Energy, Mines and Resources Canada
Earth Physics Branch

Énergie, Mines et Ressources Canada
Direction de la physique du globe

Geomagnetic Service of Canada

ANNUAL REPORT FOR MAGNETIC OBSERVATORIES — 1972

E. I. Loomer

Geomagnetic Series Number 7
Ottawa, Canada 1976

Energy, Mines and Resources Canada
Earth Physics Branch
1 Observatory Crescent
Ottawa Canada
K1A 0Y3

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ANNUAL REPORT FOR MAGNETIC OBSERVATORIES — 1972

E. I. Loomer

The annual report is in two sections. An introductory section gives coordinates of the observatories and a general description of the instrumentation and methods of data reduction and distribution applicable throughout the observatory network. This is followed by brief reports for each observatory containing details of instrument changes, baselines, scale values, corrections for temperature and parallax effects, and a summary of mean values of the magnetic field components.

Tables of mean hourly values and hourly ranges are not published. Microfilm copies of these tables and of the K-indices for Victoria, Meanook, Ottawa and St. John's are sent on a yearly basis to World Data Center A. A magnetic tape containing the tabular data for several years is also deposited at World Data Center A. Computer-output copies of mean hourly values and hourly ranges will be distributed on an exchange basis to foreign magnetic observatories.

The standard year-book for Victoria observatory for 1972 has already been published. For completeness, extracts from this publication have been included in the 1972[1] annual report.

Introduction

The magnetic observatories in Canada are operated by:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Canada K1A 0Y3

There were several significant changes in the Canadian magnetic observatory network in 1972: digitally recording magnetometer systems (AMOS)[2] were installed at Cambridge Bay and at Great Whale River; photographic recording was discontinued at St. John's observatory July 31, and at Alert observatory on September 30. These changes are discussed in the individual observatory reports.

Cambridge Bay and St. John's are the first Canadian observatories to be operated without permanent staff. They are operated under local contract, and are attended once or twice a week only, for the purpose of absolute measurements of the field and instrument and building checks.

The value of the AMOS network was demonstrated during the period of unusually intense magnetic activity which followed the large solar disturbance on August 2. The amplitude of the magnetic disturbance on August 4 - 5 exceeded 6000 nT at Fort Churchill. Maximum rate of change of the field was observed at Meanook where the H component changed by more than 1800 nT over one minute. Standard analogue recorders were unable to provide legible records for this disturbance, which was the largest ever recorded. However, the seven AMOS stations then in operation provided a complete record of the intensity and variation of the magnetic field during this storm.[3] A magnetic tape of all AMOS data for this storm was sent to World Data Center A in December 1972.

The location, method of recording, and date of commencement of the observatories are given in the following table.

OBSERVATORIES		GEOGRAPHIC				GEOMAGNETIC*		ELE-VATION	ELEMENTS RECORDED	DATE OF COMMENCEMENT OF CONTINUOUS RECORDING IN THREE ELEMENTS	
Name	IAGA Code	Lat. N. °	'	Long. W. °	'	Lat. N. °	Long. E. °	m		Analogue	Digital
Northern											
Alert	AT	82	30	62	30	85.7	168.7	60	X Y Z	Oct 1961	
Resolute Bay	RB	74	42	94	54	83.1	287.7	25	X Y Z	Nov 1953	
Mould Bay	MLB	76	12	119	24	79.1	255.4	40	X Y Z	July 1962	
Cambridge Bay	CB	69	06	105	00	76.7	294.0	17	H D Z		Apr 1972
Baker Lake	BL	64	20	96	02	73.9	314.8	30	H D Z	Mar 1951	
									X Y Z	July 1957	Nov 1971
Fort Churchill	CHR	58	48	94	06	68.8	322.5	15	X Y Z	July 1957	Sept 1971
Great Whale River	GW	55	18	77	45	66.8	347.2	25	H D Z	Jan 1965	Oct 1972
Southern											
Meanook	ME	54	37	113	20	61.8	301.0	700	H D Z	Sept 1931	Nov 1970
St. John's	JO	47	36	52	41	58.7	21.4	100	H D Z	Aug 1968	Dec 1969
Ottawa	OT	45	24	75	33	57.0	351.5	75	H D Z	July 1968	Sept 1970
Victoria	VI	48	31	123	25	54.3	292.7	185	H D Z	July 1975	Nov 1970

*Assuming geomagnetic pole 78.3°N, 291.0°E (Finch and Leaton, 1957).

Observatory instrumentation

Primary Photographic Recorders

A set of three-component standard-run Ruska variometers recording the North(X) and East(Y) (or Horizontal intensity (H) and Declination (D)) and the Vertical (Z) components of the earth's magnetic field was the primary recorder at all observatories except Cambridge Bay and St. John's. (Amos is the primary recorder at the new Cambridge Bay observatory. It replaced the photographic recorders at St. John's in August.) The time scale of the Ruska magnetograms is 20 mm/hr. The hour marks at all observatories are initiated on the hour by a crystal-controlled clock and last for approximately 15 to 20 seconds.

Scale values were determined once or twice a month using the Helmholtz coils provided, and are listed with adopted baselines in the brief reports which follow for each observatory. Scale values are determined for four current settings: +10 mA, +5 mA, -5 mA and -10 mA. Measurements of the resulting magnetogram trace deflections are made to the undisturbed trace level (that is, with zero current in the coils).

Assuming the Helmholtz coils are calibrated to an accuracy of 0.05% and that the coils are sufficiently well-aligned, uncertainties in scale value determinations will result from errors in setting and reading the current in the coils, and errors in measuring the trace deflections on the magnetogram. To minimize errors arising from uncertainty in current readings, the ammeters previously used were replaced in 1972 with digital ammeters capable of measuring current to 0.05%. A magnifying viewer with a scale in tenths of mm is used to measure deflections. Owing to the finite width of the traces and the problem in identifying upper and lower trace edges precisely, the uncertainty in measuring trace deflections is estimated to be 0.2 mm in most cases.

The resulting uncertainty in a single determination of Ruska scale values, using four current settings, should be about 0.5%. In practice, uncertainties are frequently as high as 1%. Scale values for the year are adopted from a least-squares fit to the series of observed values. The uncertainty in the

adopted values should be less than 0.3%. For a typical magnetogram, this could introduce an error of about 1 nT in the absolute value of the baseline.

Thermostatically controlled electric heaters maintained the temperature in the variometer rooms constant to $\pm$ 1.5°C for periods of a few months, except at times of power failure or heater malfunction. The correction for seasonal temperature changes is included in the adopted baseline values. Mean hourly values have been corrected for significant temperature changes occurring over periods of a few hours to a few days.

Tests to determine the temperature and parallax corrections to be applied to the Ruska magnetograms are carried out at regular intervals and the corrections are listed for each observatory. To test for the effect of temperature changes on the elements recorded by the Ruska magnetograph, the heaters in the Ruska variometer room are disconnected for a period of about six hours when magnetic conditions are relatively quiet. Mean hourly values scaled from the Ruska magnetogram for this period are then compared with values from the stand-by fluxgate chart at stations where the stand-by instrument is located in a separate room, or with mean hourly values derived from the AMOS. Where a large temperature change persists over periods of several weeks, the temperature coefficient is established from the baseline values observed before and after the temperature shift.

Temperature corrections are to be used with the formula $A_o = A - \alpha (T - T_o)$, where

A_o is the component value at the normal variometer room temperature,
A is the uncorrected component value,
α is the temperature coefficient,
T is the instantaneous temperature in °C,
and T_o is the normal temperature in °C.

The sensitivity of the Ruska temperature trace is 1.3°C/mm.

Stand-by variometers and storm recorders

Continuous traces of X,Y (or H,D) and Z on a strip-chart recorder were provided by a three-component fluxgate magnetometer at all observatories. A new untuned solid-state version of the recording fluxgate magnetometer[4], with improved temperature stability, was in use in 1972. Full scale chart sensitivity is normally 1000 or 2000 nT, with automatic switching to half sensitivity at times of large magnetic disturbance.

The chart is operated at 20 mm/hr. Chart values are used to interpolate for missing intervals on the Ruska magnetograms. The chart also provides a visual indication of magnetic field conditions. An electronic integrator[5] is used in conjunction with the fluxgate magnetometer at Ottawa observatory.

Additional stand-by recorders in operation in 1972 were a standard LaCour and a low-sensitivity LaCour magnetograph at Meanook, and a second Ruska standard magnetograph at Ottawa.

Digital magnetometer

A digitally recording magnetometer system (AMOS) was installed in Cambridge Bay in April and in Great Whale River in November, extending the AMOS network to eight observatories (see Table). The AMOS records values of D,H (or X,Y), Z and F once a minute on digital magnetic tape in a format which can be read directly by computer.

The orthogonal elements D,H (or X,Y) and Z are derived from three fluxgate sensors mounted inside a Helmholtz coil system. One pair of coils continuously nulls the principal horizontal component and the second pair, Z, so that the fluxgates operate in essentially zero field at D,H stations. At Fort Churchill and Baker Lake, where X,Y are measured, the minor horizontal component (Y) is 510 nT and 125 nT respectively. A proton precession magnetometer measures F.

Voltages proportional to the values of the three orthogonal components D,H,Z or X,Y,Z are sampled in quick succession by a digital volt-meter each minute. Then follows a measurement of F by the proton magnetometer. The four readings are recorded on digital magnetic tape together with the date, time and station identification. The variations of the three orthogonal components are also recorded continuously by a strip-chart recorder.

Installation and maintenance of AMOS is carried out by electronic technologists located in Ottawa who travel as required to AMOS sites. In addition a telephone verification system (TVS)[6] has been developed whereby the operation of an AMOS at some distant point is monitored by the operations controller in Ottawa by means of connections to commercial telephone circuits. In 1972, TVS was installed at six sites: St. John's (January); Victoria (March); Cambridge Bay (June); Fort Churchill (July); Meanook and Ottawa (August). These sites were interrogated from Ottawa for one or two minutes each day, to record data actually being produced together with signals

indicating a malfunction of the distant equipment. Frequently an AMOS malfunction could be diagnosed immediately from the TVS check; replacement modules for the equipment were then shipped to the station, dispensing with the necessity of a costly service trip.

Frequent noise spikes in the proton precession magnetometer (PPM) signal at several AMOS sites greatly complicated the editing of AMOS data. Beginning in 1972, the PPM sensors were operated inside a cube, 0.6 m to the side, constructed of aluminum sheeting, 3 mm in thickness. (For a proton precession frequency of 2500 Hz, conductivity (g) 3.5×10^7 mho/m and permeability (μ) 4×10^{-7} weber/amp.-meter, the skin depth (δ), given by $(\pi f g \mu)^{-\frac{1}{2}}$, is 1.7 mm.) In general, these shields have proved most effective: e.g. at Cambridge Bay, noise originating from a Ministry of Transport radio beacon in the vicinity was reduced with the shield by a factor of 3.5 with no loss in signal strength.

To minimize temperature variations at times of power failure or heater malfunction, the AMOS fluxgate sensor and associated Helmholtz coils were placed inside a styrofoam box.

Enclosed aluminum cable runs were installed at all AMOS observatories.

Absolute instruments

A proton precession magnetometer[2] is the primary standard for total intensity F.

A portable electrical magnetometer[7] of the saturable core type is the primary standard for determination of declination D and inclination I at the northern observatories and at St. John's. It was also in use at the other observatories as a back-up instrument for declinometers and inclinometers of classical design.

In 1972 a new non-magnetic internally reading theodolite (Jena 020) was introduced for use with the portable electrical magnetometer. This replaces the Cooke, Troughton and Simms theodolite previously in use at all observatories.

A Quartz Horizontal Intensity Magnetometer (QHM)[8] was the primary standard for H at the observatories in southern Canada.

Absolute observations and baseline calculations

Absolute observations were made on an average of twice a week at Meanook and once a week at the other observatories, during magnetically quiet periods.

From earlier comparisons with the Agincourt observatory standards,[7] the probable error of a single observation using the portable electrical magnetometer and including the error in reading the magnetogram, was 0.3' in D and 0.2' in I, equivalent to 3 nT at Agincourt. Assuming the probable error remains at 3 nT in the horizontal components at any site in Canada, the probable error in D will be expected to range from 0.3' in southern Canada to 14' at Resolute Bay.

Calculation of baselines

Time marks were placed on the Ruska record at the times of the absolute observations. Baseline values were calculated from the measurement of the record ordinates at these points and the values of H (or X,Y) and Z obtained from the absolute observations. In general each baseline determination was based on the mean of six absolute measurements of D,I,F or D,I,H,F. The final baseline values were adopted by fitting the best straight line to the observed values between known discontinuities. Lists of adopted and observed baselines and scale values are included in the reports for individual observatories. All baseline drifts are assumed to be linear unless otherwise indicated.

At stations equipped with AMOS the facility to record the value of F at the time of the absolute measurement of inclination has made it possible to improve the procedure for calculating baselines by eliminating the necessity of scaling the magnetograms for changes in the Z field between the times of the F and I observations. This had been the method previously used to approximate the correction ΔF required to reduce the observed value of F to the time of the I reading. In the new procedure the absolute values of Z and H are calculated from the relations $Z = F \sin I$ and $H = F \cos I$, where Z,H and F are field values at the time of the I measurement.

In determining the absolute value of X and Y for observatories recording geographical components of the field, a correction must be calculated to reduce H to the time of the D observations, as X and Y are functions of both H and D. This correction is given by

$$\Delta H = (X_D - X_I) \cos D + (Y_D - Y_I) \sin D,$$

where X_D, X_I, Y_D, Y_I are the ordinates of the traces measured at the times of the absolute determinations.

At observatories recording X,Y and Z components of the field, the magnetogram baselines are calculated from the following formulae:

$$X \text{ baseline} = (F_I \cos I + \Delta H) \cos D + X \text{ var}_D \cdot e_X$$

$$Y \text{ baseline} = (F_I \cos I + \Delta H) \sin D + Y \text{ var}_D \cdot e_Y$$

$$Z \text{ baseline} = F_I \sin I + Z \text{ var}_I \cdot e_Z$$

where F_I is the value of F at the time of the I absolute measurement; X var_D and Y var_D are the deflections in mm of the X and Y traces from the baselines at the time of the D absolute measurement; and e_X, e_Y, e_Z are the scale values of the X,Y and Z Ruska traces respectively. Z var_I is the deflection in mm of the Z trace from the baseline at the time of the I absolute measurement.

The uncertainties in the Ruska X and Y baselines are approximated by the sum of the magnitudes of the partial differentials of the X and Y baseline equations. Assuming uncertainties of 1 nT in F, 0.2' in I, the equivalent of 3 nT in D, 0.2 mm in scaling and 0.3% in scale values, the calculated uncertainty in the X and Y baselines, derived from the mean of 6 absolute measurements of D,I and F is 3 nT at all X,Y stations. Approximately half of this uncertainty is attributable to the uncertainty in scaling and in scale values. The corresponding uncertainty in determining the Z baseline from the mean of 6 absolute measurements is 1.5 nT.

Microfilm copies of standard-run photographic magnetograms with provisional baselines and scale values are supplied to World Data Centre A, Boulder, Colorado, on a monthly basis. Copies of magnetograms may be obtained from the Division of Geomagnetism or from

World Data Center A, Geomagnetism,
NOAA
Boulder, Colorado 80302
U.S.A.

Mean hourly values for Cambridge Bay, St. John's (August to December), and Meanook (November, December) were derived from the one-minute digital data. Magnetograms were scaled at Victoria on a semi-automatic scaling machine.[9] At Ottawa, some mean hourly value data were derived from the output of the electronic integrator.[5] In all other cases the mean hourly values were scaled manually. Values were punched on cards and the tables were calculated by computer. All values were rounded off to the nearest nT. Copies of mean hourly value and hourly range tables may be obtained from World Data Centre A or from the Division of Geomagnetism. Tabular data on magnetic tape is in the IAGA format. On microfilm, the tables for each observatory are arranged as follows:

Tables 1-36: Mean values of the three recorded elements for each hour of the day, and daily and monthly means for all days and for the international quiet and disturbed days;

Tables 37-45: Summary by month, season, and year of mean hourly values of the three elements for all days and for the international quiet and disturbed days;

Table 46: For the observatories reporting K-indices (Victoria, Meanook, Ottawa, St. John's), three-hour range indices and K-indices.

Tables 46-69: For the northern observatories, hourly ranges in 10-gamma units in the two horizontal components (R-Indices).

All times on the tables are universal time (UT).

K-indices are sent twice a month from the southern observatories to DeBilt, Netherlands, and Göttingen, Germany, for use in preparation of planetary K-indices published by the International Association of Geomagnetism and Aeronomy (IAGA). The lower limit, in nT, for K_9 is

1500 for Meanook
500 for Victoria
750 for Ottawa
750 for St. John's

Magnetograms are read each month at these observatories for magnetic events and the results forwarded to the appropriate IAGA Commission.

Summary of mean values

The summary for 1972 of the mean hourly values of the three elements, and a list of annual mean values, are given in the reports for individual observatories.

ALERT

Officer-in-charge: W. Piche

In the summer of 1961 the Dominion Observatory (now Earth Physics Branch, Department of Energy, Mines and Resources) established a combined magnetic and seismic observatory at Alert, Ellesmere Island, Northwest Territories. The choice of Alert Meteorological Station as a new magnetic observatory site resulted from studies of magnetic data recorded there during the International Geophysical Year.

Owing to the presence of a large induction anomaly[10], it was not considered worthwhile to continue a full observatory program at Alert, and photographic recording was discontinued on September 30, 1972. A stand-by variometer of the type described in the introductory section of the report, has continued in operation, and the Ruska magnetograph is re-activated for periods of several weeks to a few months each year as a control for magnetic surveys in the Arctic Islands and for training purposes. Microfilm copies of the fluxgate charts, and of Ruska magnetograms when available, are sent on a regular basis to World Data Center A, Boulder, Colorado.

The mailing address for Alert Observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Canada
K1A 0Y3

Observatory site

The observatory building rests on recent unconsolidated marine sediments that are underlain by metamorphosed sediments of early Paleozoic age. Magnetic field intensity gradients are extremely small: before construction a survey indicated a maximum gradient in the total field intensity of only 10 nT in 300 m. The site is 215 m northwest of the Ministry of Transport Meteorological Station.

Instrument piers

Owing to magnetic contamination of the original instrument piers, an external magnetic station was established in 1961 some 15 m west of the observatory at a location substantially free from artificial field disturbances and marked with a brass plug. The results for all years have been reduced to this reference site for uniformity.

In July 1962, the piers were replaced with non-magnetic concrete, necessitating the closing of the observatory from July 9 to 14. The corrections applied to the absolute observations made inside the observatory to reduce the data to the external reference point are listed below:

October 1961 to July 9, 1962	
X	- 56 nT
Y	-206 nT
Z	+ 24 nT
After July 15, 1962	
X	- 10 nT
Y	- 19 nT
Z	+ 28 nT

Parameters for Ruska data reduction

Corrections for temperature and parallax

No tests for the effect of temperature change were carried out in 1972. Coefficients determined in 1971 were adopted for 1972. Parallax determinations were made April 23 and September 28. The temperature and parallax corrections adopted for 1972 are as follows:

	Temperature Coefficients	Parallax corrections (to be subtracted from times read on the magnetograms)
	nT/°C	min
X	+1.3	0.1
Y	-0.9	0.1
Z	-3.5	0.4

Baselines and scale values

No abrupt baseline changes were observed in 1972.

Following are the adopted and observed baselines and scale values for 1972 (Tables 1-3).

Local quiet days (Alert)

The five local quiet days for each month, selected on the basis of the R indices are listed below. Local quiet days which do not

appear also in the list of 10 international quiet days are underlined.

January	6	7	8	13	14
February	9	12	22	27	29
March	1	5	14	15	19
April	3	11	16	25	26
May	7	8	19	22	24
June	9	10	11	13	30
July	4	5	6	21	30
August	23	24	25	30	31
September	12	19	20	21	22
October	-	-	-	-	-
November	-	-	-	-	-
December	-	-	-	-	-

Summary of mean values

The summary by month, season and year of the mean hourly values for all days in 1972, and the list of annual mean values, are given in Tables 4-7.

ALERT 1972 Table 1

X BASELINES nT				X SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan.	595	Jan. 1	593	Jan.	12.40	Jan. 6	12.42
		Jan. 10	597				
		Jan. 31	596				
Feb.	595	Feb. 10	592	Feb.	12.40	Feb. 25	12.38
		Feb. 27	595			Feb. 29	12.35
Mar.	595	Mar. 11	595	Mar.	12.40	Mar. 11	12.43
	to 593	Mar. 31	595				
Apr.	593	Apr. 15	590	Apr.	12.40	Apr. 24	12.40
	to 588	Apr. 25	587			Apr. 26	12.43
May	588	May 13	589	May	12.40	May 20	12.36
	to 586					May 23	12.35
June	586	June 14	583	June	12.40		
	to 584	June 30	584				
July	584	July 29	578	July	12.40	July 1	12.46
	to 578					July 14	12.43
Aug.	577	Aug. 13	574	Aug.	12.40	Aug. 1	12.47
	to 568	Aug. 24	569			Aug. 13	12.38
		Aug. 30	567			Aug. 31	12.46
Sept.	569	Sept. 27	570	Sept.	12.40	Sept. 22	12.41

ALERT 1972 Table 2

BASELINES γ Y			SCALE VALUES γ/mm		
Adopted		Observed	Adopted		Observed	
Jan.	-3807 to -3810	Jan. 1 -3806 Jan. 10 -3810 Jan. 31 -3806	Jan.	12.65	Jan. 6	12.63
Feb.	-3810 to -3813	Feb. 10 -3811 Feb. 27 -3815	Feb.	12.65	Feb. 25 Feb. 29	13.65 12.68
Mar.	-3813 to -3816	Mar. 11 -3815 Mar. 31 -3816	Mar.	12.60	Mar. 11	12.71
April	-3815 to 3812	Apr. 15 -3810 Apr. 25 -3814	Apr.	12.60	Apr. 23 Apr. 26	12.57 12.55
May	-3812 to -3806	May 15 -3812	May	12.60	May 20 May 23	12.57 12.55
June	-3805 to -3796	June 14 -3800 June 30 -3796	June	12.60		
July	-3796 to -3799	July 30 -3799	July	12.60	July 1 July 14	12.65 12.59
Aug.	-3799	Aug. 24 -3802 Aug. 31 -3798	Aug.	12.60	Aug. 1 Aug. 13 Aug. 31	12.59 12.65 12.57
Sept.	-3799	Sept. 27 -3797	Sept.	12.60	Sept. 22	12.59

ALERT 1972 Table 3

Z BASELINES nT				SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan.	55620 to 55625	Jan. 1 Jan.10 Jan.31	55624 55622 55626	Jan.	12.75	Jan. 6 Jan.25	12.72 12.76
Feb.	55624 to 55620	Feb.10 Feb.27	55619 55622	Feb. 1-15 Feb.16-29	12.75 12.80	Feb.25 Feb.29	12.76 12.85
Mar.	55620 to 55623	Mar.11 Mar.31	55622	Mar. 1-15 Mar.16-31	12.85 12.90	Mar.11	12.85
Apr. 1-25 Apr.26-31	55624 to 55627 55626 to 55623	Apr.15 Apr.25	55624 55628	Apr. 1-15 Apr.15-30	12.95 13.00	Apr.24 Apr.27	13.02 13.00
May	55622 to 55609	May 15	55610	May 1-15 May 16-31	13.05 13.10	May 19 May 22	13.06 13.07
June	55608 to 55603	Jun.14 Jun.30	55608 55603	June	13.10	-	
Jul.	55603 to 55590	Jul.30	55590	Jul.	13.10	Jul. 1 Jul.14	13.14 13.10
Aug.	55589 to 55570	Aug.23 Aug.31	55569 55573	Aug. 1-15 Aug.16-31	13.10 13.15	Aug. 2 Aug.12 Aug.31	13.02 13.05 13.14
Sept.	55570 to 55565	Sept.27	55566	Sept.1-16 Sept.17-30	13.20 13.25	Sept.22	13.23

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 4 ALERT 1972

X = 500 PLUS TABULAR VALUES IN NANOTESLAS

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	190	195	198	202	192	192	198	210	201	0	0	0	198	198	200	193
1-2	201	200	211	203	210	206	209	218	217	0	0	0	208	211	210	201
2-3	207	206	218	214	211	235	217	231	219	0	0	0	218	224	217	207
3-4	203	204	221	222	227	242	228	247	238	0	0	0	226	236	227	204
4-5	206	204	225	226	229	263	246	264	236	0	0	0	233	251	229	205
5-6	210	212	221	224	231	264	246	268	234	0	0	0	234	252	226	211
6-7	212	210	214	224	225	251	240	261	225	0	0	0	229	244	221	211
7-8	208	207	218	223	228	261	239	232	217	0	0	0	226	240	219	208
8-9	207	204	210	224	203	257	232	225	210	0	0	0	219	229	215	206
9-10	200	196	206	208	212	236	222	239	199	0	0	0	213	227	204	198
10-11	190	189	194	199	188	236	206	212	188	0	0	0	200	211	194	190
11-12	181	176	178	192	195	212	190	190	176	0	0	0	188	197	182	179
12-13	171	162	172	173	171	194	175	185	161	0	0	0	174	181	169	167
13-14	161	162	156	162	151	184	163	163	152	0	0	0	162	165	157	162
14-15	144	155	147	145	141	142	148	129	141	0	0	0	144	140	144	150
15-16	119	144	130	128	122	108	132	119	136	0	0	0	126	120	131	132
16-17	115	141	125	125	105	92	112	101	121	0	0	0	115	103	124	128
17-18	135	130	134	114	108	78	95	109	111	0	0	0	113	98	120	133
18-19	134	131	129	108	93	80	106	96	98	0	0	0	108	94	112	133
19-20	140	151	129	119	62	79	108	114	122	0	0	0	114	91	123	140
20-21	162	160	137	138	114	95	118	135	144	0	0	0	134	116	140	161
21-22	169	160	142	152	139	117	139	142	157	0	0	0	146	134	150	165
22-23	177	172	163	166	146	141	157	170	180	0	0	0	164	154	170	175
23-24	188	180	186	180	166	172	161	190	197	0	0	0	180	172	186	184
MEANS	176	177	178	178	170	181	179	185	178	0	0	0	178	179	178	177

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 5 ALERT 1972

Y = -4000 PLUS TABULAR VALUES IN NANOTESLAS

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	285	278	238	254	223	213	233	235	272	0	0	0	248	226	255	252
1-2	286	289	263	269	236	211	250	228	279	0	0	0	257	231	270	286
2-3	290	295	277	271	262	230	260	259	293	0	0	0	271	253	280	293
3-4	299	304	287	279	274	245	272	266	297	0	0	0	280	264	288	302
4-5	308	314	303	294	290	264	280	278	319	0	0	0	294	273	305	311
5-6	313	317	314	313	309	290	300	294	335	0	0	0	309	298	321	315
6-7	322	327	331	328	322	318	315	327	349	0	0	0	327	321	336	325
7-8	330	337	339	341	331	329	338	359	363	0	0	0	341	339	348	334
8-9	339	342	352	350	370	348	354	371	375	0	0	0	356	361	359	341
9-10	349	351	361	364	363	378	368	368	384	0	0	0	365	369	370	350
10-11	362	354	367	376	368	396	390	391	388	0	0	0	377	386	377	358
11-12	369	370	380	388	370	421	385	401	384	0	0	0	385	394	384	370
12-13	378	375	368	394	386	426	386	405	378	0	0	0	388	401	380	377
13-14	372	362	358	393	369	434	399	419	364	0	0	0	386	405	372	367
14-15	372	355	357	381	368	429	409	429	353	0	0	0	384	409	364	364
15-16	375	356	365	373	376	429	401	420	342	0	0	0	382	407	360	366
16-17	355	339	358	360	370	400	376	397	326	0	0	0	365	386	348	347
17-18	327	331	339	343	344	361	358	359	315	0	0	0	342	356	332	329
18-19	309	321	317	326	326	327	329	333	313	0	0	0	322	329	319	315
19-20	296	306	303	299	314	304	318	308	284	0	0	0	304	311	295	301
20-21	285	294	280	278	269	280	291	283	265	0	0	0	281	281	274	290
21-22	284	284	266	260	245	250	256	264	270	0	0	0	264	254	265	284
22-23	283	272	260	255	244	224	237	255	257	0	0	0	254	240	257	276
23-24	280	267	237	256	240	223	241	253	254	0	0	0	250	239	249	274
MEANS	324	323	317	323	315	322	323	329	323	0	0	0	322	322	321	323

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 6 ALERT 1972

Z = 55000 PLUS TABULAR VALUES IN NANOTESLAS

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	776	773	767	758	740	723	740	770	781	0	0	0	759	743	769	779
1-2	774	771	766	759	738	732	735	777	786	0	0	0	760	746	770	773
2-3	775	771	767	763	739	732	739	778	785	0	0	0	761	747	772	773
3-4	774	771	765	763	744	737	747	777	790	0	0	0	763	751	773	773
4-5	774	769	767	763	740	734	749	775	792	0	0	0	763	750	774	772
5-6	772	768	767	763	735	724	746	775	793	0	0	0	760	745	774	770
6-7	770	767	766	763	737	720	747	769	789	0	0	0	759	743	773	769
7-8	770	766	766	759	736	723	754	768	784	0	0	0	758	745	770	768
8-9	769	766	766	757	723	727	746	770	781	0	0	0	756	742	768	768
9-10	768	765	764	758	718	731	744	768	779	0	0	0	755	740	767	767
10-11	767	765	762	760	715	726	741	768	772	0	0	0	753	738	765	766
11-12	767	764	762	758	722	731	733	778	769	0	0	0	754	741	763	766
12-13	767	765	760	755	712	708	725	767	765	0	0	0	747	728	760	766
13-14	767	767	754	754	709	705	737	760	760	0	0	0	746	728	756	767
14-15	768	766	747	750	707	708	733	757	762	0	0	0	744	726	753	767
15-16	769	764	744	743	699	698	723	750	759	0	0	0	739	718	749	767
16-17	774	763	746	742	704	702	713	751	755	0	0	0	739	718	748	769
17-18	774	762	747	739	710	700	715	754	749	0	0	0	739	720	745	766
18-19	773	762	750	740	709	699	715	754	752	0	0	0	739	719	747	768
19-20	776	766	749	743	711	704	729	757	761	0	0	0	744	725	751	771
20-21	774	767	755	745	721	713	736	764	761	0	0	0	748	734	754	771
21-22	773	768	755	748	722	720	738	768	765	0	0	0	751	737	756	771
22-23	773	768	760	752	726	721	732	768	774	0	0	0	753	737	762	771
23-24	773	772	769	755	733	724	735	770	778	0	0	0	757	741	767	773
MEANS	772	767	759	754	723	718	736	766	773	0	0	0	752	736	762	769

TABLE 7

Annual Mean Values (Alert)

Year	X	Y	Z	D East*		I North*		H*	F*
	nT	nT	nT	°	'	°	'	nT	nT
1962.5	720	-3776	55379	280	48	86	01.8	3844	55512
1963.5	722	-3751	55392	280	54	86	03.3	3820	55524
1964.5	728	-3744	55430	281	00	86	03.8	3814	55561
1965.5	743	-3722	55448	281	17	86	05.1	3795	55578
1966.5	724	-3709	55497	281	03	86	06.3	3779	55626
1967.5	717	-3709	55537	280	56	86	06.5	3778	55665
1968.5	707	-3711	55578	280	47	86	06.7	3778	55706
1969.5	697	-3710	55619	280	38	86	07.0	3775	55747
1970.5	680	-3704	55665	280	24	86	07.8	3766	55792
1971.5	678	-3696	55726	280	24	86	08.3	3758	55853
1972.4	678	-3678	55752	280	27	86	09.7	3740	55877

*D,I,H,F are derived from the annual means of X, Y and Z.

RESOLUTE BAY

Officers-in-charge: P. Fournier 1971.5-1972.5
D. Showalter 1972.5-1973.5

A magnetic observatory was established at Resolute, Cornwallis Island, N.W.T. in 1948. However, photographic variometers capable of recording the geomagnetic field in three components were not in operation until November 1953.

The mailing address for Resolute Bay Observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines & Resources
Ottawa, Canada
K1A 0Y3

Observatory site

The area consists of Paleozoic limestone. Magnetic field intensity gradients are extremely small: a survey of the area has indicated a very low gradient in total field intensity with no natural anomaly greater than 50 nT within 1.5 km of the observatory.

Magnetic equipment

There were difficulties in operating the station proton precession magnetometer. In April a total force station was established 15 m north of the absolute building. The absolute measurements of total intensity F were made at this station with a Barringer proton precession magnetometer from April 3 to September 25, at which time a new station proton precession magnetometer equipped with an aluminum noise shield was installed. The station difference in F between the inside and outside piers was -63 nT (inside pier minus outside pier).

Parameters for Ruska data reduction

Corrections for temperature and parallax

Tests for the effect of temperature changes on the Ruska recordings were carried out July 27 - 29, October 28 - 30, and November 25, 26. Temperature changes were determined by comparison with the chart from the stand-by fluxgate magnetometer, located in the absolute building. Parallax tests were done April 23 and December 17. The results are listed below.

	Temperature Coefficients	Parallax correction (to be added to times read on the magnetograms)	
	nT/°C	min	
		Jan-Aug	Sept-Dec
X	+2.5	0.5	1.0
Y	-1.0	0.8	1.2
Z	-1.0	0.1	0.8

The change in parallax correction followed realignment of the Ruska magnetograph August 31.

Baselines and scale values

On August 31 when attempting to fix the time-light, the Ruska optical bench was accidentally moved, and all traces had to be realigned. This resulted in baseline changes in all components.

Z baseline changes were observed in April following adjustment of the variometer, and in October, November and December, when unexplained jumps occurred in the Z trace. The Z scale value changed in April at the time of the variometer adjustment. Times of change are given in Tables 8 to 10, which list the adopted and observed baselines and scale values for 1972.

Local quiet days (Resolute)

The five local quiet days for each month selected on the basis of the R indices are listed below. Local quiet days which do not appear also on the list of 10 international quiet days are underlined.

January	6	7	8	13	14
February	6	8	9	12	29
March	1	5	14	15	19
April	3	9	11	25	26
May	7	8	19	20	24
June	9	10	12	13	30
July	5	6	21	28	30
August*	22	23	24	25	29
September	3	12	19	20	30
October*	5	6	7	8	17
November	10	12	13	14	30
December	5	6	10	11	27

*August 31 and October 20 incomplete and not used in selection of local quiet days.

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 11-14.

RESOLUTE BAY 1972 Table 8

X BASELINES nT			X SCALE VALUES nT/mm		
Adopted		Observed	Adopted		Observed
January	-56 to -51	Jan. 8 -48 24 -53 28 -49	January	12.2	Jan. 8 12.25 28 12.18
February	-52 to -55	Feb. 9 -53 23 -52 29 -56	February	12.2	Feb. 9 12.20
March	-55	Mar. 13 -57 20 -53 29 -55	March	12.15	Mar. 13 12.18
April	-55 to -58	Apr. 20 -57 25 -57 30 -58	April	12.1	Apr. 17 12.10
May (1-17)	-58	13 -60	May	12.05	May 6 12.00
(18-31)	-59 to -53	24 -60 31 -50			
June	-53 to -39	11 -55 25 -41 30 -40	June 1-15 16-30	12.1 12.15	June 19 12.13
July	-38 to -36	16 -38 26 -34 31 -34	July	12.2	July 16 12.24
August 1-31 (1925)	-36 to -34	10 -38 16 -37	August	12.25	August 10 12.25 16 12.27
31 (1925-2400)	no record	24 -34			24 12.26
Sept. 1-2 (0215)	no record		September	12.3	Sept. 6 12.34
2 (0215)-30	-110 to -118	Sep 7 -108 16 -119 27 -119			16 12.28 21 12.30 27 12.21
Oct. 1-17	-118 to -123	Oct. 5 -112	October	12.25	Oct. 5 12.31
18-31	-123	12 -125			12 (12.14)
Nov.	-123	Nov. 7 -121 24 -124 30 -120	November	12.25	Nov. 7 (12.08) 17 12.28 25 12.19 30 12.29
Dec.	-123	Dec. 7	December	12.3	Dec. 7 12.29

RESOLUTE BAY 1972 Table 9

Y BASELINES nT				Y SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan	-553	Jan 8	-555	January	11.3	Jan. 8	11.30
		24	-548			28	11.25
		28	-552				
Feb	-552	Feb 9	-556	February	11.35	Feb. 9	11.35
		23	-550				
		29	-553				
Mar	-552 to -550	Mar 13	-550	March	11.4	Mar. 13	11.40
		20	-552				
		29	-548				
Apr	-550	Apr 20	-550	April	11.45	Apr. 17	11.50
		25	-549				
		30	-558				
May 1-18	-550	May 13	-550	May	11.45	May 6	11.43
19-31	-550 to -546	24	-542				
		31	-555				
June	-546 to -537	June 11	-546	June	11.4	Jun. 12	11.48
		25	-532			19	11.29
		30	-540				
July	-537 to -525	July 16	-525	July	11.4	July 16	11.44
		26	(-516)				
		31	-528				
Aug 1-31(1925)	-525 to -532	Aug 10	-526	August	11.4	Aug. 16	11.35
		16	-530			24	11.46
		24	-531				
31(1925-2400)	no record						
Sept. 1-2(0215)	no record			September	11.45	Sept.16	11.39
2(0215)-30	-690 to -701	Sept 7	-696			21	11.43
		16	-689			27	11.52
		27	-700				
Oct.	-702 to -713	Oct. 5	-705	October	11.4	Oct. 5	11.48
		12	-706			12	11.31
Nov.	-714	Nov. 7	-714	November	11.35	Nov. 7	11.36
		24	-713			25	11.29
		30	-714			30	11.29
Dec.	-714	Dec. 7	-714	December	11.3	Dec. 7	

RESOLUTE BAY 1972

Table 10

Z BASELINES nT

Adopted		Observed	
Jan	58100	Jan 8	58100
		24	58099
		28	58101
Feb	58100		
Mar	58100	Mar 13	58105
		20	58098
		29	58100
Apr 1-16(1700)	58100	Apr 20	58132
16(1700)-17(2115)		No Trace	
17(2115)-25	58145 to 58100	25	58103
26-30	58100 to 58095	30	58092
May 1-17	58095 to 58104	May 13	58102
18-31	58104 to 58107	24	58112
June	58107 to 58109	June 11	58101
		25	58119
		30	58113
July	58110 to 58112	July 16	58105
		26	58107
		31	58110
Aug. 1-31(1925)	58113 to 58115	Aug. 10	58021
		16	58112
		24	58114
31(1925-2400) no record			
Sept 1-2(0215) No Trace		Sept 7	58107
2(0215)-3(1715)	58115	16	58107
3(1715)-30	58104 to 58101	27	58100
Oct. 1-4	58100 to 58085	Oct. 5	58086
5-25(1700)	58085	12	58082
25(1700)-31	58110 to 58120		
Nov. 1-6	58122 to 58137	Nov. 7	58142
7-19(2255)	58140	24	58112
19(2255)-22(0100)	58283 to 58140	30	58136
22(0100-0209)	58130		
22(0209)-30	58108 to 58137		
Dec. 1-27(0520)	58137	Dec. 7	58137
27(0520)-31	58145		

Z SCALE VALUES nT/mm

Adopted		Observed	
January	9.95	Jan 8	9.97
		28	9.95
February	10.0	Feb. 9	10.08
March	10.05	Mar. 13	10.05
Apr 1-16(1700)	10.05	Apr. 17	9.56
17(2115)-20	9.55 to 9.77	20	9.77
21-30	9.77 to 9.83		
May 1-20	9.83 to 9.95	May 6	9.88
21-31	9.95		
June	9.95	June 12	9.99
		19	9.93
July 1-10(1800)	9.95	July 16	10.37
10(1800)-31	10.25		
Aug. 1-31(1925)	10.25	Aug. 16	10.08
		24	10.20
Sept 2(0215)-15	9.85	Sept. 16	9.80
16-30	9.90	21	9.88
		27	9.85
Oct. 1-25(1700)	9.95	Oct. 5	10.00
25(1700)-31	11.00	12	9.98
Nov. 1-15	11.00	Nov. 7	10.96
16-30	11.05	17	11.04
		25	11.11
		30	11.09
Dec. 1-15	11.10	Dec. 7	11.15
16-31	11.15		

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 11 RESOLUTE BAY X = 0 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	189	191	175	203	191	181	205	236	207	207	215	218	202	203	198	203
1-2	195	200	203	211	211	194	216	207	219	220	218	222	210	207	213	209
2-3	200	207	215	226	224	216	223	232	231	230	222	224	221	224	226	213
3-4	207	212	225	238	242	242	241	255	241	241	228	228	233	245	236	219
4-5	217	220	238	251	255	277	260	275	257	247	243	233	248	267	248	228
5-6	225	227	244	259	267	285	274	289	266	254	249	239	257	279	256	235
6-7	231	232	249	268	272	294	280	300	267	261	256	246	263	287	261	241
7-8	235	239	254	274	280	308	289	288	272	267	261	252	268	291	267	247
8-9	238	240	255	282	293	311	289	291	273	274	270	249	272	296	271	249
9-10	240	237	255	279	293	313	292	302	272	272	265	250	273	300	270	248
10-11	239	231	251	278	285	311	297	291	267	261	258	246	268	296	264	244
11-12	233	230	248	275	284	309	294	285	261	247	244	241	263	293	258	237
12-13	224	216	234	265	280	315	286	297	248	231	233	234	255	295	245	227
13-14	211	207	230	257	262	305	269	288	241	226	221	222	245	281	239	215
14-15	203	200	228	241	266	283	253	261	221	202	207	218	232	266	223	207
15-16	184	192	215	224	251	250	249	244	207	197	188	210	218	249	211	194
16-17	162	180	192	212	217	217	213	194	194	190	177	199	196	210	197	180
17-18	158	169	179	195	188	191	195	169	189	184	168	191	181	186	187	172
18-19	151	163	170	168	173	159	170	155	169	174	174	190	168	164	170	170
19-20	154	166	166	170	158	141	154	142	169	159	176	191	162	149	166	172
20-21	162	167	154	180	172	139	163	133	173	166	184	193	166	152	168	177
21-22	173	166	153	178	188	149	170	145	172	182	193	193	172	163	171	181
22-23	184	165	161	186	180	162	174	145	180	187	204	201	177	165	179	189
23-24	185	170	161	192	176	179	178	177	190	199	201	207	185	178	186	191
MEANS	200	201	211	230	234	239	235	233	224	220	219	221	222	235	221	210

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 12 RESOLUTE BAY Y = -1000 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	284	278	269	266	252	252	269	239	269	265	280	297	268	253	267	285
1-2	279	281	271	259	249	233	264	226	266	271	276	291	264	243	267	282
2-3	275	281	273	256	252	226	254	221	265	271	274	289	261	238	266	280
3-4	278	282	276	257	255	231	251	215	258	270	266	290	261	238	265	279
4-5	280	286	280	264	263	242	255	217	262	275	276	292	266	244	270	284
5-6	282	286	286	272	273	252	265	218	275	280	286	294	272	252	278	287
6-7	292	290	297	284	282	266	271	245	291	291	292	294	282	266	291	290
7-8	288	298	308	296	293	275	281	274	306	302	300	301	294	281	303	297
8-9	298	308	319	305	317	284	300	305	322	324	314	309	309	302	318	307
9-10	310	317	328	321	320	306	313	311	334	337	326	319	320	313	330	318
10-11	323	326	335	330	331	317	327	335	345	349	334	330	332	328	340	328
11-12	335	338	349	337	337	342	349	342	356	354	346	334	343	343	349	338
12-13	346	349	353	352	356	362	363	355	365	366	349	338	355	359	359	346
13-14	349	346	359	361	379	375	371	386	369	368	351	340	363	378	364	347
14-15	358	347	367	375	381	399	383	417	377	365	351	335	371	395	371	348
15-16	366	350	376	382	393	429	400	425	374	364	354	333	379	412	374	351
16-17	365	347	377	377	402	426	402	415	376	346	345	332	376	411	369	347
17-18	348	341	366	387	384	423	401	385	370	335	332	330	367	398	365	338
18-19	330	333	348	362	369	386	365	383	360	329	317	320	350	376	350	325
19-20	314	318	331	334	363	367	357	367	330	317	307	312	335	364	328	313
20-21	299	310	315	312	319	344	328	328	307	301	297	306	314	330	309	303
21-22	296	302	309	292	298	310	316	333	291	293	292	299	303	314	296	297
22-23	292	287	298	280	284	293	288	268	278	278	288	296	286	283	284	291
23-24	287	279	276	274	269	278	274	248	269	273	279	298	275	267	273	286
MEANS	311	312	319	314	318	317	319	311	317	314	310	312	314	316	316	311

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 13 RESOLUTE BAY Z = 58000 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	443	442	435	427	394	373	374	407	433	459	478	461	427	387	439	456
1-2	442	443	437	426	394	372	382	434	434	461	476	460	430	396	440	455
2-3	443	445	440	425	398	380	390	447	439	465	476	460	434	404	442	456
3-4	444	449	445	429	407	386	398	437	450	468	482	464	438	407	448	460
4-5	446	449	451	433	410	390	405	440	459	471	483	466	442	411	454	461
5-6	451	451	453	438	414	397	411	475	464	476	484	468	449	424	458	464
6-7	457	455	455	441	417	400	414	472	464	481	487	470	451	426	460	467
7-8	458	460	459	444	416	406	423	466	464	484	492	475	454	428	463	471
8-9	462	460	463	445	421	408	421	473	465	486	498	476	457	431	465	474
9-10	461	461	465	446	418	415	420	468	467	494	498	479	458	430	468	475
10-11	467	462	465	446	416	417	424	466	465	495	497	483	459	431	468	477
11-12	471	466	467	450	421	424	420	477	461	488	498	486	461	436	467	480
12-13	478	467	464	453	424	422	416	484	456	485	496	483	461	437	465	481
13-14	471	466	454	458	419	427	428	477	443	482	493	480	458	438	459	478
14-15	471	464	451	458	416	430	437	477	436	471	496	475	457	440	454	477
15-16	474	468	461	450	420	430	431	479	431	469	500	470	457	440	453	478
16-17	473	464	464	454	423	420	424	480	412	465	498	471	454	437	449	477
17-18	466	462	463	446	397	381	415	445	397	463	494	473	441	407	442	474
18-19	455	466	451	432	378	381	402	416	400	464	493	472	434	394	437	472
19-20	454	468	448	415	380	354	393	398	406	459	489	470	428	381	432	470
20-21	452	457	453	419	379	362	383	411	401	461	488	469	428	384	434	467
21-22	448	446	444	425	370	359	357	394	421	465	481	465	423	370	439	460
22-23	444	442	449	426	389	349	358	399	425	461	477	463	424	374	440	457
23-24	441	443	436	427	396	373	370	394	428	462	474	461	425	383	438	455
MEANS	457	456	453	438	404	394	404	446	438	472	489	471	444	412	450	468

TABLE 14

Annual Mean Values (Resolute Bay)

Year	X	Y	Z	D East*		I North*		H*	F*
	nT	nT	nT	°	'	°	'	nT	nT
1954.5	-96	-915	57971	264	01	89	05.4	920	57978
1955.5	-69	-906	57999	265	38	89	06.1	909	58006
1956.5	-41	-904	58020	267	24	89	06.4	905	58027
1957.5	-24	-903	58065	268	29	89	06.5	903	58072
1958.5	9	-884	58035	270	35	89	07.6	884	58042
1959.5	32	-861	58032	272	08	89	08.9	862	58038
1960.5	54	-850	58052	273	38	89	09.5	852	58058
1961.5	72	-844	58076	274	53	89	09.9	847	58082
1962.5	85	-827	58103	275	52	89	10.8	831	58109
1963.5	108	-815	58120	277	33	89	11.4	822	58126
1964.5	117	-800	58144	278	19	89	12.2	809	58150
1965.5	132	-791	58170	279	28	89	12.6	802	58175
1966.5	141	-780	58208	280	15	89	13.2	793	58213
1967.5	153	-766	58250	281	18	89	13.9	781	58255
1968.5	166	-751	58291	282	28	89	14.7	769	58296
1969.5	179	-732	58320	283	16	89	15.6	754	58325
1970.5	193	-715	58374	285	06	89	16.4	741	58379
1971.5	199	-697	58417	285	56	89	17.3	725	58421
1972.5	222	-686	58444	287	56	89	17.6	721	58448

*D,I,H,F are derived from the annual means of X, Y, Z.

MOULD BAY

Officers-in-charge: D. Weston 1970.5-1972.5
R. Green 1972.5-1973.5

Introduction

A combined magnetic and seismic observatory was established at Mould Bay, Prince Patrick Island, N.W.T., in the summer of 1961.

The mailing address for Mould Bay observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines & Resources
Ottawa, Canada
K1A 0Y3

Observatory site

The station is in a permafrost area and is underlain by sandstones, siltstones and shales of the Devonian Melville Island formation. Using a Varian portable proton precession magnetometer, small magnetic field intensity gradients of the order of a few nanoteslas in 30 m were found to exist at the site. The magnetic-seismic observatory is north of the weather station and about 70 m from the nearest building.

Magnetic equipment

Difficulties were experienced with the Ruska drive-clock. This was replaced in July by a synchronous motor-drive.

Parameters for Ruska data reduction

Corrections for temperature and parallax

The temperature coefficients for use with the Ruska magnetograms, determined February 29, 1972, and January 3, 1973, and the parallax corrections, determined March 30, 1972 and January 3, 1973, are listed below.

	Temperature Coefficients	Parallax corrections (to be subtracted from the times read on the magnetograms)	
	nT/°C	min	
		Jan 1-July 3	July 4-Dec 31
X	+0.5	0.3	0.1
Y	-1.5	0.2	0.1
Z	+3.0	0.0	0.4

Change in the parallax corrections followed the time-light adjustment July 4, at 0720 U.T.

Baselines and scale values

Baseline changes followed instrument adjustments in August, September, November and December.

There were many abrupt changes in the Z baseline in 1972, of magnitude 20 to 30 nT. These have been attributed to sudden settling of the permafrost into which the piers are set. The movement on October 31 at 1700 hours was of sufficient intensity to render the Z system inoperative, and was identified as an ice-crack on the seismograms.

Times of sudden baseline changes and associated changes in scale values are given in Tables 15 to 17, which list the adopted and observed baselines and scale values for 1972.

Local quiet days (Mould Bay)

The five local quiet days for each month, selected on the basis of the R indices are listed below. Local quiet days which do not appear also in the list of 10 international quiet days are underlined.

January	6	7	8	13	14
February	6	8	9	12	29
March	1	5	13	14	15
April	3	9	16	25	26
May	7	8	19	20	24
June	9	10	12	13	30
July	5	6	21	28	30
August	2	17	23	24	25
September	12	19	20	21	30
October	5	6	8	9	17
November	10	12	13	14	30
December	5	6	10	11	27

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 18-21.

MOULD BAY 1972

Table 15

X BASELINES nT			X SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan 1-9	751 to 759	Jan 6	758	January	12.40	Jan.13	12.38
Jan 10-23	759	Jan 13	759			Jan 27	12.51
Jan 24-31	759 to 763	Jan 21	756				
		Jan 28	761				
Feb 1-10	764 to 770	Feb 6	769	February	12.40	Feb 25	12.37
Feb 11-29	770	Feb 22	774				
		Feb 29	765				
Mar 1-23	768 to 725	Mar 9	744	March	12.35	Mar 9	12.32
Mar 24-31	726 to 732	Mar 16	745				
		Mar 24	722				
Apr 1-9 (0650)	732 to 740	Apr 4	735	Apr	12.30	Apr 14	12.32
Apr 9(0650)-30	732	Apr 13	730				
		Apr 22	737				
May	732	May 7	730	May	12.30	May 31	12.21
		May 21	732				
		May 31	734				
June	733 to 743	Jun 8	734	June	12.35	Jun 25	12.38
		Jun 15	738			Jun 24	12.20
		Jun 29	739				
Jul 1-10	743 to 747	Jul 5	748	July	12.40	July 7	12.16
Jul 11-31	746 to 739	Jul 12	748			Jul 28	12.49
		Jul 21	743				
		Jul 30	738				
Aug 1-16 (0000)	738 to 728	Aug 10	732	August	12.45	Aug 17	12.40
Aug 16(0000)-31	686 to 678	Aug 17	684			Aug 25	12.42
		Aug 23	682				
		Aug 28	679				
Sep 1-22(0403)	677 to 661	Sep 7	675	September	12.50	Sep 16	12.51
Sep 22(0403)-30	767 to 756	Sep 16	666			Sep 22	12.48
		Sep 22	767			Sep 23	12.51
		Sep 28	759				
Oct 1-3	755 to 752	Oct 5	751	Oct 1-15	12.50	Oct 5	12.51
Oct 3-31	753 to 766	Oct 12	761	Oct 16-31	12.55	Oct 18	12.48
		Oct 18	756			Oct 26	12.52
		Oct 26	762				
Nov 1-11(0430)	767 to 772	Nov 5	773	Nov 1-15	12.60	Nov 5	12.63
Nov 11(0430)-30	813	Nov 11	814	Nov 16-30	12.55	Nov 11	12.64
		Nov 14	814			Nov 14	12.62
		Nov 22	814			Nov 28	12.53
		Nov 28	809				

X BASELINES nT				X SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Dec 1-2 (0600)	813	Dec 2	827	December	12.55	Dec 6	12.54
Dec 2 (0600) -20 (0720)	827 to 839	Dec 8	829			Dec 20	12.60
Dec 20 (0720) -31	858	Dec 15	837				
		Dec 21	858				
		Dec 27	857				

MOULD BAY 1972

Table 16

Y BASELINES nT				Y SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan 1-22	2165	Jan 6	2164	January	12.25	-	
Jan 23-31	2166 to 2168	Jan 13	2165				
		Jan 21	2164				
		Jan 28	2167				
Feb 1-6	2169	Feb 6	2170	February	12.25	-	
7-29	2169 to 2165	Feb 22	2166				
		Feb 29	2164				
March	2168	Mar 9	2169	March	12.25	-	
		Mar 16	(2183)				
		Mar 24	2169				
Apr 1-4	2169	Apr 4	2169	April	12.25	-	
Apr 5-30	2169 to 2193	Apr 14	2176				
		Apr 22	2184				
		Apr 30	2192				
May	2194 to 2223	May 7	2207	May	12.25	-	
		May 21	2214				
		May 31	2220				
June	2224 to 2252	Jun 8	2228	June	12.30	Jun 25	12.23
		Jun 15	2233			Jun 26	12.34
		Jun 22	2241				
		Jun 29	2259				
Jul 1-9	2253 to 2262	Jul 5	2261	July	12.30	-	
Jul 10-31	2262 to 2264	Jul 12	2262				
		Jul 21	2264				
		Jul 30	2262				
Aug 1-16 (0000)	2265	Aug 10	2266	August	12.35	Aug 24	12.31
Aug 16 (0000)							
-25 (0535)	2079 to 2074	Aug 17	2079			Aug 25	12.36
		Aug 23	2074			Aug 26	12.39
Aug 25 (0535)							
-31	2130	Aug 28	2130				
Sep 1-15	2129 to 2123	Sep 7	2127	September	12.35	-	
Sep 16-30	2122 to 2107	Sep 16	2121				
		Sep 22	2116				
		Sep 27	2108				
Oct 1-15	2107	Oct 5	2103	October	12.35	-	
Oct 16-31	2106 to 2092	Oct 12	2110				
		Oct 18	2106				
		Oct 27	2100				
Nov 1-11 (0430)	2091 to 2081	Nov 5	2080	November	12.35	Nov 11	12.33
Nov 11 (0430)		Nov 10	2179			Nov 12	12.31
-30	2179 to 2155	Nov 14	2176			Nov 16	12.39
		Nov 22	2164				
		Nov 28	2156				

MOULD BAY 1972 Table 16

Y BASELINES nT				Y SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Dec 1-2 (0600)	2154	Dec 2	2162	Dec 1-20 (0700)	12.35	Dec 20	12.40
Dec 2 (0600)		Dec 8	2163	Dec 20(0700)-31	12.45	Dec 20	12.50
-20 (0720)	2160 to 2171	Dec 15	2169				
Dec 20 (0720)		Dec 21	2104				
-31	2104	Dec 27	2103				

MOULD BAY 1972 Table 17

Z BASELINES nT				Z SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan 1-7(1320) 57944 to 57967		Jan 6	57960	January	11.65	Jan 18	11.67
Jan 7(1320-9(1445)	58005	Jan 13	58008			Jan 28	11.67
Jan 9(1145-1600)	57997	Jan 21	57990				
Jan 9(1600-2103)	57960	Jan 28	57988				
Jan 9(2103) - 17(2148)	58008						
Jan 17(2148) - 31	57990						
Feb 1-19(0715) 57990 to 57998		Feb 6	57995	February	11.65	Feb 25	11.69
Feb 19(0715)-20(2310)	57960	Feb 22	57993				
Feb 20(2310)-29	57998	Feb 29	57999				
Mar 1-2(2125)	57998	Mar 9	57981	March 1-2 (2125)	11.65	Mar 9	11.38
Mar 2(2125)-31	57980	Mar 11	57975	March 2 (2125)-31	11.40		
		Mar 24	57979				
Apr 1-7(0850)	57980	Apr 4	57979	April	11.40	Apr 14	11.40
Apr 7(0850)-30	57990	Apr 14	57990				
		Apr 21	57990				
		Apr 30	57990				
May	57990	May 7	57989	May 1-18 (2014)	11.40	May 31	12.35
		May 21	57990	May 18 (2014)-31	12.30		
		May 31	57991				
Jun 1-25(0500)	57992	Jun 13	57991	June	12.30	Jun 15	12.29
Jun 25(0500)-30	57999	Jun 15	57994			Jun 25	12.18
		Jun 22	57991				
		Jun 29	57999				
July 57999 to 57997		Jul 5	57999	July	12.35	Jul 7	12.32
		Jul 12	57997			Jul 28	12.35
		Jul 21	57999				
		Jul 28	57995				
Aug 1-21 57996 to 57988		Aug 10	57995	August	12.35	Aug 17	12.35
Aug 22-31	57988	Aug 17	57988				
		Aug 23	57986				
		Aug 28	57988				
Sep 1-15	57988	Sep 8	57988	Sept 1-15	12.40	Sept 16	12.47
Sep 16-30 57988 to 57981		Sep 16	57988	Sept 16-30	12.45	Sept 22	12.42
		Sep 21	57986				
		Sep 28	57982				
Oct 1-24(1815)	57891	Oct 5	57979	Oct. 1-15	12.50	Oct 5	12.50
Oct 24(1815) - 27(0200)	57970	Oct 12	57980	Oct 16-31	12.45	Oct 18	12.54
Oct 27(0200)-29(1711)	57976	Oct 18	57981			Oct 26	12.44
Oct 29(1711)-31(1235)	58026	Oct 26	57970				
Oct 31(1235-1700)	57976						
Oct 31(1700-2400) Z inoperative							

MOULD BAY 1972

Table 17

Z BASELINES nT				Z SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Nov. 1(0000-0200) Z inoperative							
Nov 1(0200)		Nov 5	57937	Nov 1-11(0430)	12.40	Nov 5	11.80
- 2(0550)	57928	Nov 11	58008	Nov 11(0430)-16	11.65-11.80	Nov 11	11.64
Nov 2(0550)		Nov 14	58013	Nov 17-30	11.80	Nov 14	11.70
-11(0430) 57922 to	57954	Nov 22	58006			Nov 14	11.83
Nov 11(0430)-30	58008	Nov 28	58008			Nov 28	11.82
Dec 1(0000)-2(0600)	58008	Dec 2	57998	Dec 1-20(0700)	11.80	Dec 6	11.81
		Dec 8	57998			Dec 20	11.61
Dec 2(0600)-31	57998	Dec 15	57999	Dec 20(0700)-31	11.60-11.71		
		Dec 21	57996				
		Dec 27	57999				

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 18 MOULD BAY X = 500 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	615	619	582	587	595	587	618	649	615	618	629	635	612	612	601	625
1-2	622	629	606	589	611	586	622	620	629	629	629	638	618	610	613	630
2-3	623	634	614	604	617	610	624	620	637	634	632	639	624	618	622	632
3-4	632	638	623	621	639	641	637	644	646	643	634	642	637	640	633	637
4-5	639	644	637	638	653	675	660	658	656	650	646	645	650	662	645	644
5-6	642	650	646	648	667	685	675	659	667	654	652	651	658	672	654	649
6-7	646	657	651	663	677	695	683	691	676	662	661	654	668	687	663	655
7-8	653	664	662	671	689	713	693	693	684	674	669	662	677	697	673	662
8-9	661	671	670	680	700	722	698	708	692	688	679	663	686	707	683	669
9-10	667	674	675	680	706	723	703	720	693	693	685	669	691	713	685	674
10-11	669	670	672	680	701	728	709	715	691	684	680	667	689	713	682	672
11-12	661	671	667	678	701	725	707	709	683	671	669	663	684	711	675	666
12-13	656	661	653	671	701	733	704	711	673	653	659	658	678	712	663	659
13-14	650	651	646	665	691	730	696	710	667	650	647	646	671	707	657	649
14-15	644	643	646	655	692	710	685	694	656	631	635	645	661	695	647	642
15-16	626	639	641	642	679	691	684	686	651	627	618	636	652	685	640	630
16-17	607	632	624	629	655	663	659	643	640	622	613	625	634	655	629	619
17-18	606	621	614	619	631	646	634	621	635	617	603	617	622	633	621	612
18-19	595	612	604	590	615	611	609	603	611	606	600	613	606	610	603	605
19-20	598	609	586	577	589	572	592	586	604	582	598	611	591	585	587	602
20-21	592	608	569	573	589	561	590	577	608	583	599	611	588	579	583	603
21-22	602	603	565	571	608	575	608	586	601	595	604	608	594	594	583	604
22-23	612	598	565	584	600	597	608	563	606	595	615	617	597	592	588	611
23-24	616	600	568	587	587	606	599	597	611	610	616	626	602	597	594	615
MEANS	630	637	624	629	650	658	654	653	647	636	636	639	641	654	634	636

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 19 MOULD BAY Y = 2000 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	304	297	277	283	289	282	321	279	292	293	306	319	295	293	286	307
1-2	304	303	278	272	264	259	303	255	292	295	308	316	287	270	284	308
2-3	299	300	276	269	277	252	280	251	286	298	308	315	284	265	282	306
3-4	302	301	275	271	274	255	279	229	271	295	293	316	280	259	278	303
4-5	303	306	270	273	274	260	275	237	274	294	306	319	283	262	278	309
5-6	300	301	277	279	283	261	279	219	280	292	310	315	283	261	282	307
6-7	294	301	287	289	286	270	281	251	293	296	309	311	289	272	291	304
7-8	299	302	295	295	296	271	287	272	311	303	312	314	296	282	301	307
8-9	305	309	305	305	313	280	308	300	324	322	316	318	309	300	314	312
9-10	314	322	315	320	318	301	314	309	336	330	333	329	320	312	325	325
10-11	327	332	327	333	333	317	334	337	352	348	346	342	336	330	340	337
11-12	336	347	344	341	340	340	355	342	366	359	364	338	348	344	353	346
12-13	354	365	349	357	358	358	371	359	376	376	367	355	362	362	365	360
13-14	364	356	356	364	374	372	378	388	378	370	371	358	369	378	367	362
14-15	370	358	360	378	394	394	391	414	390	371	373	353	378	396	375	364
15-16	382	363	373	390	402	423	409	418	395	378	376	357	389	413	384	370
16-17	378	359	384	388	415	428	423	421	410	370	374	362	393	422	388	368
17-18	367	365	371	397	421	443	430	421	416	372	364	360	394	429	389	364
18-19	359	364	370	386	428	420	403	433	416	372	357	350	388	421	386	358
19-20	345	344	360	381	424	422	398	435	395	364	343	339	379	420	375	343
20-21	327	339	351	351	391	394	379	388	377	341	328	334	358	386	355	332
21-22	319	334	341	324	347	360	380	395	341	312	319	324	341	371	330	324
22-23	311	314	293	310	325	351	358	337	324	298	312	316	321	343	306	313
23-24	307	301	280	291	283	307	327	314	295	297	307	317	302	308	291	308
MEANS	328	328	321	327	337	334	344	334	341	331	333	332	333	337	330	331

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 20 MOULD BAY Z = 57500 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	667	660	645	659	626	60 8	611	606	638	662	682	678	645	613	651	672
1-2	664	659	644	648	615	597	605	634	642	666	682	674	644	613	650	670
2-3	661	660	649	639	620	597	605	637	645	669	680	671	644	615	651	668
3-4	660	661	651	636	617	596	606	627	650	671	677	672	644	612	652	668
4-5	658	663	656	640	621	598	612	629	660	675	682	675	647	615	658	670
5-6	663	666	661	649	631	616	624	645	672	681	687	674	656	629	666	673
6-7	671	668	668	657	637	629	633	668	677	690	692	678	664	642	673	677
7-8	675	675	678	666	644	640	645	676	685	697	703	686	673	651	682	685
8-9	686	681	684	673	656	647	653	693	694	706	717	695	682	662	689	695
9-10	695	687	693	680	665	660	660	698	702	723	727	702	691	671	700	703
10-11	706	693	694	684	664	670	668	707	703	726	726	713	696	677	702	710
11-12	715	698	700	687	665	679	676	712	708	719	729	718	701	683	704	715
12-13	726	711	703	691	672	688	676	712	709	722	728	716	705	687	706	720
13-14	721	706	696	696	686	687	679	716	697	721	726	715	704	692	703	717
14-15	721	700	695	703	684	698	692	732	694	715	730	707	706	702	702	715
15-16	730	710	705	708	692	715	701	743	694	716	736	703	713	713	706	720
16-17	738	706	724	716	708	721	708	745	694	709	735	705	717	721	711	721
17-18	728	708	729	727	716	720	709	734	687	703	729	709	717	720	712	719
18-19	714	713	724	725	709	709	702	722	683	702	724	704	711	711	709	714
19-20	706	709	705	711	706	706	699	711	674	691	715	698	703	706	695	707
20-21	692	693	693	684	667	685	675	671	642	680	703	693	682	675	675	695
21-22	683	679	671	658	630	657	648	634	630	668	692	686	661	642	657	685
22-23	673	667	663	641	631	625	617	622	622	664	687	680	649	624	648	677
23-24	667	663	652	652	633	619	616	612	625	665	681	678	647	620	649	672
MEANS	692	685	683	676	658	657	655	679	672	693	707	693	679	662	681	694

TABLE 21

Annual Mean Values (Mould Bay)

Year	X	Y	Z	D East*		I North*		H*	F*
	nT	nT	nT	°	'	°	'	nT	nT
1962.8	983	2205	57951	65	57	87	37.0	2412	58001
1963.5	1001	2208	57940	65	37	87	36.3	2424	57991
1964.5	1015	2212	57948	65	21	87	35.7	2434	57999
1965.5	1034	2220	57960	65	02	87	34.8	2449	58012
1966.5	1053	2233	57991	64	45	87	33.7	2469	58044
1967.5	1067	2247	58019	64	36	87	32.7	2487	58072
1968.5	1078	2258	58053	64	29	87	31.9	2502	58107
1969.5	1092	2276	58081	64	22	87	30.8	2524	58136
1970.5	1115	2306	58120	64	12	87	28.6	2561	58176
1971.5	1125	2322	58145	64	09	87	27.6	2580	58202
1972.5	1141	2333	58179	63	56	87	26.6	2597	58237

*D,I,H,F are derived from the annual means of X,Y,Z.

CAMBRIDGE BAY

Officer-in-charge: Operated under contract by Cambridge Bay Sports and Electric Co.

Owing to the effects of the large induction anomaly at Alert[10], a decision was made to close the Alert Magnetic Observatory in 1972. It was initially planned to replace Alert with an observatory at Eureka (80° 00' N; 85°56' W). However, an analysis of magnetic survey results from 1960 to 1962 showed that effects of the Alert anomaly were significant as far south as Eureka. As the next stage in selection of a suitable alternative site, a recording fluxgate magnetometer was operated at Cambridge Bay for two months in the summer of 1968. No unusual effects were observed in these recordings. In addition, Cambridge Bay is situated under the magnetospheric cleft region, and should provide valuable data for magnetospheric studies. Accordingly an AMOS[2] was installed in April 1972 at a site 1.5 km east of the Cambridge Bay settlement.

The observatory is located on top of a 17 m hill at the centre of the site, of area 90,000 m^2, and is 180 m north of the coast. The observatory is not permanently staffed; it is attended once or twice a week for absolute observations and routine instrument and building checks.

The mailing address of Cambridge Bay observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Canada K1A 0Y3

Building and site

A preliminary site selection was made from an air-photo of the area in consultation with officers of the Department of Indian and Northern Affairs. A total force survey of the proposed site was made in September 1971. Readings were taken at intervals of 30 m along two lines in the east-west and north-south directions. Gradients were 1.5 nT in 10 m to the north and 3 nT in 10 m to the south of the proposed building location. Soil borings taken earlier had confirmed that the site was suitable for construction of a magnetic observatory. An outside reference station was established about 60 m west of the proposed building location to provide azimuth information for the absolute pier.

The building was completed in December 1971. It is of the same construction as Resolute Bay observatory[11], 6 m by 12 m, with the long axis aligned magnetic north-south.

Magnetic equipment

The AMOS installed in April 1972 is the primary recorder. H,D,Z and F values are recorded digitally on magnetic tape at intervals of one minute. An independent 3-component fluxgate magnetometer recording on paper chart at 20 mm/hr provides a stand-by analogue recording system.

Absolute measurements in D and I are made once or twice a week with the portable fluxgate magnetometer discussed in the first section of this report.

Under normal conditions thermostatically-controlled electric heaters maintain the temperature in the observatory constant to $\pm$ 1.5°C.

Professor Y. Kato from Tokai University installed micropulsation recording equipment at Cambridge Bay in August. Induction coils were buried about 15 m southwest of the building, and recording equipment was located in the vestibule of the observatory.

Reduction of data

Corrections to reduce the AMOS values to the absolute pier of the observatory are calculated from the absolute measurements of D and I and the simultaneous AMOS F values. The procedure for calculating these corrections is analogous to that used for determining Ruska baseline values.[12] A list of the corrections to be applied to the AMOS values is given in Tables 22 - 24.

Computer plots of the one-minute AMOS data are produced in the Ruska magnetogram format for distribution to World Data Center A and for general research purposes. Mean hourly value tables were calculated by computer from the edited digital data and corrected to the absolute reference of the observatory.

Summary of mean values

A summary by month of the mean hourly values for all days for the period July to December 1972 is given in Tables 25 - 27.

The mean field values for this period are:

	H	D		Z	X
	nT	^{o}		nT	nT
1972.75	2936	31	33.0	60025	2502
	Y	I		F	
	nT	^{o}		nT	
	1536	87	12.0	60097	

Cambridge Bay
1972

Table 22
H BASELINES nT

Adopted			Observed			
	nT			nT		
July	-50	July 1-7	July 1	-47		
	-51	8-24	10	-55		
	-52	25-31	18	-51		
			24	-55		
Aug.	-52	Aug 1-6	Aug. 1	-47		
	-53	7-22	12	-55		
	-54	23-24	21	-51		
	-53	25-31	23	-55		
Sept	-53	Sept 1-2	Sept 11	-52		
	-52	3-8	18	-35		
	-51	9-15				
	-50	16-24				
	-49	25-30				
Oct	-48	Oct 1-7	Oct 9	-51		
	-47	8-15	17	-47		
	-46	16-22	24	-39		
	-45	23-26	31	-48		
	-44	27-30				
	-45	31				
Nov	-45	Nov 1-6	Nov 13	-45		
	-46	7-13	20	-45		
	-47	14-21	27	-48		
	-48	21-27				
	-49	28-30				
Dec	-49	Dec 1-4	Dec 4	-52		
	-50	5-11	26	-52		
	-51	12-18				
	-52	19-27				
	-51	28-30				
	-50	31				

Cambridge Bay
1972

Table 23

D BASELINES (minutes of arc)

Adopted			Observed		
July	1843.0	July 1-31	July 1	1841.0	
			10	1842.0	
			18	1846.0	
			24	1844.0	
Aug	1844.0	Aug 1-15	Aug 1	1842.0	
	1845.0	16-18	12	1849.0	
	1846.0	19-22	21	1840.0	
	1847.0	23-27	28	1843.0	
	1848.0	28-30			
	1849.0	31			
Sept	1849.0	Sept 1			
	1850.0	2-4			
	1851.0	5-7			
	1852.0	8-10			
	1853.0	11-13			
	1854.0	14-16			
	1855.0	17-18			
	1856.0	19-21			
	1857.0	21-23			
	1858.0	24-26			
	1859.0	27-30			
Oct	1860.0	Oct 1-3	Oct 9	1866.0	
	1861.0	4-6	17	1866.0	
	1862.0	7-9	24	1859.0	
	1863.0	10-12	31	1863.0	
	1864.0	13-15			
	1865.0	16			
	1864.0	17-19			
	1863.0	20-31			
Nov	1862.0	Nov 1-10	Nov 13	1862.0	
	1861.0	11-26	20	1854.0	
	1860.0	27-30	27	1862.0	
Dec	1859.0	Dec 1-17	Dec 4	1861.0	
	1858.0	18-29	26	1860.0	
	1857.0	30-31			

CAMBRIDGE BAY Table 24

1972 Z BASELINES nT

Adopted		Observed			
	nT		nT		
July	+2	July 1	3		
		10	2		
		18	2		
--		24	2		
Aug	+2	Aug 1	2		
	+3	12	3		
		21	3		
		28	3		
Sept	+3	Sep 11	2		
		18	3		
Oct	+3	Oct 9	3		
		17	3		
		24	3		
		31	2		
Nov	+3	Nov 13	2		
		27	3		
		27	2		
Dec	+3	Dec 4	2		
		11	2		
		26	2		

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY-ALL DAYS

TABLE 25 CAMBRIDGE BAY H = 2500 PLUS TABULAR VALUES IN GAMMAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	0	0	0	0	0	0	446	403	404	405	411	422	415	424	404	417
1-2	0	0	0	0	0	0	436	382	409	412	410	423	412	409	411	417
2-3	0	0	0	0	0	0	424	387	408	413	411	420	411	405	411	416
3-4	0	0	0	0	0	0	421	397	396	414	401	418	408	409	405	409
4-5	0	0	0	0	0	0	423	398	397	419	411	418	411	410	408	415
5-6	0	0	0	0	0	0	434	390	413	417	418	422	416	412	415	420
6-7	0	0	0	0	0	0	441	424	430	423	418	424	427	432	426	421
7-8	0	0	0	0	0	0	445	446	448	441	434	430	441	446	444	432
8-9	0	0	0	0	0	0	463	459	460	461	437	431	452	461	461	434
9-10	0	0	0	0	0	0	472	478	464	461	453	437	461	475	463	445
10-11	0	0	0	0	0	0	480	475	464	465	457	438	463	477	465	447
11-12	0	0	0	0	0	0	491	476	463	462	454	438	464	484	463	446
12-13	0	0	0	0	0	0	491	487	467	454	451	440	465	489	461	445
13-14	0	0	0	0	0	0	481	503	476	456	444	437	466	492	466	440
14-15	0	0	0	0	0	0	467	495	473	455	432	434	459	481	464	433
15-16	0	0	0	0	0	0	468	481	462	449	428	431	453	474	456	429
16-17	0	0	0	0	0	0	449	452	472	441	424	421	443	450	457	423
17-18	0	0	0	0	0	0	439	466	474	434	414	416	440	452	454	415
18-19	0	0	0	0	0	0	422	461	454	440	411	410	433	442	447	411
19-20	0	0	0	0	0	0	445	458	457	431	411	409	435	452	444	410
20-21	0	0	0	0	0	0	444	489	452	430	406	408	438	467	441	407
21-22	0	0	0	0	0	0	473	468	435	411	406	404	433	471	423	405
22-23	0	0	0	0	0	0	459	410	425	396	410	412	418	434	410	411
23-24	0	0	0	0	0	0	440	431	407	398	403	415	416	436	403	409
MEANS	0	0	0	0	0	0	452	446	442	433	423	423	437	449	437	423

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION-ALL DAYS

TABLE 26 CAMBRIDGE BAY D = 31.0 DEGREES PLUS TABULAR VALUES IN MINUTES 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	0.0	0.0	0.0	0.0	0.0	0.0	13.6	-15.2	10.7	16.4	24.9	27.5	13.0	-.8	13.5	26.2
1-2	0.0	0.0	0.0	0.0	0.0	0.0	-2.9	-20.5	1.5	13.0	21.7	21.7	5.8	-11.7	7.3	21.7
2-3	0.0	0.0	0.0	0.0	0.0	0.0	-16.3	-39.5	-5.6	6.7	19.0	22.2	-2.3	-27.9	.6	20.6
3-4	0.0	0.0	0.0	0.0	0.0	0.0	-29.1	-67.4	-19.2	-4.7	6.4	22.8	-15.2	-48.3	-12.0	14.6
4-5	0.0	0.0	0.0	0.0	0.0	0.0	-36.7	-74.7	-28.8	-8.1	2.4	23.5	-20.4	-55.7	-18.5	13.0
5-6	0.0	0.0	0.0	0.0	0.0	0.0	-41.5	-86.4	-33.0	-12.4	1.8	13.6	-26.3	-64.0	-22.7	7.7
6-7	0.0	0.0	0.0	0.0	0.0	0.0	-42.7	-75.5	-21.7	-10.9	-.2	4.5	-24.4	-59.1	-16.3	2.2
7-8	0.0	0.0	0.0	0.0	0.0	0.0	-38.0	-47.6	-6.3	-6.8	1.4	7.7	-14.9	-42.8	-6.6	4.6
8-9	0.0	0.0	0.0	0.0	0.0	0.0	-20.0	-19.6	6.7	10.8	10.1	11.3	-.1	-19.8	8.7	10.7
9-10	0.0	0.0	0.0	0.0	0.0	0.0	-13.1	-9.8	19.4	25.7	27.3	23.8	12.2	-11.4	22.5	25.5
10-11	0.0	0.0	0.0	0.0	0.0	0.0	-7.1	9.4	32.1	39.1	37.5	39.3	25.0	1.1	35.6	38.4
11-12	0.0	0.0	0.0	0.0	0.0	0.0	8.8	22.4	42.5	48.6	55.3	43.0	36.8	15.6	45.6	49.1
12-13	0.0	0.0	0.0	0.0	0.0	0.0	26.7	19.5	47.8	64.0	62.4	50.6	45.2	23.1	55.9	56.5
13-14	0.0	0.0	0.0	0.0	0.0	0.0	48.9	42.1	50.1	64.6	67.2	57.0	55.0	45.5	57.4	62.1
14-15	0.0	0.0	0.0	0.0	0.0	0.0	72.6	87.8	69.8	70.5	80.3	57.2	73.0	80.2	70.2	68.7
15-16	0.0	0.0	0.0	0.0	0.0	0.0	89.0	108.0	78.8	82.4	91.1	62.8	85.4	98.5	80.6	76.9
16-17	0.0	0.0	0.0	0.0	0.0	0.0	106.7	137.0	80.2	78.6	92.7	71.0	94.4	121.8	79.4	81.8
17-18	0.0	0.0	0.0	0.0	0.0	0.0	104.4	109.4	79.3	81.6	90.5	74.7	90.0	106.9	80.4	82.6
18-19	0.0	0.0	0.0	0.0	0.0	0.0	89.1	102.3	88.9	78.7	78.5	66.9	84.1	95.7	83.8	72.7
19-20	0.0	0.0	0.0	0.0	0.0	0.0	90.3	111.3	74.2	77.1	69.6	57.2	79.9	100.8	75.6	63.4
20-21	0.0	0.0	0.0	0.0	0.0	0.0	73.5	84.8	62.2	63.6	54.9	49.0	64.7	79.2	62.9	52.0
21-22	0.0	0.0	0.0	0.0	0.0	0.0	78.7	96.6	51.0	48.1	45.5	43.2	60.5	87.7	49.5	44.4
22-23	0.0	0.0	0.0	0.0	0.0	0.0	63.3	54.4	37.2	35.3	32.3	35.5	43.0	58.8	36.2	33.9
23-24	0.0	0.0	0.0	0.0	0.0	0.0	40.0	18.2	21.2	25.1	30.8	33.3	28.1	29.1	23.1	32.1
MEANS	0.0	0.0	0.0	0.0	0.0	0.0	27.4	22.8	30.8	37.0	41.8	38.3	33.0	25.1	33.9	40.1

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 27 CAMBRIDGE BAY Z = 59600 PLUS TABULAR VALUES IN GAMMAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	0	0	0	0	0	0	291	342	364	390	402	398	365	317	377	400
1-2	0	0	0	0	0	0	316	353	381	397	408	399	376	334	389	404
2-3	0	0	0	0	0	0	331	367	395	403	413	401	385	349	399	407
3-4	0	0	0	0	0	0	348	391	412	414	424	405	399	370	413	415
4-5	0	0	0	0	0	0	371	421	433	425	432	408	415	396	429	420
5-6	0	0	0	0	0	0	389	438	447	441	442	413	428	414	444	427
6-7	0	0	0	0	0	0	402	444	445	450	459	429	438	423	447	444
7-8	0	0	0	0	0	0	418	441	449	459	466	442	446	430	454	454
8-9	0	0	0	0	0	0	408	457	452	464	494	439	452	432	458	466
9-10	0	0	0	0	0	0	410	461	458	492	487	442	458	435	475	464
10-11	0	0	0	0	0	0	423	468	455	484	480	444	459	445	470	462
11-12	0	0	0	0	0	0	427	471	458	467	478	444	457	449	462	461
12-13	0	0	0	0	0	0	436	481	465	468	478	443	462	459	467	460
13-14	0	0	0	0	0	0	447	484	463	473	474	441	464	466	468	457
14-15	0	0	0	0	0	0	462	487	459	465	492	443	468	474	462	467
15-16	0	0	0	0	0	0	482	518	464	475	491	441	478	500	470	466
16-17	0	0	0	0	0	0	466	494	445	461	486	448	467	480	453	467
17-18	0	0	0	0	0	0	440	459	446	450	480	445	454	450	448	463
18-19	0	0	0	0	0	0	425	454	438	431	454	441	441	440	434	448
19-20	0	0	0	0	0	0	410	425	421	401	433	425	419	417	411	429
20-21	0	0	0	0	0	0	369	374	387	381	416	413	390	371	384	414
21-22	0	0	0	0	0	0	340	345	360	378	398	401	371	343	369	400
22-23	0	0	0	0	0	0	314	316	333	372	395	397	354	315	353	396
23-24	0	0	0	0	0	0	293	290	345	382	396	394	350	292	363	395
MEANS	0	0	0	0	0	0	392	424	424	434	449	425	425	408	429	437

BAKER LAKE

Officer-in-charge: O. Jensen

The Dominion Observatory (now Earth Physics Branch) began a program of magnetic field observations at Baker Lake, N.W.T., in 1947. Continuous photographic recording of the field using standard LaCour variometers began in January 1951.

The mailing address of Baker Lake observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Canada
K1A 0Y3

The area is one of granitic rocks of the Precambrian Shield.

Parameters for Ruska data reduction

Temperature and parallax corrections

Temperature coefficients were determined by comparison of the mean hourly values from the Ruska magnetogram and the fluxgate chart between October 16 and 18. In this period the temperature of the variometer changed by 9°C. Parallax corrections were determined November 30.

	Temperature Coefficients	Parallax corrections (to be added to times read on the magnetograms)	
	nT/°C	min.	
		Jan. 1-19	Jan. 20-Dec. 31
X	-1.0	0.7	-0.1
Y	0.0	0.5	-0.2
Z	+4.0	0.4	-0.3

The change in parallax correction followed repositioning of the Ruska lamps on January 19.

Baselines and scale values

A sudden change in X and Z baselines was observed on January 19 at 0400 U.T. following levelling of the magnetograph.

The large baseline drifts reported in previous years for the months September to December, caused by shifting of the concrete-slab floor, were greatly reduced in 1972 following the laying of styrofoam, covered with sheets of polyethylene and about 0.5 m of dry gravel, around the south end of the building in the preceding summer.

Observed and adopted baselines and scale values for 1972 are given in Tables 28-30.

Local quiet days (Baker Lake)

The five local quiet days for each month, selected on the basis of the R index, are listed below. Local quiet days which do not appear also in the list of 10 international quiet days are underlined.

January	6	7	8	9	14
February	6	8	9	12	29
March	5	10	12	14	15
April	3	9	10	25	26
May	8	19	20	24	25
June	9	11	12	13	21
July	4	5	6	13	21
August	2	23	24	25	31
September	3	5	7	21	30
October	5	6	7	8	17
November	5	10	13	24	30
December	5	6	21	25	27

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 31-34.

BAKER LAKE 1972 Table 28

X BASELINES nT				X SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan 1-19 (0400)	3950 to 3983	Jan 5	3944	January	13.00	Jan 5	13.01
		Jan 11	3940				
Jan 19 (0400)-31	3975 to 3972	Jan 19	3941				
		Jan 19	3975				
		Jan 28	3975				
Feb	3971 to 3966	Feb 9	3967	February	13.05	Feb 10	13.13
		Feb 15	3964				
		Feb 25	3970				
March	3966	Mar 1	3966	March	13.10	Mar 1	13.08
		Mar 10	3963				
		Mar 18	3967				
		Mar 30	3971				
Apr	3966 to 3958	Apr 11	3962	April	13.10	Apr 14	13.15
	"	Apr 24	3957				
May	3958 to 3960	May 5	3960	May	13.05	May 5	13.15
		May 11	3960				
		May 21	3957				
June	3961 to 3963	Jun 1	3962	June	13.00	Jun 1	13.03
		Jun 9	3959				
		Jun 22	3963				
Jul	3963 to 3965			July	12.95	Jul 6	(12.83)
						Jul 29	12.90
Aug	3966 to 3971	Aug 10	3966	August	12.95	Aug 23	13.02
		Aug 22	(3977)				
		Aug 30	3972				
Sep 1-17	3971 to 3974	Sep 5	3972	September	12.95	-	
Sep18-30	3974 to 3963	Sep 13	3972				
		Sep 19	3973				
		Sep 29	3964				
Oct 1-6	3962 to 3958	Oct 6	3958	October	12.95	Oct 26	12.91
Oct 7-31	3958 to 3966	Oct 17	3961				
		Oct 24	3966				
		Oct 31	3966				
Nov	3965 to 3960	Nov 7	3963	November	12.95	Nov 30	12.96
		Nov 14	3964				
		Nov 21	3961				
		Nov 30	3960				
Dec 1-13	3960 to 3958	Dec 5	3960	December	12.95	Dec 27	12.94
Dec 14-31	3957 to 3961	Dec 13	3956				
		Dec 20	3959				
		Dec 27	3960				

BAKER LAKE 1972

Table 29

Y BASELINES nT				Y SCALE VALUES nT /mm			
Adopted		Observed		Adopted		Observed	
Jan 1-8	23 to 30	Jan 5	30	January	13.55	Jan 5	13.55
Jan 9-19 (0400)	30 to 25	Jan 11	30				
Jan 19 (0400)-31	26 to 24	Jan 19	27				
		Jan 19	25				
		Jan 28	23				
Feb	23 to 21	Feb 9	21	February	13.55	Feb 9	13.52
		Feb 15	19				
		Feb 25	18				
March	20	Mar 1	21	March	13.55	Mar 1	13.57
		Mar 10	18				
		Mar 18	21				
		Mar 30	20				
April	21 to 26	Apr 11	24	April	13.60	Apr 14	13.62
		Apr 24	25				
May	26	May 5	25	May	13.60	May 5	13.60
		May 11	26				
		May 21	28				
Jun 1-5	26	Jun 1	24	Jun 1-15	13.60	Jun 1	13.69
Jun 6-22	25 to 2	Jun 9	28	Jun 16-30	13.55		
Jun 23-30	1 to 3	Jun 22	2				
July	3 to 8	-		Jul 1-15	13.50	Jul 6	13.52
				Jul 16-31	13.45	Jul 29	13.39
Aug	9 to 14	Aug 22	12	August	13.40	Aug 22	13.34
		Aug 30	14				
Sept	13 to 6	Sep 6	13	September	13.35	-	
		Sep 13	9				
		Sep 19	12				
		Sep 29	9				
Oct	6 to -8	Oct 6	1	October	13.35	Oct 26	13.34
		Oct 17	-1				
		Oct 24	-7				
		Oct 31	-7				
Nov	-9 to -16	Nov 7	-11	November	13.40	Nov 30	13.44
		Nov 14	-12				
		Nov 21	-14				
		Nov 30	-14				
Dec 1-13	-17 to -22	Dec 5	-20	December	13.45	Dec 27	13.47
Dec 14-31	-22 to -15	Dec 13	-22				
		Dec 20	-19				
		Dec 27	-16				

Table 30

BAKER LAKE 1972

Z BASELINES nT				Z SCALE VALUES nT/mm			
Adopted		Observed		Adopted		Observed	
Jan 1-7	60276 to 20282	Jan 5	60281	January	13.45	Jan 5	13.42
Jan 8-19 (0400)	60281 to 60275	Jan 11	60280				
Jan 19 (0400)-31	60281	Jan 19	60275			-	
		Jan 19	60280				
		Jan 28	60282				
Feb	60281	Feb 9	60281	February	13.45	Feb 9	13.41
		Feb 15	60283				
		Feb 25	60282				
March	60280 to 60279	Mar 1	60279	March	13.45	Mar 1	13.47
		Mar 10	60279				
		Mar 18	60280				
		Mar 30	60272				
April	60278 to 60288	Apr 11	60281	April	13.45	Apr 14	13.47
		Apr 24	60287				
May	60287 to 60283	May 5	60286	May	13.50	May 5	13.54
		May 11	60285				
		May 21	60287				
June	60283 to 60263	Jun 1	60281	June 1-15	13.45	Jun 1	13.50
		Jun 9	60281	Jun 16-30	13.40		
		Jun 22	60267				
Jul 1-9	60262 to 60257	Jul 10	60257	July 1-15	13.35	Jul 6	13.41
Jul 10-31	60257	Jul 15	60257	Jul 16-31	13.30	Jul 29	13.27
		Jul 22	60254				
Aug	60258 to 60267	Aug 10	60261	August	13.30	Aug 22	13.26
		Aug 22	60270				
		Aug 28	60270				
Sept	60268 to 60275	Sep 6	60267	September	13.30	-	
		Sep 13	60269				
		Sep 19	60272				
		Sep 29	60275				
Oct 1-25	60274 to 60242	Oct 6	60260	October	13.30	Oct 26	13.30
Oct 26-31	60242	Oct 17	60254				
		Oct 24	60241				
		Oct 31	60244				
Nov	60243 to 60250	Nov 7	60245	November	13.35	Nov 30	13.37
		Nov 14	60246				
		Nov 21	60246				
		Nov 30	60251				
Dec 1-13	60249 to 60245	Dec 5	60246	December	13.40	Dec 27	13.39
Dec 14-31	60245 to 60248	Dec 13	60245				
		Dec 20	60245				
		Dec 27	60248				

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 31 BAKER LAKE X = 3500 PLUS TABULAR VALUES IN GAMMAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	860	856	846	877	895	908	920	881	896	869	881	894	882	901	872	873
1-2	850	854	849	876	893	899	906	866	886	871	872	890	876	891	871	867
2-3	833	845	851	872	877	883	890	868	880	869	865	881	868	880	868	856
3-4	838	838	852	868	872	888	882	877	868	860	856	868	864	880	862	850
4-5	835	837	857	870	872	901	877	882	869	863	861	874	867	883	865	852
5-6	830	829	860	867	882	900	889	875	879	863	866	868	867	887	867	848
6-7	838	846	867	882	883	912	897	891	898	879	866	872	878	896	882	856
7-8	831	850	869	881	895	908	892	905	903	884	883	858	880	900	884	856
8-9	834	856	866	882	893	909	903	893	903	887	872	882	882	900	885	861
9-10	850	856	863	882	894	918	904	903	894	859	874	877	881	905	875	864
10-11	837	848	859	880	890	917	895	874	890	864	876	863	874	894	873	856
11-12	825	828	841	864	880	896	895	876	886	870	864	853	865	887	865	843
12-13	804	821	834	851	866	869	868	851	873	855	855	852	850	864	853	833
13-14	807	814	828	813	836	833	836	857	864	847	845	852	836	841	838	830
14-15	791	806	794	787	793	803	808	834	849	842	813	843	814	810	818	813
15-16	774	778	770	770	769	788	785	796	838	828	812	847	796	785	802	803
16-17	777	794	767	780	798	794	796	821	868	840	823	846	809	802	814	810
17-18	794	807	797	826	826	816	825	839	869	845	835	855	828	827	834	823
18-19	822	815	835	850	854	866	860	865	888	866	856	869	854	861	860	841
19-20	838	839	864	863	883	905	897	894	909	887	877	880	878	895	881	859
20-21	848	855	878	876	899	908	919	941	930	902	888	885	894	917	897	869
21-22	861	859	877	880	907	910	941	922	933	896	901	887	898	920	897	877
22-23	869	862	863	882	901	923	927	919	927	891	900	894	897	918	891	881
23-24	864	854	863	878	898	915	918	928	902	874	887	893	890	915	879	875
MEANS	830	835	844	857	869	882	880	877	888	867	864	870	864	877	864	850

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 32 BAKER LAKE Y = 0 PLUS TABULAR VALUES IN GAMMAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	222	221	202	217	214	213	229	199	219	213	223	230	217	214	213	224
1-2	219	222	202	208	205	185	215	181	212	212	216	225	209	197	209	221
2-3	217	218	200	199	195	174	197	165	203	205	213	224	201	183	202	218
3-4	216	212	189	195	187	174	184	145	181	191	199	225	192	173	189	213
4-5	208	208	187	196	187	171	178	138	174	191	196	216	188	169	187	207
5-6	193	200	195	195	191	177	188	134	184	188	198	210	188	173	191	200
6-7	192	198	203	215	203	190	195	172	210	200	200	212	199	190	207	201
7-8	198	210	220	224	218	198	201	203	236	219	220	218	214	205	225	212
8-9	212	232	234	234	232	207	217	231	251	241	227	228	229	222	240	225
9-10	230	242	244	246	229	221	223	240	258	245	245	235	238	228	248	238
10-11	237	249	251	248	242	230	235	245	261	258	252	239	246	238	255	244
11-12	245	255	256	256	253	251	252	263	263	261	259	243	255	255	259	251
12-13	252	261	260	271	270	269	270	275	270	264	264	251	265	271	266	257
13-14	261	263	262	288	289	293	281	295	279	265	263	252	274	290	274	260
14-15	273	263	272	295	292	312	290	315	283	264	263	254	281	302	279	263
15-16	277	268	278	293	291	305	285	309	270	265	264	250	280	298	277	265
16-17	268	262	269	277	273	282	271	290	260	252	255	243	267	279	265	257
17-18	255	254	248	269	253	274	261	270	258	250	244	239	256	265	256	248
18-19	251	246	255	262	269	273	250	269	265	250	237	234	255	265	258	242
19-20	241	241	257	258	292	285	269	283	265	253	239	233	260	282	258	239
20-21	231	242	262	255	277	289	263	281	266	250	240	231	257	278	258	236
21-22	227	236	254	253	253	261	273	289	258	237	233	229	250	269	251	231
22-23	227	228	225	235	239	252	256	235	243	225	229	232	236	246	232	229
23-24	226	224	210	225	227	237	236	227	232	219	225	231	227	232	222	227
MEANS	232	236	235	242	241	238	238	235	242	234	233	233	237	238	238	234

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 33 BAKER LAKE Z = 60000 PLUS TABULAR VALUES IN GAMMAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	589	591	569	570	535	547	547	586	610	620	629	631	585	554	592	610
1-2	596	600	592	586	551	557	570	592	630	632	639	635	598	568	610	618
2-3	598	614	610	610	582	580	583	621	650	642	648	639	615	592	628	625
3-4	604	624	626	626	607	602	604	661	680	664	661	643	634	619	649	633
4-5	628	634	646	639	627	639	630	693	710	673	679	645	654	647	667	647
5-6	646	649	666	650	654	667	656	721	719	698	685	662	673	675	683	661
6-7	665	675	679	667	666	679	666	725	714	707	704	686	686	684	692	683
7-8	670	680	687	678	657	700	682	711	719	714	720	702	693	688	700	693
8-9	685	681	690	683	681	705	666	718	723	726	737	690	699	693	706	698
9-10	679	676	699	691	699	713	672	721	727	757	727	703	705	701	719	696
10-11	698	687	696	696	687	715	695	732	726	753	724	710	710	707	718	705
11-12	704	691	719	711	698	734	702	741	737	732	730	721	718	719	725	712
12-13	707	706	711	725	712	754	709	762	755	725	729	717	726	734	729	715
13-14	715	692	704	742	724	767	703	769	754	739	714	701	727	741	735	706
14-15	711	675	709	716	700	736	695	750	733	714	721	689	712	720	718	699
15-16	691	672	692	682	659	697	691	722	716	700	716	667	692	692	698	687
16-17	668	645	666	642	611	667	666	668	714	687	685	660	665	653	677	665
17-18	645	626	646	633	616	655	648	665	698	673	664	647	651	646	663	646
18-19	618	617	635	626	610	635	620	651	673	653	656	638	636	629	647	632
19-20	599	614	611	609	596	599	617	638	668	634	645	629	622	613	631	622
20-21	585	608	573	583	558	552	597	619	631	620	624	626	598	582	602	611
21-22	584	594	550	555	550	531	576	571	604	609	623	629	581	557	580	608
22-23	583	588	551	550	540	519	545	555	590	589	623	624	571	540	570	605
23-24	590	585	558	555	532	535	540	560	597	605	620	622	575	542	579	604
MEANS	644	643	645	643	627	645	637	673	687	678	679	663	655	646	663	657

TABLE 34

Annual Mean Values (Baker Lake)

Year	X	Y	Z	D East*		I North*		H*	F*
	nT	nT	nT	°	'	°	'	nT	nT
1951.6	3730	74	60229	1	8	86	27.3	3731	60344
1952.5	3744	79	60216	1	13	86	26.5	3745	60332
1953.5	3767	87	60224	1	19	86	25.2	3768	60342
1954.5	3799	80	60230	1	12	86	23.4	3800	60350
1955.5	3834	80	60291	1	12	86	21.6	3835	60413
1956.5	3896	76	60314	1	7	86	18.2	3897	60440
1957.5	3933	84	60333	1	13	86	16.2	3934	60461
1958.5	3968	91	60338	1	19	86	14.2	3969	60468
1959.5	4009	109	60371	1	33	86	12.0	4010	60504
1960.5	4030	120	60394	1	42	86	10.8	4032	60528
1961.5	4056	125	60407	1	46	86	9.4	4058	60543
1962.5	4089	134	60412	1	53	86	7.5	4091	60550
1963.5	4115	145	60400	2	1	86	6.0	4118	60540
1964.5	4138	151	60390	2	5	86	4.7	4141	60532
1965.5	4174	144	60386	1	59	86	2.6	4176	60530
1966.5	4199	158	60396	2	9	86	1.2	4202	60542
1967.5	4223	178	60433	2	25	86	0.0	4227	60581
1968.5	4252	191	60492	2	34	85	58.5	4256	60642
1969.5	4277	201	60532	2	41	85	57.2	4282	60683
1970.5	4302	214	60587	2	51	85	55.9	4307	60740
1971.5	4329	224	60622	2	58	85	54.6	4335	60777
1972.5	4368	237	60655	3	06	85	52.5	4374	60813

*D,I,H,F are derived from the annual means of X,Y,Z. All values corrected to the pier in the new magnetic observatory building.

FORT CHURCHILL

Officer-in-charge: Operated by National Research Council under Contract.

Photographic recording of magnetic field variations was begun at Fort Churchill in 1957 by the Defence Research Northern Laboratory (DRNL) of the Defence Research Board, primarily to provide information for the Fort Churchill Rocket Program. In July 1965 the operation of the Churchill Research Range, including the magnetic observatory, was taken over by the National Research Council of Canada, with funds for the magnetic observatory provided by the Earth Physics Branch, Department of Energy, Mines and Resources.

Until 1965 there were no facilities for regular absolute observations; baselines and scale values of the magnetograms were determined by personnel of the Division of Geomagnetism on an average of once or twice a year. Owing to inadequate absolute control, no data were published for the years 1957 to 1963.

The mailing address for Fort Churchill observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Ontario
K1A 0Y3

Observatory site

The observatory is in a region characterized by sedimentary and volcanic rocks of Precambrian age.

A total force survey carried out in 1963 had shown that the area was reasonably flat magnetically with no total force anomalies greater than 30 nT within 45 m of the proposed site of the building for absolute observations, which was constructed in November 1964 42 m west of the original varometer building.

Parameters for Ruska data reduction

Temperature and parallax corrections

Temperature coefficients were determined April 11. There were large temperature fluctuations in the variometer room from January to March owing to insufficient control of the electric heaters, with a maximum change of 10°C between February 27 and 29. The X and Z mean hourly values were corrected for temperature changes in the period January to March, using the temperature coefficients listed below. Parallax corrections were determined April 6.

	Temperature Coefficients	Parallax Corrections (to be added to times read on the magnetograms)
	nT/°C	min
X	-2	0.6
Y	<1	0.0
Z	+2	-0.3

Baselines and scale values

The Z baseline increased about 50 nT between April 27 and 28. The reason for this large and apparently linear change over two days is not known. The Z scale value decreased by more than 5% following an abortive temperature calibration on November 30.

The adopted and observed baselines and scale values for 1972 are given in Tables 35-37.

Local quiet days (Fort Churchill)

The five local quiet days for each month, selected on the basis of the R index, are listed below. Local quiet days which do not appear also in the list of 10 international quiet days are underlined.

January	6	7	8	13	14
February	6	9	12	23	29
March	1	5	10	12	15
April	3	9	10	25	26
May	7	8	19	21	25
June	9	11	12	13	21
July*	4	5	6	13	30
August	3	13	23	24	28
September*	3	4	5	21	22
October	2	5	6	8	17
November	4	5	13	14	30
December	5	6	9	25	27

*July 22 and September 20 incomplete.

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 38-41.

FT. CHURCHILL 1972 Table 35

X BASELINES nT | SCALE VALUES nT/mm

Adopted		Observed		Adopted		Observed	
Jan. 7106 to 7107		-		Jan.	7.85	-	
Feb. 7108 to 7111		Feb. 2 Feb. 4	7113 7103	Feb.	7.85	-	
Mar. 7112 to 7115		Mar. 9 Mar.13	7113 7112	Mar.	7.80	Mar. 13	7.81
Apr. 7115 to 7117		Apr. 5 Apr.22 Apr.22	7113 7122 7118	Apr.	7.80	Apr. 22	7.78
May	7118			May	7.85	May 23	7.94
Jun. 7119 to 7123		Jun. 8 Jun. 9 Jun.12 Jun.21	7119 7117 7123 7118	Jun.	7.85	Jun. 8 Jun. 9	7.83 7.83
Jul. 7124 to 7130		Jul.17 Jul.18 Jul.27 Jul.30	7130 7128 7125 7132	Jul.	7.85	Jul. 11	7.85
Aug.	7130	Aug.16	7133	Aug.	7.85	Aug. 16	7.94
Sept.	7130	-		Sept.	7.85	-	
Oct.	7130	-		Oct.	7.85	-	
Nov. 7129 to 7115		Nov.21	7120	Nov.	7.85	Nov. 3	7.86
Dec.	7118	Dec.20 Dec.21 Dec.27	7119 7128 7117	Dec.	7.85	Dec.5 Dec.18	7.88 7.88

FORT CHURCHILL 1972 Table 36

Y BASELINES nT | SCALE VALUES nT/mm

Adopted		Observed		Adopted		Observed	
Jan.	346 to 354	-		Jan.	7.95	-	
Feb.	355	Feb. 2 Feb. 4	358 352	Feb.	7.90	-	
Mar.	355 to 352	Mar. 9 Mar. 13	353 358	Mar.	7.85	Mar. 13	7.85
Apr.	351 to 346	Apr. 5 Apr. 22 Apr. 22	349 349 347	Apr.	7.80	Apr. 22	7.81
May	346 to 344	May 24 May 26	(337) 343	May	7.80	May 23	7.85
Jun.	344 to 342	Jun. 8 Jun. 9 Jun. 12 Jun. 21	339 346 336 352	Jun.	7.80	Jun. 8 Jun. 9	7.81 7.81
Jul.	342 to 340	Jul. 17 Jul. 18 Jul. 27 Jul. 30	345 341 340 344	Jul.	7.80	Jul. 11	7.83
Aug.	340	Aug. 16	335	Aug.	7.80	Aug. 16	7.80
Sept.	339	-		Sept.	7.85	-	
Oct.	339	-		Oct.	7.90	-	
Nov.	340 to 354	Nov. 21 Nov. 29	344 355	Nov.	7.90	Nov. 3	7.92
Dec.	355 to 350	Dec. 15 Dec. 16 Dec. 27	352 353 351	Dec.	7.90	Dec. 5 Dec. 18	7.88 7.90

FORT CHURCHILL 1972 Table 37

Z BASELINES nT | SCALE VALUES nT/mm

Adopted		Observed		Adopted		Observed	
Jan.	60635 to 60642	-		Jan.	8.45	-	
Feb.	60642 to 60633	Feb. 2 Feb. 4	60637 60649	Feb.	8.40	-	
Mar.1-12	60632 to 60628	Mar. 9 Mar. 13	60626 60629	Mar.	8.35	Mar. 13	8.35
Mar.13-21	60630 to 60652						
Apr.1-26	60654 to 60685	Apr. 5 Apr. 22	60660 60677	Apr.	8.35 to 8.50	Apr. 22	8.45
Apr.27-28	60686 to 60735	Apr. 22	60680				
Apr.29, 30	60735						
May	60735	-		May	8.50 to 8.70	May 23	8.68
June 1-15	60735	June 8 June 9	60734 60731	June	8.70	June 9	8.74
June 16-30	60735 to 60743	June 12 June 21	60744 60728				
July	60743 to 60760	July 17 July 18 July 27 July 30	60751 60749 60750 60767	July	8.65	July 11	8.68
Aug. 1-18	60760 to 60770	Aug. 16	60784	Aug.	8.60	Aug. 16	8.59
Aug.19-30	60769 to 60757						
Sept.	60757 to 60725			Sept.	8.65	-	
Oct.	60724 to 60691	-		Oct.	8.70	-	
Nov.	60690 to 60658	Nov. 21 Nov. 29	60674 60658	Nov.	8.70	Nov. 3	8.72
Dec.1-21	60657 to 60613	Dec. 2	60656	Dec.	8.30	Dec. 5	8.24
Dec.22-31	60612	Dec.20 Dec.21 Dec.27	60620 60613 60612			Dec. 18	8.27

MEAN VALUES OF MAGNETIC ELEMENTS

NORTH COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 38 FORT CHURCHILL X = 6500 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	651	664	675	694	709	713	720	693	696	689	693	691	691	709	689	675
1-2	648	653	665	669	692	695	699	680	676	672	677	694	677	692	671	668
2-3	638	636	650	649	660	677	686	648	648	664	675	689	660	668	653	660
3-4	641	629	631	640	635	662	657	630	617	650	646	675	643	646	635	648
4-5	609	626	617	619	611	633	637	578	595	643	640	674	624	615	619	637
5-6	607	609	604	608	600	614	620	581	622	613	640	662	615	604	612	630
6-7	596	574	593	604	602	589	615	604	634	612	617	645	607	603	611	608
7-8	595	584	590	598	618	583	600	611	621	615	613	638	606	603	606	608
8-9	574	589	583	590	586	574	619	594	602	594	592	641	595	593	592	599
9-10	571	584	566	580	574	573	620	592	582	565	603	617	586	590	573	594
10-11	546	559	560	569	594	578	586	565	580	552	598	603	574	581	565	577
11-12	531	550	534	554	579	557	582	559	557	568	576	596	562	569	553	563
12-13	527	539	554	543	548	544	579	557	546	575	594	605	559	557	555	566
13-14	555	571	582	538	562	554	578	556	569	580	618	636	575	563	567	595
14-15	556	596	591	571	593	571	587	569	604	623	606	658	594	580	597	604
15-16	554	587	587	583	604	598	591	587	612	633	614	671	602	595	604	607
16-17	581	602	591	605	611	613	615	611	631	648	637	663	617	613	619	621
17-18	596	609	608	620	622	625	629	632	646	655	652	669	630	627	632	632
18-19	615	616	624	639	644	645	652	651	660	664	667	678	646	648	647	644
19-20	624	627	644	664	670	678	672	668	674	688	678	686	664	672	668	654
20-21	635	641	673	692	701	713	694	698	706	699	683	689	685	702	693	662
21-22	642	655	692	704	712	734	714	726	718	702	686	690	698	722	704	668
22-23	648	662	687	701	716	742	729	730	722	719	692	699	704	729	707	675
23-24	646	668	681	698	721	724	727	713	709	713	691	702	699	721	700	677
MEANS	599	610	616	622	632	633	642	626	634	639	641	661	630	633	628	628

MEAN VALUES OF MAGNETIC ELEMENTS

EAST COMPONENT OF HORIZONTAL INTENSITY-ALL DAYS

TABLE 39 FORT CHURCHILL Y = 0 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	511	513	505	507	508	505	516	502	506	502	508	501	507	508	505	508
1-2	516	515	507	501	508	487	507	492	498	498	506	501	503	499	501	510
2-3	525	512	499	495	502	482	500	472	486	489	504	506	498	489	492	512
3-4	519	512	487	488	490	477	483	443	466	474	498	514	488	473	479	511
4-5	503	502	483	486	475	461	474	426	446	472	483	501	476	459	472	497
5-6	482	491	479	476	475	465	474	429	446	464	480	487	471	461	466	485
6-7	480	481	484	486	488	472	478	445	475	472	480	482	477	471	479	481
7-8	489	493	501	497	501	482	485	478	497	491	488	491	491	487	497	490
8-9	497	512	517	510	508	496	504	503	513	506	500	500	506	503	512	502
9-10	514	521	523	522	513	507	511	512	526	506	517	503	515	511	519	514
10-11	519	532	533	528	530	517	527	512	528	528	525	516	525	522	529	523
11-12	531	540	539	544	546	541	546	549	535	538	539	515	539	546	539	531
12-13	537	544	544	554	566	563	565	566	545	533	535	520	548	565	544	534
13-14	536	542	546	566	567	577	568	577	545	528	526	518	550	572	546	531
14-15	546	539	547	552	554	565	561	566	534	520	519	515	543	562	538	530
15-16	541	534	539	542	539	554	542	552	517	514	513	512	533	547	528	525
16-17	526	527	523	522	520	532	526	529	502	502	503	504	518	527	512	515
17-18	516	518	507	512	504	516	511	513	497	499	497	498	507	511	504	507
18-19	509	509	505	503	506	501	496	508	499	497	493	492	502	503	501	501
19-20	502	503	506	500	519	504	496	513	499	495	491	492	502	508	500	497
20-21	500	503	513	507	517	510	499	513	501	494	494	494	504	510	504	498
21-22	501	504	514	510	513	510	512	546	502	493	495	496	508	520	505	499
22-23	506	508	508	506	508	510	523	501	509	496	498	500	506	511	505	503
23-24	509	512	502	506	510	508	521	511	510	501	503	503	508	513	505	507
MEANS	513	515	513	513	515	510	513	507	503	501	504	503	509	511	508	509

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 40 FORT CHURCHILL Z = 60500 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	358	345	281	334	345	320	337	336	346	341	353	359	338	335	326	354
1-2	335	333	291	329	341	305	338	303	329	333	338	354	327	322	321	340
2-3	324	328	309	324	329	307	331	308	334	335	335	347	326	319	326	334
3-4	321	318	323	332	345	320	327	351	349	333	346	334	333	336	334	330
4-5	336	314	333	341	366	352	331	384	370	347	353	327	346	358	348	333
5-6	343	323	353	358	390	383	378	421	379	377	368	341	368	393	367	344
6-7	372	352	374	388	403	411	410	418	415	404	388	369	392	411	395	370
7-8	370	376	396	410	419	430	415	442	429	425	416	373	408	427	415	384
8-9	400	386	410	420	439	446	413	452	447	458	440	394	425	438	434	405
9-10	412	392	407	430	439	457	413	462	437	467	431	407	430	443	435	411
10-11	414	398	403	430	426	453	422	454	437	452	437	401	427	439	431	413
11-12	402	383	391	426	428	451	415	447	428	421	415	375	415	435	417	394
12-13	383	374	367	416	406	410	394	408	410	404	383	357	393	405	399	374
13-14	365	352	348	373	372	369	367	384	371	379	375	350	367	373	368	361
14-15	349	350	328	354	358	356	342	370	356	361	366	347	353	357	350	353
15-16	351	347	323	349	359	357	331	361	352	352	360	348	349	352	344	352
16-17	348	348	329	350	366	357	338	361	363	361	356	350	352	356	351	351
17-18	354	349	337	356	371	356	351	361	377	366	363	360	358	360	359	357
18-19	363	348	349	364	381	362	360	372	380	372	370	363	365	369	366	361
19-20	365	353	358	369	385	367	370	369	377	376	374	367	369	373	370	365
20-21	361	353	351	358	369	344	369	377	376	371	376	366	364	365	364	364
21-22	365	353	335	340	363	334	356	335	373	367	376	354	354	347	354	362
22-23	363	345	331	337	354	338	339	344	357	367	374	359	351	344	348	360
23-24	358	336	309	332	345	335	326	344	346	350	362	362	342	338	334	355
MEANS	363	352	347	368	379	372	366	382	381	380	377	361	369	375	369	363

TABLE 41

Annual Mean Values (Fort Churchill)

Year	X	Y	Z	D East*		I North*		H*	F*
	nT	nT	nT	°	'	°	'	nT	nT
1957.7	6648	320	60649	2	45	83	44.2	6656	61013
1958.5	6650	329	60641	2	50	83	44.1	6658	61006
1964.5	6826	459	60646	3	51	83	33.1	6841	61031
1965.5	6866	437	60683	3	39	83	41.1	6880	61072
1966.5	6881	452	60701	3	46	83	31.1	6896	61092
1967.5	6917	462	60736	3	49	83	29.3	6932	61130
1968.5	6941	469	60756	3	52	83	28.1	6957	61153
1969.5	6982	479	60781	3	55	83	25.9	6998	61182
1970.5	7030	497	60816	4	03	83	23.4	7048	61223
1971.5	7075	510	60847	4	07	83	21.1	7093	61259
1972.5	7130	509	60869	4	05	83	18.1	7148	61287

*D,I,H,F are derived from annual means of X,Y,Z.

GREAT WHALE

Officer-in-charge: L. Newitt 1971.5-1972.7

Following 1972.7: Operated by National Research Council under contract.

The Division of Geomagnetism of the Earth Physics Branch established the Great Whale River magnetic observatory in January 1965 at Poste-de-la-Baleine, Quebec. The Observatory was designed to assist in conjugate point studies: its location is geomagnetically conjugate to the observatory operated by the United States, from August 1957 to October 1971 at Byrd in Antarctica, and its instrumentation is similar, including both standard and rapid-run photographic variometers. For two years prior to the installation of photographic recorders a three-component electrical recording magnetometer had been in operation in Great Whale River.

From September 1965, when a seismic observatory was established, until September 1972, a combined magnetic-seismic observatory was operated jointly by the Divisions of Seismology and Geomagnetism. Following September 1972 the magnetic operation has been carried out by contract with the National Research Council.

The mailing address for the observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Canada
K1A 0Y3

Observatory site

Poste-de-la-Baleine is located on a broad sandy spit at the mouth of Great Whale River on the east shore of Hudson Bay. The area consists of Archean granites largely overlain with a thick layer of sand. The sand was tested for magnetic properties and found to contain significant quantities of magnetite.

The observatory was built on a rock ridge 25 m above sea level about 2 km north of the east-west runway. Because of its magnetic properties, the local sand was not used in the construction.

Magnetic equipment

In addition to the standard observatory instrumentation, a rapid-run Ruska magnetograph, recording D,H,Z at a time scale of 240 mm/hr, has been in operation at Great Whale River for the period 1 January to 31 March 1965, and 24 August 1965 to 10 June 1972.

An AMOS was installed at Great Whale River observatory in October 1972. The AMOS fluxgate sensor with associated Helmholtz coils was located in the rapid-run variometer room, following removal of the magnets from the rapid-run magnetograph.

Scale values for rapid-run magnetograms

Great Whale River

	D '/mm	H nT/mm	Z nT/mm
January	1.7	4.8	5.8
February	1.7	4.8	5.8
March	1.8	4.8	5.8
April	1.7	4.9	6.0
May	1.7	4.9	6.1
June 1-10	1.8	4.9	6.0

Parameters for Ruska data reduction

Temperature and parallax corrections

Ruska temperature coefficients were determined March 26 and 28 by comparison with the stand-by fluxgate chart. Tests for parallax errors were carried out March 25 and December 9.

	Temperature Coefficients	Parallax Corrections (to be subtracted from times read on the magnetograms)
	nT/°C	min
D	0.0	1.0
H	0.0	1.0
Z	-4.0	0.8

Baseline and scale values

Abrupt changes in the Z baseline were observed in July and October. Changes in October occurred during installation of the AMOS. Times of baseline changes are given in the list of observed and adopted baselines and scale values in Tables 42-44.

Local quiet days (Great Whale River)

The five local quiet days for each month, selected on the basis of the R index, are listed below. Local quiet days which do not appear also in the list of 10 international quiet days are underlined.

January	6	7	8	13	14
February	9	12	23	27	29
March	10	12	13	14	15
April	3	9	10	25	26
May	7	8	19	21	25
June	9	11	12	13	21
July	4	5	6	13	30
August	3	14	23	24	25
September*	4	5	7	20	21
October	3	5	6	8	17
November*	4	5	13	14	30
December*	5	6	9	21	25

*September 2, 3; November 10; December 28 incomplete.

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 45-48.

Great Whale River 1972 Table 42

BASELINES

D

Adopted			Observed			SCALE VALUES '/mm Adopted	Observed		
Jan.	1-14	339° 09.5'	Jan.	6	339° 08.5'	Jan. 4.67	Jan.	5	4.67
	to	339° 09.2'	Jan.	13	339° 08.5'				
Jan.	15-31	339° 09.3'	Jan.	30	339° 13.0'		Jan.	30	4.69
	to	339° 12.4'							
Feb.		339° 12.5'	Feb.	20	339° 14.8'	Feb. 4.66	Feb.	5	4.68
	to	339° 17.8'	Feb.	28	339° 18.3'		Feb.	18	4.69
Mar.		339° 17.9'	Mar.	9	339° 17.5'	Mar. 4.65	Mar.	10	4.65
	to	339° 18.7'	Mar.	18	339° 17.3'		Mar.	22	4.66
			Mar.	25	339° 19.2'				
			Mar.	31	339° 18.2'				
Apr.	1-23	339° 18.7'	Apr.	8	339° 19.0'	Apr. 4.64	Apr.	8	4.64
							Apr.	25	4.64
			Apr.	15	339° 18.7'				
Apr.	23-30	339° 19.2'	Apr.	23	339° 19.2'				
	to	339° 17.7'							
May		339° 17.6'	May	5	339° 17.0'	May 4.64	May	5	4.63
	to	339° 16.7'							
			May	13	339° 17.5'		May	19	4.62
			May	20	339° 16.7'				
			May	31	339° 17.0'				
June		339° 16.7'	June	8	339° 15.5'	June 4.67	June	8	4.68
	to	339° 15.5'					June	26	4.68
			June	15	339° 17.0'				
			June	27	339° 16.5'				
July		339° 15.5'	July	2	339° 13.0'	July 4.69	July	1	4.69
	to	339° 13.1'					July	18	4.66
			July	11	339° 16.0'				
			July	20	339° 14.5'				
			July	28	339° 12.0'				
Aug.		339° 13.0'	Aug.	3	339° 12.0'	Aug. 4.65	Aug.	2	4.69
	to	339° 10.6'							
			Aug.	13	339° 12.0'				
			Aug.	23	339° 11.7'		Aug.	22	4.67
			Aug.	30	339° 11.0'				

Great Whale River 1972 (cont.) Table 42

BASELINES D						SCALE VALUES '/mm			
Adopted			Observed			Adopted		Observed	
Sept.	339° to 339°	10.5' 08.4'	Sept.	20	339° 08.8'	Sept.	4.66	Sept. 20	4.62
Oct.	339° to 339°	08.5' 12.9'	Oct.	1	339° 07.3'	Oct.	4.66	Oct. 24	4.67
			Oct.	23	339° 13.7'				
			Oct.	23	339° 17.0'				
			Oct.	25	339° 11.0'				
			Oct.	25	339° 16.0'				
			Oct.	26	339° 16.7'				
Nov.	1-15 339° to 339°	13.0' 15.0'	Nov.	5	339° 14.0'	Nov.	4.64	Nov. 5	4.66
	16-30 339°	15.5'	Nov.	12	339° 15.0'			Nov. 24	4.62
			Nov.	30	339° 16.0'				
Dec.	339°	15.5'	Dec.	14	(339°) (19.5')	Dec.	4.63	Dec. 10	4.63
			Dec.	24	(339°) (11.0')			Dec. 27	4.62
			Dec.	28	339° 14.5				

GREAT WHALE RIVER 1972 Table 43

H BASELINES nT | SCALE VALUES nT/mm

Adopted		Observed		Adopted		Observed	
Jan.	9920	Jan. 6	9919	Jan.	13.70	Jan. 5	13.68
		Jan. 13	9921			Jan. 29	13.67
		Jan. 30	9920				
Feb.	9920	Feb. 20	9918	Feb.	13.65	Feb. 5	13.67
		Feb. 28	9922			Feb. 23	13.63
Mar.	9920	Mar. 9	9920	Mar.	13.60	Mar. 10	13.60
	to 9917	Mar. 18	9918			Mar. 22	13.61
		Mar. 25	9919				
		Mar. 31	9915				
Apr.	9916	Apr. 8	9915	Apr.	13.60	Apr. 8	13.62
	to 9912	Apr. 15	9912			Apr. 25	13.61
		Apr. 25	9914				
May	9912	May 5	9910	May	13.60	May 5	13.67
	to 9908	May 13	9910			May 19	13.55
		May 20	9908				
		May 31	9907				
June	9907	June 8	9908	June	13.60	June 8	13.63
	to 9903	June 15	9906			June 26	13.59
		June 27	9904				
July	9902	July 2	9900	July	13.65	July 1	13.64
	to 9896	July 11	9902			July 18	13.65
		July 20	9896				
		July 28	9898				
Aug. 1-25	9896	Aug. 3	9892	Aug.	13.60	Aug. 2	13.64
	to 9894	Aug. 13	9895			Aug. 22	13.66
Aug. 25-31	9895	Aug. 23	9897				
		Aug. 30	9894				
Sept.	9895	Sept. 20	9895	Sept.	13.60	Sept. 20	(13.48)
	to 9897						
Oct.	9897	Oct. 1	(9888)	Oct.	13.60	Oct. 24	13.56
	to 9902	Oct. 22	9904				
		Oct. 23	9897				
		Oct. 23	9907				
		Oct. 25	9898				
		Oct. 26	9908				
Nov.	9903	Nov. 5	9902	Nov.	13.60	Nov. 5	13.69
		Nov. 11	9904			Nov. 24	13.50
		Nov. 30	9904				
Dec.	9903	Dec. 14	9903	Dec.	13.60	Dec. 10	13.58
		Dec. 24	(9894)			Dec. 27	13.66
		Dec. 28	9903				

Great Whale River 1972 Table 44

Z BASELINES nT | SCALE VALUES nT/mm

Adopted		Observed		Adopted		Observed	
Jan.	59255 to 59240	Jan. 6	59251	Jan.	14.20 to 14.38	Jan. 5	14.18
		Jan. 13	59251				
		Jan. 30	59241			Jan. 30	14.42
Feb.	59239 to 59226	Feb. 20	59229	Feb.	14.38 to 14.45	Feb. 18	14.49
		Feb. 28	59226				
Mar.	59227 to 59232	Mar. 9	59228	Mar.	14.45	Mar. 10	14.42
		Mar. 18	59233			Mar. 22	14.45
		Mar. 25	59230				
		Mar. 31	59235			Mar. 31	14.42
Apr.	59231	Apr. 8	59229	Apr.	14.50	Apr. 14	14.49
		Apr. 15	59233			Apr. 16	14.51
		Apr. 23	59231				
May	59231 to 59249	May 5	59233	May	14.50	May 5	14.51
		May 13	59237			May 13	14.53
		May 20	59240			May 20	14.57
		May 31	59249			May 26	14.42
June 1-15	59248	June 8	59248	June	14.50 to 14.40	June 8	14.53
16-30	59249 to 59256	June 15	59248			June 15	14.43
		June 27	59254			June 26	14.39
July 1(0000)-4(1750)	59258	July 2	59260	July	14.40	July 1	14.41
		July 11	59278			July 10	14.35
July 4(1750)-31	59272 to 59277	July 20	59276			July 19	14.32
		July 28	59270			July 27	14.56
Aug.	59278 to 59283	Aug. 3	59278	Aug.	14.40	Aug. 2	14.35
		Aug. 13	59278			Aug. 12	14.38
		Aug. 23	59284			Aug. 22	14.36
		Aug. 30	59280			Aug. 28	14.47
Sept. 1-22	59284 to 59287	Sept. 20	59290	Sept.	14.45	Sept. 21	14.48
23-30	59286 to 59279						
Oct. 1-20(1437)	59278 to 59259	Oct. 1	59272	Oct. 1-24(1430)	14.45	Oct. 2	14.59
		Oct. 22	59284	Oct. 24 (1430)-31	13.83 to 13.95	Oct. 24	13.83
		Oct. 23	59281				
		Oct. 23	59286				
20(1437)-24(1430)	59284	Oct. 25	59289				
		Oct. 26	59309				
24(1430)-31	59310 to 59304						
Nov.	59303 to 59281	Nov. 5	59297	Nov.	13.96 to 14.27	Nov. 5	14.03
		Nov. 12	59290			Nov. 12	14.12
		Nov. 30	59280			Nov. 24	14.29
Dec.	59280 to 59268	Dec. 14	59275	Dec.	14.28 to 14.44	Dec. 10	14.26
		Dec. 24	59268			Dec. 20	14.31
		Dec. 28	59268			Dec. 27	14.48

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY-ALL DAYS

TABLE 45 GREAT WHALE RIVER H = 9500 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	608	622	659	652	668	668	669	642	655	650	655	656	650	662	654	635
1-2	619	613	620	619	648	648	652	629	641	637	648	655	636	644	629	634
2-3	607	596	602	606	616	618	637	599	617	621	640	646	617	618	611	622
3-4	600	584	574	580	592	597	608	561	560	596	609	642	592	589	578	609
4-5	572	576	560	570	557	558	584	508	535	581	598	642	570	552	562	597
5-6	551	549	542	553	554	523	559	489	544	545	598	617	552	531	546	579
6-7	532	524	525	542	557	512	538	512	566	541	573	598	543	530	543	557
7-8	524	521	515	528	559	504	535	543	562	538	556	590	540	535	536	548
8-9	506	537	517	526	536	484	558	527	537	506	549	602	532	526	521	549
9-10	519	542	527	507	532	496	568	530	541	483	565	583	533	532	514	552
10-11	515	540	532	506	566	525	557	511	552	529	568	587	541	540	530	553
11-12	535	546	533	526	573	520	568	543	571	579	602	603	558	551	552	572
12-13	549	551	561	532	578	548	589	562	576	591	611	623	573	569	565	583
13-14	555	569	573	550	584	576	589	573	596	599	614	633	584	581	579	592
14-15	551	565	570	560	588	568	590	578	598	610	610	634	585	581	584	590
15-16	553	565	566	573	593	583	593	584	604	611	610	636	589	588	588	591
16-17	571	568	571	586	603	601	609	611	616	613	623	632	600	606	596	598
17-18	579	577	584	604	618	627	621	628	634	623	635	638	614	623	611	607
18-19	588	588	600	624	644	648	642	647	652	637	644	644	630	645	628	616
19-20	600	597	621	647	680	676	666	659	658	655	653	653	647	670	645	626
20-21	603	607	647	663	695	701	680	677	679	664	659	659	661	688	663	632
21-22	605	616	656	672	691	707	697	695	680	660	655	660	666	698	667	634
22-23	610	627	648	664	689	704	700	673	673	672	655	668	665	692	665	640
23-24	607	640	650	660	683	678	686	667	673	672	653	669	661	678	664	642
MEANS	569	576	581	585	609	595	612	590	605	601	616	632	598	601	593	598

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION-ALL DAYS

TABLE 46 GREAT WHALE RIVERD = 339.5 DEGREES EAST PLUS TABULAR VALUES IN MINUTES 1972

J.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	43.4	46.8	44.3	47.5	47.7	46.6	48.6	73.6	46.3	47.8	51.7	50.0	49.5	54.1	46.5	48.0
1-2	46.2	47.0	42.8	43.5	44.5	40.7	46.3	66.7	41.0	43.3	49.3	51.8	46.9	49.6	42.6	48.6
2-3	45.8	44.5	41.9	40.2	37.3	36.1	42.6	59.4	37.0	37.8	46.1	51.0	43.3	43.9	39.2	46.9
3-4	43.8	41.5	36.2	38.0	36.4	37.3	36.8	53.7	38.2	34.4	37.0	48.1	40.1	41.1	36.7	42.6
4-5	39.0	40.1	37.4	34.6	35.3	36.8	35.9	48.5	24.3	34.8	38.6	45.1	37.5	39.1	32.8	40.7
5-6	33.1	34.4	37.9	36.4	37.3	33.3	36.7	49.2	35.2	33.0	39.2	43.1	37.4	39.1	35.6	37.4
6-7	34.2	36.8	38.5	41.9	39.2	35.7	38.4	63.2	42.8	37.6	38.7	43.5	40.9	44.1	40.2	38.3
7-8	36.3	40.8	42.1	44.0	43.9	39.2	39.3	71.6	46.7	43.3	41.3	43.6	44.3	48.5	44.0	40.5
8-9	36.8	44.2	43.6	44.8	44.3	42.0	45.3	73.8	46.8	46.8	43.6	47.8	46.6	51.3	45.5	43.1
9-10	40.7	46.3	46.1	46.8	47.8	49.4	51.8	78.3	49.4	43.5	48.5	48.0	49.7	56.8	46.4	45.9
10-11	41.7	46.1	48.3	51.7	55.5	54.6	55.7	80.6	51.9	45.8	50.1	47.8	52.5	61.6	49.4	46.4
11-12	42.2	46.0	50.5	55.1	56.2	56.2	58.8	87.5	50.6	46.0	49.2	46.1	53.7	64.7	50.5	45.9
12-13	39.8	44.8	51.6	54.6	55.8	58.9	60.1	88.1	48.0	44.8	48.8	47.2	53.5	65.7	49.7	45.1
13-14	44.1	48.0	52.3	50.6	52.6	56.8	56.3	84.0	47.0	45.4	49.2	49.7	53.0	62.4	48.8	47.7
14-15	43.5	47.6	48.8	46.8	49.4	50.1	51.0	79.5	42.7	44.3	46.4	49.3	50.0	57.5	45.7	46.7
15-16	39.5	42.6	43.5	42.6	43.4	48.6	44.1	73.6	38.1	41.9	41.3	47.8	45.6	52.4	41.5	42.8
16-17	38.1	40.0	38.1	38.5	37.5	42.4	40.0	68.3	35.8	38.8	40.8	45.3	42.0	47.0	37.8	41.0
17-18	36.1	38.9	35.3	38.7	35.7	40.6	37.9	68.4	37.1	38.5	40.7	44.7	41.0	45.7	37.4	40.1
18-19	35.7	38.0	36.5	39.3	39.2	41.5	38.1	70.4	40.9	39.9	41.3	44.3	42.1	47.3	39.1	39.8
19-20	36.6	38.0	40.3	43.0	48.4	45.9	42.9	73.3	43.0	42.7	42.6	45.5	45.2	52.6	42.2	40.7
20-21	38.0	40.8	45.2	46.8	49.5	50.3	47.2	77.2	47.0	43.5	44.7	47.0	48.1	56.0	45.6	42.6
21-22	39.8	43.2	46.5	47.1	50.8	51.1	51.3	81.0	47.7	44.2	45.8	48.2	49.7	58.5	46.4	44.2
22-23	41.9	45.9	45.5	47.4	49.4	52.8	51.7	75.1	48.2	47.5	47.3	50.1	50.2	57.2	47.1	46.3
23-24	43.1	49.0	42.8	47.7	49.4	49.9	50.0	77.7	49.7	49.3	49.9	50.7	50.8	56.8	47.3	48.2
MEANS	40.0	43.0	43.2	44.5	45.3	45.7	46.1	71.8	43.1	42.3	44.7	47.3	46.4	52.2	43.3	43.7

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 47 GREAT WHALE RIVER Z = 59000 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	489	479	453	472	465	466	485	476	477	447	467	476	471	473	462	477
1-2	478	468	452	473	458	469	477	458	468	438	453	469	464	465	458	467
2-3	461	464	470	470	458	471	477	468	476	465	462	457	467	469	470	461
3-4	471	463	478	470	476	489	487	529	492	489	472	437	479	495	482	461
4-5	487	472	501	483	487	516	498	562	529	494	478	458	497	516	502	474
5-6	502	485	520	504	495	522	519	568	548	494	497	475	511	526	517	490
6-7	500	495	520	512	491	540	530	563	540	510	506	480	515	531	521	495
7-8	501	496	509	512	502	533	510	567	531	517	510	485	514	528	517	498
8-9	499	485	501	511	508	535	503	549	521	516	503	480	509	524	512	492
9-10	484	480	483	509	483	519	495	537	485	491	495	475	495	509	492	484
10-11	477	473	471	493	474	496	485	527	470	449	485	463	480	496	471	474
11-12	461	456	461	479	466	482	473	495	457	446	462	455	466	479	461	458
12-13	465	464	465	468	464	478	467	480	460	454	470	457	466	472	462	464
13-14	474	470	473	465	467	481	471	482	473	461	473	465	471	475	468	471
14-15	473	474	478	475	473	482	472	493	484	471	470	467	476	480	477	471
15-16	472	476	483	482	476	484	478	499	490	478	477	472	481	484	483	474
16-17	483	483	489	488	482	487	484	502	499	482	485	475	487	489	490	481
17-18	488	486	494	494	487	496	490	503	506	484	488	481	491	494	495	486
18-19	496	484	501	500	497	499	499	505	502	483	492	483	495	500	496	489
19-20	497	489	504	501	493	497	504	499	496	485	494	483	495	498	496	491
20-21	487	488	495	487	477	495	503	504	489	485	494	482	491	495	489	488
21-22	497	490	493	481	480	482	485	482	496	482	492	466	485	482	488	486
22-23	495	479	484	474	478	479	472	474	490	481	491	472	481	476	482	484
23-24	487	471	468	471	469	478	473	465	480	462	482	481	474	471	470	480
MEANS	484	478	485	486	479	495	489	508	494	478	483	471	486	493	486	479

TABLE 48

Annual Mean Values (Great Whale River)

Year	X*	Y*	Z	D East		I North*		H	F*
	nT	nT	nT	°	'	°	'	nT	nT
1967.5	9201	-3401	59302	339	42.8	80	36.4	9809	60108
1968.5	9246	-3399	59333	339	48.9	80	34.4	9850	60145
1969.5	9319	-3405	59379	339	55.6	80	30.8	9922	60202
1970.5	9357	-3407	59430	339	59.6	80	29.3	9958	60259
1971.5	9430	-3409	59468	340	07.6	80	25.8	10027	60307
1972.5	9505	-3408	59486	340	16.4	80	21.9	10098	60337

*Values for X,Y,I and F derived from monthly means of D,H,Z.

MEANOOK

Officer-in-charge: A.B. Cook

Introduction

Meanook magnetic observatory was established in July 1916, 136 km north of the city of Edmonton, Alberta, and 18 km south of the town of Athabasca.

The mailing address of Meanook observatory is:

Meanook Magnetic Observatory
Box 89
Athabasca, Alberta
T0G 0B0

Observatory site

The observatory is located on the top of the plain to the west of the Tawatinaw valley. The site is underlain by Upper Cretaceous sedimentary deposits to a depth of 2 km.

Magnetic equipment

In July, breaks in the earth current lines were located and repaired, and a set of auxiliary probes was installed. Earth-current recordings were made at Meanook throughout 1972 for Dr. R.R. Heacock, of the University of Alaska.

A digitally recording magnetometer was in operation at the observatory in 1972 for Dr. G. Rostoker of the University of Alberta.

In August the AMOS proton precession magnetometer sensor was moved from the centre pier of the absolute room, where it affected the QHM measurements, to the recording wing of the observatory building.

Three sets of photographic variometers were in continuous operation at Meanook: standard-sensitivity Ruska variometers, and standard-sensitivity LaCour and low-sensitivity LaCour variometers. The paper speed is 20 mm/hr for the Ruska and 15 mm/hr for the LaCour.

The scale values per mm adopted for the LaCour variometers were constant throughout the year, and are as follows:

LaCour Standard	H	7.18 nT
	D	0.93'
	Z	10.36 nT
LaCour Low-sensitivity	H	21.67 nT
	D	2.35'
	Z	37.47 nT

Absolute instruments

The absolute instruments used at Meanook during 1972 were: Cooke magnetometer No. 15 (with correction -0.3') for declination; quartz horizontal magnetometer No. 259 (with correction -0.00013H) for horizontal intensity; Ruska earth inductor No. 6540 (with correction 0.0') for inclination; a proton precession magnetometer (4.25760×10^7 Hz/tesla) for total intensity. A portable fluxgate magnetometer was used as a standby instrument for determining declination and inclination.

Parameters for standard Ruska data reduction

Temperature corrections

The Ruska temperature coefficients determined from the baseline changes which followed the increase in ambient temperature on March 10 were as follows:

H +4 nT/^{o}C;

No significant temperature effect was observed in D and Z.

Ruska magnetogram baselines and scale values

An abrupt baseline change was observed in D on February 28 following an adjustment of the D variometer. The H baseline decreased 20 nT between 0400 and 1200 U.T. March 10, when the ambient temperature of the Ruska variometer room was increased by 5^{o}C. Times of baseline changes are given with the lists of adopted and observed baselines and scale values in Tables 49-51.

Manual scaling of mean hourly values from the Ruska magnetograms was discontinued October 31. Mean hourly values for November and December were derived by computer from the edited one-minute AMOS values. The following corrections, calculated from the absolute field measurements[11], were applied to reduce the AMOS values to the absolute pier:

H +68 nT
D +23^{o} 34.8; Δ D (mins. of arc) = Δ D (nT) x 0.26.
Z +9 nT

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 52-55.

MEANOOK 1972

TABLE 49

D BASELINES			SCALE VALUES '/mm	
Adopted		Observed	Adopted	Observed
Jan. 1	22° 55.6 '		Jan. 1 - Dec. 31 1.61'/mm	
2 - 5	55.5			
6 - 8	55.4			
9 - 12	55.3			
13 - 31	55.2			
Feb. 1	55.2			
2 - 28	55.1			
Shift Feb. 28th				
Mar. 1 - 2	59.4			
3 - 13	59.5			
14 - 24	59.6			
25 - 31	59.7			
Apr. 1 - 2	59.7			
3 - 13	59.8			
14 - 23	59.9			
24 - 30	23° 00.0			
May 1 - 2	23° 00.0			
3 - 11	00.1			
12 - 24	00.2			
25 - 31	00.3			
June 1 - 9	00.3			
10 - 17	00.4			
18 - 27	00.3			
28 - 30	00.2			
July 1 - 7	00.2			
8 - 31	00.1			
Aug. 1 - 31	00.1			
Sept. 1 - 30	00.1			
Oct. 1 - 14	00.1			
15 - 31	00.0			
Nov. 1 - 30	00.0			
Dec. 1 - 31	00.0			

MEANOOK 1972 TABLE 50

H BASELINES nT

Adopted		Observed
Jan. 1 - 17	13075	
18 - 31	13076	
Feb. 1 - 7	13077	
8 - 29	13078	
Mar. 1 - 9	13078	
Shift March 10th		
10 - 28	13057	
29 - 31	13058	
Apr. 1 - 30	13058	
May 1 - 23	13058	
24 - 31	13057	
June 1 - 19	13057	
20 - 30	13058	
July 1 - 5	13058	
6 - 20	13059	
21 - 31	13060	
Aug. 1 - 4	13060	
5 - 24	13061	
25 - 31	13060	
Sept. 1 - 9	13060	
10 - 30	13059	
Oct. 1 - 31	13058	
Nov. 1 - 9	13058	
10 - 16	13059	
17 - 22	13058	
23 - 29	13057	
30	13056	
Dec. 1 - 6	13056	
7 - 14	13055	
15 - 24	13054	
25 - 31	13053	

SCALE VALUES nT/mm

Adopted	Observed
Jan. 1 - Dec. 31 10.29nT/mm	

MEANOOK 1972 TABLE 51

Z BASELINES nT				SCALE VALUES nT/mm	
	Adopted		Observed	Adopted	Observed
Jan.	1 - 2	58429		Jan. 1 - Dec. 31 9.42 nT/mm	
	3 - 7	58430			
	8 - 12	58431			
	13 - 17	58432			
	18 - 20	58433			
	21 - 23	58434			
	24 - 26	58435			
	27 - 29	58436			
	30 - 31	58437			
Feb.	1 - 2	58437			
	3 - 5	58438			
	6 - 8	58439			
	9 - 11	58440			
	12 - 29	58441			
March	1 - 31	58441			
April	1 - 16	58441			
	17	58440			
	18	58439			
	19 - 21	58438			
	22 - 24	58437			
	25 - 29	58436			
	30	58435			
May	1	58435			
	2 - 4	58434			
	5 - 6	58433			
	7 - 9	58432			
	10 - 11	58431			
	12 - 14	58430			
	15 - 19	58429			
	20 - 25	58430			
	26 - 31	58431			
June	2 - 7	58431			
	8 - 24	58432			
	25 - 30	58431			
July	1 - 7	58431			
	8 - 31	58430			
Aug.	1 - 20	58430			
	21 - 31	58429			
Sept.	1	58429			
	2 - 9	58428			
	10 - 21	58427			
	22 - 30	58426			
Oct.	1 - 13	58426			
	14 - 19	58425			
	20 - 27	58424			
	28 - 31	58423			
Nov.	1 - 2	58423			
	3 - 8	58422			
	9 - 15	58421			
	16 - 30	58422			
Dec.	1	58422			
	2 - 9	58423			
	10 - 31	58424			

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY-ALL DAYS

TABLE 52 MEANOOK H = 12500 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	834	834	849	848	874	868	869	872	851	851	858	867	856	871	850	848
1-2	838	836	844	855	868	880	870	877	853	858	865	870	859	873	853	852
2-3	841	834	847	853	856	872	866	876	856	869	863	871	859	868	856	852
3-4	838	835	859	857	853	864	869	892	852	863	875	871	861	870	858	855
4-5	836	835	859	860	852	850	867	881	851	859	864	871	857	862	857	852
5-6	835	836	845	850	854	831	851	834	847	855	850	870	846	843	849	848
6-7	830	834	835	821	846	815	839	810	837	837	824	870	833	828	833	839
7-8	822	824	817	821	838	813	844	797	822	820	823	859	825	823	820	832
8-9	817	810	809	801	816	790	839	772	808	777	809	856	808	804	799	823
9-10	806	818	810	786	829	797	828	764	809	764	803	840	805	805	792	817
10-11	781	804	812	788	838	795	829	766	814	794	802	831	805	807	802	804
11-12	795	796	801	790	838	793	843	793	821	810	807	842	811	817	805	810
12-13	789	796	815	793	839	800	851	809	824	810	825	852	817	825	811	815
13-14	795	814	828	804	840	815	854	818	843	832	832	852	827	832	827	823
14-15	800	814	830	819	842	823	852	818	835	843	844	863	832	834	832	830
15-16	796	819	822	818	835	817	849	815	836	839	841	866	829	829	829	831
16-17	809	824	813	817	827	821	841	826	827	840	843	862	829	829	824	835
17-18	810	817	812	810	823	819	832	821	819	836	837	856	824	824	819	830
18-19	806	810	805	811	819	817	828	816	815	828	834	853	820	820	815	826
19-20	806	809	803	814	822	827	826	818	823	826	833	852	821	823	816	825
20-21	815	809	810	822	831	834	832	830	835	832	838	850	828	832	825	828
21-22	815	814	821	833	839	843	843	853	845	840	842	852	837	844	835	831
22-23	821	819	824	842	851	864	857	885	853	847	849	857	847	864	842	836
23-24	826	826	840	844	863	863	866	870	850	846	854	862	851	865	845	842
MEANS	815	819	825	823	841	830	848	830	834	832	838	858	833	837	829	833

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION-ALL DAYS

TABLE 53 MEANOOK D = 23.0 DEGREES EAST PLUS TABULAR VALUES IN MINUTES 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	31.6	29.9	28.0	26.6	25.9	24.4	25.9	26.2	26.6	25.9	27.2	27.4	27.1	25.6	26.8	29.0
1-2	32.2	30.5	28.8	27.8	28.1	24.9	27.0	26.8	27.1	26.8	27.9	27.7	27.9	26.5	27.6	29.6
2-3	34.0	31.9	29.5	28.8	29.5	26.6	27.5	26.5	27.6	27.4	28.5	28.4	28.9	27.5	28.3	30.7
3-4	33.8	32.6	30.1	29.1	30.1	27.7	28.2	26.6	29.8	28.8	28.1	29.6	29.6	28.2	29.5	31.0
4-5	35.6	33.4	31.0	29.9	30.6	29.2	28.9	28.2	29.5	28.8	29.4	29.1	30.3	29.3	29.8	31.9
5-6	35.1	34.3	32.5	31.0	31.0	30.4	29.2	24.5	26.8	30.0	28.9	29.4	30.2	28.7	30.1	31.9
6-7	34.5	34.3	33.2	31.3	30.7	30.5	29.5	23.0	27.3	28.4	28.6	29.2	30.0	28.4	30.1	31.7
7-8	34.3	33.9	33.1	31.9	30.0	30.1	29.4	26.0	27.8	27.2	28.2	29.6	30.1	28.9	30.0	31.5
8-9	33.6	33.3	33.6	33.2	31.3	29.2	29.3	26.6	29.1	29.7	28.2	29.1	30.5	29.1	31.4	31.0
9-10	33.6	33.8	34.3	34.5	31.3	31.1	29.8	29.2	31.6	33.3	28.7	28.4	31.6	30.4	33.4	31.1
10-11	34.6	35.5	35.3	35.2	31.0	30.1	29.6	30.3	31.8	34.7	29.6	28.7	32.2	30.2	34.3	32.1
11-12	36.4	36.5	36.1	35.6	32.1	32.7	32.3	30.0	32.4	33.6	29.0	29.9	33.0	31.8	34.4	32.9
12-13	35.9	35.8	35.6	37.2	35.1	35.6	34.7	33.6	33.6	30.3	30.3	30.9	34.1	34.8	34.2	33.2
13-14	33.4	35.6	35.1	37.4	37.7	38.5	37.9	36.2	35.5	30.3	30.2	29.2	34.8	37.6	34.6	32.1
14-15	34.3	35.4	36.7	39.2	39.2	40.4	40.1	38.6	36.5	30.7	29.3	29.6	35.8	39.6	35.8	32.1
15-16	36.6	35.9	38.2	38.6	40.1	41.6	40.4	38.7	36.4	31.5	30.1	30.0	36.5	40.2	36.2	33.2
16-17	36.3	37.8	37.4	37.4	39.2	40.5	39.1	38.4	34.6	32.1	30.1	30.3	36.1	39.3	35.4	33.6
17-18	35.6	37.4	36.3	35.6	36.3	37.1	36.0	35.8	32.0	31.8	29.4	29.6	34.4	36.3	33.9	33.0
18-19	34.3	34.7	34.5	31.9	32.6	32.6	32.0	31.2	28.4	29.5	27.3	28.1	31.4	32.1	31.1	31.1
19-20	32.6	32.3	31.6	28.3	29.4	28.9	26.7	27.5	25.0	26.4	25.9	27.5	28.5	28.1	27.8	29.6
20-21	31.2	30.9	30.1	26.5	25.9	26.2	23.5	24.4	23.3	24.6	25.9	26.6	26.6	25.0	26.1	28.7
21-22	30.1	30.0	29.1	26.2	24.1	24.0	22.3	25.5	23.3	24.6	25.6	26.3	25.9	24.0	25.8	28.0
22-23	30.3	29.3	28.1	26.0	23.9	24.0	22.8	25.1	24.6	24.7	26.1	26.2	25.9	23.9	25.8	28.0
23-24	31.3	29.2	27.7	26.2	24.6	24.4	24.6	25.0	26.0	25.4	26.6	26.8	26.5	24.6	26.3	28.4
MEANS	33.8	33.5	32.7	31.9	31.2	30.9	30.3	29.3	29.4	29.0	28.3	28.6	30.8	30.4	30.8	31.1

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 54 MEANOOK Z = 58000 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	684	683	694	687	688	676	691	694	693	692	692	674	687	687	691	683
1-2	688	682	696	689	688	680	687	693	694	692	694	677	688	687	693	685
2-3	690	680	695	688	689	669	686	689	691	691	685	681	686	683	691	684
3-4	688	684	694	692	687	678	688	683	682	686	682	682	685	684	688	684
4-5	687	681	691	686	685	677	679	658	671	686	676	683	680	675	683	682
5-6	683	679	682	677	680	676	667	646	678	679	682	679	676	667	679	681
6-7	673	672	674	663	671	666	661	647	671	663	683	674	668	661	668	675
7-8	666	668	667	662	661	642	659	670	654	654	664	662	661	658	659	665
8-9	658	660	649	655	633	648	659	648	633	631	654	657	649	647	642	657
9-10	652	653	643	647	637	636	654	651	639	616	658	640	644	644	637	651
10-11	644	652	640	651	650	640	646	648	642	623	651	636	644	646	639	646
11-12	641	643	633	650	653	645	651	659	641	638	651	639	645	652	640	643
12-13	637	625	645	640	656	657	657	667	640	637	657	641	646	659	640	640
13-14	636	647	657	644	658	654	657	670	655	644	655	650	652	660	650	647
14-15	645	656	664	651	661	655	655	671	658	661	652	656	657	661	659	652
15-16	647	654	664	655	662	654	654	666	664	666	655	665	659	659	662	655
16-17	660	664	663	663	662	654	658	676	671	671	664	663	664	663	667	663
17-18	666	667	666	668	662	655	658	678	673	675	668	662	666	663	670	666
18-19	670	669	670	669	661	653	660	678	677	674	671	666	668	663	673	669
19-20	676	670	675	671	664	661	661	681	683	679	676	669	672	667	677	673
20-21	679	672	682	676	672	668	666	688	688	682	680	670	677	674	682	675
21-22	679	675	687	684	680	678	673	701	688	682	683	674	682	683	685	678
22-23	680	678	688	687	683	682	682	701	691	684	685	677	685	687	688	680
23-24	681	681	692	688	688	672	691	704	692	685	689	673	686	689	689	681
MEANS	667	667	671	668	668	661	667	674	670	666	671	665	668	667	669	667

TABLE 55

Mean Annual Values (Meanook)

Year	D(East)		H	Z	X*	Y*(E)	I*(N)		F*
	°	'	nT	nT	nT	nT	°	'	nT
1957.5	24	23.1	12921	58801	11768	5335	77	36.4	60204
1958.5		15.0	12943	58819	11801	5316		35.4	60226
1959.5		13.0	12960	58787	11819	5316		34.1	60198
1960.5		09.7	12985	58774	11848	5316		32.5	60192
1961.5		06.1	13022	58748	11887	5318		30.1	60175
1962.5		02.7	13054	58723	11921	5318		28.1	60156
1963.5	23	58.7	13076	58711	11949	5314		26.5	60150
1964.5		54.9	13103	58694	11978	5312		24.9	60139
1965.5		51.7	13130	58672	12008	5312		23.1	60123
1966.5		49.6	13150	58663	12029	5312		21.9	60119
1967.5		47.2	13170	58663	12051	5312		20.8	60123
1968.5		45.0	13197	58659	12079	5315		19.4	60125
1969.5		42.1	13234	58662	12118	5320		17.2	60136
1970.5		39.8	13265	58672	12150	5324		15.6	60153
1971.5		36.2	13303	58669	12190	5327		13.5	60158
1972.5	23	30.8	13333	58668	12226	5319	77	11.8	60164

*X,Y,I,F are derived from annual means, D,H,Z.

OTTAWA

Officer-in-charge: W.R. Darker
Assistant: R. Groulx

Ottawa magnetic observatory was established in 1968 as part of the new complex of magnetic laboratories in the Department of Energy, Mines and Resources, located immediately east of the city of Ottawa, near the village of Blackburn. The new observatory was fully operational on July 1, 1968, and is the replacement for Agincourt observatory which had to be closed March 31, 1969, owing to industrial development and highway construction in the vicinity of the observatory. Agincourt observatory had been in continuous operation since 1898, and was itself a replacement for the Toronto observatory, established in 1843, which had to be relocated following electrification of the Toronto tramway system.

The mailing address for the Ottawa observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Canada
K1A 0Y3

Observatory site

The observatory is located on the east-west ridge of land known as Dolman Ridge, bounded on the north by the swamps and marshes of Mer Bleue, and on the south by the Borthwick Creek swampland. Dolman Ridge is a feature of the recent geological period, and was at one time an island in the Champlain Sea.

Magnetic equipment

In addition to magnetic equipment described in the introductory section of the annual report, the electronic integrator designed by W.R. Darker (1971) was in operation at the Ottawa observatory in 1972.

Absolute instruments

Declination: Ruska magnetometer no. 6513; portable D,I electrical magnetometer. Inclination: Ruska Earth Inductor no. 11650; portable D,I electrical magnetometer. Total Intensity: Proton Precession Magnetometer (Division of Geomagnetism design). Horizontal Intensity: Quartz Horizontal Magnetometer (QHM) nos. 258, 571, 572, 573.

Ruska Magnetogram baselines and scale values

The adopted baselines and scale values for 1972 are given in Tables 56 to 58.

Summary of mean values (Ottawa)

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 59-62.

Ottawa 1972

Table 56

	D BASELINES γ Adopted		D BASELINES γ Observed		D SCALE VALUES ′/mm	
Jan.	1	346°28.4'	Jan. 6	346°27.7'	Jan. 1-31	1.06
	2-3	28.3'	10	28.0'		
	4-5	28.2'	20	27.6'		
	6-8	28.1'	27	28.7'		
	9-21	28.0'				
	22-23	28.1'				
	24-31	28.2'				
Feb.	1-9	346°28.2'	Feb. 7	346°27.4'	Feb. 1-29	1.06
	10-19	28.1'	18	27.6'		
	15-17	28.0'	29	26.9'		
	18-19	27.9'				
	20-21	27.8'				
	22-23	27.7'				
	24-28	27.6'				
	29	27.5'				
Mar.	1-6	346°27.5'	Mar.10	346°27.3'	Mar. 1-31	1.08
	7-18	27.4'	14	27.3'		
	19-21	27.5'	21	27.5'		
	22-26	27.6'				
	27-29	27.5'				
Apr.	1	346°27.5'	Apr. 6	346°29.5'	Apr. 1-30	1.07
	2-3	27.4'	11	30.7'		
	4	30.2'	20	30.1'		
	5-6	30.1'	25	29.6'		
	7	30.2'				
	8-9	30.3'				
	10-11	30.4'				
	12-19	30.6'				
	15-17	30.5'				
	18	30.4'				
	19	30.2'				
	20-21	30.1'				
	22-23	30.0'				
	24	29.9'				
	25-30	29.7'				
May	1-2	346°29.7'	May 2	346°29.6'	May 1-31	1.06
	3	29.8'	9	29.4'		
	4-9	29.9'	18	29.7'		
	10-18	30.0'	23	30.1'		
	19-26	30.1'	30	29.9'		
	27-31	30.2'				
June	1-3	346°30.3'	June 7	346°30.3'	June 1-30	1.07
	4-5	30.4'	12	30.5'		
	6-9	30.5'	20	31.8'		
	10-12	30.6'				
	13-14(15.00)	30.7'				
	14	31.6'				
	15-17	31.7'				
	18-21	31.8'				
	22-30	31.9'				
July	1-2	346°31.9'	July 15	346°31.5'	July 1-31	1.08
	3-12	31.8'	19	32.7'		
	13-15	31.9'	27	31.2'		
	16-17	32.0'				
	18-21	32.1'				
	22-23	32.0'				
	24-25	31.9'				
	26-31	31.8'				
Aug.	1-3	346°31.8'	Aug. 2	346°31.8'	Aug. 1-31	1.07
	4-6	31.9'	11	31.9'		
	7-9	32.0'	15	31.6'		
	10-12	31.9'	28	31.9'		
	13-14	31.8'				
	15-18	31.7'				
	19-24	31.8'				
	25-31	31.9'				

Ottawa 1972

D BASELINES γ Table 56 D SCALE VALUES ½mm

	Adopted		Observed			
Sept.	1	346°31.9'	Sept.11	346°31.3'	Sept. 1-30	1.07
	2-8	31.8'	15	31.4'		
	9-11	31.7'	24	30.8'		
	12-19	31.6'	27	30.5'		
	20	31.5'				
	21	31.3'				
	22-23	31.2'				
	24-25	31.1'				
	26-28	31.0'				
	29-31	30.9'				
Oct.	1	346°30.9'	Oct. 4	346°30.0'	Oct. 1-31	1.06
	2-5	30.8'	19	30.6'		
	6-8	30.7'	26	31'		
	8-12	30.6'				
	12-15	30.5'				
	16-24	30.6'				
	25-31	30.7				
Nov.	1-10	346°30.7'	Nov. 3	346°30.5'	Nov. 1-30	1.06
	11-23	30.6'	7	30.4'		
	24-30	30.8'	14	30.2'		
			22	30.5'		
			29	30.8'		
Dec.	1	346°30.8	Dec. 5	346°31.1	Dec. 1-31	1.07
	2-22	30.9	12	31.2		
	23-29	30.8	19	30.4		
	30-31	30.9	28	30.4		

Ottawa 1972

H BASELINES γ Table 57 H SCALE VALUES γ/mm

Adopted		Observed			
Jan. 1-2	15845	Jan. 6	15843	Jan. 1-31	6.25
3-4	44	10	43		
5-8	43	20	44		
9-27	42	27	43		
28-31	44				
Feb. 1-2	15844	Feb. 2	15846	Feb. 1-29	6.15
3-5	46	7	47		
6-13	45	25	47		
14-26	44	29	49		
27-29	45				
Mar. 1-6	15845	Mar.10	15842	Mar. 1-31	6.25
7-12	44	14	43		
13-14	43	21	41		
15-17	44				
18-20	43				
21-23	42				
24-29	43				
30-31	44				
Apr. 1-3	15844	Apr. 6	15847	Apr. 1-30	6.11
4-6	45	11	44		
7-8	46	20	48		
9-10	47	25	49		
11-28	46				
29-30	47				
May 1-18	15847	May 2	15849	May 1-31	6.14
19-20	45	9	49		
21-22	44	18	52		
23	43	23	44		
24-25	42	30	44		
26-28	41				
29-31	40				
June 1-3	15845	June 12	15849	June 1-30	6.35
4-6	44	16	38		
7-10	43	20	43		
11-12	42				
13-20	39				
21	40				
22-30	41				
July 1	15841	July 6	15843	July 1-31	6.22
2-7	42	15	42		
8-10	43	19	52		
11-13	44	27	49		
14-15	45				
16-17	46				
18-22	48				
23-27	47				
28-29	46				
30-31	45				
Aug. 1-2	15844	Aug. 2	15847	Aug. 1-31	6.28
3-7	43	11	42		
8-26	42	15	47		
27-28	43	28	41		
29	44				
30-31	46				
Sept.1-2	15847	Sept. 11	15851	Sept. 1-30	6.18
3-4	48	15	49		
5-8	49	24	48		
9-11	50	27	51		
12	51				
13-14	50				
15-16	49				
17-21	50				
22-24	49				
25-26	50				
27-30	49				

Ottawa 1972

H BASELINES γ Table 57 | H SCALE VALUES γ/mm

Adopted		Observed			
Oct. 1-10	15849	Oct. 12	15850	Oct. 1-31	6.12
11-12	48	19	49		
13-15	47	26	47		
16-22	46				
23-25	47				
26-28	48				
29-31	49				
Nov. 1-4	15850	Nov. 3	15854	Nov. 1-30	6.18
5-19	51	14	52		
20-30	50	29	53		
Dec. 1	15850	Dec. 4	15854	Dec. 1-31	6.11
2-7	51	13	56		
8-11	52	19	58		
12-30	53	28	56		

Ottawa 1972

Z BASELINES γ Table 58 | Z SCALE VALUES γ/mm

	Adopted		Observed			
Jan.	1-3	56351	Jan. 6	56353	Jan. 1-31	6.4
	4-10	52	10	56354		
	11-15	53	20	353		
	16-21	54	27	355		
	22-28	55				
	29-31	54				
Feb.	1-2	56353	Feb. 2	56350	Feb. 1-29	6.53
	3-4	52	7	348		
	5-0	51	18	346		
	7	50	25	347		
	8-13	49	29	350		
	14-25	48				
	26-27	49				
	28	50				
	29	51				
Mar.	1	56252	Mar.10	56251	Mar. 1-31	6.31
	2-20	53	14	252		
	21-31	54	21	252		
Apr.	1-19	56254	Apr. 6	56255	Apr. 1-30	6.18
	20	53	"	251		
	21	52	20	256		
	22-23	51	25	246		
	24	56250				
	25-26	49				
	27-30	48				
May	1-4	56247	May 2	56241	May 1-31	6.33
	5-6	46	9	42		
	7-8	45	18	40		
	9-10	44	23	38		
	11-12	43	30	38		
	13-14	42				
	15-16	41				
	17-20	40				
	21-23	39				
	24-27	38				
	28-31	37				
June	1-2	56237	June 7	56233	June 1-30	6.39
	3-10	36	12	229		
	11-12	30	20	231		
	13-20	31				
	21	30				
	22	29				
	23	28				
	24-25	27				
	26	56226				
	27	25				
	28-29	24				
	30	23				
July	1	56223	July 6	56220	July 1-31	6.55
	2-3	22	15	118		
	4-5	21	19	111		
	6-7	20				
	8-9	19	27	111		
	10-11	18				
	12-13	17				
	14-15	16				
	16	15				
	17	14				
	18-22	11				
	23-27	10				
	28-29	09				
	30-31	10			Aug. 1-31	6.46
Aug.	1-2	56211	Aug. 2	56213		
	3-4	12	11	17		
	5-8	13	15	18		
	9-10	14	28	07		
	11-13	56215				
	14-21	14				
	22-25	13				
	26	12				
	27	11				
	28-29	10				
	30-31	09				

Ottawa 1972

Z BASELINES γ Table 58 | Z SCALE VALUES γ/mm

Adopted		Observed			
Sept. 1-2	56209	Sept. 6	56211	Sept. 1-30	6.42
3-7	10	11	11		
8-9	11	15	18		
10-11	12	24	20		
12	15	27	22		
13-14	16	29	27		
15	17				
16-17	18				
18-19	19				
20-22	20				
23-24	21				
25-26	22				
27	24				
28	25				
29-30	27				
Oct. 1	56227	Oct. 12	56230	Oct. 1-30	6.51
2-5	28	26	40		
6-9	29				
10-13	30				
14-15	31				
16-17	32				
18-19	33				
20-21	34				
22	35				
24-25	37				
26	38				
27	39				
28	40				
29-30	41				
31	42				
Nov. 1	56239	Nov. 3	56238	Nov. 1-30	6.55
2-6	40	7	42		
7-8	39	14	33		
9-10	38	22	54		
11-12	37	29	47		
13-16	36				
17-18 (14.54)	56235				
18-23	53				
24-27	55				
28-30	54				
Dec. 1-4	56254	Dec. 5	56254	Dec. 1-31	6.53
5-14	55				
15-18	54	19	49		
19-23	53	28	54		
24-29	54				
30-31	53				

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY-ALL DAYS

TABLE 59 OTTAWA H = 15500 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	511	521	530	543	560	578	571	586	575	581	588	607	563	574	557	557
1-2	509	519	529	542	557	563	569	581	574	580	589	605	560	567	556	555
2-3	510	518	526	542	552	539	568	564	571	578	584	603	555	556	554	554
3-4	508	518	525	540	551	537	567	554	570	576	578	604	552	552	553	552
4-5	509	519	523	538	551	531	565	527	560	576	577	603	548	543	549	552
5-6	508	519	521	536	550	535	562	510	559	576	560	604	545	539	548	548
6-7	507	518	522	532	550	526	563	511	566	572	564	604	545	537	548	548
7-8	507	518	523	535	550	525	563	523	571	571	573	605	547	540	550	551
8-9	509	519	525	532	547	530	564	540	572	574	563	606	548	545	551	549
9-10	511	519	529	534	549	550	563	535	575	577	573	607	552	549	554	553
10-11	512	521	529	535	550	544	562	535	575	585	586	609	554	547	556	557
11-12	515	521	527	533	545	544	561	544	568	585	589	611	554	549	553	559
12-13	512	517	523	526	538	538	552	538	558	575	587	610	548	542	545	557
13-14	506	512	513	517	530	532	542	528	546	564	579	605	540	533	535	551
14-15	497	501	500	509	522	525	533	515	538	556	568	600	530	524	526	541
15-16	479	492	490	505	522	525	532	511	538	551	562	594	525	522	521	532
16-17	476	490	492	512	531	534	541	529	547	554	563	590	530	534	526	530
17-18	482	494	503	523	545	548	555	547	560	565	569	591	540	549	538	534
18-19	492	504	514	535	561	565	570	562	575	575	578	598	552	564	550	543
19-20	501	513	524	545	573	583	580	578	589	580	584	605	563	578	560	551
20-21	511	521	535	552	575	591	584	582	589	582	587	609	568	583	565	557
21-22	517	523	539	555	569	587	587	594	583	584	590	610	570	584	566	560
22-23	517	523	534	552	566	588	584	601	584	585	591	609	570	585	564	560
23-24	513	521	536	547	563	585	577	590	574	582	589	608	566	579	560	558
MEANS	505	514	521	534	550	550	563	549	567	574	578	604	551	553	549	550

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION-ALL DAYS

TABLE 60 OTTAWA D = 346.0 DEGREES EAST PLUS TABULAR VALUES IN MINUTES 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	18.9	18.7	18.8	18.7	19.7	19.3	19.9	19.8	19.2	18.8	19.6	18.5	19.2	19.7	18.9	19.0
1-2	20.4	19.7	20.1	19.9	19.7	18.8	19.6	20.1	19.2	18.8	20.5	19.3	19.7	19.5	19.5	20.0
2-3	21.4	20.2	19.8	19.4	19.7	18.8	19.5	19.3	19.7	19.3	19.5	19.6	19.7	19.3	19.6	20.2
3-4	20.6	20.2	20.1	20.1	19.7	19.0	19.7	19.2	19.8	18.8	19.1	19.5	19.6	19.4	19.7	19.8
4-5	19.4	19.5	20.5	19.9	19.7	18.0	19.9	15.3	17.4	19.1	17.7	19.0	18.8	18.2	19.2	18.9
5-6	18.5	18.8	19.8	19.6	19.9	18.5	18.8	16.0	18.9	19.3	16.3	18.6	18.6	18.3	19.4	18.1
6-7	18.6	18.9	19.8	19.3	20.1	18.6	19.3	16.8	19.6	19.2	15.2	18.6	18.6	18.7	19.5	17.8
7-8	18.6	19.6	19.8	20.5	20.5	18.3	19.9	17.7	20.6	19.5	18.2	18.0	19.3	19.1	20.1	18.6
8-9	18.9	19.8	19.9	21.2	20.2	19.7	21.0	18.4	21.2	19.6	17.2	18.6	19.6	19.8	20.5	18.6
9-10	19.3	20.0	20.2	21.9	22.6	21.5	22.5	19.2	22.3	19.0	18.6	18.3	20.4	21.4	20.8	19.1
10-11	18.7	20.0	21.0	23.1	25.1	23.3	24.8	22.7	22.9	19.2	19.2	18.2	21.5	24.0	21.6	19.1
11-12	19.0	20.2	22.0	24.1	25.9	25.0	27.2	25.2	23.2	19.6	19.2	17.9	22.4	25.8	22.2	19.1
12-13	19.1	20.2	23.2	24.0	26.1	25.5	27.7	26.3	22.4	19.2	20.2	18.7	22.7	26.4	22.2	19.6
13-14	20.9	21.8	23.8	22.9	24.2	24.3	26.0	24.3	21.5	19.6	20.5	19.5	22.4	24.7	21.9	20.7
14-15	21.0	21.5	21.9	20.2	21.2	21.3	22.3	20.5	17.8	19.3	19.7	19.8	20.5	21.3	19.8	20.5
15-16	18.1	18.7	17.8	16.2	16.9	17.5	17.7	15.2	14.0	16.9	16.6	18.5	17.0	16.8	16.2	18.0
16-17	14.9	16.3	13.7	13.2	12.9	13.5	13.8	11.6	11.5	14.6	14.7	16.2	13.9	13.0	13.2	15.5
17-18	13.1	14.1	11.6	11.6	11.3	11.4	11.7	10.4	11.1	13.6	13.4	14.3	12.3	11.2	12.0	13.7
18-19	12.5	13.1	11.4	11.5	12.2	11.6	11.7	10.7	12.0	13.4	13.3	14.0	12.3	11.5	12.1	13.2
19-20	12.8	13.7	12.3	12.6	14.0	13.8	13.5	13.3	14.8	13.7	14.0	14.7	13.6	13.7	13.4	13.8
20-21	15.0	15.1	14.1	14.5	15.8	15.6	16.0	15.6	16.5	14.9	16.2	15.4	15.4	15.8	15.0	15.4
21-22	16.8	16.5	15.8	16.6	17.5	17.2	18.5	19.3	17.7	15.8	16.8	16.4	17.1	18.1	16.4	16.6
22-23	17.7	17.1	16.7	17.8	18.6	19.1	19.6	20.1	18.8	16.4	17.6	17.3	18.1	19.3	17.4	17.4
23-24	18.5	17.7	16.9	18.1	19.9	19.5	20.5	19.8	19.0	16.9	19.5	17.8	18.7	19.9	17.7	18.4
MEANS	18.0	18.4	18.4	18.6	19.3	18.7	19.5	18.2	18.4	17.7	17.6	17.8	18.4	19.0	18.3	18.0

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 61 OTTAWA Z = 56000 PLUS TABULAR VALUES IN NANOTESLAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	420	419	421	408	404	391	397	384	388	387	376	365	397	394	401	395
1-2	419	417	416	403	400	382	390	385	384	385	374	366	394	389	397	394
2-3	417	413	410	398	392	389	388	372	376	381	368	366	389	385	391	391
3-4	414	411	401	395	388	386	383	353	363	372	361	364	383	378	383	387
4-5	409	408	397	394	385	377	379	335	356	371	359	363	378	369	379	385
5-6	406	405	392	390	386	373	371	330	358	369	354	360	374	365	377	381
6-7	405	403	392	385	385	365	369	347	366	363	366	357	375	367	376	383
7-8	405	401	392	386	386	361	372	358	371	363	353	355	375	369	378	378
8-9	405	402	393	383	382	365	378	365	369	359	349	358	376	372	376	379
9-10	405	401	397	384	385	372	382	369	369	354	354	356	377	377	376	379
10-11	404	400	398	385	389	374	381	366	370	360	354	353	378	377	378	378
11-12	404	401	399	386	388	378	380	379	372	368	360	354	381	381	381	380
12-13	406	402	400	389	387	378	380	381	372	372	364	356	382	381	383	382
13-14	407	403	400	390	386	379	379	381	372	373	366	358	383	381	384	383
14-15	403	402	399	390	385	378	379	382	374	374	364	355	382	381	384	381
15-16	403	400	396	390	383	380	379	387	373	373	362	354	382	382	383	380
16-17	410	402	400	393	385	383	381	390	377	372	366	355	385	385	386	383
17-18	414	405	402	397	387	384	383	393	382	375	370	358	387	387	389	387
18-19	418	409	405	402	391	389	385	398	388	377	372	364	391	391	393	391
19-20	421	413	409	406	397	395	389	402	396	382	374	366	396	396	398	393
20-21	422	414	413	411	404	401	393	403	396	384	374	366	398	400	401	394
21-22	419	415	415	416	407	404	398	411	394	384	374	369	401	405	402	394
22-23	418	416	415	414	407	408	402	408	395	384	373	367	400	406	402	393
23-24	418	418	419	410	406	402	402	398	391	385	375	365	399	402	401	394
MEANS	411	407	403	396	392	383	384	378	377	374	365	361	386	384	388	386

TABLE 62

Annual Mean Values (Ottawa)

Year	D(East)		H	Z	X*	Y*	I(N)*		F*
	°	'	nT	nT	nT	nT	°	'	nT
1968.5	346	18.4	15684	56478	15238	-3713	74	28,8	58615
1969.5	346	18.9	15760	56467	15313	-3729	74	24,3	58625
1970.5	346	17.6	15858	56455	15406	-3758	74	18,6	58640
1971.5	346	18.8	15960	56429	15507	-3776	74	12.4	58643
1972.5	346	18.4	16051	56386	15595	-3800	74	06,6	58626

*Values of X,Y,I and F are derived from means of D,H,Z.

ST. JOHN'S

Officer-in-charge: G.A. Brown
To July 31, 1972, after which the observatory was operated by Memorial University of Newfoundland under contract.

The magnetic observatory at St. John's, Newfoundland, began operation on August 1, 1968. A location in southeastern Newfoundland was chosen to reduce one of the largest gaps in the geographical distribution of the magnetic observatories of the northern hemisphere. In addition to contributing data for studies of world-wide geomagnetic variations and secular change, the St. John's observatory provides control for the many marine and airborne magnetic surveys conducted over the broad continental shelf east of Canada.

Mr. Brown was transferred to Ottawa in August to take over the new position of Operations Controller of the network of AMOS stations.

The mailing address of St. John's observatory is:

Division of Geomagnetism
Earth Physics Branch
Department of Energy, Mines and Resources
Ottawa, Canada
K1A 0Y3

Observatory site

The original land allotment for St. John's observatory of 135,000 m^2 was increased to 589,500 m^2. A land survey of the enlarged site was completed in February, 1972. The additional land was acquired to protect the magnetic environment of the observatory, and to accommodate earth-current measurements, such as the earth-current experiment carried out by Memorial University of Newfoundland during the summer of 1972.

The observatory is 3 km northeast of the centre of the city and 1.5 km from the sea. The area is magnetically flat, and the total intensity varies less than 15 nT within the site. A preliminary survey of geomagnetic time variations throughout Newfoundland revealed no gross anomalies of electromagnetic induction in the St. John's region, but some coastal induction effects must be expected and have in fact been found.

Magnetic equipment

Absolute instruments

A portable fluxgate magnetometer is used to determine the declination and inclination. A Barringer nuclear proton precession magnetometer (4.25760×10^7 Hz/tesla) is the primary standard of total intensity (F). A set of three Quartz Horizontal Magnetometers Nos. 680, 681, 682 was the standard for horizontal intensity until July 31. A second portable (D,I) fluxgate was used for comparisons and for the St. John's magnetic repeat station program.

Following Mr. Brown's transfer to Ottawa, photographic recording was discontinued and AMOS became the primary recorder at St. John's. An independent 3-component fluxgate magnetometer recording on paper chart at 20 mm/hr provides a standby analogue recording system. The observatory is operated under local contract. Absolute field measurements in D and I and routine checks on the instruments and buildings are carried out twice a week.

Reduction of data

Tables 63-65 list the Ruska baselines and scale values adopted for the period January to July, 1972, and the corrections for reducing AMOS values to the absolute reference of the observatory for the months August to December inclusive. AMOS corrections obtained for the period August 1 to October 27 were unreliable owing to the malfunctioning of the digital voltmeter. For this period corrections were determined from examination of AMOS data plots and quiet day levels. A new magnetometer was installed October 27.

The procedure for calculating AMOS corrections from the absolute measurements of D,I and F is analogous to that used for determining the Ruska baseline values[12].

Following discontinuance of photographic recording, computer plots of the one-minute AMOS data in the Ruska magnetogram format, were produced for distribution to World Data Center A and for general research purposes. Mean hourly value tables were calculated by computer from the edited digital data and corrected to the absolute reference of the observatory.

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 66 to 69.

ST. JOHN'S

1972 H BASELINES nT (RUSKA) Table 63

SCALE VALUES nT/mm

Adopted		Observed		Adopted		Observed
JAN	17602	17598	JAN 4	JAN	6.60	6.55
		17598	4			
		17604	10			
		17600	19			
		17606	19			
		17608	24			
		17602	25			
FEB	17602	17604	FEB 3	FEB	6.60	6.56
		17602	3			
		17600	7			
		17602	7			
		17605	7			
		17605	14			
		17599	18			
		17600	22			
		17602	22			
		17596	26			
		17596	26			
		17607	27			
MAR	17603	176	MAR 3	MAR	6.60	6.56
		17602	6			
		17605	10			
		17601	11			
		17607	11			
		17598	12			
		17601	20			
		17596	21			
		17603	21			
		17609	25			
		17609	25			
		17607	26			
APR	17603	17601	APR 3	APR	6.60	6.55
		17599	7			
		17601	10			
		17598	11			
		17597	22			
		17601	22			
		17603	23			
MAY	17599 to 17597	17598	MAY 4	MAY	6.60	6.55
		17602	4			
		17601	8			
		17601	15			
		17599	17			
		17594	11			
		17597	20			
		17593	23			
		(17585)	24			
JUNE	17597 to 17594	17595	JUN 8	JUNE	6.60	6.55
		17589	9			
		17596	9			
		17594	9			
		17591	10			
		17588	16			
		17595	23			
		17594	23			
		17601	23			
		17594	29			
		17599	29			
JULY	17593 to 17590	17585	JUL 6	JULY	6.60	-----
		17593	6			
		17594	6			
		17585	16			
		17586	16			
		17589	21			
		17582	21			
		17584	28			
		17591	28			

St. John's 1972

H BASELINES nT (AMOS)		Table 63		SCALE VALUES /mm	
Adopted		Observed		Adopted	Observed
AUGUST 1	60				
2	40				
3-9	20				
10-13	10				
14-31	20				
SEPTEMBER	20				
OCTOBER 1-26	27				
27-31	data missing				
NOVEMBER 1-9	data missing	2	Nov. 5		
		4	12		
10-30	3	4	17		
		3	26		
DECEMBER 1-14	4	3	Dec. 4		
15-31	4 to 8	6	9		
		3	17		
		9	31		

St. John's 1972

D BASELINES (Ruska)	Table 64		SCALE VALUES /mm		
Adopted	Observed		Adopted		Observed
JANUARY					
-26° 53.0'	$-26^{\circ}53.4$	Jan. 4	JAN.	0.97'/mm	0.97 '/mm
	52.4	4			
	52.1	10			
	52.1	19			
	51.2	19			
	51.2	20			
	52.1	24			
	52.9	25			
FEBRUARY					
$-26^{\circ}53.0'$ to $-26^{\circ}52.7'$	$-26^{\circ}54.2$	Feb. 3	FEB.	0.97'/mm	0.96'/mm
	53.1	3			
	53.3	7			
	52.3	7			
	53.4	14			
	53.7	18			
	52.8	22			
	52.5	22			
	52.6	26			
	51.9	27			
MARCH					
$-26^{\circ}52.7$ to $26^{\circ}51.9$	$-26^{\circ}52.3$	Mar. 3	MAR.	0.97'/mm	0.96 '/mm
	52.9	6			
	51.6	10			
	52.7	11			
	52.3	12			
	52.8	20			
	51.7	21			
	51.8	25			
	51.9	26			
APRIL					
$-26^{\circ}51.8$ to $-26^{\circ}51.0$	$-26^{\circ}52.6$	Apr. 3	APR.	0.97'/mm	0.96 '/mm
	52.0	7			
	50.2	10			
	51.9	11			
	49.9	22			
	51.2	23			
	49.7	27			
MAY					
$-26^{\circ}50.9$ to $-26^{\circ}50.5$	$-26^{\circ}51.1$	May 4	MAY	0.97'/mm	0.96 '/mm
	49.9	4			
	49.4	8			
	51.6	10			
	49.9	15			
	52.6	17			
	49.9	19			
	48.5	20			
	49.2	23			
	51.9	24			

St. John's 1972

D BASELINES (RUSKA)		Table 64		SCALE VALUES γ/mm		
Adopted		Observed		Adopted		Observed
JUNE						
-26° 50.3		-26°49.3	June 6	JUNE	0.97	0.96'/mm
		52.2	9			
		49.7	9			
		51.0	10			
		50.7	16			
		49.5	26			
		52.5	23			
		50.6	27			
		51.7	29			
		50.6	29			
JULY						
-26° 50.5		-26°51.0	July 6	JULY	0.97	
		49.1	6			
		52.1	16			
		49.5	16			
		51.6	21			
		49.7	21			
		49.7	28			
		52.3	28			
D BASELINES (AMOS)						
August 1	-26°23.1					
2	21.1					
3-12	17.2					
13-15	16.3					
16-31	13.4					
SEPTEMBER	-26°13.4					
October 1-5	-26°13.4					
6-26	14.8					
27-31	data missing					
November 1-9	data missing	-26°21.6	Nov. 5			
10-30	-26°22.6 to	22.5	12			
	23.1	23.1	17			
		23.6	26			
December 1-28	-26°23.2 to	-26°24.0	Dec. 3			
	-26°23.9	23.5	9			
29-31	23.2	23.4	17			
		24.9	31			

ST. JOHN'S 1972 — Z BASELINES nT (RUSKA) — Table 65 — SCALE VALUES nT /mm

Adopted	Observed		Adopted		Observed
JANUARY					
50602 to 50598	50600	JAN 4	JAN	8.30	8.34
	50599	4			
	50597	10			
	50600	19			
	50599	19			
	50594	24			
	50596	25			
FEBRUARY					
50598 to 50596	50602	FEB 3	FEB	8.30	8.28
	50599	3			
	50601	7			
	50598	7			
	50593	14			
	50596	22			
	50598	26			
	50595	27			
MARCH					
50596 to 50594	50592	MAR 3	MAR	8.30	8.35
	50593	6			
	50591	10			
	50592	11			
	50595	12			
	50590	20			
	50593	21			
	50591	25			
	50592	26			
APRIL					
50594 to 50593	50592	APR 3	APRIL	8.30	8.34
	50594	7			
	50592	10			
	50595	11			
	50594	22			
	50596	23			
	50597	27			
MAY					
50593 to 50590	50597	MAY 4	MAY	8.30	8.34
	50593	4			
	50593	8			
	50593	10			
	50593	15			
	50590	17			
	50590	19			
	50592	20			
	50591	23			
	50592	24			
JUNE					
50590 to 50588	50589	JUNE 8	JUNE	8.30	8.35
	88	9			
	87	9			
	50590	10			
	50589	16			
	50584	16			
	50584	23			
	50581	23			
	50586	29			
	50584	29			

St. John's 1972

Z BASELINES nT (Ruska) Table 65

SCALE VALUES nT/mm

Adopted		Observed		Adopted		Observed
JULY						
50589 to 50590		50588	July 6	JULY	8.30	
		50587	6			
		50589	16			
		50586	16			
		50594	21			
		50592	21			
		50588	28			
		50591	28			
Z BASELINES nT (AMOS)						
AUGUST 1-16	-51					
17-31	-36					
SEPTEMBER	-1					
OCTOBER	-1					
NOVEMBER	-1	-1	Nov. 5			
		-1	12			
		-1	17			
		-1	26			
DECEMBER 1-29	-1	-3	Dec. 4			
30-31	-3	-1	9			
		-1	17			
		-3	31			

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY-ALL DAYS

TABLE 66 ST JOHN S H = 17000 PLUS TABULAR VALUES IN GAMMAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	724	741	751	770	781	786	793	813	807	814	817	828	785	793	785	778
1-2	724	741	750	770	778	774	792	804	805	811	817	830	783	787	784	778
2-3	724	740	749	768	775	772	791	788	800	808	817	828	780	782	781	777
3-4	723	740	748	766	775	777	789	781	798	806	816	828	779	780	779	777
4-5	724	740	747	764	774	767	788	746	788	808	819	828	774	769	777	778
5-6	723	739	746	763	773	780	784	746	794	810	819	830	776	771	778	778
6-7	725	741	748	762	774	766	783	751	798	811	821	829	776	768	780	779
7-8	728	744	750	764	774	766	785	766	804	812	822	832	779	773	782	781
8-9	730	746	751	765	772	767	786	773	805	813	824	834	781	774	784	784
9-10	731	746	753	764	770	769	782	766	803	815	826	835	780	772	784	785
10-11	730	744	749	758	765	760	773	755	795	813	825	834	775	763	779	783
11-12	728	738	742	751	754	753	765	754	783	804	818	831	768	757	770	779
12-13	719	728	735	739	745	745	757	747	773	790	809	827	760	749	759	771
13-14	711	723	726	732	742	743	752	744	771	781	803	822	754	745	752	764
14-15	706	716	722	733	747	747	755	748	776	778	799	820	754	749	752	760
15-16	704	717	722	740	759	759	765	760	788	785	800	822	760	761	759	761
16-17	710	724	729	751	773	775	780	783	801	794	811	827	771	778	769	768
17-18	720	733	742	766	787	787	795	805	812	808	818	830	784	794	782	775
18-19	725	742	753	777	801	802	804	817	824	817	823	833	793	806	793	781
19-20	728	746	760	782	809	814	812	823	834	820	824	837	799	815	799	784
20-21	732	748	763	783	805	813	811	820	824	821	821	836	798	812	798	784
21-22	731	747	762	780	795	808	809	824	815	823	823	834	796	809	795	784
22-23	729	745	757	776	789	803	803	825	815	821	822	831	793	805	792	782
23-24	726	742	752	772	785	792	798	814	808	818	820	829	788	797	787	779
MEANS	723	738	746	762	775	776	786	781	801	808	817	830	779	780	779	777

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION-ALL DAYS

TABLE 67 ST JOHN S D = 333.0 DEGREES PLUS TABULAR VALUES IN MINUTES 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	36.1	35.4	38.2	38.1	39.2	39.9	41.0	39.2	38.3	36.6	43.4	44.7	39.2	39.8	37.8	39.9
1-2	36.6	36.2	38.1	38.3	39.3	40.4	40.9	38.9	38.1	36.7	43.4	44.9	39.3	39.8	37.8	40.3
2-3	36.2	36.1	38.0	38.2	39.4	40.0	40.8	37.9	37.9	36.7	43.1	44.6	39.1	39.5	37.7	40.0
3-4	35.9	35.5	37.5	38.6	39.5	40.9	40.7	37.0	37.6	36.3	42.2	44.3	38.8	39.5	37.5	39.5
4-5	34.7	35.1	37.7	39.1	39.6	40.7	41.1	36.1	38.3	36.9	41.9	44.3	38.8	39.4	38.0	39.0
5-6	34.4	35.0	37.8	39.3	40.1	40.4	40.7	38.2	39.3	36.7	42.1	43.7	39.0	39.9	38.3	38.8
6-7	34.6	35.3	38.0	39.8	40.7	40.3	40.9	40.5	40.1	37.1	42.2	44.1	39.5	40.6	38.8	39.1
7-8	35.0	35.8	38.2	40.6	41.6	41.5	42.2	41.2	40.7	37.7	42.3	44.4	40.1	41.6	39.3	39.4
8-9	35.1	36.2	38.3	41.2	42.9	43.3	44.6	42.2	40.4	37.0	42.7	45.0	40.7	43.2	39.2	39.7
9-10	35.1	36.2	38.5	41.8	44.6	45.5	46.5	43.6	40.9	36.5	43.0	44.4	41.4	45.0	39.4	39.7
10-11	34.7	35.9	39.7	42.4	46.0	46.9	47.6	43.0	41.1	37.0	43.1	43.7	41.8	45.9	40.1	39.3
11-12	35.6	36.7	40.5	42.3	45.5	46.7	47.3	43.8	40.2	37.9	43.3	43.9	42.0	45.8	40.2	39.9
12-13	35.8	36.8	39.5	41.3	43.5	45.4	45.7	42.5	38.0	37.3	43.1	44.5	41.1	44.3	39.0	40.1
13-14	34.7	35.7	37.6	38.8	40.3	42.6	43.0	39.6	36.1	35.8	41.5	43.8	39.1	41.4	37.1	38.9
14-15	32.0	33.4	34.9	35.9	37.2	39.1	39.6	36.8	33.8	33.7	38.7	42.1	36.4	38.2	34.6	36.5
15-16	30.1	31.2	32.2	33.0	34.3	36.1	36.2	34.2	32.2	31.7	36.1	40.5	34.0	35.2	32.3	34.5
16-17	28.7	29.6	30.0	31.2	32.4	33.8	34.2	32.5	32.2	30.6	35.8	39.4	32.5	33.2	31.0	33.4
17-18	28.6	28.8	29.4	30.9	32.2	32.9	33.6	32.9	33.2	30.9	36.5	39.3	32.4	32.9	31.1	33.3
18-19	29.3	29.7	30.3	32.2	33.5	33.9	34.5	34.7	34.8	32.1	37.7	40.3	33.6	34.2	32.3	34.3
19-20	30.7	31.3	32.0	33.8	35.4	35.6	36.3	36.7	36.4	33.5	38.5	41.5	35.2	36.0	34.0	35.5
20-21	32.7	32.6	34.1	35.7	37.0	37.2	38.4	38.4	37.1	34.6	40.1	42.3	36.7	37.8	35.4	36.9
21-22	33.3	33.3	34.9	37.0	38.5	38.8	40.1	39.7	37.4	35.1	41.1	43.0	37.7	39.3	36.1	37.7
22-23	34.0	33.8	35.5	37.7	38.5	39.2	40.9	39.2	37.9	35.3	41.9	43.6	38.1	39.4	36.6	38.3
23-24	35.3	34.8	35.8	37.6	39.0	39.2	41.2	38.6	38.3	35.8	43.4	44.0	38.6	39.5	36.9	39.4
MEANS	33.7	34.2	36.1	37.7	39.2	40.0	40.7	38.6	37.5	35.4	41.1	43.2	38.1	39.6	36.7	38.1

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY-ALL DAYS

TABLE 68 ST JOHN S Z = 50500 PLUS TABULAR VALUES IN GAMMAS 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0-1	253	252	244	240	236	236	230	221	229	225	230	225	235	231	234	240
1-2	249	248	239	234	234	222	226	214	226	224	224	223	230	224	231	236
2-3	244	245	237	232	226	215	223	202	216	219	215	223	225	216	226	232
3-4	246	244	232	227	226	210	218	186	214	215	212	222	221	210	222	231
4-5	247	245	230	227	225	212	217	177	203	219	216	223	220	208	220	233
5-6	247	244	231	228	226	212	216	170	210	219	211	224	220	206	222	232
6-7	246	244	235	229	227	211	216	181	221	215	215	220	222	209	225	231
7-8	246	242	237	228	229	208	219	207	225	217	218	221	225	216	227	232
8-9	245	244	240	226	228	214	221	221	225	218	214	223	227	221	227	231
9-10	247	243	242	226	222	216	220	219	224	218	222	222	227	219	228	234
10-11	247	243	238	223	222	213	214	212	221	220	223	221	225	215	225	234
11-12	245	239	233	222	220	216	214	221	221	217	224	220	224	218	223	232
12-13	239	235	232	223	222	220	216	224	225	217	221	217	224	220	224	228
13-14	237	236	232	228	228	228	222	230	230	219	222	215	227	227	227	228
14-15	243	240	237	238	236	236	230	237	238	224	225	218	233	235	234	232
15-16	253	249	246	247	248	249	239	251	243	231	234	223	243	247	242	240
16-17	263	255	255	254	256	259	247	261	249	236	242	229	250	255	249	247
17-18	267	261	261	259	258	261	250	262	253	241	246	232	254	257	253	252
18-19	268	263	262	259	256	260	249	259	255	241	245	232	254	256	255	252
19-20	265	259	262	258	256	258	247	253	254	245	244	231	253	254	255	250
20-21	258	256	261	256	256	254	242	247	249	242	238	229	249	250	252	245
21-22	256	255	258	253	250	250	239	249	244	238	236	229	246	247	248	244
22-23	255	255	253	247	246	248	236	242	239	237	235	227	243	243	244	243
23-24	252	254	248	243	240	242	232	234	232	232	230	226	239	237	239	241
MEANS	251	248	244	238	236	231	228	224	231	226	227	224	234	230	235	237

TABLE 69

Annual Mean Values (St. John's)

Year	D		H	Z	X*	Y*	I(N)*		F*
	o	'	nT	nT	nT	nT	o	'	nT
1968.8	333	02.2	17436	50769	15541	-7906	71	02.7	53680
1969.5	333	09.9	17503	50777	15619	-7901	70	58.8	53709
1970.5	333	16.7	17598	50788	15719	-7913	70	53.3	53750
1971.5	333	28.5	17687	50761	15825	-7899	70	47.4	53754
1972.5	333	37.9	17779	50734	15929	-7896	70	41.3	53759

*X,Y,I and F are derived from annual means of D,H,Z.

VICTORIA

Officer-in-charge: B. Caner
Assistant: D.R. Auld

The Victoria Magnetic Observatory was established in 1957 on the grounds of the Dominion Astrophysical Observatory (now National Research Council) on Little Saanich Mountain about 16 km north of Victoria, British Columbia. The observatory is situated, some 185 m above mean sea level, in a wooded area about 120 m northeast of the Dominion Astro-physical Observatory office building. The site was chosen in 1956 for convenience to observatory facilities and power, whilst maintaining adequate separation from buildings and pipelines.

The mailing address of Victoria magnetic observatory is:

Victoria Magnetic Observatory
R.R. #7,
5071 West Saanich Road
Victoria, British Columbia
V8X 3X3

Observatory site

The area is underlain by acid intrusive rocks of Mesozoic age. A survey was made in 1956, using a 7.5 m grid separation of stations, to determine the vertical magnetic field intensity gradients. This revealed an average station difference, independent of sign, of 25 nT $\pm$ 20 nT standard deviation in any one difference. No large anomalies exceeding 25 nT were found within 30 m of the building site and the distribution of small anomalies was apparently random. Beyond this distance to the southeast a decrease of 50 nT was noted. The building site was therefore chosen for its flatness and convenience. To the east the ground falls rather steeply.

Magnetic equipment

The AMOS H fluxgate sensor was found to be defective in April, and a new sensor and Helmholtz-coil system were installed.

Absolute instruments

In March 1968 a GSI precise (first order) magnetometer, following the rotating coil design of Dr. I. Tsubokawa and manufactured by Sokkisha Limited, Japan, replaced the portable fluxgate magnetometer for the determination of declination and inclination. A proton precession magnetometer manufactured by Presentey Engineering Products (Model PPM-1) was used for measurement of total force.

Additional magnetic equipment in operation at Victoria is described in the introductory section of the annual report.

Magnetic reductions

As of 1962 data has been processed on the semi-automatic magnetogram reader[9], with output directly to computer cards. Direct photo-offset reproduction of the computer output sheets was used for the observatory year-books. The data is available on tab cards, and duplicate decks can be supplied to interested agencies.

Parameters for Ruska data reduction

Temperature corrections

H: + 9 nT per mm change of temperature trace relative to the adopted reference level, when temperature is greater than reference level;

- 7 nT per mm change of temperature trace when temperature is less than the reference level.

Z: - 2 nT per mm change of temperature trace.

The temperature reference levels, expressed in terms of the deflection of the temperature trace relative to the Z baseline, are listed below.

Jan 1 (0000) - May 11 (1628)	:	5.0 mm
May 11 (1628) - Oct 12 (1607)	:	13.3 mm
Oct 12 (1607) - Dec 31 (2400)	:	4.4 mm

Baselines and scale values

The observed and adopted baselines and scale values for 1972 are listed in Tables 70-72.

Summary of mean values

A summary by month, season and year of the mean hourly values for all days in 1972, and a list of the annual mean values, are given in Tables 73-76.

VICTORIA Table 70 1972

D Baselines °'				D Scale Values '/mm		
Adopted			Observed		Adopted	Observed
Jan. 1 (0000) - Jan. 15 (2400)	22°	9.0	Jan. 4	22° 9.5	Jan.	0.94	0.93
Jan. 16 (0000) - Jan. 31 (2400)	22°	9.2	14	22° 9.5			
			24	22° 9.5			
			31	22° 9.6			
Feb. 1-28	22°	9.4	Feb. 11	22° 9.6	Feb.	0.94	0.94
			16	22° 10.0			
			25	22° 9.7			
Mar. 1-31	22°	9.4	Mar. 6	22° 9.6	Mar.	0.94	0.94
			15	22° 9.6			
			30	22° 9.5			
Apr. 1-30	22°	9.4	Apr. 11	22° 9.4	Apr.	0.94	0.95
			17	22° 9.5			
			28	22° 9.2			
May 1-31	22°	9.4	May 5	22° 9.8	May	0.94	0.95
			18	22° 9.6			
			29	22° 9.4			
			31	22° 9.4			
June 1-30	22°	9.4	June 13	22° 9.8	June	0.94	0.94
			19	22° 10.0			
			23	22° 9.4			
			29	22° 9.9			
July 1-31	22°	9.4	July 10	22° 9.4	July	0.94	0.94
			27	22° 9.4			
			31	22° 9.4			

D Baselines °'					D Scale Values '/mm		
Adopted			Observed		Adopted		Observed
Aug. 1-31	22°	9.4	Aug. 3	22° 9.2	Aug.	0.94	0.94
			18	22° 9.5			
			24	22° 9.4			
			30	22° 10.1			
Sept. 1-30	22°	9.4	Sept. 8	22° 9.4	Sept.	0.94	0.94
			29	22° 9.3			
Oct. 1 (0000) - Oct. 1 (2400)	22°	9.4	Oct. 6	22° 9.8	Oct.	0.94	0.93
Oct. 2 (0000) - Oct. 31 (2400)	22°	9.8	20	22° 9.5			
			26	22° 10.0			
Nov. 1 (0000) - Nov. 16 (2400)	22°	9.8	Nov. 6	22° 9.8	Nov.	0.94	0.95
Nov. 17 (0000) - Nov. 30 (2400)	22°	10.3	17	22° 9.8			
			23	22° 9.3			
			27	22° 9.5			
Dec. 1-31	22°	10.3	Dec. 14	22° 9.7	Dec.	0.94	0.94
			18	22° 9.7			
			29	22° 9.6			

H Baselines nT				H Scale Values nT/mm		
Adopted		Observed		Adopted		Observed
Jan. 1-31	18916	Jan. 4	18916	Jan.	2.33	2.32
		14	18912			
		24	18915			
		31	18912			
Feb. 1-28	18916	Feb. 11	18914	Feb.	2.33	2.35
		16	18911			
		25	18914			
Mar. 1-31	18916	Mar. 6	18912	Mar.	2.33	2.33
		15	18914			
		30	18915			
Apr. 1-30	18916	Apr. 11	18915	Apr.	2.33	2.30
		17	18912			
		28	18916			
May 1 (0000) - May 11 (1628)	18916	May 5	18912	May 1 (0000) - May 11 (1628)	2.33	2.31
May 11 (1628) - May 31 (2400)	18982	18	18984	May 11 (1628) - May 31 (2400)	2.25	2.22
		29	18984			
		31	18985			
June 1-30	18982	June 13	18981	June	2.25	2.25
		19	18981			
		23	18983			
		29	18984			
July 1-31	18982	July 10	18981	July	2.25	2.26
		27	18988			
		31	18979			

VICTORIA

Table 71

1972

H Baselines nT

Adopted		Observed	
Aug. 1-31	18982	Aug. 3	18982
		18	18978
		24	18981
		30	18981
Sept. 1-30	18982	Sept. 8	18980
		29	18978
Oct. 1 (0000) - Oct. 12 (1607)	18982	Oct. 6	18976
Oct. 12 (1607) - Oct. 31 (2400)	18901	20	18899
		26	18902
Nov. 1 (0000) - Nov. 11 (0010)	18901	Nov. 6	18899
Nov. 11 (0010) - Nov. 30 (2400)	18963	17	18965
		23	18962
		27	18962
Dec. 1-31	18963	Dec. 14	18965
		18	18963
		29	18964

H Scale Values nT

Adopted		Observed
Aug.	2.25	2.27
Sept.	2.25	2.24
Oct. 1 (0000) - Oct. 12 (1607)	2.25	2.28
Oct. 12 (1607) - Oct. 31 (2400)	2.36	2.37
Nov. 1 (0000) - Nov. 11 (0010)	2.36	2.34
Nov. 11 (0010) - Nov. 30 (2400)	2.28	2.26
Dec. 1-31	2.28	2.28

Z Baselines nT				Z Scale Values nT/mm		
Adopted		Observed		Adopted		Observed
Jan. 1-31	53052	Jan. 4	53049	Jan.	4.12	4.13
		14	53051			
		24	53052			
		31	53052			
Feb. 1-28	53052	Feb. 11	53053	Feb.	4.12	4.15
		16	53050			
		25	53052			
Mar. 1-31	53052	Mar. 6	53053	Mar.	4.12	4.15
		15	53049			
		30	53051			
Apr. 1-30	53052	Apr. 11	53054	Apr.	4.12	4.08
		17	53054			
		28	53051			
May 1 (0000) - May 11 (1628)	53052	May 5	53053	May 1 (0000) - May 11 (1628)	4.12	4.14
May 11 (1628) - May 31 (2400)	53035	18	53037	May 11 (1628) - May 31 (2400)	3.95	
		29	53033			
		31	53033			
June 1-30	53035	June 13	53036	June	3.95	3.97
		19	53036			
		23	53037			
		29	53034			
July 1-31	53035	July 10	53035	July	3.95	3.99
		27	53035			
		31	53035			

Z Baselines nT				Z Scale Values nT/mm		
Adopted		Observed		Adopted		Observed
Aug. 1-31	53035	Aug. 3	53034	Aug.	3.95	3.92
		18	53037			
		24	53036			
		30	53033			
Sept. 1-30	53035	Sept. 8	53037	Sept.	3.95	3.93
		29	53036			
Oct. 1 (0000) - Oct. 12 (1607)	53035	Oct. 6	53038	Oct. 1 (0000) - Oct. 12 (1607)	3.95	3.97
Oct. 12 (1607) - Oct. 31 (2400)	53049	20	53050	Oct. 12 (1607) - Oct. 31 (2400)	4.18	4.13
		26	53050			
Nov. 1-30	53049	Nov. 6	53046	Nov.	4.18	4.18
		17	53047			
		23	53048			
		27	53050			
Dec. 1-31	53049	Dec. 14	53047	Dec.	4.18	4.17
		18	53048			
		29	53047			

MEAN VALUES OF MAGNETIC ELEMENTS

HORIZONTAL INTENSITY in nT (ALL DAYS)

TABLE 73 VICTORIA H = 18,500 NANOTESLAS+ 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0- 1	480	479	481	491	498	500	494	491	491	489	489	496	490	496	488	486
1- 2	481	481	481	492	494	505	495	494	490	486	489	497	490	497	487	487
2- 3	478	482	483	494	492	505	495	492	490	487	490	496	490	496	489	487
3- 4	479	481	483	491	492	493	494	494	489	487	490	494	489	493	488	486
4- 5	478	483	482	491	493	489	494	491	491	487	486	494	488	492	488	485
5- 6	479	482	482	492	494	488	494	489	490	485	485	493	488	491	487	485
6- 7	477	481	483	493	496	487	495	489	492	487	485	491	488	492	489	484
7- 8	476	481	484	494	498	488	497	488	494	487	482	491	488	493	490	483
8- 9	477	481	487	496	500	488	497	488	495	488	481	493	489	493	492	483
9-10	477	483	491	496	500	491	499	490	494	490	478	495	490	495	493	483
10-11	478	482	491	496	501	489	500	491	496	493	489	495	492	495	494	486
11-12	479	483	492	497	500	488	501	488	498	494	488	497	492	494	495	487
12-13	481	487	492	498	501	493	504	486	500	497	490	498	494	496	497	489
13-14	483	488	493	498	503	495	507	488	501	498	492	499	495	498	498	491
14-15	482	486	492	497	502	498	509	486	499	496	496	500	495	499	496	491
15-16	480	487	488	491	496	494	505	483	490	492	491	499	491	495	490	489
16-17	479	485	483	483	490	489	497	476	480	487	491	500	487	488	483	489
17-18	474	476	477	473	484	481	485	468	471	480	483	497	479	480	475	483
18-19	465	468	466	469	481	478	480	461	465	473	478	492	473	475	468	476
19-20	458	462	459	469	478	477	477	460	466	468	471	484	469	473	466	469
20-21	457	459	457	472	482	478	478	466	474	472	469	480	470	476	469	466
21-22	462	459	461	476	484	480	483	469	482	478	472	480	474	479	474	468
22-23	470	464	466	481	488	486	488	485	488	484	479	486	481	487	480	475
23-24	475	472	476	486	491	489	491	485	489	485	482	490	484	489	484	480
MEAN	475	478	480	488	493	489	494	483	488	486	484	493	486	490	486	483

MEAN VALUES OF MAGNETIC ELEMENTS

DECLINATION (MINUTES) (ALL DAYS)

TABLE 74 VICTORIA D = 22 DEG 00.0 MIN EAST + 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0- 1	18.5	17.8	15.9	15.2	14.4	13.7	14.9	15.0	16.4	16.1	16.8	16.6	16.0	14.5	15.9	17.4
1- 2	19.4	18.4	17.0	16.2	16.1	15.1	16.1	15.8	16.8	16.4	17.2	17.1	16.8	15.8	16.6	18.0
2- 3	20.2	19.3	17.7	17.4	17.9	17.2	17.2	16.8	17.3	17.0	18.1	17.7	17.8	17.3	17.4	18.8
3- 4	20.5	19.8	18.5	18.1	18.6	18.7	17.8	17.7	18.5	18.1	18.9	18.4	18.6	18.2	18.3	19.4
4- 5	21.3	20.4	19.2	18.7	18.8	19.3	18.3	20.1	19.4	18.2	19.3	18.4	19.3	19.1	18.9	19.8
5- 6	21.3	20.7	20.3	19.3	18.9	19.3	18.7	20.0	17.8	18.8	19.1	18.5	19.4	19.2	19.0	19.9
6- 7	21.3	21.0	20.6	19.7	18.8	19.4	18.7	19.4	18.4	18.7	19.8	18.8	19.5	19.1	19.3	20.2
7- 8	21.3	20.7	20.6	19.8	18.7	19.3	18.5	18.5	17.8	18.1	18.8	18.9	19.3	18.8	19.1	19.9
8- 9	20.8	20.5	20.4	20.4	19.1	19.3	18.3	19.0	18.2	18.9	18.9	18.4	19.4	18.9	19.5	19.6
9-10	20.3	20.3	20.7	21.0	19.1	19.0	18.1	18.9	18.9	19.5	17.7	18.0	19.3	18.8	20.0	19.1
10-11	20.5	21.0	21.1	21.0	19.1	18.6	18.3	18.8	19.2	20.1	18.5	17.8	19.5	18.7	20.4	19.5
11-12	20.9	21.3	21.3	21.1	19.2	18.4	19.2	18.8	19.2	19.2	18.2	18.3	19.6	18.9	20.2	19.7
12-13	20.3	20.8	20.9	21.3	20.4	19.9	20.2	19.6	20.0	18.0	18.2	18.7	19.9	20.0	20.0	19.5
13-14	19.8	20.9	20.8	21.9	21.9	21.5	21.8	20.4	21.0	18.4	17.9	17.6	20.3	21.4	20.5	19.0
14-15	20.1	20.6	21.4	23.1	23.6	23.3	23.9	22.3	22.5	18.9	18.4	18.1	21.3	23.3	21.5	19.3
15-16	20.4	21.4	22.7	24.1	25.1	25.0	25.3	24.2	23.7	19.6	18.8	18.1	22.4	24.9	22.5	19.7
16-17	21.4	23.4	23.7	24.6	25.3	25.6	25.7	25.6	23.9	21.2	19.7	18.7	23.2	25.6	23.3	20.8
17-18	22.4	24.0	24.2	23.7	23.9	24.5	24.1	24.4	22.0	21.2	19.8	19.0	22.8	24.2	22.8	21.3
18-19	22.3	22.9	23.0	21.3	21.5	21.3	20.9	21.3	19.2	20.0	18.9	18.7	21.0	21.3	20.9	20.7
19-20	21.0	21.2	20.5	18.4	18.4	18.4	17.2	17.8	16.1	17.1	17.5	18.1	18.5	18.0	18.0	19.5
20-21	19.6	19.3	18.7	16.7	15.4	15.6	14.2	15.5	14.4	15.5	16.8	17.2	16.6	15.2	16.3	18.4
21-22	18.1	18.4	17.3	15.3	13.9	13.7	12.6	14.9	13.8	14.9	15.9	16.1	15.4	13.8	15.3	17.1
22-23	17.6	17.4	16.2	14.6	13.1	12.9	12.5	14.4	14.2	14.9	16.0	15.9	15.0	13.2	15.0	16.7
23-24	18.0	16.8	15.5	14.6	13.1	12.9	13.3	13.7	15.3	15.4	16.1	15.8	15.1	13.3	15.2	16.7
MEAN	20.3	20.4	19.9	19.5	18.9	18.8	18.6	18.9	18.5	18.1	18.1	17.9	19.0	18.8	19.0	19.2

MEAN VALUES OF MAGNETIC ELEMENTS

VERTICAL INTENSITY in nT (ALL DAYS)

TABLE 75 VICTORIA Z = 53,000 NANOTESLAS+ 1972

U.T.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	SUMMER	EQUINOX	WINTER
0- 1	101	98	97	93	94	101	94	105	89	84	84	75	93	99	91	90
1- 2	102	100	100	96	98	108	97	106	88	86	85	75	95	102	93	91
2- 3	103	100	102	98	98	111	98	109	91	89	89	76	97	104	95	92
3- 4	104	101	103	98	95	103	95	109	95	91	96	76	97	101	97	94
4- 5	104	101	104	98	92	97	95	116	93	90	92	77	96	100	96	94
5- 6	104	100	104	97	91	91	91	113	86	89	88	76	94	97	94	92
6- 7	102	100	102	94	90	87	89	106	88	88	80	77	92	93	93	90
7- 8	101	99	98	92	89	83	87	96	84	83	76	75	89	89	89	88
8- 9	99	97	95	88	85	76	88	92	81	79	69	74	85	85	86	85
9-10	97	94	92	85	82	78	86	82	79	71	62	70	81	82	82	81
10-11	93	92	90	83	84	72	84	75	79	70	62	66	79	79	80	78
11-12	91	89	86	80	83	73	85	77	78	71	63	65	79	80	79	77
12-13	89	86	83	78	85	77	88	86	77	69	66	66	79	84	77	77
13-14	86	86	88	79	85	77	88	88	79	70	69	65	80	85	79	77
14-15	85	87	90	81	84	79	89	90	81	76	73	67	82	86	82	78
15-16	86	89	92	81	82	79	86	88	81	78	73	69	82	84	83	79
16-17	91	94	90	81	78	76	83	89	81	80	75	71	82	82	83	83
17-18	93	93	87	77	72	70	78	84	75	78	73	69	79	76	79	82
18-19	93	90	82	75	67	62	71	79	73	73	72	68	75	70	76	81
19-20	94	88	81	75	65	61	67	77	74	71	71	67	74	68	75	80
20-21	95	89	93	78	69	65	68	82	78	73	73	68	77	71	78	81
21-22	96	89	86	81	74	70	72	87	81	76	76	69	80	76	81	83
22-23	97	92	89	85	79	77	79	98	85	80	79	72	84	83	85	85
23-24	98	94	93	88	86	86	87	100	87	82	81	73	88	90	88	87
MEAN	96	94	92	86	84	82	85	93	83	79	76	71	85	86	85	84

TABLE 76

Summary of Annual Mean Values (Victoria)

Year	D East		H	Z	X*	Y*	I*		F*
	°	'	nT	nT	nT	nT	°	'	nT
1956.6	23	00.2	18689	53427	17203	7303	70	43.2	56601
1957.75	22	57.1	18703	53408	17224	7294	70	41.9	56589
1958.5	22	55.2	18713	53396	17236	7288	70	41.2	56580
1959.5	22	52.8	18736	53377	17262	7284	70	39.5	56570
1960.5	22	50.3	18748	53362	17278	7277	70	38.5	56560
1961.5	22	47.8	18787	53322	17319	7279	70	35.5	56535
1962.5	22	44.4	18804	53288	17342	7268	70	33.8	56508
1963.5	22	41.4	18814	53264	17358	7257	70	32.7	56489
1964.5	22	38.6	18837	53239	17385	7252	70	30.9	56473
1965.5	22	36.0	18860	53205	17412	7248	70	28.9	56449
1966.5	22	34.2	18873	53179	17428	7244	70	27.6	56429
1967.5	22	31.7	18888	53157	17447	7237	70	26.3	56413
1968.5	22	29.4	18902	53138	17464	7230	70	25.1	56400
1969.5	22	27.4	18923	53127	17488	7228	70	23.7	56396
1970.5	22	24.8	18946	53117	17515	7224	70	22.2	56395
1971.5	22	21.8	18971	53099	17544	7218	70	20.4	56386
1972.5	22	19.0	18986	53085	17564	7209	70	19.2	56378

*X,Y,I,F are derived from annual means of D,H,Z.

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