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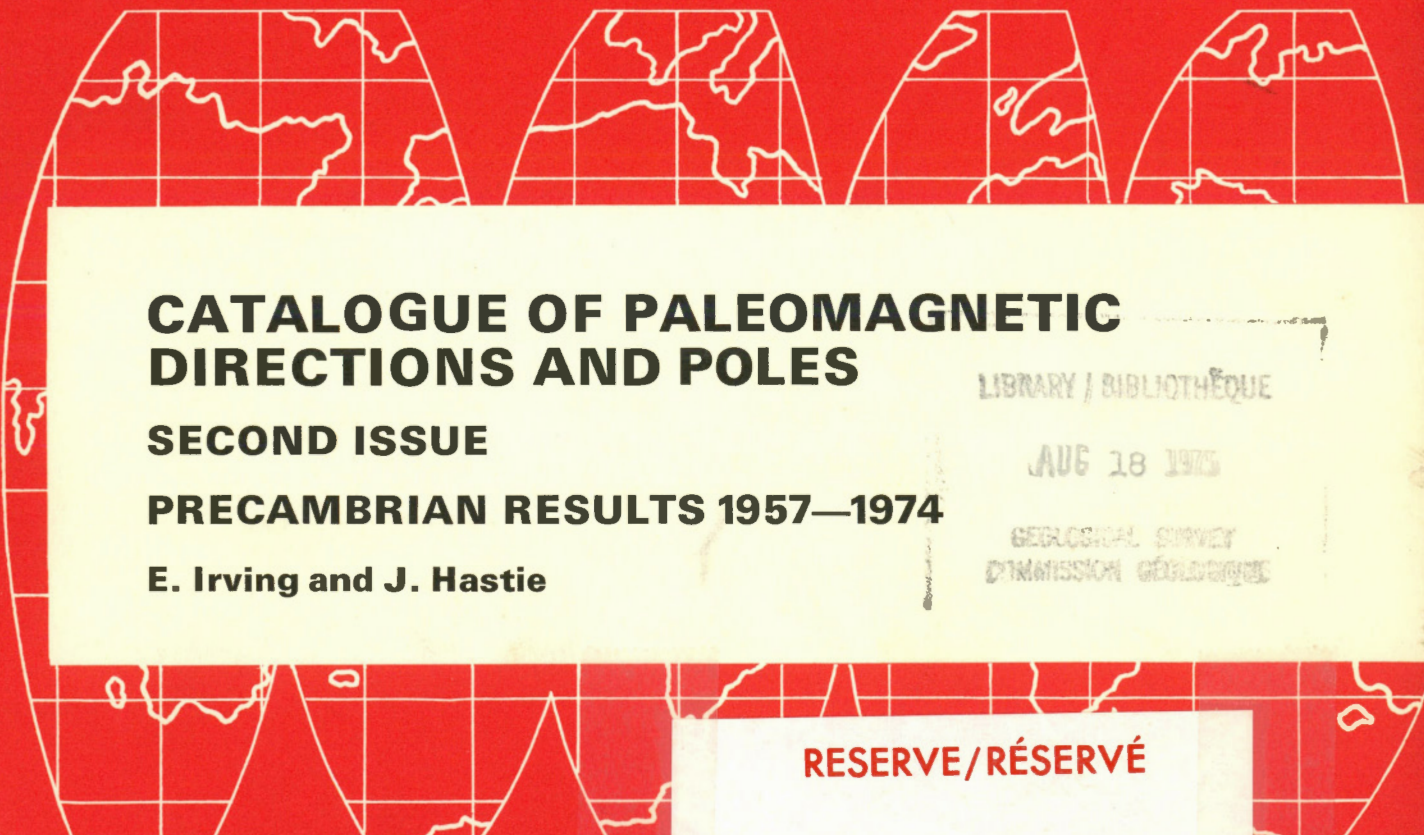

CATALOGUE OF PALEOMAGNETIC DIRECTIONS AND POLES

SECOND ISSUE

PRECAMBRIAN RESULTS 1957—1974

E. Irving and J. Hastie

Geomagnetic Series Number 3
Ottawa, Canada 1975

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Contents

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SECOND ISSUE

PRECAMBRIAN RESULTS 1957—1974

Introduction

The paleomagnetic results from Precambrian rocks are presented as a table, with explanatory notes and bibliography, following the style and numbering system used in the appendix to the book *Paleomagnetism* (Irving, 1964) and in our first issue of this catalogue (Hicken *et al.*, 1972). The compilation is approximately complete up to 1974. In future issues the Phanerozoic results will be compiled. The explanatory notes and bibliography of *Paleomagnetism* and our first issue are not repeated, but the data themselves are relisted. Anyone having this catalogue together with copies of our first issue and the appendix to *Paleomagnetism* has a ready access to all Precambrian data and to the bibliography. Copies of our first issue can be obtained upon request from Mrs. Hastie. The data are tabulated by regions, the regions being arranged in this order: Africa, Antarctica, Australia, Asia excluding the USSR, Europe excluding the USSR, North America, South America, and the USSR. Within each region the entries are arranged in some convenient geographical order which can be determined by running the finger down columns 3 and 4, for example the Russian data are listed so that the sampling localities are arranged from west to east, results from the Baltic Shield first. A limited number of listings arranged alphabetically by the names of rock units, numerically by the Ottawa catalogue numbers, and by Geophysical Journal numbers are available and may be obtained from Mrs. Hastie.

The columns contain the following information. Zeros indicate that no information is available.

Column 1 contains the Ottawa catalogue number. In this issue the first digit is always unity, which simply means that the results are from Precambrian rocks. The remaining digits are accession numbers of no special significance, except that the older data have generally smaller numbers than more recent data.

Column 2 contains the name of the rock unit and the country.

Columns 3 and 4 contain the geographical coordinates of the sampling area. If the area is large the mean position is quoted. If the coordinates have not been given in the original, they have, where possible, been read from standard atlases and gazetteers.

Column 5 gives the number of collecting sites.

Column 6 gives the number of samples on which results are based. It is sometimes not possible to determine from the original whether this is the number of independent samples or the number of specimens cut from fewer samples, and subjective judgments have sometimes had to be made.

Column 7 gives the laboratory treatment. *N* means that the result is based on observations of natural remanent magnetization. *A* means that the samples have been partially demagnetized in alternating magnetic fields. *T* means that the samples have been partially demagnetized by heating followed by cooling in zero field. *X* is *A+T*. *Y* is *N+A*. *Z* is *N+T*. *V* is *L+T*. *W* is *N+A+T*. *L* means that acid leaching has been carried out, and *G* that acid leaching and other demagnetizing techniques have been used. Sometimes geometrical techniques have been used to correct for partial instability (for example the frequent use by Russian workers of "the intersections of remagnetization great circles") and users should consult the notes and originals for details.

Column 8 contains a reliability index. *A(B)* indicates that the result does (does not) fulfil certain MINIMUM reliability criteria. This does NOT mean that results in category *A* are necessarily reliable indicators of the ancient geomagnetic field. The purpose of these criteria is to provide a first-order filter, by which those results which can, on common sense grounds, be considered of little use for tracing the past history of the field, may be separated from the main body of the data. The minimum reliability criteria are a little simpler than those used by us previously and are as follows:

(1) No result is placed in the *A* category unless it is based on consistent observations from 10 or more separately oriented samples. Results based on fewer than 10 samples are placed in the *B* category whatever the stratigraphic distribution of samples and however many specimens were cut from them. If the number of samples is not stated in the source reference then the result is automatically placed in *B*.

(2) No result is placed in the *A* category unless the error in the mean direction (column 13) is 20° or less. Results with larger errors are entered in *B*.

We wish to emphasize that these are only MINIMUM reliability criteria. Removal of the *B* data provides a first-order filtering of the data which is rather more rigorous than that used by Irving (1964) in *Paleomagnetism* who used 5 samples as a demarcation criterion, and by McElhinny (1972) in *Paleomagnetism and Plate Tectonics* who used 8 samples. Users of this catalogue should be prepared to take account of the very wide variability in the quality of results, which can only be fully appreciated after reading the sources.

Column 9 contains the percentage of reversed polarizations observed. If the entry is zero then all the magnetizations are normal. See notes to columns 14 and 15 below.

Columns 10 and 11 contain an estimate of the mean direction of magnetization. The declination D is reckoned clockwise east from geographic north, and I the inclination, is regarded as negative if the direction is upward, and positive when below the horizontal. For rock units in which the beds are undisturbed, the horizontal is the present-day horizontal, but if the beds have been tilted, the horizontal is assumed to be the bedding plane, which, in the case of igneous rocks, is obtained from adjacent sediments. In metamorphic terrain, which was magnetized during cooling and uplift and after deformation, the present horizontal plane is the usual plane of reference. Exceptions are explained in the notes. If the results contain directions of both polarities, then the mean, irrespective of sign, is given.

Column 12 contains Fisher's precision k (Fisher, 1953) to the nearest whole number, where $k=(N-1)\ (N-R)^{-1}$ and R the resultant of N directions each given unit weight. The standard deviation θ_{63} is given by $\theta_{63}=81k^{-1/2}$ degrees approximately. Another useful approximation for the standard deviation (δ) is given by $\delta=\cos^{-1}(R/N)$ (Wilson, 1959). Since N and k are known (N is usually given in the notes) δ and θ_{63} can be easily calculated.

Column 13 contains Fisher's circle of confidence α_{95} (P=0.05). The weighting procedure is generally given in the notes.

Columns 14 and 15 contain the latitude (positive north negative south) and longitude (positive east negative west) of the pole corresponding to the direction given in columns 10 and 11 (Creer *et al.,* 1954, 1957). In Precambrian work it is generally not possible to say with any certainty that a given pole corresponds to the present north geographical pole. In this compilation the poles given are those that can be formed into a reasonable time sequence. These poles are then designated in the regional headings as "possible north poles" or "may be north or south poles" etc. Polarity may then be defined with respect to these, the directions pointing to "possible north (south) poles" being defined as normal (reversed). This is an arbitrary procedure but is all that can be done until Precambrian polar sequences have been confidently reconstructed and linked to their Phanerozoic counterparts. This procedure has only been applied rigorously to the North American data. No attempt has been made to rationalize data from other regions because most (over 50 per cent) of the Precambrian record is from North America, in particular from the Canadian Shield, and a self-consistent scheme can be erected with some degree of confidence, whereas this cannot be said of the records from other Precambrian Shields which are known in less detail.

Columns 16 and 17 contain the precision (K) of site poles and the error A_{95} in mean pole calculated as an average of site poles.

Columns 18 and 19 contain the semi-axes of the polar error ellipse (Irving, 1956).

Column 20 contains the list number of the Geophysical Journal of the Royal Astronomical Society, or the index number given in Russian compilations. The latter have the prefix S.

Regarding the explanatory notes three points need to be mentioned. Firstly the numbers of samples with reversed and normal polarity are sometimes given, for example, 10N,18R meaning 10 normal samples and 18 reversed samples. Secondly the decay constant used to calculate the age of rock units from Rb-Sr isochrons when this has been quoted in the source reference is given in the shorthand form, for example λ=1.39, meaning $\lambda=1.39 \times 10^{-11}\ yr^{-1}$. Thirdly when results may be of Cambrian age cross reference is made to entries with an initial index number 2, which may be found in the third issue of our catalogue.

In Figure 1 a sketch-map of the major Precambrian Shields of the world is given showing the paleomagnetic data available from them to about August 1974. About half the data are from the Laurentian Shield and also the largest number of data based on replicate observations.

We would like to express our thanks to Atulesh Nandi for processing the listings and to Richard Couillard and Pierre Lapointe who helped to access the data.

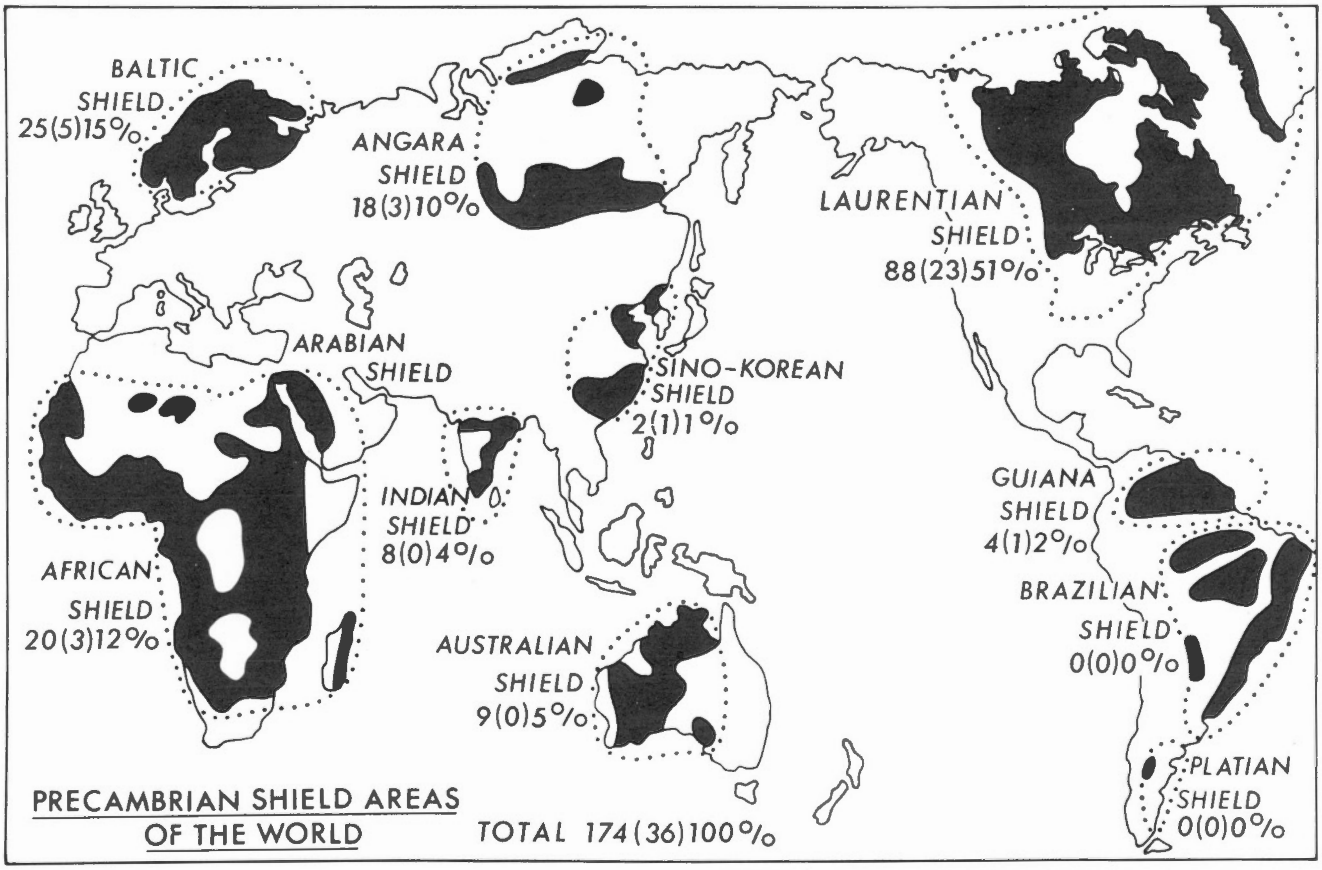

Figure 1. Precambrian Shields of the world and the number of paleomagnetic results available from them. Only *A* data are counted and replicate results from the same rock unit are counted as one. The numbers of results based on two or more studies are given in brackets, followed by the percentage of the total from all regions.

Listing of Data

PRECAMBRIAN OF AFRICA MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	TR	RE	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 217	VENTERSDOP LAVAS SOUTH AFRICA	-28.7	28.4	002	013	X	A	0	211.0	71.5	390	13.0	55.1	174.8	0	0.0	22.0	22.0	09157
1 243	VAN DYKE MINE DYKE SOUTH AFRICA	-26.2	28.2	001	008	A	B	100	158.5	-66.5	140	4.7	12.4	13.9	0	0.0	8.0	7.0	08156
1 6	PILANSBERG DYKES SOUTH AFRICA	-26.0	28.0	005	169	A	A	100	24.0	69.0	124	6.0	8.0	43.0	0	0.0	10.0	9.0	01141
1 128	PREMIER MINE KIMBERLITE S AFRICA	-25.7	28.5	000	016	A	A	0	186.0	-24.5	26	7.0	51.1	37.5	25	7.5	7.9	4.2	10197
1 242	POST WATERBURG DIABASE BOTSWANA	-25.0	28.0	013	090	A	A	0	189.6	2.3	31	8.0	65.0	50.5	87	4.5	0.0	0.0	08155
1 7	BUSHVELD GABBRO SOUTH AFRICA	-25.5	28.0	005	099	N	A	100	11.0	59.0	70	9.0	23.0	36.0	0	0.0	12.0	12.0	01142
1 154	GABERONES GRANITE BOTSWANA	-25.0	25.6	007	019	A	A	100	55.5	-6.5	11	18.0	34.5	103.5	0	16.0	0.0	0.0	09158
1 166	MODIPE GABBRO BOTSWANA	-24.7	26.2	010	036	A	A	70	154.5	85.5	80	5.4	-32.8	30.9	22	10.5	0.0	0.0	08157
1 134	WATERBERG RED BEDS 1 SOUTH AFRICA	-24.0	29.0	002	009	X	B	0	186.0	4.0	0	0.0	67.0	44.0	0	0.0	0.0	0.0	09148
1 135	WATERBERG RED BEDS 2 SOUTH AFRICA	-24.0	29.0	002	009	A	B	0	182.0	-4.5	0	0.0	41.0	33.0	0	0.0	0.0	0.0	09149
1 136	WATERBERG RED BEDS 3 SOUTH AFRICA	-24.0	29.0	004	022	X	A	0	110.0	-48.0	33	16.0	3.0	-27.0	0	0.0	21.0	14.0	09150
1 137	WATERBERG RED BEDS 4 SOUTH AFRICA	-24.0	29.0	001	005	A	B	0	146.0	-70.0	0	0.0	8.0	10.0	0	0.0	0.0	0.0	09151
1 138	WATERBERG RED BEDS 5 SOUTH AFRICA	-24.0	29.0	003	015	X	A	100	17.0	45.0	41	19.0	36.0	48.0	0	0.0	24.0	15.0	09152
1 122	UMKONDO DOLERITE RHODESIA	-19.0	33.0	009	077	A	A	0	182.5	-10.5	50	7.0	65.0	40.0	0	0.0	7.0	4.0	08152
1 123	UMKONDO LAVAS RHODESIA	-20.0	32.0	009	021	A	A	0	172.5	-12.5	13	15.0	62.5	16.0	0	0.0	15.0	8.0	08153
1 124	UMKONDO LAVAS DOL COMBINE RHODESIA	-20.0	33.0	018	098	A	A	0	178.0	-11.5	20	8.0	64.1	28.4	22	7.5	8.0	4.0	08154
1 63	GREAT DYKE 1 RHODESIA	-18.5	30.3	009	090	A	A	0	218.0	-59.0	68	6.0	21.0	62.0	0	0.0	9.0	9.0	07062
1 64	GREAT DYKE 2 RHODESIA	-18.5	30.3	006	010	A	A	0	236.0	-61.0	12	20.0	11.0	69.0	0	0.0	31.0	23.0	07063
1 102	MASHONALAND DOLERITE RHODESIA	-18.5	31.5	014	121	A	A	71	292.0	51.0	40	6.0	7.0	-20.0	28	7.5	0.0	0.0	08151
1 334	SIJARIRA GROUP RHODESIA	-17.5	28.5	009	040	T	A	100	291.0	67.0	9	18.0	2.0	-8.0	0	0.0	30.0	26.0	12149
1 127	NTONYA RING STRUCTURE MALAWI	-15.5	35.5	007	027	A	A	100	313.3	42.8	999	1.9	27.7	-15.1	0	0.0	2.3	1.4	09137
1 253	DEZA MOUNTAIN SYENITE MALAWI	-14.4	34.3	001	001	A	B	100	308.0	41.0	0	0.0	26.6	-19.6	0	0.0	0.0	0.0	10150
1 357	MALAGARASI SANDSTONE TANZANIA	-5.1	30.4	001	012	T	B	100	263.0	-16.0	5	25.0	-7.0	-68.0	0	0.0	25.8	13.3	00000
1 356	GAGWE LAVAS TANZANIA	-4.0	30.5	028	131	A	A	100	239.0	-25.0	5	13.0	-29.0	-77.0	0	0.0	14.2	7.7	00000
1 358	KIGONERA FLAGS TANZANIA	-5.0	30.3	004	020	T	B	100	280.0	-47.0	13	27.0	12.0	-93.0	0	0.0	34.5	22.3	00000
1 359	BUKOBAN SANDSTONE TANZANIA	-2.7	31.4	001	010	T	A	0	132.0	-19.0	7	20.0	40.0	-43.0	0	0.0	21.3	11.1	00000
1 355	BUKOBAN INTRUSIVES TANZANIA	-2.7	31.5	016	076	A	A	19	76.8	32.2	5	19.0	-11.0	-79.0	0	0.0	21.6	12.1	00000

PRECAMBRIAN OF AFRICA MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 360	MANYOVU RED BEDS TANZANIA	-4.6	29.8	005	044	T	B	60	246.0	-2.0	5	39.0	25.0	-118.0	0	0.0	39.7	19.7	00000
1 361	BUKOBAN SEDIMENTS COMBINE TANZANIA	-5.0	30.0	011	084	T	B	73	273.7	-21.9	5	23.8	4.6	-71.0	0	0.0	25.2	13.3	00000
1 362	KISII SERIES KENYA	-4.0	34.8	009	063	A	A	0	99.0	-59.0	24	11.0	6.0	-12.0	15	14.0	16.0	12.0	00000
1 203	RED SANDSTONES 1 MOROCCO	32.0	-7.0	002	006	T	B	0	103.0	33.0	0	55.0	-7.0	70.0	0	0.0	0.0	0.0	09139
1 204	RED SANDSTONES 2 MOROCCO	32.0	-7.0	004	012	T	B	0	135.0	15.0	0	47.0	-32.0	48.0	0	0.0	0.0	0.0	09138
1 424	OBUASI GREENSTONE ASHANTI GHANA	6.2	-1.7	005	074	N	A	0	320.0	26.0	21	19.0	-50.0	102.0	0	0.0	21.0	11.4	00000
1 425	TARKWA DOLERITES GHANA	5.3	-2.0	005	056	A	A	100	156.0	40.0	32	14.0	-53.0	36.0	0	0.0	17.5	10.5	00000
1 426	OBUASI DOLERITE DYKE GHANA	6.2	-1.7	001	014	A	A	0	328.0	-11.0	21	11.0	-56.0	69.0	0	0.0	11.0	5.6	00000
1 427	IVORY COAST DOLERITE IVORY COAST	5.5	-7.2	001	007	A	B	0	281.0	14.0	3	39.0	-11.0	102.0	0	0.0	40.0	2.0	00000
1 477	VREDEFORT RING DYKES SOUTH AFRICA	-27.5	27.5	004	012	A	A	0	0.0	61.0	62	12.0	22.0	27.0	0	1.4	0.0	0.0	12163

PRECAMBRIAN OF ANTARCTICA MAY BE SOUTH OR NORTH POLE

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 401	VESTFOLD DYKES ANTARCTICA	-68.5	78.0	009	009	A	B	0	112.0	-39.0	63	7.5	12.8	-163.8	0	0.0	0.0	0.0	00000

PRECAMBRAIN OF ARCTIC REGIONS MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 55	MULTICOLOURED SERIES GREENLAND	73.0	-25.0	002	010	N	A	100	110.0	36.0	31	9.0	-13.0	-141.0	0	0.0	10.0	5.0	04034
1 56	TILLITE FORMATION GREENLAND	73.0	-25.0	000	016	N	A	100	135.0	16.0	5	18.0	4.0	-161.0	0	0.0	19.0	10.0	04033

PRECAMBRIAN OF AUSTRALIA MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 218	MARINOAN SANDSTONE NORMAL S AUST	-35.1	138.5	004	007	N	B	0	7.0	11.0	35	0.0	49.0	149.0	0	0.0	0.0	0.0	09140
1 219	MARINOAN SANDSTONE REVERSE S AUST	-35.1	138.5	003	007	T	B	100	191.0	39.0	5	0.0	74.0	178.0	0	0.0	0.0	0.0	09141
1 214	MIDDLEBACK RANGES HEMATITE POS SA	-33.0	138.0	000	028	X	A	100	283.0	63.0	12	8.0	15.0	-88.0	6	12.0	0.0	0.0	09145
1 215	MIDDLEBACK RANGES HEMATITE NEG SA	-33.0	138.0	000	013	X	A	0	26.0	-58.0	19	10.0	64.0	-93.0	20	9.0	0.0	0.0	09146
1 216	IRON PRINCE SOUTH AUSTRALIA	-33.0	138.0	000	022	X	A	0	63.0	-46.0	16	8.0	39.0	-113.0	10	9.5	0.0	0.0	09147
1 8	EDITH RIVER VOLCANICS NT	-13.0	132.0	010	010	N	A	0	90.0	48.0	0	18.0	6.0	-14.0	0	0.0	24.0	15.0	01145
1 10	BULDIVA QUARTZITE NORTHERN TERR	-14.0	132.0	000	008	N	B	0	243.0	38.0	0	12.0	30.0	-121.0	0	0.0	14.0	8.0	01143
1 333	HART DOLERITE NORTH TERRITORY	-17.5	127.0	012	036	A	B	83	12.1	2.0	3	31.0	29.0	46.0	0	24.0	0.0	0.0	12162
1 354	GILES COMPLEX WEST AUSTRALIA	-26.0	128.5	000	039	A	A	-0	145.0	-86.0	3	16.0	34.0	-49.0	0	0.0	31.0	31.0	13087
1 9	NULLAGINE LAVAS WEST AUSTRALIA	-21.0	120.0	000	005	N	B	100	143.0	64.0	0	8.0	51.0	-18.0	0	0.0	13.0	10.0	01144
1 206	WIDGIEMOOLTHA DYKE WESTERN AUSTR	-31.5	121.9	011	040	A	A	9	242.0	-67.0	68	5.1	8.5	-23.0	31	8.0	9.0	7.0	10200
1 213	KOOLYANOBBING IRON ORES WA	-31.0	120.0	000	035	A	A	0	303.0	-60.5	15	6.5	43.0	-4.0	9	8.5	0.0	0.0	10173
1 207	LODE ORE GROUP 1 WEST AUSTRALIA	-20.5	119.5	000	031	N	A	0	317.0	54.0	23	6.0	20.0	84.0	19	6.0	0.0	0.0	10169
1 209	CRUST ORE GROUP 2 WEST AUSTRALIA	-20.5	119.5	000	006	N	B	100	263.0	68.5	31	12.0	21.5	-101.0	13	19.0	0.0	0.0	10171
1 208	LODE ORE GROUP 3 WEST AUSTRALIA	-20.5	119.5	000	008	N	B	100	115.0	73.5	45	8.5	30.0	-30.5	20	12.5	0.0	0.0	10170
1 210	JASPILITES MTS GOLDSWORTHY WA	-20.5	119.5	000	009	N	B	100	298.0	68.0	27	10.0	0.0	86.0	0	16.0	0.0	0.0	10172
1 211	MOUNT TOMPRICE ORE W AUSTRALIA	-22.5	118.0	000	028	A	A	0	304.0	25.0	6	12.0	22.0	57.0	6	12.0	0.0	0.0	10174
1 212	MOUNT NEWMAN ORE WEST AUSTRALIA	-23.0	119.5	000	020	N	A	0	302.0	39.0	12	9.5	17.0	66.0	12	10.0	0.0	0.0	10175

PRECAMBRIAN OF EUROPE MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 1	TORRIDON GROUP RED BEDS SCOTLAND	58.0	-6.0	081	205	N	A	65	123.0	44.0	12	5.0	-6.0	-137.0	0	0.0	6.0	4.0	01126
1 423	TORRIDON GROUP RED BEDS SCOTLAND	58.0	-5.4	011	030	T	A	100	106.0	61.0	10	16.0	26.0	-132.0	0	0.0	24.0	19.0	00000
1 2	STOER GROUP RED BEDS SCOTLAND	58.0	-6.0	013	032	N	A	0	307.0	34.0	40	7.0	35.0	-118.0	0	0.0	8.0	5.0	01127
1 422	STOER GROUP RED BEDS SCOTLAND	58.0	-5.4	020	050	T	A	0	313.0	29.0	18	8.0	35.0	-126.0	0	0.0	9.0	4.0	00000
1 489	DALRADIAN TILLITE S TREND SCOTLAND	56.0	-55.0	005	029	T	A	100	168.0	-18.0	0	11.0	39.0	-170.0	0	0.0	13.0	7.0	00000
1 490	DALRADIAN TILLITE NE TREND SCOTLAN	56.0	-55.0	004	028	T	A	0	43.0	-57.0	0	16.0	-17.0	129.0	0	0.0	22.0	16.0	00000
1 3	LONGMYNDIAN ENGLAND	53.0	-3.0	012	040	N	A	29	114.0	29.0	5	12.0	2.0	-120.0	0	0.0	13.0	7.0	01128
1 173	MALVERNIAN ROCKS ENGLAND	52.2	-2.3	000	016	N	A	0	127.0	77.0	0	10.0	35.0	21.0	0	0.0	0.0	0.0	00000
1 174	WARREN HOUSE SERIES ENGLAND	52.2	-2.3	000	007	N	B	0	233.0	77.0	0	25.0	35.0	-26.0	0	0.0	0.0	0.0	00000
1 4	SPARAGMITES NORWAY	60.5	11.0	000	007	N	B	71	11.0	-21.0	7	24.0	18.0	179.0	0	0.0	25.0	12.0	02040
1 156	EGERSUND DOLERITE 1 NORWAY	58.0	6.0	004	033	X	A	0	114.0	64.5	6	11.5	-28.0	-128.0	0	0.0	17.0	15.0	09030
1 331	EGERSUND DOLERITE 2 NORWAY	58.4	6.2	004	035	A	A	0	119.0	61.0	44	14.0	-22.0	-129.0	0	0.0	16.0	14.0	13082
1 332	HUNNEDALEN DYKES NORWAY	58.9	6.9	008	037	A	A	100	322.0	-75.0	134	5.0	-34.0	-152.0	0	0.0	10.0	9.0	13081
1 327	ROGALAND ANORTHOSITE NORWAY	58.5	6.0	003	022	A	B	100	318.0	-58.0	12	38.0	-13.3	-141.5	0	0.0	0.0	0.0	00000
1 328	BJERKREIM-SOKNDAL LOPOLITH NORWAY	58.5	6.3	009	045	A	A	100	283.0	-73.0	45	8.0	-41.8	-130.7	0	0.0	0.0	0.0	00000
1 329	MIGMATITE COMPLEX NORWAY	58.6	6.5	007	027	A	A	100	286.0	-70.0	29	11.0	-37.3	-128.2	0	0.0	0.0	0.0	00000
1 330	ROGAMENT BASEMENT COMBINED NORWAY	58.5	6.2	019	094	A	A	100	292.0	-71.0	0	0.0	-36.2	-133.1	0	0.0	1.2	1.0	13080
1 476	EGERSUND ANORTHOSITE SOUTH NORWAY	58.8	6.1	005	016	A	A	0	315.0	-82.0	92	8.0	-42.0	-160.0	28	15.0	0.0	0.0	00000
1 98	UPPER DALA VOLCANICS SWEDEN	61.5	14.0	002	011	A	A	0	17.0	-9.0	0	0.0	23.0	-176.0	0	0.0	0.0	0.0	10192
1 254	JOTNIAN + UP DALA VOLCANIC SWEDEN	61.0	14.0	008	040	A	A	0	13.0	-4.0	12	16.9	26.0	179.0	0	0.0	16.9	8.5	00000
1 301	UPPER DALA VOLC COMBINED SWEDEN	0.0	0.0	000	000	A	A	0	0.0	0.0	0	0.0	24.5	-178.5	0	0.0	0.0	0.0	00000
1 99	JOTNIAN BASALTS SWEDEN	61.1	13.4	002	016	A	A	0	7.0	6.0	584	10.0	32.0	-174.0	0	0.0	10.0	5.0	10193
1 100	LATE JOTNIAN DOLERITE SWEDEN	61.5	14.0	004	027	A	B	0	14.0	-9.0	6	40.0	23.0	178.0	0	0.0	40.0	20.5	10194
1 101	HYPERITE DOLERITE DYKE SWEDEN	58.0	14.5	005	070	A	A	100	317.0	-58.0	23	16.0	-12.0	-134.0	0	0.0	23.0	17.0	10195
1 245	DOLERITE-BASALT DALARNA SWEDEN	61.0	13.0	000	005	A	B	100	85.0	-27.0	0	25.0	10.0	-65.0	0	0.0	0.0	0.0	12177
1 317	TARENDO ACID ROCKS SWEDEN	67.1	-22.5	003	012	A	A	0	324.0	42.0	51	18.0	42.0	-112.0	0	0.0	0.0	0.0	00000
1 319	TARENDO GABBRO SWEDEN	67.1	22.5	005	017	A	A	0	340.0	41.0	30	14.0	45.0	-132.0	0	0.0	17.0	10.3	00000

PRECAMBRIAN OF EUROPE MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 318	YLIVIESKA GABBRO FINLAND	64.1	24.3	001	013		A	0	341.0	41.0	145	4.0	47.0	-129.0	0	0.0	0.0	0.0	00000
1 512	DIORITE-GABBRO YLIVIESKA FINLAND	64.0	24.3	000	000	A	B	0	331.3	38.2	0	6.8	43.3	-117.7	0	0.0	8.1	4.8	00000
1 511	DIORITE-GABBROS OF SW FINLAND	60.6	22.4	007	082	A	A	0	329.0	29.0	14	16.6	39.7	-117.4	0	0.0	18.3	10.0	00000
1 513	DIORITE-GABBRO YLIVIESKA FINLAND	64.1	24.6	000	000	A	B	0	332.3	29.2	0	13.4	37.9	-120.9	0	0.0	14.8	8.2	00000
1 514	DIORITE-GABBRO TAMMELA FINLAND	60.7	23.7	000	000	A	B	0	323.8	50.9	0	3.6	52.5	-100.6	0	0.0	4.9	3.3	00000
1 515	DIORITE-GABBRO MIKKELA FINLAND	61.7	27.3	000	000	A	B	0	344.8	44.6	0	12.2	53.1	-129.7	0	0.0	15.3	9.7	00000
1 516	DIORITE-GABBRO HYVINKAA FINLAND	60.6	24.6	000	000	A	B	0	329.0	36.1	0	7.3	44.1	-113.8	0	0.0	8.5	4.9	00000
1 517	DIORITE-GABBROS FINLAND AND SWEDEN	62.7	24.6	007	000	A	A	0	333.9	38.6	0	7.2	45.5	-119.0	79	6.8	0.0	0.0	00000
1 197	DIABASE DYKE HAME FINLAND	61.4	24.8	000	019	A	A	0	48.0	78.0	23	7.0	67.0	72.0	0	0.0	14.0	13.0	10196
1 198	AVA INTRUSIVE AALAND IS FINLAND	59.8	21.2	015	040	A	A	0	25.0	27.0	7	15.0	41.0	169.0	0	0.0	17.0	9.0	00000
1 199	MARKET DIABASES FINLAND	60.2	19.3	009	065	A	A	100	60.0	-40.0	36	9.2	5.9	144.5	0	0.0	11.0	7.0	12178
1 200	FOGLO DIABASES FINLAND	60.2	20.6	008	056	A	A	0	12.0	4.0	24	11.5	31.3	186.5	0	0.0	11.5	5.8	12179
1 201	KUMLINGE DIABASES 1 FINLAND	60.3	20.8	005	024	A	B	0	177.0	39.0	12	23.6	7.6	203.8	0	0.0	28.0	18.0	12180
1 202	KUMLINGE DIABASES 2 FINLAND	60.3	20.8	007	032	A	A	0	181.0	32.0	14	17.0	13.0	201.0	0	0.0	19.0	11.0	00000
1 237	JOTNIAN DOLERITE SATAKUNTA FINLAND	61.2	22.0	018	018	X	A	100	46.0	-34.0	60	4.0	2.0	158.0	0	0.0	4.8	2.0	08185
1 238	VAASA DOLERITE FINLAND	63.0	20.9	015	015	X	A	100	38.0	-29.0	54	5.0	7.0	164.0	0	0.0	6.0	3.0	08186
1 475	JOTNIAN SATAKUNTA SS TURKU FINLAND	61.0	22.0	006	010	T	A	100	24.0	-41.0	24	10.0	3.0	180.0	0	0.0	12.0	8.0	00000
1 93	BARRANDIAN PORPHYRY A1 CZECH	50.0	13.7	000	014	N	B	100	97.0	-22.0	0	21.0	13.0	-78.0	0	0.0	22.0	12.0	05088
1 94	BARRANDIAN PORPHYRY A2 CZECH	50.0	13.7	000	015	N	A	100	123.0	8.0	0	16.0	17.0	-105.0	0	0.0	16.0	8.0	05088
1 95	BARRANDIAN PORPHYRY A3 CZECH	50.0	13.7	000	012	N	A	100	17.0	35.0	0	9.0	66.0	134.0	0	0.0	11.0	6.0	05088
1 96	BARRANDIAN PORPHYRY A4 CZECH	50.0	13.7	000	016	N	A	100	108.0	-14.0	0	8.0	17.0	-86.0	0	0.0	9.0	4.0	05088
1 97	BARRANDIAN COMBINED CZECH	50.0	13.7	000	045	N	A	100	109.0	-9.0	16	0.0	16.0	-88.0	0	0.0	0.0	0.0	05088
1 267	CZECHOSLOVAKIAN SEDIMENTS	50.0	14.0	007	044	Y	B	57	315.0	-9.0	5	29.0	21.0	243.0	0	21.0	0.0	0.0	08149

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 52	SIGNAL HILL SANDSTONE CANADA	47.0	-53.0	001	009	N	B	0	283.0	20.0	21	11.0	16.0	-145.0	0	0.0	12.0	6.0	01139
1 53	BLACKHEAD SANDSTONE NWFD CANADA	47.0	-53.0	001	010	N	A	0	232.0	51.0	25	10.0	2.0	-95.0	0	0.0	13.0	9.0	01140
1 54	SIGNAL + BLACKHEAD COMBINED	47.0	-53.0	002	019	N	A	0	262.0	39.0	8	14.0	11.0	-122.0	0	0.0	16.0	10.0	00000
1 314	MUGFORD VOLCANIC SERIES CANADA	57.8	-62.0	016	016	X	A	0	297.0	63.0	41	6.0	49.0	-143.0	0	0.0	11.0	9.0	13093
1 315	LABRADOR DYKE CANADA	54.4	-57.1	001	004	A	B	100	82.0	-47.0	111	9.0	18.2	-124.0	0	0.0	12.0	8.0	13094
1 316	INDIAN HARBOUR DYKES CANADA	54.4	-57.1	012	012	X	A	0	242.0	22.0	15	12.0	-6.0	-117.0	0	0.0	12.0	6.0	13076
1 352	MICHAEL GABBRO LABRADOR CANADA	54.5	-59.0	021	104	A	A	100	138.0	31.0	161	0.0	10.2	162.5	226	2.0	0.0	0.0	00000
1 353	AILLIK DYKES LABRADOR CANADA	55.2	-59.2	006	032	A	A	0	278.0	50.0	60	0.0	27.0	-136.0	64	7.1	0.0	0.0	00000
1 460	SEAL GROUP VOLCANICS A LABR CANADA	54.5	-62.0	005	022	A	A	100	146.0	43.0	107	0.0	6.0	149.0	0	0.0	10.0	6.0	00000
1 461	SEAL GROUP VOLCANICS B LABR CANADA	54.5	-62.0	003	006	A	B	0	292.0	13.0	36	0.0	18.0	194.0	0	0.0	0.0	0.0	00000
1 462	SEAL GROUP DIABASES LABRADOR CANAD	54.5	-62.0	009	051	A	A	100	143.0	37.0	29	0.0	8.0	153.0	0	0.0	12.0	7.0	00000
1 463	SEAL GROUP COMBINED IGNEOUS CANADA	54.5	-62.0	014	073	A	A	100	144.0	39.0	40	0.0	8.0	152.0	0	0.0	8.0	5.0	00000
1 464	SEAL GROUP REDBEDS LABRADOR CANADA	54.5	-62.0	010	045	G	A	0	275.0	5.0	57	5.6	6.0	205.0	0	0.0	6.0	3.0	00000
1 465	CROTEAU GROUP VOLCANICS LAB CANADA	54.5	-62.0	050	028	A	A	100	136.0	52.0	19	0.0	-5.0	154.0	0	0.0	26.0	16.0	00000
1 466	SEAL+CROTEAU COMBINED LAB CANADA	54.5	-62.0	019	112	A	A	100	142.0	42.0	28	0.0	5.0	152.0	0	0.0	8.0	5.0	00000
1 415	MEALY MT ANORTHOSITE SUITE NW CAN	53.0	-60.0	011	056	A	A	0	300.0	-19.0	7	0.0	8.4	-179.3	12	12.0	0.0	0.0	00000
1 416	MEALY MT ANORTHOSITE NW COMP CANA	53.0	-60.0	008	041	A	A	0	297.7	-28.0	12	17.0	3.8	-179.1	0	0.0	18.0	10.0	00000
1 417	MEALY MT ANORTHOSITE SUITE E CANA	53.0	-60.0	014	066	A	A	100	87.0	65.0	35	0.0	-37.9	-181.7	17	9.1	0.0	0.0	00000
1 205	MICHIKAMAU ANORTHOSITE CANADA	54.5	-64.0	006	029	A	A	0	262.0	9.6	35	9.7	-.6	-144.7	0	0.0	9.8	4.9	10191
1 418	SHABOGAMO GABBRO NEAR FRONT CANAD	53.6	-65.0	010	085	A	A	100	104.4	35.4	10	15.2	-7.5	-178.1	0	0.0	16.8	9.3	00000
1 419	SHABOGAMO GABBRO 80KM FROM FRONT	54.2	-64.3	003	012	A	B	100	76.3	9.4	17	31.4	-11.9	-146.3	0	0.0	32.0	16.0	00000
1 420	SHABOGAMO GABBRO COMBINED CANADA	53.8	-64.8	013	097	A	A	100	97.0	30.0	8	0.0	-10.1	-171.2	10	12.0	0.0	0.0	00000
1 467	OTISH GABBRO QUEBEC CANADA	52.3	-71.0	010	075	A	A	0	250.0	73.0	64	0.0	34.8	-106.6	24	9.0	0.0	0.0	00000
1 130	LAC ALLARD ANORTHOSITE QU CANADA	51.0	-63.0	004	112	X	A	10	296.6	-79.0	88	9.8	-38.6	140.4	0	18.0	0.0	0.0	09142
1 409	ST URBAIN ANORTHOSITE QUEB CANADA	47.6	-70.4	005	021	A	A	100	127.9	57.0	49	11.1	-7.0	148.0	0	0.0	16.0	12.0	00000
1 482	MORIN COMPLEX M1 QUEBEC CANADA	46.1	-74.4	024	117	X	A	0	266.2	-76.8	32	5.3	-42.2	140.6	11	9.1	9.9	9.2	00000
1 483	MORIN COMPLEX M2 QUEBEC CANADA	46.1	-74.4	013	045	X	A	100	114.0	38.0	17	10.0	0.0	164.0	0	0.0	12.0	9.0	00000

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 484	MORIN COMPLEX M3 QUEBEC CANADA	46.1	-74.4	002	009	A	B	55	272.0	1.0	0	0.0	2.0	-165.0	0	0.0	0.0	0.0	00000
1 41	ADIRONDACK GNEISS NEW YORK USA	44.0	-75.0	000	128	N	B	0	145.0	50.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1 363	FRONTENAC DYKES ONTARIO CANADA	44.3	-76.3	006	037	A	A	100	103.0	50.0	112	6.0	-12.0	163.0	85	7.0	9.0	6.0	13072
1 364	KINGSTON DYKE 4 ONTARIO CANADA	44.3	-76.4	001	009	A	B	0	315.0	-15.0	134	5.0	24.0	154.0	0	0.0	0.0	0.0	00000
1 365	KINGSTON DYKE 12 ONTARIO CANADA	44.3	-75.9	001	007	A	B	0	283.0	30.0	30	11.0	20.0	-163.0	0	0.0	0.0	0.0	00000
1 86	GRENVILLE METAMORPHIC RX ONTARIO	45.0	-78.5	003	016	Y	A	0	283.6	-44.6	12	11.4	-9.6	-163.7	0	0.0	14.0	9.3	07080
1 322	GRENVILLE METAMORPHIC RX QUEBEC	45.6	-76.7	013	057	A	A	31	271.0	-66.0	61	5.0	-32.0	155.0	25	8.0	0.0	0.0	13071
1 42	BOULTER INTRUSIVE ONTARIO CANADA	45.0	-77.5	000	008	N	B	0	297.0	55.0	19	5.0	42.0	-157.0	0	0.0	7.0	5.0	05093
1 43	UMFRAVILLE INTRUSIVE ONTARIO CANAD	45.0	-78.0	000	012	N	A	0	115.0	43.0	8	7.0	-1.0	158.0	0	0.0	9.0	6.0	05094
1 44	THANET INTRUSIVE ONTARIO CANADA	45.0	-77.5	000	006	N	B	0	93.0	62.0	5	14.0	-28.0	157.0	0	0.0	22.0	18.0	05094
1 45	TUDOR INTRUSIVE ONTARIO CANADA	44.5	-77.5	000	011	N	A	0	328.0	11.0	5	9.0	42.0	149.0	0	0.0	9.0	5.0	05095
1 458	TUDOR GABBRO ONTARIO CANADA	44.7	-77.7	010	047	A	A	0	324.2	-36.7	40	7.7	17.1	137.9	0	8.4	9.0	5.2	00000
1 457	WILBERFORCE PYROXENITE ONT CANADA	45.1	-78.3	004	027	A	A	0	293.2	-59.6	390	4.7	-14.4	148.0	0	0.0	7.0	5.3	00000
1 399	HALIBURTON RX A COMPONENT CANADA	45.0	-78.6	010	028	A	A	0	266.0	-73.0	64	6.0	-39.0	144.0	0	0.0	10.0	9.0	00000
1 400	HALIBURTON RX B COMPONENT CANADA	45.0	-78.6	000	013		A	0	299.0	1.0	8	16.0	21.0	171.0	0	0.0	16.0	8.0	00000
1 459	GRENVILLE FRONT ANORTH ONT CANADA	46.6	-80.0	004	016	A	A	100	117.3	24.8	211	6.3	8.2	161.3	0	6.3	6.8	3.7	00000
1 161	GRENVILLE DYKES ONTARIO CANADA	46.0	-78.0	011	055	A	A	9	118.9	45.2	14	11.3	-3.0	151.0	0	11.0	0.0	0.0	13085
1 500	WHITESTONE ANORTHOSITE WW CANADA	45.6	-79.9	005	029	X	A	0	285.0	-56.0	96	8.0	-16.0	156.0	0	0.0	11.0	8.0	00000
1 501	WHITESTONE ANORTHOSITE WX CANADA	45.6	-79.9	002	013	A	B	100	122.0	45.0	3	26.0	-1.0	152.0	0	0.0	33.0	21.0	00000
1 502	WHITESTONE ANORTHOSITE WY CANADA	45.6	-79.9	008	039	X	A	100	104.0	36.0	45	8.0	-5.0	168.0	0	0.0	10.0	6.0	00000
1 503	WHITESTONE META-DIORITE WZ CANADA	45.6	-79.9	004	015	X	A	0	292.0	-67.0	223	6.0	-22.0	146.0	0	0.0	10.0	8.0	00000
1 170	NIPISSING DIABASE 1 ONT CANADA	47.0	-79.0	001	012	A	A	100	28.6	-44.6	38	7.2	-12.0	-105.0	0	0.0	9.0	5.7	09156
1 171	NIPISSING DIABASE 2 ONT CANADA	47.3	-79.5	011	039	A	A	100	8.6	-39.9	60	5.4	-19.4	-87.9	0	0.0	6.5	3.9	12164
1 271	NIPISSING DIABASE 3 ONT CANADA	46.0	-83.0	008	025	A	B	38	200.8	69.1	5	27.0	10.2	-95.7	0	0.0	0.0	0.0	00000
1 272	NIPISSING DIABASE 4 ONT CANADA	46.0	-83.0	004	016	A	A	100	358.1	-43.1	148	7.6	-18.9	-81.2	0	0.0	9.4	5.8	00000
1 273	NIPISSING DIABASE 5 ONT CANADA	46.0	-83.0	006	018	A	A	0	271.1	69.0	17	17.0	36.0	-131.0	0	0.0	0.0	0.0	00000
1 421	NIPISSING DIABASE 6 ONT CANADA	46.4	-83.0	005	021	A	A	100	345.8	-45.2	166	6.0	-15.7	-69.8	0	6.1	7.6	4.8	00000

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 168	COBALT GROUP SEDIMENTS CANADA	47.0	-79.0	004	008	A	B	100	35.3	-74.1	15	14.6	21.5	-97.5	0	0.0	26.4	23.8	09159
1 169	COBALT UPPER SLATE ONTARIO CANADA	47.0	-79.0	001	004	A	B	100	41.4	-30.4	5	48.2	-16.2	-131.1	0	0.0	53.7	29.9	00000
1 129	CROKER ISLAND COMPLEX 1 CANADA	46.1	-82.2	019	023	A	A	0	251.7	41.6	14	8.5	5.4	-142.8	0	0.0	10.5	6.7	11090
1 50	DYKES 1 ONTARIO + QUEBEC CANADA	49.0	-79.0	005	035	A	A	0	254.6	-55.5	40	12.3	-35.8	175.0	0	0.0	17.6	12.6	06070
1 51	DYKES 2 ONTARIO + QUEBEC CANADA	49.0	-79.0	005	073	A	A	0	10.0	-15.0	14	21.0	33.0	91.0	0	0.0	21.0	11.0	06071
1 108	ABITIBI DYKES ONT-QUE CANADA	48.0	-79.0	005	035	A	A	0	254.0	55.0	40	12.0	17.0	-132.0	0	14.0	0.0	0.0	08180
1 112	ABITIBI DYKES ONT-QUE CANADA	48.5	-78.5	014	055	A	A	0	268.5	65.1	35	6.8	32.3	-131.8	0	0.0	11.0	89.0	08170
1 109	ABITIBI DYKES WEST CANADA	48.5	-78.5	010	083	A	A	0	264.0	61.0	102	4.8	27.0	-134.0	0	0.0	7.4	5.7	08171
1 110	ABITIBI DYKES NORTH CANADA	48.5	-78.5	002	013	A	A	0	354.0	-32.0	390	0.0	-24.0	-73.0	0	0.0	0.0	0.0	08172
1 111	ABITIBI DYKES SOUTHWEST CANADA	48.5	-78.5	004	014	A	A	100	221.0	19.0	0	0.0	-21.0	-122.0	0	0.0	0.0	0.0	08173
1 103	MATACHEWAN DYKES SW CANADA	48.0	-81.0	000	039	A	A	100	211.9	-5.9	4	12.4	-37.2	-120.8	0	0.0	12.5	6.3	08174
1 104	MATACHEWAN DYKES NE CANADA	48.0	-81.0	000	015	A	A	0	16.6	42.3	6	17.5	-62.9	-118.8	0	0.0	21.6	13.3	08175
1 105	MATACHEWAN DYKES ONT CANADA	48.0	-79.0	005	043	A	B	100	194.0	-9.0	12	23.0	-45.0	-99.0	0	22.0	0.0	0.0	08181
1 106	MATACHEWAN DYKES ONT CANADA	48.0	-79.0	000	031	A	A	0	18.0	30.0	24	5.0	-54.0	-109.0	0	0.0	6.0	3.0	08182
1 107	MATACHEWAN DYKES ONT COMBINED	0.0	0.0	000	128	A	B	64	200.4	-21.9	18	22.0	-50.1	-111.6	11	13.0	0.0	0.0	00000
1 46	SUDBURY NI ERUPTIVE N CANADA	46.6	-81.4	000	014	Y	A	0	320.0	70.0	20	5.0	64.0	-141.0	0	0.0	9.0	8.0	05092
1 47	SUDBURY NI ERUPTIVE S CANADA	46.5	-81.0	000	033	Y	A	0	183.0	68.0	49	2.0	8.0	-82.0	0	0.0	3.0	2.0	05092
1 48	SUDBURY IRRUPTIVE COMBINED 1	46.6	-81.2	000	000	Y	A	0	245.0	82.0	0	0.0	39.0	-99.0	0	0.0	0.0	0.0	05092
1 49	SUDBURY IRRUPTIVE COMBINED 2	46.6	-81.2	000	000	Y	A	0	300.0	78.0	0	0.0	53.0	-115.0	0	0.0	0.0	0.0	05092
1 87	SUDBURY IRRUPTIVE NORTH RANGE	46.5	-81.1	030	068	A	A	0	310.0	73.0	0	5.0	58.0	-130.0	0	0.0	9.0	8.0	07076
1 88	SUDBURY IRRUPTIVE SOUTH RANGE	46.5	-81.1	026	039	A	A	0	173.0	64.0	0	4.0	3.0	-86.0	0	0.0	6.0	5.0	07077
1 286	SUDBURY NORITE 1 ONTARIO CANADA	46.5	-81.5	005	010	A		0	257.8	61.4	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1 287	SUDBURY NORITE 2 ONTARIO CANADA	46.6	-81.4	024	086	A		0	294.3	64.9	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1 288	SUDBURY MICROPEGMATITE 2 CANADA	46.6	-81.4	016	054	A		0	303.8	61.2	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1 289	SUDBURY NORITE 3 ONTARIO CANADA	46.6	-81.3	005	011	A		0	304.4	70.6	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1 290	SUDBURY MICROPEGMATITE 3 CANADA	46.6	-81.3	005	010	A		0	301.4	78.5	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1 291	SUDBURY NORITE 5 ONTARIO CANADA	46.7	-81.0	003	006	A	B	0	22.0	86.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000

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OTTAWA LIST		ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1	292	SUDBURY NORITE 6 ONTARIO CANADA	46.7	-79.8	019	055	A		0	62.0	46.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1	293	SUDBURY MICROPEGMATITE 6 CANADA	46.7	-79.8	016	042	A		0	50.0	78.5	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1	294	SUDBURY NORITE 7 ONTARIO CANADA	46.6	-79.9	003	007	A	B	0	188.2	38.4	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1	295	SUDBURY NORITE 8 ONTARIO CANADA	46.5	-81.0	025	074	A		0	170.9	64.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1	296	SUDBURY NORITE 9 ONTARIO CANADA	46.4	-81.2	010	024	A		0	176.5	64.3	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1	89	SUDBURY DIABASE DYKE ONT CANADA	46.5	-81.0	002	013	A	A	0	258.0	-1.0	35	7.0	-8.0	-163.0	0	0.0	7.0	4.0	07078
1	119	SUDBURY DYKES ONTARIO CANADA	47.0	-82.0	022	037	A	A	0	264.1	1.0	4	13.0	-3.8	-166.5	0	0.0	13.2	6.6	08178
1	120	SUDBURY DYKES ONTARIO CANADA	46.4	-81.5	011	053	A	A	0	268.0	-1.0	52	3.0	-2.0	-181.0	0	0.0	3.0	1.0	09143
1	412	NEMEGOSENDA COMPLEX ONTARIO CANAD	48.0	-83.1	011	041	A	A	0	305.0	46.0	0	18.0	43.0	-178.0	0	0.0	24.0	15.0	00000
1	413	SPANISH RIVER ALKALI RX ONT CANAD	46.5	-81.6	008	021	A	A	0	234.0	83.0	7	13.0	37.0	-96.0	0	0.0	25.0	24.0	00000
1	414	SPANISH RIVER DYKES ETC ONT CANAD	46.5	-81.6	004	014	A	A	0	56.0	-29.0	5	19.0	-10.0	-136.0	0	0.0	21.0	11.0	00000
1	114	MARATHON DYKES ONTARIO CANADA	49.0	-86.0	005	009	A	B	0	268.2	60.5	25	10.5	29.0	-146.8	0	0.0	16.0	12.2	08176
1	34	BARAGA COUNTY DYKES MICHIGAN USA	46.5	-88.5	002	036	N	A	100	82.0	-86.0	82	1.0	45.0	-99.0	0	0.0	2.0	2.0	01129
1	232	BARRON QUARTZITE 1 WISCONSIN USA	45.0	-92.0	001	009	N	B	0	273.0	78.0	6	25.0	42.0	-122.0	0	0.0	47.0	45.0	08164
1	233	BARRON QUARTZITE 2 WISCONSIN USA	45.0	-92.0	001	009	N	B	0	208.0	62.0	21	12.0	2.0	-112.0	0	0.0	19.0	15.0	08164
1	234	SIOUX QUARTZITE 1 MINNESOTA USA	44.0	-94.0	001	008	N	B	0	243.0	56.0	2	58.0	9.0	-141.0	0	0.0	83.0	60.0	08165
1	235	SIOUX QUARTZITE 2 MINNESOTA USA	44.0	-94.0	001	008	N	B	0	122.0	79.0	7	25.0	31.0	-73.0	0	0.0	47.0	45.0	08165
1	236	RED BEDS WISCONSIN MINNESOTA USA	44.5	-93.0	004	033	N	B	0	224.5	73.8	17	22.7	22.9	-113.2	7	38.9	0.0	0.0	00000
1	85	SANDSTONE DYKES ONTARIO CANADA	47.0	-84.5	002	004	N	B	0	243.0	66.0	14	26.0	19.0	-123.0	0	0.0	0.0	0.0	07075
1	75	ORIENTA SANDSTONE USA	47.0	-91.0	000	008	N	B	0	273.0	-5.0	7	22.0	0.0	176.0	0	0.0	22.0	11.0	07064
1	76	AMNICON FORMATION USA	47.0	-91.0	000	006	N	B	0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	07065
1	77	EILEEN SANDSTONE USA	47.0	-91.0	005	028	N	A	0	300.0	-18.0	18	7.0	13.0	151.0	0	0.0	7.0	4.0	07066
1	78	SAULT STE MARIE SEDS CANADA	47.0	-84.5	002	004	N	B	0	306.0	19.0	25	17.0	31.0	165.0	0	0.0	18.0	9.0	07068
1	35	CHEQUAMEGON SANDSTONE USA	47.0	-88.5	002	015	N	A	0	30.0	74.0	47	6.0	69.0	-47.0	0	0.0	11.0	10.0	01130
1	36	JACOBSVILLE SANDSTONE 1 USA	47.0	-88.5	000	015	N	A	0	250.0	-11.0	11	13.0	-17.5	-166.0	0	0.0	13.0	7.0	01131
1	74	JACOBSVILLE SANDSTONE 2 CANADA	47.0	-84.5	002	014	N	A	0	289.0	-21.0	11	14.0	5.0	164.0	0	0.0	15.0	7.0	07067
1	302	JACOBSVILLE COMBINED USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	-6.0	179.0	0	0.0	0.0	0.0	00000

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	TR	RE	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 37	FREDA AND NONESUCH MICHIGAN USA	47.0	-88.5	012	068	N	A	0	285.0	-1.0	26	3.0	9.0	170.0	0	0.0	3.0	2.0	01132
1 133	FREDA AND NONESUCH MICHIGAN USA	47.0	-88.5	005	000	T	A	0	279.0	2.0	31	14.0	7.0	176.0	0	0.0	14.0	7.0	10184
1 303	FREDA AND NONESUCH COMBINED USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	8.0	173.0	0	0.0	0.0	0.0	00000
1 38	COPPER HARBOUR 1 MICHIGAN USA	47.0	-88.5	004	025	N	A	0	294.0	32.0	20	7.0	29.0	176.0	0	0.0	7.0	4.0	01133
1 132	COPPER HARBOUR LAVA 2 MICHIGAN USA	47.0	-88.5	006	000	X	A	0	282.0	12.0	30	12.0	13.0	176.0	0	0.0	12.0	6.0	10183
1 304	COPPER HARBOUR COMBINED MICH USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	21.0	176.0	0	0.0	0.0	0.0	00000
1 39	PORTAGE LAKE LAVA 1 MICHIGAN USA	47.0	-88.5	006	031	N	A	0	282.0	44.0	47	4.0	26.0	-169.0	0	0.0	5.0	3.0	01134
1 131	PORTAGE LAKE LAVA 2 MICHIGAN USA	47.0	-88.5	014	018	T	A	0	286.0	33.0	22	9.0	24.0	-177.0	0	0.0	10.0	6.0	10168
1 148	PORTAGE LAKE LAVA 3 MICHIGAN USA	47.2	-88.5	029	145	A	A	0	289.3	35.3	106	2.6	27.1	-179.0	0	0.0	4.0	2.0	12158
1 367	PORTAGE LAKE LAVAS 4 KEARSAGE USA	47.3	-88.4	023	106	A	A	0	289.3	35.1	77	3.5	27.1	-178.6	0	0.0	4.0	2.3	00000
1 368	PORTAGE LAKE LAVAS 5 KEARSAGE USA	47.3	-88.4	007	034	A	A	0	274.5	45.8	73	7.0	22.6	-162.1	0	0.0	9.1	5.8	00000
1 369	PORTAGE LAKE LAVAS 6 KEARSAGE USA	47.3	-38.4	022	100	A	A	0	291.0	34.9	106	3.1	28.2	180.0	0	0.0	3.6	2.1	00000
1 370	PORTAGE LAKE LAVAS 7 KEARSAGE USA	47.4	-88.1	017	077	A	A	0	288.4	36.4	27	7.0	27.1	-177.1	0	0.0	8.1	4.7	00000
1 375	PORTAGE LAKE LAVAS 8 IRONWOOD USA	46.6	-90.1	004	020	A	A	0	284.2	30.9	333	5.0	21.7	-178.4	0	0.0	5.6	3.1	00000
1 376	PORTAGE LAKE LAVAS 9 IRONWOOD USA	46.7	-90.1	005	021	A	A	0	287.7	26.2	52	10.8	22.1	176.8	0	0.0	11.7	6.3	00000
1 305	PORTAGE LAKE LAVAS COMBINED 1 USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	25.8	-175.0	262	5.0	0.0	0.0	00000
1 392	PORTAGE LAKE LAVAS COMBINED 2 USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	25.2	-176.0	161	4.1	0.0	0.0	00000
1 366	GOGEBIC RHYOLITES KEWEENAWAN USA	46.7	-89.6	003	013	A	A	0	287.2	28.0	164	9.7	22.5	178.5	0	0.0	10.6	5.8	00000
1 371	GOGEBIC QU PORPHYRY KEWEENAWN USA	46.6	-89.6	003	013	A	B	0	298.6	36.0	25	25.0	33.9	174.0	0	0.0	29.0	16.8	00000
1 372	KEWEENAWAN RHYOLITE 1 KEASAGE USA	47.2	-38.4	001	008	A	B	0	275.1	23.2	9	19.8	12.3	-173.0	0	0.0	21.1	11.2	00000
1 373	KEWEENAWAN RHYOLITE 2 KEASAGE USA	47.2	-88.6	001	006	A	B	0	295.0	22.2	58	9.0	25.4	170.7	0	0.0	9.4	5.0	00000
1 146	NORTH SHORE VOLC MINNESOTA USA	47.5	-91.0	054	054	A	A	0	287.7	47.3	23	4.1	32.1	-172.5	0	0.0	5.3	3.6	12176
1 377	NORTH SHORE VOLCANICS 2 NORMAL USA	47.7	-90.4	036	155	A	A	0	291.2	43.9	46	3.6	32.6	-176.9	0	0.0	4.4	2.8	00000
1 393	NORTH SHORE VOL NORMAL COMBINE USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	32.5	-174.7	0	0.0	0.0	0.0	00000
1 378	ISLE ROYALE LR FLOWS KEWEENAW USA	47.9	-89.2	004	020	A	A	0	287.3	23.4	107	8.9	20.6	176.3	0	0.0	9.5	5.1	00000
1 379	ISLE ROYALE UP FLOWS KEWEENAW USA	47.9	-39.2	005	024	A	A	0	271.8	53.8	61	9.9	25.9	-155.7	0	0.0	13.8	9.7	00000
1 159	BEAVER BAY COMPLEX MINNESOTA USA	47.0	-91.5	029	080	A	A	0	282.5	45.0	36	4.5	27.5	-170.5	0	0.0	5.5	3.5	11087

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 266	BEAVER BAY BASALT MINNESOTA USA	47.0	-91.0	004	019	N	B	0	291.0	38.0	12	28.0	30.0	180.0	0	0.0	33.0	20.0	10187
1 307	BEAVER BAY MINNESOTA COMBINED	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	28.8	-175.2	0	0.0	0.0	0.0	00000
1 180	ANORTHOSITIC GABBRO MINNESOTA USA	46.9	-92.0	012	040	A	A	0	294.5	56.5	40	7.0	42.0	-169.0	0	0.0	10.0	7.5	12150
1 181	LAYERED SERIES MINNESOTA USA	46.9	-92.0	024	080	A	A	0	290.0	53.0	116	3.0	36.5	-170.0	0	0.0	4.0	2.5	12151
1 182	ENDION SILL MINNESOTA USA	46.9	-92.0	014	045	A	A	0	286.0	49.0	53	5.5	31.5	-171.0	0	0.0	7.5	5.0	12155
1 183	LESTER RIVER SILL MINNESOTA USA	46.9	-92.0	020	060	A	A	0	283.0	57.5	79	3.5	35.0	-161.0	0	0.0	5.0	4.0	12157
1 261	MELLEN GABBRO MICHIGAN USA	46.5	-91.0	014	000	A	A	0	294.0	48.0	14	0.0	36.0	184.0	0	0.0	0.0	0.0	11086
1 79	DULUTH GABBRO MINNESOTA USA	47.0	-92.0	009	018	N	A	0	286.0	33.0	17	9.0	23.0	180.0	0	0.0	10.0	6.0	07069
1 184	DULUTH GABBRO NORMAL USA	48.0	-91.4	010	030	A	A	0	280.0	56.0	25	10.0	32.5	-160.0	0	0.0	14.5	10.5	12152
1 264	DULUTH GABBRO MINNESOTA USA	47.0	-92.0	007	023	N	A	0	290.0	42.0	120	6.0	31.0	182.0	0	0.0	7.0	5.0	10185
1 265	DULUTH DIABASE MINNESOTA USA	47.0	-92.0	004	021	N	A	0	291.0	47.0	30	17.0	34.0	185.0	0	0.0	22.0	14.0	10186
1 160	COOK COUNTY GABBRO MINNESOTA USA	48.0	-90.5	007	039	A	A	100	125.0	-55.0	47	7.5	48.0	-183.0	0	0.0	11.0	8.0	11088
1 308	KEWEENAWAN INTRUSIVE COMBINED USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	35.2	-172.2	79	5.5	0.0	0.0	00000
1 82	LOGAN DIABASE NORMAL 1 CANADA	48.0	-89.5	015	025	N	A	0	288.0	48.0	21	7.0	33.0	-172.0	0	0.0	8.0	6.0	07073
1 268	LOGAN DYKES NORMAL 2 CANADA	48.3	-89.1	015	069	A	A	0	295.0	43.0	54	5.3	35.0	-179.0	0	5.0	7.0	4.0	13090
1 185	LOGAN DIABASE NORMAL 3 USA	48.0	-91.4	008	025	A	A	0	277.5	47.0	37	9.0	25.5	-166.0	0	0.0	11.5	7.5	12154
1 80	MAMAINSE POINT LAVAS CANADA	47.0	-84.5	000	012	N	A	0	292.0	40.0	19	10.0	32.0	-173.0	8	0.0	12.0	9.0	07070
1 141	MAMAINSE LAVAS NORMAL 2 CANADA	47.0	-84.7	052	052	A	A	0	299.9	40.4	21	4.4	36.8	-179.6	0	0.0	5.3	3.5	12170
1 311	MAMAINSE COMBINED ONTARIO CANADA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	34.4	-176.2	0	0.0	0.0	0.0	00000
1 142	MICHIPICOTEN VOLCANIC ONT CANADA	47.7	-85.8	028	040	A	A	0	293.6	32.3	13	7.7	28.7	179.0	0	0.0	8.7	5.2	12172
1 143	UPPER GARGANTUA VOLCANIC CANADA	47.6	-85.0	008	014	A	A	0	297.6	37.7	58	7.3	33.9	179.7	0	0.0	8.6	5.5	12173
1 145	NORTH SHORE VOLCANIC REV 1 USA	47.8	-89.9	014	014	A	A	100	116.4	-62.9	31	7.3	47.0	-159.8	0	0.0	11.7	9.3	12175
1 149	NORTH SHORE VOLCANIC REV 2 USA	48.0	-90.0	011	052	A	A	100	117.0	-59.2	129	4.0	44.5	-163.0	0	0.0	6.0	5.0	12159
1 306	NORTH SHORE REVERSED COMB USA	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	45.8	-161.4	0	0.0	0.0	0.0	00000
1 147	OSLER VOLCANICS ONTARIO CANADA	48.6	-88.1	012	024	A	A	100	117.5	-64.5	24	9.0	48.9	-156.7	0	0.0	14.4	11.7	12168
1 186	DULUTH-LOGAN REVERSED USA	48.0	-91.4	013	040	A	A	100	91.0	-65.5	44	6.0	42.5	-156.0	0	0.0	9.5	7.0	12153
1 81	LOGAN DIABASE REV 1 ONT CANADA	48.5	-89.0	018	080	N	A	100	117.0	-76.0	13	5.0	54.0	-130.0	0	0.0	8.0	8.0	07072

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 151	LOGAN SILL REV 2 ONTARIO CANADA	49.5	-88.5	021	034	A	A	100	108.3	-73.3	59	4.2	49.2	-136.9	0	0.0	7.6	6.7	12167
1 152	LOGAN SILL REV 3 ONTARIO CANADA	48.5	-89.0	009	015	A	A	100	110.7	-69.2	46	7.6	47.5	-146.4	0	0.0	12.9	11.2	12167
1 153	LOGAN SILL REV 4 ONTARIO CANADA	49.0	-89.0	000	000	A	B	100	0.0	0.0	0	0.0	48.4	-141.7	0	0.0	0.0	0.0	12167
1 269	LOGAN SILL REV 5 ONTARIO CANADA	48.8	-38.9	012	051	A	A	100	107.0	-72.0	34	8.0	47.0	-140.0	0	8.0	13.0	12.0	13092
1 309	LOGAN REVERSED COMBINED CANADA	0.0	0.0	000	000		A	100	0.0	0.0	0	0.0	48.4	-142.5	108	7.4	0.0	0.0	00000
1 84	ALONA BAY LAVA 1 ONTARIO CANADA	47.0	-84.5	000	012	N	A	100	50.0	-84.0	12	14.0	39.0	-95.0	0	0.0	25.0	25.0	07071
1 139	ALONA BAY LAVA 2 ONTARIO CANADA	47.6	-84.7	011	011	A	A	100	106.3	-74.8	21	10.2	47.4	-127.3	0	0.0	18.5	17.1	12169
1 310	ALONA LAVAS COMBINED CANADA	0.0	0.0	000	000		A	100	0.0	0.0	0	0.0	44.0	-110.0	0	0.0	0.0	0.0	00000
1 140	MAMAINSE LAVA REVERSED CANADA	47.0	-84.7	020	020	A	A	100	124.8	-67.9	20	7.5	54.4	-147.6	0	0.0	12.8	10.6	12171
1 144	LOWER GARGANTUA VOLCANIC CANADA	47.6	-85.0	009	011	A	A	100	154.3	-71.5	90	5.5	72.1	-136.7	0	0.0	9.5	8.4	12174
1 394	MAMAINSE-GARGANTUA LAVAS N CANADA	47.2	-84.8	015	076	X	A	0	293.0	35.0	35	6.1	29.5	-177.3	0	0.0	7.6	4.4	00000
1 395	MAMAINSE-GARGANTUA LAVAS R CANADA	47.2	-84.8	012	067	X	A	100	104.0	-74.0	27	7.8	48.5	-128.0	0	0.0	16.0	14.0	00000
1 187	KEWEENAWAN INTRUSIVE COMBINED	0.0	0.0	000	000	A	A	15	0.0	0.0	0	0.0	33.0	-167.0	143	5.1	0.0	0.0	00000
1 473	SIBLEY GROUP REDBEDS ONTARIO CANAD	48.8	-88.5	007	025	T	A	25	231.0	9.0	22	13.0	-21.0	216.0	0	0.0	13.0	7.0	00000
1 474	SIBLEY GROUP HEATED BY DIABASE CAN	48.8	-88.5	005	017	T	A	100	151.0	-69.0	17	19.0	71.0	206.0	0	0.0	33.0	28.0	00000
1 83	SIBLEY SERIES ONTARIO CANADA	48.5	-89.0	004	018	N	A	72	78.0	-51.0	23	8.0	16.0	-149.0	0	0.0	10.0	8.0	07074
1 191	GUNFLINT IRON FORMATION CANADA	48.5	-89.2	020	020	A	A	20	192.0	79.0	14	9.0	28.0	-94.0	0	0.0	17.0	16.0	10152
1 380	MARQUETTE RANGE SUPERGROUP USA	46.5	-90.0	001	004	A	B	0	261.2	45.0	88	9.8	13.3	-155.3	0	0.0	12.4	7.9	00000
1 381	ROVE SLATE ANIMIKIE MICHIGAN USA	48.0	-89.7	001	005	A	B	0	240.9	58.5	15	20.6	12.6	-133.6	0	0.0	32.2	20.6	00000
1 192	HEMATITE ORE MINNESOTA USA	47.9	-92.1	005	031	A	A	0	290.1	80.9	16	19.6	51.0	-119.3	20	18.0	37.8	36.4	10154
1 193	ELY GREENSTONE MINNESOTA USA	47.9	-92.1	002	009	A	B	0	260.1	76.0	25	51.9	37.8	-125.8	16	11.4	0.0	0.0	10157
1 194	SOUDAN IRON FORMATION MINNESOTA US	47.9	-92.1	001	008	A	B	0	338.0	3.0	13	16.0	39.0	239.0	0	0.0	16.0	9.0	10153
1 195	NEGAUNEE IRON ORES 1 MINNESOTA USA	46.5	-87.6	000	006	A	B	0	169.0	19.0	4	35.0	-33.0	-75.0	0	0.0	36.0	18.0	09153
1 196	NEGAUNEE IRON ORES 2 MINNESOTA USA	46.5	-37.6	000	008	A	B	0	239.0	30.0	10	17.0	-8.0	-144.0	0	0.0	9.0	18.0	09154
1 150	SOUTH TRAP RANGE LAVA MICHIGAN US	46.5	-30.0	014	061	A	A	100	74.0	-71.5	71	4.8	28.0	-127.5	0	0.0	7.9	6.8	12160
1 374	SOUTH TRAP RA LAVAS 2 IRONWOOD USA	46.5	-90.1	007	036	A	A	0	262.5	37.0	29	11.4	9.8	-160.4	0	0.0	13.5	7.8	00000
1 189	KEWEENAWAN DIORITE 1 USA	46.5	-87.6	000	004	A	B	0	213.0	58.0	4	40.0	0.0	0.0	0	0.0	0.0	0.0	09155

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 190	KEWEENAWAN DIORITE 2 USA	45.5	-87.9	000	004	A	B	0	248.0	72.0	8	28.0	28.0	-122.0	0	0.0	51.0	45.0	10151
1 113	MOLSON DYKES MANITOBA CANADA	55.0	-96.0	004	005	A	B	0	209.6	79.9	275	14.8	36.2	-108.9	0	0.0	28.4	27.2	08177
1 491	DOGRIB DYKES NWT CANADA	62.7	-113.9	016	083	A	A	100	309.0	37.0	70	4.0	-35.0	-50.0	0	4.0	5.0	3.0	00000
1 492	INDIN DYKES NWT CANADA	63.3	-113.6	013	072	A	A	31	131.0	58.0	29	8.0	19.0	-76.0	0	10.0	12.0	9.0	00000
1 493	X DYKES SLAVE NWT CANADA	63.3	-113.8	003	011	A	A	0	132.0	-5.0	100	12.0	-20.0	-61.0	0	0.0	12.0	6.0	00000
1 494	SLAVE PROVINCE SE OVERPRINT CANADA	63.3	-113.6	008	013	A	A	0	139.0	47.0	21	9.0	7.0	-78.0	0	0.0	12.0	8.0	00000
1 495	THISTLEWAITE DYKE NWT CANADA	63.2	-113.6	001	005	A	B	0	281.0	72.0	400	3.0	53.0	-175.0	0	0.0	5.2	4.5	00000
1 496	DUCK LAKE SILL NWT CANADA	62.5	-114.3	001	005	A	B	0	113.0	9.0	44	17.0	-6.0	-47.0	0	0.0	17.0	8.7	00000
1 497	PENSIVE LAKE SHEET NWT CANADA	62.7	-113.4	001	005	A	B	0	355.0	63.0	400	4.0	72.0	-77.0	0	0.0	6.0	4.6	00000
1 341	ET-THEN GROUP RED BEDS NWT CANADA	62.3	-111.6	014	037	T	A	28	29.4	-21.0	17	10.0	-1.0	-48.0	26	8.0	0.0	0.0	00000
1 468	MARTIN FORMATION SASKATCHEWAN CANA	59.6	-108.6	015	055	X	A	66	322.5	-29.4	15	10.4	-9.0	-72.0	0	0.0	11.5	6.3	00000
1 410	SPARROW DYKES NWT CANADA	61.6	-109.8	010	054	A	A	10	131.0	51.0	50	7.0	12.0	-69.0	35	8.0	9.4	6.6	00000
1 411	NONACHO GROUP SANDSTONE NWT CANADA	61.6	-109.8	012	040	T	A	0	148.0	57.0	11	14.0	13.0	-85.0	6	19.0	8.4	6.2	00000
1 478	DUBAWNT GRP MARTEL SYENITE NWT CAN	64.1	-94.4	001	004	A	B	100	338.0	-51.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	00000
1 479	DUBAWNT GRP CHRISTOPHER ISLAND CAN	64.1	-94.4	009	056	X	A	78	347.0	-63.0	11	16.0	19.0	-85.0	0	0.0	24.0	18.0	00000
1 480	DUBAWNT GROUP KAZAN FM NWT CANADA	64.1	-94.4	020	070	T	A	53	347.0	-45.0	19	6.0	1.0	-83.0	0	0.0	7.0	5.0	00000
1 481	DUBAWNT GROUP COMBINED NWT CANADA	64.1	-94.4	030	130	X	A	63	347.0	-50.0	17	7.0	7.0	-83.0	12	8.0	0.0	0.0	00000
1 456	MELVILLE-DALY BAY METAM RX CANADA	66.0	-88.0	016	063	A	A	0	196.0	55.0	38	6.0	11.0	-101.0	27	7.2	8.0	6.0	00000
1 504	WESTERN CHANNEL DIABASE NWT CANADA	66.4	-117.8	035	130	A	A	100	356.0	-50.0	35	6.0	9.0	-115.0	32	6.0	0.0	0.0	00000
1 506	CAMERON BAY GROUP NWT CANADA	66.5	-117.8	001	003	A	B	0	165.0	41.0	0	0.0	1.0	-104.0	0	0.0	0.0	0.0	00000
1 505	HORNBY BAY GROUP NWT CANADA	66.5	-117.9	001	002	T	B	0	151.0	61.0	0	0.0	22.0	-95.0	0	0.0	0.0	0.0	00000
1 115	MUSKOK INTRUSION NWT CANADA	66.0	-113.0	080	019	A	A	0	242.0	29.0	11	18.0	4.0	-175.0	25	8.0	19.0	11.0	08183
1 121	COPPERMINE LAVAS NWT CANADA	67.0	-116.0	024	048	A	A	0	243.0	22.0	23	6.0	1.0	-175.0	34	5.0	0.0	0.0	08184
1 469	COPPERMINE GROUP REDBEDS NWT CANAD	67.5	-116.0	005	013	A	B	0	234.0	29.0	9	28.0	2.0	193.0	0	0.0	30.0	17.0	00000
1 470	COPPERMINE GROUP UP LAVAS A CANADA	67.5	-116.0	004	020	A	A	0	256.0	8.0	42	14.0	-2.0	168.0	0	0.0	14.0	7.0	00000
1 471	COPPERMINE GROUP UP LAVAS B CANADA	67.6	-116.2	011	063	A	A	0	214.0	20.0	23	10.0	-8.0	210.0	0	0.0	10.0	5.0	00000
1 472	COPPERMINE GROUP COMBINED CANADA	67.3	-116.0	030	090	A	A	0	243.0	22.0	21	6.0	1.0	183.0	0	0.0	6.0	3.0	00000

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 116	MACKENZIE DYKES NWT CANADA	67.0	-116.0	026	054	A	A	0	227.0	31.0	4	15.0	4.0	-158.0	4	16.0	0.0	0.0	00000
1 117	MACKENZIE DYKES NWT CANADA	65.0	-112.0	023	034	A	A	0	250.8	24.7	7	10.2	3.8	-177.3	0	0.0	11.0	5.9	08179
1 118	MACKENZIE DIABASE NWT CANADA	0.0	0.0	014	063	A	A	0	0.0	0.0	0	0.0	3.5	-166.9	82	4.0	0.0	0.0	11089
1 337	MACKENZIE DIABASE + CONTACT CANADA	64.0	-110.0	008	064	A	A	0	0.0	0.0	0	0.0	-1.0	-175.0	83	6.0	0.0	0.0	00000
1 338	MACKENZIE DYKE COMBINED 1 CANADA	0.0	0.0	035	000	O	A	0	0.0	0.0	0	0.0	1.0	-171.0	78	3.0	0.0	0.0	00000
1 339	MACKENZIE DYKE COMBINED 2 CANADA	0.0	0.0	000	000	O	A	0	0.0	0.0	0	0.0	2.0	-170.0	105	8.0	0.0	0.0	00000
1 452	MACKENZIE DIABASE KEEWATIN CANADA	66.0	-90.0	012	094	A	A	0	0.0	0.0	0	0.0	2.5	-169.8	35	7.4	0.0	0.0	00000
1 453	MACKENZIE DIABASE COMBINED CANADA	0.0	0.0	047	000	A	A	0	0.0	0.0	0	0.0	1.4	-170.5	75	2.4	0.0	0.0	00000
1 340	MACKENZIE IGNEOUS EPISODE CANADA	0.0	0.0	000	000	O	A	0	0.0	0.0	0	0.0	3.0	-171.0	122	6.0	0.0	0.0	00000
1 162	FRANKLIN DIABASE NWT CANADA	0.0	0.0	023	114	A	A	21	0.0	0.0	0	0.0	8.0	167.0	32	5.0	0.0	0.0	13077
1 312	CORONATION SILLS NWT CANADA	67.8	-116.0	013	078	X	A	100	81.0	-4.0	11	13.0	-1.0	163.0	0	9.0	0.0	0.0	13078
1 313	FRANKLIN DIABASE COMBINED 1 CANADA	0.0	0.0	036	192	X	A	47	0.0	0.0	0	0.0	4.8	165.3	26	4.7	0.0	0.0	13079
1 428	FRANKLIN DIABASE BAFFIN IS CANADA	70.0	-74.0	010	049	A	A	60	0.0	0.0	0	0.0	6.3	168.2	84	4.8	0.0	0.0	00000
1 451	FRANKLIN DIABASE KEEWATIN CANADA	66.0	-90.0	003	032	A	A	66	0.0	0.0	0	0.0	3.0	161.3	181	9.2	0.0	0.0	00000
1 454	FRANKLIN DIABASE NORMAL CANADA	0.0	0.0	023	000	A	A	0	0.0	0.0	0	0.0	7.8	166.7	40	4.9	0.0	0.0	00000
1 455	FRANKLIN DIABASE REVERSED CANADA	0.0	0.0	028	000	A	A	100	0.0	0.0	0	0.0	2.9	163.5	32	4.9	0.0	0.0	00000
1 429	FRANKLIN DIABASE COMBINED 2 CANADA	0.0	0.0	046	245	A	A	52	0.0	0.0	0	0.0	5.8	165.8	29	3.8	0.0	0.0	00000
1 450	FRANKLIN DIABASE COMBINED 3 CANADA	0.0	0.0	051	277	A	A	55	0.0	0.0	0	0.0	5.1	165.3	34	3.4	0.0	0.0	00000
1 23	BELT SPOKANE SHALE MONTANA 1 USA	47.0	-112.0	000	039	N	A	0	232.0	55.0	18	4.0	5.0	-152.0	0	0.0	6.0	4.0	03079
1 24	BELT SPOKANE SHALE 2 MONTANA USA	49.0	-114.0	000	005	N	B	0	206.0	39.0	10	8.0	-16.0	-139.0	0	0.0	10.0	6.0	03080
1 22	BELT MILLER PEAK FM MONTANA USA	47.0	-114.0	000	014	N	A	0	234.0	30.0	20	7.0	-11.0	-166.0	0	0.0	8.0	4.0	03078
1 21	BELT MCNAMARA FORMATION MONT USA	47.0	-114.0	000	020	N	A	100	26.0	-43.0	30	4.0	-14.0	-138.0	0	0.0	5.0	3.0	03077
1 26	BELT APPEKUNNY FM MONTANA USA	49.0	-114.0	000	015	N	A	0	223.0	29.0	15	6.0	-15.0	-156.0	0	0.0	7.0	4.0	03082
1 28	BELT KINTLA FORMATION 1 CANADA	49.4	-114.9	000	027	A	A	100	39.0	-40.0	23	6.0	-11.0	-150.0	0	0.0	7.0	5.0	05089
1 29	BELT KINTLA FORMATION 2 CANADA	49.3	-114.3	000	024	A	A	50	38.0	-49.0	24	7.0	-3.0	-146.0	0	0.0	9.0	6.0	05090
1 30	BELT KINTLA FORMATION 3 CANADA	49.0	-114.0	000	008	A	B	100	50.0	-38.0	40	10.0	-7.0	-159.0	0	0.0	12.0	8.0	05091
1 31	BELT KINTLA FM COMBINED CANADA	49.0	-114.3	000	059	A	A	20	43.0	-43.0	111	0.0	-7.0	-152.0	0	0.0	0.0	0.0	00000

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OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 67	BELT KINTLA FORMATION A CANADA	49.2	-114.3	003	013	A	A	100	46.0	-34.0	25	9.0	-12.0	-159.0	0	0.0	0.0	0.0	00000
1 65	BELT KINTLA FORMATION C CANADA	49.3	-114.6	002	025	A	A	100	221.0	49.0	14	8.0	-3.0	-149.0	0	0.0	0.0	0.0	00000
1 66	BELT KINTLA FORMATION B SILL CANAD	49.3	-114.2	001	004	A	B	100	18.0	-12.0	24	19.0	-31.0	-136.0	0	0.0	0.0	0.0	00000
1 68	BELT PURCELL LAVAS CANADA	50.3	-114.3	005	022	A	A	100	25.0	-18.0	4	18.0	-29.0	-144.0	0	0.0	0.0	0.0	00000
1 69	BELT UPPER SIYEH FORM CANADA	49.2	-114.1	002	004	A	B	100	47.0	-24.0	34	16.0	-16.0	-162.0	0	0.0	0.0	0.0	00000
1 71	BELT WATERTON FM MIXED CANADA	49.1	-114.1	003	017	A	A	0	202.0	33.0	25	7.0	-20.0	-137.0	0	0.0	0.0	0.0	00000
1 70	BELT GRINNEL FORMATION 1 CANADA	49.2	-114.1	003	016	A	A	0	212.0	51.0	52	5.0	-5.0	-143.0	0	0.0	0.0	0.0	00000
1 25	BELT GRINNEL FORMATION 2 USA	49.0	-114.0	000	016	N	A	0	225.0	48.0	15	6.0	-2.0	-152.0	0	0.0	8.0	5.0	03081
1 223	BELT GRINNEL FORMATION 3 USA	48.0	-114.0	001	009	N	B	0	240.0	7.0	12	16.0	-17.0	-171.0	0	0.0	16.0	8.0	08162
1 224	BELT MISSOULA GROUP MONTANA USA	48.0	-114.0	001	039	N	A	100	38.0	-27.0	19	6.0	-19.0	-153.0	0	0.0	6.0	3.0	08161
1 225	BELT SERIES COMBINED 1	48.0	-114.0	011	216	Y	A	46	43.0	-37.4	26	9.0	-10.2	-153.6	36	7.7	0.0	0.0	00000
1 300	BELT SERIES COMBINED 2	0.0	0.0	000	000		A	0	0.0	0.0	0	0.0	-12.8	-149.6	37	8.5	0.0	0.0	00000
1 326	WIND RIVER DYKES WYOMING USA	42.6	-108.8	004	023	A	A	0	277.0	85.0	65	11.0	43.0	-121.0	0	0.0	23.0	23.0	13083
1 244	STILLWATER COMPLEX MONTANA USA	45.4	-110.0	009	096	A	A	100	160.0	-40.0	23	10.9	62.0	112.0	0	0.0	13.0	8.0	12166
1 510	STILLWATER COMPLEX MONTANA USA	45.4	-110.0	009	096	A	A	100	72.2	-58.3	30	9.5	16.3	-160.5	0	0.0	14.1	10.4	12166
1 382	BIGHORN MTS DYKES WYOMING USA	44.5	-107.0	006	034	X	B	17	360.0	37.0	6	29.0	-66.0	-106.0	0	0.0	34.0	20.0	00000
1 383	BEARTOOTH MTS DYKE 1 MONTANA USA	45.0	-110.0	001	007	X	B	0	337.0	70.0	14	17.0	73.0	-160.0		0.0	28.0	24.0	00000
1 384	BEARTOOTH MTS DYKE 2 MONTANA USA	45.0	-110.0	002	008	X	B	0	287.0	-11.0	0	0.0	7.0	-147.0	0	0.0	0.0	0.0	00000
1 385	BEARTOOTH MTS DYKE 3 WYOMING USA	45.0	-110.0	001	005	X	B	0	130.0	40.0	63	9.0	-9.0	-64.0	0	0.0	0.0	0.0	00000
1 386	BEARTOOTH MTS DYKES 4+5 USA	45.0	-110.0	002	015	X	A	0	110.0	15.0	0	0.0	-12.0	-40.0	0	0.0	0.0	0.0	00000
1 387	BEARTOOTH MTS DYKE 6 WYOMING USA	45.0	-110.0	001	006	X	B	0	129.0	-35.0	40	11.0	-40.0	-34.0	0	0.0	12.0	7.0	00000
1 388	BEARTOOTH MTS DYKES 7+8 WY+MON USA	45.0	-110.0	002	012	X	A	100	336.0	-61.0	0	0.0	0.0	-92.0	0	0.0	0.0	0.0	00000
1 389	OWLCREEK MTS DYKES WYOMING USA	36.5	-112.0	003	016	X	A	100	11.0	-34.0	0	0.0	-28.0	-112.0	0	0.0	0.0	0.0	00000
1 390	LARAMIE RA ANORTHOSITE WYOMING USA	41.8	-105.5	001	008	X	B	100	50.0	-34.0	110	5.0	-14.0	-154.0	0	0.0	6.0	3.0	00000
1 172	SHERMAN GRANITE COLORADA USA	41.0	-185.4	005	014	A	A	20	52.0	-44.0	86	4.0	-8.0	-151.0	0	0.0	6.0	4.0	09144
1 155	PIKES PEAK GRANITE COLORADO USA	38.9	-105.3	004	010	T	A	0	265.0	29.0	144	7.0	6.0	-179.0	0	0.0	8.0	4.0	12161
1 188	SIERRA ANCHA DIABASE ARIZONA USA	0.0	0.0	000	000		B	0	0.0	0.0	0	0.0	27.5	182.0	0	0.0	0.0	0.0	00000

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	TR	RE	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 13	BONITO CANYON QUARTZITE USA	36.0	-109.0	000	016	N	A	100	31.0	-25.0	19	4.0	-33.0	-146.0	0	0.0	4.0	2.0	03087
1 14	BASS LIMESTONE ARIZONA USA	36.0	-112.0	000	014	N	A	0	225.0	34.0	0	0.0	-21.0	-158.0	0	0.0	0.0	0.0	03086
1 220	BASS LIMESTONE ARIZONA USA	36.0	-112.0	001	008	N	B	0	231.0	36.0	0	2.0	-16.0	-162.0	0	0.0	2.0	1.0	08168
1 221	BASS LIMESTONE COMBINED USA	36.0	-112.0	002	022	N	A	100	228.0	35.0	0	0.0	-18.0	-160.0	0	0.0	0.0	0.0	00000
1 15	BASS AND HAKATAI FORMATION USA	36.0	-112.0	000	010	N	B	0	205.0	65.0	6	21.0	-4.0	-128.0	0	0.0	33.0	27.0	01138
1 16	HAKATAI SHALES 1 ARIZONA USA	36.0	-112.0	000	015	N	A	0	268.0	73.0	22	5.0	30.0	-150.0	0	0.0	10.0	9.0	01137
1 17	HAKATAI SHALES 2 ARIZONA USA	36.0	-112.0	000	014	N	A	0	245.0	31.0	0	0.0	-9.0	-174.0	0	0.0	0.0	0.0	03084
1 222	HAKATAI SHALES 3 ARIZONA USA	36.0	-112.0	001	009	N	B	0	224.0	74.0	152	4.0	12.0	133.0	0	0.0	7.0	7.0	08169
1 18	SHINUMO QUARTZITE ARIZCNA USA	36.0	-112.0	000	014	N	A	0	246.0	33.0	0	0.0	-7.0	-173.0	0	0.0	0.0	0.0	03083
1 19	GRAND CANYON COMBINED ARIZ USA	36.0	-112.0	000	067	N	B	100	237.0	48.0	12	23.0	-3.0	-157.0	0	0.0	26.0	26.0	00000
1 20	ARIZONA PRECAMBRIAN COMBINED USA	36.0	-112.0	000	083	N	B	63	231.0	45.0	11	21.0	-8.0	-155.0	0	0.0	23.0	23.0	00000
1 391	RAMA DIABASE ARIZONA USA	36.5	-112.0	004	032	X	A	0	261.6	26.0	128	7.2	1.5	174.0	0	0.0	9.0	5.0	00000
1 396	NANKOWEAP FORMATION ARIZONA USA	36.1	-111.8	006	000	X	B	0	270.9	36.6	105	6.6	12.5	174.4	0	0.0	7.7	4.5	00000
1 397	CARDENAS LAVAS UNKAR GRP ARIZ USA	36.1	-111.8	010	028	X	A	0	253.5	38.9	50	6.9	.4	-174.6	0	0.0	8.2	4.9	00000
1 398	CARDENAS LAVAS WEATHERED ARIZ USA	36.1	-111.8	005	000	X	B	0	306.6	65.7	79	8.6	49.4	-167.8	0	0.0	14.1	11.4	00000
1 226	UINTA MTS UTAH GROUP USA	41.0	-110.0	001	008	N	B	100	53.0	-7.0	9	24.0	-24.0	-171.0	0	0.0	24.0	12.0	08166
1 227	BIG COTTONWOOD FORMATION USA	41.0	-110.0	001	007	N	B	100	78.0	-31.0	0	18.0	2.0	-180.0	0	0.0	19.0	11.0	08167
1 228	PIONEER SHALE 1 ARIZONA USA	33.0	-111.0	001	015	N	A	100	18.0	-48.0	11	12.0	-25.0	-128.0	0	0.0	16.0	10.0	08163
1 229	PIONEER SHALE 2 ARIZCNA USA	34.0	-111.0	001	013	N	A	100	29.0	-33.0	5	20.0	-20.0	-144.0	0	0.0	23.0	13.0	08163
1 230	PIONEER SHALE 3 ARIZONA USA	33.0	-112.0	001	021	N	B	100	18.0	-52.0	5	23.0	-23.0	-128.0	0	0.0	31.0	21.0	08163
1 231	PRECAMBRIAN SEDS SOUTHWEST USA	0.0	0.0	009	108	N	A	34	44.6	-34.7	15	13.8	-20.8	-155.2	0	0.0	0.0	0.0	00000
1 320	GILA COUNTY DIABASE ARIZONA USA	34.6	-110.6	008	098	X	A	0	285.0	49.0	56	7.0	27.0	179.0	0	0.0	9.0	6.0	13075
1 167	EL PASO ROCKS TEXAS USA	31.9	-106.4	012	101	A	A	0	279.0	62.0	557	4.0	28.0	-160.0	0	0.0	6.0	5.0	13084
1 498	TOWN MOUNTAIN GRANITE TEXAS USA	34.2	-97.1	003	049	N	B	0	242.0	21.0	12	37.0	-17.0	-163.0	0	0.0	38.0	20.0	00000
1 11	HAZEL FORMATION FLAT NM USA	31.0	-105.0	005	015	N	A	0	316.0	56.0	35	6.0	53.0	-173.0	0	0.0	9.0	7.0	01135
1 12	HAZEL FM FOLDED NEW MEXICO USA	31.0	-105.0	009	037	N	A	0	328.0	37.0	3	17.0	60.0	154.0	0	0.0	20.0	12.0	01136
1 157	ARBUCKLE GRANITE OKLAHOMA USA	34.3	-96.7	004	019	T	B	0	271.0	42.0	3	22.0	14.0	-166.0	0	0.0	27.0	17.0	10166

PRECAMBRIAN OF NORTH AMERICA POSSIBLE NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 158	ARBUCKLE GRANITE COMBINED USA	34.3	-96.7	000	000	T	B	0	0.0	0.0	0	0.0	18.0	-157.0	69	15.0	0.0	0.0	00000
1 239	ST FRANCOIS TUFFS MISSOURI USA	37.6	-90.7	011	049	A	A	0	243.3	47.4	110	4.4	-1.2	-140.9	0	6.0	5.6	3.7	08159
1 240	ST-FRANCOIS IGNEOUS ROCKS USA	37.5	-90.5	005	095	Y	A	0	244.9	45.6	65	9.6	-1.3	-143.3	0	9.0	12.2	7.7	08160
1 241	ST-FRANCOIS COMB MISSOURI USA	37.5	-90.5	006	144	Y	A	0	244.6	45.9	80	7.5	-1.3	-143.9	0	0.0	9.6	6.1	00000
1 298	IRON MOUNTAIN PRIMARY ORE USA	37.7	-90.6	000	025	A	A	0	219.3	17.3	0	8.2	-30.7	-137.3	0	0.0	0.0	0.0	00000
1 299	IRON MOUNTAIN CONTACT ORE USA	37.7	-90.6	000	000	A	B	0	0.0	0.0	0	0.0	-4.0	-133.0	0	0.0	0.0	0.0	00000

PRECAMBRIAN OF SOUTH AMERICA MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 163	RORAIMA DOLOMITE 1 GUYANA	6.0	-61.0	007	034	A	A	0	333.5	27.5	29	11.0	63.0	-129.0	47	9.0	0.0	0.0	10160
1 164	RORAIMA DOLOMITE 2 GUYANA	6.0	-61.0	007	035	A	A	100	145.0	39.5	25	12.0	45.0	167.0	40	10.0	0.0	0.0	10161
1 165	MINOR DYKE SUITE VENEZUELA	6.0	-61.0	004	029	A	A	0	16.5	21.0	36	16.0	73.0	11.0	53	13.0	0.0	0.0	00000
1 325	KABALEBO DOLERITE SURINAM	5.0	-57.5	002	030	X	A	0	314.0	3.0	95	3.0	44.0	-150.0	0	0.0	3.0	1.5	13074
1 351	BLAKAWATRA DOLERITE SURINAM	3.0	-55.5	002	017	X	A	0	277.0	35.0	25	7.0	8.0	-127.0	0	0.0	8.0	5.0	13073
1 90	RED BEDS JUJUY PROVINCE ARGENTINA	-5.0	-65.0	000	007	N	B	100	196.0	-32.0	0	25.0	45.0	-43.0	0	0.0	0.0	0.0	06072
1 91	PARANA RED SEDIMENTS BRAZIL	-25.0	-49.0	000	003	N	B	100	210.0	-71.0	0	0.0	6.0	-32.0	0	0.0	0.0	0.0	06073

PRECAMBRIAN OF ASIA WITHOUT USSR MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	TR	RE	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 323	MYSORE DYKE B2 INDIA	14.2	76.4	001	013	A	A	0	26.0	50.0	37	12.8	45.0	138.0	0	0.0	17.2	11.4	13088
1 324	MYSORE DYKE B10 INDIA	12.7	77.5	001	004	A	B	100	141.0	-75.0	50	9.9	34.0	55.0	0	0.0	18.5	16.3	13089
1 62	CUDDAPAH TRAPS SCATTERED INDIA	14.0	78.0	010	072	A	B	0	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	07059
1 251	CUDDAPAH SEDIMENTS INDIA	15.0	78.0	002	000		A	0	294.5	-8.0	0	0.0	22.5	-21.5	0	0.0	0.0	0.0	00000
1 250	CHITLOOR DYKE INDIA	14.6	79.0	003	009		B	33	113.7	27.9	6	58.0	18.3	-31.9	0	0.0	63.3	34.4	00000
1 125	VELDURTI HEMATITE DEPOSITS INDIA	15.6	78.0	000	030	N	A	80	133.0	-37.0	4	14.0	45.0	-27.0	0	0.0	16.0	10.0	08158
1 252	HYDERABAD DYKE INDIA	17.4	78.5	001	013	A	A	0	44.0	-3.0	32	5.0	43.0	-173.0	0	0.0	5.0	3.0	10167
1 247	CHARNOKITES 1 INDIA	17.5	83.0	000	006	T	B	0	280.0	35.0	0	0.0	15.0	9.0	0	0.0	0.0	0.0	10188
1 248	CHARNOKITES 2 INDIA	17.5	83.0	000	004	T	B	0	45.0	45.0	0	0.0	48.0	152.0	0	0.0	0.0	0.0	10189
1 249	CHARNOKITES 3 INDIA	17.5	83.0	000	006	T	B	0	45.0	-20.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	10190
1 246	BANDED HEMATITE INDIA	24.0	81.0	002	010		A	0	279.5	-10.5	0	0.0	6.5	-17.8	0	0.0	0.0	0.0	00000
1 126	KAIMUR SANDSTONE INDIA	24.6	83.1	020	047	A	A	32	357.0	31.0	0	6.0	82.0	286.0	0	0.0	7.0	4.0	08150
1 61	MUNDWARA COMPLEX INDIA	25.0	73.0	001	006	X	B	0	329.0	-24.0	0	21.0	42.0	-65.0	0	0.0	22.0	12.0	07058
1 59	MALANI RHYOLITES INDIA	26.0	73.0	009	060	X	A	0	353.0	56.0	0	10.0	78.0	45.0	0	0.0	15.0	11.0	07061
1 60	BIJAWARA TRAPS INDIA	26.0	78.0	001	007	X	B	0	7.0	3.0	0	18.0	19.0	176.0	0	0.0	18.0	9.0	07060
1 486	GWALIOR TRAPS MORAR STAGE INDIA	26.0	78.0	003	017	X	A	0	2.5	-73.5	378	6.5	-4.0	77.0	0	0.0	11.5	10.5	00000
1 487	GWALIOR TRAPS MORAR STAGE INDIA	26.0	78.0	004	023	A	A	100	78.0	34.5	369	5.0	19.0	155.5	0	0.0	5.5	3.0	00000
1 488	GWALIOR TRAPS MORAR STAGE INDIA	26.0	78.0	004	023	X	A	100	79.5	8.0	56	12.5	11.0	169.0	0	0.0	12.5	6.5	00000
1 507	NEWER DOLERITE OF SINGHBHUM INDIA	22.3	86.1	007	042	T	A	0	343.4	9.4	15	16.4	66.3	-49.1	0	0.0	16.6	8.4	00000
1 508	NEWER DOLERITE OF SINGHBHUM INDIA	22.3	86.1	002	013	A	A	0	50.0	84.0	0	0.0	30.0	95.0	0	0.0	0.0	0.0	00000
1 509	NEWER DOLERITE OF SINGHBHUM INDIA	22.3	86.1	001	005	T	B	100	142.0	46.0	0	0.0	-28.0	124.0	0	0.0	0.0	0.0	00000
1 175	XIUNING SERIES 1 CHINA	29.9	118.1	000	012	N	A	0	313.0	80.0	0	13.0	42.0	98.0	0	0.0	25.0	24.0	10162
1 176	XIUNING SERIES 2 CHINA	30.1	118.6	000	005	N	B	0	292.0	82.0	0	10.0	35.0	100.0	0	0.0	21.0	19.0	10164
1 178	XIUNING SERIES 3 CHINA	29.9	118.1	000	005	N	B	0	311.0	76.0	0	15.0	45.0	90.0	0	0.0	28.0	26.0	10163
1 177	LIANTO SERIES CHINA	30.9	111.1	000	000	N	B	0	300.0	83.0	0	0.0	37.0	95.0	0	0.0	0.0	0.0	10165
1 179	LOWER SINIAN SANDSTONE COMBINED	0.0	0.0	000	000	N	A	0	305.0	81.0	165	2.7	39.8	95.9	207	6.4	0.0	0.0	00000

PRECAMBRIAN OF USSR MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	T R	R E	REV	DECL	INCL	KD	ED 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 405	YATULII REDBEDS + LAVA KARELIA	64.0	34.0	012	038	A	A	0	345.0	53.0	60	12.0	58.0	238.0	0	0.0	12.0	6.0	S1319
1 345	PAP INTRUSION KOLA PENINSULA	67.5	35.5	001	012	N	A	0	354.0	32.0	8	14.0	40.0	223.0	0	0.0	16.0	9.0	S1309
1 256	JOTNIAN SANDST SOUTH KARELIA	61.5	34.0	000	057	N	A	6	347.5	29.5	0	4.5	44.0	231.0	0	0.0	5.0	4.0	10199
1 255	JOTNIAN SANDST SOUTH KARELIA	61.5	35.0	000	029	N	A	0	344.0	46.0	58	3.5	54.0	240.0	0	0.0	5.0	4.0	10198
1 257	JOTNIAN SANDSTONE COMBINED	61.5	35.0	000	086	N	A	4	346.0	38.0	0	0.0	49.0	236.0	0	0.0	0.0	0.0	00000
1 344	RYBORETSKII SILL LAKE ONEGA	61.3	35.5	001	029	A	A	0	348.0	8.0	56	2.0	32.0	231.0	0	0.0	2.0	1.0	S1308
1 281	KATAV SUITE 1 SOUTH URALS	53.0	57.0	000	016		A	100	193.0	34.0	0	8.0	17.0	224.0	0	0.0	9.0	5.0	00000
1 348	KATAV SUITE 2 SOUTH URALS	54.5	57.0	004	149	N	A	65	52.0	36.0	20	7.0	39.0	167.0	0	0.0	8.0	5.0	S1303
1 406	TARTASH INTRUSIVE COMPLEX S URALS	55.5	60.0	002	028	N	A	100	56.0	-21.0	9	9.0	9.0	186.0	0	0.0	9.0	5.0	S1320
1 407	TARTASH INTRUSIVE COMPLEX S URALS	55.0	60.0	003	034	N	A	0	191.0	45.0	11	8.0	8.0	230.0	0	0.0	10.0	6.0	S1321
1 403	YENISEA SERIES KUZNETSKII ALATAU	55.5	88.0	005	007	N	B	0	177.0	-28.0	38	5.0	49.0	-88.0	0	0.0	6.0	3.0	S1317
1 280	BUROVUYA SUITE TUNGUSKA RIVER	66.0	89.0	000	039		A	0	336.0	34.0	0	8.0	40.0	298.0	0	0.0	8.0	4.0	00000
1 402	VENDIAN STAGE WESTERN TAIMYR	75.0	90.0	004	032	N	A	100	308.0	10.0	8	11.0	14.0	-36.0	0	0.0	11.0	6.0	S1316
1 282	KOKIN SUITE YENISEI AREA	59.0	92.0	000	022		A	0	12.0	12.0	0	18.0	37.0	257.0	0	0.0	18.0	9.0	00000
1 57	LOWER ANGARA SUITE YENISEI AREA	58.0	95.0	000	000	A	A	0	6.0	-28.0	0	0.0	17.0	-93.0	0	0.0	12.0	0.0	07056
1 58	KONINSK SUITE YENISEI AREA	59.0	92.0	000	023	A	A	0	12.0	12.0	0	0.0	35.0	-103.0	0	0.0	18.0	0.0	07057
1 259	TUNGUSIK SERIES MIXED YENISEI AREA	59.0	98.0	000	159	N	A	0	163.0	16.4	99	16.4	21.3	-63.9	0	0.0	12.8	6.6	10177
1 277	TUNGUSIK SERIES YENISEI AREA	59.0	95.0	000	083	N	A	0	155.0	10.0	0	8.0	22.0	-58.0	0	0.0	8.0	4.0	00000
1 260	SUKHOPITIAN 1 YENISEI AREA	59.0	98.0	000	139	N	A	0	173.0	24.7	121	11.2	17.9	-76.0	0	0.0	12.0	7.0	10180
1 278	SUKHOPITIAN 2 YENISEI AREA	59.0	95.0	000	078	N	A	72	162.8	26.7	83	13.6	15.5	-67.7	0	0.0	14.8	8.0	00000
1 279	SUKHOPITIAN 3 YENISEI COMBINED	59.0	96.5	000	217	N	A	63	0.0	0.0	0	0.0	16.9	-73.0	107	6.5	0.0	0.0	00000
1 350	POTOSKUI SUITE YENISEI AREA	59.0	95.0	001	035	N	A	0	163.0	8.0	5	11.0	25.0	-65.0	0	0.0	11.0	6.0	S1304
1 346	YENISEA AREA SEDS COMBINED	59.0	95.0	008	470	N	A	67	166.0	22.0	24	11.0	20.0	-72.0	0	0.0	12.0	6.0	S1304
1 284	KARAGASSKI SUITE SAYAN AREA	55.0	98.0	000	023	N	A	0	141.0	9.0	0	10.0	22.0	-39.0	0	0.0	10.0	5.0	00000
1 258	OSLYANSK SERIES 1 YENISEI AREA	59.0	98.0	000	009	N	B	100	132.0	24.0	0	14.0	10.0	142.0	0	0.0	15.0	8.0	10176
1 276	OSLYANSK SERIES 2 YENISEI AREA	59.0	95.0	000	009	N	B	100	307.0	-25.0	0	19.0	6.0	145.0	0	0.0	20.0	11.0	00000
1 404	ANABAR PEAK DOLERITE SILLS	71.5	106.5	003	019	A	A	0	82.0	9.0	45	5.0	10.0	203.0	0	0.0	5.0	3.0	S1318

PRECAMBRIAN OF USSR MAY BE SOUTH OR NORTH POLES

OTTAWA LIST	ROCK UNIT	LAT	LONG	B	N	TR	RE	REV	DECL	INCL	KO	EO 95	POLE LAT	POLE LONG	KP	EP 95	DM	DP	OTHER LISTS
1 5	SINIAN SEDS PATOM RIVER	60.0	117.0	000	030	N	A	0	35.0	-7.0	0	8.0	21.0	-101.0	0	0.0	9.0	4.0	06069
1 275	ULUNTUI SUITE NORTH LAKE BAIKAL	55.0	109.0	000	053		A	100	202.0	4.0	0	8.0	29.0	263.0	0	0.0	8.0	4.0	00000
1 342	ALDAN AREA METAMORPHIC ROCKS	70.0	110.0	019	199	A	A	100	167.5	8.5	0	0.0	14.0	-54.0	0	0.0	0.0	0.0	S1312
1 408	GABBRO-DIABASE STOCK OLENEK REGION	71.0	124.5	001	012	A	A	0	26.0	28.0	37	7.0	32.0	274.0	0	0.0	8.0	4.0	S1322
1 347	ALDAN AREA DIABASE AND NORITE	58.0	126.0	006	059	A	A	0	255.0	38.0	29	13.0	3.0	-96.0	0	0.0	15.0	9.0	S1311
1 283	LOWER SINIAN 1 YAKUTSK AREA	59.0	134.8	000	229		A	58	296.1	24.6	0	9.0	24.4	28.7	0	0.0	10.3	5.5	00000
1 343	LOWER SINIAN 2 YAKUTSK AREA	59.0	134.5	055	167	N	A	76	295.0	28.0	50	8.0	24.0	28.0	0	8.0	0.0	0.0	S1305

Explanatory Notes

1.93 see **2.10**

1.94 see **2.11**

1.95 see **2.12**

1.96 see **2.14**

1.97 see **2.14**

1.126 **Kaimur Sandstone** Klootwijk (1973) cites K-Ar glauconite ages of 940 and 910 m.y. The Kaimur appears to be bracketted by these ages, and an age of 1150 m.y. for the diamond pipes that intrude it. See our first issue.

1.255 **Shoksha Suite** Jotnian "Absolute age – 1950 m.y. (Pb/Th and K/Ar)". Red sandstones. Additional note from Khramov (1971). See our first issue.

1.275 **Uluntui Suite** Contains Late Proterozoic fossils. 12 m surveyed. Additional note from Khramov (1971). See our first issue.

1.284 **Karagasski Suite** Vendian sedimentary rocks resting on slates which are dated between 840 and 870 m.y. Overlying rocks (also Vendian) are dated 700 to 747 m.y. by K-Ar on glauconite. Hence age is apparently between 870 and 700 m.y. Samples (17N 6R) given unit weight N=23(17N 6R). Aggregate thickness sampled is 145 m. Supplementing notes from Khramov (1971). See our first issue.

1.314 **Mugford basalt** (Barton, 1973) K-Ar whole-rock ages of 1361, 1484 and 1488 indicate minimum age of 1490 m.y. Rb-Sr data through which a reference isochron of 2300 m.y. can be drawn indicates that the age may be much greater. See our first issue.

1.320 **Gila County diabase sills** (Helsley and Spall, 1972) K-Ar date of 1140, and U-Pb date of 1150 m.y. cited. Cleaning at 88-140 Oe and 400-560°C. Sample spread 50 km. Remanence due to magnetite probably produced during deuteric alteration. Bodies similar to, but somewhat to the SE of, those studied earlier (**1.188**).

1.322 **Grenville diorites near Ottawa** (Irving, Park and Roy, 1972) Collections from near villages of Bryson and Larrimac of foliated diorites that grade laterally into granulite facies rocks. Cleaned in a.f. 250 Oe. Sites unit weight N=13.

1.323 and 1.324 **Mysore dykes** (Hasnain and Qureshy, 1971, Hasnain, 1971) Dolerite dykes give directions different from Deccan Traps (**11.384**) and hence are not feeders of them. Provisionally assigned to Precambrian.

1.325 **Kabalebo Dolerite** (Veldkamp, Mulder and Zijderveld, 1971) Age cited as "probably about 1750 m.y.". Samples unit weight N=30.

1.326 **Mafic dykes Wind River Range** (Spall, 1971) K-Ar (pyroxene) ages of 1760 to 1880 m.y. given. Whole-rock K-Ar dates ranging 900 to 2060 m.y. also quoted. Some samples from 2 of 5 dykes gave low inclinations corresponding to Early Paleozoic field, and are thought by Spall to be remagnetized at that time. Result based on 4 dykes (N=4) spaced over 2 km and corrected for regional tilt (determined from overlying Cambrian sediments) of 15° to NE. Cleaning 175 to 1400 Oe. Author concludes "minimum apparent age of intrusion at 1880 m.y.".

1.327 to 1.330 **Basement metamorphic rocks Rogaland** (Poorter, 1972) Three rock groups. Sites unit weight. Following dates (m.y.) cited: **1.328** K-Ar gave 815 and 864; **1.328** U-Pb on zircons gave 950; **1.329** U-Pb on zircons gave 1030; **1.329** Rb-Sr from micas gave 850, and from whole-rock 1050 and 1152. The age assigned to the magnetization in Table 2 of the original is 850-950 m.y. Alternatively it may be argued that the K-Ar ages reflect post-orogenic uplift and provide a minimum age for the magnetization, whereas the zircon and whole-rock Rb-Sr ages reflect the end of the orogeny and provide a maximum age for the magnetization. Age limits for the magnetization would then be 815-1152 m.y. Sites spread over 50 km. **1.330** combined result, sites unit weight N=31.

1.331 **Egersund dolerite dykes 2** (Poorter, 1972) Intrude Rogaland basement (**1.330**), are unmetamorphosed with glass at margins. The magnetization probably post-dates that of basement.

1.332 **Hunnedalen dykes** (Poorter, 1972) Since direction differs somewhat from that of basement (**1.330**) authors say "that these dykes were intruded after the magnetization of the basement".

1.333 **Hart Dolerite** (Evans, 1969) Rb-Sr age of 1800 ± 25 m.y. cited. Spread over 80 km. Contact test attempted but dispersion very high.

1.334 **Sijarira Group** (Reid, 1968) Conglomerate test made. Age cited as Precambrian to Cambrian.

1.337 **Mackenzie diabase and baked contact rocks** (Irving, Park and McGlynn, 1972) Rocks referred to Mackenzie igneous episode 1200 m.y. (Fahrig and Jones, 1969). Eight sites over 600 km. Study of baked rocks at 4 intrusive contacts and of unheated rocks at distance shows that diabase magnetized during cooling. Cleaning 200 to 2900 Oe.

1.338 and 1.339 **Mackenzie diabase combined 1 and 2** (Irving, Park and McGlynn, 1972) In **1.338** the mean of 35 site poles (each based on 4 to 6 samples) obtained in studies listed under entries (**1.120**, **1.337**, **1.118**) is given N=35. In **1.339** the mean of 5 studies (**1.120** **1.116**, **1.118**, **1.117**, **1.337**) is given N=5.

1.340 **Mackenzie igneous episode** Includes plutonic (Muskox intrusion **1.115**) hypabyssal (Mackenzie diabase dykes and sills **1.339**) and volcanic (Coppermine lavas **1.121** and **1.469**) phases. Mean of poles for each phase is given N=3 (Irving, Park and McGlynn, 1972). The Mackenzie diabase has K-Ar dates ranging 1360 to 865 m.y., and Fahrig and Jones (1969) suggest a preferred age of 1200 m.y. Mackenzie dykes feed the Coppermine lavas, but some Mackenzie dykes may be both older and younger than the flows. The K-Ar ages for the Coppermine lavas range from 740 to 1200 m.y., and an Rb-Sr whole-rock isochron from lower flows gives 1214±45 m.y. (Wanless and Loveridge, 1972). The Muskox intrusion is overlain unconformably by about 1000 m of sediment, which are overlain by the Coppermine lavas. A K-Ar date of 1155 m.y., and an Rb-Sr isochron by R.K. Wanless of 1189 m.y. are cited for the Muskox intrusion by Baragar and Robertson (1973). Decay constant λ=1.47 used for Rb-Sr dates.

1.341 **Et-Then Group** (Irving, Park and McGlynn, 1972) Red beds. Age limits of 1250 to 1845 m.y. cited. Samples spread 30 km. Sites unit weight N=14. Cleaning 600°C.

1.342 **Metamorphic rocks Aldan area** (Katseblin quoted in Khramov, 1971) Archean. Schists gneisses and migmatites of the upper Anabar, Daldyn, and Khapchan Series. Two results with similar directions (167,+13 and 168,+04) and mean is given here. Magnetization "corresponds to the time at which the last phase of high-temperature regional metamorphism, probably at the beginning of the Proterozoic".

1.343 **Lower Sinian sediments (2)** Uppermost Precambrian. Summary of work of Sidorova revised in Khramov (1971). Results from Omino, Malgin, Cipanda and Lakhanda Suites of the Ingli Complex, each given unit weight N=4. Supersedes **1.283**. "Absolute age of 890 m.y." cited. Cumulative thickness 825 m sampled.

1.344 **Ryboretskii sill** (Katseblin quoted in Khramov, 1971) Gabbro and diabase from north of Lake Onega. "Absolute age of 1600 to 1800 m.y." Samples unit weight N=15.

1.345 **Pap intrusion** (Katseblin quoted in Khramov, 1971) The gabbro is intrusive into Imandravarsuga Suite, and is itself intruded by Devonian alkaline rocks. Samples unit weight N=12. K-Ar dates 1820 to 1880 m.y. cited.

1.346 **Sediments from Yenisei Ridge combined** Average of entries **1.57** (1) **1.276** (1) **1.277** (2) **1.350** (1) **1.278** (3) in Khramov, 1971 where these radiometric dates are listed: **1.57** and **1.276** 744-930 m.y.; **1.277** (Tinguisik) 930-950 m.y.; **1.278** (Sukhopit) three values 1120-1150, 1270-1320, and 1300 m.y.: **1.350** 1050-1100 m.y. Method of dating not given. Unit weight to 8 localities N=8. Aggregate thickness sampled exceeds 5000 m.

1.347 **Diabase and diorite Aldan** (Kamysheva quoted in Khramov (1971)) Results from sheet intrusions in dolomites. K-Ar whole-rock date 1590 m.y., but true age may be less. Six outcrops over an area 150 by 300 km. Samples unit weight N=59.

1.348 **Katav Suite** (Komissarova summary of 4 results in Khramov, 1971) Unfossiliferous brown and red limestones. Presumably supersedes **1.281**. Thickness sampled 150 m. K-Ar date of 960 m.y. cited. It is stated that "where magnetization coincides with Permo-Carboniferous magnetization of Russian Platform the age of magnetization is assumed as Hercynian". Presumably such directions have been excluded.

1.350 **Potoskui Suite** (Vlassov and Popova quoted in Khramov, 1971) Slates and sandstones. "Absolute age" of 1050 to 1100 m.y. cited. Thickness sampled 500 m.

1.351 **Blakawatra dolerite** (Veldkamp, Mulder and Zijderveld, 1971) Whole-rock K-Ar age of 1540 m.y. cited. Samples unit weight N=17.

1.352 **Michael gabbro** (Fahrig and Larochelle, 1972) Southerly-dipping intrusive sheets. Four K-Ar ages cited ranging from 974 to 1340 m.y. Rb-Sr isochron 1488 m.y. cited (λ = 1.39). The magnetization is regarded by the authors as of the latter age. In situ directions quoted. Cleaning 350 Oe. Sites unit weight N=21. **1.316** is also from the Michael gabbro but the results differ by 90°. Sampling sites are <30 km north of Grenville Front, and the magnetization is parallel to the post-metamorphic magnetization of Grenville rocks (compare **1.459** or **1.483**) and Irving, Emslie and Ueno (1974) argue therefore that the magnetization of the Michael gabbros may have been acquired during heating as the nearby highly metamorphosed Grenville Province was uplifted about 1000 m.y. ago.

1.353 **Aillik dykes** (Fahrig and Larochelle, 1972) Five K-Ar dates range 685 to 995, with average of 830 m.y. Age preferred by authors 1000-1100 m.y. assuming "some argon loss".

1.354 **Giles Complex** (Facer, 1971a and b) Age of 1060±141 m.y. on nearby volcanics cited. Age of metamorphic basement into which complex intruded considered to be 1300-1600 m.y. Samples unit weight. Directions uncorrected for igneous layering.

1.355 to 1.361 **Bukoban System**

1.355 **Bukoban intrusives** (Piper, 1972) Sills intruding Bukoban Sandstone. Two samples gave K-Ar 806 and 803 m.y. Cleaning 100 to 300 Oe. Sites unit weight N=16. Spread 200 km.

1.356 **Gagwe amygdaloidal lavas** (Piper, 1972) One K-Ar date of 813 m.y. Sites unit weight N=28. Spread 200 km.

1.357 **Malagarasi sandstone** (Piper, 1972) Red and purple sandstone. Upper unit of Busondo Group. Thickness sampled 4 m. Cleaned 500°C. Samples unit weight N=12.

1.358 **Kigonera flags** (Piper, 1972) Red sediments. Overlie Busondo Group (**1.357**). Thickness sampled 20 m. Cleaning 290 to 450°C. Sites unit weight N=4.

1.359 **Bukoban sandstone** (Piper, 1972) Purple sediment considered to be equivalent of Busondo Group (**1.357**) Thickness 3 m. Samples unit weight N=10. Result marginally fulfils minimum reliability criteria and placed in B because author states work of "reconnaissance nature". Brock and Piper (1972) suggest age is about 1000 m.y.

1.360 **Manyovu red beds** (Piper, 1972) Upper unit of Bukoban System, overlie Gagwe lavas (**1.356**). Sites unit weight N=5.

1.361 **Sediments of Bukoban System combined** Combination of **1.357** to **1.361** giving sites unit weight N=11.

1.362 **Basalts of Kisii Series** (Brock, Raja and Vise, 1972) Whole-rock K-Ar dates of 906 and 964 m.y. quoted, and preferred minimum age is 930 m.y. Cleaning 150 to 400 Oe.

1.363 to 1.365 **Dykes near Kingston, Ontario** (Park and Irving, 1972) There are 3 sets of dykes. **1.363** Frontenac dykes, 6 NW-trending dykes sampled over 25 km, whole-rock and biotite dates 751 and 817 m.y. respectively. **1.364** single N-trending dyke. **1.365** single dyke from NE-trending swarm, whole-rock K-Ar dates 402 and 411 m.y.

1.366 **Rhyolites of Lake Gogebic** (Books, 1972) Keweenawan Peninsula. Locally overlie Portage Lake lavas, and either underlie or grade laterally into Copper Harbour conglomerate.

1.367 to 1.369 **Portage Lake lavas** (Books, 1972) Samples from Kearsage section, Keweenawan Peninsula. **1.367** from below conglomerate No. 14, thickness about 2000 m. **1.368** from between conglomerates Nos. 14 and 15, about 200 m sampled. **1.369** from above conglomerate No. 15, about 1000 m sampled.

1.370 **Portage Lake lavas** (Books, 1972) Samples from NE of Kearsage, Keweenawan Peninsula.

1.371 **Quartz porphyry near Lake Gogebic** (Books, 1972) Intruded into Keweenawan lavas. Corrected to dip of lower contact 30°NW.

1.372 **Rhyolite intrusion 1** (Books, 1972) Intruded into Portage Lake lavas of Keweenawan Peninsula.

1.373 **Rhyolite intrusion 2** (Books, 1972) Intrudes Freda Sandstone of Keweenawan Peninsula. Corrected for dip 22°NW.

1.374 **South Trap Range lavas 2** Described as "lowermost Keweenawan lava flows". Samples from lower 100 m of lavas and basal quartzite. Results from upper 2000 m, which are reversed, given in **1.150**. Overlain by Portage Lake lavas.

1.375 and 1.376 **Portage Lake Lavas** (Books, 1972) Described as "Portage Lake lava equivalents". **1.375** from Chippewa Hill, and **1.376** from Algonquin Falls, both in Michigan.

1.377 **North Shore Volcanic Group** (Books, 1972) Exposed between Tofte and Grand Portage. Results from 20 lowermost flows (reversed) were reported earlier (**1.149**).

1.378 and 1.379 **Isle Royale** (Books, 1972) Lavas divided into two groups on basis of directions, which show two distinct groups.

1.380 **Marquette Range Supergroup** (Books, 1972) Ironwood Michigan. Previously called "Animikie". Keweenawan igneous sequence rests upon it.

1.381 **Rove Slate** (Books, 1972) Grand Portage, Michigan. Animikie Series.

1.382 **Bighorn Mountains dykes** (Larson, Reynolds and Hobbitt, 1973) Average of 6 basic dykes is given N=6. K-Ar dates of 1390 to 2020 m.y. cited.

1.383 to 1.388 **Bear Tooth Mountain dykes** (Larson, Reynolds and Hobbitt, 1973) Results from 8 mafic dykes of differing radiometric ages and trends. **1.383** NW trend, dates of 2550 (Rb-Sr) and 1010 (K-Ar) cited, directions close to those in adjacent Tertiary stock and are considered by authors to be Tertiary. **1.384** NE trend, whole-rock K-Ar date of 730 m.y. cited, 2 sites, 1 dyke. **1.385** NE trend, dates of 2550 (Rb-Sr) and 2160 (K-Ar) cited, authors believe magnetization dates from time of recrystallization which is equated with K-Ar date. **1.386** NW trend, dates of 2550 (Rb-Sr), 1690 and 1960 (K-Ar) cited, authors believe magnetization dates from time of recrystallization which they equate with K-Ar date. **1.387** N trend, dates of 2550 (Rb-Sr) and 2000 cited (K-Ar), unrecrystallized dyke and authors believe magnetization is primary. **1.388** NW trend, dates of 1500 (Rb-Sr) and 1500 (K-Ar) cited. Pole **1.388** differs from that usually associated with rocks of this age and authors suggest this is due to 50° anti-clockwise rotation. Thus all older (**1.385** to **1.387**) poles have also rotated. This, the authors argue, brings the older results into conformity with those from rest of Laurentia, notable the Matachewan diabase.

1.389 **Owl Creek Mountains dykes** (Larson, Reynolds and Hobbitt, 1973) K-Ar dates 1910 to 2090 cited. WNW trend. Three basic dykes show good agreement.

1.390 **Laramie Range anorthosite** (Larson, Reynolds and Hobbitt, 1973) Samples unit weight N=8. K-Ar date of 1500 m.y. cited.

1.391 **Rama diabase** (Larson, Reynolds and Hobbitt, 1973) K-Ar dates of 850 and 935 cited. Sills and dykes in Hakatai Shales and Bass Limestone, at Hance Rapids, in the Grand Canyon. Directions more scattered after correction for dip of adjacent sediments. Directions in nearby unbaked Hakatai Shales essentially same as in diabase. Mean of 4 bodies listed in original N=4.

1.392 **Portage Lake lavas combined** 2 Mean of **1.39**, **1.131**, **1.148**, **1.367** to **1.370**, **1.375**, **1.376** N=9.

1.393 **North Shore Volcanics normal** Average of **1.146** and **1.377**.

1.394 and 1.395 **Mamainse Point and Gargantua Point lavas** (Robertson, 1973b) These two sequences are 70 km apart. In earlier work (**1.141** and **1.144**) results from them were given separately. Robertson combines his observation from them because the presence of a prominent marker flow in both sections suggests they are equivalent. The Gargantua Point sequence contains one reversal (reversed below). The Mamainse Point sequence (6000 m) apparently contains several reversals, but he maintains that they are caused by faulting, so that in reality only one reversal (reversed to normal) is present. He argues that the absence of 180° alignment is not caused by secondary components, as Palmer (1970) contends, but a true field direction. Sites given unit weight. K-Ar dates of 800-1055 m.y., and an Rb/Sr isochron (Van Schmus, 1971) of 1070 ±50 m.y., λ=1.39, are cited.

1.396 **Nankoweap Formation** (Elston and Scott, 1973) Overlies Unkar Group of Grand Canyon Supergroup. Six samples from basal ferruginous beds each unit weight N=6.

1.397 and 1.398 **Cardenas Lavas** (Elston and Scott, 1973) Uppermost unit of Unkar Group. **1.397** from 2 flows and 8 sandstone samples each given unit weight N=10. **1.398** results from weathered zones developed across these lavas. K-Ar date of 845 ±15 m.y. given by Ford Breed and Mitchell (1972). Rb-Sr date of 1090 ±70 m.y. cited by Elston, Grommé and McKee (1973).

1.399 and 1.400 **Haliburton basic rocks** (Buchan and Dunlop, 1973) Collections from the Bark Lake and Dudmon diorites and the Glamorgan gabbro had a high coercive force magnetization (**1.399**), and a magnetization of lower coercive force (**1.400**) often coexisting in same specimen. Sites unit weight in **1.399**. Specimens unit weight in **1.400**.

1.401 **Vestfold dykes** (Embleton and Arriens, 1973) Result based on 9 samples from 9 dykes near Davis Camp. Rb-Sr isochron of 1030 ±220 m.y. cited.

1.402 **Vendian Stage** (Gusev listed in Khramov, 1973) K-Ar dates of 610-621 m.y. correspond to metamorphism at end of Baikalian orogeny. Amphibolite-plagioclase gneisses. One exposure, 400 m, on Lenivaya R. Samples unit weight N=32. Intersections of remagnetization circles used to calculate direction.

1.403 **Yenisei Series** (Ponomarev listed in Khramov, 1973) Late Proterozoic. Grey dolomites from upper part of Series. Five exposures, 1-6 beds in each. 190 m sampled. Directions from intersections of remagnetization circles. Magnetization pre-folding, which is Salairskaya Phase.

1.404 **Anabar Peak dolerites** (Gusev listed in Khramov, 1973) Late Proterozoic. K-Ar of 820, 912, and 1135 m.y. (ave 960). Unaltered sills in Upper Proterozoic carbonate rocks. Three sills, 12, 8 and 6 m thick, Fomich River, spread 32 km. Cleaning 150 to 360 0e.

1.405 **Lower and Middle Yatulii** (Ignat'era summary result listed in Khramov, 1973) Whole-rock K-Ar determinations on slates indicate age of 1610-1870 m.y. Thermal demagnetization of selected specimens. Summary of 4 determinations. (a) Sandstone, 2 exposures, Belomorskii region, 7 beds, 7 samples, spaced through 1300 and 700 m, 359, +58. (b) Undifferentiated sandstone and quartzite, 3 exposures, Lake Elmozero, 14 samples, 331, +60. (c) Sandstone and quartzite, 5 exposures, 5 samples, directions estimated from 10 intersections of remagnetization circles, 344, +52. (d) Quartzites and effusive diabase, 2 exposures, 5 flows, total thickness 310 m, 12 samples, 345, +42.

1.406 and 1.407 **Taratash Intrusive Complex** (Danukalov in Khramov, 1973) Seems to be a composite sequence of widely ranging ages. Gabbro-diabases near Tara-Tash. Samples unit weight. A.f. (800 Oe) and thermal cleaning of selected samples did not change directions. **1.406** Early Proterozoic, K-Ar date of 1550 m.y. cited. **1.407** Archean, K-Ar date of 2078 m.y. cited. Compare **5.161** and **4.70.**

1.408 **Quartz gabbro-diabase stock** (Kamysheva in Khramov, 1973) Proterozoic or Archean. Cut by granite and pegmatite with K-Ar dates on muscovite and biotite of 2085-1850 m.y. One exposure, Sololi R.

1.409 **St. Urbain anorthosite** (Hargraves and Roy, 1974) Samples were obtained from scattered bodies mainly associated with the Charlevoix crypto-explosion structure, in the Grenville Structural Province, Quebec. Samples over 20 km distant from centre of structure gave this result, after demagnetization in 100-500 Oe. Sites unit weight N=5. Results near centre were scattered. Impactite from the structure gave a radiometric date of 350 m.y.

1.410 **Sparrow dykes** (McGlynn, Hanson, Irving and Park, 1974) K-Ar whole-rock dates of 1390, 1480 and 1550 m.y. cited, and considered to represent the younger limit. $^{40}Ar/^{39}Ar$ studies yield a plateau age for the least altered dyke of about 1700 m.y., which is regarded as the best available estimate. Ten dykes, each unit weight, over 100 km. Baked contact studies indicate magnetization original. Cleaning in 150 to 500 Oe.

1.411 **Nonacho Group sandstones** (McGlynn, Hanson, Irving and Park, 1974) They overlie basement of the Churchill Structural Province, which may be updated Archean or early Proterozoic, and are intruded by Sparrow dykes (approximately 1700 m.y. see **1.410**). Probable age therefore is Aphebian approximately 2500 to 1700 m.y. Magnetization post-dates folding, and is considered to have been acquired during uplift over a long interval from about 1700 to 1400 m.y. Sites unit weight. Cleaning at 500 and 550°C.

1.412 **Nemegosenda Carbonatite Complex** (Symons and Garber, 1974) Circular diatreme or volcanic neck 8 km in diameter. K-Ar date of 1988 and 1036 m.y. cited, and latter regarded as "good estimate of the real age". Similar bodies nearby yield ages of 1103, 1090, 1069 and 1048 m.y. Cleaning 150 to 350 Oe. Eleven sites from complex and metasomatic aureole.

1.413 and 1.414 **Spanish River Complex** (Robertson and Watkinson, 1974) K-Ar dates range 1800 to 1400 m.y. Whole-rock Rb-Sr isochron of 1790 ±100 m.y. cited, λ=1.39. A.f. cleaning 200 Oe. Samples unit weight. Results show high scatter. **1.413** from ijolites and carbonatites. Samples unit weight. **1.414** from associated dykes and fenites. The time at which magnetizaton was acquired is in doubt.

1.415 to 1.417 **Mealy Mountain anorthosite suite** (Fahrig, Christie and Schwarz, 1974) No radiometric work available. Rocks are from eastern Grenville Structural Province, Labrador. Sampling over 200 km. Sites unit weight. Two magnetizations present. **1.415** north-west component from anorthosite, monzonite and gabbro. **1.416** north-west component from anorthosite only, calculated from original Table 1. **1.417** east component from anorthosite, monzonite, and gabbro.

1.418 to 1.420 **Shabogamo gabbro** (Fahrig, Christie and Schwarz, 1974) Labrador. Body has an irregular outcrop extending up to 100 km north of the Grenville Front and at least 50 km south of the Front. Study area is north of Front. **1.418** results 30 km or less from Front, and **1.419** results 80 km north of Front, both recalculated from Table 1 of original. **1.420** combined.

1.421 **Nipissing diabase** (Patel and Palmer, 1974) K-Ar biotite date of 2095, and Rb-Sr whole-rock isochron of 2155 ±80 m.y. cited, λ=1.39. Samples from Lake Matinenda area. Result based on selection of 5 sites which show ilmenite-hematite exsolution textures.

1.422 **Stoer Group** (Stewart and Irving, 1974) Rb-Sr isochron of 991 ±24 m.y. cited, λ=1.39. Thickness sampled 600 m. Four localities, spread 20 km. Study of conglomerate shows magnetization older than overlying Torridon Group (**1.423**). Study of penecontemporaneous slumps show magnetization to date from time of formation. Cleaning 500°C. Supersedes **1.2.**

1.423 **Torridon Group** (Stewart and Irving, 1974) Rb-Sr isochron of 796 ±24 m.y. cited, λ=1.39. Samples from lower 100 m only. Cleaning at 500°C. See **1.1.**

1.424 to 1.427 **Birrimian and Tarkwaian rocks West Africa** (Piper and Lomax, 1973) These rocks are referred by the authors to the interval 2200-2000 m.y. and are metamorphosed to middle greenschist or amphibolite facies. **1.424 Obuasi greenstone body**, recrystallized during regional metamorphism, U-Pb age of 2200 m.y. from galena cited, directions scatter when rocks demagnetized. **1.425 Tarkwa dolerites**, scatter diminishes after correction for tilt. **1.426 Obuasi dolerite dyke**, intrudes **1.424** and subjected to some regional shearing. **1.427 Ivory coast dolerite.**

1.428 **Franklin diabase Baffin Island** (Fahrig and Schwarz, 1973) Sites unit weight N=10. Cleaning 200 to 300 Oe. Spread 1000 km.

1.429 **Franklin diabase combined 2** Average given by Fahrig and Schwarz (1973) of results from extensive area of northern Canada, Coronation Sills **1.312**, northern Quebec and northern part of mainland Arctic Canada **1.162**. Sites unit weight N=46. Spread 3000 km.

1.450 **Franklin diabase combined 3** Average of entries **1.162, 1.312, 1.428** and **1.451** giving sites unit weight N=51. Two sites from Victoria Island given by Robertson and Baragar (1972) are included.

1.451 **Franklin diabase Keewatin** (Park, 1974) Results from 3 dykes in district of Keewatin which include detailed studies of heated contacts showing that the magnetization of the Franklin diabase was acquired at the time of cooling.

1.452 **Mackenzie diabase** (Park, 1974) Study of 12 dykes and heated contact rocks showing that remanence dates from time of cooling.

1.453 **Mackenzie diabase combined** Combination of entries **1.338** and **1.452** giving sites unit weight N=47.

1.454 and 1.455 **Franklin diabase** Means of normal and reversed sites.

1.456 **Metamorphic rocks Melville Peninsula and Daly Bay** (Park, 1973) Foliated rocks of basic composition metamorphosed to amphibolite grade. No systematic effect on directions due to anisotropy. Evidence given which suggests that magnetization corresponds in time approximately to K-Ar dates obtained from micas in the region, 1622 ±30 m.y., 12 values. A second magnetization (055, +72) also observed but this "probably of recent origin". Sites unit weight N=16.

1.457 **Wilberforce pyroxenite** (Palmer and Carmichael, 1973) Grenville Province high-grade metamorphic rocks.

1.458 **Tudor gabbro** (Palmer and Carmichael, 1973) No age dating on body itself. Intrudes metavolcanics with zircon U-Pb ages of 1310 ±15 m.y. Comparable nearby bodies, thought to represent same series, give zircon ages of 1250 ±25 m.y. Body is metamorphosed to greenschist facies and plutons thought to have been emplaced during culmination of metamorphism "dated at 1125 ±25 m.y." Spread 5 km.

1.459 **Grenville Front anorthosites** (Palmer and Carmichael, 1973) Results from two bodies within the Grenville Province about 20 km south of the Grenville Front.

1.460 to 1.466 **Seal and Croteau Groups** (Roy and Fahrig, 1973) Study of 46 sites from an aggregate of 1000 m. The Seal overlies the Croteau, and all collecting localities are within 30 km (north) of the Grenville Front. A Croteau isochron of 1563 ±43 (λ=1.39) is cited. The Seal is dated only by whole-rock K-Ar at 960 and 865 m.y., but is certainly older. Seal rocks apparently are younger than the Harp Lake anorthosite which is considered to be about 1400 m.y. The Seal red beds (**1.464**) have blocking temperatures commonly as high as 670°C and magnetization is considered primary. The Seal volcanics have two magnetizations (*A* and *B*). *B* has a remanent coercive force > 1000 Oe and is found in red hematized basalt. The remanence directions of Seal *B* and the Seal red beds are similar. The directions of the Seal *A* and Croteau igneous rocks are also similar. Two explanations have been suggested: the *A* remanence of the Seal-Croteau igneous rocks could be primary and Seal *B* secondary (Roy and Fahrig, 1973); alternatively the former could be secondary originating at the time of formation of the Grenville Front, and Seal *B* primary could be dating from the time of deuteric alteration of the Seal volcanics (Irving, Emslie and Ueno, 1974).

1.467 **Otish gabbro** (Fahrig and Chown, 1973) Two sills and some dyke-like feeders were sampled. Age "not precisely known". One whole-rock K-Ar date of 1465 m.y. cited. The gabbro intrudes the sedimentary Otish Mountains Group, which, it is argued, is "certainly older than 1787 and possibly older than 1960 m.y." The Otish Mountains Group "may be correlative with the Huronian which has an age of 2300 m.y." The age limits of the gabbro would therefore appear to be 2300-1465 m.y. Cleaning 150-250 Oe. Spread 40 km.

1.468 **Martin Formation** (Evans and Bingham, 1973) Red beds, lavas, and sills. Thickness sampled 3000 m. Spread 12 km. A basaltic flow in the Martin gives (a) 1635 ±180 m.y. by K-Ar whole-rock. The Martin overlies the Tazin Group which has yielded an Rb-Sr isochron of (b) 1975 ±20 m.y., and which also contains a dyke dated at (c) 1835 ±50 by biotite K-Ar. Gabbro dyke cutting the lower Martin gives (d) 1490 ±100 by whole-rock K-Ar. Two age limits for Martin cited by authors: 1830 to 1650 m.y. based on (a) and (b); and 1970 to 1760 m.y. based on U-Pb dating of associated mineralization. It is possible that (c) was updated at time of Martin volcanism and hence provides a good estimate of its age. Precision improves significantly after correction for folding from 3 to 15.

1.469 to 1.472 **Coppermine River Group** (Baragar and Robertson, 1973) Coppermine River Group comprise a lower sequence of lavas (3300 m), and an upper sequence of interlayered flows and red beds. An isochron of 1214 ±45 m.y. (λ=1.47) cited for the lower lavas. K-Ar dates range 740 to 1200 m.y. These younger dates are attributed to the intrusion of the nearby Coronation Sills. Earlier result (**1.121**) was from lower lavas. **1.469** red beds from upper part. **1.470** lavas from upper part. **1.471** lavas from upper part separated from other localities by a fault and magnetization suggest 28° anticlockwise rotation relative to the main localities. **1.472** combination of **1.121** (omitting 3 divergent sites) **1.469** and **1.470** giving sites unit weight N=30.

1.473 **Sibley Group** (Robertson, 1973a) Rb-Sr isochron 1370 ±32 m.y. (λ=1.39) by R.K. Wanless, personal communication. Rests on Animikie sediments, is overlain by Osler Formation, and is intruded by Logan diabase. Results (**1.474**) from rocks heated by diabase, show that magnetization **1.473** predates the Logan diabase, and that the magnetization of the diabase was acquired at time of cooling.

1.474 **Sibley Group heated** (Robertson, 1973a) Red beds remagnetized by heating during intrusion of Logan diabase. See **1.473**.

1.475 **Satakunta sandstone** (Neuvonen, 1973) Jotnian. Age of 1300 m.y. cited but "no fully reliable age is yet available". Intruded by Satakunta dolerite (**1.237**). Cleaning 400°C.

1.476 **Egersund anorthosite** (Hargraves and Fish, 1972) Samples from two adjacent bodies the Egersund-Ogna and Haaland-Helleren anorthosites. Cleaning 300 Oe. Spread 30 km.

1.477 **Basic granophyre ring dykes of Vredefort Complex** (Hargraves, 1970) Radiometric age of 1970 m.y. cited.

1.478 to 1.481 **Dubawnt Group** (Park, Irving and Donaldson, 1973) Christopher Island volcanics (**1.479**) overlie Kazan red beds (**1.480**), which are intruded by syenite (**1.478**) and dyke feeders to the Christopher Island, all of which have been sampled. Thickness sampled about 5000 m. Baked contact studies suggest that dyke magnetization is original. Igneous rocks have K-Ar age of 1716 m.y. and Rb-Sr isochron of 1725 ±4 m.y., λ=1.47. Basement, on which Kazan rests has mean K-Ar age of 1735 m.y. Hence Kazan probably only a little older than Christopher Island Formation. Sites unit weight.

1.482 to 1.484 **Morin Complex** (Irving, Park and Emslie, 1974) The complex has two main magnetizations commonly coexisting in the same sample. Granulite facies metamorphism of region probably occurred about 1124 ±27 m.y. (λ=1.39). The high remanent coercive force component M1 (**1.482**) which is due to hematite and has coercive forces over 1000 Oe is considered to have been acquired following this metamorphism. The medium coercive force component M2 (**1.483**) has coercivities of 100–1000 Oe, is thought to be due to magnetite, and was probably acquired in the last stages of regional uplift about 1000 m.y. The subordinate magnetization M3 (**1.484**) is found in the marginal pyroxene granulites and in a basic dyke-like body, and may be very late Precambrian in age.

1.486 and 1.488 **Gwalior Traps** (Klootwijk, 1974) Rb-Sr age of 1830 ±200 m.y. cited. Two traps in Morar (upper) stage of Gwalior Series. Three directions observed. **1.486** is found at 3 sites and are separable by demagnetization. **1.487** is the more stable and is considered to be the primary magnetization. **1.488** is similar to earlier result of Athavale.

1.489 and 1.490 **Dalradian tillite** (Tarling, 1974) Eocambrian. Two directions observed from Garbh Eileach. Author regards **1.489** as primary and **1.490** as secondary, but absence of fold test makes this uncertain. Data quoted with respect to bedding. Poles from directions uncorrected for bedding are 25N, 172W and 28S, 117E respectively. Cleaned at 200°C.

1.491 and 1.497 **Aphebian dykes of Slave Province** (McGlynn and Irving, 1975) Unmetamorphosed basic rocks intrusive into Achaean basement rocks with granites with Rb-Sr dates of 2550 to 2660 m.y. (λ=1.39).

1.491 **Dogrib dykes** (McGlynn and Irving, 1975) K-Ar whole-rock dates of 900 to 2310 m.y. cited. Rb-Sr isochron of 2692 ±80 m.y. (λ=1.39) by Gates and Hurley (1973). Studies of baked contact rocks yield no stable magnetization, but divergence of directions from those in rocks in the near vicinity indicate that the magnetization predates the Indin dykes (**1.492**) and is probably primary. Sites unit weight N=26. Spread 50 km. Cleaning 200-500 Oe.

1.492 **Indin dykes** (McGlynn and Irving, 1975) K-Ar whole-rock dates of 1205 to 1935 m.y. Rb-Sr isochron 2093 ±86 m.y. (λ=1.39) by Gates and Hurley (1973). Baked contacts yield directions parallel to dykes, but directions at distances of over 1 km were different indicating that the magnetization is primary. Sites unit weight N=13. Spread 150 km. Cleaning 200-400 Oe.

1.493 **X dykes** (McGlynn and Irving, 1975) Three dykes having uniform directions and their ages are considered to be *about* the same as **1.491**. Site unit weight N=3.

1.494 **Slave Province overprint** (McGlynn and Irving, 1975). SE directions of intermediate coercive force are found sporadically in several rock units of the Slave Province and are summarized here giving samples unit weight N=13. They are considered to have originated during post-Hudsonian uplift.

1.495 to 1.497 **Miscellaneous diabase of Slave Province** (McGlynn and Irving, 1975) Three small bodies of uncertain age.

1.498 **Town Mountains Granite** (Spall, 1972) Lone Grove Pluton. Directions scattered and are not improved by demagnetization. Rb-Sr and K-Ar mineral ages fall between 1000 and 1050 m.y. Collections from associated rhyolite dykes (Ilanite) are scattered.

1.500 to 1.503 **Whitestone anorthosite and diorite** (Ueno, Irving and McNutt, 1974) Amphibolite grade metamorphic rocks form Grenville Province. Four magnetizations occur. *WW* **(1.500)** and *WZ* **(1.503)** are due to hematite, have remanent coercive forces commonly > 1000 Oe, and are considered to have been acquired soon after metamorphism (approximately 1100 m.y.). *WX* **(1.501)** and *WY* **(1.502)** are probably due to magnetite, have coercive force between 300 and 1000 Oe, and are considered to have been acquired during later stages of regional uplift about 1000 m.y.

1.504 **Western Channel diabase** (Irving, Donaldson and Park, 1972) Dykes and sills of east shore Great Bear Lake. K-Ar date on biotite of 1400 ±75 m.y. cited. Intrudes basement dated at 1785 m.y. by K-Ar. Hence age limits 1325 to 1785 m.y. Contact test shows magnetization dates from time of intrusion. Spread 40 km.

1.505 **Hornby Bay Group** (Irving, Donaldson and Park, 1972) Red beds overlying **1.506** and intruded by **1.504**.

1.506 **Cameron Bay porphyry** (Irving, Donaldson and Park, 1972) Rb-Sr isochron of 1770 ±30 m.y. λ=1.39 (Robinson and Morton, 1972).

1.507 to 1.509 **Newer dolerites of Singhbhum** (Verma and Prasad, 1974) Dykes cut Singhbhum granite (Bihar) which marks end of the Singhbhum cycle which is cited as about 850 m.y. K-Ar dates of 1560 and 1690 m.y. reported (it is not clear if they refer to dykes sampled paleomagnetically) so older dykes may be present. **1.507** 7 dykes each unit weight, cleaning 200 to 450°C. **1.508** two dykes. **1.509** one dyke with magnetization close to that for Deccan traps.

1.510 **Stillwater Complex** (Bergh, 1970) K-Ar biotite and whole-rock ages of 3100 and 3200 ±200 m.y. cited. An Rb-Sr isochron of 2950 ±330 m.y. also cited. It is stated that "regional metamorphism on an impressive scale" occurred between 2600 and 2700 m.y. The magnetization may have dated from uplift following regional metamorphism and the magnetization may be post-, not pre-deformational, as is assumed in entry **1.244**. In **1.510** the directions and pole are given with respect to present horizontal.

1.511 to 1.517 **Synorogenic diorite-gabbro intrusions** Data summarized in and abstracted from Neuvonen (1974). Age "considered to be about 1900 m.y.". Intruded during Svecokarelian orogeny. Occur in west Finland and northern Sweden, spread over about 600 km. **1.319** Tarendo gabbro, see our first issue. **1.511** Neuvonen (1974) cleaned 250-350 Oe. **1.512** Pesonen and Stigzelius (1972) see **1.318** for earlier mention. **1.513** Pesonen and Stigzelius (1972). **1.514** and **1.515** Grundstrom (1967). **1.516** Puranen (1960, 1968). **1.517** is the mean of poles in entries **1.319**, and **1.511** to **1.516**, N=7.

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