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Magnetic Observations at Mawson, 1955

by

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P R E F A C E

The geomagnetic work at Mawson, Antarctica, which is described in this report, was planned and carried out by the Bureau of Mineral Resources, Geology and Geophysics of the Department of National Development, and was made possible by the Australian National Antarctic Research Expedition (A.N.A.R.E.), which established a scientific research station at Mawson in the summer of 1953/54. The instruments used in making the geomagnetic observations were supplied by the Bureau of Mineral Resources, and the observatory buildings and living accommodation were provided by the A.N.A.R.E., which is responsible for the general administration of the research station.

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A B S T R A C T

This report describes the establishment of a Geomagnetic Observatory at Mawson, Antarctica, early in 1955, by the Commonwealth Bureau of Mineral Resources, Geology and Geophysics.

The base established by the A.N.A.R.E. is briefly described and a detailed description is given of the observatory buildings and the instruments used. Hourly values and associated means of the magnetic elements (declination, horizontal intensity and magnetic intensity) are presented in tabular form for the period August to December, 1955.

INTRODUCTION

The Australian National Antarctic Research Expedition (A.N.A.R.E.) of the Antarctic Division, Department of External Affairs, has carried out a programme of scientific research at Macquarie Island and Heard Island since 1947. The Bureau of Mineral Resources, Geology and Geophysics of the Department of National Development has been responsible for planning and carrying out geomagnetic and seismic research programmes at these stations.

At the beginning of 1954, the A.N.A.R.E. established a base at Mawson on the coast of the Antarctic Continent. Mawson lies in the sector known as MacRobertson Land; its geographic co-ordinates are 67° 36' S., 62° 54' E., and its geomagnetic co-ordinates are -73.1°, 103.4°. During the inaugural year of 1954, scientific work at Mawson was restricted mainly to meteorology and geology.

Personnel at A.N.A.R.E. stations normally remain for one year at the station. A ship calls annually with the relieving party and with stores and provisions.

At the beginning of 1955, the writer was the geophysicist in a party of fifteen men sent to relieve the first party and carry out a more extensive scientific programme. It was the writer's task to establish and maintain a magnetic observatory at Mawson.

En route to Mawson, the ship called at Heard Island, where the station was being closed down, and the two magnetic huts and the variometers were taken aboard for use at Mawson.

DESCRIPTION OF MAWSON BASE

The scientific station is pleasantly situated on the shore of a sheltered harbour (Plate 1) in a small rocky area almost free from ice and snow. For about nine months of the year the sea is frozen as far as the eye can see, but during the rest of the year the harbour and adjacent coastline are ice-free. Behind the rocky camp area, the ice plateau begins; it rises sharply at first and then more gradually to a height of 6,000 feet at a point 160 miles inland. On either side of the rocky area the plateau terminates in ice cliffs up to 100 feet high which form the coastline.

The rocky area and islands nearby are all coarse-grained felspar porphyry of fairly uniform texture and composition. Much of the surface is swept clean by the wind, but in parts it is strewn with huge boulders which include both local rock and glacial erratics. Moss and lichen constitute the only vegetation. In summer the shore is frequented by seals, penguins and other sea-birds, but these migrate to other areas in winter.

The climate is rigorous; during the year described in this report the air temperature ranged from -22.2° F. to $+45.3^{\circ}$ F., the mean annual temperature being $+12.8^{\circ}$ F.. The annual mean wind was 23 m.p.h. with a maximum gust of 110 m.p.h. Snow fell on many days and there were almost continuous blizzards on 30 days. As Mawson is just inside the Antarctic Circle, there are several days in mid-winter when the sun does not appear above the horizon.

MAGNETIC OBSERVATORY BUILDINGS

A. THE SITE

Readings taken with a Watts vertical-force magnetic balance showed that there is no large magnetic anomaly in the eastern part of the rocky area. The building sites were chosen, therefore, for flatness and accessibility, but far enough from other station buildings to be free from magnetic interference (Plate 1). As the Variometer Hut must be visited every day, regardless of weather, it was located closer to the living quarters than the Absolute Hut.

B. METHOD OF SECURING BUILDINGS

The bearers of the magnetic huts project outwards a foot or more from the walls. A "Warsop" rock-drill was used to bore a hole about one foot deep alongside each bearer. Lengths of $\frac{3}{4}$ -in. non-magnetic brass rod were cut to size and threaded at each end; their lower ends were cemented into the holes with melted sulphur and the upper ends projected through holes in lengths of timber laid across the bearers. Nuts on the upper ends of the rods thus secured the bearers firmly to the rock, and wedges driven between the rods and bearers prevented the latter from sliding.

Ingall (1953) gives a detailed description of the two buildings. The prefabricated panels of the huts are fixed together with non-magnetic screws, bolts and brackets. In addition, loops of copper cable were tied from the roof edges to the bearers, and as a final precaution against overturning in high winds, a single inclined strut was fitted from the roof edge to the ground on the down-wind side.

C. THE ABSOLUTE MAGNETIC HUT

Reassembly of the hut resulted in gaps between some of the panels; these were sealed with sponge rubber and a bituminous sealing compound, and were eventually made snow-proof. The interior of the hut was painted white.

A 12-in. square Oregon instrument pier was erected; it was set in a concrete block cast on the rock surface (Plate 2). A deep slot was sawn in the top of the pier to accommodate the turn-magnet of the Magnetometric Zero Balance (B.M.Z.). A fibre plate with three grooved brass foot-plates was screwed to the top of the pier.

The instrument pier stands below a skylight, but as there is no natural lighting in winter, an electric lamp was mounted on a ceiling bracket directly above the pier. The Quartz Horizontal Magnetometer (Q.H.M.) requires light from vertically above the eyepiece, and it had previously been found that a single open bulb is inadequate for the purpose. In this instance, therefore, an "Oyster bowl" fitting was used; having a diameter of about one foot, it provided excellent lighting at any angular setting of the Q.H.M., and its 100-watt bulb gave good general lighting in the hut. A 1000-watt electric radiator made of non-magnetic material gave some measure of comfort during winter observations.

Electric power at 240 volts A.C. is reticulated on steel poles six to seven feet high. Near the Absolute Hut, however, copper poles were used.

D. THE VARIOMETER HUT

The Variometer Hut was erected with its long axis in a north-south (magnetic) direction. It was snow-proofed in the same way as the Absolute Hut.

Two large slate slabs (Plate 3) for the recorder and variometers respectively, were each supported on two columns; the columns consist of two earthenware pipes cemented together and cemented to brass hook-rods fixed into holes drilled in the rock. As for all other concrete work on the station, "Ciment Fondu" high alumina cement was used.

About 50 yards from the Variometer Hut a box was erected on a stand and attached for support to one of the power-line poles; in the box were housed a 6-volt accumulator, a trickle charger and a rheostat for controlling the charge. This equipment supplies the current for the variometer lamp and scale-value circuits.

A blizzard line of light rope, rigged between the power poles, proved useful for hauling oneself along and avoiding being blown over or becoming lost in blizzards. Without it, the journey to the huts would have been almost impossible in bad weather.

ABSOLUTE MAGNETIC INSTRUMENTS

Absolute observations were commenced on 4th May, 1955, on which date the hut was ready for use. Thereafter, absolute observations were made at intervals averaging about 8 days. Whenever possible, observations were made during relatively undisturbed conditions.

The instruments were of the semi-absolute type and comprised a set of three Q.H.Ms., Nos. 300, 301 and 302, for measuring the horizontal component and declination of the earth's field, and a universal B.M.Z., No. 115, for measuring the vertical component of the earth's field. These instruments were all of La Cour pattern, and are

fully described by La Cour (1936 and 1942). The instruments were received from the makers just before the writer's departure for Mawson, and there was no time to compare them, as had been intended, with instruments at Toolangi Observatory. At the end of the writer's period of duty at Mawson, they were compared with Q.H.M. No. 174, Askania magnetometer No. 508813 and B.M.Z. No. 121 by P.M. McGregor, resident geophysicist at Mawson during 1956.

A. THE QUARTZ HORIZONTAL MAGNETOMETERS

Q.H.M. No. 302 was used exclusively until late in September when time was found to intercompare the three magnetometers. It was then found that No. 302 is optically very inferior to the other two, apparently through lack of flatness of its glass windows. This results in a multiple image of the azimuth mark when sightings are taken during D-observations. This effect was responsible for some of the scatter in early baseline determinations. The instrument was, however, quite satisfactory for H-observations. When the limitations of Q.H.M. No. 302 were realised its use was discontinued except for a later H-intercomparison with Nos. 300 and 301.

It was found that the Q.H.M. telescope had to be depressed about one degree below the horizontal when viewing the image reflected from the suspended mirror. Accordingly, an azimuth mark was established about one degree below the horizontal from the instrument pier, thus eliminating any error due to non-verticality of the telescope cross-hair.

Changes in H-baseline values during the year are attributed to inconsistency of the H-variometer. The final intercomparisons for H with Q.H.M. No. 174 indicated that a provisional I.M.S. correction of minus 6 gammas should be applied to Q.H.Ms. Nos. 300, 301 and 302. This correction has been applied to baseline values as determined by these three Q.H.Ms. throughout the period described in this report. The Q.H.M. is considered to be a reliable instrument for measuring horizontal intensity, and is ideally suited to measurements in regions of almost continuous magnetic disturbance.

D-baseline determinations gave values which remained at a fairly steady average figure for several months and then changed at a rapid rate through a range of nearly 10 minutes of arc. As the Q.H.Ms. were mutually fairly consistent, the fault was at first attributed to the D variometer. The intercomparison with Askania magnetometer 508813, however, showed an error of almost exactly this amount in the Q.H.Ms. This error was confirmed by an examination of the year's H determinations which showed that the value "alpha" for the Q.H.Ms. had changed gradually at such a rate as to account for the apparent change in D-baseline values.

B. THE MAGNETOMETRIC ZERO BALANCE

B.M.Z. No. 115 functioned satisfactorily throughout the period, with the exception of the slow-motion knob on the turn-magnet, which used to work loose in cold weather. It was eventually locked to its shaft with a small copper key. The rapidity with which readings can be taken with a B.M.Z. makes it an ideal instrument for the control of Z variometers in magnetically-disturbed regions.

The intercomparison with B.M.Z. No. 121 indicated a zero provisional I.M.S. correction for B.M.Z. No. 115. No corrections have therefore been applied to the Z-baseline values as determined by No. 115.

C. METHOD OF ABSOLUTE OBSERVATIONS

It was conclusively proved that a Q.H.M. is not influenced by another Q.H.M. or by either the turn-magnet or balancing magnet of the B.M.Z., provided they are more than a few feet from it. Thus, during observations of H and D, the two spare Q.H.Ms. and the B.M.Z. were stored in the Absolute Hut at a point farthest from the observing pier. As an added precaution, the two Q.H.Ms. were placed side by side with their magnets in opposition, and the B.M.Z. turn-magnet was orientated in opposition to the balancing magnet. It was, of course, necessary to have the large B.M.Z. field magnet at a greater distance from the magnetometers; the magnet was therefore wrapped in a snow-proof plastic bag and kept some distance from the hut during observations of H and D.

In colder weather the electric radiator was switched on about an hour before the commencement of absolute observations, to give the instruments time to warm up to hut temperature.

Readings were taken in the order Z, H, D, D, H, Z. Each Z determination and each D determination consisted of three readings, and each H determination gave two independent values.

The B.M.Z. field magnet, having been outside the hut during most of the set of readings, had to be warmed up for the final Z-determination. This was done by removing its insulating tube and warming the magnet with the hands or the radiator until the thermometer approached room temperature. The insulating tube was then replaced and the magnet screwed to the B.M.Z. where it was allowed to remain for 15 minutes before the final Z determination was made.

Timing of absolute readings was done with a pocket watch checked against station W.W.V.H. immediately before and after the set of readings.

THE MAGNETIC VARIOMETERS

The variometers are of La Cour pattern; the set comprises a horizontal intensity variometer, a vertical intensity variometer, a declinometer and a 15 mm/hour photographic recorder. These are fully described by La Cour (1930), La Cour and Laursen (1930) and Laursen (1943).

Time marks are provided by a separate lamp operated by electrical contacts on a pendulum clock. The contacts close every 5 minutes and also one minute before and after each hour. The clock was set to run slightly fast. Each day before the recording paper was changed, the clock was checked against W.W.V.H. and the pendulum stopped for a few seconds so that each record starts with zero time error and ends with an error no more than a few seconds.

Masks were fitted between the three cylindrical lenses to prevent minor overlapping of adjacent traces; such overlapping makes difficult the interpretation of records of magnetic disturbances.

Temperatures of the H and Z variometers were read daily from the thermometers provided with the instruments.

At each end of the variometer room a short horizontal brass rod was mounted on wall brackets. On each rod was fitted a sliding brass collar having a peripheral groove and a lock-nut. The cords of plumb-bobs hanging in the grooves could be viewed from a theodolite through a hole in the outside wall. By this means the magnetic meridian was transferred from the Absolute Hut, and the two brass collars adjusted to lie in a magnetic north-south plane. A fine thread, hung between the two grooves and suitably weighted, was used as the reference meridian for orientation of the variometer magnets.

The magnets of the D and H variometers were oriented so that they were unaffected by currents of several hundred milliamps passing through Helmholtz-Gaugain coils mounted with their axes respectively parallel to and at right angles to the reference meridian, as measured by offsets to the loops.

A. THE DECLINATION VARIOMETER

Scale value

The scale value was determined solely by a Helmholtz-Gaugain coil. Six determinations over a period of two months gave an average figure of 0.853 minutes of arc per mm (Table 1). This figure corresponds to a sensitivity of about 4.5 gammas of transverse field per mm, which is approximately twice the sensitivity of the H and Z variometers; during magnetic storms, therefore, the declination trace has a very large amplitude, but in only one or two extreme peaks did the trace become unreadable.

Baselines

As already described, the Quartz Horizontal Magnetometers were shown to be unreliable for the control of the D variometer. However, as the final intercomparison with Askania Magnetometer No. 508813 indicates a provisional I.M.S. correction almost equal to the apparent change in baseline value, and as the changes in Q.H.M. constant (α) agree closely with individual sudden changes in apparent baseline value, it is most probable that the D variometer remained stable throughout the period described. No adjustments were made to this variometer, and its construction renders it insensitive to changes in temperature or in the moment of its magnet. For these reasons a fixed baseline value, $57^{\circ} 28' W.$, has been adopted for the whole period (Table 4).

B. HORIZONTAL-INTENSITY VARIOMETER

Scale values

These were determined on the same days as absolute values, and were repeated, if necessary, whenever conditions were undisturbed. The determination was made with a Helmholtz-Gaugain coil whose constant was 7.493 gammas/mA. A current of $20mA$ was applied for about 15 seconds alternately in each direction twice. Scale-value current was supplied from the comprehensive control panel which includes rotary reversing and selector switches, and coarse and fine controls with rotary potentiometers. The current was measured with a sub-standard milliammeter.

Measured and adopted scale values are given in Table 2.

Temperature compensation

The H variometer had been adequately compensated for temperature while in use at Heard Island. The bi-metallic compensating strip was therefore set to the same length as at Heard Island, and large changes of temperature produced no detectable change in the magnetic ordinate. No temperature corrections are included in the magnetic values tabulated in this report.

Graphs of temperature-trace-ordinate against temperature read for the instrument thermometer were used to correct for several slight shifts of the baseline trace, which followed adjustments to the variometers.

Baselines

Observed baseline values decreased gradually for several months, and then more rapidly. No reason can be advanced for this behaviour. After allowing for known shifts of baseline mirror, etc., the plotted baseline values were smoothed, and adopted values were drawn as a series of steps of 2 or 3 gammas, having the smoothed curve as their mean.

Measured and adopted H-baseline values are given in Table 5.

C. VERTICAL-INTENSITY VARIOMETER

The balancing magnet was ground several times and was tested with its north pole pointing both north and south before a satisfactory sensitivity was reached. The final sensitivity was slightly under 10 gammas per mm, with the north pole pointing north.

The horizontality of the balancing magnet was checked by placing it with its north pole pointing south, and by grinding one end until it balanced with its axis parallel (by visual inspection) to a spirit level resting alongside the variometer.

Before sealing the variometer a small jar of phosphorus pentoxide and another of coloured silica gel were placed in the magnet chamber to absorb moisture.

Scale values

Determinations of scale value were carried out at the same times and in the same manner as described for the H variometer. Measured and adopted scale values are presented in Table 3.

Temperature compensation

The bi-metallic strip was adjusted to an arbitrary length, and the hut was then heated through a considerable temperature range. As the day was magnetically very undisturbed, the changes in temperature ordinate and magnetic ordinate made possible a simple calculation to determine the required length of bi-metallic strip. No opportunity arose to check the temperature compensation more carefully, and subsequent tests have revealed a temperature coefficient of 1.3 gammas/°C. It has not been considered necessary, however, to correct for temperature the values presented here.

Baselines

Observed baseline values increased rapidly at first and thereafter maintained a very satisfactory stability. After allowing for a known shift of the baseline mirror, the plotted values were smoothed, and adopted values were arranged in steps of 2 or 3 gammas about the smoothed curve. Observed and adopted values are presented in Table 6.

D. MAGNETOGRAM SCALINGS

Mean ordinate scalings of all elements were made for intervals bounded by successive hour marks. Greenwich Mean Time was used, and the results are tabulated on standard forms. Scalings were also made of the instantaneous maxima and minima for each Greenwich day. Scalings were made first in millimetres and then converted to gammas or minutes of arc.

E. SHRINKAGE CORRECTION

All scalings were corrected for shrinkage of the photographic paper. Immediately after its removal from the recorder drum, the paper was punched in eight

places with a shrinkage gauge whose needle points are 100.0 mm apart. Shrinkage was kept to a minimum by soaking the exposed and processed paper in 10-per-cent glycerine and pressing it between sheets of blotting paper.

BASIC HOURLY VALUES AND ASSOCIATED MEANS

A. BASIC HOURLY VALUES

Hourly values of magnetic declination, horizontal intensity and vertical intensity for the period August to December are given in Tables 9 to 13, 14 to 18 and 19 to 23 respectively. The values are the means for successive hourly periods commencing at 00 hrs. G.M.T.

The values of vertical intensity are expressed in a numerical sense; the vertical intensity is negative at Mawson. Declination also is expressed numerically; declination at Mawson is west and therefore algebraically negative.

Scalings in millimetres were carried out by the writer after his return to Melbourne, and checked by the Bureau's computing staff under C.A. van der Waal. The writer made the conversions to gammas and minutes, and checked them by independent methods.

B. COMPUTED MEANS

The mean hourly values for "all days" as well as the means of the five international quiet days, ten least disturbed days and five international disturbed days of each month are given at the foot of Tables 9 to 23. The daily mean values are listed vertically before the maximum and minimum values.

Monthly means are summarised in Table 7.

K - INDICES

K-indices were scaled each month from the records. The scale adopted has a lower limit of 1500 gammas for K9. The method adopted was to select the magnetically quiet days of the month and use the mean hourly scalings of these quiet days to prepare Sq curves, which are used as the basis for scaling K-indices. For months in which no quiet days were recorded, the Sq curve from the previous month was used. The K-indices are published at monthly intervals in the Geophysical Observatory Report issued by the Bureau of Mineral Resources, Geology and Geophysics.

MAGNETIC ACTIVITY

The principal magnetic storms are shown in Table 8.

Sudden commencements are difficult to select from the Mawson records. Although there are many examples of "polar bays", etc., which include rapid pulses, the onset of these disturbances is usually a gradual change in at least one element, long before the main pulse. The small initial pulses which characterise typical sudden commencements are masked by the general disturbance level of the field, and for this reason no sudden commencements are listed in this report.

REPRODUCED MAGNETOGRAMS

Typical magnetograms are reproduced on Plates 4, 5 and 6. They represent, respectively, a quiet day, a day with typical polar disturbances, and a day of magnetic storm, and are included to illustrate the type of record obtained at the Mawson magnetic observatory.

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TABLE 1

Observed and adopted D scale-values

Date	Observed	Adopted	Method used for determination
1955	γ/mm	γ/mm	
August 12	0.853	0.853	Helmholtz coil
" 25	0.852	0.853	" "
Sept. 10	0.845	0.853	" "
" 15	0.856	0.853	" "
" 15	0.858	0.853	" "
October 12	0.856	0.853	" "

TABLE 2

Observed and adopted H scale-values

(Observed values determined with Helmholtz coil)

Date	Observed	Adopted	Adopted value used to	Date	Observed	Adopted	Adopted value used to
1955	γ/mm	γ/mm		1955	γ/mm	γ/mm	
July 25	9.43	9.45		November 3	9.48	9.50	
" 25	9.49	9.45		" 6	9.48	9.50	
August 2	9.34	9.45		" 7	9.47	9.50	
Sept. 18	9.48	9.45		" 21	9.52	9.50	
" 22	9.49	9.45		" 27	9.54	9.50	00h Dec. 1
" 23	9.47	9.45		December 5	9.55	9.52	
October 7	9.42	9.45		" 13	9.50	9.52	
" 9	9.44	9.45		" 15	9.56	9.52	
" 17	9.46	9.45	00h Nov. 1	" 29	9.50	9.52	

TABLE 3

Observed and adopted Z scale-values

(Observed values determined with Helmholtz coil)

Date	Observed	Adopted	Adopted value used to	Date	Observed	Adopted	Adopted value used to
1955	γ/mm	γ/mm		1955	γ/mm	γ/mm	
August 2	9.75	9.77		October 17	9.88	9.85	
" 12	9.76	9.77		" 20	9.82	9.85	00h Nov. 1
" 25	9.79	9.77	00h Sept. 1	November 3	9.87	9.88	
Sept. 10	9.66	9.81		" 6	9.86	9.88	
" 15	9.82	9.81		" 7	9.87	9.88	
" 18	9.79	9.81		" 21	9.90	9.88	
" 22	9.83	9.81		" 27	9.93	9.88	00h Dec. 1
" 23	9.83	9.81	00h Oct. 1	December 5	9.92	9.90	
October 7	9.83	9.85		" 13	9.90	9.90	
" 9	9.80	9.85		" 15	9.90	9.90	
				" 29	9.90	9.90	00h Jan. 1

TABLE 4

Adopted base-line values for D variometer
(West declination)

Base-line value of 57° 28.0' west was adopted for the whole period, as described in the text.

TABLE 5

Observed and adopted base-line values for H variometer
(Observed values determined with QHMs Nos. 300, 301 and 302)
(Values corrected to provisional I.M.S.)

Date	Observed	Adopted	Adopted value used to	Remarks
1955	Y	Y		
July 25	17741	17745		
August 2	17746	17745	00h Aug. 11	
" 12	17746	17743	00h Aug. 24	
" 25	17741	17741		
September 1	17741	17741	00h Sept. 7	
" 15	17739	17739	00h Sept. 21	
" 23	17736	17737	00h Oct. 5	
October 9	17735	17735		
" 18	17736	17735	00h Oct. 19	
		17733	00h Oct. 22	
		17730	00h Oct. 26	
		17727	00h Oct. 30	
		17724	00h Nov. 1	
				Drop of 3 Y to compensate for change of adopted scale-value
		17719	00h Nov. 5	
November 6	17716	17716	00h Nov. 9	
" 9	17709	17713	00h Nov. 13	
		17710	00h Nov. 16	
		17707	00h Nov. 20	
" 21	17704	17704	00h Nov. 24	
" 27	17702	17701	00h Nov. 28	
		17698	00h Dec. 2	
December 5	17696	17695	00h Dec. 6	
"		17692	09h Dec. 8	
		17687	00h Dec. 12	
		17684	00h Dec. 15	
" 12	17682	17684		Drop of 4 Y due to bumping variometer
" 15	17684	17681		
" 19	17678	17681	00h Dec. 20	
		17678	00h Dec. 23	
		17675	00h Dec. 28	
" 29	17676	17672	00h Jan. 1	
1956				
January 9	17668			

TABLE 6

Observed and adopted base-line values for Z variometer

(Observed values determined with BMZ No.115)

(Values corrected to provisional I.M.S.)

Date	Observed	Adopted	Adopted value used to	Remarks
1955	Y	Y		
July 25	-48578			
August 2	-48593	-48592	00h Aug. 2	
		-48595	00h Aug. 4	
		-48598	00h Aug. 6	
		-48601	00h Aug. 8	
		-48604	00h Aug. 10	
" 12	-48608	-48607	00h Aug. 13	
		-48610	00h Aug. 16	
		-48613	00h Aug. 19	
		-48616	00h Aug. 24	
" 25	-48621	-48619	00h Sept. 1	
September 1	-48621	-48622		
" 15	-48630	-48622	00h Sept.19	
" 22	-48620	-48624		
October 9	-48623	-48624	00h Oct. 11	
" 18	-48628	-48626	00h Oct. 30	
November 6	-48630	-48628	00h Nov. 12	
		-48630	09h Nov. 17	
" 21	-48619	-48624	00h Nov. 23	Drop of 7 Y, base-line mirror adjusted
" 27	-48631	-48627	00h Dec. 1	
December 5	-48629	-48630	00h Dec. 7	
" 12	-48636	-48633	00h Dec. 13	
" 15	-48636	-48636		
" 19	-48643	-48636	00h Dec. 20	
" 29	-48640	-48639	00h Jan. 1	
1956				
January 9	-48640			

TABLE 7

Summary of monthly mean values

Month	D		H	Z	D		H	Z
	°	'	Y	Y	°	'	Y	Y
1955								
			All days		Ten least disturbed days			
August	-58	35.4	18258	-49004	-58	35.5	18267	-49000
September	-58	38.0	18241	-49012	-58	37.2	18260	-49010
October	-58	38.3	18256	-49018	-58	37.8	18267	-49014
November	-58	39.2	18259	-49024	-58	39.6	18267	-49022
December	-58	40.1	18279	-49019	-58	40.4	18280	-49021
			Five international quiet days		Five international disturbed days			
August	-58	35.0	18273	-48999	-58	35.7	18235	-49026
September	-58	37.1	18260	-49014	-58	40.3	18192	-49017
October	-58	37.6	18271	-49011	-58	39.8	18206	-49042
November	-58	39.6	18266	-49020	-58	38.8	18210	-49042
December	-58	41.1	18288	-49017	-58	38.9	18268	-49013

TABLE 8
Principal magnetic storms

Greenwich Date	Storm time			Sudden commencement			Degree of activity ϕ	Gr. day	Maximal activity on K-scale 0-9	Ranges			
	G.M.T. of beginning	G.M.T. of ending	Type	D	H	Z				D	H	Z	
1955	h m d h	h m d h											
August	2 20 10	11 10	.....	.....	.....	.....	B	4	6,7,8	7	132	923	1234
								5	8	7			
								6	8	7			
September 12	22 00	15 10	.....	.....	.....	.....	B	12	8	7	119	728	804
September 26,		03 20	.....	.....	.....	.....	A	13	1	7			
September 27 or 28			.....	.....	.....	.....		30	3	8	162	1101	1147
October 24	22 30	28 18	.....	.....	.....	.....	B	25	7,8	7	157	1192	1324
								26	1	7			
								26	6,7	7			
November 3	19 00	06 09	.....	.....	.....	.....	A	4	2	9	159	975	1552
November 14	12 00	17 17	.....	.....	.....	.....	B	15	4	6	115	846	785
								16	2,3	6			
								17	2	6			
November 17	19 00	21 14	.....	.....	.....	.....	B	18	2	7	160	961	1265
								18	6,7	7			
								19	5	7			
								20	1	7			
December 24	12 00	29 10	.....	.....	.....	.....	B	27	2	7	119	840	865

ϕ Severe storm classified A. Moderately severe storm classified B. Moderate storm classified C.
Record lost at beginning of storm.

TABLE 11
HOURLY VALUES OF DECLINATION

58° West plus tabular quantities expressed in tenths of minutes of arc

OCTOBER 1955

G. M. T. used

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean	Maximum	Minimum	Range				
																											h	h	m	m			
1	409	419	422	423	431	451	435	436	404	336	373	342	350	345	362	360	362	359	351	340	378	351	358	357	381	20	54	64	11	47	087	554	
2	358	388	379	502	473	441	422	440	411	301	316	330	330	324	322	361	302	379	309	292	268	292	328	369	357	03	36	548	20	12	-182	730	
3	349	376	376	521	490	506	434	429	417	321	353	351	310	325	336	323	378	375	395	382	370	370	362	362	387	04	01	649	09	39	275	374	
4	362	385	470	514	568	589	517	420	388	405	383	335	310	325	336	360	365	365	358	351	341	344	356	358	396	02	52	642	21	37	267	375	
5	392	405	457	486	498	430	410	417	376	372	353	347	323	323	314	345	345	302	284	204	132	183	332	371	350	22	15	744	20	14	-175	919	
6	394	411	452	599	733	634	428	422	446	434	356	318	326	326	318	335	376	378	370	320	294	288	352	378	402	16	48	1060	19	53	053	1007	
7	356	339	531	487	443	439	426	405	396	375	370	341	318	307	310	310	344	374	369	356	342	343	352	378	380	02	14	628	21	36	197	431	
8	395	431	427	494	488	441	528	489	382	336	343	332	337	343	347	356	356	361	353	352	362	353	344	333	390	07	06	632	21	21	289	343	
9	361	368	368	471	446	431	407	393	374	366	341	329	329	322	332	322	317	452	378	358	349	353	344	333	382	04	05	604	22	19	-027	838	
10	370	413	440	426	492	477	424	424	480	356	359	328	328	328	273	308	325	360	363	347	353	347	347	362	375	18	45	605	12	57	140	465	
11	370	392	397	436	469	426	480	489	511	409	356	308	281	268	273	373	370	370	375	370	359	345	342	348	377	05	03	466	22	25	264	302	
12	357	361	385	428	444	445	426	409	405	364	356	355	353	361	368	353	370	370	361	341	300	322	338	348	373	05	51	469	23	00	132	337	
13	369	400	416	419	440	459	443	419	395	372	357	345	322	335	352	358	355	359	368	371	361	353	360	343	382	22	22	539	23	02	173	366	
14	365	390	450	465	454	468	457	454	400	350	340	330	322	354	361	368	369	370	368	370	351	340	331	331	378	03	58	537	23	02	143	394	
15	384	395	441	492	479	431	421	388	363	347	344	341	341	354	361	359	360	356	356	352	353	353	337	382	389	00	24	594	22	42	302	292	
16	437	454	458	482	438	477	428	419	373	373	370	358	348	350	353	369	368	365	359	359	369	369	369	365	380	03	12	485	01	28	314	171	
17	350	341	426	469	449	437	426	409	394	376	359	354	357	365	370	366	368	369	369	369	369	370	369	374	375	05	03	424	23	22	343	081	
18	384	380	394	396	399	401	400	388	382	386	373	362	361	359	362	363	365	365	365	365	365	365	366	361	378	21	11	463	22	20	327	136	
19	369	389	394	397	407	402	404	405	396	386	373	362	361	359	362	363	365	365	365	365	365	365	366	361	383	03	59	610	15	02	274	336	
20	371	405	447	449	537	458	435	453	442	413	393	346	330	318	318	330	352	343	342	334	349	342	348	361	370	21	30	675	21	34	161	544	
21	376	378	400	410	413	437	429	392	394	368	355	347	341	339	334	346	343	353	364	348	326	341	351	362	360	08	09	515	16	11	161	354	
22	382	408	450	437	420	435	409	416	439	393	351	335	324	329	258	288	245	268	291	314	345	342	323	361	384	03	29	550	00	23	327	223	
23	349	393	460	519	464	419	417	399	392	389	370	352	349	353	350	350	354	361	377	367	361	359	353	349	379	04	18	450	23	05	284	166	
24	380	366	422	424	443	437	437	423	411	387	363	352	347	357	360	362	365	368	366	362	357	348	343	318	444	04	34	1081	20	26	-429	1510	
25	294	414	591	720	895	891	672	682	675	495	615	428	430	482	349	237	336	242	179	189	080	209	255	282	421	17	20	1145	00	13	-210	1355	
26	255	471	513	521	603	664	550	433	392	392	417	432	341	322	324	324	333	366	353	302	319	302	311	377	400	05	24	696	01	06	017	1799	
27	417	426	442	514	582	614	562	485	452	422	374	366	336	324	289	384	367	390	386	377	334	347	364	393	403	04	17	675	14	14	196	679	
28	351	426	475	510	615	519	498	453	430	423	365	366	336	324	291	384	367	365	361	277	294	300	364	348	378	04	59	705	18	37	056	649	
29	394	399	442	523	610	579	463	438	411	383	370	348	343	319	291	326	336	365	351	277	294	300	364	348	378	19	05	686	19	53	104	582	
30	379	423	438	424	429	445	433	424	420	399	366	344	333	321	353	351	332	301	333	262	285	293	338	336	365	19	05	686	19	53	104	582	
31	362	398	429	515	722	773	654	498	388	328	328	335	317	326	332	340	296	296	296	259	102	107	281	300	374	04	09	1158	20	28	-262	1420	
Mean	369	402	438	483	509	499	461	437	416	376	367	350	338	342	336	343	348	356	348	335	315	323	338	355	363			DESIGNATIONS				537	
Mean *	368	382	419	442	439	434	427	409	393	371	359	350	346	352	357	362	362	364	368	363	352	350	345	350	378	*		Ten least disturbed days				259	
Mean †	372	383	402	413	427	429	422	409	398	377	364	354	350	355	361	365	365	365	368	362	352	351	339	345	376	†		Five international quiet days				184	
Mean ‡	339	420	488	568	690	678	543	490	455	404	414	372	347	357	333	317	336	369	311	281	185	218	301	338	398	‡		Five international disturbed days				1240	
																													()				Approximate

a Means of 9 values

b Means of 8 values

c Means of 4 values

TABLE 13
HOURLY VALUES OF DECLINATION

58° West plus tabular quantities expressed in tenths of minutes of arc

DECEMBER 1955

G.M.T. used

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean	Maximum	Minimum	Range	
	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m
1	361	482	493	627	573	485	445	441	445	451	395	353	315	285	356	211	220	092	040	206	173	211	167	208	334	03	35	683	732	
2	223	266	382	523	608	948	995	850	571	446	443	338	344	366	366	377	370	368	362	374	352	371	360	370	457	06	39	1125	943	
3	360	388	455	490	471	455	416	407	420	363	365	363	368	294	295	361	299	349	309	247	231	243	272	335	358	03	53	518	502	
4	423	263	496	540	556	603	416	394	405	361	382	370	371	371	380	384	384	390	386	362	382	370	339	339	404	05	15	814	632	
5	365	358	428	551	529	432	452	412	386	374	370	369	359	353	353	368	366	365	370	359	328	370	307	253	382	03	52	604	468	
6	304	343	353	454	550	521	521	516	373	353	359	350	353	359	371	388	380	380	383	365	374	373	337	341	402	03	53	634	310	
7	375	395	493	637	678	610	579	489	439	389	372	353	359	371	388	388	393	380	392	365	374	365	337	341	390	04	33	639	400	
8	334	419	448	511	556	567	565	542	400	341	352	368	353	379	371	353	379	371	365	365	281	273	315	276	404	05	36	639	703	
9	353	422	459	487	536	511	439	441	404	374	370	375	365	365	368	349	353	289	388	318	359	334	348	365	397	04	02	623	561	
10	338	423	439	437	459	436	449	405	426	367	370	375	357	369	370	358	384	361	361	286	356	311	311	360	382	08	56	498	506	
11	375	376	478	532	493	496	460	434	400	393	383	381	373	374	392	382	382	376	356	312	273	273	345	353	389	03	25	545	406	
12	327	411	487	522	492	483	443	424	403	389	376	365	373	381	378	372	372	359	385	366	377	366	352	360	402	03	21	547	243	
13	363	400	431	550	575	489	452	428	402	379	366	367	366	366	370	377	377	379	383	365	383	356	347	347	402	03	21	547	310	
14	351	349	446	571	607	565	487	424	396	367	364	368	366	366	370	369	358	353	312	327	335	292	288	340	390	04	33	634	400	
15	383	434	473	602	768	811	583	449	440	428	394	368	322	275	318	324	311	353	332	361	365	352	357	369	424	05	28	922	703	
16	360	434	531	579	584	557	481	434	411	405	368	359	349	349	346	336	323	336	370	374	362	359	357	359	390	04	33	643	400	
17	395	432	533	577	537	516	485	465	427	385	376	374	370	377	377	367	387	367	387	365	378	359	357	370	404	05	36	639	303	
18	365	415	464	533	505	469	456	444	481	405	351	333	336	317	245	276	247	279	245	234	244	251	279	300	419	02	44	612	303	
19	301	365	503	571	719	778	632	477	431	373	364	371	356	347	245	276	247	279	245	234	244	251	279	300	354	03	49	548	278	
20	386	503	523	650	690	573	564	490	402	392	402	388	384	390	337	258	287	309	380	383	364	289	281	283	401	05	41	867	507	
21	439	479	581	579	657	596	467	433	410	390	375	359	366	356	306	286	284	342	353	361	283	224	276	345	413	04	59	793	662	
22	379	443	503	583	643	514	490	475	421	402	392	382	370	373	370	339	321	373	376	361	353	352	336	347	434	03	53	753	479	
23	240	446	541	643	684	906	695	533	377	356	383	379	348	361	341	303	323	228	214	227	109	328	303	218	402	03	28	609	503	
24	394	436	434	557	676	660	554	429	405	400	420	379	346	322	228	337	262	225	214	227	109	328	303	218	399	05	28	1089	503	
25	335	457	537	555	703	829	591	464	439	372	420	394	371	326	349	385	345	362	337	262	225	132	163	221	398	04	36	705	1130	
26	397	460	518	556	549	512	457	436	414	412	362	366	304	329	342	362	345	362	397	370	317	244	300	370	425	05	11	1143	1022	
27	398	458	489	539	540	471	439	405	392	383	359	354	379	359	354	318	319	345	304	329	342	324	338	364	395	04	53	593	336	
28	397	437	510	607	665	602	471	402	398	402	383	383	383	383	395	407	410	399	391	390	388	386	346	363	415	03	40	567	257	
29	339	376	461	542	750	869	817	574	416	392	375	364	359	352	352	336	336	347	348	187	259	230	250	263	420	04	40	701	310	
30	360	413	486	562	601	596	530	463	420	390	379	371	364	357	351	346	338	346	340	335	321	309	311	327	411	05	35	1070	433	
31	377	420	492	550	560	545	463	426	406	387	372	369	367	371	373	376	374	372	370	369	357	343	336	350	404	* Ten	least	disturbed	566	
Mean *	390	436	504	555	560	499	457	431	407	389	375	370	371	376	379	385	381	380	385	381	376	367	349	357	411	† Five	international	quiet	293	
Mean †	332	448	501	596	659	720	574	467	416	395	400	401	388	354	369	315	284	261	247	266	206	207	236	291	389	‡ Five	international	disturbed	909	
Mean ‡																											()	Approximate		

DESIGNATIONS
 * Ten least disturbed days
 † Five international quiet days
 ‡ Five international disturbed days
 () Approximate

TABLE 14
HOURLY VALUES OF HORIZONTAL INTENSITY
17500 plus tabular quantities expressed in gammas

G. M. T. used

AUGUST 1955

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean	Maximum	Minimum	Range				
																										h m	h m	h m					
1	* /	775	722	649	674	757	780	772	772	768	764	768	770	775	775	777	781	781	767	769	749	732	735	772	714	21 20	864	23 59	439				
2	*	608	732	710	691	787	749	749	752	769	782	773	776	772	780	803	800	823	819	812	787	722	599	709	754	17 56	835	23 05	290				
3		626	715	772	719	664	623	659	751	749	730	711	810	831	762	728	740	645	727	795	768	722	555	639	716	18 10	958	17 55	667				
4	/	759	764	752	717	763	762	567	673	639	592	730	809	857	855	819	812	806	797	751	563	697	728	539	749	09 13	914	23 43	684				
5	/	462	627	716	695	668	688	487	(671)	718	757	774	809	847	857	788	803	814	803	752	598	601	472	539	719	13 20	896	(17 04	035)				
6	/	586	612	684	695	668	688	763	(757)	759	752	759	776	825	782	777	802	819	831	815	817	795	768	766	742	778	12 46	915	23 55	581			
7		729	725	760	772	763	795	739	(756)	771	766	772	786	786	794	781	795	785	795	821	816	802	755	710	720	762	09 21	843	22 16	532			
8		646	704	744	740	754	735	744	(753)	771	766	758	776	805	795	810	803	790	805	812	816	835	774	717	752	764	20 24	867	23 00	299			
9		762	749	750	770	763	747	769	770	778	769	774	759	770	781	781	780	781	784	789	801	801	774	775	771	771	20 02	830	03 26	679			
10	* /	770	766	780	747	716	770	775	770	778	769	774	757	775	779	779	779	781	788	798	806	812	741	779	796	764	22 05	828	20 27	679			
11		753	736	662	695	727	739	760	777	775	775	765	768	776	780	792	784	789	795	805	800	770	750	690	581	753	19 09	818	23 11	414			
12		740	713	719	750	780	747	712	(737)	755	760	757	755	772	798	800	819	811	732	764	779	717	613	721	746	757	13 32	862	21 12	290			
13		745	774	776	751	730	750	740	757	746	754	758	759	770	774	770	770	775	770	768	766	750	722	738	734	757	03 25	837	23 50	640			
14		716	765	771	756	759	673	603	718	750	751	758	759	763	764	767	782	759	766	716	803	753	758	762	763	750	04 40	784	06 34	573			
15		768	771	774	775	772	775	634	731	742	767	763	784	783	784	804	817	816	829	831	741	755	590	697	717	756	19 10	832	21 47	441			
16		725	751	771	753	742	662	711	770	766	752	791	782	765	769	775	794	791	786	785	782	746	575	750	787	757	16 25	866	21 47	431			
17		681	709	690	690	704	715	772	767	762	782	757	782	774	790	801	810	804	784	840	808	794	774	766	753	778	19 04	837	23 14	473			
18	*	767	760	754	775	778	773	772	767	762	784	772	770	769	775	784	782	784	802	799	772	739	765	748	776	757	17 51	823	00 40	475			
19	*	623	610	706	734	732	763	791	789	787	784	772	770	772	775	777	777	779	781	782	779	768	727	699	734	769	19 07	819	22 36	576			
20	* /	779	776	775	773	782	780	781	776	771	764	762	766	772	781	785	788	791	794	811	807	780	749	747	779	779	19 07	819	21 43	641			
21	*	766	783	789	785	784	784	780	769	769	770	768	771	776	781	785	808	805	819	808	807	780	779	772	776	783	13 55	862	00 12	735			
22	*	755	767	759	773	775	792	790	780	773	764	764	764	773	773	780	784	786	802	768	746	736	759	778	769	772	17 42	817	20 19	674			
23	*	777	774	779	764	779	772	779	782	773	768	764	767	768	773	786	797	794	773	777	776	764	760	739	749	771	16 44	801	23 16	628			
24	*	689	733	729	765	785	782	778	(774)	769	769	767	764	767	771	775	782	790	800	794	786	770	768	713	773	768	17 44	801	00 01	645			
25	*	774	782	780	731	679	682	722	570	715	699	768	764	795	837	829	817	802	804	774	765	747	723	757	778	755	13 46	868	07 42	472			
26	*	782	772	772	767	764	753	662	695	732	749	752	758	767	767	778	775	771	744	775	771	744	486	683	756	739	01 30	810	20 57	054			
27		750	794	745	708	778	778	778	768	768	763	753	753	764	782	777	773	772	772	778	771	771	769	763	672	761	16 21	804	23 39	587			
28		677	655	763	778	747	757	759	767	756	756	755	767	793	789	782	786	785	786	790	773	733	719	575	731	749	12 57	826	22 18	431			
29		727	739	741	737	747	743	735	750	759	762	763	772	781	787	786	789	790	786	788	780	752	720	723	723	758	758	DESIGNATIONS					
30		746	745	745	747	764	774	778	775	771	769	765	767	771	777	781	784	785	790	792	782	758	744	734	761	767	* Ten least days						
31		773	774	773	763	777	778	777	773	770	766	763	766	773	778	781	782	784	790	788	783	771	752	750	768	773	/ Five international quiet days						
Mean		686	718	722	705	694	684	656	680	725	744	761	788	806	831	799	791	791	765	763	752	669	718	696	677	735	# Five international disturbed days						
Mean #a		727	739	741	737	747	743	735	750	759	762	763	772	781	787	786	789	790	786	788	780	752	720	723	723	758	758	DESIGNATIONS					
Mean #c		773	774	773	763	777	778	777	773	770	766	763	766	773	778	781	782	784	790	788	783	771	752	750	768	773	/ Five international quiet days						
Mean #c		686	718	722	705	694	684	656	680	725	744	761	788	806	831	799	791	791	765	763	752	669	718	696	677	735	# Five international disturbed days						
																												() Approximate					

a Means of 9 values

b Means of 8 values

c Means of 4 values

TABLE 1E
HOURLY VALUES OF HORIZONTAL INTENSITY

17500 plus tabular quantities expressed in gammas

SEPTEMBER 1955

G. M. T. used

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean	Maximum	Minimum	Range					
1	714	758	759	782	762	756	768	770	762	753	772	770	783	786	821	823	825	799	726	654	754	709	670	736	759	16	38	885	h	m	503			
2	708	749	711	305	498	511	595	706	754	781	715	726	817	817	825	830	826	834	820	759	726	820	759	726	724	656	707	15	09	868	h	m	382	
3	724	724	729	593	656	674	711	765	767	798	755	710	827	775	770	775	778	779	762	727	679	709	740	768	742	12	09	871	h	m	251			
4	437	616	714	672	680	788	773	769	765	744	791	631	810	792	872	832	860	823	812	763	741	465	576	685	734	14	40	921	h	m	364			
5	636	782	766	711	576	587	715	717	739	739	785	804	821	798	813	824	792	850	749	613	737	735	702	702	704	10	25	869	h	m	610			
6	564	654	690	724	729	770	778	775	750	764	748	759	772	772	778	780	778	778	759	695	683	779	768	678	734	17	45	855	h	m	406			
7	743	758	751	743	752	754	778	777	772	766	753	758	768	793	832	832	819	862	824	793	783	770	766	748	779	17	20	895	h	m	288			
8	724	710	714	714	754	789	705	724	758	770	774	758	766	771	763	777	778	780	777	777	785	773	771	773	706	760	06	04	806	h	m	199		
9	716	733	721	714	681	647	705	724	755	768	765	765	768	765	787	790	785	780	782	782	756	772	771	773	673	744	14	12	808	h	m	217		
10	677	703	706	714	666	666	614	(612)	757	766	773	777	792	780	777	791	791	797	793	783	804	771	779	747	748	19	10	804	h	m	217			
11	424	635	537	587	386	501	602	741	783	775	779	817	811	838	799	723	798	769	763	741	738	780	771	650	740	19	20	845	h	m	236			
12	765	765	755	760	769	742	717	677	712	780	791	798	782	788	793	820	796	794	800	791	769	722	770	723	703	10	58	890	h	m	653			
13	761	743	744	739	727	730	717	677	712	762	723	765	770	777	777	776	777	766	695	591	752	772	772	756	757	19	31	829	h	m	702			
14	648	740	743	720	686	481	498	516	654	732	771	812	831	826	866	835	812	805	779	774	768	759	658	624	757	14	14	890	h	m	203			
15	732	765	701	593	628	717	731	730	754	758	794	800	821	815	784	785	784	794	761	649	598	634	674	705	700	11	47	837	h	m	242			
16	760	623	656	615	620	737	773	760	752	750	768	784	792	786	792	851	822	746	764	760	771	771	779	791	760	15	57	899	h	m	498			
17	607	713	733	714	677	740	784	766	746	718	756	759	760	771	776	778	776	772	772	769	705	715	640	746	737	06	39	799	h	m	348			
18	769	774	764	771	787	778	778	767	760	754	756	761	765	771	772	772	777	760	781	748	719	726	733	789	765	23	42	811	h	m	406			
19	797	797	782	624	737	795	791	782	774	764	762	764	774	773	773	775	773	774	787	753	697	747	707	763	752	01	56	841	h	m	138			
20	621	556	729	731	772	781	775	767	765	744	767	765	768	778	782	795	807	(770)	782	811	797	685	664	733	752	16	50	817	h	m	468			
21	776	773	692	726	774	787	779	(770)	767	761	760	760	763	763	777	778	782	784	786	788	785	675	721	731	751	18	34	795	h	m	461			
22	763	781	738	767	784	781	778	767	760	758	760	762	764	768	771	774	777	780	786	781	778	781	786	771	781	772	22	50	795	h	m	453		
23	756	767	704	532	639	763	768	(644)	749	811	782	759	768	816	790	781	802	792	634	481	663	710	760	642	709	(13	18	891)	h	m	(697)			
24	589	738	581	669	661	716	729	(726)	731	768	777	761	778	778	820	812	674	676	692	744	775	504	676	638	554	15	17	872	h	m	598			
25	712	807	806	771	649	286	125	474	752	758	799	716	857	864	823	813	753	715	596	521	401	505	692	497	760	13	08	913	h	m	1101			
26	692	725	703	692	691	685	694	714	747	763	771	773	790	790	798	797	790	782	763	741	726	716	721	717	741	DESIGNATIONS								
27	738	737	725	734	747	749	757	751	758	764	765	766	770	775	784	788	786	787	768	775	768	751	759	741	760	* Ten least disturbed days								
28	763	764	716	735	748	755	764	759	762	761	761	763	769	773	775	776	780	782	766	761	761	745	738	755	760	† Five international quiet days								
29	612	731	635	685	590	523	469	585	707	777	793	772	817	820	814	793	755	729	700	655	663	638	710	650	692	‡ Five international disturbed days								
30																											() Approximate							
31																																		

Mean # Mean † Mean ‡ Mean † c
 * Ten least disturbed days
 † Five international quiet days
 ‡ Five international disturbed days
 () Approximate

TABLE 17

HOURLY VALUES OF HORIZONTAL INTENSITY

17500 plus tabular quantities expressed in gammas

G. M. T. used

NOVEMBER 1955

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean	Maximum	Minimum	Range					
1	772	814	785	764	502	423	664	758	756	761	759	774	775	779	785	780	803	772	677	552	732	772	753	756	728	03	37	832	546					
2	757	753	773	761	730	783	756	758	760	760	801	820	768	844	860	855	863	870	865	816	785	794	804	812	801	18	18	908	18	46				
3	810	814	804	785	767	781	780	764	757	755	755	761	768	770	764	774	774	775	775	799	769	775	799	810	813	801	23	17	841	20	35			
4	675	555	564	550	236	276	276	718	745	801	792	815	842	816	810	815	825	816	808	802	809	794	733	561	717	654	15	40	841	04	56			
5	657	650	634	729	594	523	740	748	752	801	792	815	842	816	810	815	825	816	808	824	782	826	824	782	752	758	12	35	861	05	11			
6	691	670	671	666	666	673	747	752	754	781	781	742	777	777	790	792	800	800	793	778	726	710	717	773	710	741	18	53	803	21	24			
7	800	772	704	648	696	665	647	647	642	644	689	759	757	762	777	777	790	792	800	800	793	796	796	791	789	787	16	54	816	02	35			
8	707	764	794	796	638	708	777	763	761	763	759	769	773	777	787	796	805	793	798	777	778	788	777	778	786	799	23	47	924	04	01			
9	744	712	717	737	773	764	744	753	757	756	765	767	767	763	781	796	805	793	798	777	777	788	777	778	786	799	03	45	822	04	24			
10	644	667	692	763	796	774	773	760	768	777	762	763	763	763	781	816	825	792	802	807	737	607	770	721	804	791	16	20	851	19	00			
11	739	768	775	763	783	809	782	741	725	838	770	817	823	823	823	816	825	792	802	807	737	641	734	788	804	791	16	40	823	19	00			
12	804	823	811	868	855	852	722	780	754	757	759	769	786	791	788	802	807	804	778	792	804	738	749	763	783	789	09	39	922	21	18			
13	776	756	755	778	785	779	775	761	756	756	753	757	780	784	815	831	807	820	809	790	691	771	793	793	782	778	03	55	886	06	13			
14	794	811	801	748	697	728	704	714	719	731	807	801	881	887	847	844	835	856	819	638	783	782	766	746	777	778	15	08	843	20	44			
15	684	772	777	480	573	544	356	543	786	830	820	887	887	904	853	872	817	747	717	694	755	790	674	768	777	11	10	1053	19	24				
16	743	804	706	673	429	687	772	778	774	768	767	770	800	863	865	827	772	775	775	787	791	761	757	789	760	13	52	954	06	19				
17	820	814	820	799	796	513	621	750	744	761	759	764	813	888	863	857	843	314	331	657	856	882	761	810	743	13	11	944	04	11				
18	884	883	820	804	792	783	771	766	770	777	775	682	570	471	302	515	723	656	753	804	806	857	844	838	730	00	51	925	14	30				
19	804	465	575	803	815	620	782	771	768	813	786	715	634	727	686	701	606	538	608	690	689	632	705	703	693	04	15	1032	01	12				
20	701	692	654	674	666	712	755	777	777	804	781	787	761	751	753	758	763	787	786	787	791	768	768	759	751	09	35	823	02	38				
21	769	773	748	725	748	761	753	731	765	766	785	853	900	920	892	783	769	791	786	774	764	784	777	793	788	13	23	948	07	35				
22	780	776	787	768	741	749	767	767	763	752	731	767	760	766	766	769	772	784	796	782	777	673	758	742	763	11	39	834	21	24				
23	782	784	798	790	785	762	699	714	736	775	805	861	906	909	911	926	879	869	838	802	762	788	802	793	811	15	32	945	06	47				
24	785	718	527	624	759	793	796	769	757	745	774	804	855	852	845	871	812	840	803	776	784	792	795	789	778	15	22	900	02	49				
25	720	735	590	529	638	773	776	765	765	766	764	783	766	776	792	781	784	783	794	795	775	736	747	788	748	23	24	814	03	20				
26	633	726	784	781	788	775	746	752	752	757	775	826	866	838	870	822	812	804	802	794	767	795	785	793	785	12	55	890	00	20				
27	774	757	741	744	756	780	773	759	749	762	783	839	892	818	791	818	830	793	797	800	818	800	652	664	779	12	41	904	02	59				
28	718	686	640	666	736	792	780	753	732	747	760	835	835	778	763	786	810	815	785	704	724	763	776	791	757	12	04	867	19	59				
29	788	764	727	681	621	706	766	770	754	760	772	781	786	836	882	856	868	835	799	829	803	794	785	775	781	14	45	887	04	46				
30	750	738	720	711	693	703	719	745	752	768	769	789	797	801	795	801	800	773	764	758	764	770	767	768	759	759	759	09	35	823	02	38		
31	746	738	720	710	722	757	764	760	760	757	762	780	792	799	812	796	797	799	792	785	764	765	771	772	766	767	767	11	39	834	21	24		
Mean *	760	733	726	718	724	754	766	759	763	755	758	777	791	798	798	781	781	789	788	786	766	754	770	782	760	766	766	766	766	766	766	766	766	
Mean †	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	
Mean ‡	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	
Mean §	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	
Mean ¶	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	
Mean ††	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	710
Mean †††	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	710
Mean ††††	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	710
Mean †††††	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613	641	716	733	776	738	760	760	710	710	710	710	710	710	710	710	710
Mean ††††††	773	698	712	647	642	547	561	710	763	791	769	769	737	752	695	751	758	613																

TABLE 18
HOURLY VALUES OF HORIZONTAL INTENSITY

17500 plus tabular quantities expressed in gamma

DECEMBER 1955

G. M. T. used

Day	Hour																																Mean	Maximum		Minimum		Range																																																										
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	h	m	h	m	h	m																																																																	
1	795	735	724	690	747	784	764	753	748	771	780	788	859	702	618	859	793	800	691	783	800	815	692	778	771	13	24	1016	22	45	593																																																																	
2	808	759	694	598	774	338	508	512	713	816	817	825	771	771	778	787	808	793	797	837	738	776	803	874	813	12	45	867	05	30	213																																																																	
3	808	821	803	799	807	783	769	758	755	748	766	752	771	772	769	781	795	793	800	798	793	776	760	795	785	15	12	978	20	37	483																																																																	
4	820	855	902	780	722	703	783	785	770	773	775	765	766	764	802	831	826	813	819	815	777	808	726	537	782	02	04	946	05	12	329																																																																	
5	690	729	738	880	904	829	817	647	748	748	798	829	777	777	773	777	777	773	779	779	779	805	793	768	782	22	36	895	23	08	533																																																																	
6	737	711	611	623	590	595	597	632	718	752	772	772	782	797	853	911	889	816	811	804	675	805	793	768	740	15	24	942	20	42	490																																																																	
7	761	652	741	735	830	780	753	723	717	752	772	860	856	841	822	812	877	822	802	742	758	772	792	803	795	17	05	926	01	47	550																																																																	
8	812	793	801	777	752	780	768	768	764	771	786	775	843	835	820	858	878	859	758	773	821	805	788	784	785	14	23	1002	01	47	412																																																																	
9	782	818	831	810	793	786	762	779	788	764	767	763	764	767	790	821	818	785	734	818	785	794	812	748	794	15	37	883	23	59	396																																																																	
10	701	793	758	787	796	772	762	767	762	761	769	766	774	787	792	826	826	866	828	760	773	795	788	789	785	16	37	879	00	01	230																																																																	
11	754	729	775	784	791	781	770	761	759	769	774	777	773	782	783	789	829	826	811	795	806	802	800	817	787	16	37	846	00	20	111																																																																	
12	823	809	797	747	759	793	779	760	751	751	755	768	773	782	783	789	789	793	803	815	809	821	807	828	787	17	26	844	23	06	132																																																																	
13	822	704	699	680	713	785	782	765	756	758	763	782	802	789	784	789	822	835	798	792	745	786	819	732	765	17	26	844	23	06	236																																																																	
14	738	743	768	677	631	580	720	758	752	771	836	872	821	861	843	821	872	847	850	827	814	805	789	812	790	12	27	942	02	47	135																																																																	
15	797	770	770	744	718	731	766	766	767	777	748	757	777	791	811	813	865	852	838	807	805	800	785	755	785	16	05	881	02	04	181																																																																	
16	776	756	746	758	801	786	771	756	746	746	748	750	764	774	775	778	779	787	790	800	811	815	825	837	778	23	33	843	02	45	136																																																																	
17	841	810	786	786	824	823	803	737	754	765	748	781	845	909	555	931	907	886	786	850	810	778	776	804	822	14	41	1004	18	53	295																																																																	
18	749	665	697	616	611	625	680	737	754	772	778	783	928	836	759	775	777	810	822	816	778	685	752	766	768	14	21	1004	03	35	459																																																																	
19	792	782	762	696	697	753	758	757	754	742	778	783	928	836	759	775	777	810	822	816	778	685	752	766	775	12	40	958	21	29	433																																																																	
20	737	755	760	701	623	716	717	764	757	733	744	754	761	844	825	858	842	843	806	803	802	802	800	790	778	14	28	947	04	06	370																																																																	
21	734	685	649	704	677	732	750	754	751	746	752	773	800	835	816	792	808	806	811	820	805	802	743	577	762	13	05	846	02	07	253																																																																	
22	759	768	765	731	771	773	778	776	768	760	770	783	794	772	787	804	853	819	854	836	816	821	810	665	790	13	02	850	23	48	302																																																																	
23	825	664	712	701	680	461	664	744	741	758	770	770	814	912	757	808	805	749	776	781	782	751	805	637	748	13	32	959	03	43	616																																																																	
24	825	644	712	701	680	461	664	744	741	758	770	770	814	912	757	808	805	749	776	781	782	751	805	637	748	13	01	1006	21	24	717																																																																	
25	825	644	712	701	680	461	664	744	741	758	770	770	814	912	757	808	805	749	776	781	782	751	805	637	748	14	20	915	05	14	166																																																																	
26	798	717	733	589	547	421	750	789	786	771	832	851	851	870	898	850	862	857	810	817	827	825	746	825	762	15	04	915	05	25	188																																																																	
27	792	781	777	781	766	772	772	760	757	777	756	754	768	823	857	850	862	857	750	781	827	802	796	797	798	15	04	915	05	25	188																																																																	
28	785	820	802	778	761	806	787	767	751	752	749	765	773	777	770	772	782	753	805	786	780	757	756	749	776	02	14	835	22	58	125																																																																	
29	749	724	724	703	686	737	769	762	752	750	754	772	795	832	867	854	805	793	753	759	806	805	793	834	779	14	43	892	04	45	227																																																																	
30	820	806	797	759	572	477	555	729	777	744	740	762	772	797	816	862	845	756	791	700	730	805	793	843	754	15	32	900	05	37	496																																																																	
31	779	762	760	727	705	702	737	747	755	762	773	789	819	832	832	837	837	817	804	796	788	776	763	784	779	15	15	846	02	07	373																																																																	
Mean	772	765	755	749	750	771	771	763	758	757	758	767	780	792	758	812	819	819	811	795	793	792	797	782	780	* Ten	days	least	disturbed	373																																																																		
Mean /	774	768	754	754	758	780	771	759	752	752	756	767	777	791	787	786	797	800	804	803	802	796	790	795	788	/ Five	international	quiet	days	151																																																																		
Mean / c	771	732	749	685	618	588	724	758	756	768	800	834	862	913	850	830	807	761	776	794	799	708	710	816	768	/ Five	international	disturbed	days	668																																																																		
	a Means of 9 values																																b Means of 8 values																																c Means of 4 values																															
	DESIGNATIONS																																																																																															

TABLE 19

HOURLY VALUES OF VERTICAL INTENSITY

48500 plus tabular quantities expressed in gammas

G. M. T. used

AUGUST 1955

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean	Maximum	Minimum	Range					
1	509	584	596	530	482	491	495	496	499	497	501	503	499	496	499	497	499	496	473	446	445	387	384	492	515	502	23	54	711	21	44	147	564	
2	571	571	598	563	489	453	495	495	494	500	498	503	500	499	497	494	484	451	456	460	477	499	541	595	645	504	23	38	796	18	41	-195	601	
3	693	626	514	538	599	552	464	463	484	479	437	384	386	427	508	264	402	448	264	402	448	521	594	605	512	490	22	20	914	10	41	-222	936	
4	562	565	552	577	519	508	481	480	485	495	508	499	502	495	441	470	478	409	457	528	733	649	689	722	512	23	23	971	17	37	258	713		
5	676	627	521	522	567	479	470	480	485	495	508	499	502	495	441	470	478	409	457	528	733	649	689	722	512	23	23	971	17	37	258	713		
6	506	515	519	506	507	500	496	495	494	500	498	503	500	499	497	494	488	412	401	353	429	526	521	580	566	493	01	45	579	06	47	429	150	
7	537	556	556	503	479	466	468	482	497	486	499	507	515	519	515	512	512	515	492	462	455	468	544	501	501	503	23	20	641	23	11	238	405	
8	517	509	536	504	480	479	470	444	457	479	485	503	492	492	494	488	412	401	353	429	526	521	580	566	493	02	57	579	06	47	429	150		
9	518	519	536	500	479	478	472	458	470	479	485	503	492	492	494	488	412	401	353	429	526	521	580	566	493	02	57	579	06	47	429	150		
10	491	425	499	498	491	488	487	488	491	489	493	517	508	508	508	508	508	508	508	508	508	508	508	508	508	501	22	53	736	21	19	178	558	
11	494	432	493	493	491	487	487	488	491	489	493	517	508	508	508	508	508	508	508	508	508	508	508	508	508	501	22	53	736	21	19	178	558	
12	575	522	517	506	486	489	487	488	491	489	493	517	508	508	508	508	508	508	508	508	508	508	508	508	508	501	22	53	736	21	19	178	558	
13	512	515	515	511	504	500	494	493	497	491	491	499	503	499	503	509	509	508	508	508	508	508	508	508	508	501	22	53	736	21	19	178	558	
14	593	516	543	520	513	494	485	497	491	491	491	499	503	499	503	509	509	508	508	508	508	508	508	508	508	501	22	53	736	21	19	178	558	
15	504	506	502	501	504	502	500	497	497	500	505	510	509	509	509	509	509	508	508	508	508	508	508	508	508	501	22	53	736	21	19	178	558	
16	526	509	504	503	493	491	493	489	489	489	492	498	515	522	516	511	511	512	512	512	512	512	512	512	512	498	13	35	544	18	11	151	107	
17	198	504	503	198	485	478	480	486	489	489	492	498	503	503	503	503	503	503	503	503	503	503	503	503	503	506	22	50	635	22	55	444	221	
18	522	516	517	505	490	476	470	482	488	488	492	498	500	496	500	503	506	516	517	511	506	505	502	499	518	506	22	50	635	22	55	444	221	
19	337	327	311	300	193	192	192	199	200	199	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	501	08	10	685	03	49	450	197
20	499	492	490	490	491	497	484	484	467	484	485	467	482	498	502	513	513	513	513	513	513	513	513	513	513	513	506	21	02	721	20	57	250	471
21	523	530	552	535	477	482	484	486	488	493	499	512	500	500	502	502	502	502	502	502	502	502	502	502	502	506	23	39	630	04	10	452	253	
22	615	562	507	501	482	480	476	481	481	491	497	503	516	508	508	508	508	508	508	508	508	508	508	508	508	507	00	13	666	22	14	247	419	
Mean	541	546	540	523	507	500	486	486	491	496	502	506	508	504	504	504	503	498	491	474	477	481	485	509	543	504	00	13	666	22	14	247	380	
Mean # a	521	524	528	513	497	490	490	494	496	498	501	507	508	509	508	508	508	505	504	489	476	481	462	482	523	500	00	13	666	22	14	247	249	
Mean # c	507	507	509	502	497	494	492	493	495	498	501	507	508	509	510	509	508	506	501	492	482	495	498	477	502	499	00	13	666	22	14	247	198	
Mean # c	630	626	590	586	594	605	531	520	515	503	498	488	496	474	472	472	472	472	472	422	475	492	534	556	606	526	00	13	666	22	14	247	609	

a Means of 9 values b Means of 8 values c Means of 4 values

DBSIGNATIONS

* Ten days disturbed
 # Five international quiet days
 / Five international disturbed days
 () Approximate

TABLE 21

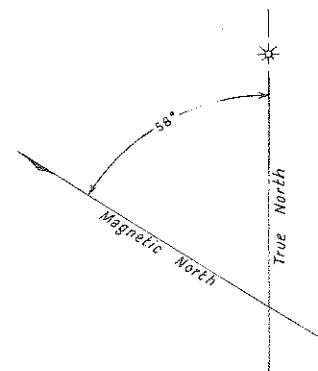
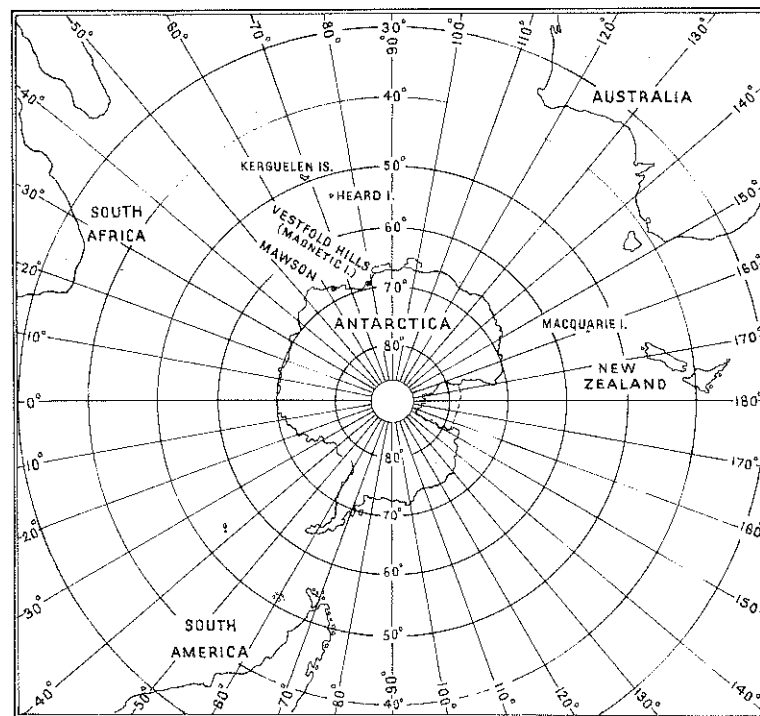
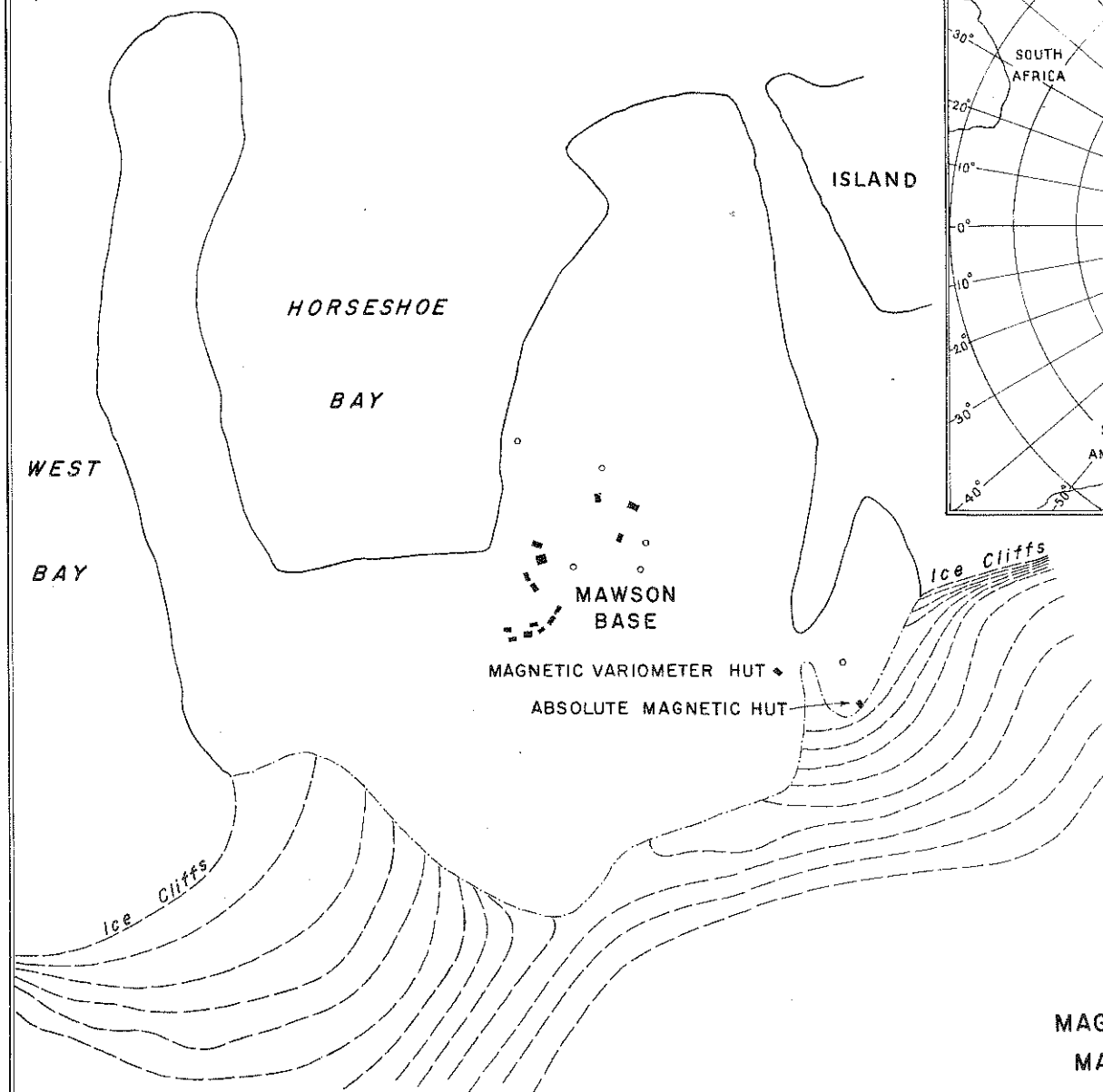
HOURLY VALUES OF VERTICAL INTENSITY

44500 plus tabular quantities expressed in gammas

G. M. T. used

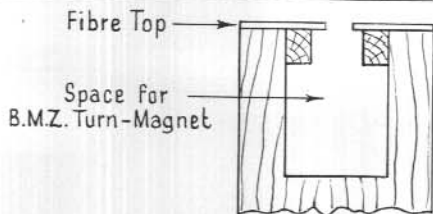
OCTOBER 1955

Day	Hour																								Mean	Maximum		Minimum		Range																																																																		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	h m	h m	h m		h m																																																																	
1	622	583	554	530	518	492	488	487	512	523	528	510	523	531	515	518	519	511	495	498	543	552	536	548	557	00	16	715	11	49	341	374																																																																
2	551	550	585	585	511	490	493	495	497	538	527	523	538	523	547	449	423	421	484	484	631	511	501	518	510	20	05	819	19	40	223	626																																																																
3	538	528	624	641	545	464	430	497	521	508	518	528	532	527	528	520	521	521	503	489	503	461	502	527	524	03	07	666	16	48	359	307																																																																
4	594	591	599	556	485	496	502	492	507	509	520	509	493	435	464	356	394	445	461	467	602	600	664	628	524	23	52	678	21	19	403	275																																																																
5	627	594	587	657	509	485	498	498	508	513	563	551	548	535	486	431	395	351	429	424	498	500	550	551	512	03	26	722	15	42	034	829																																																																
6	618	656	656	587	523	509	501	511	511	539	532	537	551	543	543	542	536	526	514	500	527	571	589	585	550	02	22	704	06	49	483	215																																																																
7	573	539	525	497	460	482	432	446	442	(479)	507	521	525	526	526	522	518	515	508	502	506	516	542	591	508	02	05	615	08	58	403	242																																																																
8	604	562	619	578	491	462	464	456	469	546	536	538	526	524	526	494	449	403	468	489	506	407	571	528	522	23	04	782	21	47	026	756																																																																
9	518	526	508	492	490	487	486	451	439	(421)	440	408	393	424	468	472	414	481	435	497	494	513	513	512	508	00	06	669	17	19	321	348																																																																
10	513	510	510	508	485	485	494	487	496	524	531	536	535	538	534	528	527	520	518	518	503	513	513	512	515	21	33	540	22	07	303	243																																																																
11	537	509	503	504	487	472	479	487	496	511	527	536	542	536	529	515	502	488	480	473	425	434	498	534	500	21	32	554	20	14	339	215																																																																
12	520	508	522	509	490	469	451	456	478	528	528	535	540	539	534	524	522	512	486	490	504	516	576	584	513	23	10	631	22	31	367	264																																																																
13	548	535	535	528	507	494	489	490	500	517	530	530	522	524	525	521	517	514	519	512	510	510	509	533	520	525	23	08	727	20	47	458	269																																																															
14	642	611	573	528	497	479	481	489	508	513	514	520	522	524	525	521	517	514	512	510	510	509	533	520	524	00	31	742	23	13	451	291																																																																
15	544	579	646	579	520	495	486	492	494	504	510	519	522	522	525	519	517	515	512	510	510	512	516	515	523	02	23	679	02	02	477	202																																																																
16	512	510	507	504	500	495	499	504	509	518	521	528	528	528	527	523	520	518	516	516	512	510	518	529	523	02	21	532	05	03	457	049																																																																
17	539	524	510	507	500	495	498	500	501	508	518	528	525	525	525	520	517	513	511	507	504	495	503	502	513	23	52	550	21	15	436	114																																																																
18	514	513	506	584	498	493	491	479	484	506	503	518	518	532	520	430	461	472	473	489	503	520	503	502	504	03	25	632	22	02	426	226																																																																
19	572	574	547	502	497	487	490	485	487	516	530	530	532	532	530	524	405	375	436	411	471	500	583	587	508	22	46	680	21	32	274	406																																																																
20	555	603	626	558	499	497	490	488	487	437	512	519	525	529	526	519	518	508	494	500	502	510	508	520	488	00	08	594	19	04	313	281																																																																
21	518	522	514	494	485	482	482	488	496	508	520	525	531	528	521	519	516	511	509	502	502	500	526	547	520	02	24	656	06	46	478	178																																																																
22	593	717	756	791	714	513	455	619	518	443	356	225	359	293	332	300	423	490	459	575	796	663	609	764	534	24	00	1057	11	24	057	1000																																																																
23	(766)	681	727	662	625	543	555	500	500	491	513	515	491	439	487	474	392	331	530	510	743	633	687	722	575	00	10	1180	17	20	-144	1324																																																																
24	633	639	601	603	541	497	475	478	496	491	513	515	492	525	509	492	375	420	447	496	607	592	528	587	532	03	48	708	16	44	238	470																																																																
25	589	588	606	603	541	497	472	483	492	489	503	476	396	352	343	459	525	527	520	520	520	510	504	492	501	04	04	666	14	41	262	404																																																																
26	518	500	504	487	471	513	494	500	500	511	515	530	535	532	530	527	487	456	419	388	483	569	535	580	499	21	49	733	18	31	190	543																																																																
27	566	554	529	512	505	494	500	500	511	506	522	530	532	532	530	527	525	456	496	455	483	510	525	539	515	19	11	602	19	16	234	368																																																																
28	561	649	773	753	793	661	626	514	531	543	543	542	536	510	397	274	416	487	474	520	503	747	600	600	565	04	15	602	20	38	-263	1246																																																																
29	571	571	578	568	530	499	489	491	496	508	513	508	512	502	498	483	477	474	485	498	529	531	543	569	518	DESIGNATIONS				419																																																																		
30	530	531	538	519	497	488	485	488	495	512	520	527	532	531	527	522	515	507	501	500	495	502	526	554	514	*	Ten	least	disturbed	days	192																																																																	
31	524	515	509	503	491	487	490	496	501	514	523	529	533	531	527	521	516	510	507	503	489	490	510	532	511	^	Five	international	quiet	days	121																																																																	
Mean	628	646	688	703	656	552	527	525	513	505	495	453	486	442	433	385	404	421	471	539	628	629	622	653	542	^	Five	international	disturbed	days	1017																																																																	
	a Means of 9 values																								b Means of 8 values																								c Means of 4 values																								() Approximate																							

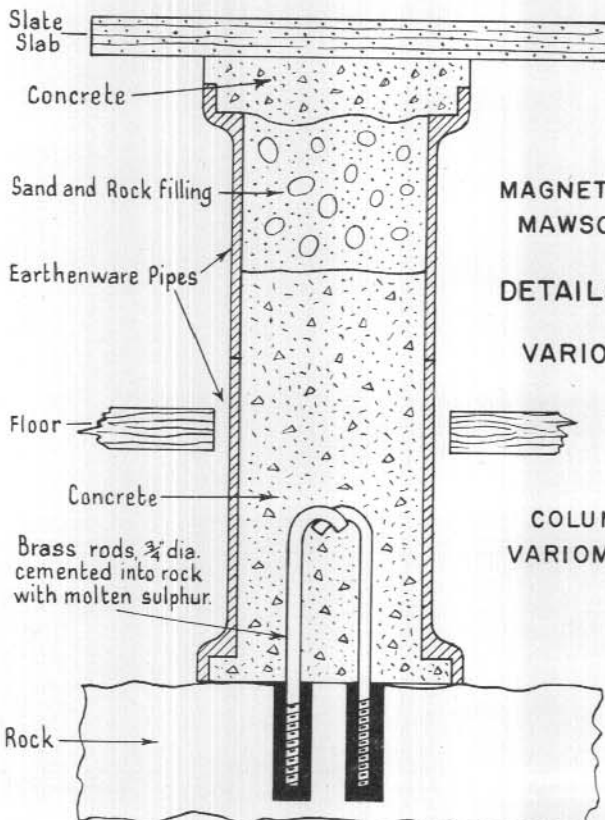
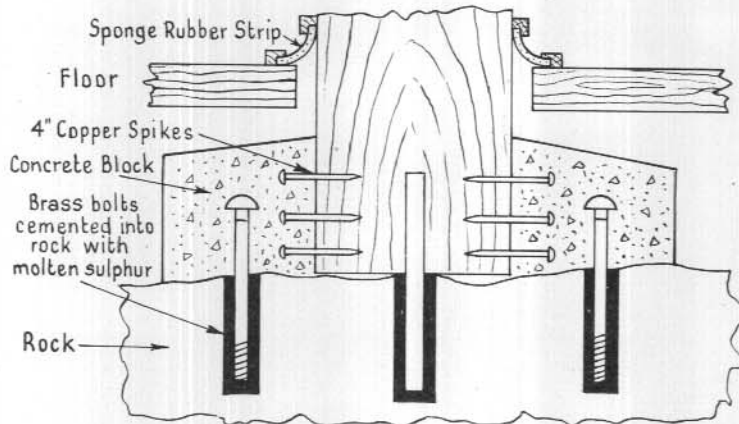


MAGNETIC OBSERVATORY,
MAWSON, ANTARCTICA

LOCALITY MAP



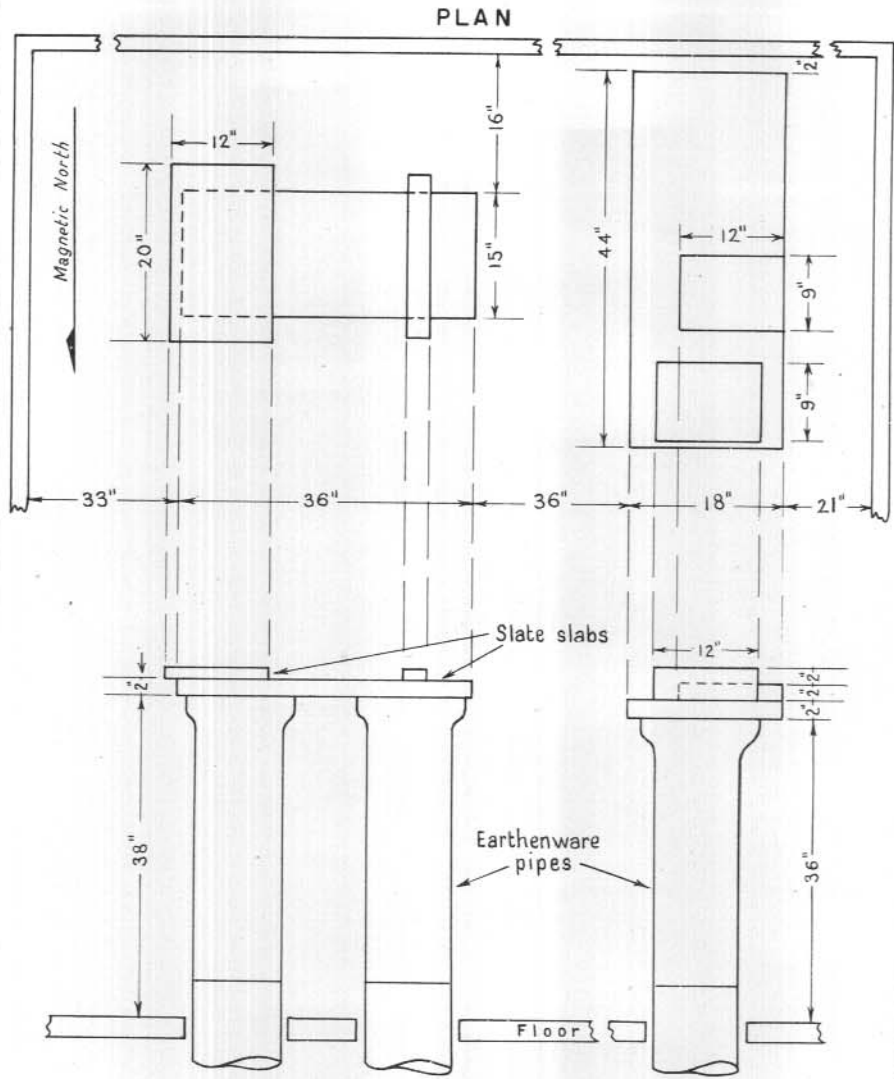
ABSOLUTE PIER
(12"X12" OREGON)



MAGNETIC OBSERVATORY,
MAWSON, ANTARCTICA

DETAILS OF ABSOLUTE
AND
VARIOMETER PIERS

COLUMNS FOR
VARIOMETER PIERS



ELEVATION

MAGNETIC OBSERVATORY,
MAWSON, ANTARCTICA
LAYOUT OF PIERS FOR
MAGNETIC VARIOMETERS
AND RECORDER

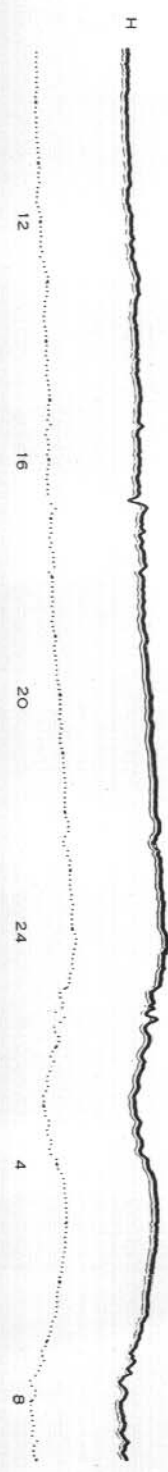
H TEMP
18/19 DECEMBER 1955

MAGNETIC OBSERVATORY
MAWSON, ANTARCTICA

CORRECTION TO
TIME MARKS
0 MIN.

PLATE 4

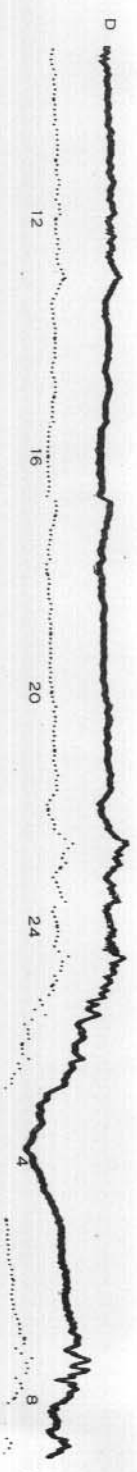
200 Y
H INCREASING



H BASE

D BASE

40 MIN.
D EASTWARDS



Z BASE

200 Y
Z INCREASING
NUMERICALLY



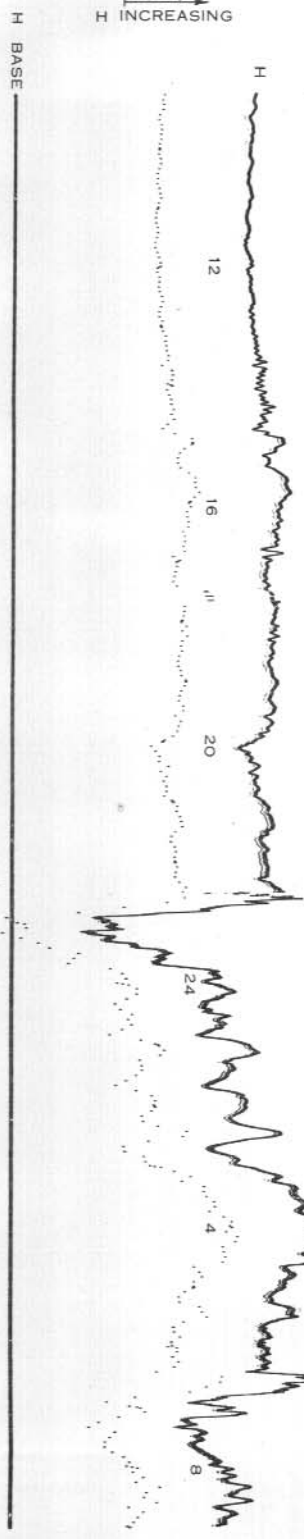
GREENWICH MEAN TIME

H TEMP _____
5/6 DECEMBER 1955

MAGNETIC OBSERVATORY
MAWSON, ANTARCTICA

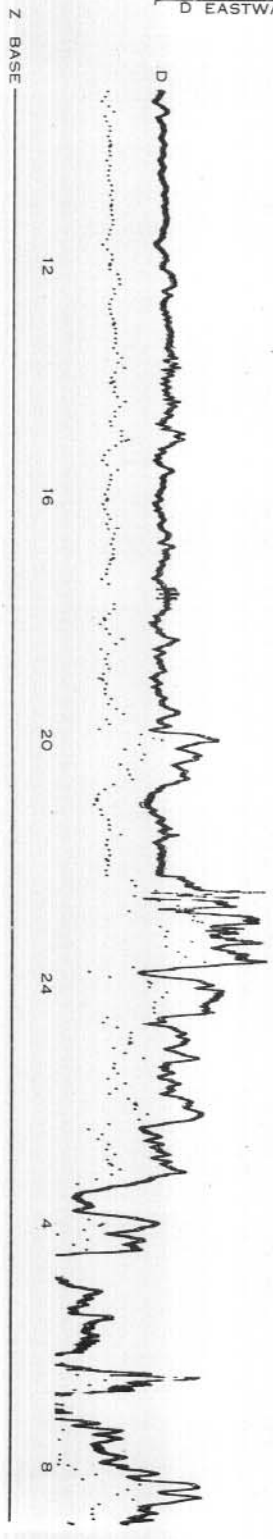
CORRECTION TO
TIME MARKS
0 MIN
PLATE 5

200 Y
H INCREASING

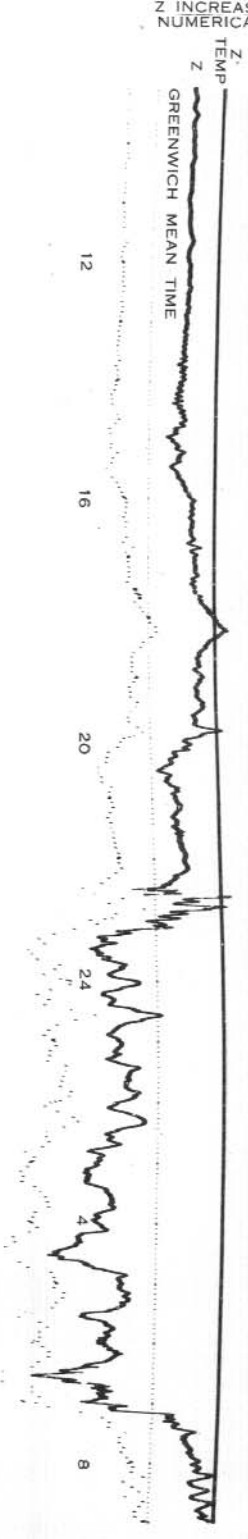


D BASE _____

40 MIN.
D EASTWARDS



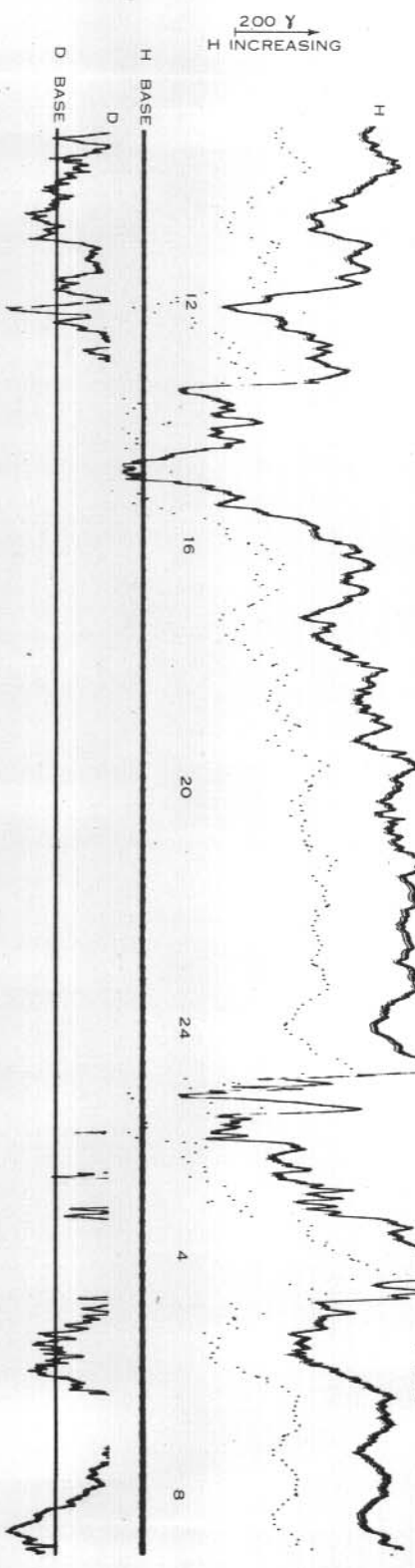
200 Y
Z INCREASING
NUMERICALLY



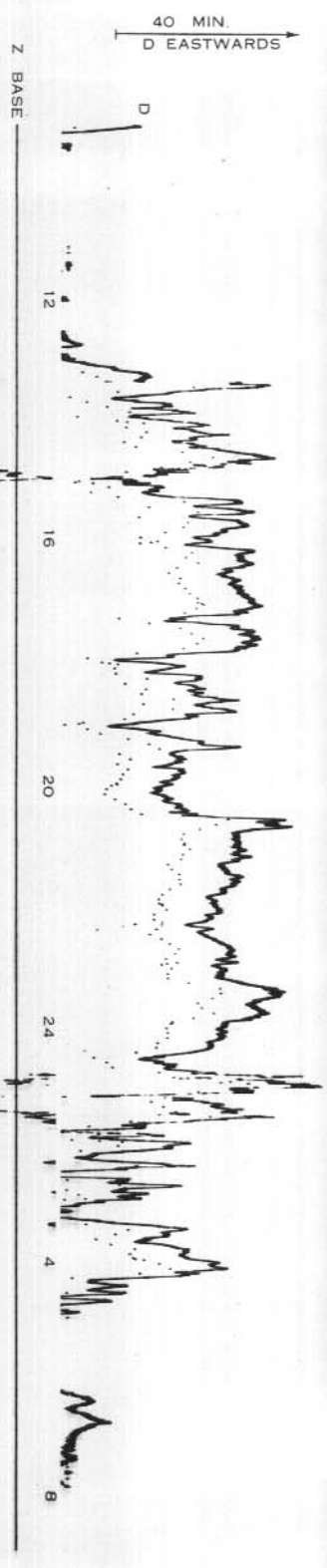
H TEMP
19/20 NOVEMBER 1955

MAGNETIC OBSERVATORY
MAWSON, ANTARCTICA

CORRECTION TO
TIME MARKS
0 MIN.
PLATE 6



40 MIN.
D EASTWARDS



200 Y
Z INCREASING
NUMERICALLY

