8	8	22	20	13	14	5	14
15	3	9	6	2	4	3	3	4	2	6	7	4	5	5	11	5	4	7	6	7	4	4	4	3	5
16	12	2	3	2	2	2	2	1	3	1	5	5	4	3	5	4	4	5	8	8	5	7	8	2	4
17	3	4	2	1	2	2	2	2	2	2	8	5	4	2	1	2	2	5	5	6	4	8	4	2	3
18	2	2	3	2	2	2	2	2	2	1	3	4	2	1	2	2	4	4	4	5	4	2	1	3	3
19	3	1	1	1	1	1	2	1	1	0	1	2	1	2	2	3	2	2	3	3	2	8	3	2	2
20	2	1	2	2	3	4	3	5	3	3	10	3	3	5	5	5	4	6	7	8	8	5	5	4	4
21	6	3	5	1	2	1	3	1	2	2	4	3	2	2	3	3	4	5	5	7	13	8	7	4	4
22	4	7	4	3	4	3	2	2	4	6	3	4	6	3	2	3	3	6	7	10	13	6	8	6	5
23	1	1	2	1	2	2	5	4	4	2	2	8	9	5	2	7	4	5	4	4	4	8	3	9	4
24	2	1	2	1	1	2	2	2	1	3	5	3	2	1	1	2	4	2	8	5	4	5	8	6	3
25	2	6	6	5	2	2	2	1	1	4	4	2	2	2	3	2	4	2	3	5	11	8	5	2	4
26	3	2	2	2	3	4	3	2	2	2	3	4	4	4	4	2	4	3	4	8	4	7	4	2	3
27	4	10	3	1	1	1	0	1	1	2	2	1	1	1	2	1	3	2	5	4	2	5	7	6	3
28	2	2	1	2	1	2	2	2	2	7	3	3	3	2	4	2	3	3	3	2	3	7	4	4	3
29																									
30																									
31																									
Mean	4	4	4	3	3	3	4	3	13	6	5	4	4	4	4	4	4	5	6	7	8	7	5	4	5

Table 80 Mould Bay R_y (Hourly Ranges in 10 γ units) March 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	3	4	4	5	4	4	3	5	5	2	4	4	4	4	7	6	3	10	7	6	2	2	2	4
2	4	5	4	2	2	3	4	3	3	3	4	4	10	5	4	3	4	5	4	11	8	4	4	9	5
3	3	1	2	2	2	2	6	6	5	5	3	3	4	5	5	2	2	3	6	6	6	4	3	3	4
4	5	5	4	2	3	2	1	2	3	3	2	2	1	1	1	2	3	2	3	3	6	8	2	2	3
5	3	2	2	2	2	3	2	1	2	4	3	2	2	4	5	3	4	2	4	4	7	6	5	5	3
6	8	5	5	1	2	4	4	1	1	1	1	2	2	2	1	2	6	5	3	5	10	5	7	5	4
7	3	4	4	2	1	4	4	2	2	2	1	1	1	1	1	1	1	3	4	20	13	13	13	14	5
8	25	15	7	8	5	6	4	5	7	6	7	13	11	6	10	10	15	13	15	10	19	20	10	9	11
9	14	9	9	5	9	8	3	3	6	4	13	9	6	12	9	6	7	6	22	16	12	25	8	9	10
10	11	14	8	7	15	13	6	6	15	16	8	17	6	10	16	16	11	12	20	20	20	24	20	13	14
11	13	21	11	13	4	5	2	3	4	20	4	4	4	2	4	6	7	10	12	14	17	12	8	13	9
12	11	9	12	6	5	7	3	5	12	8	9	8	9	5	6	5	13	9	14	14	11	7	13	11	9
13	9	7	4	2	2	1	4	2	3	3	5	4	8	5	18	32	6	10	12	10	10	6	10	8	8
14	11	6	2	1	1	1	1	1	1	0	1	1	1	2	3	2	4	5	4	4	5	4	3	4	3
15	3	4	2	2	2	2	2	1	1	2	2	1	0	1	1	1	2	2	2	2	2	3	2	5	2
16	5	3	1	1	1	0	0	1	1	3	2	1	1	1	1	2	3	2	3	4	8	9	6	4	3
17	3	1	1	1	0	0	1	1	1	1	1	2	5	5	2	2	6	5	6	8	5	5	6	5	3
18	4	6	4	5	5	3	2	2	2	4	1	1	1	8	3	5	2	14	4	7	6	9	2	6	4
19	6	9	4	6	4	4	6	6	1	2	1	2	2	2	2	4	3	4	4	9	6	7	5	5	4
20	2	2	2	4	2	1	1	2	2	2	1	2	3	1	2	2	3	3	4	8	14	9	12	8	4
21	5	5	5	3	6	2	2	3	2	2	1	1	2	1	1	2	2	3	4	4	3	2	4	2	3
22	2	1	1	1	1	0	1	1	1	1	1	1	2	2	3	3	1	4	5	8	8	4	7	6	3
23	3	10	9	3	2	1	4	3	3	2	20	12	4	11	5	8	6	9	12	14	16	10	12	4	8
24	2	8	4	1	1	2	1	1	1	1	1	6	5	2	3	3	4	6	4	8	13	12	8	6	4
25	2	3	2	2	2	1	2	1	1	1	4	2	1	2	4	4	2	6	7	8	9	5	10	6	4
26	3	1	1	1	0	0	1	1	1	1	1	1	2	2	1	2	3	5	5	3	6	11	5	3	2
27	6	3	5	2	0	0	1	2	1	1	1	2	2	1	2	2	1	3	5	7	6	6	7	5	3
28	3	1	2	1	1	1	2	3	2	2	2	1	2	2	1	1	2	2	2	8	10	10	14	6	3
29	10	8	4	6	2	4	1	2	2	2	2	4	7	3	2	1	3	4	3	5	6	4	7	4	4
30	6	6	2	1	3	2	2	1	1	2	5	5	2	2	1	1	2	2	2	8	7	8	2	2	3
31	2	2	1	3	1	1	1	1	1	2	1	2	1	2	2	1	2	2	4	2	4	10	11	7	3
Mean	6	6	4	3	3	3	3	2	3	4	4	4	4	4	4	5	4	5	7	8	9	9	7	6	5

Table 81 Mould Bay R_y (Hourly Ranges in 10 γ unit) April 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	5	6	6	9	8	6	6	4	3	2	3	1	3	3	4	2	2	2	4	6	8	4	3	5	4
2	6	9	8	1	1	1	1	0	1	1	1	1	1	2	1	2	6	2	3	8	7	8	8	4	3
3	2	5	3	5	4	2	2	2	5	4	3	1	0	1	2	2	3	4	5	5	4	5	3	3	3
4	2	3	1	2	2	1	3	2	4	5	6	5	4	10	7	6	15	12	10	18	31	54	56	32	12
5	16	14	9	10	21	14	10	6	9	4	13	7	12	8	5	5	8	10	19	23	21	30	12	8	12
6																									
7	12	9	5	11	3	5	6	6	6	13	4	8	6	5	5	8	8	10	7	7	13	16	24	15	9
8	10	10	6	8	5	4	2	2	3	4	4	12	14	3	3	3	4	9	6	11	5	12	11	13	7
9	2	4	4	6	5	5	3	3	5	4	2	6	4	4	3	4	4	4	4	5	13	11	7	7	5
10	4	3	2	1	1	1	1	2	2	2	2	2	3	3	2	1	2	4	3	6	4	5	12	6	3
11	2	3	3	3	1	1	1	1	2	3	4	3	2	2	1	1	2	1	4	11	4	5	9	6	3
12	5	6	2	6	4	2	2	4	4	3	5	4	3	4	4	3	3	8	8	7	8	11	4	9	5
13	3	2	4	2	3	1	2	1	3	10	5	5	3	5	6	6	7	13	14	12	6	15	15	12	6
14	14	10	9	6	5	7	4	3	3	12	9	5	14	8	8	12	11	6	12	36	34	35	14	13	12
15	7	7	12	5	5	3	9	13	6	2	2	5	5	7	4	3	4	4	5	5	17	18	19	12	7
16	9	5	4	7	5	6	9	1	3	5	2	6	5	4	3	3	4	6	10	10	13	11	11	7	6
17	5	10	5	5	4	4	2	2	3	5	6	4	2	3	2	2	3	3	9	9	13	9	10	3	5
18	2	5	2	2	6	4	2	2	5	5	3	4	4	4	8	8	6	8	23	23	15	10	9	8	7
19	7	11	9	6	9	9	7	8	8	6	4	3	4	3	3	8	8	7	6	8	9	12	7	13	7
20	15	5	9	10	6	4	4	8	4	7	4	6	3	4	3	14	13	5	12	5	7	6	6	4	7
21	4	1	2	1	4	2	1	1	1	1	3	3	8	4	2	2	3	4	5	6	6	9	7	11	4
22	10	11	11	2	3	2	1	2	2	4	3	4	6	6	5	7	6	3	5	10	10	16	14	10	6
23	10	11	4	4	5	3	4	5	4	6	4	2	2	2	3	2	3	2	12	2	10	6	4	5	5
24	5	3	1	2	1	1	1	2	1	1	2	1	3	2	2	1	5	5	4	3	7	4	4	2	3
25	4	4	2	1	3	4	2	3	1	1	1	2	1	1	4	2	3	9	10	6	9	7	8	10	4
26	6	4	2	9	9	3	2	4	2	3	2	1	2	2	1	1	2	4	16	11	8	11	26	10	6
27	8	10	8	4	4	4	2	4	4	5	4	3	6	5	4	5	5	5	12	13	6	4	7	21	6
28	9	2	2	3	2	2	1	2	1	1	1	2	1	2	2	2	6	4	4	4	8	11	13	8	4
29	6	2	4	8	2	3	2	2	1	1	1	3	1	1	2	2	1	1	2	8	10	8	12	6	4
30	4	2	5	5	2	3	2	1	2	6	4	2	2	5	8	8	9	11	42	31	21	76	80	46	16
31																									
Mean	7	6	5	5	5	4	3	3	3	4	4	4	4	4	4	4	5	6	10	11	11	15	14	11	6

Table 82 Mould Bay R_y (Hourly Ranges in 10 γ units) May 1963

Day \ Hour U.T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	14	37	21	21	4	9	8	8	7	7	6	8	9	10	12	4	35	36	17	17	19	27	36	16	16
2	13	13	16	9	15	9	11	8	4	5	13	16	11	10	6	10	8	12	11	9	11	17	31	55	13
3	29	13	20	16	8	6	8	6	10	7	5	5	6	4	3	4	12	9	9	32	18	14	12	9	11
4	23	13	10	11	6	6	4	7	24	25	17	6	9	6	12	9	14	12	11	8	6	8	26	16	12
5	8	12	18	11	18	5	7	14	8	10	6	9	4	5	4	5	3	7	8	10	14	17	26	16	10
6	9	5	12	12	6	6	6	4	5	4	2	5	2	6	4	5	7	12	10	6	7	18	16	10	7
7	17	3	5	4	3	3	5	6	2	9	10	3	7	7	3	4	4	5	10	22	28	12	40	27	10
8	12	13	9	7	4	5	2	4	9	6	2	3	4	9	5	12	5	10	6	10	20	16	19	14	9
9	7	16	9	8	10	8	10	7	5	7	4	4	7	5	7	5	10	10	10	32	13	38	18	14	11
10	16	14	8	10	4	3	4	3	4	12	11	6	5	4	7	9	6	9	15	23	29	17	15	16	10
11	6	7	14	15	20	4	4	7	6	4	6	6	22	16	9	8	8	5	14	23	27	30	21	14	12
12	13	12	10	6	5	6	4	4	4	4	5	4	4	6	4	8	4	13	17	16	13	13	24	19	9
13	13	16	13	21	20	14	8	5	10	10	7	16	5	4	6	4	6	6	13	20	27	13	16	9	12
14	8	15	11	9	6	7	6	8	13	17	5	8	3	4	2	2	1	4	14	9	13	29	7	16	9
15	10	9	13	4	5	3	5	5	5	3	6	3	3	3	5	2	2	4	8	8	15	10	9	7	6
16	6	2	6	4	3	2	1	2	3	4	2	2	1	2	1	2	2	2	5	5	10	9	7	4	4
17	8	7	2	3	2	5	8	4	3	3	4	9	7	6	7	6	4	5	20	3	6	12	8	8	6
18	3	4	2	5	2	3	3	2	3	2	3	3	4	7	3	5	6	5	5	12	8	6	4	11	5
19	8	6	2	5	2	1	2	3	4	3	1	2	5	8	3	6	12	6	4	8	12	6	7	6	5
20	5	5	11	9	6	3	3	2	2	2	3	4	2	3	6	4	6	3	4	6	14	21	27	9	7
21	6	5	4	2	4	2	2	2	1	2	1	1	4	3	2	2	2	10	6	11	9	13	5	13	5
22	8	5	5	5	3	4	2	2	1	1	1	2	8	9	4	1	2	5	2	4	9	12	4	4	4
23	3	2	2	2	2	2	1	3	2	4	3	4	2	2	5	4	4	4	10	6	4	5	2	7	4
24	6	2	1	5	2	1	2	4	2	2	1	1	1	2	3	6	4	3	5	7	6	4	5	2	3
25	6	12	5	3	5	3	4	4	2	3	4	2	11	9	6	5	5	5	18	35	22	19	14	14	9
26	10	4	2	2	4	3	3	3	4	4	3	6	4	2	4	3	6	15	8	26	23	22	10	9	8
27	9	5	6	5	4	4	2	3	4	1	2	4	4	3	1	6	9	8	8	10	18	42	17	51	9
28	28	18	21	13	16	12	9	11	10	6	12	13	8	6	7	6	11	9	13	25	28	47	59	48	18
29	28	32	32	21	25	9	5	13	4	8	7	3	13	8	9	11	9	14	43	28	12	33	48	34	19
30	36	16	21	15	4	7	13	8	6	6	14	18	5	6	4	7	9	5	6	13	12	14	8	21	11
31	8	4	4	4	4	3	4	3	4	8	9	6	23	13	8	13	4	10	14	16	20	9	19	14	9
Mean	12	11	10	9	7	5	5	5	6	6	6	6	7	6	5	6	7	8	11	15	15	18	18	17	9

Table 83 Mould Bay R_y (Hourly Ranges in 10 γ units) June 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	15	20	13	7	11	12	7	12	4	5	8	10	7	8	6	7	15	9	10	17	19	12	38	35	13
2	17	14	14	6	9	14	5	7	3	2	5	9	12	4	3	8	7	11	13	25	31	14	25	32	12
3	32	13	18	18	9	4	6	7	6	10	8	20	11	5	6	4	2	6	11	10	16	28	12	16	12
4	12	7	7	8	3	5	10	6	8	4	2	3	2	5	9	3	1	5	6	10	4	25	19	18	8
5	15	4	3	1	4	4	1	1	2	1	2	2	1	1	2	2	2	3	3	4	5	4	5	4	3
6	8	3	3	2	3	3	1	3	2	1	2	2	2	4	3	6	3	8	17	9	16	18	30	41	8
7	19	12	17	14	5	8	8	10	5	7	7	9	8	9	7	18	4	17	17	39	46	29	19	12	14
8	18	21	16	5	10	6	4	4	3	6	6	10	7	7	5	5	6	10	12	19	42	25	22	22	12
9	15	13	13	14	8	10	4	9	9	6	5	17	6	3	6	9	8	8	18	13	20	16	19	7	11
10	22	9	6	6	4	4	4	5	2	3	6	5	2	4	5	4	6	7	6	10	29	16	11	19	8
11	13	4	6	13	11	9	9	3	6	4	6	8	5	11	8	11	7	9	5	3	7	7	11	11	8
12	14	16	16	8	4	2	3	3	2	4	3	6	3	1	1	3	4	6	10	13	12	14	13	8	7
13	5	4	4	5	2	4	5	2	4	2	3	3	3	6	2	4	6	19	6	6	25	39	26	30	9
14	17	6	6	5	3	4	4	4	4	6	6	7	3	4	12	10	14	7	7	4	5	14	19	24	8
15	21	6	7	16	4	12	14	4	6	2	3	4	4	2	3	3	5	4	20	7	8	31	10	24	9
16	17	4	5	3	3	3	2	1	2	2	2	2	1	1	2	3	4	10	3	4	12	11	18	8	5
17	11	5	7	6	10	4	4	2	4	5	3	7	6	5	3	3	6	5	7	13	6	15	12	13	7
18	11	16	17	6	8	8	9	10	11	3	5	12	11	15	13	9	8	13	13	9	6	14	7	4	10
19	5	14	7	9	9	4	6	3	4	2	1	2	2	3	6	9	4	6	9	7	21	14	10	15	7
20	12	17	6	9	6	8	10	8	6	6	12	12	4	6	5	5	6	8	11	17	22	19	14	13	10
21	14	8	7	6	7	6	3	3	4	9	5	5	6	2	2	5	8	6	8	16	22	22	27	16	9
22	11	7	8	6	7	7	4	4	6	4	3	4	3	5	2	1	3	3	4	10	14	13	7	13	6
23	6	11	4	7	2	5	2	2	6	6	8	3	4	3	1	3	2	4	10	10	12	10	10	8	6
24	8	5	6	4	4	2	5	4	4	5	6	2	8	5	8	14	10	8	5	9	13	14	13	14	7
25	13	5	9	10	13	6	18	18	6	7	8	6	10	27	14	17	9	20	20	16	22	25	54	36	16
26	45	20	30	25	15	15	8	12	10	12	11	5	8	9	9	14	5	13	32	9	35	30	34	42	19
27	22	30	17	12	24	15	6	4	10	6	13	6	9	12	9	12	8	12	13	10	30	61	41	34	17
28	28	9	5	6	12	11	9	10	12	8	8	11	11	8	8	14	16	13	22	46	62	28	9	14	16
29	23	20	19	15	5	6	5	8	6	3	6	7	6	8	6	15	9	19	21	28	24	22	22	18	13
30	27	10	9	4	10	8	11	9	11	6	7	7	9	6	10	8	6	13	18	18	26	11	33	21	12
31																									
Mean	17	11	10	9	8	7	6	6	6	5	6	7	6	6	6	8	6	9	12	14	20	20	20	19	10

Table 84 Mould Bay R_y (Hourly Ranges in 10 γ units) July 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	14	8	14	18	8	4	5	2	2	3	2	4	5	4	2	1	2	3	8	7	8	8	13	6	6
2	5	4	4	2	2	4	2	3	5	5	4	4	5	3	3	4	3	9	14	8	5	7	8	10	5
3	16	5	6	4	4	3	1	1	1	2	4	2	4	4	3	1	1	1	5	6	4	12	12	12	5
4	3	3	4	3	6	9	5	4	7	2	5	6	10	6	6	10	7	10	31	16	13	16	21	28	10
5	39	31	14	9	14	5	10	27	11	6	4	6	6	5	6	4	4	12	14	16	69	55	42	21	18
6	22	18	12	18	14	11	9	6	6	5	9	5	4	5	10	8	7	9	20	17	17	39	34	16	13
7	6	8	8	8	5	5	9	4	4	6	7	5	5	5	20	11	13	6	8	20	30	18	16	22	10
8	17	16	12	11	11	6	4	8	14	6	3	6	10	6	9	9	7	4	12	23	24	41	16	12	12
9	20	14	19	19	20	10	9	4	9	6	6	8	8	7	9	10	9	12	20	29	13	22	18	22	13
10	19	12	9	9	9	6	12	6	12	4	4	4	6	3	5	7	11	13	18	18	12	21	22	14	11
11	12	10	9	12	7	6	13	7	4	6	3	4	4	2	4	5	3	5	5	9	25	9	18	10	8
12	7	8	8	5	2	5	3	4	4	2	3	2	2	5	1	1	2	8	14	9	11	7	5	9	5
13	9	14	4	4	5	3	3	6	7	2	5	4	4	2	3	3	2	3	5	10	14	10	15	11	6
14	7	4	4	2	2	1	2	1	3	2	2	1	5	3	5	5	6	5	3	6	7	14	11	7	4
15	8	4	4	2	3	2	2	2	2	2	3	2	9	5	3	3	4	3	6	4	4	30	12	12	5
16	9	4	10	10	7	6	6	4	4	3	5	2	5	7	3	5	4	16	4	9	16	20	13	17	8
17	18	31	8	7	5	3	9	7	6	7	6	15	17	5	5	10	8	13	6	17	11	15	7	7	10
18	8	10	7	8	6	9	6	3	4	8	5	5	4	14	9	14	13	9	8	12	21	16	4	14	9
19	8	8	4	18	8	5	6	2	2	4	3	8	6	5	7	3	3	8	6	17	15	8	14	20	8
20	13	6	3	5	8	4	2	2	2	2	2	5	8	4	4	4	8	17	8	32	5	8	17	11	8
21	30	11	5	3	4	8	8	9	10	8	8	5	24	10	7	25	27	13	12	11	19	19	22	22	13
22	21	16	6	7	10	14	5	8	7	8	4	5	9	11	21	9	8	4	16	14	6	10	27	20	11
23	16	17	14	6	5	12	7	4	8	6	10	9	8	10	23	13	10	15	19	15	22	51	41	49	16
24	36	34	10	10	17	9	6	8	4	9	14	8	36	26	7	8	8	20	10	11	20	38	18	25	16
25	28	22	12	9	21	19	8	13	7	8	3	6	8	6	5	13	8	17	16	12	15	14	14	23	13
26	14	17	10	19	17	4	8	14	10	6	10	12	7	18	12	5	4	5	19	26	20	35	47	38	16
27	22	26	28	20	12	6	14	12	10	8	8	6	6	13	7	6	8	8	12	9	16	17	16	13	13
28	11	8	9	10	7	5	7	6	5	6	6	2	3	4	2	3	5	1	6	5	5	6	17	11	6
29	6	8	4	3	3	3	2	1	3	3	4	2	5	10	5	5	2	3	4	9	8	15	13	14	6
30	14	12	22	9	14	7	8	3	6	5	5	8	22	16	12	8	16	25	18	36	32	37	43	22	17
31	21	25	27	10	13	8	6	18	6	3	5	4	32	12	9	6	5	11	9	22	26	59	44	28	17
Mean	15	13	10	9	9	7	6	6	6	5	5	5	9	8	7	7	7	9	11	15	17	22	20	18	10

Table 85 Mould Bay R_y (Hourly Ranges in 10 γ units) August 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	22	17	22	34	13	14	10	5	3	5	9	6	8	9	10	11	16	16	20	32	38	30	46	25	18
2	16	9	11	12	12	16	9	8	15	8	5	7	7	4	6	8	6	13	16	19	22	49	17	18	13
3	12	13	11	11	7	5	6	4	6	4	4	4	2	4	7	7	6	6	5	14	17	42	33	16	10
4	10	9	13	9	6	4	3	8	4	11	4	10	5	13	6	6	17	8	16	20	19	36	38	31	13
5	17	7	9	4	9	4	8	4	4	4	6	18	8	6	3	4	9	5	14	23	11	28	12	15	10
6	9	8	12	3	6	3	6	4	7	5	7	13	5	7	6	5	8	2	9	15	30	13	13	12	9
7	24	5	9	6	5	6	4	6	4	5	5	6	9	12	5	4	4	3	7	8	9	17	23	22	9
8	10	7	4	8	4	4	8	3	2	6	6	7	6	3	5	6	4	7	7	4	5	12	5	10	6
9	8	8	5	6	4	2	9	5	8	8	7	4	4	3	4	4	4	5	5	8	6	13	17	10	7
10	9	6	7	3	6	4	4	1	2	2	2	8	6	7	5	17	10	3	4	7	9	6	8	30	7
11	8	16	8	3	3	3	4	2	2	3	1	2	2	4	5	3	3	6	4	8	12	14	40	20	7
12	9	6	2	2	4	5	6	5	2	1	4	3	3	2	4	4	3	4	7	15	13	15	8	5	5
13	6	6	4	4	2	3	3	3	1	1	2	1	4	2	2	2	3	3	3	8	10	12	6	7	4
14	4	3	5	4	1	3	3	2	2	2	3	2	2	2	3	2	2	2	4	3	10	9	14	19	4
15	2	4	3	4	2	3	2	2	2	2	2	2	2	7	8	4	6	13	10	9	6	11	36	16	7
16	21	12	5	2	4	5	2	2	2	1	2	5	3	5	5	8	9	6	9	6	14	21	14	9	7
17	11	14	10	5	6	4	3	2	2	2	8	2	2	4	3	3	3	8	12	34	15	5	18	20	8
18	15	12	7	4	11	6	7	7	12	16	15	4	11	12	9	12	12	13	9	22	13	23	35	24	13
19	20	10	12	7	3	4	4	2	2	2	3	4	6	6	8	4	11	8	38	21	6	8	4	19	9
20	9	11	19	22	12	11	10	9	3	14	19	18	86	13	15	6	14	13	19	10	19	23	46	38	19
21	17	7	14	11	16	5	9	8	9	16	7	17	6	11	31	38	16	11	17	10	21	20	9	20	14
22	19	11	10	6	3	8	6	7	22	5	5	6	2	4	4	3	6	4	4	11	16	19	15	15	9
23	7	7	12	13	4	7	5	4	8	6	6	14	12	9	10	11	5	9	10	20	10	8	12	19	10
24	8	17	7	8	3	3	2	3	5	13	8	8	9	4	9	8	4	8	5	7	16	13	11	8	8
25	13	7	5	3	4	7	4	6	4	8	4	3	3	7	5	2	8	9	19	19	34	21	23	10	10
26	12	10	9	16	10	12	6	3	6	5	4	3	4	6	5	11	7	9	10	20	19	18	20	10	10
27	10	6	9	10	4	4	3	3	2	3	3	7	8	7	5	10	14	21	20	17	12	19	32	13	10
28	13	6	6	12	7	9	8	4	2	7	12	14	9	5	3	5	18	9	22	26	34	22	18	12	12
29	9	11	7	13	10	5	4	4	12	22	12	7	10	8	10	11	7	14	23	22	16	24	26	12	12
30	13	13	8	8	9	4	3	4	4	2	4	6	4	8	4	8	10	5	22	14	21	9	20	9	9
31	11	12	8	6	7	9	6	5	7	8	3	6	5	10	7	10	7	10	15	20	10	24	11	8	9
Mean	12	9	9	8	6	6	5	4	5	6	6	7	8	7	7	8	8	8	12	15	16	19	20	16	9

Table 86 Mould Bay R_y (Hourly Ranges in 10γ units) September 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	14	8	13	3	5	4	3	3	11	11	11	8	11	18	4	3	9	12	6	12	10	9	8	11	9
2	12	7	5	6	5	4	2	1	2	2	2	2	2	4	4	4	5	4	8	9	14	22	10	8	6
3	12	7	8	10	9	4	4	3	3	2	5	4	5	2	6	6	5	7	9	17	9	16	11	11	7
4	5	4	6	2	2	2	2	4	4	5	6	3	2	6	4	3	2	4	7	14	11	8	8	15	5
5	9	8	5	2	3	4	2	2	2	4	4	8	5	5	3	4	5	6	8	19	13	10	12	6	6
6	6	7	7	6	3	6	7	2	3	2	4	4	2	3	4	3	4	3	8	12	17	9	12	14	6
7	10	6	2	4	3	3	3	2	2	1	2	2	2	3	2	2	1	5	5	5	5	6	6	9	4
8	7	9	9	4	6	19	12	5	4	2	4	11	4	10	3	4	8	6	6	9	8	9	13	5	7
9	11	10	3	10	8	10	2	3	4	8	6	4	11	17	14	6	8	9	13	26	12	13	14	8	10
10	5	15	13	4	3	2	3	5	8	3	3	11	9	4	5	3	4	6	10	6	17	19	16	9	8
11	9	10	12	4	7	3	3	4	3	5	6	14	9	4	2	7	5	11	9	15	17	12	16	14	8
12	16	8	13	8	5	9	4	8	10	6	5	2	5	4	9	3	6	6	10	8	8	14	9	7	8
13	7	5	4	2	3	2	2	2	2	2	2	1	1	2	2	2	2	2	8	10	24	22	12	6	5
14	6	6	5	7	16	5	12	10	6	32	22	6	31	25	9	12	12	21	11	21	18	19	8	13	14
15	11	13	4	10	15	10	6	8	7	10	9	13	13	66	13	6	12	6	17	17	21	22	7	12	14
16	14	7	10	12	9	10	7	6	15	9	9	17	7	4	6	20	18	11	18	20	20	23	12	24	13
17	16	13	7	18	13	15	13	25	16	8	21	20	14	11	14	10	10	11	8	44	14	24	14	24	16
18	18	14	10	14	7	6	2	8	8	7	8	18	10	9	14	8	30	43	8	9	8	8	17	13	12
19	10	4	8	10	8	10	9	10	13	8	10	34	29	18	8	8	10	8	19	9	13	8	13	16	12
20	10	6	5	3	4	8	4	5	2	16	8	5	4	8	16	12	14	19	14	12	4	5	6	2	8
21	5	7	3	17	9	6	4	5	3	14	12	5	4	2	20	17	13	58	49	41	27	12	64	12	17
22	16	9	14	11	32	12	18	21	25	24	23	12	9	5	4	4	30	36	53	40	54	27	30	53	23
23	24	24	24	25	18	50	29	38	61	31	42	23	16	18	8	8	21	15	18	17	16	17	17	8	24
24	6	10	10	6	6	5	5	4	8	4	6	5	9	6	4	8	14	11	19	10	8	12	5	10	8
25	15	21	18	30	9	7	6	8	10	11	22	7	5	6	6	15	11	11	16	20	25	24	20	6	14
26	7	6	4	9	18	16	8	6	6	4	9	6	9	10	6	10	10	14	16	29	23	13	9	12	11
27	14	22	18	16	13	10	7	5	7	12	6	12	10	9	7	10	16	8	16	73	39	29	24	24	17
28	23	23	12	8	11	6	10	12	16	10	6	10	18	13	11	11	12	17	17	14	19	18	18	9	14
29	14	11	8	6	11	5	6	5	20	12	10	6	14	18	8	6	8	10	10	18	14	18	9	8	11
30	6	14	17	3	4	7	7	6	4	10	13	5	10	10	3	4	8	9	7	6	12	14	12	7	8
31																									
Mean	11	10	9	9	9	9	7	8	9	9	10	9	9	11	7	7	10	13	14	19	17	15	14	13	11

Table 87 Mould Bay R_y (Hourly Ranges in 10 γ units) October 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	4	4	2	3	2	3	2	2	2	1	2	2	2	3	5	9	4	4	6	6	8	7	4	4
2	6	3	1	3	1	1	2	1	2	2	2	1	3	2	2	2	4	4	3	8	9	7	6	3	3
3	3	2	3	2	3	2	3	2	3	5	1	2	2	3	4	5	5	4	9	12	6	6	3	6	4
4	3	5	5	5	4	3	3	4	3	6	4	2	2	1	6	4	9	4	4	3	5	9	5	4	4
5	3	2	5	2	4	3	2	1	2	10	6	4	2	3	3	2	4	4	3	4	6	5	3	2	4
6	6	6	5	3	5	6	2	1	2	2	1	2	2	1	1	2	2	3	3	10	8	4	3	1	3
7	2	2	3	5	2	2	1	2	2	4	2	2	2	1	1	5	6	10	6	11	24	11	12	6	5
8	14	12	9	12	6	8	5	4	6	5	6	3	6	6	4	6	3	7	11	7	15	10	4	3	7
9	5	5	4	4	2	4	3	2	3	4	4	4	5	4	2	3	7	10	6	12	8	7	4	6	5
10	8	4	4	3	3	2	3	3	4	5	10	6	7	4	4	4	2	4	8	10	10	6	6	4	5
11	6	4	4	6	4	2	2	5	10	8	9	10	6	8	5	12	3	9	10	8	18	12	15	14	8
12	7	11	9	12	6	6	6	4	9	6	8	6	28	23	20	20	9	8	24	27	21	23	10	6	13
13	15	6	12	9	9	11	7	6	14	10	9	5	7	7	8	7	4	7	21	13	18	15	17	8	10
14	10	12	8	18	4	8	8	21	15	17	9	13	13	8	10	6	16	25	31	16	17	21	11	11	14
15	9	7	8	7	5	7	6	7	4	5	5	6	3	5	8	4	16	9	13	9	28	26	10	12	9
16	14	10	11	8	3	5	9	6	7	9	5	6	12	8	11	5	10	5	11	14	9	8	11	7	9
17	4	3	2	4	6	3	3	5	2	2	3	3	2	2	1	5	2	3	6	5	4	4	6	5	4
18	1	2	3	4	3	2	2	2	2	4	4	9	7	4	2	6	4	3	8	7	6	6	7	3	4
19	8	7	2	2	2	3	3	4	4	2	2	4	4	3	4	4	5	5	7	5	4	7	10	5	4
20	3	3	2	2	2	2	3	2	3	4	3	6	15	13	12	4	3	4	7	4	4	4	9	9	5
21	2	2	2	8	3	4	7	4	2	4	4	2	2	2	4	3	6	2	4	5	4	6	4	2	4
22	2	2	2	2	2	3	3	2	2	2	2	2	2	1	3	4	4	5	5	5	6	7	4	4	3
23	2	4	2	2	5	2	1	1	2	1	1	2	3	2	3	3	3	6	3	11	13	13	14	5	4
24	8	12	12	8	12	6	12	4	13	6	13	16	6	6	6	11	8	14	15	21	22	17	8	10	11
25	17	14	9	11	4	2	4	5	3	3	2	2	6	4	4	4	6	10	7	12	8	5	7	8	7
26	14	5	9	5	2	4	2	2	2	2	5	5	2	5	6	5	6	4	11	9	12	10	5	8	6
27	3	4	4	3	3	3	1	1	1	2	2	1	2	2	3	4	4	2	4	5	6	4	3	2	3
28	3	2	3	2	1	2	1	2	2	1	6	8	5	1	2	12	10	28	17	29	7	7	7	6	7
29	4	7	7	4	3	3	2	3	3	2	4	3	3	17	21	8	53	50	25	15	14	19	26	13	13
30	20	13	21	25	70	83	72	57	28	12	7	5	3	3	6	5	4	4	5	10	7	6	7	5	20
31	3	4	3	3	3	3	3	2	3	4	2	2	2	2	2	3	5	4	5	6	10	12	7	5	4
Mean	7	6	6	6	6	6	6	5	5	5	5	5	5	5	6	6	7	8	10	10	11	10	8	6	7

Table 88 Mould Bay R_y (Hourly Ranges in 10 γ units) November 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	6	6	6	4	5	9	11	3	4	4	2	3	3	3	4	10	10	12	14	8	10	5	4	9	6
2	11	6	6	7	6	4	4	2	4	3	4	5	12	5	4	15	14	18	17	21	12	13	9	11	9
3	4	6	10	9	8	9	3	9	18	6	6	4	4	4	8	4	2	6	9	9	8	15	10	2	7
4	10	8	6	4	3	3	4	2	2	3	5	2	3	2	2	2	4	5	6	5	5	4	4	3	4
5	4	2	3	4	3	2	4	3	3	2	2	3	2	2	2	1	2	3	2	4	2	5	3	4	3
6	4	3	4	3	2	2	3	2	5	5	5	5	5	4	6	8	10	16	14	9	6	8	7	5	6
7	8	6	5	8	9	8	7	7	3	6	8	28	7	11	6	16	10	12	13	12	21	12	7	10	10
8	21	18	12	11	10	35	36	19	16	5	6	14	34	19	16	9	13	13	18	13	10	12	7	11	16
9	9	6	9	8	10	4	4	34	67	18	26	24	20	28	13	10	10	20	6	10	13	11	7	10	16
10	7	7	20	14	11	12	5	9	10	36	78	10	9	5	8	8	6	12	12	16	17	6	11	7	14
11	10	10	8	6	8	7	3	11	10	10	14	13	6	5	6	7	11	12	14	10	14	14	10	5	9
12	7	6	4	7	4	4	3	17	14	5	12	7	3	3	6	8	18	14	7	5	12	9	14	7	8
13	2	5	2	4	2	2	2	1	2	1	8	7	7	6	4	3	4	5	11	6	6	6	4	2	4
14	5	5	2	2	5	5	6	2	5	1	1	2	2	3	2	2	2	1	3	2	4	6	2	2	3
15	3	4	2	5	4	2	2	2	4	4	3	2	2	4	1	2	2	4	3	3	3	5	4	3	3
16	2	2	2	2	1	1	4	2	4	2	2	1	1	1	2	2	2	2	2	2	2	3	3	2	2
17	2	2	2	2	2	1	2	2	2	4	4	6	6	4	28	36	16	26	30	9	7	4	2	3	8
18	2	2	2	2	2	4	2	2	2	2	2	1	2	2	2	2	2	4	7	3	3	2	2	2	2
19	2	3	2	2	2	2	2	1	2	1	3	4	1	1	2	1	2	2	2	3	2	2	3	4	2
20	2	4	5	9	2	2	1	2	2	2	2	1	1	2	2	2	3	2	2	5	3	2	2	1	3
21	2	2	2	2	2	2	2	2	1	1	1	1	2	4	5	3	2	2	2	3	1	2	2	2	2
22	1	1	1	2	2	1	2	2	2	3	4	2	2	2	2	4	4	5	8	19	5	3	2	5	3
23	5	4	5	5	2	3	2	2	3	6	2	2	2	1	3	5	3	1	6	7	3	4	3	2	3
24	4	3	4	4	2	2	2	2	8	2	7	6	18	14	9	5	7	10	10	5	4	5	7	5	6
25	7	8	3	5	6	13	12	5	3	3	8	5	10	10	4	5	8	6	5	3	4	3	6	3	6
26	2	1	2	2	2	2	2	2	4	6	2	3	2	2	3	2	3	2	2	2	2	2	2	2	2
27	1	1	2	2	1	2	2	3	4	2	3	4	1	1	2	2	2	5	2	6	4	5	4	2	3
28	5	4	7	3	5	6	3	2	1	2	2	2	4	2	2	2	2	4	3	2	1	1	2	2	3
29	2	2	2	2	2	3	2	2	2	2	4	5	3	4	4	8	4	3	4	6	4	6	8	8	4
30	4	3	3	2	2	3	2	2	2	2	9	7	26	17	7	8	4	12	10	4	5	4	4	3	6
31																									
Mean	5	5	5	5	4	5	5	5	7	5	8	6	7	6	6	6	6	8	8	7	6	6	5	5	6

Table 89 Mould Bay R_y (Hourly Ranges in 10 γ units) December 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	2	1	2	2	1	1	1	1	2	1	1	2	3	1	6	7	2	4	4	2	4	3	4	2
2	9	8	3	4	4	4	2	3	5	2	2	2	3	2	12	9	6	6	8	9	4	9	5	5	5
3	4	6	7	4	7	7	6	105	75	11	17	11	10	18	6	13	14	12	9	11	8	6	10	9	16
4	9	12	5	7	3	5	85	14	3	8	8	5	7	8	6	8	18	11	16	21	11	9	5	9	12
5	14	14	8	7	9	6	7	12	19	11	24	21	6	12	9	12	9	8	7	7	10	7	4	6	10
6	10	5	4	7	11	6	9	5	5	27	35	13	9	13	13	7	13	13	10	10	11	9	6	9	11
7	5	6	6	3	6	6	5	10	24	15	6	12	7	17	12	9	12	9	6	8	11	4	3	5	9
8	4	3	3	6	8	6	6	28	8	12	5	5	9	7	7	7	6	5	6	6	4	6	5	4	7
9	8	2	4	2	1	3	2	12	7	13	36	34	7	3	7	2	5	4	2	3	2	2	1	1	7
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
11	1	0	1	1	0	1	1	1	1	2	3	5	2	3	1	2	1	2	2	2	3	3	3	3	2
12	1	1	1	1	1	2	1	2	3	5	3	2	1	1	1	2	1	2	3	2	2	3	2	5	2
13	3	4	2	5	4	6	3	3	1	3	3	2	1	3	2	5	1	2	4	4	3	3	3	4	3
14	2	2	3	3	2	2	1	1	2	2	2	2	13	6	8	16	5	8	11	9	8	8	6	5	5
15	4	7	7	5	3	3	4	3	2	3	3	7	2	5	4	7	4	6	5	11	8	5	1	4	5
16	3	4	4	3	4	1	1	1	2	2	3	2	2	3	3	3	5	12	2	4	4	4	4	3	3
17	8	4	2	1	1	2	2	2	2	1	1	1	1	1	2	2	1	3	1	3	3	3	2	1	2
18	3	6	4	2	1	1	1	1	1	2	3	3	2	1	1	1	2	1	2	2	2	1	1	1	2
19	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	2	3	2	3	2	4	4	4	3	2
20	8	10	1	4	3	1	8	7	5	4	3	3	17	17	6	3	3	4	6	5	5	6	4	4	6
21	3	4	1	1	1	1	1	1	3	2	1	2	5	6	9	10	6	7	7	3	6	5	6	6	4
22	3	2	3	1	2	3	7	5	6	3	5	4	3	20	16	4	7	6	4	5	5	6	2	2	5
23	4	8	2	4	3	1	3	3	3	8	5	1	1	1	2	7	5	14	6	5	7	8	3	8	5
24	7	5	3	3	3	2	1	1	2	1	1	1	3	9	13	6	2	3	11	7	5	2	2	4	4
25	2	1	2	1	3	1	3	1	2	8	15	5	5	4	4	4	2	2	4	4	4	1	3	1	3
26	2	2	2	3	3	2	3	2	1	3	6	5	3	2	2	2	2	2	1	3	5	4	1	2	3
27	2	3	3	1	1	3	3	3	2	1	3	4	5	9	3	1	1	4	2	3	2	4	2	3	3
28	2	1	1	1	4	3	3	5	4	4	2	3	3	4	2	5	4	5	4	5	7	7	5	5	4
29	6	6	5	5	3	3	5	6	4	2	3	13	9	3	8	5	5	11	6	10	13	6	5	5	6
30	7	4	2	5	3	3	2	1	1	1	2	4	2	1	5	4	3	7	1	6	4	2	3	3	3
31	4	4	3	3	3	2	2	2	1	2	3	2	4	2	1	1	1	2	1	2	2	2	2	1	2
Mean	5	4	3	3	3	3	6	8	6	5	7	6	5	6	5	5	5	6	5	6	5	5	3	4	5

RESOLUTE BAY MAGNETIC OBSERVATORY
1963

The Magnetic Equipment

No changes were made in the station equipment in 1963. A summary of the equipment in operation during this period is provided below:

The Photographic Variometers

A set of three-component photographic Ruska variometers is aligned to record the geographic components X, Y and Z of the earth's magnetic field. The time scale of the Ruska magnetograms is 20 mm/hr. Scale values adopted for the Ruska variometers for 1963 were:

X	Jan. 1—Mar. 18	5.44 gammas/mm
	Mar. 19	3.80
	Mar. 20—Aug. 8 at 06 hrs	7.11 increasing linearly to 7.24
	Aug. 8 at 06 hrs—Dec. 31	6.51 decreasing linearly to 6.37
Y	Jan. 1—Mar. 18	4.50 gammas/mm
	Mar. 19	2.80
	Mar. 20—Aug. 8 at 06 hrs	7.02 decreasing linearly to 6.89
	Aug. 8 at 06 hrs—Dec. 31	6.57 " " 6.51
Z	Jan. 1—Mar. 18	4.44 gammas/mm
	Mar. 19—Aug. 31	4.63
	September	4.68
	Oct. 1—Dec. 31	4.70

Sensitivity changes were made on the X and Y variometers on March 19, March 20, and August 8.

Temperature coefficients were +2.5 gammas/°C for X and +0.7 gammas/°C for Y until March 19, 00 hrs. U.T., when the X and Y temperature control magnets were removed with a view to reducing as much as possible the interactions between the various magnets. Following their removal the temperature coefficients were −1.6 gammas/°C in X and −0.9 gammas/°C in Y. The Z temperature coefficient was less than 1 gamma/°C.

Thermostatically controlled electric heaters maintain the temperature in the variometer room constant to within approximately 2 degrees, except for brief periods of high wind velocity or power failure. Temperature effects were generally small and were disregarded in base-line calculations and mean hourly value measurements.

The Stand-by Variometer and Storm Recorder

A three-component electrical magnetometer with an inked output records X, Y and Z. Chart speed is 20 mm/hr. Full-scale sensitivity is 2000 gammas normally, with automatic switching to 4000 gammas at times of heavy disturbance.

Absolute Instruments

A proton precession magnetometer is the primary standard of total intensity (F). A portable three-component electrical magnetometer of the saturable core type is used for the determination of declination (D) and inclination (I).

Base-line Values

The r.m.s. value of the observed minus adopted base-line values was 3 gammas for 22 observations in X; 5 gammas for 22 observations in Y; and 3 gammas for 23 observations in Z.

The Magnetic Reductions

A summary for 1963 by month, season and year of the mean hourly values of X, Y and Z for all days and for the international quiet and disturbed days is given in Tables 90–98. The daily mean values of the three elements are given in Tables 99–101.

R_y indices of magnetic disturbance are given for each hour of 1963 in Tables 102–113. The R_y indices are the hourly ranges in Y, the principal horizontal magnetic field component recorded at Resolute Bay, expressed in 10-gamma units.

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (All days)

Table 90 Resolute Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	93	100	111	105	97	103	98	84	74	98	108	114	99	96	97	104
1-2	95	106	114	114	112	99	110	104	99	107	110	120	108	106	109	108
2-3	103	109	121	125	123	120	133	125	110	119	115	122	119	125	119	112
3-4	111	115	127	135	140	135	149	140	130	132	118	126	130	141	131	118
4-5	117	121	132	147	162	156	170	153	153	141	130	132	143	160	143	125
5-6	128	124	135	154	174	182	180	165	176	147	140	131	153	175	153	131
6-7	132	131	142	156	190	196	197	169	173	154	139	143	160	188	156	136
7-8	131	135	146	164	184	203	202	171	175	157	148	150	164	190	161	141
8-9	135	137	148	167	182	209	199	173	181	158	149	151	166	191	164	143
9-10	135	135	142	165	192	206	191	176	172	155	146	145	163	191	158	140
10-11	127	125	138	160	183	207	194	174	169	148	140	138	159	190	154	133
11-12	115	120	133	153	182	200	198	168	160	134	129	131	152	187	145	124
12-13	112	108	126	148	168	199	192	168	151	120	119	120	144	182	136	115
13-14	99	101	118	140	150	191	194	150	125	113	110	109	133	171	124	105
14-15	80	94	109	125	134	178	159	131	111	104	102	103	119	150	112	95
15-16	79	87	100	113	116	156	132	107	97	94	85	93	105	128	101	86
16-17	71	72	89	100	84	108	103	87	73	76	68	87	85	96	84	75
17-18	59	73	79	78	75	106	78	58	51	59	66	79	72	79	67	69
18-19	62	72	80	76	63	83	69	46	36	59	68	79	66	65	63	70
19-20	61	71	79	76	64	71	55	49	36	59	75	79	65	60	63	72
20-21	68	80	88	75	84	57	57	38	43	65	75	85	68	59	68	77
21-22	76	86	88	91	87	74	62	44	38	70	89	91	75	67	72	86
22-23	81	91	91	103	90	99	73	62	61	73	98	98	85	81	82	92
23-24	87	95	97	96	97	95	87	73	60	92	104	105	91	88	86	98
Mean	98	104	114	124	131	143	137	117	111	110	110	114	118	132	115	106

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 91 Resolute Bay 1963

U T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	108	109	111	123	120	120	124	98	95	108	115	125	113	116	109	114
1-2	108	112	112	123	126	114	127	118	108	111	114	123	116	121	113	114
2-3	108	113	116	123	129	116	130	123	119	114	114	124	119	124	118	115
3-4	107	111	119	126	131	126	137	126	123	123	116	124	122	130	123	114
4-5	107	113	119	128	138	138	140	132	126	121	116	123	125	137	123	115
5-6	108	114	121	129	145	148	145	137	130	125	119	124	129	144	126	116
6-7	109	114	121	129	147	161	150	142	130	126	124	124	131	150	126	118
7-8	113	115	122	134	152	184	164	144	130	127	123	129	136	161	128	120
8-9	112	117	127	141	155	173	169	140	128	132	124	136	138	159	132	122
9-10	112	117	128	145	168	168	159	139	132	130	124	139	138	158	134	123
10-11	109	114	128	147	165	167	161	140	127	124	121	133	136	158	131	119
11-12	106	111	126	143	147	161	172	139	120	120	119	129	133	155	127	116
12-13	106	109	124	135	140	156	171	124	117	112	116	124	128	148	122	114
13-14	103	108	125	125	133	148	161	114	104	114	113	121	122	139	117	111
14-15	99	104	122	114	118	132	137	137	104	107	105	119	117	131	112	107
15-16	97	102	120	105	108	132	140	120	97	90	103	117	111	125	103	105
16-17	94	100	113	107	98	118	111	104	76	91	103	115	103	108	97	103
17-18	91	95	94	103	99	103	100	77	77	94	103	113	96	95	92	101
18-19	95	95	92	95	98	111	105	61	79	97	102	110	95	94	91	100
19-20	97	99	91	105	108	106	106	45	90	100	106	110	97	91	97	103
20-21	101	104	100	116	121	107	127	58	78	101	108	115	103	103	99	107
21-22	101	109	109	124	135	102	108	86	68	105	105	120	106	108	101	109
22-23	102	107	113	120	124	107	99	99	74	107	110	119	107	107	104	110
23-24	101	108	113	110	119	88	107	97	75	108	111	120	105	103	102	110
Mean	104	108	115	123	130	133	135	113	104	112	113	122	118	128	114	112

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 92 Resolute Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	70	64	98	107	117	76	103	87	-6	60	94	91	80	96	65	80
1-2	71	94	100	113	117	76	145	122	72	89	101	115	101	115	93	95
2-3	102	110	116	123	127	149	141	157	93	132	116	121	124	144	116	112
3-4	128	136	133	144	150	174	172	166	131	159	116	125	144	165	142	126
4-5	148	154	149	160	201	219	194	191	220	179	148	150	176	201	177	150
5-6	172	163	152	163	205	214	208	195	268	181	174	128	185	205	191	159
6-7	187	188	178	155	213	257	253	206	246	192	151	165	199	232	193	173
7-8	171	190	189	167	203	274	245	217	255	207	182	180	207	235	205	181
8-9	189	172	184	172	206	283	236	222	263	211	164	176	207	237	208	175
9-10	202	173	150	178	230	238	218	223	202	206	166	159	195	227	184	175
10-11	180	146	147	162	210	207	230	208	180	191	164	145	181	214	170	159
11-12	128	133	139	147	194	200	251	208	168	142	148	138	166	213	149	137
12-13	129	98	128	165	179	228	246	243	156	121	119	111	160	224	142	114
13-14	99	95	100	158	155	229	272	187	123	110	103	95	144	211	123	98
14-15	40	80	87	128	148	207	168	150	99	88	92	76	114	168	101	72
15-16	50	55	66	98	124	138	137	131	82	67	51	69	89	133	78	56
16-17	28	26	36	89	104	54	153	94	46	7	-16	52	56	101	44	23
17-18	7	42	16	36	51	113	46	73	48	-23	-15	29	35	71	19	16
18-19	9	41	41	36	72	97	46	16	9	11	-5	30	34	58	24	19
19-20	3	15	39	58	74	69	12	44	-2	0	2	17	28	50	24	9
20-21	35	40	51	9	115	-27	-24	35	8	16	5	21	24	25	21	25
21-22	59	62	59	88	108	0	25	-3	-26	49	39	36	41	32	42	49
22-23	80	86	73	110	46	33	46	32	61	53	57	66	62	39	74	72
23-24	65	81	83	73	94	70	67	50	67	99	73	97	77	70	81	79
Mean	98	102	105	118	143	149	150	136	115	106	93	100	118	144	111	98

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (gammas) (All Days)

Table 93 Resolute Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	854	850	854	871	877	877	879	877	888	865	848	836	865	878	870	847
1-2	856	849	854	869	881	894	885	881	894	868	850	832	868	885	871	847
2-3	854	849	854	866	890	890	882	881	907	867	853	832	869	886	874	847
3-4	854	850	852	859	887	884	878	876	881	865	851	833	864	881	864	847
4-5	866	851	850	858	872	882	883	870	887	856	853	834	864	877	863	851
5-6	862	849	844	854	860	876	867	859	883	849	853	838	858	866	858	850
6-7	852	846	842	843	843	856	851	845	858	847	845	832	847	849	848	844
7-8	847	837	833	830	830	837	836	830	837	826	827	825	833	833	832	834
8-9	831	829	824	822	816	819	815	814	810	814	816	816	819	816	818	823
9-10	822	825	814	808	803	809	798	800	783	795	807	803	806	803	800	814
10-11	811	813	803	801	789	793	786	790	772	788	795	797	795	790	791	804
11-12	803	809	798	794	782	777	774	774	753	782	791	792	786	777	782	799
12-13	802	797	794	785	764	756	752	757	748	779	781	781	775	757	777	790
13-14	797	795	790	776	754	743	735	755	742	774	781	773	768	747	771	786
14-15	792	790	782	770	747	722	731	745	747	769	781	770	762	736	767	783
15-16	791	793	775	769	748	712	727	743	740	773	781	778	761	733	764	786
16-17	799	799	787	772	760	725	738	754	745	775	789	789	769	744	770	794
17-18	812	812	800	783	761	725	744	780	771	793	799	798	781	752	787	805
18-19	824	820	817	793	770	731	777	788	790	811	815	811	796	767	803	818
19-20	830	835	826	807	800	764	800	812	803	824	829	820	812	794	815	828
20-21	840	842	837	828	827	781	807	826	825	833	838	830	826	810	831	837
21-22	845	846	842	841	842	826	832	836	855	846	841	835	841	834	846	842
22-23	850	847	849	849	853	844	847	847	872	860	840	837	850	848	858	844
23-24	854	848	850	860	862	863	867	863	878	858	844	836	857	864	862	846
Mean	831	828	824	821	817	808	812	817	820	822	821	814	820	814	822	824

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (gammas) (Quiet Days)

Table 94 Resolute Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	834	845	840	834	842	846	838	857	853	833	827	813	839	846	840	830
1-2	833	840	836	835	862	846	842	857	844	833	828	815	839	852	837	829
2-3	834	838	833	835	851	852	840	855	840	833	832	814	838	849	835	830
3-4	835	836	831	831	847	852	837	854	834	841	830	814	837	848	834	829
4-5	836	836	828	829	848	850	836	848	832	837	830	814	835	845	831	829
5-6	837	836	827	826	842	850	829	849	830	832	830	814	834	843	829	829
6-7	835	835	825	822	835	851	827	839	828	827	829	814	831	838	826	828
7-8	834	834	824	818	830	840	820	836	819	821	826	814	826	831	820	827
8-9	833	833	822	817	826	818	808	822	811	816	821	812	820	818	817	825
9-10	829	828	818	818	819	808	809	821	804	810	818	804	815	814	812	820
10-11	827	825	814	811	808	793	797	817	801	810	816	790	809	804	809	814
11-12	824	820	810	804	799	795	788	815	796	809	816	797	806	799	805	814
12-13	820	821	808	794	788	789	776	805	800	805	814	794	801	789	802	812
13-14	820	820	801	789	775	785	762	800	795	799	811	793	796	781	796	811
14-15	820	817	794	783	772	774	761	790	792	792	810	797	792	774	790	811
15-16	819	813	783	787	775	763	753	786	796	801	812	799	791	769	792	811
16-17	821	818	787	792	789	759	759	791	813	807	813	803	796	774	800	814
17-18	828	826	805	795	786	762	779	808	825	816	817	804	804	784	810	819
18-19	832	825	806	801	791	770	792	822	823	829	820	808	810	794	815	821
19-20	832	844	825	804	802	793	797	832	825	831	829	812	819	806	821	829
20-21	835	845	831	823	833	821	826	842	814	833	829	815	829	831	825	831
21-22	838	842	835	830	839	830	818	851	825	829	828	817	832	835	829	831
22-23	834	838	839	839	836	826	829	847	842	831	828	815	834	835	838	829
23-24	834	838	837	843	837	840	856	853	863	831	828	815	840	847	844	829
Mean	830	831	819	815	818	813	807	829	821	821	823	808	820	817	819	823

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (gammas) (Disturbed Days)

Table 95 Resolute Bay 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	895	894	886	891	889	923	921	913	985	942	899	873	909	911	926	890
1-2	901	889	893	889	922	977	898	910	973	950	893	854	912	927	926	884
2-3	893	885	892	873	945	944	885	912	1072	947	901	859	917	922	946	884
3-4	909	894	888	857	926	952	896	918	931	920	881	860	903	923	899	886
4-5	962	902	897	863	896	948	905	889	956	891	867	864	903	909	902	899
5-6	926	893	876	862	888	891	869	867	989	864	871	880	890	879	898	893
6-7	882	878	874	848	866	870	852	845	907	914	873	860	872	858	886	873
7-8	878	838	852	838	828	833	831	815	850	837	830	853	840	827	844	850
8-9	821	821	832	815	809	819	813	796	788	809	825	838	815	809	811	826
9-10	804	831	802	797	805	801	774	797	735	762	795	801	792	794	774	808
10-11	773	796	788	775	754	771	763	762	737	751	761	789	768	762	763	780
11-12	737	781	763	759	743	765	754	740	707	750	739	771	751	750	745	757
12-13	755	745	751	755	731	730	693	692	688	741	713	756	729	711	734	742
13-14	737	749	754	742	731	709	648	711	671	712	694	731	716	700	720	728
14-15	726	742	748	722	708	656	694	684	699	702	722	729	711	685	718	730
15-16	722	757	742	726	712	676	700	685	702	723	720	761	719	693	723	740
16-17	757	770	776	734	710	753	675	709	695	731	728	771	734	712	732	757
17-18	789	807	790	786	750	722	679	727	736	740	765	797	757	719	763	789
18-19	820	800	825	827	759	693	707	763	815	795	810	814	786	731	816	811
19-20	837	834	825	783	830	698	742	758	808	827	837	835	801	757	811	836
20-21	848	852	854	838	830	771	775	800	866	853	868	858	834	794	853	856
21-22	855	859	866	876	865	832	831	848	909	878	876	875	864	844	882	866
22-23	863	858	866	880	876	832	869	843	923	892	878	871	871	855	890	868
23-24	883	868	870	895	888	877	914	880	894	864	895	866	883	890	881	878
Mean	832	831	830	818	819	810	795	803	835	825	818	824	820	807	827	826

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (All Days)

Table 96 Resolute Bay 58,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	114	120	113	100	97	60	90	119	146	145	157	140	117	91	126	133
1-2	117	119	115	101	101	76	95	119	150	149	156	140	120	98	129	133
2-3	119	121	118	106	103	83	96	117	152	153	159	141	122	100	132	135
3-4	119	123	119	108	111	91	98	120	157	156	161	143	125	105	135	136
4-5	128	126	124	111	117	98	105	125	165	160	165	147	131	111	140	142
5-6	132	130	126	114	121	108	113	130	182	168	173	156	138	118	148	148
6-7	133	135	128	116	128	112	123	137	186	182	181	158	143	125	153	152
7-8	136	134	128	118	131	115	129	141	183	178	175	163	144	129	152	152
8-9	143	151	132	120	130	118	127	143	183	179	178	168	148	130	154	160
9-10	149	145	130	122	130	115	128	146	181	176	179	161	147	130	152	159
10-11	147	138	130	120	133	110	125	145	183	175	180	160	145	128	152	156
11-12	141	134	131	119	133	114	120	145	179	175	178	160	144	128	151	153
12-13	137	135	129	119	129	110	122	148	177	170	181	162	143	127	149	154
13-14	134	133	128	118	128	101	115	151	177	169	184	164	142	124	148	154
14-15	136	130	126	116	118	89	120	152	173	161	179	167	139	120	144	153
15-16	137	126	122	126	110	62	111	144	170	151	176	161	133	107	142	150
16-17	129	117	114	128	110	69	119	140	162	142	171	156	130	110	137	143
17-18	124	108	107	120	99	50	104	157	156	143	171	155	125	103	132	140
18-19	120	106	110	101	105	43	71	152	161	145	172	150	120	93	129	137
19-20	119	111	104	100	102	34	82	137	151	140	167	146	116	89	123	136
20-21	120	113	102	90	87	46	78	133	145	146	162	143	114	86	121	135
21-22	117	114	108	95	86	45	87	139	135	144	159	140	114	89	121	132
22-23	117	114	110	101	86	22	76	146	130	143	157	139	112	83	121	132
23-24	115	117	114	103	93	48	88	129	147	146	155	139	116	90	127	131
Mean	128	125	119	111	112	80	105	138	164	158	170	152	130	109	138	144

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Quiet Days)

Table 97 Resolute Bay 58,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	119	112	118	120	100	83	100	127	134	148	155	139	121	102	130	131
1-2	121	115	118	116	104	94	95	122	134	148	154	140	122	104	129	133
2-3	120	117	122	115	106	105	97	120	134	148	155	139	123	107	130	133
3-4	118	123	122	116	110	108	106	121	133	148	156	142	125	111	130	135
4-5	117	122	122	114	116	108	106	120	136	149	155	142	126	113	130	134
5-6	120	120	121	114	119	106	110	118	138	152	155	143	126	113	131	134
6-7	122	121	121	116	122	106	109	117	140	153	157	143	127	113	132	136
7-8	120	121	122	114	119	115	108	120	141	151	158	143	128	116	132	136
8-9	122	121	122	113	119	112	108	125	143	152	159	147	129	116	133	137
9-10	122	124	123	109	120	103	111	128	145	153	158	151	129	116	132	139
10-11	121	123	122	110	119	99	113	129	146	151	156	156	129	115	132	139
11-12	120	123	122	108	120	102	105	129	147	150	155	151	128	114	132	137
12-13	121	123	122	108	123	107	104	137	146	148	154	151	129	118	131	137
13-14	118	121	119	112	126	102	96	137	142	144	155	148	127	115	129	136
14-15	117	120	114	107	114	108	100	133	135	141	156	147	124	114	124	135
15-16	116	109	104	108	103	116	76	134	132	132	156	147	119	107	119	132
16-17	115	104	88	85	100	106	57	152	126	122	157	145	110	104	95	130
17-18	114	96	80	67	109	80	35	173	132	113	159	145	108	99	98	128
18-19	114	93	85	60	115	61	36	196	136	116	166	145	110	102	99	129
19-20	114	104	89	64	92	58	43	191	138	123	163	142	110	96	103	131
20-21	111	105	85	59	105	83	64	174	120	138	157	140	112	107	101	128
21-22	115	113	89	70	119	80	71	169	123	140	154	140	115	110	105	130
22-23	115	113	104	90	133	56	85	156	127	135	154	139	117	107	114	130
23-24	114	113	111	104	127	75	82	136	133	137	153	137	118	105	121	129
Mean	118	115	110	100	114	95	88	140	136	141	157	144	121	109	121	133

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (Disturbed Days)

Table 98 Resolute Bay 58,000 γ + 1963

U.T.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Summer	Equinox	Winter
0-1	107	124	121	99	96	71	39	99	179	152	165	143	116	76	138	135
1-2	114	122	129	95	93	73	56	108	196	164	166	142	121	82	146	136
2-3	117	125	136	105	91	63	83	117	194	177	181	144	128	89	153	142
3-4	118	130	134	109	116	70	88	121	210	179	188	152	135	99	158	147
4-5	171	150	156	118	118	92	97	140	206	188	185	168	149	112	167	168
5-6	168	169	165	125	134	110	108	137	264	212	200	194	166	122	192	183
6-7	161	191	163	117	145	123	122	146	263	271	255	195	179	134	203	200
7-8	175	176	161	116	150	123	135	161	241	241	228	201	176	142	190	195
8-9	170	253	176	129	148	150	130	159	266	239	223	223	189	147	203	217
9-10	231	216	160	127	153	136	129	165	242	228	207	184	182	146	189	210
10-11	226	173	156	119	155	118	123	162	244	223	228	179	176	140	186	202
11-12	200	162	159	117	145	106	108	169	216	212	231	179	167	132	176	193
12-13	185	161	158	114	138	109	112	171	210	204	239	185	166	133	172	193
13-14	173	157	150	112	129	90	111	140	199	213	256	193	160	118	168	195
14-15	185	143	145	106	91	44	99	112	172	209	234	195	145	87	158	189
15-16	194	142	139	107	70	-5	121	86	154	190	206	181	132	68	147	181
16-17	159	118	138	126	53	49	108	56	132	187	194	168	124	66	146	160
17-18	148	100	130	135	8	-16	114	24	132	186	180	158	108	32	146	146
18-19	137	91	127	96	36	24	76	75	176	192	175	151	113	53	148	138
19-20	133	100	109	61	50	-17	84	56	176	180	167	147	104	43	132	137
20-21	137	107	116	58	2	41	32	58	198	185	169	141	104	33	139	139
21-22	126	113	131	89	18	12	70	77	184	190	174	143	111	44	149	139
22-23	120	112	135	85	70	-26	23	135	143	175	169	146	107	50	134	137
23-24	114	114	134	81	70	75	42	127	163	177	160	144	117	79	139	133
Mean	157	144	143	106	95	67	92	117	198	199	199	169	141	93	162	167

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 99 Resolute Bay 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	101	82	111	123	134	183	144	100	114	110	105	112
2	105	106	123	112	147	190	137	105	103	109	101	109
3	105	95	115	125	115	160	139	92	105	119	118	101
4	94	97	115	112	137	140	100	116	98	118	106	90
5	111	100	107	124	145	127	85	110	103	111	113	100
6	102	103	103	129	133	92	127	136	109	111	105	100
7	99	101	96	130	124	121	118	126	106	105	88	115
8	103	107	108	124	118	112	113	120	128	117	101	115
9	101	95	107	134	135	---	115	117	112	109	85	128
10	103	106	91	125	100	---	125	131	109	105	100	118
11	93	102	107	113	112	146	116	119	108	114	110	118
12	99	100	115	116	114	124	109	125	121	97	115	119
13	95	97	114	116	117	151	130	104	107	103	113	113
14	80	104	111	108	117	163	116	126	138	116	118	104
15	102	106	113	147	118	161	142	96	99	108	115	116
16	78	101	115	110	113	159	183	89	117	120	117	108
17	98	109	101	123	148	159	181	108	152	120	105	112
18	89	107	117	110	135	---	148	175	114	116	112	115
19	84	109	116	158	127	148	109	79	126	123	114	105
20	103	99	129	126	160	125	139	174	114	101	114	107
21	96	100	124	133	117	133	201	141	108	129	109	106
22	96	112	115	120	140	122	179	114	86	111	104	98
23	97	110	118	145	129	115	142	159	143	94	117	113
24	86	111	111	110	134	132	168	124	67	121	90	113
25	95	112	118	110	84	149	162	103	108	102	129	131
26	101	111	114	102	102	159	148	105	106	108	119	127
27	107	109	122	137	120	167	145	95	86	110	117	133
28	107	111	116	134	176	149	137	109	101	92	118	120
29	93		124	130	182	134	144	109	115	58	113	118
30	101		128	119	167	139	132	105	115	139	116	121
31	103		121		151		105	118		106		129
Mean	98	104	114	124	131	143	137	117	111	110	110	114

MEAN VALUES OF MAGNETIC ELEMENTS

WEST COMPONENT OF HORIZONTAL INTENSITY (gammas)

Table 100 Resolute Bay 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	829	816	838	857	797	809	822	825	813	820	826	825
2	830	830	834	817	819	784	805	830	819	821	820	820
3	827	827	824	824	820	807	814	837	819	820	836	827
4	818	833	826	817	826	820	810	797	823	823	826	828
5	820	820	826	837	820	809	855	828	829	811	826	831
6	828	829	824	809	821	801	836	818	817	821	813	823
7	825	828	836	828	807	842	838	834	819	823	811	810
8	831	830	816	824	823	823	822	807	826	822	838	832
9	824	829	830	821	827	---	835	840	823	826	814	797
10	833	825	825	821	822	---	816	803	826	814	823	808
11	830	829	840	829	828	805	832	814	806	805	826	811
12	835	843	816	820	817	802	820	828	833	803	813	804
13	833	819	808	803	827	822	822	839	827	839	817	831
14	819	838	825	819	840	771	827	839	793	804	829	809
15	847	819	834	829	812	812	807	797	797	827	819	819
16	843	820	824	833	833	788	769	825	808	810	823	819
17	834	832	820	827	805	793	817	827	820	821	802	823
18	844	827	821	815	801	---	792	808	797	814	825	823
19	827	830	824	816	779	804	823	789	787	812	823	825
20	833	826	829	806	819	836	811	803	802	819	825	810
21	832	820	825	800	802	831	746	815	798	826	817	822
22	832	830	818	807	814	829	791	807	891	826	816	804
23	840	826	807	843	821	820	783	816	822	827	826	809
24	832	834	813	822	821	812	802	808	819	846	810	806
25	833	834	820	827	826	793	798	826	840	836	825	797
26	838	829	814	830	842	814	806	825	826	821	822	804
27	835	833	814	822	835	791	824	805	830	819	825	804
28	834	836	825	804	806	788	829	797	827	811	830	804
29	831		830	822	828	796	784	820	817	815	822	788
30	832		831	807	821	804	814	808	834	856	816	802
31	830		831		785		831	816		831		805
Mean	831	828	824	821	817	808	812	817	820	822	821	814

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY (gammas)

Table 101 Resolute Bay 58,000 γ + 1963

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	141	155	129	126	85	60	86	178	163	142	200	149
2	132	127	119	98	89	48	98	145	132	132	175	146
3	129	129	125	108	138	73	77	162	161	127	188	181
4	130	132	134	72	126	102	137	166	156	151	178	163
5	138	129	132	95	99	100	122	165	139	142	162	166
6	121	134	113	103	97	92	168	117	136	128	172	176
7	123	128	117	95	111	149	164	137	125	136	194	168
8	121	123	140	101	124	153	139	131	150	149	228	166
9	109	119	133	103	127	---	143	158	161	130	209	162
10	108	159	156	106	158	---	136	98	147	120	196	146
11	106	147	155	111	174	62	140	107	132	148	188	147
12	110	132	135	131	133	109	135	141	168	168	187	140
13	118	144	127	154	115	63	108	148	131	157	170	141
14	140	137	113	166	146	53	111	138	167	191	165	157
15	161	140	128	128	127	60	98	123	134	163	155	150
16	151	117	117	125	133	48	-14	167	142	187	155	148
17	141	117	131	123	108	71	133	126	201	153	182	137
18	132	109	144	132	96	---	86	70	170	138	159	140
19	156	107	120	38	74	42	140	111	165	145	155	142
20	129	109	107	125	61	127	50	115	172	148	152	160
21	107	118	114	89	120	93	57	125	133	136	152	146
22	109	112	106	87	106	111	78	115	241	152	146	158
23	107	113	94	134	128	112	36	122	198	160	146	152
24	118	110	94	118	108	89	62	115	198	206	169	152
25	120	112	111	130	161	31	71	130	198	180	176	150
26	117	115	115	133	126	38	111	159	169	181	154	150
27	113	108	97	143	129	52	104	160	170	153	146	144
28	113	117	101	76	58	47	119	163	188	146	143	139
29	114		106	95	59	67	57	183	187	187	136	155
30	164		95	93	82	109	141	148	179	242	157	149
31	203		102		71		164	160		201		145
Mean	128	125	119	111	112	80	105	138	164	158	170	152

Table 102 Resolute Bay R_y (Hourly Ranges in 10γ units) January 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	1	1	2	1	2	2	1	1	2	2	1	2	2	3	3	3	3	2	2	1	1	1	1	2
2	1	0	1	1	1	1	0	0	0	0	1	1	1	1	1	2	3	2	1	2	1	0	0	1	1
3	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	2	3	2	1	1	1	1	1
4	2	2	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	2	4	1	1	1	1	2
5	1	1	0	0	0	1	1	2	6	2	2	1	3	3	1	2	3	2	2	2	1	1	0	1	2
6	1	1	2	1	0	0	0	1	0	1	0	1	0	0	2	2	1	2	1	1	1	1	1	1	1
7	1	4	3	2	1	3	2	2	1	1	0	1	1	3	2	5	4	2	2	2	1	1	1	1	2
8	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1
9	1	0	1	0	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	1
10	1	2	1	2	2	1	1	1	1	1	1	1	2	2	2	3	2	2	2	2	0	0	0	1	1
11	1	0	0	0	1	1	1	1	1	1	0	0	1	2	3	3	4	2	4	3	3	2	3	2	2
12	0	1	0	1	2	2	2	1	0	1	1	1	1	1	1	2	4	3	5	3	2	2	3	5	2
13	7	9	7	7	12	6	5	4	5	5	13	16	7	6	2	6	7	6	4	4	5	3	6	5	7
14	8	8	4	7	3	3	8	3	8	2	13	10	9	6	12	18	6	7	6	7	5	3	3	6	7
15	7	5	6	13	14	4	8	25	9	13	5	4	7	6	5	10	12	7	9	6	3	3	3	5	8
16	10	8	10	4	4	4	2	7	42	7	4	6	7	6	5	7	10	7	7	5	6	4	4	8	8
17	6	5	4	2	4	11	3	7	9	3	6	5	4	2	2	9	10	8	3	8	3	1	2	5	5
18	5	4	3	3	6	4	3	2	4	5	4	4	2	6	3	10	8	3	6	4	3	4	4	12	5
19	10	3	5	3	3	7	5	4	8	5	4	4	5	2	10	4	6	7	4	2	4	4	3	4	5
20	5	2	1	2	1	2	2	1	3	2	4	2	5	3	3	2	3	1	4	2	2	1	1	1	2
21	1	1	1	1	2	2	2	1	2	3	2	1	2	0	2	2	2	4	4	2	2	1	1	2	2
22	1	1	1	1	1	1	2	2	2	3	2	1	1	2	2	2	2	2	4	3	3	0	3	4	2
23	4	2	4	4	2	2	1	2	2	2	2	2	5	4	3	1	8	6	6	4	3	2	2	3	3
24	3	2	2	2	4	2	1	5	4	3	8	3	3	3	5	3	9	8	8	4	2	4	5	2	4
25	2	1	2	4	3	2	1	2	1	3	2	2	2	2	4	4	3	3	4	2	2	1	2	1	2
26	1	1	1	1	1	0	1	1	3	3	1	1	1	1	1	1	2	2	2	3	3	1	1	1	1
27	1	0	1	1	0	1	1	1	2	1	0	1	2	1	1	1	3	2	2	1	1	0	1	1	1
28	2	0	1	1	0	1	1	1	1	1	1	0	1	0	1	1	2	0	0	0	0	1	0	0	1
29	1	0	0	0	0	0	0	0	1	1	0	2	2	2	1	4	4	7	6	2	3	2	2	2	2
30	5	3	5	2	7	3	7	4	3	8	5	5	6	2	3	7	6	4	4	8	4	4	4	7	5
31	7	3	7	5	6	4	4	4	7	5	6	2	6	20	7	12	3	7	5	6	2	2	2	6	6
Mean	3	2	3	2	3	2	2	3	4	3	3	3	3	3	3	4	4	4	4	3	2	2	2	3	3

Table 103 Resolute Bay R_y (Hourly Ranges in 10 γ units) February 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	1	1	1	1	1	1	1	1	1	5	7	3	7	5	7	4	3	5	4	3	6	2	3	2	3
2	1	2	2	2	1	2	1	1	1	0	1	1	1	1	1	1	2	2	3	1	2	1	1	0	1
3	1	1	2	2	1	2	1	1	1	1	1	1	1	2	1	3	2	2	3	1	2	1	1	2	1
4	1	1	0	0	1	0	0	1	0	0	0	0	0	1	2	3	3	3	3	3	4	1	2	1	1
5	1	1	1	1	0	0	1	1	1	1	2	5	4	2	2	4	3	4	4	3	3	2	1	1	2
6	1	1	3	2	2	2	1	1	1	1	1	1	1	2	2	5	7	5	4	2	2	1	1	1	2
7	1	1	1	0	1	1	1	0	1	3	2	2	1	1	1	3	3	3	3	1	2	3	2	3	2
8	1	1	0	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	2	1
9	1	0	0	0	1	1	1	1	0	1	1	1	1	1	2	2	1	5	7	3	3	4	7	6	2
10	4	6	3	4	8	7	5	9	6	8	8	7	6	10	9	12	13	8	11	8	7	7	4	5	7
11	10	7	4	5	7	9	12	9	4	6	4	7	6	4	10	9	10	14	18	8	9	9	3	5	8
12	10	12	11	9	6	7	6	7	21	11	6	4	3	6	5	12	8	12	14	15	6	9	8	9	9
13	5	9	6	4	6	5	7	10	6	4	5	5	6	9	10	6	11	7	11	11	9	6	7	5	7
14	8	4	5	5	8	5	3	3	34	7	3	4	7	6	8	5	8	4	11	10	6	2	3	8	7
15	3	5	3	2	3	3	2	2	2	5	5	5	3	7	10	5	5	11	10	7	3	1	1	1	4
16	5	1	2	1	2	2	1	1	1	1	4	3	4	3	4	3	4	5	6	4	3	2	2	1	3
17	1	1	1	1	1	2	1	1	2	2	4	2	2	1	1	3	3	7	4	4	1	2	1	1	2
18	1	1	2	1	1	1	1	1	1	1	2	2	1	2	3	2	4	2	4	3	2	1	1	2	2
19	2	1	1	1	1	0	1	1	1	1	1	1	2	2	1	1	3	1	2	2	1	3	1	0	1
20	1	1	2	2	1	2	2	2	2	2	4	3	4	4	3	5	4	4	3	4	4	2	4	4	3
21	4	2	3	1	1	1	1	1	2	1	1	2	1	3	3	5	4	3	3	5	4	2	3	2	2
22	2	3	1	2	3	2	1	2	3	2	2	2	2	2	3	2	4	5	8	8	5	2	2	3	3
23	1	1	1	1	1	1	3	4	1	1	1	5	5	3	2	5	7	5	2	6	4	5	1	2	3
24	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	3	2	8	3	3	3	3	3	2
25	3	4	4	3	2	2	1	0	1	2	3	2	2	2	3	4	2	5	2	5	4	3	1	2	3
26	2	1	1	1	1	2	2	2	2	2	1	2	4	2	3	3	5	1	3	6	2	1	1	1	2
27	1	4	1	1	1	0	0	1	1	1	1	1	1	1	2	1	3	2	4	2	1	1	1	1	1
28	2	2	1	3	1	1	2	1	4	5	2	1	2	4	7	2	2	3	2	2	2	3	2	2	2
29																									
30																									
31																									
Mean	3	3	2	2	2	2	2	2	4	3	3	3	3	3	4	4	5	5	6	5	4	3	2	3	3

Table 104 Resolute Bay — R_y (Hourly Ranges in 10 γ units) — March 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	2	3	3	5	4	4	5	4	2	1	3	3	4	4	6	7	3	8	4	2	2	2	2	4
2	2	2	2	2	1	1	3	1	2	1	3	3	4	3	7	3	4	5	3	7	4	2	2	2	3
3	2	1	1	2	2	2	3	2	4	2	1	2	3	3	4	2	2	3	4	4	2	3	2	2	2
4	4	2	2	1	2	1	1	1	2	3	2	1	1	2	2	2	3	3	3	2	2	2	1	1	2
5	2	1	0	1	2	2	0	1	1	2	1	2	2	1	2	3	2	2	3	3	3	2	2	3	2
6	2	3	2	1	1	4	5	0	1	1	1	1	2	1	2	4	4	4	4	3	3	2	3	3	2
7	2	2	2	1	1	2	2	1	1	1	0	0	0	1	1	1	1	1	4	14	9	3	9	10	3
8	11	7	4	7	2	3	2	4	6	2	5	12	10	9	9	7	15	16	10	7	8	6	4	4	7
9	6	4	4	4	14	9	2	2	4	4	4	5	6	12	9	9	7	8	17	11	8	11	4	7	7
10	6	10	8	3	7	5	6	7	13	5	4	7	3	7	8	14	12	12	14	18	8	9	8	13	9
11	6	11	7	8	5	4	2	2	3	4	2	1	3	2	4	8	9	12	14	9	11	5	7	5	6
12	6	6	6	3	4	4	2	5	9	3	6	5	7	3	3	9	12	8	14	7	4	2	3	2	6
13	2	2	2	1	1	1	2	2	2	3	4	2	4	4	12	18	6	11	12	9	6	2	2	2	5
14	2	3	1	0	0	1	1	0	0	0	1	1	1	1	2	1	1	4	3	6	2	1	1	1	2
15	1	2	2	2	2	2	1	1	1	2	1	0	0	1	1	1	2	2	2	2	1	2	1	3	2
16	2	1	1	1	0	0	1	1	1	2	1	0	0	2	2	2	3	5	2	4	5	1	2	2	2
17	2	2	0	1	0	0	0	1	1	1	1	1	2	1	3	2	5	6	2	3	4	2	4	3	2
18	2	3	1	3	4	1	1	1	2	2	1	1	1	6	4	3	3	14	6	3	3	5	3	5	3
19	3	2	2	5	2	2	5	3	1	1	1	1	1	2	2	3	2	4	2	6	1	2	4	3	2
20	2	2	3	2	2	1	1	1	1	1	2	1	1	1	2	4	2	2	4	7	12	5	5	6	3
21	4	1	2	2	4	2	2	2	2	1	1	1	1	1	1	3	3	3	3	3	2	2	1	1	2
22	1	0	0	0	0	0	0	0	0	2	1	1	1	2	2	2	4	5	6	6	4	2	1	1	2
23	2	6	4	1	1	2	2	2	2	2	14	13	4	6	8	6	11	10	9	12	9	3	2	2	6
24	1	3	2	1	1	1	1	0	1	1	2	3	4	2	4	4	4	8	2	5	5	3	2	3	2
25	2	1	0	1	1	1	1	0	1	1	2	1	1	2	2	2	4	3	6	12	6	2	1	2	2
26	1	1	0	1	0	0	0	0	0	1	1	1	1	1	3	2	3	6	6	4	5	1	1	1	2
27	2	2	2	1	0	0	0	1	1	1	1	2	1	2	1	1	1	4	4	6	2	1	1	1	2
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	2	3	7	7	3	4	3	2
29	2	2	3	3	2	1	1	1	1	2	2	3	3	2	3	2	4	6	8	4	4	2	2	1	3
30	2	3	1	1	2	1	1	1	1	1	3	3	1	1	1	2	2	1	2	5	3	4	1	1	2
31	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	4	3	4	3	3	6	4	2
Mean	3	3	2	2	2	2	2	2	2	2	2	3	2	3	4	4	5	6	6	6	5	3	3	3	3

Table 105 Resolute Bay R_y (Hourly Ranges in 10 γ units) April 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	4	3	3	5	6	7	4	3	2	1	1	3	3	2	5	8	5	4	6	3	3	2	2	4
2	2	4	3	1	1	1	1	1	1	1	1	1	1	2	2	2	6	5	2	4	4	2	2	6	2
3	4	2	1	2	2	2	1	1	5	3	1	1	1	1	1	4	1	5	3	4	1	1	1	2	2
4	1	1	1	1	1	1	1	2	3	2	4	5	2	6	6	15	19	11	13	18	10	11	14	16	7
5	22	14	5	7	14	11	10	5	8	4	6	4	6	6	6	8	6	15	20	10	8	4	5	9	9
6	6	5	6	4	4	6	2	4	8	6	5	6	8	4	6	9	7	15	11	10	11	8	4	6	7
7	6	3	3	5	1	4	5	6	4	9	3	6	4	4	7	9	6	10	11	14	14	7	4	6	6
8	2	4	2	4	3	2	2	1	2	4	2	6	6	1	2	2	7	8	5	16	5	4	5	4	4
9	2	1	2	4	5	4	2	5	4	4	3	4	3	3	4	6	2	5	9	8	14	5	2	1	4
10	2	1	1	1	1	1	0	1	1	2	1	2	2	1	2	1	2	4	6	9	5	2	2	1	2
11	1	1	1	1	1	1	1	1	2	2	4	2	1	1	1	2	2	6	2	11	4	2	2	2	2
12	5	5	1	3	1	1	1	2	1	4	5	2	2	7	3	3	10	12	6	4	4	4	2	2	4
13	2	1	3	3	3	1	1	1	4	5	4	4	2	4	6	4	8	11	7	6	7	8	6	4	4
14	10	5	4	3	2	4	2	2	2	10	5	5	8	5	4	12	21	6	25	14	5	6	5	9	7
15	4	4	7	5	3	2	10	6	2	3	2	6	4	4	5	6	4	4	8	4	6	2	3	6	4
16	2	2	2	5	2	4	5	1	3	5	2	4	4	2	2	8	6	8	11	5	3	3	4	5	4
17	1	4	5	1	4	2	2	2	2	4	4	3	2	2	1	2	5	2	5	9	3	3	4	1	3
18	1	2	1	1	2	1	1	1	4	5	4	1	3	4	4	13	11	7	11	20	12	3	5	8	5
19	7	4	5	3	4	5	3	5	6	4	3	2	1	4	3	8	12	7	17	12	7	10	10	4	6
20	11	4	3	4	2	2	2	3	2	5	3	3	4	5	5	9	9	6	7	3	4	4	1	1	4
21	1	1	1	1	1	1	1	1	1	1	2	2	6	2	2	1	5	5	3	6	5	2	4	5	2
22	4	12	11	5	2	1	1	2	2	2	3	3	4	1	3	3	5	3	6	10	10	7	4	4	4
23	4	6	3	3	2	3	4	2	3	4	5	4	2	4	4	3	8	8	14	4	10	4	2	1	4
24	1	1	1	1	1	1	1	1	1	2	2	1	2	1	2	2	5	6	6	2	2	2	1	1	2
25	1	2	2	2	3	4	1	2	2	1	1	1	1	1	1	1	6	12	3	2	4	2	3	4	3
26	2	1	2	8	6	3	2	1	1	2	1	3	1	1	1	4	4	6	8	5	5	4	5	5	3
27	4	2	5	1	2	3	2	4	2	2	2	3	5	4	2	15	11	10	9	16	3	3	2	4	5
28	3	1	1	1	1	2	1	1	1	1	1	2	1	4	2	2	3	5	4	4	10	5	1	2	3
29	2	1	1	4	2	2	2	1	1	1	1	2	2	2	2	4	1	3	3	8	5	3	2	2	2
30	1	1	3	1	1	1	1	1	2	4	2	3	3	4	3	8	15	11	42	24	26	15	16	17	9
31																									
Mean	4	3	3	3	3	3	3	2	3	3	3	3	3	3	3	6	7	7	9	9	7	5	4	5	4

Table 106 Resolute Bay R_y (Hourly Ranges in 10 γ units) May 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	15	6	15	7	6	7	3	6	4	7	6	10	7	8	6	17	25	20	31	9	16	7	8	10
2	10	11	11	3	3	3	8	3	3	7	6	4	6	9	10	9	10	16	13	18	12	7	22	21	9
3	15	10	16	4	6	3	8	8	7	5	3	4	5	6	7	12	22	25	18	11	9	8	12	8	10
4	10	9	10	3	5	6	6	3	13	16	8	3	6	4	7	11	9	8	7	8	5	10	8	7	8
5	8	6	9	8	13	5	3	7	2	6	3	6	5	3	5	10	12	12	17	20	18	10	3	7	8
6	6	3	7	12	6	7	4	6	4	3	3	6	2	5	6	8	7	12	14	7	7	8	3	3	6
7	4	1	2	2	2	3	3	5	2	5	8	2	6	4	3	3	3	8	12	12	7	3	4	4	4
8	11	10	7	6	2	2	3	2	8	3	4	4	2	5	7	13	8	9	9	6	8	7	5	6	6
9	6	4	4	5	3	5	3	3	3	8	5	3	5	6	6	12	13	10	27	30	7	8	5	6	8
10	3	6	4	7	3	3	3	4	4	8	7	6	5	4	8	18	10	22	11	8	8	6	4	6	7
11	8	3	10	6	9	3	2	6	3	5	5	5	10	7	9	8	10	15	14	16	7	9	5	6	8
12	4	3	6	3	1	3	3	4	3	2	4	3	3	8	6	13	10	20	12	8	8	4	2	8	6
13	6	8	8	11	6	8	6	6	5	6	5	6	6	5	5	6	13	10	11	9	10	12	6	10	8
14	6	6	5	5	5	6	10	6	9	7	3	7	3	3	2	4	5	8	15	9	6	10	3	5	6
15	5	4	5	2	1	2	6	2	4	2	4	2	2	2	3	3	6	6	5	5	5	5	3	2	4
16	8	7	7	1	1	2	1	1	1	2	2	2	1	1	1	3	2	4	6	3	5	2	3	2	3
17	3	3	2	2	1	3	6	2	2	1	2	7	4	5	4	3	7	10	20	6	3	3	2	2	4
18	2	2	1	1	2	2	1	2	2	2	2	2	3	4	2	4	7	8	7	14	2	2	1	3	3
19	1	1	1	1	1	1	2	2	1	2	1	2	3	7	2	6	11	4	3	5	9	6	6	7	4
20	3	5	5	6	7	2	2	2	1	2	2	2	1	3	3	2	7	6	6	14	9	5	3	1	4
21	3	3	1	2	2	2	1	1	1	1	2	1	3	6	3	3	13	8	8	7	6	3	2	3	4
22	1	1	1	1	2	1	1	1	2	2	1	2	5	3	2	3	3	7	8	4	6	4	2	1	3
23	1	1	1	1	1	1	1	3	1	1	2	3	2	2	2	3	5	6	9	5	2	2	1	2	2
24	2	1	2	1	1	1	2	2	2	2	1	1	1	3	2	3	6	5	9	3	7	2	1	1	3
25	1	5	1	1	2	2	1	3	2	2	5	5	7	8	16	13	6	9	29	23	7	12	3	5	7
26	5	2	2	4	3	2	3	1	1	3	2	4	2	2	3	3	12	26	13	25	9	4	5	4	6
27	3	3	3	2	3	3	1	2	5	2	2	3	4	4	2	8	5	8	15	17	24	19	18	9	7
28	8	8	12	11	13	8	4	9	8	5	8	8	4	3	6	5	16	15	16	26	27	28	23	7	12
29	11	10	26	18	18	8	5	5	4	7	6	3	7	5	8	8	11	37	53	22	33	29	6	4	14
30	3	11	7	7	4	3	10	4	5	5	16	9	6	3	2	6	12	6	11	12	22	15	5	3	8
31	3	1	1	1	1	3	3	3	3	7	6	6	14	7	6	10	9	16	15	15	11	9	6	5	7
Mean	5	5	6	5	4	4	4	4	4	4	4	4	5	5	5	7	9	12	14	13	10	9	6	5	6

Table 107 Resolute Bay R_y (Hourly Ranges in 10 γ units) June 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	4	7	6	2	6	8	4	2	3	7	3	4	5	8	3	6	17	19	19	30	12	9	7	4	8
2	8	7	8	3	5	7	3	6	3	4	3	5	8	3	1	7	18	9	19	23	23	10	9	8	8
3	6	9	7	6	4	4	5	4	6	11	5	12	6	3	5	4	3	11	12	20	8	8	3	10	7
4	6	2	2	2	1	2	3	4	3	3	2	2	3	5	6	5	2	7	8	15	5	5	4	2	4
5	2	3	1	1	2	3	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	2	2	1	2
6	3	1	1	1	2	1	1	1	4	2	1	1	1	5	2	3	3	17	23	9	12	10	13	13	6
7	12	10	12	14	5	6	11	6	5	10	6	7	10	8	13	11	7	14	19	17	23	11	11	5	11
8	7	7	7	3	5	3	4	2	3	6	3	6	6	7	6	11	15	17	25	10	21	9	17	8	9
9 *	7	6	4	7	5	7	3	7	6					5			6	17	15	10	13	4	2	4	
10 *													3	3	5	10	9	8	5	9	11	5	6	5	
11	6	3	3	6	9	6	8	3	6	3	4	4	3	8	3	12	9	16	6	4	10	8	3	2	6
12	3	7	6	3	3	2	3	2	2	3	5	4	1	1	1	2	9	3	8	14	5	3	4	3	4
13	2	3	6	3	3	2	2	2	3	2	2	3	3	6	2	3	13	24	10	20	24	19	18	11	8
14	6	2	3	4	2	2	2	5	2	4	5	5	3	3	10	12	21	12	6	2	8	9	2	6	6
15	3	5	3	7	4	4	8	5	3	2	2	4	2	2	3	2	5	3	9	4	4	6	3	2	4
16	2	2	4	1	1	1	1	1	2	2	2	2	1	2	1	6	3	2	5	8	18	12	5	9	4
17	6	9	2	4	3	2	3	2	3	6	5	7	7	8	4	3	4	3	6	9	4	11	4	3	5
18 *	3	3	8	3	5	8	5	6	4	2	6	17	25	12								11		4	
19	5	4	3	4	8	3	5	2	1	2	3	1	2	3	6	4	11	8	9	8	13	7	5	4	5
20	10	6	11	6	5	3	4	3	3	5	6	9	5	2	11	11	8	7	9	11	4	8	6	6	7
21	5	3	1	2	6	2	3	1	3	6	3	5	5	2	1	4	15	10	17	12	5	3	4	5	5
22	4	5	3	3	3	3	3	2	4	2	3	3	4	3	2	2	3	5	7	6	8	7	3	3	4
23	4	4	2	2	1	3	2	2	5	3	5	2	2	2	1	2	3	11	11	8	5	5	5	2	4
24	3	2	2	1	1	3	3	3	2	2	5	1	8	2	9	3	4	6	19	7	8	4	3	2	4
25	3	5	6	11	10	6	8	10	3	5	5	7	6	18	13	21	28	14	31	14	15	17	19	8	12
26	10	25	17	15	9	11	4	12	8	9	6	3	5	5	8	6	6	16	31	13	23	21	12	11	12
27	8	12	10	9	15	7	4	6	6	4	10	9	6	4	7	9	9	16	16	12	20	9	6	13	9
28	7	3	4	3	9	6	5	7	14	8	6	6	6	4	8	6	6	15	21	25	26	22	7	4	9
29	5	6	3	4	3	2	3	3	3	4	5	3	6	5	6	10	12	11	17	19	13	7	6	4	7
30	11	8	5	4	8	5	6	6	4	3	6	8	8	9	7	12	14	20	6	8	14	6	4	4	8
31																									
Mean	6	6	5	5	5	4	4	4	4	4	4	5	4	5	5	7	9	11	14	12	12	9	7	6	7

*Not used in means.

Table 108 Resolute Bay — R_y (Fourly Ranges in 10 γ units) — July 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	5	6	11	12	4	5	3	2	1	2	2	3	1	3	2	4	3	4	11	5	6	2	1	1	4
2	2	1	1	1	1	1	2	3	3	2	3	2	3	2	4	3	7	15	11	8	1	1	3	2	4
3	4	3	2	1	2	2	1	1	2	1	4	1	3	2	2	1	1	1	8	8	7	7	2	1	3
4	1	1	1	1	5	4	3	3	7	2	4	4	11	6	9	23	15	13	23	12	9	11	7	8	8
5	15	11	8	4	9	6	8	22	8	4	4	5	5	4	4	5	9	28	21	22	46	8	6	7	11
6	7	5	6	8	12	8	6	8	3	3	7	4	6	4	8	9	8	14	29	15	9	11	5	4	8
7	6	5	6	6	3	2	4	2	4	4	6	3	4	5	9	19	17	18	12	23	29	8	5	6	9
8	7	11	6	6	3	4	3	11	6	3	3	3	5	7	7	6	11	11	8	27	10	9	7	7	8
9	6	7	8	14	17	5	7	3	9	5	3	3	7	8	11	6	17	19	31	22	9	9	5	5	10
10	5	3	4	8	5	6	4	5	4	3	2	4	3	4	9	8	18	15	18	17	12	11	6	9	8
11	8	7	4	5	3	3	8	6	3	3	4	2	2	1	3	3	6	7	5	7	11	3	6	3	5
12	5	2	1	2	2	3	3	1	2	1	3	2	2	3	2	4	5	11	20	8	5	4	2	3	4
13	6	3	2	2	2	1	1	2	2	2	5	3	3	1	2	4	3	4	5	11	6	2	1	2	3
14	4	1	2	1	1	1	1	1	1	2	1	1	3	3	7	12	5	3	7	6	7	6	3	1	3
15	1	1	1	1	1	1	1	2	1	2	2	2	7	2	2	3	1	3	5	7	8	7	4	2	3
16	4	2	7	4	5	3	3	3	4	3	7	2	5	6	3	3	7	6	4	3	7	15	14	2	5
17	2	3	3	6	2	3	6	2	3	3	3	7	8	4	3	6	6	26	7	5	9	4	1	3	5
18	2	3	3	3	3	6	5	1	4	9	6	2	5	16	13	10	7	8	11	16	11	6	9	7	7
19	2	3	3	6	2	2	4	3	1	3	4	6	2	2	5	3	5	15	6	12	7	6	4	8	5
20	4	2	1	2	4	4	2	2	3	1	3	4	7	3	4	3	12	16	9	35	7	15	6	3	6
21	3	3	4	1	5	8	6	8	8	4	6	5	15	13	7	17	16	15	8	10	7	11	3	4	8
22	4	3	3	3	3	6	4	3	8	6	3	4	8	3	14	9	4	4	31	21	18	8	5	5	8
23	5	4	6	3	3	6	8	4	6	3	6	6	8	6	15	10	9	7	13	15	10	27	7	19	8
24	10	24	9	11	8	9	8	4	6	7	6	7	22	10	10	6	4	8	20	20	19	23	11	9	11
25	8	6	6	4	7	8	4	12	5	3	4	6	6	6	2	12	7	12	12	22	10	10	4	7	7
26	8	10	4	5	6	3	4	14	7	5	4	8	5	11	7	6	9	13	16	10	13	8	8	11	8
27	15	16	12	9	7	5	7	9	6	5	3	4	4	11	7	12	10	13	14	13	12	10	9	6	9
28	17	9	8	4	4	3	3	2	3	7	3	2	1	3	3	3	2	3	9	9	3	9	5	1	5
29	1	1	1	1	1	1	1	2	1	2	2	1	2	4	3	3	3	4	5	3	4	7	9	6	3
30	5	11	6	12	9	7	5	9	3	5	6	3	22	11	14	19	29	32	12	13	19	12	18	7	12
31	15	17	10	6	6	6	3	5	4	5	6	5	16	4	13	8	18	26	14	15	6	7	9	10	10
Mean	6	6	5	5	5	4	4	5	4	4	4	4	7	6	6	8	9	12	13	14	11	9	6	5	7

Table 109 Resolute Bay R_y (Hourly Ranges in 10 γ units) August 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	8	6	10	11	6	7	7	4	3	2	5	7	6	5	15	12	17	21	20	27	21	14	9	11	11
2	10	9	6	6	7	12	9	4	10	6	5	5	6	4	9	8	13	24	18	11	13	12	10	4	9
3	7	7	5	5	7	3	6	4	6	5	4	3	2	2	6	8	10	14	14	8	10	14	5	8	7
4	6	4	6	5	2	2	3	6	2	8	2	8	7	8	5	4	28	9	12	9	9	9	11	13	7
5	4	7	3	2	5	4	3	5	6	3	5	9	4	5	6	5	15	6	6	18	4	7	3	5	6
6	2	3	4	3	4	2	7	2	5	3	6	4	2	4	7	5	7	5	8	16	19	11	3	5	6
7	8	4	6	4	4	6	4	5	3	3	5	2	7	8	3	5	9	3	19	10	5	3	4	4	6
8	7	4	3	6	3	3	5	4	3	4	3	4	3	2	3	3	5	7	4	3	3	3	2	2	4
9	2	3	2	3	3	3	5	3	5	7	5	2	4	2	3	5	5	12	11	14	9	9	2	2	5
10	2	3	2	3	2	2	3	2	2	2	4	7	4	5	6	8	12	4	8	8	6	3	3	2	4
11	2	2	3	2	2	5	3	1	1	1	1	2	2	3	6	3	3	3	4	5	7	4	3	6	3
12	2	2	2	1	2	3	2	2	2	3	3	3	3	2	3	3	4	6	11	6	5	6	3	1	3
13	2	2	3	2	1	1	2	3	1	1	2	1	3	1	3	5	6	6	6	6	3	3	3	4	3
14	3	3	3	2	1	1	1	1	1	1	2	2	2	4	3	2	2	5	5	2	3	4	2	2	2
15	1	1	1	1	1	2	1	1	1	2	2	3	4	9	8	8	18	24	11	7	8	5	7	10	6
16	7	3	2	1	2	2	1	1	1	1	2	4	5	4	4	5	13	11	20	9	6	9	6	7	5
17	5	8	5	1	3	2	3	2	1	2	7	3	2	2	4	3	4	12	12	15	11	10	8	5	5
18	5	4	4	4	5	5	5	4	12	14	13	8	9	13	9	13	17	36	46	35	27	12	11	8	13
19	6	9	3	3	2	3	2	2	3	3	2	4	3	2	6	7	15	5	14	14	7	12	5	9	6
20	7	8	11	18	7	13	7	9	6	12	12	11	23	10	11	5	9	13	22	10	16	13	6	12	11
21	15	4	9	5	9	5	8	8	6	7	5	9	6	4	14	12	24	8	21	13	17	7	6	7	10
22	3	4	3	3	1	4	3	7	9	2	3	4	3	4	2	6	5	5	5	10	13	10	13	5	5
23	5	5	4	7	6	4	3	4	7	4	5	8	7	4	3	7	4	14	11	10	12	2	2	5	6
24	8	11	8	5	2	2	2	3	6	10	3	4	6	2	3	6	5	11	6	9	7	6	1	4	5
25	4	2	3	3	2	3	3	3	4	5	4	3	3	6	6	3	16	10	20	11	7	8	4	6	6
26	5	9	3	5	8	8	4	2	4	5	4	3	6	6	6	5	11	13	15	8	7	7	3	3	6
27	7	2	6	4	2	2	3	2	2	3	3	5	6	6	3	7	27	26	11	9	6	11	5	10	7
28	6	3	3	6	4	5	4	2	4	5	10	6	6	8	5	11	15	14	11	13	14	5	7	8	7
29	5	3	5	6	4	3	2	3	8	4	7	3	4	5	7	6	12	21	18	12	4	8	6	4	7
30	5	7	4	2	4	2	2	3	3	3	6	4	4	6	5	8	14	9	21	14		2	5	6	6
31	5	6	4	3	3	3	5	4	3	5	3	4	5	3	6	7	4	17	7	11	8	7	5	7	6
Mean	5	5	4	4	4	4	4	3	4	4	5	5	5	5	6	6	11	12	13	11	9	8	5	6	6

Table 110 Resolute Bay R_y (Hourly Ranges in 10 γ units) September 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	6	4	5	3	3	2	2	3	12	8	5	4	7	8	6	7	8	9	4	6	4	3	3	2	5
2	4	3	1	2	2	2	1	1	2	2	2	2	1	3	3	6	9	9	11	10	8	8	3	9	4
3	2	6	4	5	4	3	4	2	1	2	5	2	2	4	3	4	6	10	7	9	4	2	3	5	4
4	2	2	2	1	2	1	1	2	3	3	3	2	1	2	4	4	3	3	8	16	10	5	5	5	4
5	8	4	2	1	1	1	1	1	2	3	2	4	5	3	2	11	8	8	5	8	7	3	3	4	4
6	3	5	3	2	1	3	4	2	3	2	2	3	2	2	2	4	4	6	10	6	4	3	4	4	4
7	3	2	1	2	1	1	3	1	2	1	1	2	2	2	1	4	4	3	4	8	2	3	2	6	3
8	4	3	5	2	4	6	5	3	2	1	3	9	6	9	6	6	7	10	9	7	3	3	3	2	5
9	5	3	4	7	4	6	2	2	2	8	4	4	6	9	9	6	16	18	14	12	4	4	4	2	6
10	2	5	4	2	2	1	3	4	4	2	2	5	3	3	5	10	11	7	8	9	8	4	7	6	5
11	3	6	3	3	3	2	2	3	3	6	3	6	5	6	7	13	4	14	8	9	8	5	4	7	6
12	8	7	10	2	4	4	4	4	9	7	3	2	4	3	4	3	8	6	12	6	4	5	1	3	5
13	3	2	3	1	1	1	1	2	1	2	1	1	2	2	2	2	4	3	7	7	8	9	4	13	3
14	12	3	3	3	9	6	5	11	8	17	17	11	27	25	4	6	10	19	10	17	10	19	14	4	11
15	12	7	7	6	6	7	6	10	6	6	5	9	7	16	13	8	11	12	15	10	8	24	7	16	10
16	11	5	9	8	10	8	7	5	9	6	7	15	10	6	4	15	18	15	20	8	10	9	11	10	10
17	16	4	6	13	7	5	17	19	8	6	10	7	13	11	12	12	15	13	5	24	12	5	4	15	11
18	11	10	4	8	4	7	3	5	7	3	6	11	7	7	5	12	9	18	9	6	13	7	4	9	8
19	8	8	5	3	4	6	8	11	6	8	5	15	14	6	6	6	7	10	7	9	6	3	2	3	7
20	3	4	2	4	1	2	3	3	3	9	3	4	3	5	14	10	6	9	6	5	5	3	6	2	5
21	5	5	2	9	7	7	4	3	3	8	5	2	2	2	33	21	8	18	29	34	30	11	19	15	12
22	9	8	11	8	24	11	15	17	8	6	11	10	6	9	5	4	33	26	62	28	30	36	15	29	18
23	15	26	18	35	11	59	21	7	32	9	6	7	10	13	4	6	19	17	26	19	21	14	7	4	17
24	3	5	5	4	3	3	2	2	3	3	3	3	6	2	5	12	5	9	10	5	3	10	9	8	5
25	10	13	16	29	5	6	4	6	10	9	5	4	5	9	8	12	9	12	10	18	9	9	10	5	10
26	5	4	2	9	15	16	6	7	4	2	7	4	5	7	5	13	11	12	13	10	9	7	9	11	8
27	15	12	8	7	5	6	5	4	6	7	6	8	7	7	7	13	16	21	22	21	16	11	14	15	11
28	11	17	8	9	5	9	10	12	8	6	2	5	9	6	5	7	7	11	9	7	12	10	8	9	8
29	6	4	3	6	7	3	5	7	7	6	5	3	10	11	7	8	12	15	9	12	8	5	9	7	7
30	5	13	12	6	3	3	4	2	2	6	5	4	7	7	3	5	6	8	11	5	5	7	3	2	6
31																									
Mean	7	7	6	7	5	7	5	5	6	5	5	6	7	7	6	8	10	12	13	12	9	8	7	8	7

Table 111 Resolute Bay R_y (Hourly Range in 10γ units) October 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	2	3	2	2	1	1	2	3	1	1	1	1	2	4	4	7	4	4	5	2	1	2	2	3
2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	6	3	3	2	1	1	1	2
3	1	1	1	2	2	3	1	1	2	2	2	1	2	3	3	2	3	3	4	7	2	1	1	2	2
4	1	2	4	4	4	2	3	1	4	3	4	1	3	2	4	4	6	3	4	2	3	1	1	2	3
5	2	2	1	1	3	2	1	1	2	9	6	2	2	4	3	3	3	4	3	2	3	1	2	2	3
6	3	2	3	2	3	6	1	1	1	1	1	1	1	2	2	3	3	3	4	6	4	2	1	1	2
7	1	1	1	2	1	1	1	1	2	2	3	2	2	1	3	7	11	6	3	4	6	8	7	6	3
8	6	6	8	10	4	6	6	3	2	3	4	2	3	4	7	4	4	8	9	4	4	2	2	2	5
9	2	2	2	2	1	2	2	1	2	2	3	2	3	2	2	3	7	7	6	8	2	2	4	3	3
10	6	1	2	1	1	1	1	1	3	4	4	3	6	3	6	2	3	3	8	6	7	1	3	2	3
11	2	3	2	3	2	1	3	4	5	8	7	6	13	3	6	11	6	8	9	7	8	3	9	5	6
12	3	15	11	10	3	4	6	3	8	4	4	3	18	12	18	11	7	16	22	17	9	6	8	4	9
13	8	4	7	5	8	11	5	2	10	5	3	4	4	8	4	6	8	10	21	14	9	6	13	10	8
14	8	12	7	9	2	7	6	13	11	8	6	9	7	8	10	5	6	10	17	13	9	4	5	7	8
15	5	5	6	3	4	6	5	5	1	2	4	5	6	6	3	4	17	11	9	11	6	4	11	12	6
16	10	6	7	8	3	3	4	3	4	6	4	5	7	6	5	4	6	6	5	10	4	3	3	4	5
17	3	2	1	2	3	2	4	3	1	1	1	2	2	1	2	3	4	4	5	5	2	2	2	2	2
18	1	2	2	3	3	1	2	1	1	2	3	7	6	6	1	4	2	3	2	4	2	2	3	2	3
19	5	3	1	2	1	1	3	2	2	2	2	3	2	3	3	1	4	3	6	3	4	3	3	3	3
20	2	2	2	3	1	1	2	2	2	3	3	7	6	5	11	4	4	3	4	4	3	4	9	9	4
21	2	2	2	5	2	2	6	2	1	5	5	1	3	4	3	4	4	5	2	5	1	1	2	2	3
22	2	1	1	1	1	1	1	1	1	1	2	1	2	1	3	6	5	3	2	3	4	2	2	2	2
23	2	2	1	1	1	1	1	1	0	1	1	2	1	2	2	2	3	7	7	7	6	4	3	3	3
24	13	8	7	4	5	5	11	8	12	5	8	9	8	7	7	12	12	13	10	10	5	6	8	7	8
25	20	18	5	4	2	4	3	5	2	2	1	2	3	3	4	4	13	15	9	9	4	4	4	5	6
26	7	4	7	3	2	2	3	1	1	2	3	3	2	3	5	7	7	7	9	5	4	2	3	3	4
27	2	2	2	2	1	1	2	1	1	2	1	1	3	1	3	2	4	2	3	5	2	3	1	1	2
28	1	1	1	1	1	1	1	1	1	1	4	4	2	2	3	10	12	10	8	8	6	5	4	5	4
29	3	3	6	2	3	3	2	4	4	2	3	3	6	14	9	8	24	28	13	7	10	13	13	7	8
30	11	7	16	19	7	55	59	15	30	3	3	5	5	4	3	4	5	5	6	6	4	2	1	1	11
31	2	2	1	2	1	1	2	2	2	2	1	2	2	3	2	5	9	8	4	5	4	3	3	1	3
Mean	4	4	4	4	3	4	5	3	4	3	3	3	4	4	5	5	7	7	7	6	4	3	4	4	4

Table 112 Resolute Bay R_y (Hourly Ranges in 10 γ units) November 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	3	2	3	2	3	7	7	2	3	2	2	3	2	4	4	8	8	9	9	5	4	2	2	5	4
2	5	2	3	3	4	4	3	1	3	2	5	5	5	7	7	16	7	3	11	6	3	5	7	7	5
3	2	3	5	5	6	8	3	7	7	3	4	2	4	4	4	3	3	8	9	7	3	7	7	1	5
4	3	3	2	3	3	3	5	2	2	3	3	1	2	3	3	3	5	5	5	4	2	2	1	1	3
5	1	1	1	1	1	1	2	2	1	1	1	1	1	1	2	3	5	4	2	2	1	1	1	1	2
6	2	2	3	1	1	1	1	2	6	3	2	3	5	3	4	8	9	11	7	5	4	5	6	2	4
7	5	5	4	4	5	6	5	4	3	6	9	6	7	4	10	14	7	7	14	6	12	7	7	19	7
8	18	12	13	7	5	16	30	11	5	3	7	9	11	7	11	7	9	10	10	7	7	6	5	7	10
9	12	7	4	8	6	3	3	13	12	8	6	7	10	9	9	6	10	17	8	7	7	10	7	7	8
10	7	7	15	7	8	6	7	11	6	5	7	7	6	4	11	6	4	7	9	7	7	5	5	6	7
11	6	7	7	5	4	5	3	9	3	6	6	6	4	2	8	9	11	11	10	4	7	3	5	3	6
12	5	3	3	6	2	4	4	12	7	4	5	5	3	4	7	4	7	11	4	5	2	2	3	3	5
13	1	2	2	3	3	2	2	1	1	2	3	3	2	3	2	3	3	4	6	3	2	2	2	1	2
14	2	3	1	2	4	5	5	2	1	1	1	1	2	3	3	2	3	2	2	3	1	2	2	1	2
15	2	3	2	2	2	1	1	2	3	2	1	2	2	2	1	1	2	2	2	2	1	1	1	1	2
16	1	1	1	2	1	1	1	1	1	1	1	0	1	1	1	2	2	2	2	1	1	1	1	1	1
17	2	1	1	1	0	1	1	1	1	5	2	2	3	5	12	12	4	12	12	2	3	4	2	4	4
18	2	1	1	1	1	1	2	1	1	1	1	1	1	1	2	3	2	3	8	1	1	1	1	1	2
19	1	1	1	0	0	1	1	1	1	1	1	1	1	2	2	2	2	3	1	1	1	1	2	2	1
20	1	2	7	7	2	1	1	1	1	1	1	1	1	3	1	2	4	1	2	3	1	1	1	1	2
21	1	1	1	1	1	1	1	1	1	1	1	1	2	1	4	3	2	3	2	1	1	1	1	1	1
22	1	1	1	1	1	0	1	1	2	3	1	3	2	2	2	7	7	2	3	7	2	2	2	4	2
23	3	4	4	4	1	1	1	3	2	3	2	2	1	2	3	5	4	2	3	3	1	2	2	1	2
24	2	2	2	5	2	3	2	2	4	4	2	3	7	3	4	3	2	6	6	2	4	5	6	5	4
25	7	5	1	3	3	8	9	2	4	3	3	3	3	4	5	4	7	3	3	1	1	1	2	1	4
26	1	0	1	1	1	1	0	1	5	2	1	1	1	2	2	2	3	2	1	1	1	1	1	1	1
27	1	0	1	1	1	2	2	1	2	2	2	2	1	1	3	2	3	4	3	4	2	2	2	2	2
28	2	2	3	2	6	6	1	1	1	1	1	1	2	1	2	2	2	3	2	1	0	0	0	1	2
29	1	1	2	3	2	2	2	1	1	1	4	3	2	3	5	7	3	2	1	3	1	4	4	6	3
30	4	3	2	1	1	1	2	1	1	2	4	3	19	18	6	9	4	6	5	2	2	4	3	2	4
31																									
Mean	3	3	3	3	3	3	4	3	3	3	3	3	4	4	5	5	5	5	5	4	3	3	3	3	4

Table 113 Resolute Bay R_y (Hourly Ranges in 10 γ units) December 1963

Day \ Hour U. T.	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 to 24	Mean
1	2	1	1	1	1	1	1	1	2	1	1	1	1	2	2	4	2	2	2	1	1	2	2	2	2
2	4	4	2	3	2	2	2	2	2	1	2	2	3	2	7	6	5	2	5	2	1	5	7	5	3
3	2	4	5	3	4	9	10	34	35	4	7	4	4	7	10	12	11	9	4	5	9	11	10	5	9
4	7	6	3	6	3	3	10	2	2	5	2	5	4	7	8	10	12	9	6	7	2	6	5	12	6
5	12	9	4	3	5	6	5	3	4	6	2	4	4	7	8	8	6	6	6	5	3	3	7	7	6
6	8	2	2	4	10	27	10	4	5	5	5	4	8	8	12	5	10	6	4	6	3	6	5	6	7
7	3	5	4	2	4	3	3	3	8	4	3	6	4	7	8	7	7	4	3	2	2	2	2	2	4
8	2	2	2	4	4	14	6	7	5	4	2	4	5	3	7	5	8	3	2	4	3	2	3	4	4
9	4	1	2	1	2	2	3	4	3	7	4	4	4	2	6	2	6	2	1	2	1	1	0	1	3
10	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	1
11	0	0	0	1	1	1	0	1	1	1	1	2	1	2	2	2	1	1	2	1	1	1	1	1	1
12	1	2	1	1	1	1	1	2	1	2	1	1	1	1	1	2	2	2	2	1	1	2	1	4	1
13	4	2	1	3	2	5	1	1	1	1	1	1	1	2	1	4	1	2	3	1	1	1	2	2	2
14	1	1	2	2	2	1	1	1	2	1	1	2	6	8	4	8	4	4	5	3	4	4	3	2	3
15	2	4	2	2	2	1	2	1	1	2	2	4	2	4	4	7	2	4	2	4	3	2	1	3	3
16	1	2	2	1	1	1	0	1	1	1	2	1	2	3	4	4	7	7	2	1	1	1	2	3	2
17	5	3	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	2	1	2	2	2	2
18	2	3	1	1	1	0	0	1	1	1	2	2	0	2	1	2	2	2	2	1	0	1	1	1	1
19	1	1	1	1	0	1	0	0	0	1	0	1	0	0	1	4	3	2	2	1	1	2	5	4	1
20	4	6	1	2	1	2	4	6	4	2	2	2	6	6	3	4	2	3	3	4	4	2	4	5	3
21	1	2	1	1	1	1	1	1	3	1	1	1	5	5	6	9	5	5	2	2	1	2	5	6	3
22	2	1	1	1	1	3	9	5	2	4	2	2	2	7	6	4	6	4	3	2	2	2	3	2	3
23	2	3	1	2	1	1	2	2	7	4	2	2	2	1	1	8	2	4	5	2	2	2	3	6	3
24	4	4	2	2	1	1	1	1	2	0	1	1	2	5	7	6	4	2	4	2	3	2	4	2	3
25	1	1	2	1	1	1	1	1	1	4	7	2	2	2	3	4	1	2	4	2	1	1	1	1	2
26	1	1	2	3	3	2	2	1	2	2	2	2	2	2	2	1	2	1	0	2	2	2	1	1	2
27	1	1	2	1	1	2	3	2	1	1	2	2	2	2	5	2	1	4	1	2	1	1	1	1	2
28	1	1	1	1	2	1	1	1	2	2	2	1	1	2	3	2	3	3	2	2	6	4	3	3	2
29	3	4	4	4	2	1	2	2	2	2	2	9	3	2	5	4	2	5	2	3	3	3	2	3	3
30	5	4	2	2	1	1	1	1	0	1	2	1	1	2	2	2	2	4	2	2	1	1	2	2	2
31	1	2	1	2	1	1	0	1	1	1	2	1	2	1	1	1	2	2	1	1	1	1	1	1	1
Mean	3	3	2	2	2	3	3	3	3	2	2	2	3	4	3	5	4	4	3	2	2	2	3	3	3

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A DIGITAL RECORDER FOR PENDULUM MEASUREMENTS

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A Digital Recorder for Pendulum Measurements

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Abstract—**A portable, moderate-speed digital recorder is required for the Bronze Pendulum Apparatus of the Dominion Observatory, Canada. A review of available event recording methods reveals that, in general, contemporary recorders are too bulky and consume too much power to be readily adapted to field applications. Consequently, a miniature 30-channel recorder, having a total power consumption of 5 watts and a speed capability of three print-outs per second, has been designed. The operating speed is limited only by the chart transport mechanism, as the recording medium is capable of speeds greater than two thousand print-outs per second.**

Introduction

A MAJOR PROGRAM to redevelop the Dominion Observatory Bronze Pendulum Gravity Apparatus, originally designed by Thompson [1], has led to a requirement for a small, moderate speed digital recorder. Until recently, the periods of oscillation of two one-second pendulums swinging in antiphase have been recorded by means of a photographic chronograph. In order to improve the precision of this measurement, it was decided to replace the chronograph with an all electronic system. A complete description of this system is presently being prepared for publication. Briefly, time (as defined by an accurate frequency standard) is stored in a 15-bit binary accumulator. A timing pulse, generated photoelectrically as each pendulum crosses its null-position, is used to command a nondestructive print-out of the instantaneous state of the binary accumulator. Thus, an instrument is required to record the instantaneous state of 15 binary elements at one-second intervals.

As the current trend in digital recorder design is towards higher printing speeds at the expense of physical size and power consumption, no moderate speed instruments having specifications suitable for this application are available. Basically, instruments that record a digit directly in binary code differ very little from event recorders. The digital recorder is required to record on command the instantaneous condition of a number of two state or binary elements, whereas, the event recorder produces a continuous and simultaneous record of the operating condition (ON/OFF) of a number of electrical devices. In both cases the information is represented by the existence or nonexistence of a suitable signal. In order to determine the optimum method to be used in the design of a lightweight precision instrument for recording binary coded information, a study of available event recording techniques was undertaken.

Manuscript received July 20, 1964; revised October 14, 1964. The research reported in this paper was undertaken as part of a program to redevelop the Dominion Observatory Bronze Pendulum Gravity Apparatus. It constitutes part of the requirements for the M.Sc. degree at the University of Western Ontario, London, Ontario, Canada.

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Event Recording Techniques

A. Moving Stylus Recorders

Binary data may be recorded by utilizing the displacement, either lateral or vertical, of a number of styli. A wide choice of writing methods, including pen and ink, hot styli on heat sensitive paper and percussion styli on pressure sensitive paper is available. The reliability and convenience of this type of instrument is determined in part by the type of stylus employed; the difficulties of using ink with a multitude of pens will be well appreciated by anyone who has used conventional ink recorders.

In lateral deflection recorders the two data states are represented by the displacement of a continuous trace. If the stylus is activated by alternating current, a continuous sine wave (usually at line frequency) represents the ON or "one" state, while a straight undeflected line corresponds to the off or "zero" state. If direct current is used, the stylus has two distinct positions so that the data is displayed as a rectangular wave. The segment of the trace resulting from the deflected stylus indicates the "one" state, while the undeflected portion of the trace represents the zero state. The styli are driven by solenoids which present a highly inductive load to the signal source; thus, the problem of arc and radio interference suppression, with its inherent degradation of response time, must be overcome. Furthermore, adequate operating speed can only be obtained by sacrificing ruggedness and increasing power consumption. These instruments tend to be bulky, since about ¼ inch of chart width per channel is required to produce a legible record. A typical 60-channel dc Lateral Deflection Recorder, which has a 15-ms response time, requires two watts per channel and weighs 85 lbs.

In vertical deflection instruments, the styli move perpendicular to the paper surface drawing interrupted straight lines to represent the data states. While this type of recording requires less chart width, the formidable mechanical problem of vertical deflection adds to the size and weight of these instruments. Vertical deflection recorders, because of their complicated mechanical construction, have very long response times and are also subject to the limitations of solenoid driven devices.

B. *Fixed Stylus Recorders*

In fixed stylus recorders, the chart paper is drawn past a row of stationary styli which have two operating condi-

tions to represent the data states. The styli, for example, may be either hot or cold, electrically charged or grounded, depending on the technique employed. In all cases the binary information is represented by the presence or absence of a dot in digital recorders and by an interrupted straight line in event recorders. Although fixed stylus recording results in very compact, reliable and simple mechanisms, the various writing methods lead to a wide variety of results.

Hot pen recorders utilize a special wax-coated paper which is drawn over a row of small fixed heaters. Energizing a heater melts the wax allowing colored backing paper to show through in the vicinity of the stylus. Although hot styli permit very rugged and compact recorder construction, their high thermal capacity results in an instrument whose response time is about 30 seconds.

The direct electric writing method utilizes a special electrosensitive chart paper which consists of a layer of black carbon deposited between layers of electrically conducive paper. The top surface is coated with insulation, and the chart paper is drawn between a grounded platen and a row of stationary styli resting on the insulated surface. When a high potential is applied to a stylus, the insulated layer breaks down exposing the carbon, and the data is recorded as a black dot or line on a grey background. Although the records suffer somewhat from low contrast, they are dimensionally stable and easily reproduced. The use of direct writing paper allows response times as short as one sp to be easily achieved.

Early recorders of this type used direct current to power the styli and were characterized by considerable sparking, smoking, and radio frequency interference. The use of vacuum tubes for stylus current control, necessitated by high-power consumption at high voltages, resulted in instruments that were very bulky.

A more recent transistorized version [2], [3] employs pulsed stylus control, and, while the peak pulse power is 250 watts, the average power consumption is reduced to a value that varies from 0.025 to 25.0 watts depending on chart speed. A pulse generator develops a train of 35-volt pulses at 7A which is transformed to 700 volts and simultaneously applied to all styli. Writing control is accomplished by shunting all nonrecording styli with a low impedance, and additional control circuitry involving the use of a special step-down transformer for each stylus is necessary. As complete shielding is required to prevent the radiation of radio frequency interference, a 30-channel instrument of this type weighs 50 lbs, although it is fully transistorized.

A third method, known as electrolytic recording, uses a paper which is impregnated with liquid electrolyte. As the paper is drawn between positively charged ferrous styli and a grounded platen, ferrous ions are deposited onto its surface where they produce a sepia-toned trace. The power required per channel varies from 2 to 10 mA at 12 volts, depending on stylus diameter and chart speed. Low power consumption at low voltages makes this an ideal medium for use with a wide variety of transistor circuits.

High cost and short storage life are two criticisms often applied to electrolytic paper. This paper, however, proved to be less expensive than both the heat and electrosensitive types available for contemporary recorders of similar application, and the problem of limited shelf life, due to the rapid evaporation of electrolyte, has been overcome by individually packaging rolls of paper in sealed plastic bags.

Recorder Design

As the use of electrolytic writing seemed very promising, a digital recorder was constructed to utilize Alfax type A-2 recording paper.[1] The resulting instrument (Fig. 1), whose dimensions are 10½ by 6½ by 5 inches, weighs only 7 lbs and has an average power consumption of 5 watts.

A. *Chart Drive Mechanism*

The instantaneous time of six successive null-crossings of each pendulum is required every 30 to 50 minutes. The recorder must, therefore, display the state of the binary accumulator at one-second intervals for a total of six print-outs. The long standby interval suggests that incremental chart drive would considerably reduce paper consumption, and, in addition, printing on stationary paper reduces the average stylus power consumption to about 20 mW/channel.

The chart drive mechanism, illustrated in Fig. 2, is powered by a rotary solenoid geared to the rubber drive roller in such a manner as to provide a choice of two chart speeds, either 0.2 or 0.4 inch per increment. Constant paper tension with intermittent chart drive is maintained by the brake mechanism which consists of a spring loaded brake housing carrying a plastic pad which rests against the paper roll. As the paper tends to release the brake when it is drawn over a roller attached to the brake housing, equilibrium is established between the paper and spring tension allowing the paper to unroll uniformly.

The moisture content of the paper is maintained by enclosing it in a small compartment which is sealed except for a narrow slot from which the paper emerges. If a damp sponge is enclosed in the chamber, the paper may be stored in the recorder for periods in excess of 30 days without degrading its performance. In applications requiring standby intervals in excess of a few minutes, the recording head must also be installed inside the moisture chamber to prevent the paper under the styli from drying out. Otherwise, the recorder will not operate until fresh paper is withdrawn from the chamber, so that the first two or three print-outs of a sequence may be lost. It was found that down-times of one hour or more could be tolerated even when the recording head forms part of the exit slot as in the prototype recorder design.

The recording head consists of 30 spring-loaded stainless-steel styli arranged in two rows and mounted in a nylon holder as shown in Fig. 3. Incremental chart drive allows two rows of styli to be used without loss of legibility, thereby decreasing the required paper width by a

[1] A product of Alfax Paper and Engineering Co.

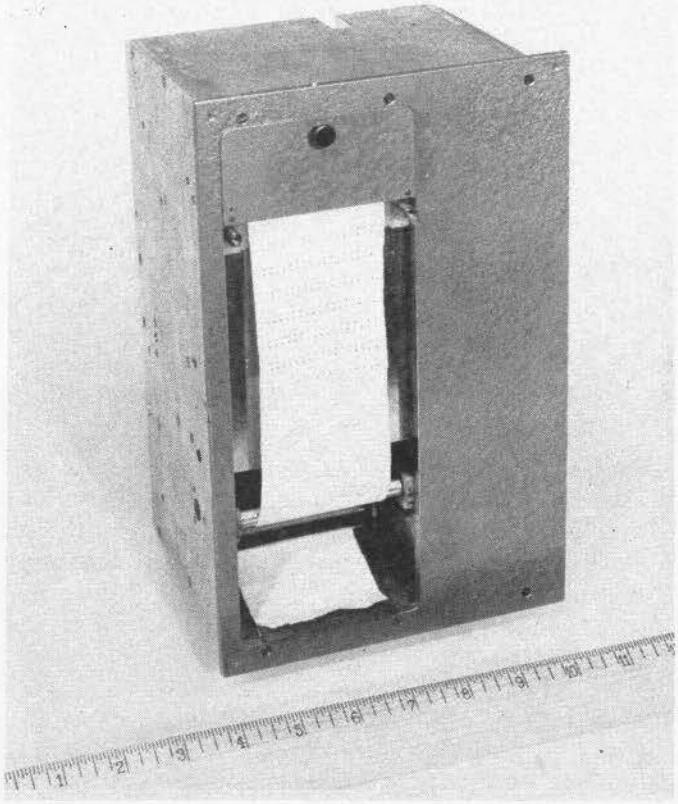

Fig. 1. Prototype recorder with the recording head removed.

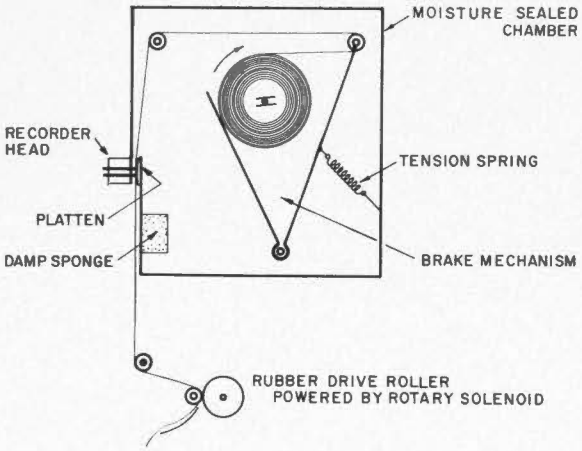

Fig. 2. The tape transport mechanism.

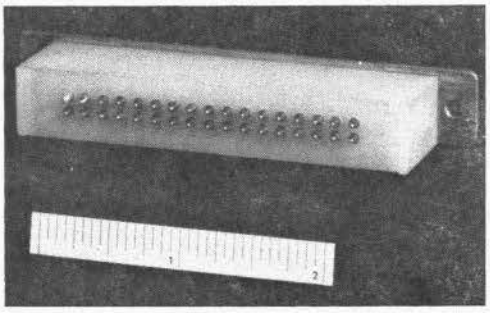

Fig. 3. The recorder head, (2¾ by ¾ by ½ inch).

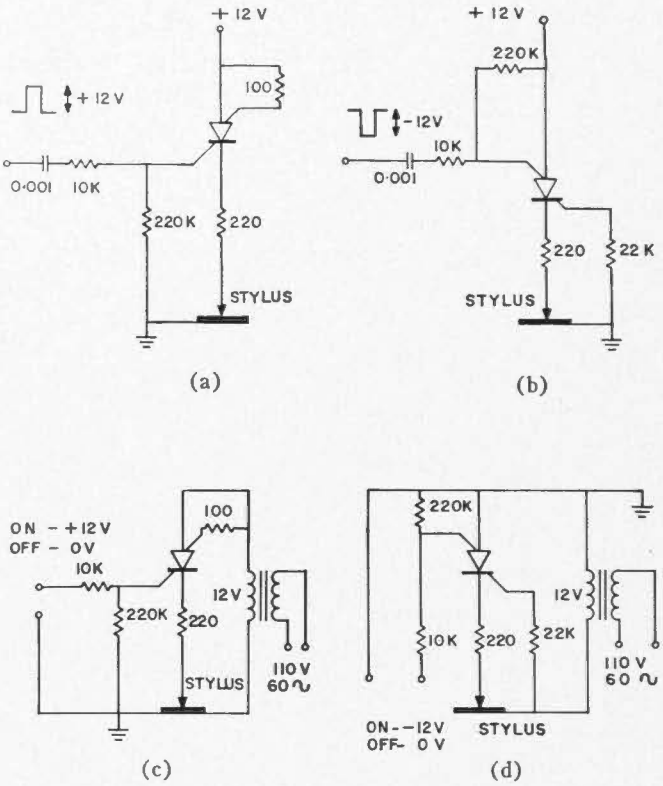

Fig. 4. Stylus control circuits. (a, b) DC operation with positive and negative control pulses, respectively. (b,c) AC operation with positive and negative control signals, respectively.

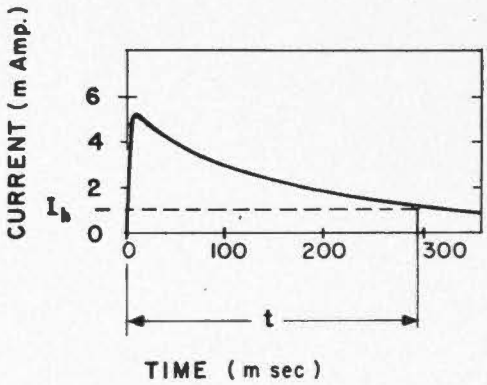

Fig. 5. Current-time characteristics for writing on stationary electrolytic recording paper.

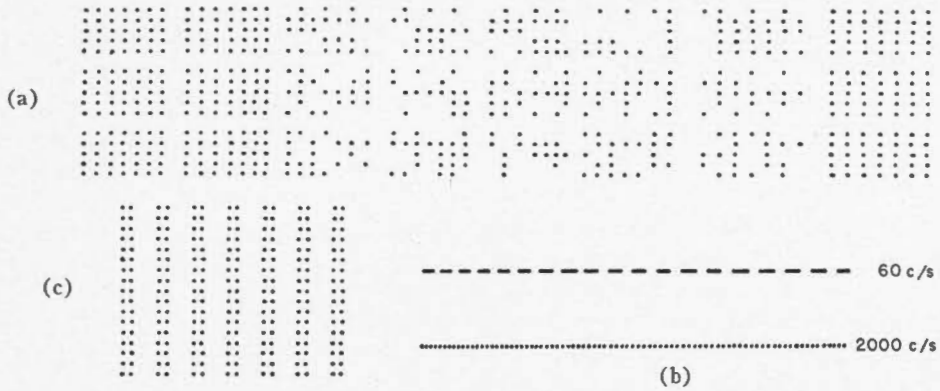

Fig. 6. Typical records obtained from the prototype recorder. (a) A typical print-out using a single row of styli. (b) Record produced with half-wave rectified ac. (c) Styli-test sequence using both rows of styli.

factor of two. Stainless steel must be employed, as other iron allows tend to mark spontaneously when resting on moist paper for a period of time.

B. *Electronic Control*

Extreme simplicity in stylus control circuitry is one of the major benefits of the electrolytic recording method. Low power and voltage requirements permit the styli to be directly powered by a wide variety of semiconductor circuits. Silicon-controlled switches appear to be particularly suited for use with electrolytic recording paper.

Two circuits for pulsed stylus control, utilizing the 3N60 silicon-controlled switch connected in the silicon-controlled rectifier (SCR) and complementary SCR configurations, are shown in Figs. 4(a) and 4(b), respectively. The behavior of the stylus current, when printing on stationary paper with constant voltage, is shown in Fig. 5. After the SCR is turned on by a positive pulse (negative pulse for complementary SCR), the stylus current rapidly falls from a maximum of about 5 mA to a value that equals the holding current (minimum anode current to sustain conduction) of the SCR. At this point the SCR switches off, and the stylus current drops to zero. The load resistor on the unused gate serves to increase the holding current of the SCR to a value that permits a reasonable pulse duration. It also prevents erroneous triggering due to "rate effect" [4] when voltage is suddenly applied to the anode. The width of the stylus current pulse amounts to about 0.3 second for this type of control, limiting the recording speed to three print-outs per second.

A typical record obtained with this instrument is shown in Fig. 6(a), and for the purpose of this test only one row of styli was used with the slower chart speed. The recording sequence begins with a series of print-outs in which all styli operate in order to verify that the recorder is functioning correctly and to establish the columns in which the data appear. The styli test sequence is followed by a series of binary print-outs, and the measurement is concluded by a second styli test sequence. Under normal operating conditions [Fig. 6(c)], both rows of styli (one for each pendulum) are employed, and the higher chart speed is required to provide adequate spacing.

These records must, of course, be read manually. If the data rate is quite slow, as in the present application, conversion from the binary to numeric mode is easily accomplished by hand. A nested polynomial of the form,

$$((((2a_n+a_{n-1})2+a_{n-2})2+a_{n-3})2 - - - - - - -+a_1)2+a_0,$$

allows the conversion to be performed mentally. The coefficients, which are either one or zero, refer to each successive binary digit. If a faster data rate is expected, the record can be transposed to punched cards for conversion by a computer. As only two characters are required, card punching is quite rapid. A short FORTRAN II program has been prepared to handle the relatively large amount of data produced during the test phase of the development of the new timing system. Normally, during field operations, manual interpretation is adequate, as the recorder is only required to print the time of six successive null-crossings each hour.

Much higher printing speeds may be obtained by suitably reducing the stylus pulse width. Pulse durations as short as 0.25 ms have been successfully employed, so that printing speeds in excess of two thousand print-outs per second are possible. Since the maximum attainable speed is ultimately limited by the tape transport mechanism, continuous chart drive is essential for higher writing speeds. The stylus power may be obtained from either a simple transistor pulse generator or from half-wave rectified alternating current. From sample traces made with driving frequencies of 60 and 2 000 c/s [Fig. 6(b)], it is evident that response times of less than 0.25 ms are possible.

Stylus control with alternating currents may be accomplished with the circuits shown in Fig. 4(c) and (d), where the 3N60 not only controls the application of power to the stylus but, in addition, rectifies the alternating current as well. These circuits are designed to be switched on by positive and negative control voltages, respectively, and both circuits are characterized by a high input resistance. In all four circuits a 220-ohm resistor is placed in series with the SCR to protect it from accidental grounding of the stylus.

Summary

An application requiring a high capacity, moderate speed digital recorder led to a review of the various methods for event recording. A 30-channel recorder having a speed capability of three print-outs per second was designed for use with electrolytic recording paper. The resulting instrument weighs 7 lbs and consumes an average of 5 watts, including both chart drive and stylus power.

The high sensitivity of electrolytic paper allows the stylus control electronics to be greatly simplified, permitting a reduction in the size and power consumption of the ancillary equipment. It was also found that this medium could be readily utilized in event recorders where response times as short as 0.25 ms are required.

Acknowledgment

The author is deeply indebted to J. Geuer, of the Dominion Observatory, who was largely responsible for the mechanical design of the tape transport mechanism. Also the author wishes to thank Dr. A. E. Beck from the University of Western Ontario; and Dr. V. Gaizauskas and R. K. McConnell from the Dominion Observatory who kindly reviewed this manuscript.

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Observatories Branch

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MAGNETIC CHARTS OF CANADA FOR EPOCH 1965.0

E. Dawson and L. C. Dalgetty

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98090—1½

Magnetic Charts of Canada for Epoch 1965.0

E. DAWSON AND L.C. DALGETTY

ABSTRACT—Magnetic charts of Canada in components D, I, H, Z, F, X, Y, G, U, V and their annual changes were drawn for epoch 1965.0. Charts were compiled from some 18,000 observations in D, H, Z, acquired since 1947. Seventy-five per cent of these were airborne data. The observatory and repeat station network, necessary for reduction of data to epoch, is described. Machine processing techniques are used. Charts are drawn using average values computed over an equal area grid, a unit grid being equivalent to a 2-degree grid at the equator. The updating method yields probable errors of ± 4 minutes in D and $\pm 20\ \gamma$ in H and Z over an 18-year reduction period. An estimate was made of the chart residuals by making a random comparison of some 1,200 updated observations in D, H, Z with corresponding chart values. The following r.m.s. differences were obtained: ± 0.6 degree in D; $\pm 125\ \gamma$ in H, Z.

RÉSUMÉ—Les cartes magnétiques du Canada dans les composantes D, I, H, Z, F, X, Y, G, U et V ont été dressées, avec les modifications nécessaires, pour l'année 1965.0. Quelque 18,000 observations en D, H, Z, effectuées depuis 1947 à l'aide d'avions dans 75 p. 100 des cas, ont servi à établissement des cartes. Les deux auteurs décrivent le réseau d'observatoires et de stations de répétition qui a servi à réduire les données à l'année 1965, au moyen d'ordinateurs. On a dressé les cartes à partir de valeurs moyennes sur un quadrillage équivalent, chaque carreau étant équivalent à 2 degrés pris à l'équateur. La méthode de mise à jour donne des erreurs probables de ± 4 minutes en D et de $\pm 20\ \gamma$ en H et en Z sur une période de réduction de 18 ans. Les auteurs ont fait une estimation des résiduelles de la carte en comparant au hasard quelque 1,200 observations mises à jour en D, H, Z avec les valeurs correspondantes de la carte. Ils ont obtenu les écarts-types suivants: ± 0.6 de degré en D et $\pm 125\ \gamma$ en H et en Z.

Introduction

The first systematic magnetic survey in Canada was carried out by Sir John H. Lefroy between 1842 and 1844. Observations (D, I, F) were made at over 300 stations, and magnetic charts for epoch 1844.0, in these elements, were published in 1883.

In connection with the proposed building of a transcontinental railway and the expected influx of immigrants to the Canadian West, comprehensive land surveys were made by the Topographical Surveys Branch of the Department of the Interior from 1880 to 1888. Numerous magnetic observations in D, I, H were made at this time. This system continued until recent times, and observations made by the Topographical Surveys Branch formed the basis of all magnetic charts of Canada up to the early 1940's.

In 1907 the Dominion Observatory initiated its program of regular annual magnetic surveys. These have been continued with few interruptions to the present day. The Meteorological Service of Canada made several important surveys in the period 1908-12, including a survey of the Mackenzie River in 1910 and of Hudson Bay and Strait in 1912. It also maintained the only magnetic observatory in Canada, at Agincourt. Another was established at Meanook under its aegis in 1916. The administration of both observatories was transferred to the Dominion Observatory, Ottawa, at the end of 1936.

In 1905-13, the Carnegie Institution of Washington made some observations in Canada, but this practice was shortly abandoned, as it was considered that Canadian surveys covered this area adequately. Other contributing agencies whose results were freely used in compiling magnetic charts of Canada were the Hydrographic Service of Canada, The Geological Survey of Canada and the United States Coast and Geodetic Survey. The Dominion Observatory took over the compiling of magnetic charts in 1948. Table VII (Appendix II) lists magnetic charts produced in Canada since 1883.

Number, Type and Distribution of Observations

Owing to the efficient coverage achieved using airborne techniques for obtaining magnetic data, it was decided that the 1965 edition of magnetic charts would be compiled only from data observed since 1947. Although this meant losing thousands of declination values in western Canada alone, plus untold numbers of old I, H values, it was felt that this gap would be amply filled using the more recent aeromagnetic data. Also the error involved in reducing this recent data to epoch should be quite small. The distribution of the observations used in the compilation is shown on Figure 1. There is almost uniform coverage over the entire country. In particular, there is a striking increase in the density of Arctic data due to airborne measurements. Up to 1947 there were less than 500 magnetic observations made in theCanadian Arctic and the majority of these readings were D values only. Since 1953 the number of observations in all components has increased by an order of magnitude.

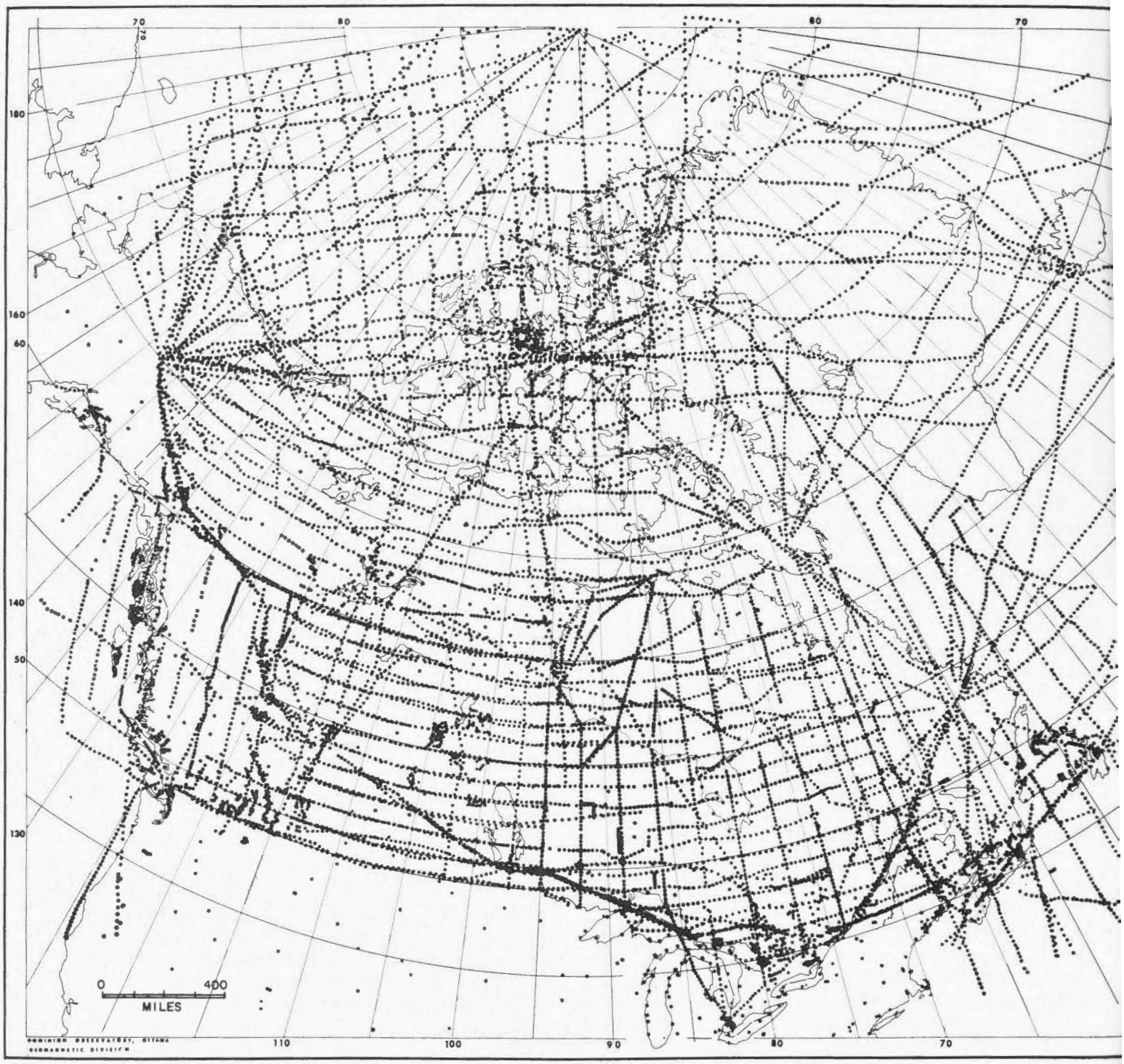


FIGURE 1. Distribution of magnetic survey observations 1945-1963.

Table I gives the total number of observations, both surface and airborne, in each component used in the compilation of the 1965 charts.

TABLE I

Latitude Range	Area	Number of Observations			Number of Observations per (100Km²)		
	Km² x 10⁶	D	H	Z	D	H	Z
40° — 60°N	14.6	11,400	9,000	9,200	7.8	6.2	6.6
60° — 90°N	16.8	6,000	6,000	7,100	3.6	3.6	4.2
Total	31.4	17,400	15,000	16,300	5.5	4.8	5.2

The area specified is the total mapping area including Alaska, Greenland, Iceland and the surrounding waters, representing 12 per cent of the northern hemisphere. Observation numbers are quoted to the nearest 100.

Table II gives a summary of the type of data, either surface or airborne. The numbers, quoted to the nearest 100, refer to geographic positions at which an observation has been made, without reference to the observed magnetic element or elements.

TABLE II

Type	40° — 60°N	60° — 90°N	Total
Airborne	7,100	6,500	13,600
Surface	3,900	500	4,400
Total	11,000	7,000	18,000

Project Magnet of the U.S. Naval Oceanographic Office contributed 23 per cent of the airborne observations, and the U.S. Coast and Geodetic Survey 19 per cent of the surface observations. The average altitude of the airborne data is between 2 and 3 km. These data were reduced to sea-level using a simple dipole correction.

From 1907 to 1964 approximately 2,000 ground stations were occupied by Dominion Observatory survey parties. From 1953 to 1963 the Dominion Observatory airborne magnetometer has been flown 300,000 miles, completing more than 150 flight lines with 12,000 observations in D, H, Z. One fifth of these flights were flown outside our mapping area.

Observed Elements

Prior to 1947, Canadian surface observations were made using deflection magnetometers, earth inductors, dip circles and theodolites with compass attachments to measure the elements D, I and H. Although these instruments are extremely accurate, it takes an hour, under ideal conditions to make a complete set of observations. In 1947, observing techniques were greatly improved with the introduction of portable electronic magnetometers of the saturable core type, for the determination of the vector geomagnetic field (Serson and Hannaford, 1956). With these instruments a complete set of observations in D, I, F, can be made in 15 minutes with an accuracy comparable to that obtained using the older type field instruments. In 1962, nuclear proton precession magnetometers were used to supplement these field instruments, with quick, dependable measurements of F.

The Dominion Observatories three-component airborne magnetometer records D, H, Z as continuous profiles (Serson et al, 1957). In addition, the instrument supplies automatically computed averages of D, H, Z, the averages being computed over 5-minute intervals. It is these averaged values that are referred to as "airborne observations" in this report.

The airborne observations contributed by the U.S. Navy Oceanographic Office consist of D, I values averaged over an interval of 100 seconds and an instantaneous F value for the centre of the interval (Schonstedt and Irons, 1955). A continuous record of F is also obtained.

The surface observations contributed by the U.S. Coast and Geodetic Survey were made using a variety of instruments, such as earth inductors and deflection magnetometers for the measurement of D, I, H. (Hazard, 1957).

Observatory and Repeat Station Coverage

Covering Canada adequately with a network of repeat stations, from logistic considerations alone, is a formidable task. The earlier work was done under great practical difficulties readily understood, since the greater part of the country lies to the north of the railway belt. The bequest from this early work, although valuable, was a poorly distributed network of repeat stations.

Since 1907, 270 repeat stations have been occupied by Observatory field parties. Of these, 82 per cent were established before 1935. At present, only 100 of these repeat stations can be classified as active and have been reoccupied within the past 10 years.

In 1962 a revised network of repeat stations, built up almost entirely from the existing stations, was initiated to provide the uniform coverage necessary for accurately defining secular change across the country (Fig. 2). The network of 103 stations consists of 31 primary stations

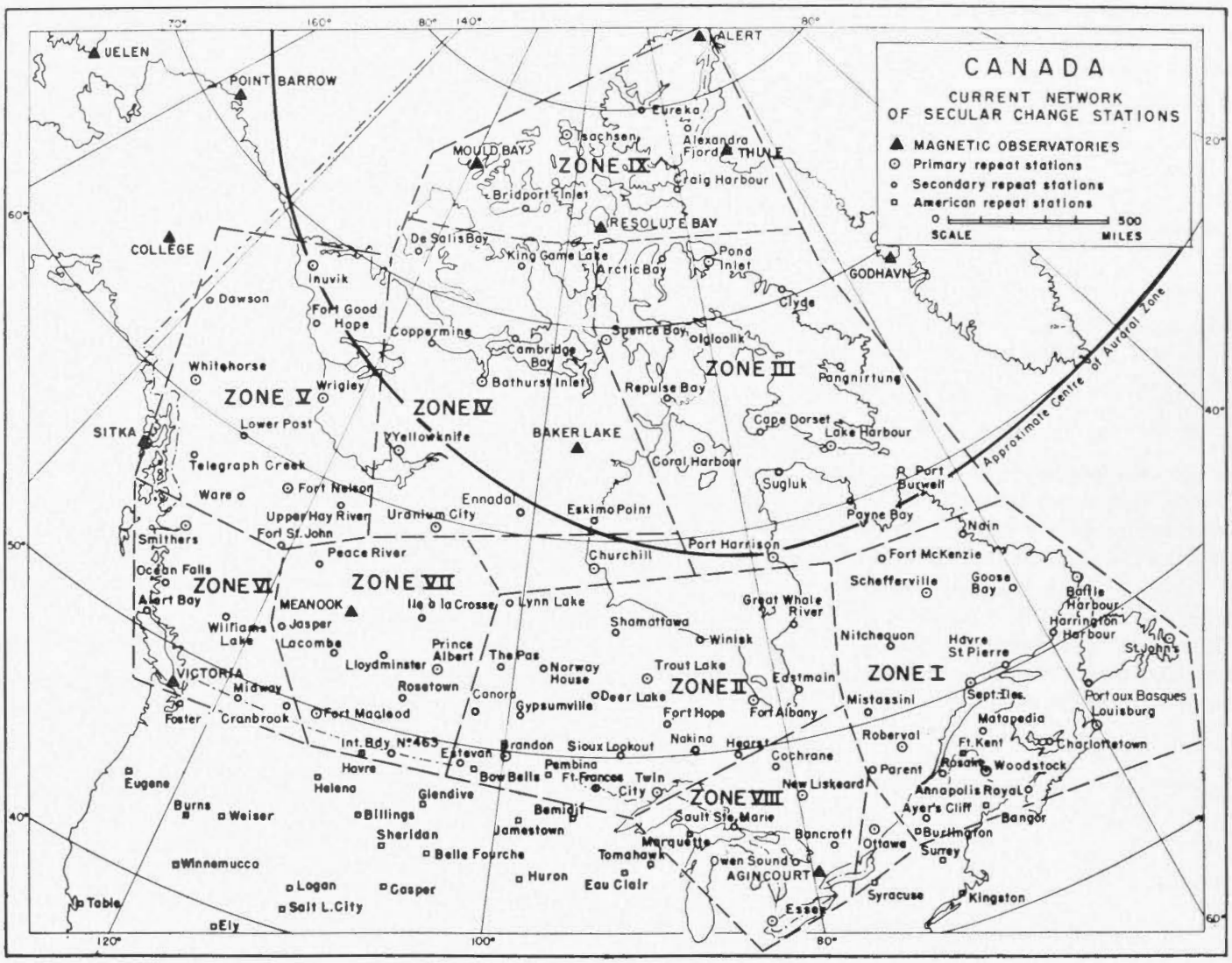


FIGURE 2.

and 72 secondary ones. At the present time, all stations will be occupied at least once every 5 years. If required, adequate secular change coverage over the entire country could be achieved using only those stations designated as primary, and secondary stations could be reoccupied at 10-year intervals. The country is divided into nine zones. Dividing the work between staff of the outlying observatories and headquarters staff, all stations can be occupied in a 5-year period. At least 80 per cent of these stations have had two or more reoccupations within the past 15 years. To ensure continuity of isolines in those areas of continental U.S.A. and Alaska, contiguous to Canada, there is an excellent system for interchange of secular change data with the U.S. Coast and Geodetic Survey. Data from 56 American repeat stations were also used in compiling secular change.

Canadian observatories are listed in Table III. The elements recorded at each are also shown.

TABLE III

Observatory	Geographic Lat.°(N)	Geographic Long.°(W)	Year Established	Elements Recorded
Agincourt	43.8	79.3	1898	D H Z
Meanook	54.6	113.3	1916	D H Z
Baker Lake	64.3	96.0	1951	D H Z
			1957	X Y Z
Resolute Bay	74.7	94.9	1953	X Y Z
Victoria	48.5	123.4	1957	D H Z
Alert	82.5	62.5	1961	X Y Z
Mould Bay	76.2	119.4	1961	X Y Z

In addition to these, data from the following observatories were also used in compiling secular change.

American—Fredericksburg, Tucson, Sitka, College, Barrow.

Russian—Uelen, Cape Chelyuskin, Dikson, Srednikan, Tiksi, Tikhaya Bay, Druzhnaya and Yakutsk.

Others—Thule, Godhavn, Leirvogur, Tromso, Dombas, Sodankyla, Lovo, Rude Skov and Lerwick.

Accuracy of Observations

The sources of error in the data used to compile the 1965 magnetic charts of Canada fall into three natural divisions: instrumental errors, errors due to transient variations, and errors in reducing the data to epoch.

For airborne observations, there are additional errors such as errors in geographical position, errors due to aircraft magnetism and errors in the direction reference system. These errors have been examined in great detail by Serson et al. (1957) and Schonstedt and Irons (1955). We are concerned here only with the overall operational accuracy of the airborne instruments.

Instrumental Errors

The probable errors for a single complete observation of the geomagnetic vector field at a particular time and place, under good survey conditions, are listed in Table IV.

TABLE IV

	Surface		Airborne	
	Dominion Observatory	U.S.C.G.S.[1]	Dominion Observatory	U.S.N.O.O.[2]
D	±0.3′	±0.5′	±0.3°[3]	±0.1° to ±0.2°
I	±0.2′	±0.1′		±0.1°
H		±10γ[4]	±60γ	
Z			±30γ	
F	±10γ to ±50γ[5]			±15γ

[1]United States Coast and Geodetic Survey.
[2]United States Naval Oceanographic Office.
[3]The Dominion Observatory airborne magnetometer records D to the nearest degree in much of the Arctic area.
[4]For a field of H = 20,000 γ, and varies directly with H.
[5]Dependent on frequency of standardization.

More detail concerning these errors can be found in the following sources, from which the table was derived: Serson and Hannaford (1956) and Svendsen (1962), for the surface observations; and Serson et al. (1957), Schonstedt and Irons (1955) and Byrnes (1960) for the airborne observations.

In his review of airborne magnetic surveys for world charts, Serson (1960) concluded that the operational accuracy of the two airborne instruments listed in Table IV was about the same and ranged from 50 to 100 γ.

Errors Due to Transient Variations

These errors are more difficult to deal with. None of the airborne observations are corrected for these variations since any attempt to correlate such variations over great distances would probably introduce additional errors. Whitham and Niblett (1961) have shown that r.m.s. differences in transient variations are proportional to the r.m.s. level of activity and to the separation of stations or in the airborne case, the proximity of the nearest observatory to a flight line. Their quantitative results, only valid for the Meanook-Edmonton area, were obtained using instantaneous values of F, at intervals of 2½ minutes, over a period of 3 days. Whitham et al. (1960), using hourly mean ranges in the principal horizontal field component for 16 Canadian I.G.Y. magnetic observatories and variation stations, showed that a high level of irregular activity is more or less continuously present over most of Canada. Serson et al. (1957) estimate that the probable error, due to disturbances and diurnal variation combined, is ±30 γ in any component. This estimate was based on an airborne survey made over western Canada near the auroral zone in 1955.

At the present time, surface observations are corrected to a mean value for the day only, unless the observations are taken in the vicinity of an observatory. Previous to 1964, Canadian observers used the following procedure in the field. Repeated observations were made for a period of 24 hours or more in three elements and the effect of diurnal variation was eliminated by averaging or by drawing a smooth curve through the series. Irregularities in the readings were attributed to the influence of magnetic disturbance and these readings were rejected. The curves of secular variation for repeat stations suggest that in general, this procedure appears to be quite satisfactory. In 1964, a temporary portable observatory was set up at 15 repeat stations in the Baffin Island, Melville Peninsula area. The average recording time was 30 hours. Four baseline readings were taken at each station and normal observatory procedure used to derive a mean value for the day. An attempt was made to further correct these readings to a monthly mean value by means of another temporary observatory operating at Frobisher Bay for the duration of the survey. The average distance from a station to the nearest observatory (Resolute Bay and Baker Lake records were also used) was 300 miles. No correlation between records was found. Whitham and Loomer (1960) investigated post-perturbation and the effect on daily means using observatory values of the Dm field for Resolute Bay and Baker Lake over 17 months in 1953-55. They found a marked seasonal variation to this effect. For the equinox-summer period, that is the

normal field season period, errors contributed by ignoring these effects are of the order of 2′ in D, I and 35 γ in Z.

Since 1958, the U.S.C.G.S., in order to diminish errors due to transient variations, set up the following system. Portable observatories are established such that the distance to a repeat station is generally not more than 200 miles. Svendsen (1962) estimates that such errors in C.G.S. surface measurements are of the order of $\pm 1'$ in D, I and $\pm 10\ \gamma$ in H.

Errors in Reducing Data to Epoch

For all observatories and most repeat stations, updated values of D, H and Z were compared with graphs of observed values, extrapolated to 1965.0. More than 300 values were examined. The probable errors in reduction over an 18-year period are as follows:

$$\pm 4' \text{ in D}; \ \pm 16\ \gamma \text{ in H}; \ \pm 20\ \gamma \text{ in Z}.$$

Machine Processing of Magnetic Data

A modified version of the method outlined by Hurwitz et al. (1954) was used. Due to the complexity of the D-isogones in the Canadian Arctic the country is divided into two areas (Fig. 3), and each area is dealt with separately. The magnetic components updated in Area I are D, H, Z and in Area II, U, V, Z where U, V, the grid components of H, are defined as follows:

$$\text{U (grid-north component)} = \text{H} \cos \text{G}$$

$$\text{V (grid-east component)} = \text{H} \sin \text{G}$$

The grid variation G (grivation) is defined in the following terms:

$$\text{G} = \text{D} - \lambda \text{ where } \lambda \text{ is east longitude,}$$

$$\text{and D is positive for east declination.}$$

The reasons for using U, V have been previously outlined by Dawson and Loomer (1963). Prior to the updating process, all declination values are converted to minutes of east declination. This step simplifies the updating and averaging of values in those areas adjacent to the agonic lines. Also, at this time, all airborne data are corrected for altitude using the simple dipole correction.

$$\text{X} = \text{X}^1 (1 + 1.4 \times 10^{-7}\text{h})$$

where X^1 is the observed component at altitude h feet, and X is the value at sea-level.

Reduction of Data to Epoch 1965.0

The period 1947-1965 is divided into four time-intervals or epochs centered on 1950, 1955, 1960 and 1965. Isoporic charts in $\dot{\text{D}}$, $\dot{\text{H}}$, $\dot{\text{Z}}$, $\dot{\text{U}}$, $\dot{\text{V}}$ are prepared for each time-interval. Values are scaled off for the corners of each zone (Fig. 3), in each component, for the four time-intervals. These values are assumed to be constant over a 5-year period. Master cards listing these data are prepared for each zone, with each master card controlling the updating of all observations within the zone.

The basic data cards are automatically sorted according to the epoch in which the observation occurred, and within the epoch, into the zones defined by the master

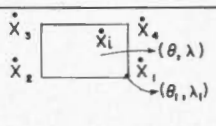
Interpolation Formula to Operate on the S.E. corner (θ, λ_1) of each Zone.

$$\dot{X}_i = \dot{X}_1 + C(\lambda - \lambda_1)(\dot{X}_2 - \dot{X}_1) + 0.2(\theta - \theta_1)\left\{(\dot{X}_4 - \dot{X}_1) + C(\lambda - \lambda_1)(\dot{X}_1 + \dot{X}_3 - \dot{X}_2 - \dot{X}_4)\right\}$$

where $\dot{X} = \dot{D}, \dot{H}, \dot{Z}, \dot{U}$ and $\dot{V}$

and C = 0·2 for area I

C = 0·07 for area II



ZONES FOR UPDATING U, V, Z

	165	164	163	162	161	160	159	158	157	156	155	154	85
	153	152	151	150	149	148	147	146	145	144	143	142	80
II	141	140	139	138	137	136	135	134	133	132	131	130	75
	129	128	127	126	125	124	123	122	121	120	119	118	70
	117	116	115	114	113	112	111	110	109	108	107	106	65
													60°N

ZONES FOR UPDATING D, H, Z

			105	104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79	78	77	76	75				65
							74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52								60
I									51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33										55
										32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16											50
											15	14	13	12	11	10	9	8	7	6	5	4	3	2	1												45
																																					40°N
180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0																			

LONGITUDE WEST

FIGURE 3.

cards. Cards outside the mapping area are extracted at this time. The time, t, between the date of the observation and the middle of the epoch in which it took place, is punched on the basic data card. Two passes are required to complete the reduction to epoch. In the first pass, the secular change for the interval t is computed for each observation from $t\,\dot{X}_i$; $\dot{X}_i$ is interpolated linearly from the $\dot{X}$ values on the master cards, where $\dot{X} = \dot{D}$, $\dot{H}$, $\dot{Z}$, $\dot{U}$ or $\dot{V}$. The interpolation formula is shown on Figure 3. This value is added algebraically to the observed value $\dot{X}$. Thus each observation is updated, or backdated as the case may be, to the nearest intermediate epoch.

The second pass through the computer, for reducing observations from the intermediate level to the required epoch 1965.0, is quite similar to the procedure used for the first pass. The annual secular-change values $\dot{X}$ are replaced by net secular-change values ΔX. These net values are computed in the following way. If we refer to the annual change in epoch 1950, in any component, as $\dot{X}_{50}$, in epoch 1955 as $\dot{X}_{55}$ and so on, then the net secular-change ΔX required to reduce an observation from 1950.0 to 1965.0 is

$$\Delta X = 2.5\,\dot{X}_{50} + 5.0\,\dot{X}_{55} + 5.0\,\dot{X}_{60} + 2.5\,\dot{X}_{65}$$

At the end of the second pass, all observations are reduced to the required epoch.

Averaging Operations

After the data cards are updated, the problem of constructing the chart begins. The approach to this problem depends on the purpose of the chart and the type of chart required to fulfill this purpose. In his review of airborne magnetic surveys for world charts, Serson (1960) states that most magnetic charts are used as a prediction of values which would be obtained if observations were to be made at any point. This certainly expresses the purpose of the Canadian charts. In attempting to fulfill this requirement, some of the earlier D-charts issued in Canada tried to satisfy every observation. The resulting contour lines had so many sinuosities and loops as to render the chart almost useless to most users. In the type of chart produced more recently the short wave-length anomalies due to crustal effects are smoothed out. The remaining field depicts the long wave-length anomalies, due to causes within the core, superimposed on the 'normal' field. To achieve this aim subjectively, smoothing formulae were applied laboriously to individual contour lines until the cartographer was satisfied with the degree of smoothness obtained.

For the current series of charts, the prospect of plotting some 80,000 points, contouring and smoothing, was overwhelming, particularly in view of the limited staff to do the job. It was realized that either an analytical approach or some averaging procedure would have to be used. It was decided to proceed with an averaging technique. Analytical approaches will be discussed at the end of the paper.

Ballenzweig (1959) discusses the deficiencies of various methods used for mapping the geographical variation of geophysical quantities. He advocates the use of an equal-area grid, particularly if the area studied has considerable latitudinal extent. A modified equal-area grid was devised such that each quadrangle had an area equivalent to a 2-degree quadrangle at the equator. Complete equality was not attained because the box widths were made variable in 0.5-degree steps only, to simplify the computing. The areal standard deviation from the mean is 4 per cent. There are 607 boxes, so that on the average, the mean values are 220 kilometers apart. It is obvious that charts drawn from this distribution of mean values will obscure the short wave-length anomalies. From the linear interpolation curves of Serson and Hannaford (1957), the expected r.m.s. errors in such charts are $\sigma_H = 170\gamma$, $\sigma_Z = 200\gamma$, and $\sigma_D = 170\ \gamma/H$. To effect a marked increase in the accuracy of the charts, quadrangles smaller than 0.5 degree would have to be used, equivalent to approximately 10,000 mean values.

During the averaging procedure, Chauvenet's criterion of rejection is used to reject doubtful observations. Rejectability is determined as a function of the deviation, dispersion and the number of measurements used in

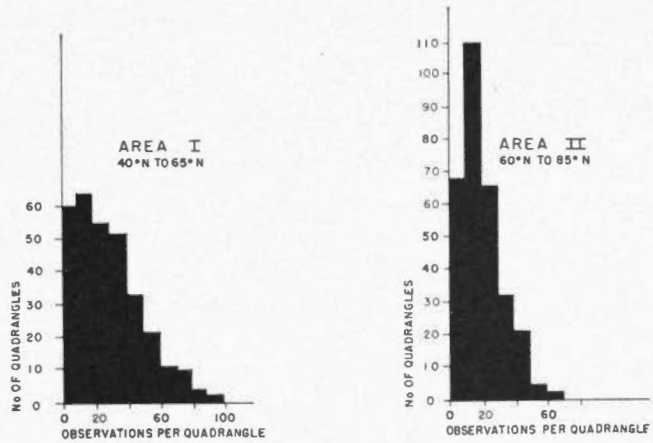


FIGURE 4. Distribution of observations over equal-area grid.

determining the mean. Less than 1 per cent of the observations were rejected. The distributions of observations over the equal-area grid are shown in Figure 4 for Areas I and II. On the average there are 31 and 21 observations per quadrangle, respectively, for these areas.

Standard deviations are computed during the averaging procedure as a test of observational scatter after the rejection criterion has been applied. The distribution of

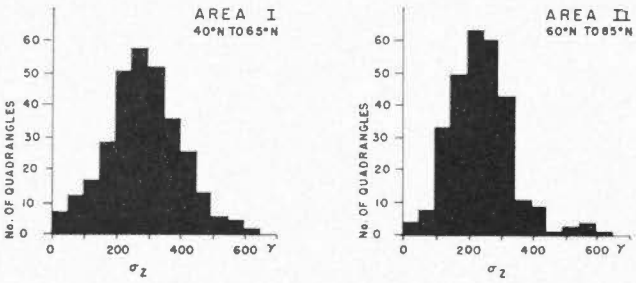


FIGURE 5. Distribution of mean standard deviations in Z.

these deviations is shown in Figure 5 for Z, the only element common to both areas. The distributions are approximately the same for the other elements. The average deviation from the mean is shown in Table V.

TABLE V

Area I			Area II		
Element	σ	% within 1 σ	Element	σ	% within 1 σ
D	0.84°	78	U	141 γ	71
H	160 γ	74	V	98 γ	69
Z	119 γ	69	Z	92 γ	65

For Area II the mean values ($\bar{U}$, $\bar{V}$, $\bar{Z}$) are plotted and contoured. U,V-isolines are adjusted for mutual consistency using an adaptation of the Chapman curl test by Hutchison (1949) for horizontal grivation components. The geographical positions of the points of intersection of the adjusted U,V-isolines are scaled off. Values of $\dot{Z}$, $\dot{U}$, $\dot{V}$ are also scaled for these positions. New cards are punched listing these data. The simple block diagram of Figure 6 depicts the program flow for computing the remaining elements. These values are plotted with the best predicted values (obtained graphically) for all observatories and reliable repeat stations and the final magnetic charts for Area II are drawn. This procedure, of using graphically obtained values to supplement those values obtained automatically, is used for all elements and their time derivatives in both areas. It seems a reasonable requirement that, if these charts are to serve the purpose of prediction as outlined earlier, then the predicted values at undisturbed magnetic observatories and repeat stations should be satisfied.

For Area I the mean values ($\bar{D}$, $\bar{H}$, $\bar{Z}$) are plotted and the final charts drawn. Originally it was thought that F, I, X, Y and their time derivatives could be computed in a single run from $\bar{D}$, $\bar{H}$, $\bar{Z}$ and their time derivatives. As it turned out, since there were many more D values than H or Z, the derived mean positions did not correspond and this plan had to be dropped. Two new sets of computing cards are prepared. From one set, listing $\bar{H}$, $\bar{Z}$, and the corresponding $\dot{H}$, $\dot{Z}$ scaled from the isoporic charts, F, I, $\dot{F}$, $\dot{I}$, are computed. From the other set, listing D, H, $\dot{D}$, $\dot{H}$, scaled off the completed charts at intervals of 5° longitude and 2.5° latitude, X, Y, $\dot{X}$, $\dot{Y}$ are computed. The simple block diagrams (Fig. 6) depict the procedure used.

The isolines in the overlapping zone between Areas I and II are averaged so that a harmonious union is obtained between these areas. Linear interpolation

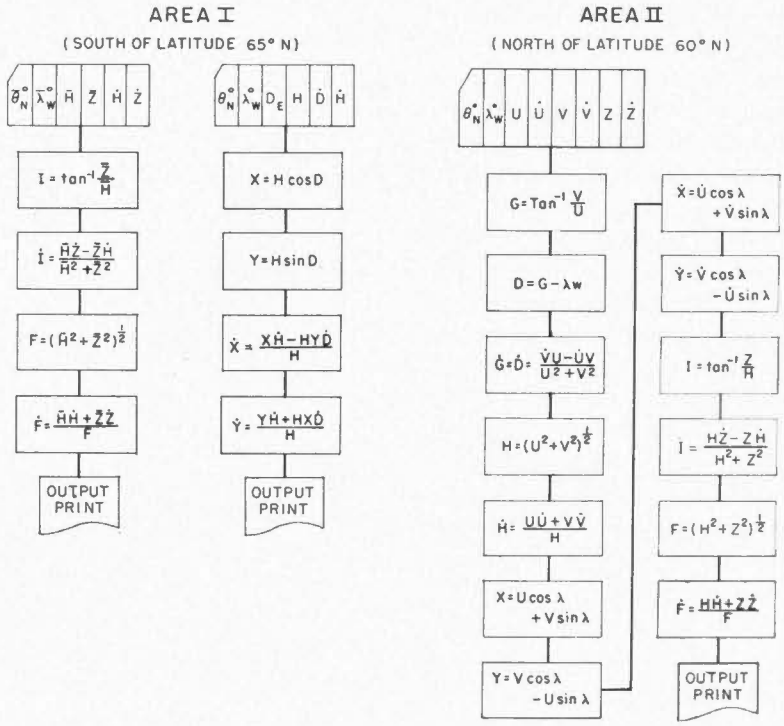


FIGURE 6. Program flow for processing of magnetic elements.

between values is used to obtain the isolines. Also, it should be stated that while the isolines, obtained by the method outlined above, were much smoother than those obtained previously for Canadian magnetic charts, a certain amount of smoothing by eye still had to be done —much more so than was expected.

Accuracy of Charts

Charts of elements D, H, Z, F, I, X, Y, G, U, V and their annual changes for 1965.0 are shown in Figures 7-16. An estimate was made of the chart residuals by making a random comparison of updated values with chart values over the entire chart. Table VI lists the number of values tested and the results of these tests.

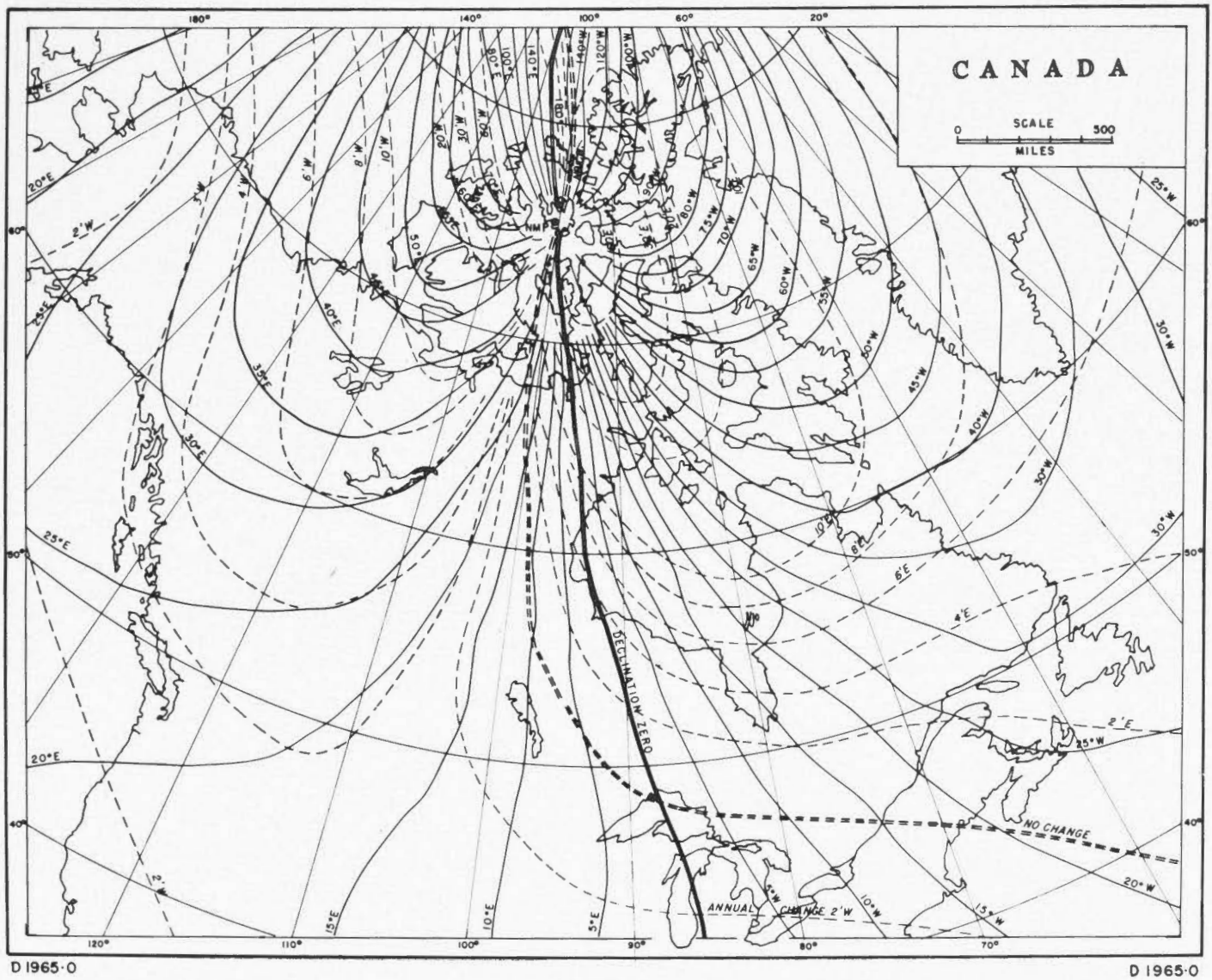
TABLE VI

Element	Number Tested	R.M.S. Difference
D	918	0.6°
H	1401	128 γ
Z	1242	122 γ
F	250	147 γ

A more realistic test of the accuracy of these charts will have to wait until the results of future surveys can be tested against the chart values.

Tests of the F-chart were made using the sea magnetometer results of Hood (1964) and Keen (1963). Their observations, made over Hudson Bay, the Labrador Sea

MAGNETIC DECLINATION (D) CANADA, 1965·0

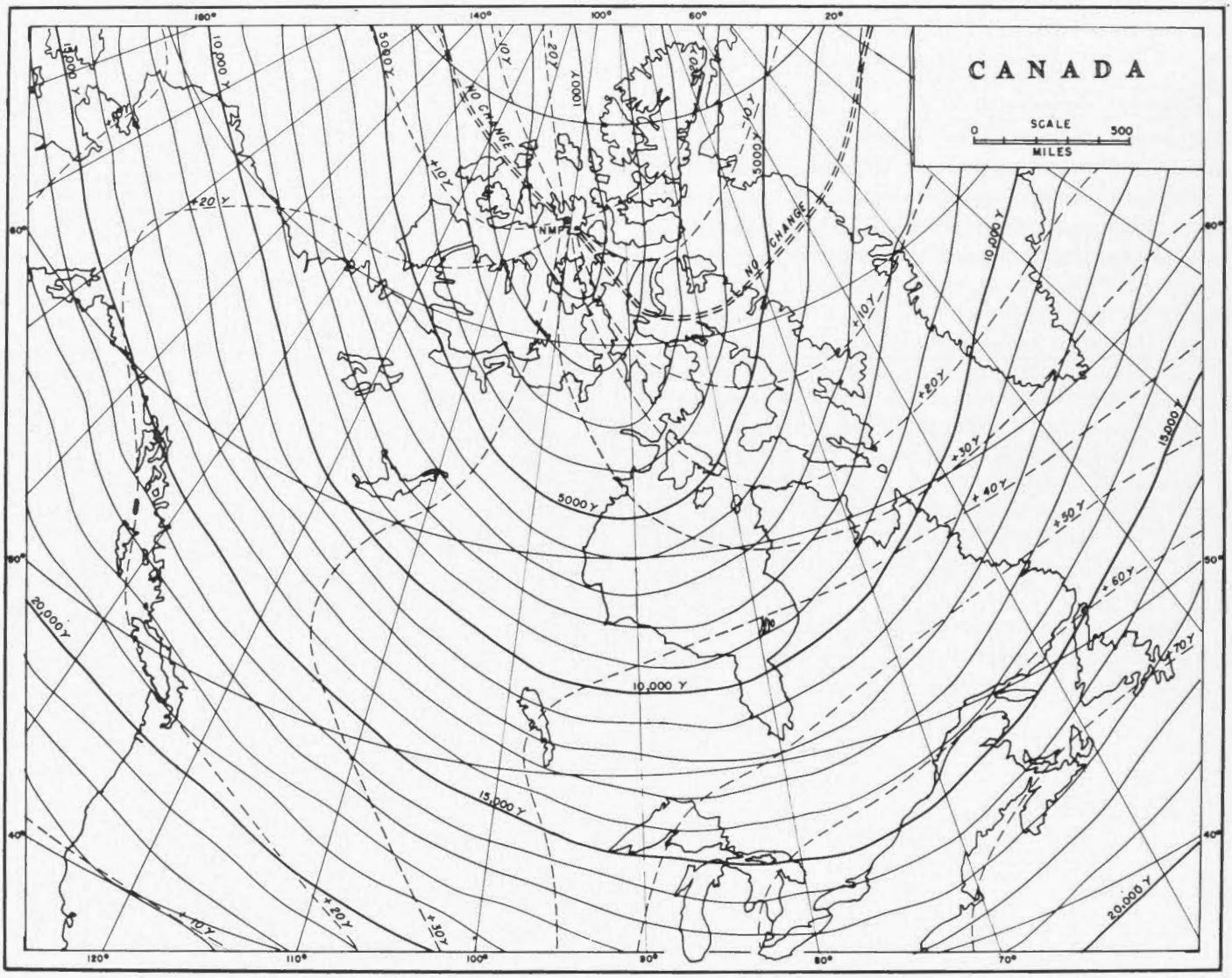


D 1965·0 D 1965·0

FIGURE 7.

and Davis Strait, were not used in the compilation of these charts. These values were updated and a comparison made with the corresponding chart values showed that the r.m.s. differences were 20 per cent higher than those found for Z. This is probably due in part to the increasing presence of the shorter wave-length anomalies in the sea magnetometer results.

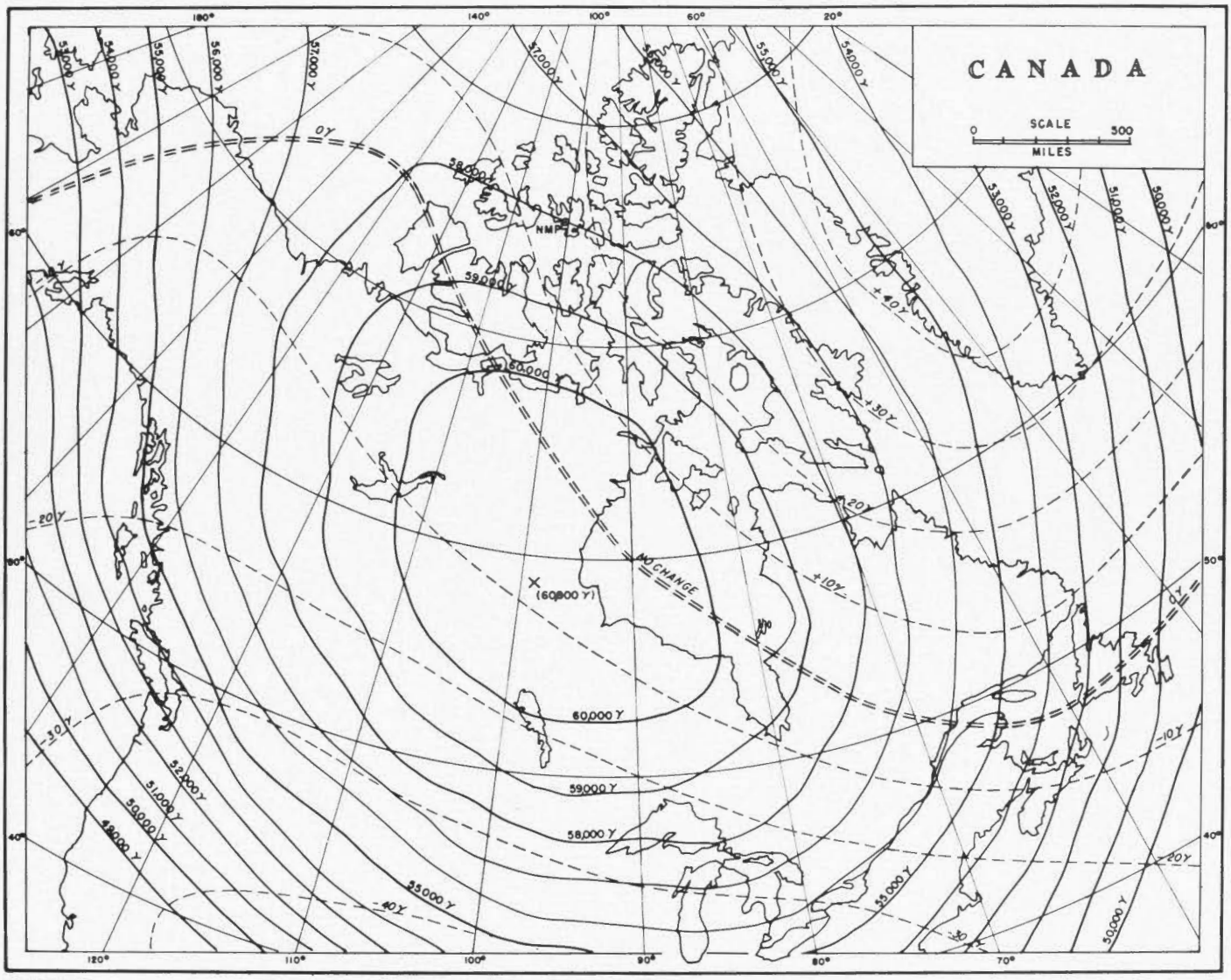
HORIZONTAL INTENSITY (H) CANADA 1965·0



H 1965·0 H 1965·0

FIGURE 8.

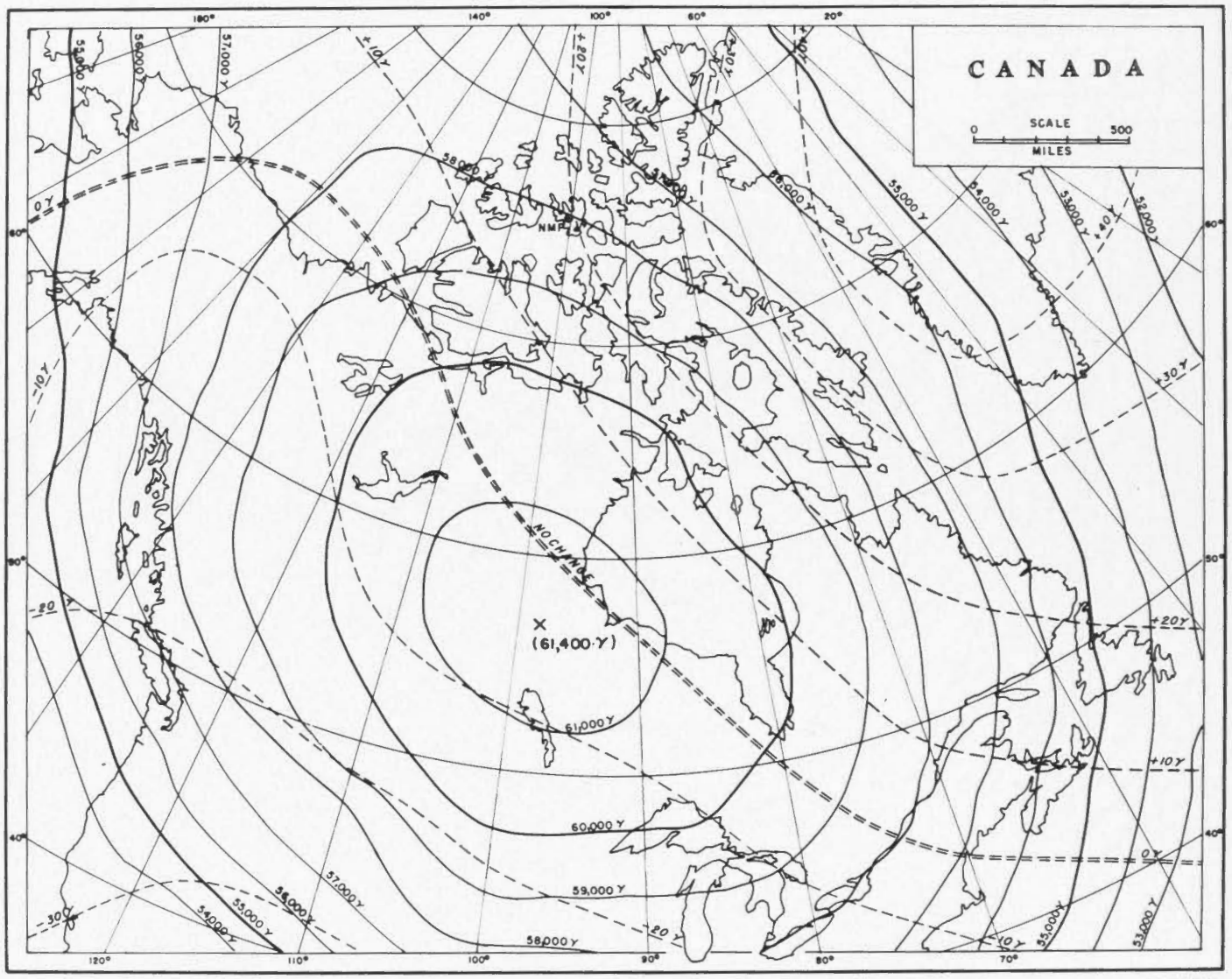
VERTICAL INTENSITY (Z) CANADA 1965·0



Z 1965·0 Z 1965·0

FIGURE 9.

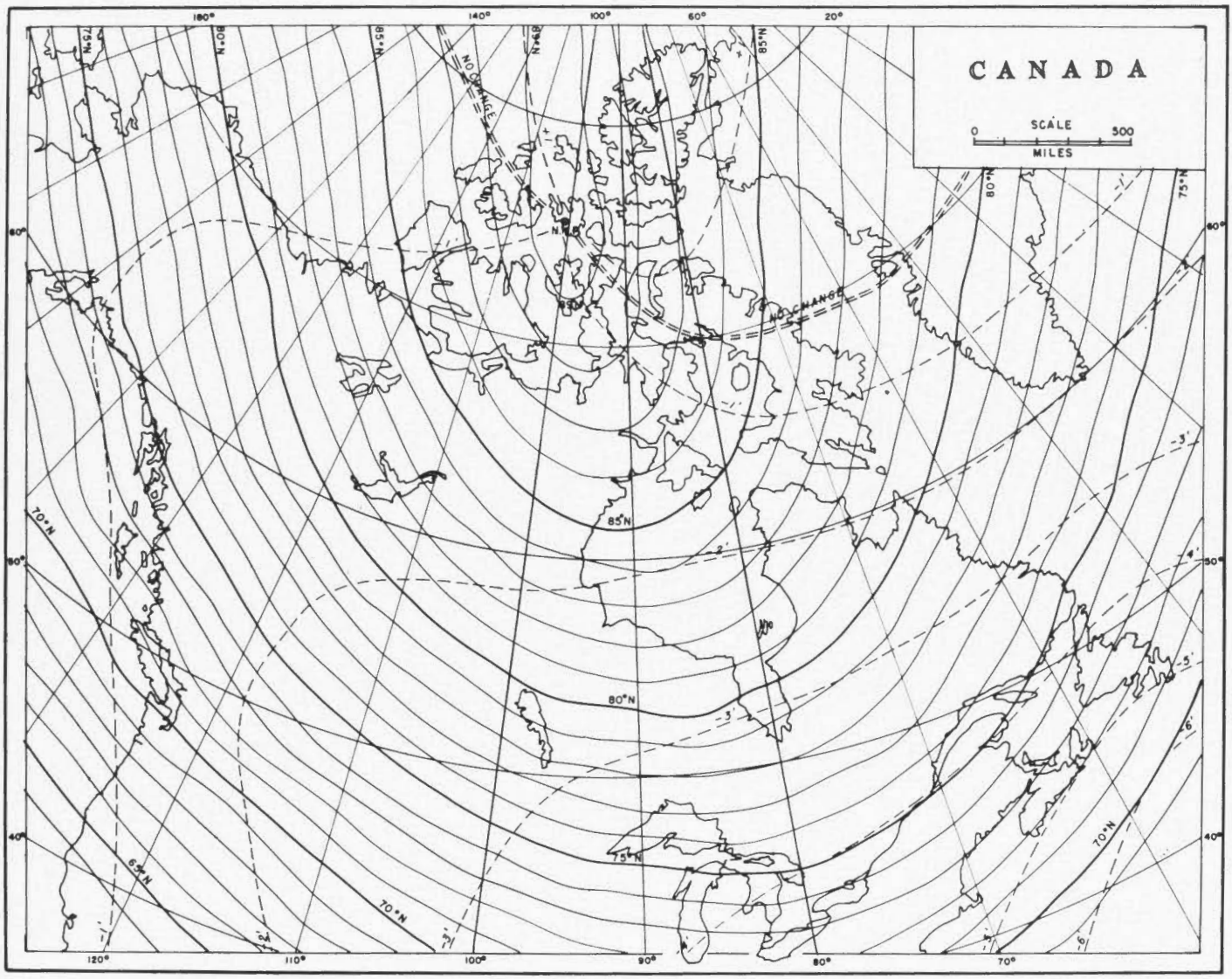
TOTAL INTENSITY (F) CANADA 1965·0



F 1965·0 F 1965·0

FIGURE 10.

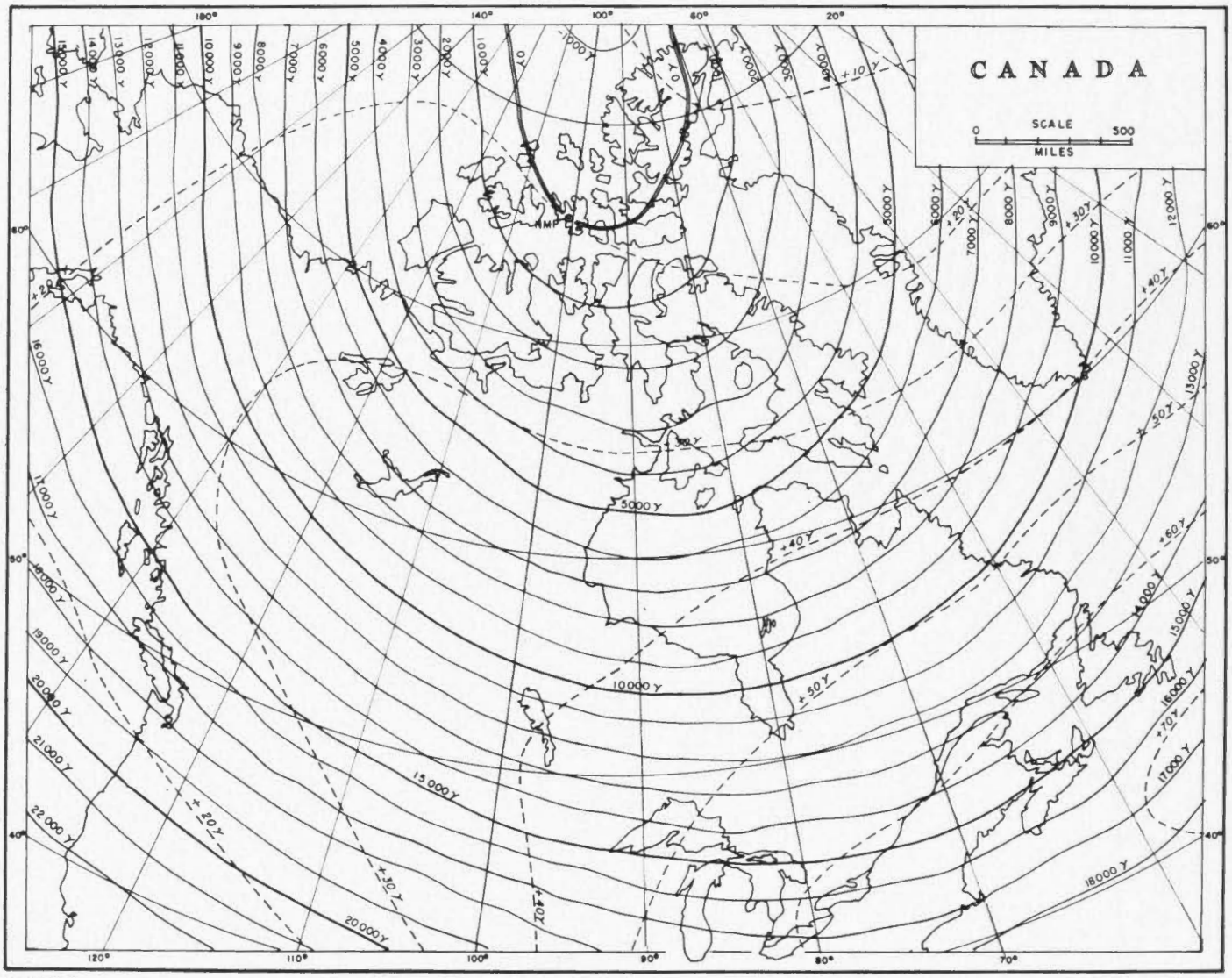
MAGNETIC INCLINATION (I) CANADA 1965·0



I 1965·0 I 1965·0

FIGURE 11.

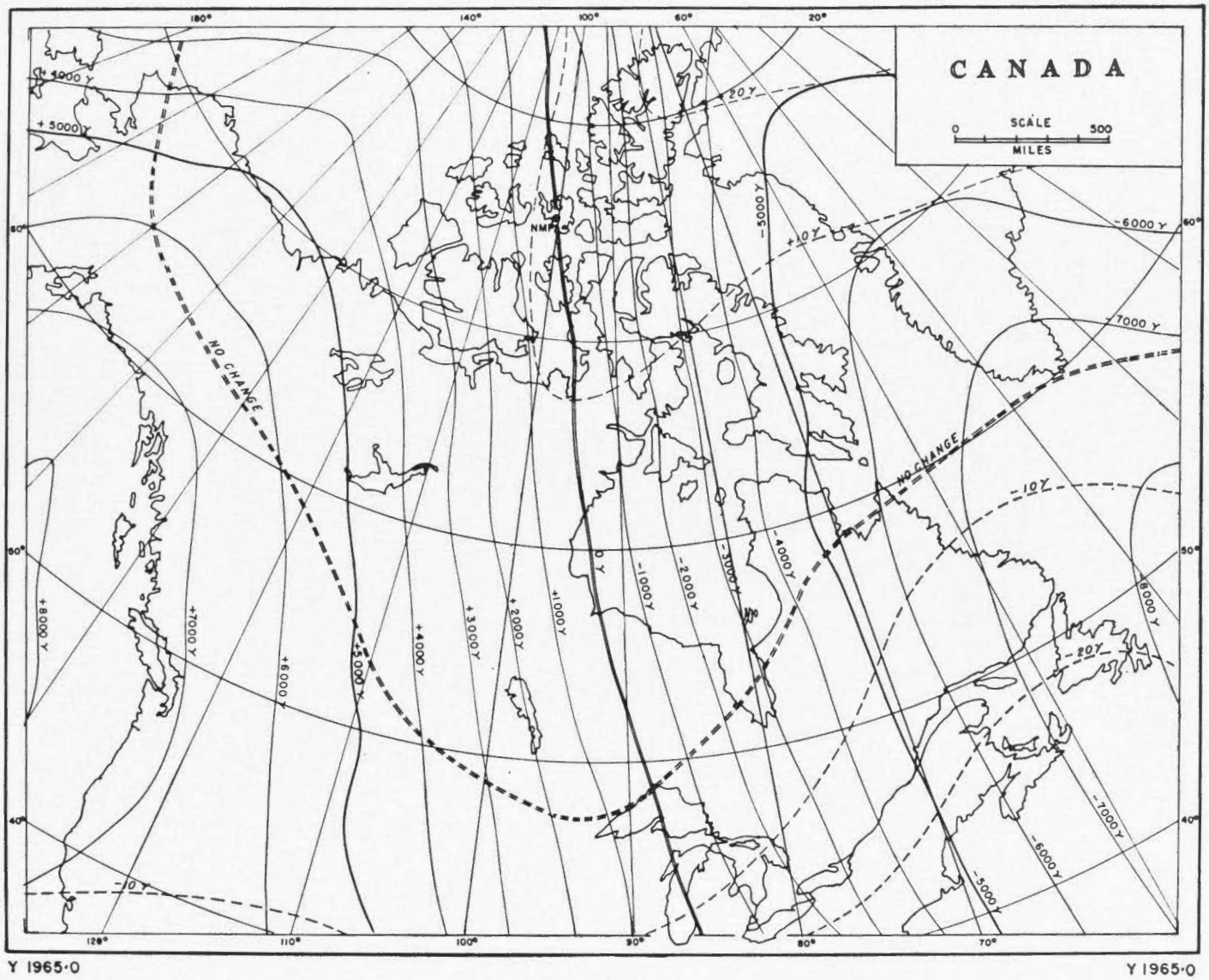
NORTH COMPONENT (X) OF THE HORIZONTAL INTENSITY .965·0



X 1965·0 X 1965·0

FIGURE 12.

EAST COMPONENT (Y) OF THE HORIZONTAL INTENSITY 1965·0



Y 1965·0 Y 1965·0

FIGURE 13.

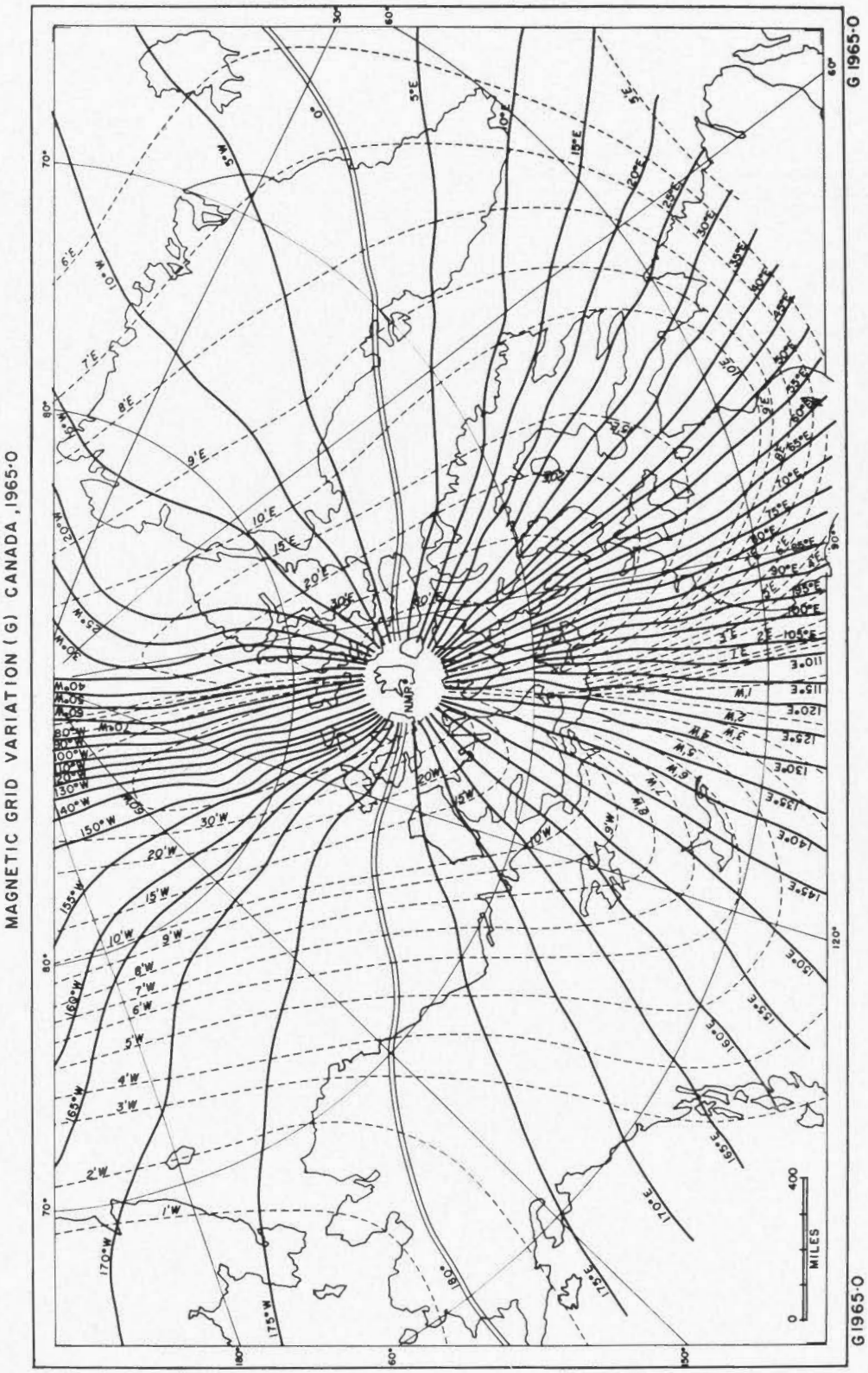

MAGNETIC GRID VARIATION (G) CANADA, 1965·0
G 1965·0
G 1965·0
MILES
0
400

FIGURE 14.

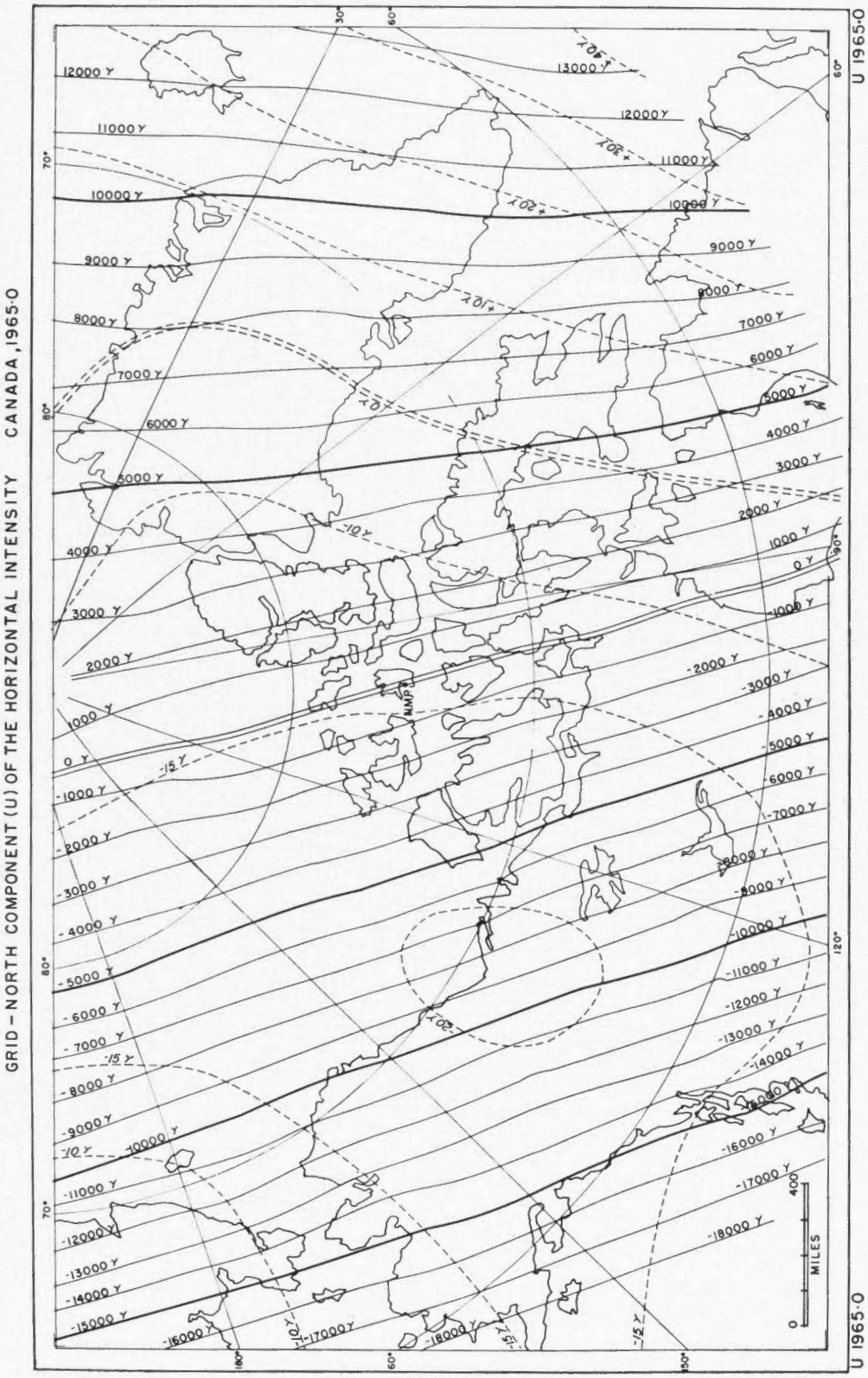

GRID – NORTH COMPONENT (U) OF THE HORIZONTAL INTENSITY CANADA, 1965·0
U 1965·0
U 1965·0
12000 γ
11000 γ
10000 γ
9000 γ
8000 γ
7000 γ
6000 γ
5000 γ
4000 γ
3000 γ
2000 γ
1000 γ
0 γ
-1000 γ
-2000 γ
-3000 γ
-4000 γ
-5000 γ
-6000 γ
-7000 γ
-8000 γ
-9000 γ
-10000 γ
-11000 γ
-12000 γ
-13000 γ
-14000 γ
-15000 γ
-16000 γ
-17000 γ
-18000 γ
13000 γ
+20 γ
+10 γ
-10 γ
-15 γ
-20 γ
-15 γ
MILES
0
400
30°
60°
70°
80°
90°
120°
150°
180°

FIGURE 15.

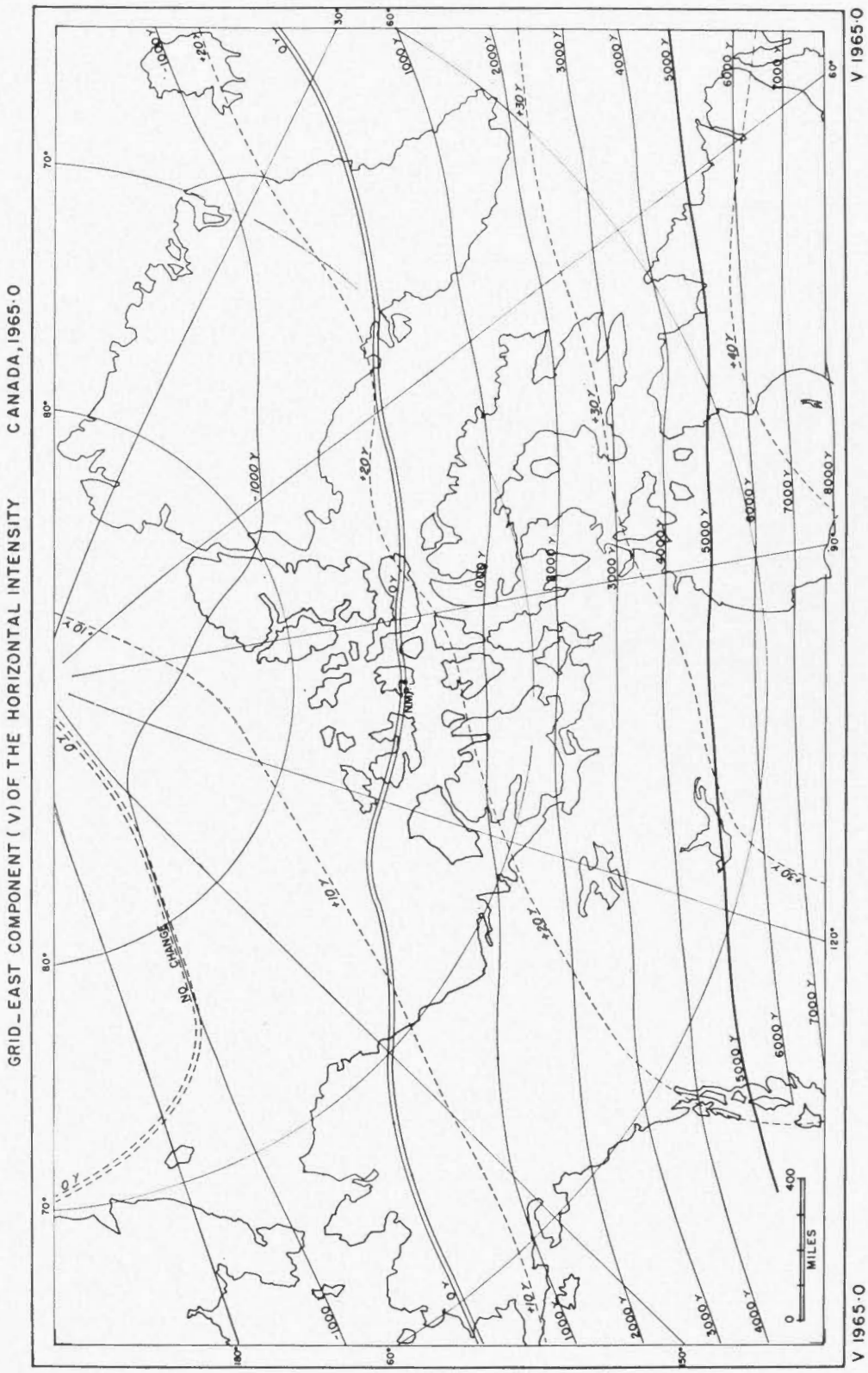

GRID_EAST COMPONENT (V) OF THE HORIZONTAL INTENSITY CANADA, 1965·0
V 1965·0
V 1965·0
NO CHANGE
NMP
MILES
0
400
0 Y
1000 Y
2000 Y
3000 Y
4000 Y
5000 Y
6000 Y
7000 Y
8000 Y
+10 Y
+20 Y
+30 Y
+40 Y
70°
80°
90°
120°
60°
30°

FIGURE 16.

Conclusions

The present system of producing Canadian charts has many advantages. The programming steps are relatively simple. The system is adaptable to smaller computer systems such as the I.B.M. 1620. Large amounts of data are easily handled due to the various natural divisions in the program logic. Regarding the charts, the average residuals were lower than expected and represent a 20 per cent improvement over the 1955 set of charts for Canada.

However, there are still many disadvantages to this system. By using equal-area grid intervals, poorly mapped areas receive the same weight as those that are well mapped. While the use of the rejection criteria with mean values spaced 220 kilometres apart contributes a certain amount of smoothing, in the final analysis the method used is basically a graphic one and is subject to all the well-known objections to the graphic method. Programming continuity has to be interrupted while intermediate charts are constructed. More sophisticated methods will be tried in the future to see what improvements can be made.

In recent years, a great deal of work has been done by Cain and his associates (1964) in evaluating spherical harmonic descriptions of the main geomagnetic field.

In 1962, Cain (private correspondence) seeking a test for his fitting programs using vector data over a small area, experimented with updated 1960 Canadian data, approximately 12,000 values in D, H, Z. He determined a set of spherical harmonics that minimized the sums of $\Delta H^2 + (H\,\Delta D)^2 + \Delta Z^2$ for all the data. Here ΔD, ΔH, ΔZ are the differences between the observed and computed values. The following average residuals were obtained. The residuals decreased significantly going

	n=3	n=4	n=5	n=6	n=7
H ΔD	359.3æ	304.8æ	304.1æ	303.9æ	303.5æ
ΔH	347.4	294.8	293.4	297.5	290.6
ΔZ	295.1	243.9	238.7	236.1	236.1

from n = 3 to 4 and there was very little improvement above n = m = 7 (63 coefficients). This led Cain to believe that the most useful fit to the data over this area is with n = 4. Charts in H,Z were plotted using the U.S. Weather Bureau automatic techniques. Although these smooth charts agreed quite favourably with preliminary charts of H,Z produced for Canada in 1960, except for a few small irregularities, the magnitude of the residuals is twice that obtainable with our present method. It appears that little improvement in the fit can be obtained without carrying the spherical harmonic analysis out to much higher orders, involving hundreds of coefficients.

From Heppner's review (1963) on field sources and the number of coefficients required to describe the earth's main field, it now appears that coefficients up to order 6 are necessary, and orders > 6 are attributed to crustal sources. An improvement in fit could probably be made by performing a separate analysis on the anomaly field by a method similar to that developed by Knapp (1942)

There are other analytical methods in current use. One of the oldest and still popular is the fitting of polynomial expressions to the observed data with coefficients to be determined by least-square approximations. To apply this method to Canadian data, a series of overlapping areas would have to be used. A system using a minimum of twenty equal areas is visualized with a unit area being equivalent to a 10 × 20° quadrangle at the equator. The area around the north magnetic pole would require a special treatment.

Figures 7-16 show that the families of isolines are quite uniform and suggest that simple geometric expressions might provide a realistic fit; for example, the fitting of a family of ellipses to the H and I isolines.

Fougere and McClay (1957) devised a method whereby the measured values of X, Y, Z and F are fitted to polynomials in latitude and longitude in such a way that the radial component of the curl F vanishes identically and $F^2 = X^2 + Y^2 + Z^2$ is satisfied identically. Fougere (1964) presented an improvement over part of this method, in which the horizontal vector is expanded in a set of orthogonal functions. These orthogonal functions can be tested for statistical significance by the variance ratio test in order to obtain the best representation of the data with vanishing curl. The final result is a pair of simple polynomials in X and Y. He applied the method to a sample of data consisting of observations of the field at 69 locations above Eglin Air Force Base in Florida. Over the small area chosen (200 sq. miles) the standard error is about 91 γ.

Pochtarev and Vints (1962) developed a method which they claim is more objective than the graphical method and less formal than the analytical method. The method determines the normal field containing only the long wave-length anomalies and eliminates the local anomaly effect. This is achieved by computing the field at an altitude where these local effects are completely attenuated. Their studies showed that to eliminate anomalies up to 200 kms in extent, an altitude of 50 kms was necessary. The field was computed by solution of the Dirichlet-Neumann problem in the form of a Poisson integral for the potential function

$$U_p = \frac{R^2 - R_o^2}{4\pi R_o} \int \frac{\bar{U}}{P^3}\, d\sigma$$

Mathematical descriptions of the earth's field are extremely useful, particularly in this present space-oriented age, for extrapolating the field to greater altitudes. There are other methods however that have more

physical meaning, such as the use of a central dipole with radial dipoles placed at the core-mantle interface, approximating electrical loops. It is not the authors' intention to review these methods but we would like to mention briefly the very good fit in H,Z and magnetic meridians that Alldredge and Van Voorhis (1962) obtained using this method to explain the observed features of the great Arctic anomaly. They did not try to adjust the magnitudes and locations of the radial dipoles by a least-squares procedure to obtain a better fit with the observed field, since their main goal was to show that the magnetic patterns observed in the Arctic could be explained by very deep seated sources as opposed to crustal geological explanations.

Alldredge and Hurwitz (1964) used a least-squares method to adjust the amplitude and location of each dipole for a best fit to the observed field components. Using various models, they were able to produce a fit to the U.S. 1945 world charts almost as good as Vestine's mathematical representation using 48 spherical harmonic coefficients. Other models obtained excellent fits to the 1955 U.S. and British Admiralty world charts.

With the volume of observations now available, it is apparent that the problem of producing accurate Canadian magnetic charts is primarily a data-handling one. Since the ultimate aim is to produce accurate charts which best fit the observed data, many of the methods listed above will be tried with our present updated observations to determine which method is most suitable for future chart production.

The fundamental problem in magnetic cartography today is to obtain a mathematical description of secular change. Our present graphical system, as stated earlier, yields probable errors of $\pm 4'$ in D and approximately $\pm 20\ \gamma$ in H and Z over an 18-year reduction period. Any improvement on this, with the present data, will have to come from a different approach.

The laws of physics demand that the secular change field have smooth continuity in the space-time continuum. At any one time, the rate of change is a single-valued function of space with continuous derivatives, and at any one point in space, a typical component is a continuous single-valued function of time with continuous derivatives. The problem is to find a practical expression of this function.

With our present system the rate of change is considered constant over a 5-year period. Thus at a fixed point, where the field is a function of time alone, this function is represented by a series of straight-line segments, and the laws of continuity are subverted in order to find a simple but workable solution.

Hutchison et al. (1953) in an unpublished paper on the secular field in Canada treated the field at each point as a continuous function of time having the forms of a Fourier series. They analysed components of X, Y and Z for six observatories and some 200 repeat stations. The equations had the form

$$X(t) = X_o + A_o\,(t-t_o) + A_1 \cos\omega\,(t-a_1) + A_2 \cos 2\omega\,(t-a_2) + \ldots$$

$$Y(t) = Y_o + B_o\,(t-t_o) + B_1 \cos\omega\,(t-a_1) + B_2 \cos 2\omega\,(t-a_2) + \ldots$$

$$Z(t) = Z_o + C_o\,(t-t_o) + C_1 \cos\omega\,(t-t_1) + C_2 \cos 2\omega\,(t-a_2) + \ldots$$

where X_o, Y_o, and Z_o are the values of the element at the time of the observation. It was found that X(t), Y(t) both exhibited a fundamental period of 133 years and one harmonic period of 67 years, while the expression for Z(t) required only a single periodic term of 50 years. There was no real physical significance attached to these periods but they were introduced only as a mathematical convenience for reducing Canadian observations to epoch.

The residuals obtained on fitting the observed values to the mathematical expressions were unfortunately high; 90 per cent of the values in X, Y and 65 per cent in Z had residuals of 100 γ's or better. However this analysis was done under considerable handicaps. The secular change data was limited. Owing to the lack of computer facilities, many graphical approximations were used, thus limiting the accuracy of the results. The authors feel that with the availability of these facilities a more refined approach may lead to expressions describing the secular change field much more accurately, over a limited period.

There are, of course, other mathematical approaches for determining secular change, of which spherical harmonic analysis of time derivatives is the most common. Alldredge and Hurwitz (1964) determined secular change from two sets of dipole parameters for the United States charts for epochs 1945 and 1955. Although they were able to obtain a mathematical description of secular change based on changes in the parameters of a dipole set, the changes shown were not much larger than the scatter for the three different sets of 1955 parameters.

Even though, at the present, our repeat station observations consist of reliable means of the day values only, the future seems promising for better secular-change determinations in Canada. There are now eight well-distributed observatories throughout the country plus the possibility of one more establishment in the not too distant future. We also share the benefits of eight other observatories in adjacent areas. The difficulties of reducing repeat station observations to a satisfactory epochal value are being overcome. Whitham and Loomer (1957) have expressed fears that programs of repeat observations, at infrequent intervals over short durations are of doubtful use in the Arctic. Certainly the

curves of secular variation for repeat stations in the lower latitudes suggest that the procedure is satisfactory, and only time will tell whether or not a regular program of observations will be of similar value in the Arctic.

Acknowledgments

The mapping programs were carried out by the Departmental Computing Centre under the able guidance of the officer-in-charge Mr. K. Shimizu. In particular, the authors would like to thank Miss Mabel Grieve, who was directly responsible for these programs.

The magnetic data shown on Figure 1 was plotted by the staff of the Canadian Army Survey Establishment, Ottawa, on their AERO-Digitork plotter.

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Appendix I

In 1960 the Canadian Hydrographic Service requested an outline of the behaviour of magnetic compasses in the Arctic, particularly in the vicinity of the north magnetic pole. Also required was a definition of the area in which magnetic compasses are valueless, the magnitude of the fluctuation in variation and the frequency and effect of magnetic disturbances. Since these notes would be of great value to a mariner they were to be included in *Pilot of Arctic Canada*, a compilation of sailing directions for the Canadian Arctic.

It was decided that a chart outlining this information would make the most effective presentation. Thus was born the "Magnetic Chart of the Canadian Arctic, 1960.0". The new chart for 1965.0 is shown as Figure 17. A note incorporated in the legend of the published chart (not shown on Fig. 17) states the following:

> Most days are magnetically disturbed in the Arctic; at Resolute Bay only 1 day in 5 is classified as reasonably quiet magnetically and only 1 day in 14 as very quiet.
>
> During moderate magnetic disturbances the daily track of the North Magnetic Pole approximates an ellipse with a major axis 30 miles long roughly north-south and a minor axis of about 18 miles roughly east-west. During a severe disturbance, its effective position can shift between 50 and 100 miles.
>
> The magnetic variation at any one place fluctuates and the amount of this fluctuation is shown on the chart as the Mean Daily Range of Magnetic Variation. These data are based on hourly mean values obtained from five northern magnetic observatories at Resolute Bay, Baker Lake, Alert, Mould Bay and Churchill, for the summer months of 1964, a period of sunspot minimum; during periods of magnetic disturbance, the values shown may be doubled for brief periods.

The chart for 1965 was compiled in the following way:

> Where $H < 6000\ \gamma$, the ordinary magnetic compass is erratic.
> Where $H < 3000\ \gamma$, the ordinary magnetic compass is useless.
> (International Hydrographic Conference, 1962).

The 1965 H-isolines were used to outline these areas.

Since ships operate in these areas in the summer months only, the D range in the mean hourly values for the summer of 1964 was examined for the five northern observatories mentioned in the note. The values obtained were used in conjunction with the 1965 H-isolines to derive the lines of equal mean daily range of magnetic variation, using the simple equation

$$r_D = \frac{R_D \cdot H_O}{H}$$

Where R_D is the D range for the observatory,
H_O is the chart value of H at the observatory,
and r_D, the D range at any point on the H-chart.

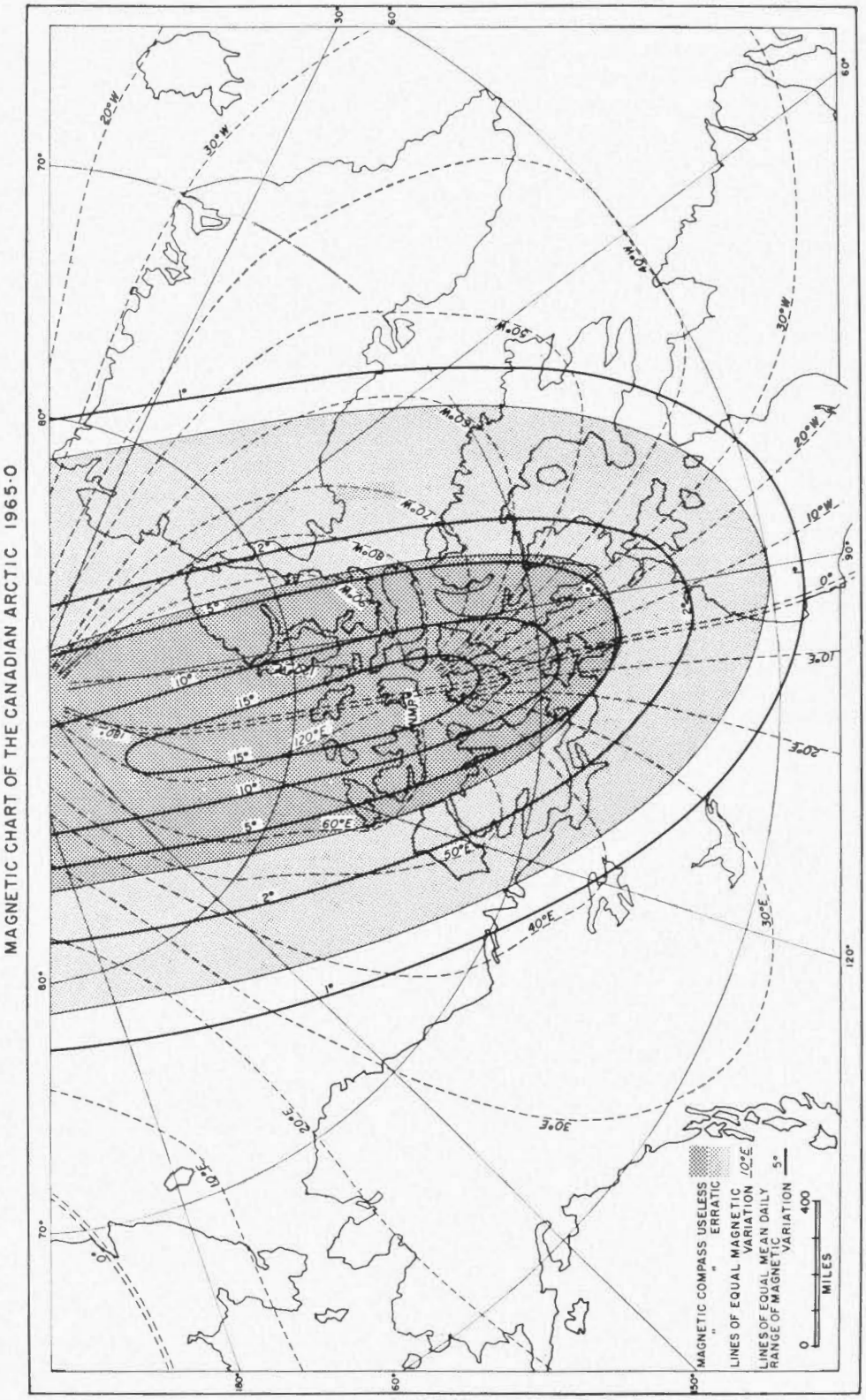
MAGNETIC CHART OF THE CANADIAN ARCTIC 1965·0
MAGNETIC COMPASS USELESS
" " ERRATIC
LINES OF EQUAL MAGNETIC VARIATION 10°E
LINES OF EQUAL MEAN DAILY RANGE OF MAGNETIC VARIATION 5°
0 400 MILES
NMP
120°E
60°E
50°E
40°E
30°E
20°E
10°E
0°
10°W
20°W
30°W
40°W
50°W
60°W
70°W
80°W
90°W
1°
2°
5°
10°
15°
70°
80°
90°
120°
150°
180°
30°
60°

FIGURE 17.

Appendix II

TABLE VII

COMPENDIUM OF CANADIAN MAGNETIC CHARTS PRODUCED SINCE 1883

Chart	Area	Epoch	Scale Mi/in	No. of Stns.	Compiling Agency	Notes
D, I, F	Canada	1844	100	300	Lefroy	south of 60°N, produced in 4 sections
D	W. Canada	1904.0	——	——	T.S.	D.L.S. use only
D	W. Canada E. Canada	1911.0	100	4,500	T.S.	in two sections
D	W. Canada	1912.0	35	4,000	T.S.	
D	W. Canada	1914.0	300	6,800	T.S.	produced in 2 sections
D, $\dot{D}$	W. Canada	1917.0	100	9,400	T.S.	first graphical showing of secular change up to 60°N; all future charts to show isopors
I, $\dot{I}$	W. Canada	1917.0	100	900	T.S.	
H, $\dot{H}$	W. Canada	1917.0	100	900	T.S.	
D	W. Canada	1922.0	100	20,000	T.S.	first Canadian magnetic chart showing location of NMP on northern end of King William Island
I	W. Canada	1922.0	197.3	1,200	T.S.	
H	W. Canada	1922.0	197.3	1,200	T.S.	
D	Canada	1922.0	100	——	T.S.	
D	Canada	1927.0	100	24,000	T.S.	
I	Canada	1927.0	300	1,700	T.S.	
D	Canada	1932.0	100	30,000	T.S.	
H	Canada	1932.0	300	3,750	T.S.	
D, $\dot{D}$	Canada	1940.0	100	——	S.E.B.	Surveys and engineering Br.
D.I.H. Mag. Mer.	Polar	1942.5	100	——	Dom.Obs.	Gnomonic projection
D	N.W.T., Yukon	1948.5	80	——	Dom.Obs.	
D	Canada	1948.5	100	——	Dom.Obs.	
D	Canada	1955.0	100	20,000	Dom.Obs.	
I, H, Z, F	Canada	1955.0	100	2,000	Dom.Obs.	
D	Man.	1955.0	20	3,470	Dom.Obs.	compiled mainly from D observations made by T.S.
D	Sask.	1955.0	20	6,250	Dom.Obs.	
D	Alta.	1955.0	20	6,650	Dom.Obs.	
D	Canada	1960.0	100	24,000	Dom.Obs.	including 5,000 airborne observations
Special	Arctic Canada	1960	137.5		Dom.Obs.	
D, I, H, Z, F	Canada	1965.0	100	18,000	Dom.Obs.	Observations from 1947 on
Special	Arctic Canada	1965.0	120		Dom.Obs.	

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EVIDENCE FOR THE IMPACT ORIGIN OF LAC COUTURE

C. S. Beals, M. R. Dence and Alvin J. Cohen

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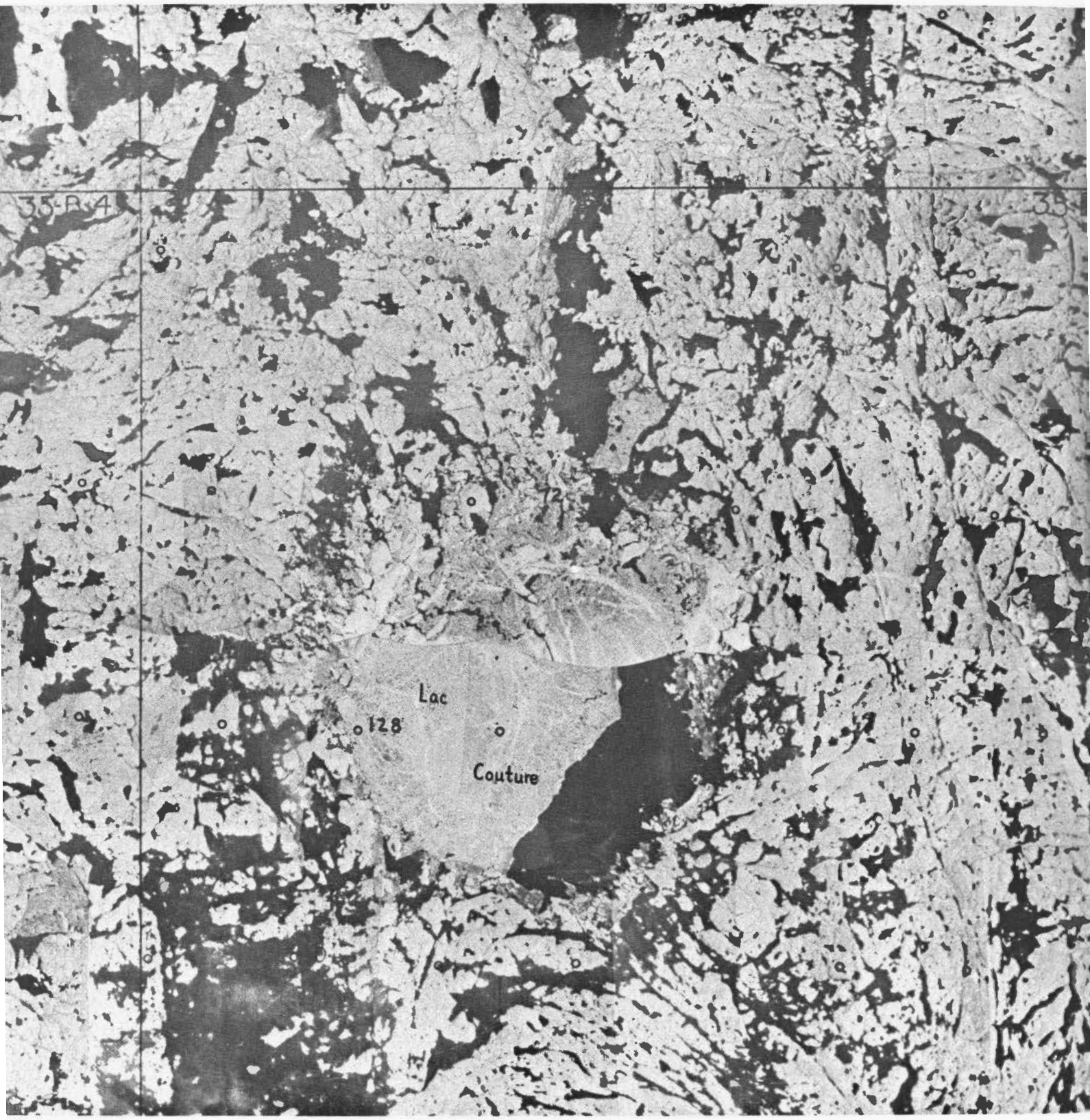


FIGURE 1. Aerial mosaic of Lac Couture; islands partly obscured by floating ice.

EVIDENCE FOR THE IMPACT ORIGIN OF LAC COUTURE

C. S. Beals, M. R. Dence and Alvin J. Cohen

Abstract:—Lac Couture is a circular lake of diameter 16 km with a central island-free area of 10 km diameter and depth 150 metres. The central deep area is surrounded by a shallower zone characterized by numerous islands and peninsulas all of which show marked indications of glacial action, the direction of ice movement being from east to west.

An examination of the bedrock of the islands showed many locations of heavy shattering and other indications of disturbance with sheeting planes and joints departing from the usual horizontal-vertical pattern common to areas surrounding the lake. Most of the islands and peninsulas examined showed numerous boulders and other types of glacial debris and on a number of islands on the westward side of the lake this debris included large quantities of rock breccia of the type normally associated with meteorite impact. Since the direction of glacial motion was from east to west and since no other explanation could be found for the breccia it was concluded that it had been dredged from the lake bottom by the moving ice.

Mineralogical examination of breccia fragments indicated the presence of numerous crystals deformed and altered by heavy shock. The evidence suggests an ancient and eroded impact crater of 12 km diameter of which the circular fringe of islands and peninsulas represents the remains of the rim, formerly several hundred metres in height.

Résumé:—Le lac Couture est un lac circulaire, d'un diamètre de 16 km et dont la partie centrale est dépourvue d'îles. Cette partie, d'un diamètre de 10 km et profonde de 150 mètres, est entourée d'une zone moins profonde, caractérisée par l'existence de nombreuses îles et presqu'îles qui toutes portent les indices évidents d'une action glaciaire, la glace ayant cheminé de l'est à l'ouest.

En étudiant la roche saine des îles, les auteurs ont constaté qu'elle a été fortement fragmentée en bien des endroits. Ils ont relevé d'autres indices d'accidents tectoniques: les plans de structure en gros bancs et les joints n'ont pas pris la position horizontale-verticale qui est ordinaire dans tous les environs du lac. Dans la plupart des îles et presqu'îles, on a vu de nombreux blocs erratiques et d'autres vestiges de l'action glaciaire. Parmi ces vestiges, sur plusieurs îles du côté ouest du lac, se trouvaient beaucoup de brèches rocheuses du genre qu'on attribue généralement à la chute d'une météorite. Étant donné que la glace a cheminé de l'est à l'ouest, et qu'on n'a pu expliquer l'existence de la brèche autrement, on en a conclu que la glace mouvante l'a façonnée par rabotage au fond du lac.

Au point de vue minéralogique, on a constaté que les fragments de brèche renferment de nombreux cristaux déformés et altérés par un choc brutal. Il faut donc croire qu'il s'agit d'un cratère météoritique ancient et érodé, d'un diamètre de 12 km et dont la bordure circulaire d'îles et presqu'îles représente tout ce qui reste d'une margelle autrefois haute de plusieurs centaines de mètres.

Introduction

The possibility that Lac Couture, Quebec (long. 75°20′W, lat. 60°08′N) might have an origin entirely different from most of the lakes in the Canadian Shield was first suggested by an examination of the 8-mile map sheet 35 SE published in 1955*. A more recent edition of this map is contained in the pocket in the back of this publication. On this map it will be seen that the lake is of roughly circular form with a diameter of the order of 8½ miles (13 km) with a shoreline characterized by numerous inlets which extend its dimensions in certain directions from 16 to 18 kilometres. The most striking feature of the lake is a central island-free area of about 10-km diameter surrounded by a fringe of islands and peninsulas which give it a unique and artificial aspect suggestive of some unusual mode of origin.

An aerial mosaic of Lac Couture is shown in Figure 1. This mosaic emphasizes its circular outline but unfortunately the lake was full of floating ice at the time the photographs were taken so that the details of islands and promontories are obscured. Figure 2 shows the same mosaic with the ice blocks painted out while Figure 3 is a map of the lake originally drawn to a scale of one mile per inch. This map shows in considerable detail the islands and the irregularities of the shoreline as well as the numerous lakes in the surrounding country.

*The New Quebec Crater (long. 73°40′W, lat. 61°17′N) Meen 1950, 1957, and Millman, 1956, also appears on this map.

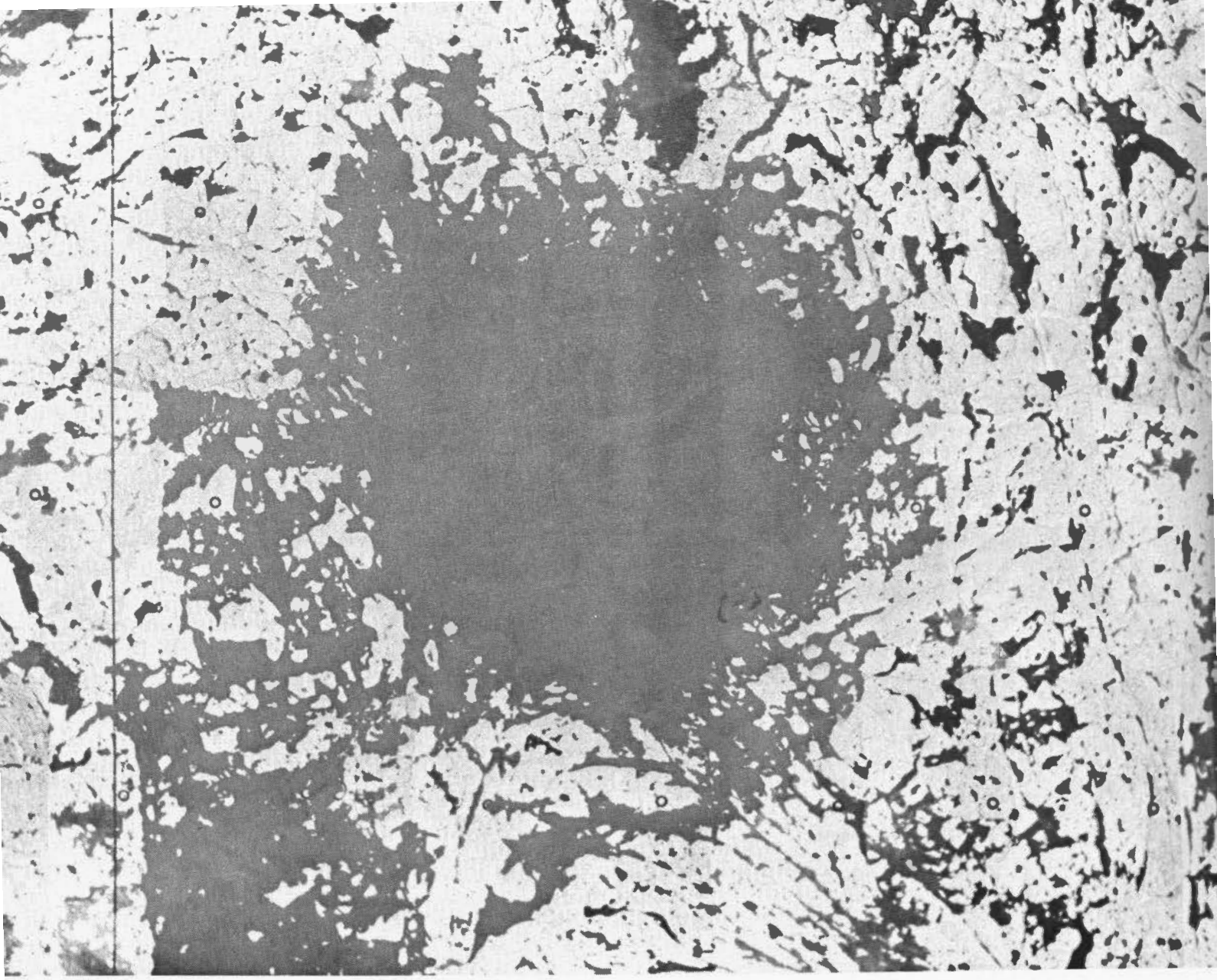


FIGURE 2. Same as Figure 1 with ice painted out to show distribution of islands.

Superimposed upon the map is a depth traverse in an approximately north-south direction indicating maximum depths of 120 metres. The depth traverse was carried out by R. K. McConnell and J. G. Tanner in connection with a gravity survey of this general area in 1959 and 1960. The measurements were made from a Beaver aircraft which was taxied across the lake using a simple mechanical depth sounder and dead reckoning positions. The accuracy was sufficient to show clearly the considerable variations in depth along the traverse and the fact that the greatest depths were not in the centre of the lake. This recalls a similar situation in the Deep Bay Crater (Innes *et al.*, 1964) where the deepest area consisted of a kidney-shaped depression southeast of the centre, possibly gouged out to that shape by glacial action. As in the case of Deep Bay the measured depths of Lac Couture indicate a lake much deeper than is ordinarily found in the Canadian Shield but shallow relative to that of an impact crater of this size. Indications of a rim remnant are found in the islands and peninsulas surrounding the lake, a part of a crater more likely to be subject to erosion than the unshattered mainland area farther from the centre.

The sum total of the preliminary information about Lac Couture outlined above indicates a definite possibility that this lake may be the remains of a very ancient impact crater nearly filled with sediments and/or glacial debris with its rim almost entirely removed by erosion. It was accordingly decided to carry on

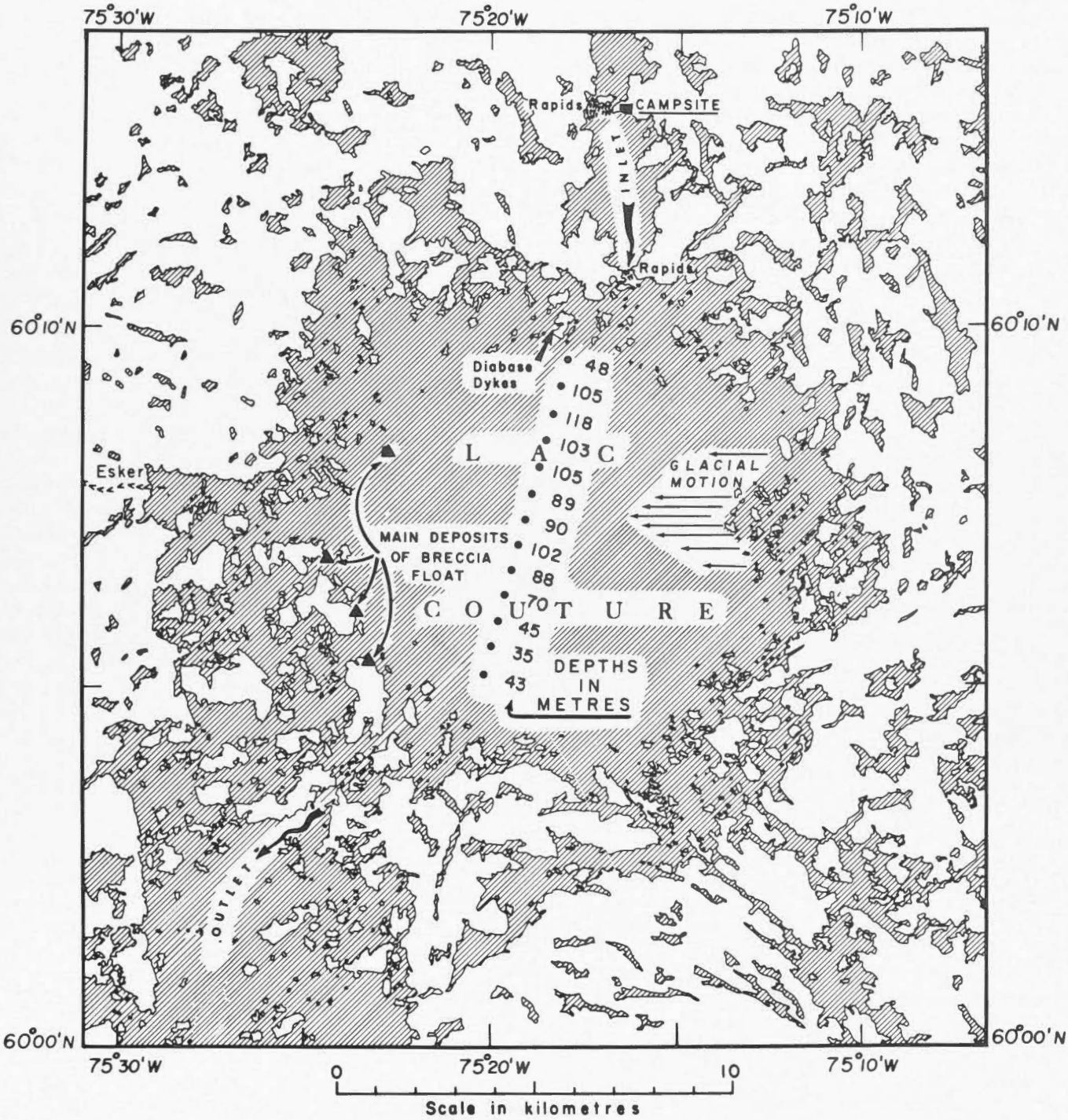


FIGURE 3. Map of Lac Couture showing depths, glacial motion and breccia locations.

further investigations of the crater and to search for additional evidence which might confirm or deny these tentative conclusions.

Field Expedition to Quebec Crater Sites

The first opportunity to do this was provided by an expedition to northern Quebec organized by the Dominion Observatory in August 1963 for the purpose of studying a number of crater sites of which Lac Couture was one. The party consisted of C. S. Beals and M. R. Dence of the Dominion Observatory, Alvin J. Cohen of the Department of Earth and Planetary Sciences, University of Pittsburgh, Geoffrey Charlewood of Heath and Sherwood Drilling Co., and the pilot of the aircraft,

Paul Saunders. Transportation was provided by a two-engined Grumman Goose amphibian of Laurentian Air Services with seats for five persons plus considerable additional space for carrying equipment. Arrangements were made for the pilot and the plane to remain with the party throughout the trip and the mobility thus provided proved to be of the greatest value to the whole operation. Although the plane was a little large for some of the numerous island landings required, this was more than compensated for by the skill of the pilot in manœuvering his craft and by the comfort of the seats and the relative quietness of the engines which made possible long flights without excessive fatigue. A feature of the plane which proved very valuable was the window beside the seat of the co-pilot, normally occupied by a passenger. When the window was open there was no draft from the slip stream and while the aeronautical implications of this were not entirely clear to us, we took full advantage of it in taking photographs and making direct visual observations of the ground below.

Leaving Ottawa on August 1, 1963, the party travelled north to James Bay via the Nottaway River and up the coast of James Bay and Hudson Bay to Great Whale River which was reached in late afternoon. Since one major objective of the expedition was to observe the island chain hugging the east coast of Hudson Bay from Long Island in the south to McCormack Island, Elsie Island and Portland Promontory in the north, the trip was resumed the next morning, following the coast as far north as Povungnituk. Most members had not flown this route before and were impressed by the magnitude of the rivers flowing into James Bay and Hudson Bay (particularly the Fort George River or Grand Rivière and Great Whale River) and the scenery on the east coast of Hudson Bay.

From Povungnituk, a flight of about 90 miles east brought the party to Lac Couture where a camp was set up. The site chosen was on a lake, or more precisely the enlargement of a stream leading south into Lac Couture, where there was a good landing beach and an unobstructed stretch of water for landings and take-offs. This location, indicated on Figure 3, was 11 kilometres north of the centre of Lac Couture and about 6 kilometres from the northern border of the island-free area of the lake.

Lac Couture from the Air

The aerial mosaic (Figure 1), its modification (Figure 2), and the large- and small-scale maps already mentioned give a general idea of what Lac Couture should look like from the air. Indeed experience in the study of aerial photographs has proved so valuable and the amount of information which can be gained from them is so great (particularly when suitable sequences of stereoscopic pairs are available) that it might well be questioned whether any additional information could be gained by direct visual observation. It should however be pointed out that the eye used directly does have some advantages over the camera. These include a wider instantaneous field of view, better colour perception and in our case ability to view the subject from a considerable variety of heights and angles. When to these is added the ability of a human observer to integrate, to judge and to make substantially simultaneous comparisons between the subject being studied and its surroundings, it seemed well worth while to spend some time flying over Lac Couture to study it directly from the air.

Most members of our party had had substantial previous experience in the observation of lakes of the Precambrian Shield which was valuable for purposes of comparison with Lac Couture. In addition there were, in its immediate vicinity, a number of bodies of water which might be termed generally characteristic of the Shield area which could be compared with it directly by no more than a turning of the head or a mere re-directing of the glance occupying a small fraction of a second. We flew around Lac Couture twice the first day at an altitude of about 2,500 feet and during the next four days numerous flights were made over the lake at different altitudes in order to reach the various islands and shorelines to be studied from the ground. Some photography was done but in view of the coverage already existing, this was subordinated to direct visual observations.

The first impression of Lac Couture, gained on a day when the illumination was good with light fleecy clouds reflected in the water, was that of a very fine visual spectacle of a kind often met with in the Canadian Shield with numerous islands dotting a broad water area having an irregular shoreline. Looking more carefully, the essentially circular shape of the shoreline gradually separated itself from the irregularly distributed inlets and indentations. One very large extension of the lake to the southwest somewhat interfered with this impression but the massiveness of the peninsulas and islands separating the two units carried the line of circularity around and left it reasonably intact. The next and most vivid impression was that of the broad circular island-free area in the centre of the lake outlined by some hundreds of islands of sizes ranging from a mile or more across to sizeable rocks projecting above the surface of the water. The islands, like the surrounding inlets were rather irregularly distributed, being to some extent bunched together in groups separated from one another by considerable stretches of water. When the distribution was looked at as a whole however, the impression of circularity reasserted itself and it became clear that we were looking at a distribution of land and water that was

unique in our experience and probably not duplicated anywhere else in the Canadian Shield.

Once established, the visual pattern struck the observer with a force far greater than any photograph. Any doubts in our minds about the exotic origin of Lac Couture were almost completely eliminated by the impact of the visual observations. Of course we were aware that no general impression, however powerful, could take the place of detailed ground observations of the kind associated with circular objects of confirmed asteroidal impact origin. As a stimulus to further observations however, the direct studies from the air had a profound effect which was of the greatest value in overcoming initial setbacks in the ground studies and encouraging persistence beyond the time which had been initially assigned to this part of the expedition.

Topography of the Islands and Surroundings of Lac Couture

Lac Couture lies in the northern part of the Superior Tectonic Province of the Canadian Shield (Lowdon *et al.*, 1962), and some 60 miles (100 km) south of the southern margin of the Wakeham Bay-Cape Smith fold mountain belt. The regional terrain is generally subdued with local relief rarely in excess of 100 feet (35 metres). Bedrock is well exposed and glacial debris is commonly restricted to a thin veneer of erratics. The main controls on the topography are the strike of the regional gneissosity; linears and steeply dipping joint sets in the gneisses; strong horizontal sheet jointing in typical development; and the last direction of glacial scour. The many small lakes and the general drainage pattern are controlled essentially by the strike of the gneissosity and the jointing, producing elongated to highly irregular, shallow bodies of water in which N-S to NW-SE trends dominate. The last glaciation moved from east to west and was mainly instrumental in moulding outcrops into typical *roche moutonnée* form. Weathering controlled by the horizontal sheeting has later modified some of these forms into step-like terraces, giving blocky profiles to many of the hillocks of the area.

Petrography of the Area

The gneisses which crop out around the lakeshore and peripheral islands are of granodioritic to quartz dioritic composition, the content of mafic material varying from less than 5 per cent to about 20 per cent. Pink, coarse-grained pegmatites of simple mineralogy occur as bands, veins and small, irregular masses cutting the gneisses. A few small diabase dykes also cut the gneisses and represent the latest event in the orogenic history of the area.

At the north end of the lake the gneisses are almost all massive, medium- to coarse-grained leucocratic rocks with less than 5 per cent of biotite and other mafic minerals. They are cut by a small swarm of northwest-trending diabase dykes up to 50 cm wide. To east, south and west the gneisses have a more emphatic foliation due to the distribution of mafic bodies, making up 10 to 20 per cent of the rock, as bands and inclusions. The mafic inclusions are predominantly medium-grained aggregates of biotite, hornblende and plagioclase. Where the banding is most pronounced many minor faults and small shears are defined. The average strike of the gneisses is north-northwest with dips in excess of 60 degrees. The southern margin of the lake corresponds to the northern closure of a major fold which is clearly defined in aerial photographs. The banding is particularly regular in the gneisses forming the fold, the alternations of light and dark material taking place over thicknesses of 2 to 10 cm.

During the late stages of consolidation of the gneisses, pegmatites of quartz, alkali feldspar, biotite and magnetite were injected to form irregular pods and veins up to 1 metre across which crosscut and locally deform the foliation. They themselves are little deformed and orogenic movement must have ceased at the time of their emplacement, save for the late injection of the diabase dykes previously mentioned.

Joints and Fractures

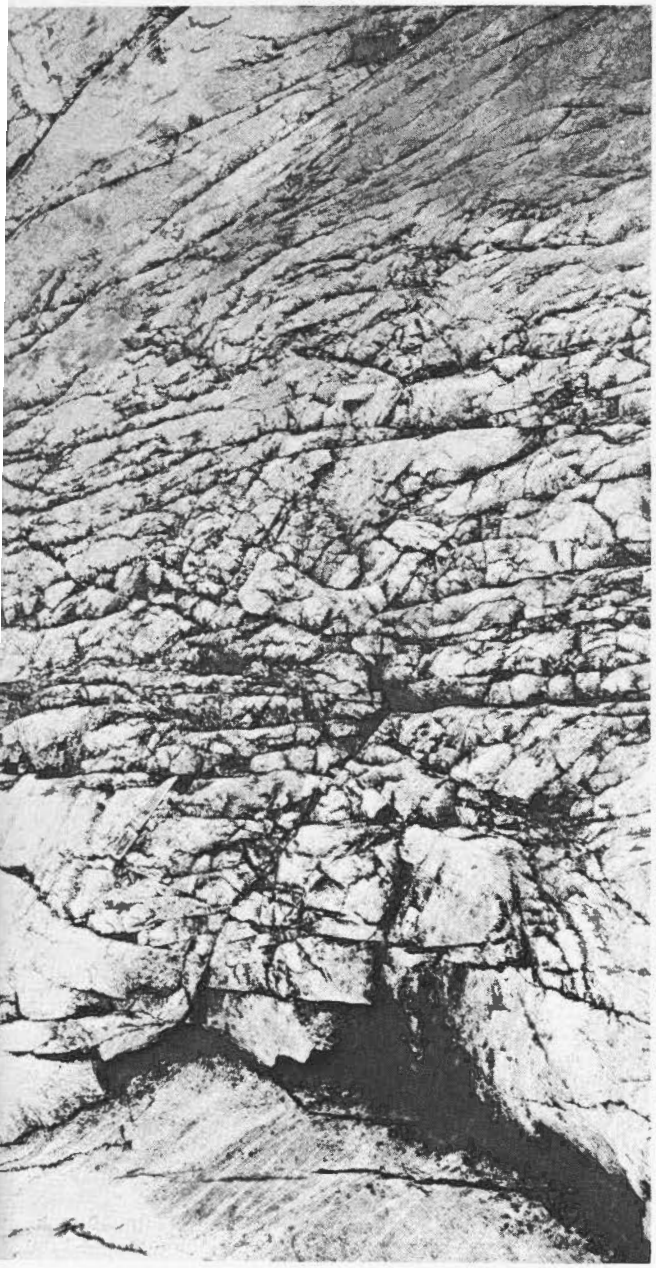
Observations to the north, west and east of the lake show that vertical sets of joints and horizontal sheet joints spaced a metre or more apart are common in the gneissic terrain (Figure 4a). However, on the islands and promontories of the lake margin these regular systems are not found. The joints that are observed dip at a variety of angles. At some localities (e.g. along the northern margin of the lake) regular surfaces which may correspond to the regional horizontal sheeting dip away from the centre of the lake at angles of 25 degrees or more. More severe disturbances are suggested by outcrops along the western side of the lake where joints of similar character dip at angles which approach the vertical. Figure 4b illustrates one location where jointing departs from the usual pattern.

Besides such signs of disturbance of pre-existing structures, more intense fracture zones are common on the outcrops of the peripheral islands. These fractures are less regular than the regional joints, are oriented at all attitudes and in many cases are concentrated in zones 10 to 30 cm across in which the individual fractures are 1 to 5 cm apart. Zones of this character are particularly common in the leucocratic members of the assemblage, notably in the pods and veins of pegmatites. Examples of such fractures are shown in Figures 5 and 6.

FIGURE 4. (a) Horizontal jointing of rocks at location 10 kilometres from lake centre.

(b) Disturbed area 6 kilometres from lake centre.

FIGURE 5.
Examples of rock shattering on islands west of lake centre.



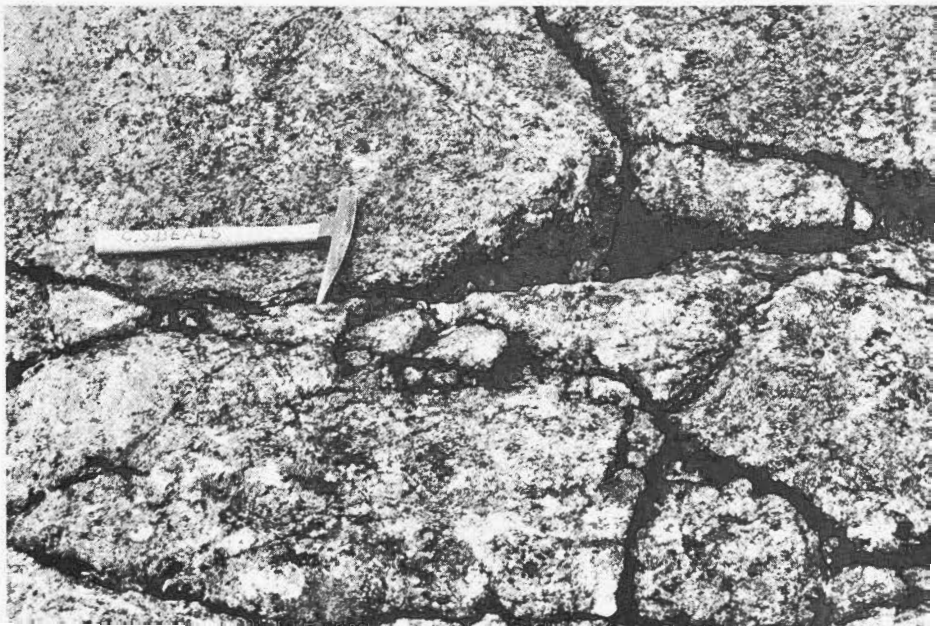


FIGURE 6. Large-scale fracturing in shallow water 5 kilometres west of lake centre.

More detailed and extensive surveys are needed to establish the degree of derangement of primary structures and introduction of later fracturing, but the observations recorded above compare closely with marginal structures from other circular structures for which a meteoritic origin has been advanced, e.g. Deep Bay and Clearwater Lake (Innes, Pearson and Geuer, 1964; and Dence, Innes and Beals, 1965).

Discovery of Breccia on the Western Islands

By analogy with other ancient Canadian craters suspected to be of meteorite origin it was expected that Lac Couture would be at least partially filled with consolidated sediments which would conceal the original crater surface. The presence of such sediments is known both from studies of surface geology and diamond drilling at the Holleford (Beals, 1960) and Brent (Millman *et al.*, 1960) craters. At the Deep Bay Crater (Innes, Pearson and Geuer, 1964) which is filled with water, the presence of sediments was suspected from the presence of Mesozoic shale pebbles and boulders located on the south shore of the lake and presumably dredged from the lake bottom by glacial action. This was later confirmed by diamond drilling near the centre of the lake which turned up shale cores similar to the specimens mentioned above as well as indicating the presence of rock breccia at the expected depths under the sediments (Innes, private communication). A similar situation existed at Clearwater Lake where numerous specimens of Palaeozoic sedimentary rocks were found on the western shores of the lake, presumably transported there by an east to west motion of glacial ice. Again the presence of sediments in this lake was confirmed by diamond drilling which succeeded in penetrating the sediments to the crater surface beneath (Dence, Innes and Beals, 1965). The same general pattern was repeated at West Hawk Lake (Halliday and Griffin, private communication 1965).

At Lac Couture, evidence for fragments of sedimentary rocks on the shorelines was lacking although, as already mentioned, heavy rock shattering and anomalously dipping gneisses were observed. What

may well be the reason for the lack of sedimentary fragments was brought to our attention when numerous pebbles and boulders of rock breccia began to appear. The first finds were made at a location on an island southwest of the lake centre and consisted of a few small but very interesting breccia fragments. Later as our party moved to other locations, numerous boulders of all sizes (Figures 7 and 8f) many smaller fragments and a number of "beds" of breccia, presumably due to the disintegration of large boulders by frost action, were found. The breccia was very similar to that found in other ancient meteorite craters. A majority of the specimens showed evidence of crushing and fracturing only but some showed evidence of heating as well, offering a very complete analogy with the Holleford and Brent breccia which has been uncovered by diamond-drilling methods.

Unfortunately the time available for study at Lac Couture was limited by commitments for similar studies at Clearwater Lakes and Manicouagan so that it was not possible to make a detailed study of the distribution of breccia locations relative to their surroundings. Such studies will certainly be made in the future in connection with geophysical and other investigations of this area. However, the very unusual nature of the material, and the difficulty of accounting for it by ordinary geological processes combined with the unusual character of the lake itself already mentioned, make an association between the two highly probable. All the breccia fragments were found west of a north-south line passing through the lake centre and it seems a reasonable conclusion that they had been dredged from the lake bottom by the east-to-west movement of glacial ice. If this is the true explanation it further seems probable that Lac Couture was never filled with consolidated sediments and that this fortunate circumstance has made possible the shoreward movement of the breccia discovered by our expedition.

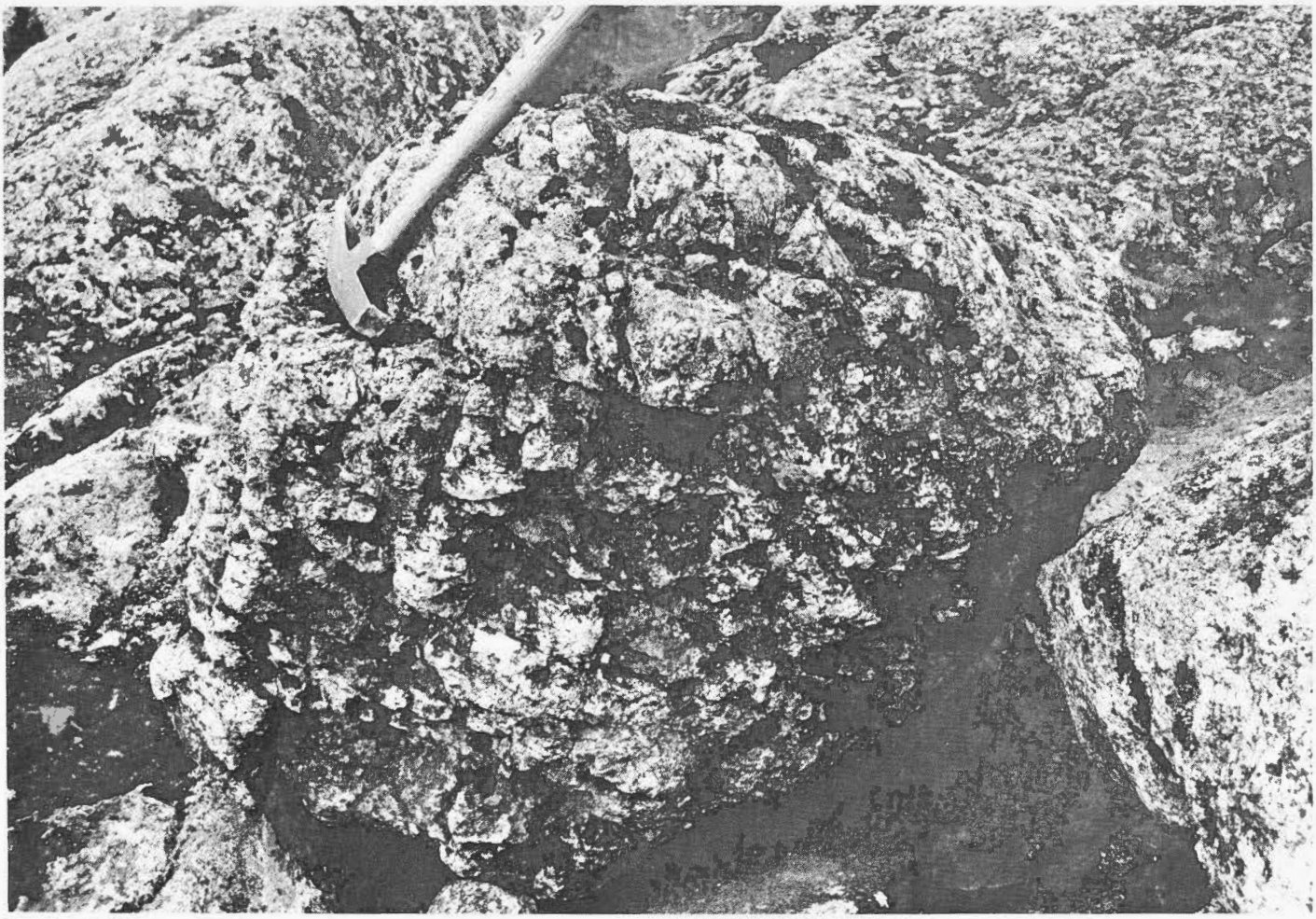


FIGURE 7. Characteristic breccia boulder on island west of lake centre.

The large size (up to 1 metre across) and the generally weak, friable nature of the boulders as shown by their tendency to disintegrate in place, makes it unlikely that they could have been transported more than a few miles and reinforces the probability that they come from the lake bottom. Again, no other possible source is known. Some of the breccia boulders may be derived from crater breccias slightly reworked to form the base of the sedimentary sequence as at Brent and Clearwater East. There is still a possibility that a veneer of basal coarse sediments may be preserved in the centre of the crater even if no representatives of finer-grained sediments remain, if they were ever present.

Petrography of the Breccia Boulders

The boulders of brecciated and altered gneiss observed at Lac Couture ranged from large, subrounded, massive blocks up to 1 metre across to small, soft platy cobbles averaging 5 cm across. It was soon apparent that the large blocks consisted of relatively unaltered fragments of gneiss up to 10 cm across in a grey-green to red-stained matrix, while the smaller erratics, more extensively altered and metamorphosed, were of medium to fine grain-sizes and varied in colour from pale grey-green to yellow and buff-pink shades. In some of the latter the groundmass was of igneous texture with small vesicles lined with quartz clearly visible. Some inclusions were chalky-white, distorted and in some cases vesicular. It was clear that while the material in general was well-consolidated it would not stand up long to continuous mechanical attrition. The boulders with fragmental matrices were generally poorly cemented and hence friable and easily broken apart, while those with partly or completely recrystallized matrices parted readily along curved joints. In many cases large boulders were found to have broken up on standing, presumably through frost action penetrating and parting the rock on planes of weakness. The exceptions were large boulders with a strong framework of well-packed cobbles of gneiss and relatively little fine-grained matrix. These proved tough and resistant to mechanical breakdown.

An effort was made to collect as broad a selection of boulder types as space and time would allow. A rough agreement was maintained between the proportion of the different varieties collected and those observed in the field, although the collection tended to be weighted in favour of the rarer types. The general field classification into massive, coarse, relatively unaltered breccias and gneiss fragments and those of fine grain-size and clearly altered or recrystallized was found on preliminary laboratory examination to be capable of elaboration into two categories of gneisses showing either weak or advanced alteration and metamorphism and five categories of breccias. The latter form a progressive series reflecting ever more severe alteration, deformation and ultimately recrystallization. The sequence is gradational and to that extent divisions are arbitrary. Nevertheless, all specimens examined to date can be assigned to one or another category with little difficulty or ambiguity, so the classification appears adequate for present purposes.

Whereas samples of gneiss collected from outcrop show only minor fracturing and alteration with the introduction of small amounts of epidote, chlorite and sericite, similar but stronger changes are seen in some gneiss fragments. One change consists of limited brecciation with development of fine-grained epidote in abundance, with chlorite and sericite also common; another of a more typically cataclastic texture. Shearing, recrystallization of quartz and deformation of primary feldspar is accompanied by development of epidote, sericite and hematite, as before.

Far-reaching metamorphism is apparent in other specimens of single gneissic fragments, which probably were large inclusions in the more highly metamorphosed breccias described below. The original distribution and relatively coarse grain-size of primary quartz, feldspar and mica is still recognizable in these specimens but original crystals are recognizable only as vague relicts. Primary crystals have been fractured and deformed and boundaries smeared. Original quartz is entirely replaced by fine-grained mosaics of secondary quartz. In a few cases primary twin lamellae in feldspars can be recognized but in general the crystals are now partly vesicular, nearly isotropic mixtures including relicts of primary domains, secondary feldspar of extremely fine grain-size and possibly some glass. Minute inclusions of epidote and iron ore are common. Biotite and to a lesser extent apatite has also been altered.

Breccias of Type I, which include the largest, coarsest and most abundant members of the breccia population, have fragments up to 10 cm across held in a matrix of the angular quartz, feldspar, mica, epidote and iron ore. They are distinguished by the extent to which their fragments bear secondary minerals (epidote, sericite) in similar development to that of the weakly altered gneissic fragments, while showing little evidence of important structural deformation. In some cases the matrix is also extensively altered and may be largely replaced by iron oxide, chlorite and epidote.

In breccias of Type II, secondary minerals, particularly epidote, are not so important as in Type I breccias, though iron oxide is again prominent. A more significant distinction lies in the more extensive deformation of individual fragments. Some granitic fragments have fracture surfaces of shatter cone type. Under the microscope, deformation of feldspar is seen to involve fracturing along irregular planes, bending of twin lamellae and the development of patchy, undulous extinction. In mica, kinking and

(a)
Grey breccia of Type I. Fragments of weakly altered gneiss in a matrix of comminuted fragments.

(b)
Red breccia of Type I. Fragments of weakly altered gneiss in an oxidized matrix of comminuted fragments.

(c)
Red breccia of Type II. Some fragments are strongly oxidized as is the matrix. Some quartz grains show microscopic evidence of shock with the development of planar structures.

(d)
Grey breccia of Type III. Fragments finer than in (a) to (c) and include both quartz and feldspar with planar structures and irregular shards of altered glass which weather out to give the rock a vuggy appearance.

(e) Fragment of gneiss about 10 cm across, which has been highly metamorphosed. Quartz (milky) and feldspar (white) are completely recrystallized. The rock is vuggy and porous. Dark spots are due to staining by groundwater.

(f)
Large, partly submerged boulder of breccia of Type I with fragments up to 10 cm across. The knobbly surface is strikingly different from neighbouring smooth boulders of gneiss.

FIGURE 8. Breccia specimens from Lac Couture.

bending deform some crystals. Quartz develops strong fractures, some of which follow rhombohedral crystallographic directions, but even more characteristic of many quartz fragments is the development of fine, closely spaced, parallel sets of planar structures following one or more crystallographic directions. The structures are discontinuous and appear to be fine fractures partly decorated with minute inclusions or cavities. This style of deformation is similar to that found in quartz from other craters (Dence, 1965; von Engelhardt and Stöffler, 1965), as well as in quartz shocked by underground nuclear explosions (Short, 1965). It appears to be a clear indicator of shock deformation.

Breccias of Type III include fragments in which deformation has reached the limits of intensive fracturing, lattice distortion, passage to a near-glassy state and recrystallization to an extremely fine-grained aggregate.

The fine-grained breccias of Types IV and V bear relicts of primary minerals generally less than a millimetre across in matrices of extremely fine grain-size. The inclusions show similar distortions to those of fragments in Type II and III breccias, and are surrounded by narrow coronas of minerals generated by reaction with the matrices. The latter are extensively but not completely crystalline in breccias of Type IV, while in those of Type V crystallization is general and there are numerous quartz-lined vesicles in the groundmass of minute laths of alkali feldspar and irregular crystallites of pale green mica. Part of the interstitial material may be glassy. In Figure 8 are shown colour photographs of specimens of breccias corresponding to the above descriptions. Magnified thin sections of planar features in quartz crystals and other interesting aspects are shown in Figure 9.

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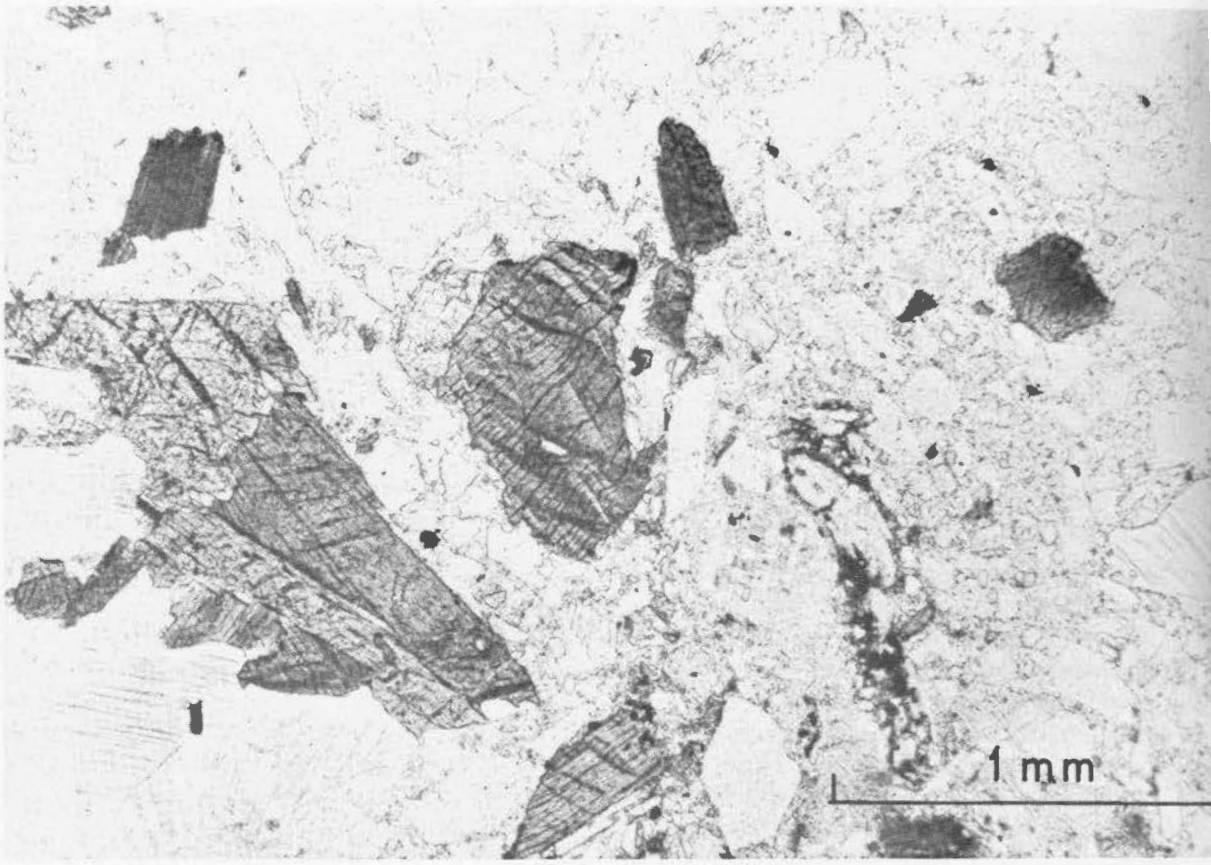
The character of the metamorphism outlined by the sequence given above is one of progressive deformation of a distinctive style associated with thermal effects which together produce an end product which is almost completely fused and recrystallized. Metamorphism of this type has been recognized in one or more of its stages from a number of craters (Dence, 1964, 1965) including some of undoubted meteoritic origin. Emphasis to date has been placed on the spectacular and distinctive cleavage fracturing in quartz (Bunch and Cohen, 1963; McIntyre, 1961) which is a characteristic of the intermediate stages of deformation observed here. Again some of the advanced stages of feldspar lattice breakdown seen in the Lac Couture material parallel the deformation achieved by experimental shock loading to 250 kilobars and more by Milton and De Carli (1963). The shatter-cone surfaces found in some fragments are similar to surfaces observed in gneisses of similar composition and primary texture from the Carswell Lake structure and Clearwater Lake. Thus while much remains to be done in documenting the effects of shock deformation, the metamorphism at Lac Couture conforms without exception to the patterns observed in other structures formed by shock.

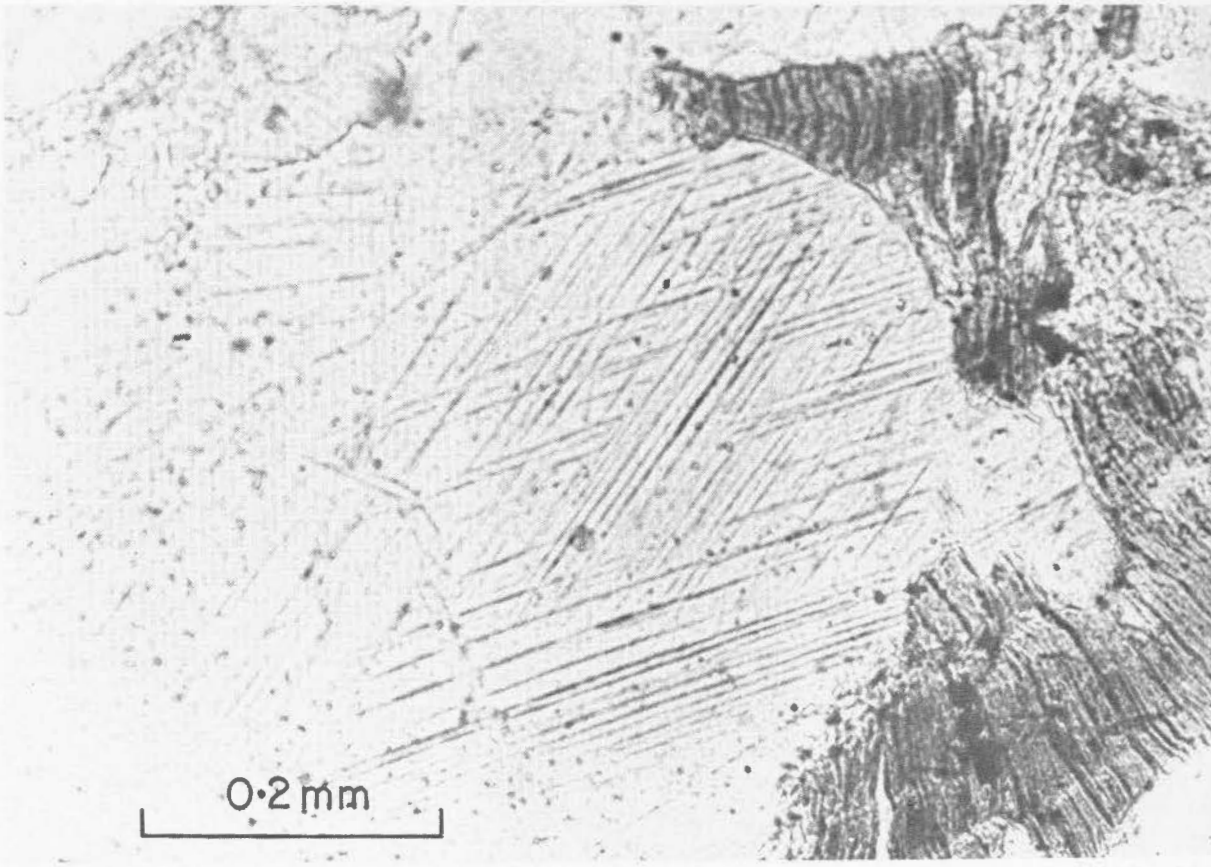
A further similarity to other craters of probable meteoritic origin comes from the alteration of the relatively weakly deformed rocks. Hydrothermal alteration to produce secondary minerals such as chlorite, epidote, iron oxide, sericite, carbonate, quartz and sulphides, is becoming recognized as characteristic of the rim and outer deformation zones of impact craters (Dence, 1964). It is of particular interest that the alteration at Lac Couture is dominated by epidote in the same fashion as the rim-rock alteration at New Quebec which is formed in rocks of the same age and general composition. Far from denying a meteoritic origin, as has been suggested by Currie (1965), alteration of this general character appears to be an invariable outcome of cratering produced by impact.

By analogy with the Brent crater (Millman *et al.*, 1961, Dence, 1964, and report in preparation) the structural position of the breccia types can be estimated. The weakly deformed gneisses and breccias of Types I, II and III are from the marginal or superficial parts of the crater. Thorough mixing is indicated by the association of weakly and strongly deformed fragments in Type II and III breccia, which in part may be the result of mixing by slumping or other essentially sedimentary processes after the crater was formed. A rude layering is evident in a few of these gritty breccias, reinforcing this possibility although in no case has significant rounding of fragments taken place. The fine grain-size of the heated breccias of Types IV and V allows comparison with the marginal portions of the vesicular layer at Brent and is an indication that erosion of the crater has penetrated as far as this layer in at least one area. The survey to date, although incomplete, does show interesting variations in the distribution and variety of breccia erratics along the western shoreline of the crater. Relatively little material was found in the immediate vicinity of the east-west diameter of the lake which agrees with the absence of types comparable with the central breccias of Brent. The greatest concentrations were about a mile to the north and south of the east-west diameter, with a particularly varied group to the south. Only there were vesicular fragments prominent. This suggests that glacial action has eroded the lake bottom more deeply in the vicinity of this southern concentration than elsewhere. The topography of the lake bottom may well show a kidney- or horseshoe-shaped depression surrounding a central hill, in similar relationship to the principal direction of glacial scour as the comparable

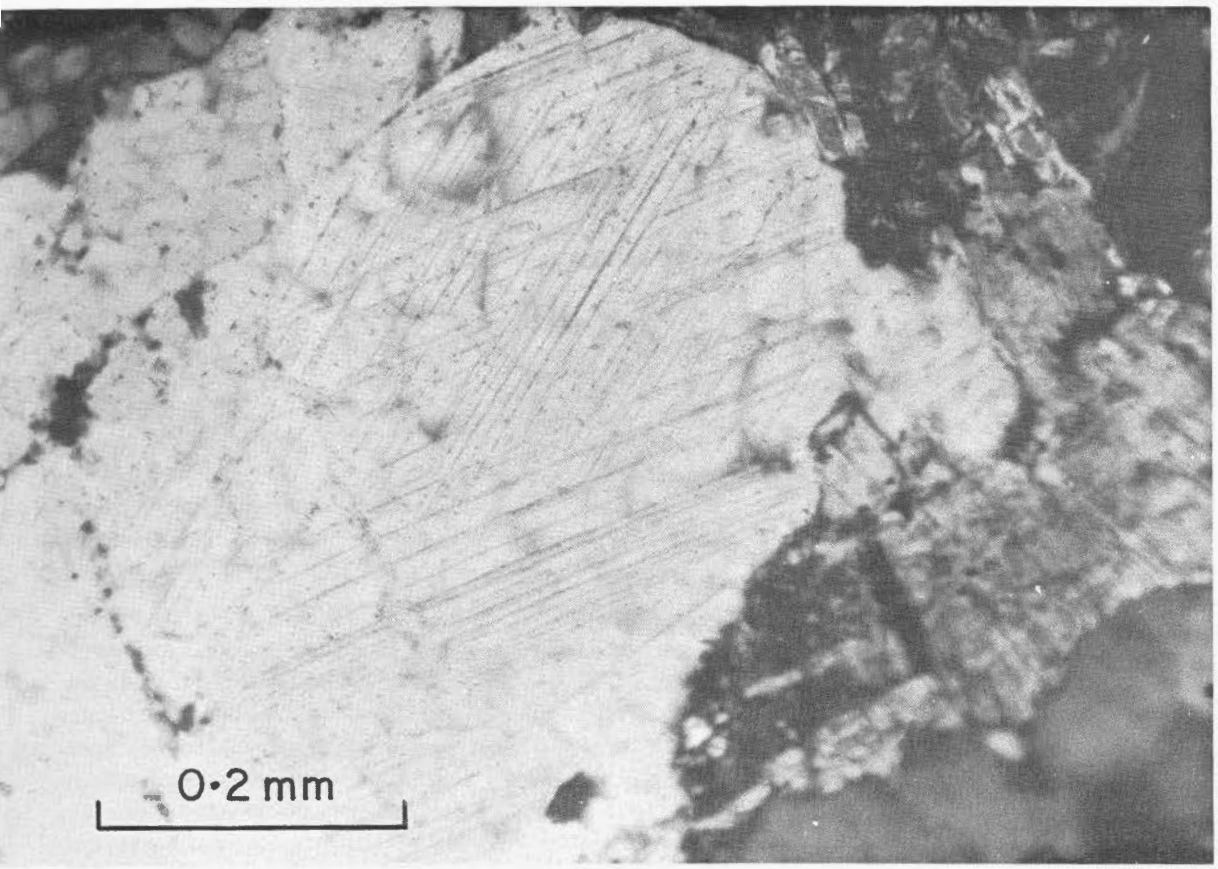
FIGURE 9. Photomicrographs of thin sections of Lac Couture breccia.



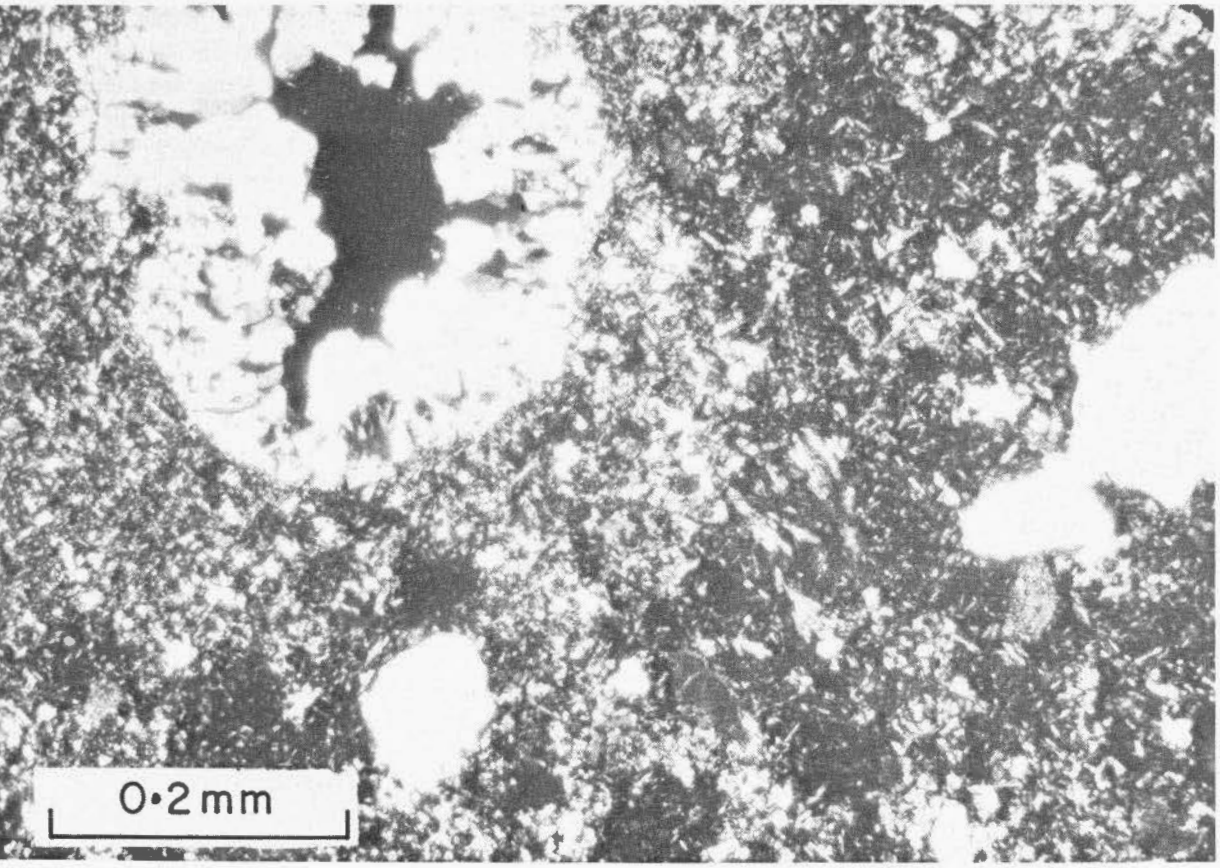
(a)
Thin section in plane light of breccia of Type II. The dark minerals are biotite mica showing well-developed kinking. Bottom left and far right are quartz grains with strong planar structures.



(b)
Detail of (a). A quartz grain in plane light showing two well-developed sets of planar structures. Associated mica is kinked.



(c)
The same as (b) under crossed nicols.



(d)
Breccia of Type V with a few fragments of quartz in a completely re-crystallized matrix of fine quartz and feldspar. The large circular structure is a vesicle partly filled with secondary quartz.

morphology of the Brent, Deep Bay, New Quebec and Clearwater Lake craters.

A further comment concerns the composition of the gneisses. Of all the Canadian craters Lac Couture shows the most restricted range in the composition of its country rocks. With few exceptions these are rocks rich in quartz and feldspar with minor biotite. They therefore have a bulk composition close to that of normal granodiorite or granite and far removed from meteoritic compositions whether stony or metallic. This encourages a particular hope that intensive search may lead to positive identification of meteoritic material even if well mixed, metamorphosed and altered. However, the most favourable site for such a search would be the centre of the crater, which can probably only be investigated by diamond-drilling methods.

General Conclusions

Reviewing the evidence collected in an attempt to ascertain the origin of Lac Couture, it may be pointed out that the initial observations of its circular shape, unusual for so large a lake and the unique distribution of islands and peninsulas around the deep, island-free central area, were suggestive of an unusual origin rather than diagnostic of the actual physical process which formed the lake. This suggestion of an unusual origin was however reinforced by the observation of extensive rock shattering on the western islands and the indications of disturbance presented by the attitudes of sheeting planes and joints on the islands and around the shorelines.

The final conclusion that the lake and its surroundings probably represent the eroded remnant of an ancient impact crater depends mainly on the observation of many tons of rock breccia on the western islands (presumed to have been removed from the lake bottom by glacial action) for which no other reasonable explanation has been found. The validity of the conclusion that the breccia was due to asteroidal impact rather than some other cause depends first on the similarity of its general character to that associated with reasonably well authenticated craters such as Holleford, Brent, West Hawk, and Deep Bay; and secondly, on the microscopic indications of crystals, particularly quartz, deformed and altered by shock in a manner so far encountered in nature only at sites suspected to be of meteorite impact origin. In this connection it is interesting to recall suggestions made by Beals, Innes and Rottenberg (1963) about the comparative pressures to be expected in meteorite impact and volcanic explosive sites. They point out that a meteorite striking the earth at a velocity of some tens of kilometres per second, generates a peak pressure of the order of 10^7 atmospheres, a pressure which is only attained lithostatically at a depth of 2,500 km below the surface of the earth. Even allowing for the attenuation of such pressures as the shock wave moves outward from the point of impact, it would still be expected to be many times greater than that of volcanic gas explosions venting near the surface of the earth. (Even at the depth of the Mohorovicic layer the lithostatic pressure is only a few per cent of a megabar.) It is scarcely surprising therefore to find crystallographic evidence of intense shock at meteorite impact sites and it is becoming increasingly probable that shock-fractured crystals represent a definite criterion for distinguishing between impact and volcanic features.

It is unfortunate that the relatively inaccessible location of Lac Couture has so far not permitted the sampling of the lake bottom itself by diamond drilling or other methods and this is something for the future. Some scattered gravity observations have been made but they are not sufficiently numerous or well distributed for a determination of the subsurface distribution of breccia by gravity methods.

In spite of the obvious lacunae in the observations which can only be filled in by extensive geophysical observations combined with diamond-drilling techniques, we consider it justifiable at this time to add Lac Couture to the growing list of probable meteorite impact sites. The number of such locations for craters over a mile in diameter is now approaching fifty (Beals and Halliday, 1965) and only recently we have received information about new discoveries in Sweden (W. von Engelhardt, private communication) which may bring the total above this figure.

It must of course be acknowledged that many scientists still regard the evidence for the impact origin of some or all of these craters to be insufficient. We would have to agree that in practically all cases a great deal of vital information is still lacking; short of the complete excavation of a crater some miles in diameter, it may never be possible to speak of final proof. In this as in many fields of astronomical and geophysical science it is necessary to rely for our conclusions on considerations of general probability combined with the gradually accumulating weight of evidence for or against a given hypothesis. With regard to the latter, the additions to the evidence for asteroidal impact as an important process on the surface of the earth and moon have been impressive over the past decade. As to the former, it would appear that the general credibility of the asteroidal impact process throughout the solar system has received a considerable impetus from the Mariner IV observations of the surface of Mars (Sky and Telescope, 1965). The remarkable photographs resulting from these observations give clear evidence of a surface dominated by circular features of a kind which is characteristic of high velocity impact. The fact that such features have now been observed on three members of the solar system, Earth,

Moon and Mars, is important evidence suggesting that similar processes are probably causing interesting markings of this kind on bodies throughout the solar system at least within the orbit of Jupiter. While it can be argued that the common factor is volcanism rather than impact, the similarity of the lunar and Martian features and their resemblance to terrestrial impact craters is difficult to reconcile with such a view. The appearance of closely similar features on three planets with such widely different characteristics as Earth, Mars and the Moon would at least suggest that the crater forms are characteristic of the mechanism of formation rather than the nature of the surface or the value of gravity on the planet where they are observed. As space exploration proceeds, it will be interesting to see what further evidence turns up on the surface of other planetary bodies unobscured by heavy atmospheres, e.g. Mercury and the satellites of Mars, Jupiter and Saturn.

Age of the Crater

While the absence of any stratigraphic evidence in the data collected so far presents a rather discouraging picture for age determination, it is perhaps worthwhile to compare this crater with Deep Bay, a feature of similar size and with a reasonably reliable minimum age. Deep Bay has a rather precipitous rim rising in places to heights of the order of 100 metres above its surroundings. This at least suggests that Lac Couture, whose rim gives little evidence of even minor elevation above the surrounding plain, is the older of the two. Mesozoic strata penetrated by drilling near the centre of Deep Bay indicate a minimum age of 150 million years and Innes (1964) has suggested, on the basis of surrounding topography, that this may be close to the true age. From this it appears that Lac Couture could be considerably older and might even be Precambrian in age.

While the observations made at Lac Couture suggest that this crater may never have been filled with sediments, this is by no means certain. Until this possibility has been more thoroughly investigated by diamond drilling or other methods, it seems best to reserve judgment on the age of Lac Couture.

Reconstruction of the Original Crater Form

In conclusion it is interesting to make use of the data on terrestrial and lunar impact craters to attempt a reconstruction of the original form of Lac Couture. Following Baldwin (1963) we made use of his empirical equations (7–2A) p. 137 and (7–6A) p. 143 to calculate the apparent depth of the crater and the height of the rim above the surrounding plain.

$$D = 0.0256d^2 + 1.0264d - 2.3461 \qquad (7\text{–}2A)$$

$$Rh = 0.004366D^3 - 0.008506D^2 + 0.9098D + 1.5987 \qquad (7\text{-}6A)$$

Here D is the logarithm of the crater diameter in kilometres measured at the rim summit, and
d is the logarithm of the crater depth in metres measured from the rim summit of the apparent crater to the crater floor.

Rh is the logarithm of the rim height above the surrounding plain. The diameter of the original crater is estimated at 12 km—the diameter of the median line of the circular complex of islands and peninsulas surrounding the central island-free area of Lac Couture.

The resulting value of 1,250 m for the depth of the crater and 378 m for the height of the rim are necessarily approximate but should give a reasonably clear picture of what a crater of these general dimensions should be like. A profile of the crater before erosion compared with present topography is shown in Figure 10. If this model is even approximately correct it is evident either that the crater has been largely filled up by erosional products from the rim and glacial debris or that the Precambrian plain surrounding the crater has itself been eroded by an amount of the order of several hundred metres since the crater was formed. No doubt both processes have been going on but it seems likely that the former would be predominant.

While current ideas about explosion craters suggest that the greatest depth is in the centre, there is increasing evidence that some craters have central mounds or uplifts due to some sort of rebound mechanism associated with the impact process (Beals and Halliday, 1965). The dotted line of Figure 10 indicates this possibility which receives some credence from the depth soundings. If the original crater had a massive central uplift, then the above suggestions, relative to the amount of erosion would have to be modified.

The size of the meteorite which could produce a crater of this diameter has been calculated from Baldwin's equation (Baldwin, 1963, p. 176)

$$D = 0.3284E - 7.9240 \qquad (8-12A)$$

where D is the logarithm of the crater diameter in kilometres and E is the logarithm of the number of ergs of kinetic energy of the impacting meteorite. Assuming a rock meteorite of density 3.4 and a velocity of 20 km/sec, the calculated energy is 2.60×10^{27} ergs and the diameter 901 metres. If the crater were formed by an iron meteorite then the calculated diameter would be 683 metres.

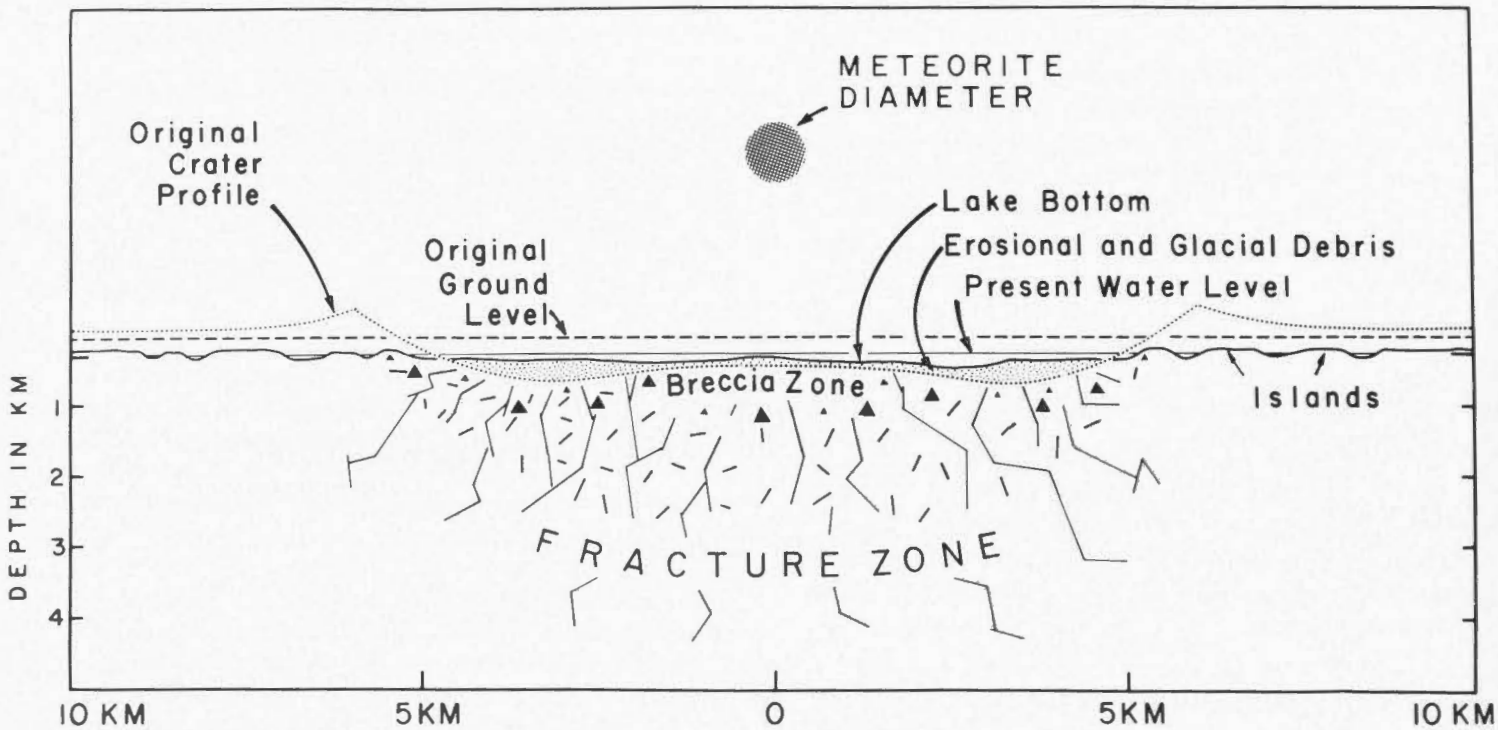


FIGURE 10. Suggested relationship between original crater profile and present topography. Order of diameter of stone meteorite capable of producing crater at velocity of 20 km/sec, 900 m.

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