

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS



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MAGNETIC RESULTS
FROM
MAWSON, ANTARCTICA, 1955

by

W. H. OLDHAM



Issued under the Authority of Senator the Hon. W. H. Spooner, M. M.,
Minister for National Development
1958

LIST OF REPORTS

1. Preliminary Report on the Geophysical Survey of the Collie Coal Basin - N.G. Chamberlain, 1948.
2. Observations on Stratigraphy and Palaeontology of Devonian, Western Portion of Kimberley Division, Western Australia - Curt Teichert, 1949.
3. Preliminary Report on Geology and Coal Resources of Oaklands-Coorabin Coalfield, New South Wales
E. K. Sturmfels, 1950.
4. Geology of the Nerrima Dome, Kimberley Division, Western Australia - D. J. Cuppy, J. O. Cunthbert and
A. W. Lindner, 1950.
5. Observations of Terrestrial Magnetism at Heard, Kerguelen and Macquarie Islands, 1947 - 1948 (Carried out
in co-operation with the Australian National Antarctic Research Expedition, 1947 - 1948) - N. G. Chamberlain,
1952.
6. Geology of New Occidental, New Cobar and Chesney Mines, Cobar, New South Wales - C. J. Sullivan, 1951.
7. Mount Chalmers Copper and Gold Mine, Queensland - N. H. Fisher and H. B. Owen, 1952.
8. Geological and Geophysical Surveys, Ashford Coal Field, New South Wales - H. B. Owen, G. M. Burton and
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18. Petrology and Petrography of Limestones from the Fitzroy Basin, Western Australia - J. E. Glover, 1955.
19. Seismic Reflection Survey, Darriman, Gippsland, Victoria - M. J. Garrett, 1955.
20. Micropalaeontological Investigations in the Bureau of Mineral Resources, Geology and Geophysics, 1927-52 -
I. Crespin, 1956.
21. Magnetic Results from Heard Island, 1952 - L. N. Ingall, 1955.
22. Oil in Glauconitic Sandstone at Lakes Entrance, Victoria - R. F. Thyer and L. C. Noakes, 1955.

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Department Of National Development

Minister—SENATOR THE HON. W. H. SPOONER, M.M.

Secretary—H. G. RAGGATT, C.B.E.

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Director: J. M. RAYNER.

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Chief Geophysicist: R. F. THYER.

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 $67^{\circ} 36' \text{ S.}$, $62^{\circ} 54' \text{ E.}$, 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-Gauguin 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	'/mm	'/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	Y/mm	Y/mm		1955	Y/mm	Y/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	Y/mm	Y/mm		1955	Y/mm	Y/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	R e m a r k s
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	
" 12	17682	17684	00h Dec. 15	
" 15	17684	17681		
" 19	17678	17681	00h Dec. 20	
		17678	00h Dec. 23	
		17675	00h Dec. 26	
" 29	17676	17672	00h Jan. 1	
1956				
January 9	17668			
				Drop of 4 Y due to bumping variometer

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	
" 12	-48608	-48604	00h Aug. 10	
		-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
1955	°	'	Y	Y	°	'	Y	Y
	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				Type	Sudden commencement Amplitudes			Degree of activity ϕ	Maximal activity on K-scale 0-9			Ranges			
	G.M.T. of beginning		G.M.T. of ending			D	H	Z		Gr. day	Gr. 3-hour period	K-index	D	H	Z	
1955	h	m	d	h		'	Y	Y					'	Y	Y	
August	2	20	10	11	10		...	...	...	B	4 5 6 6	6,7,8 8 6 8	7 7 7 7	132	923	1234
September 12	22	00	15	10			...	...	...	B	12 13	8 1	7 7	119	728	804
September 26, # 27 or 28			03	20			...	...	...	A	30	3	8	162	1101	1147
October	24	22	30	28	18		...	...	...	B	25 26 26	7,8 1 6,7	7 7 7	157	1192	1324
November	3	19	00	06	09		...	...	...	A	4	2	9	159	975	1552
November	14	12	00	17	17		...	...	...	B	15 16 17	4 2,3 2	6 6 6	115	846	785
November	17	19	00	21	14		...	...	...	B	18 18 19 20	2 6,7 5 1	7 7 7 7	160	961	1265
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 9

HOURLY VALUES OF DECLINATION

AUGUST 1955

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

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 * /									352	347																						
2 *	359	392	445					360	(359)	353	337	337	341	345	337	338	343	339	339	341	339	385	343	324	337		368	21 24	924	23 00	224	700
3	473	400	451	444	349	410		389	381	310	312	318	311	330	329	325	334	326	335	360	332	331	327	329	365		357	00 09	953	23 09	165	788
4	363	388	381	457	508	503		479	365	322	330	409	380	351	283	326	334	329	288	037	298	301	281	293	262		345	22 00	840	18 02	-363	1203
5	364	399	369	432	378	378		365	406	350	277	275	309	327	319	301	311	317	317	332	316	(417)	194	336	224		334	20 30	928	23 25	-150	1078
6	338	424	422	483	494	597		688			300	360	347	328	334	319	298	163		279	161	094	333	398	430							
7	456	456	548	527	498	494		492	417	384	296	277	305	343	324	315	318	326	338	305	305	275	347	365	366		378	06 28	671	20 52	201	470
8	334	356	404	364	378	380		387	344	354	343	309	309	303	332	324	321	309	306	337	336	339	341	341	324		341	04 25	465	23 56	191	274
9	373	387	387	379	380	405		399	(341)	322	308	323	323	324	318	322	316	322	330	341	347	347	343	443	385		353	22 30	621	00 01	255	366
10	359	360	375	450	486	464		417	(379)	343	330	296	307	307	320	318	318	324	324	350	353	307	340	312	285		350	04 58	527	23 00	128	399
11 * /	353	362	374	385	375	381		388	367	369	354	343	331	330	323	329	333	336	341	347	375	336	338	343	345		352	19 32	422	13 11	317	105
12 *	346	358	385	406	425	382		(357)	358	352	342	339	341	339	343	339	341	343	340	347	347	407	407	298	340		358	20 42	488	22 03	249	239
13	366	388	448	429	409	426		383	336	343	335	335	333	335	331	327	334	330	327	343	349	354	351	370	358		360	23 12	834	23 31	110	724
14	353	382	434	405	387	432		442	(396)	347	337	336	313	311	323	314	305	301	288	281	243	253	353	322	365		343	21 16	981	18 38	155	826
15	384	372	380	417	434	419		382	353	343	317	313	319	328	333	333	341	345	349	349	349	333	337	366	375		357	05 23	545	10 57	266	279
16	366	350	350	347	345	389		(387)	367	362	362	347	343	340	345	348	349	349	348	347	347	337	347	353	360		354	06 14	463	06 55	309	154
17	357	352	353	355	357	354		354	347	351	351	351	347	342	341	334	324	314	330	405	326	330	289	324	363		344	21 58	498	21 25	071	427
18	365	346	351	366	394	494		465	(335)	321	336	335	323	319	306	313	310	311	302	299	312	304	344	337	315		342	05 38	571	23 36	183	388
19	380	417	434	442	449	440		403	357	313	310	308	320	330	331	335	321	338	341	350	341	330	507	306	315		363	21 15	859	21 47	116	743
20 *	341	368	369	356	364	369		370	365	351	339	335	336	337	330	325	320	338	336	320	347	352	347	347	347		346	07 10	405	23 15	295	110
21 *	383	438	416	416	428	418		382	365	343	340	339	342	343	344	339	336	338	331	335	353	353	336	312	347		362	21 01	596	21 42	116	480
22 *	350	350	350	355	358	362		367	363	359	351	348	347	346	342	341	344	346	346	344	341	341	388	378	352		353	21 17	682	22 40	206	476
23 *	373	351	344	355	362	364		367	352	352	339	339	339	342	341	338	339	340	343	343	339	338	343	343	324		346	22 03	521	22 42	224	297
24	373	376	382	378	382	367		370	377	365	347	347	335	330	320	324	320	335	340	353	358	353	354	354	354		354	07 35	412	13 56	295	117
25 *	359	363	366	372	376	378		371	364	365	353	345	345	342	339	340	336	343	332	333	330	304	306	343	356		348	06 52	402	20 56	254	148
26	365	373	424	384	379	376		365	359	361	350	352	341	339	339	324	320	330	346	347	347	351	344	358	394		357	22 55	535	15 06	308	227
27 *	399	374	388	366	379	374		378	365	365	359	347	341	347	347	347	347	347	344	352	349	344	330	339	361		358	00 04	469	22 16	103	366
28	361	356	359	386	490	480		541	491	443	425	302	307	296	310	308	301	333	354	354	345	320	343	341	356		371	06 30	602	09 29	252	350
29	363	371	369	370	368	404		418	367	338	349	341	341	330	327	326	343	349	353	353	337	286	381	349	349		353	21 47	743	20 59	036	707
30	373	373	380	428	375	382		(382)	381		368	356	343	338	346	347	351	346	350	353	356	355	352	342	369		364	03 09	469	23 40	266	203
31	400	410	355	362	401	399		387	376	366	341	342	341	330	330	325	330	336	344	346	348	339	298	392	318		355	22 11	703	21 55	142	561
Mean	372	378	392	398	400	406		398	370	353	340	333	331	332	329	328	329	332	333	330	337	334	353	344	342		354	DESIGNATIONS			455	
Mean * a	363	373	382	380	383	376		371	362	357	347	342	340	341	339	337	337	341	340	340	347	347	383	338	345		355	* Ten least disturbed days			325	
Mean / c	359	357	359	367	368	371		373	362	361	349	344	341	340	336	337	338	341	341	342	346	330	344	352	344		350	/ Five international quiet days			257	
Mean ≠ c	386	400	414	451	469	464		469	420	375	332	316	325	329	309	313	316	326	324	257	316	328	291	334	302		357	≠ Five international disturbed days			775	
	a Means of 9 values							b Means of 8 values						c Means of 4 values						() Approximate												

TABLE 10

HOURLY VALUES OF DECLINATION

SEPTEMBER 1955

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

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	382	386	380		364	384	394	394	399	394	326	339	340	324	330	306	330	347	326	313	226	243	330	365	389	346	22 54	546	19 36	-073	619	
2	397	440	440		628	641	628	528	411	355	388	399	399	346	318	318	330	329	348	353	362	336	326	342	369	405	03 34	925	22 27	237	688	
3	369	352	423		521	567	550	486	367	346	370	441	426	360	340	337	334	345	349	328	336	382	392	301	346	390	20 50	782	21 51	219	563	
4	468	460	457		477	485	396	422	394	422	465	362	317	329	316	293	381	337	301	344	366	324	429	374	316	385	21 20	1090	00 32	183	907	
5	335	417	409		454	537	638	559	423	463	433	387	350	354	323	330	324	328	350	348	289	355	349	242	237	385	19 15	804	19 32	-040	844	
6	347	376	382		434	546	608	478	427	406	356	341	303	306	326	330	315	336	305	317	404	322	344	347	297	373	19 59	810	23 37	038	772	
7	347	438	475		462	452	434	396	390	382	347	320	318	339	344	347	349	351	353	355	354	348	355	366	393	379	02 19	588	11 42	291	297	
8	365	373	395		412	414	420	396	377	367	369	364	345	332	332	350	326	356	369	370	367	357	347	331	387	367	23 56	533	23 03	232	301	
9	370	373	377		512	455	415	401	378	369	359	350	343	343	346	346	337	355	355	355	353	356	351	346	364	371	03 39	596	23 19	272	324	
10	388	377	407		413	465	489	429	392	375	356	352	341	338	329	306	330	347	342	347	352	363	347	339	410	372	23 07	613	22 15	262	351	
11	366	370	457		523	533	515	435	366	352	352	341	346	337	346	339	339	344	347	341	345	355	340	346	330	378	02 32	656	23 35	283	373	
12	434	388	400		510	440	584	601	(411)	348	343	352	347	329	367	384	358	341	338	366	363	359	356	312	336	390	23 40	1084	23 38	144	940	
13	620	309	609		601	778	684	562	434	273	343	372	356	329	330	349	320	335	444	336	347	339	330	353	381	422	04 45	1335	12 14	217	1118	
14	384	379	399		399	392	408	414	(402)	323	333	342	333	324	318	319	338	341	347	365	347	342	394	351	370	361	21 25	550	08 23	209	341	
15	381	392	400		434	463	408	389	373	352	349	345	346	353	341	338	356	347	337	366	340	304	304	360	339	363	18 56	804	19 47	173	631	
16	351	450	455		470	442	466	448	358	369	365	366	335	310	318	336	346	352	354	363	363	353	331	353	344	376	22 37	768	22 50	245	523	
17	376	376	435		455	620	639	572	454	381	336	323	321	339	346	352	347	347	352	351	475	399	260	319	404	399	05 17	997	20 33	117	880	
18	360	366	433		550	570	521	479	415	373	332	336	332	326	346	314	293	347	330	326	339	351	359	363	360	380	04 32	611	15 26	237	374	
19	338	476	492		550	532	438	393	380	356	347	340	341	334	330	330	330	345	355	355	352	343	341	347	327	378	23 59	778	00 27	302	476	
20	457	396	388		473	510	457	403	405	384	327	310	322	336	343	349	355	358	356	355	345	403	347	343	379	379	20 10	808	22 03	040	768	
21	381	378	417		407	394	394	382	387	368	352	347	347	347	352	355	358	355	353	351	348	394	427	337	345	370	21 12	640	23 19	288	352	
22	398	342	462		524	469	398	383	369	357	353	348	344	345	350	353	338	358	359	350	312	382	327	415	363	375	03 41	641	20 37	179	462	
23	396	382	394		397	423	452	436	433	411	380	304	320	340	345	355	347	(332)	336	326	282	347	312	296	347	362	21 08	684	20 20	131	553	
24	437	524	469		503	461	425	402	385	376	359	359	350	351	353	355	359	350	350	487	350	367	360	351	371	394	18 30	727	18 59	237	490	
25	347	360	432		440	427	411	412	376	373	368	359	358	358	359	359	358	360	364	364	364	359	273	355	393	372	22 23	514	21 45	126	388	
26	371	367	420		420	401	415	403	392	383	380	371	359	357	354	355	355	355	352	353	359	356	356	359	383	374	02 36	454	22 03	336	118	
27	370	362	405		570	529	475	418																								
28								(391)	352		333	330	320	349	350	353	357	346	339	(579	648)	307	307	324	398		(18 53	1434)	(21 01	207)	(1227)	
29	376	433	462		527	552	513	476	408	368	307	320	333	341	346	319	315	285	205	294	272	292	324	308	359	364	22 53	743	17 53	-013	756	
30	358	421	404		443	615	671	637	534	478	371	436	420	359	336	342	340	363	357	505	341	611	585	336	341	442	06 42	1147	19 30	-141	1288	
31																																
Mean	392	396	431	475	499	492	454	401	375	360	355	346	339	339	338	340	344	344	357	345	359	353	341	356	380	DESIGNATIONS			611			
Mean *	379	389	417	446	440	430	406	383	364	358	353	347	344	343	342	346	349	352	370	352	355	350	348	369	372	* Ten least disturbed days			367			
Mean /	369	373	425	445	444	429	404	379	366	360	353	351	350	350	349	353	352	351	355	351	354	340	351	358	371	/ Five international quiet days			372			
Mean ≠c	422	395	471	506	620	628	558	450	396	364	379	365	346	334	335	325	328	339	371	312	399	397	310	330	403	≠ Five international disturbed days			1002			
	a Means of 9 values							b Means of 8 values							c Means of 4 values							() Approximate										

TABLE 11

HOURLY VALUES OF DECLINATION

OCTOBER 1955

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

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	409	419	422		423	431	451	435	436	401	336	373	342	350	345	362	360	362	359	351	340	378	351	359	357	381	h m	h m		554	
2	358	388	379		502	473	441	422	440	411	301	316	330	330	324	322	361	302	379	309	292	208	292	328	369	357	03 36	641	11 47	087	730
3	349	376	376		521	490	506	434	429	417	321	353	351	337	347	359	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	163	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	327	352	402	16 48	1060	19 53	053	1007
7	356	439	531		487	443	439	426	405	396	375	370	361	318	307	310	310	344	374	369	356	342	328	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	362	362	343	386	371	390	07 06	632	21 21	289	343
9	361	368	368		471	446	431	407	393	374	366	361	359	359	362	362	363	358	349	353	344	333	339	232	402	369	21 19	811	22 19	-027	838
10	370	413	440		426	492	477	424	424	480	356	362	328	322	332	332	326	347	452	374	353	344	357	368	362	386	04 05	614	12 14	251	363
11	370	392	397		436	469	426	480	489	511	409	336	308	281	268	273	308	325	360	388	351	367	366	363	362	376	18 45	605	12 57	140	465
12	*	357	361	385		428	444	445	426	409	405	364	356	355	353	361	368	373	370	375	370	359	345	322	348	377	05 03	466	22 25	264	202
13	*	369	400	416		419	440	459	443	419	395	372	357	345	335	340	349	361	357	355	361	341	300	322	338	373	05 51	469	20 18	132	337
14	*	365	390	450		465	454	468	457	454	400	350	340	330	322	335	352	358	365	359	368	371	361	353	360	382	22 22	539	23 00	173	366
15	*	384	395	441		492	479	431	421	388	363	347	344	341	341	354	361	368	369	370	368	370	351	340	331	378	03 58	537	23 02	143	394
16		437	454	458		482	438	477	428	419	373	373	370	358	348	350	353	359	360	356	356	352	353	353	337	389	00 24	594	22 42	302	292
17	*	350	341	426		469	449	437	426	409	394	367	359	354	357	365	370	369	368	365	359	359	362	346	358	380	03 12	485	01 28	314	171
18	*	384	380	394		396	399	401	400	388	382	376	369	357	353	360	365	366	368	369	369	369	369	366	353	375	05 03	424	23 22	343	081
19	*	369	389	394		397	407	402	404	405	396	386	373	362	361	359	362	363	365	365	370	369	374	376	358	378	21 11	463	22 20	327	136
20		374	405	447		549	537	458	435	453	412	343	323	336	330	318	318	330	352	343	342	334	349	382	368	383	03 59	610	15 02	274	336
21	*	376	378	400		410	413	437	439	399	394	368	355	347	341	339	331	346	343	353	364	348	326	341	351	370	21 30	675	21 34	161	514
22		382	408	450		437	420	433	409	416	439	393	351	335	334	369	258	288	245	258	291	311	345	342	359	360	08 09	515	16 11	161	354
23	*	349	399	460		519	464	419	417	399	392	389	370	352	349	353	350	350	354	361	377	367	361	359	353	384	03 29	550	00 23	327	223
24	*	380	386	422		424	443	437	437	423	411	387	363	352	347	357	360	362	365	368	366	362	357	348	323	379	04 18	450	23 05	284	166
25		294	414	591		720	895	891	672	682	675	495	615	428	430	482	349	237	336	242	179	189	080	209	255	444	04 34	1081	20 26	-429	1510
26		255	471	513		521	603	664	550	433	392	392	417	432	341	326	351	327	326	(628)	428	431	319	302	311	421	17 20	1145	00 13	-210	1355
27		417	426	442		514	582	614	562	485	452	422	374	365	322	327	324	324	353	366	353	302	325	328	322	400	05 24	696	21 06	017	679
28		351	426	475		510	615	519	498	453	430	423	365	366	336	324	289	384	367	390	386	377	334	347	324	403	04 17	675	12 41	196	479
29		394	399	442		523	610	579	463	438	411	383	370	348	343	319	291	326	336	265	251	277	294	300	364	378	04 59	705	18 37	056	649
30		379	423	438		424	429	445	433	424	420	399	366	344	333	321	353	351	332	301	323	262	285	293	338	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	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	383	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		
	a Means of 9 values				b Means of 8 values				c Means of 4 values																	() Approximate					

TABLE 12

HOURLY VALUES OF DECLINATION

NOVEMBER 1955

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

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	445	398	411		486	782	890	588	452	423	356	361	362	366	367	362	368	358	326	400	362	379	328	363	367	429	h m	h m	h m	
2	411	411	469		505	529	486	477	439	416	393	374	384	339	319	323	317	341	334	332	336	301	317	330	342	384	11 00	630	10 26	251
3	367	383	409		460	454	456	432	409	399	379	379	363	353	361	371	371	378	387	387	369	388	324	309	322	384	04 44	483	22 39	216
4	353	452	545		773	494	669	807	464	456	411	368	336	368	364	367	352	378	361	387	351	351	242	292	348	429	04 21	1711	22 33	117
5	388	379	470		520	641	650	527	513	459	401	362	353	354	343	343	346	363	381	376	327	335	318	319	351	409	04 54	1074	00 32	250
6	372	410	460		528	560	520	460	421	392	373	365	365	365	365	369	370	377	385	389	366	333	321	334	334	397	04 43	577	21 48	105
7	392	463	494		556	553	467	433	420	388	364	348	352	353	359	369	369	368	376	379	378	370	359	360	377	402	04 13	606	00 41	292
8	386	424	506		591	656	616	489	450	398	349	313	327	327	324	301	160	079	207	248	319	341	341	225	268	360	04 18	689	15 57	-012
9	330	412	439		464	564	573	417	370	378	329	344	344	353	356	353	361	369	378	370	365	365	353	359	363	388	04 54	716	00 10	198
10	347	411	498		536	505	459	439	390	358	362	355	353	359	362	370	370	359	376	352	392	332	335	347	383	390	19 02	735	23 15	258
11	413	488	514		514	486	464	447	419	399	404	361	365	363	352	345	355	390	372	378	347	389	390	362	369	404	21 23	914	21 48	223
12	405	433	447		492	498	437	419	535	535	366	272	288	332	337	353	351	295	285	343	349	307	335	358	357	380	18 15	620	10 09	185
13	374	386	361		401	401	455	497	389	370	353	352	341	352	357	361	361	370	340	378	364	342	343	358	360	374	06 14	631	09 23	228
14	304	409	473		470	469	446	417	405	404	382	353	361	364	360	353	383	371	369	365	328	332	385	323	359	383	02 26	488	21 06	190
15	393	419	440		504	637	537	481	437	389	364	455	513	377	275	240	264	195	243	217	146	215	248	232	305	355	04 39	705	19 42	019
16	280	290	353		663	676	736	829	637	382	(404)	383	429	413	411	359	278	238	249	184	117	160	215	311	305	388	06 15	1168	19 19	318
17	340	352	539		518	688	507	449	434	403	388	375	361	337	336	330	364	386	380	386	376	332	309	322	353	399	04 32	1063	01 06	223
18	365	378	331		394	498	773	716	581	403	(353)	341	330	327	336	324	302	208	223	112	-026	225	311	296	371	353	05 54	1282	19 41	-234
19	427	365	388		518	488	499	471	494	509	643	707	638	638	388	287	277	215	237	303	343	277	231	259	182	408	12 05	806	20 42	093
20	291	312	457		448	464	690	571	593	730	673	536	508	458	301	266	301	217	-047	129	127	165	161	205	196	365	08 37	807	17 10	-313
21	296	341	475		589	652	540	458	503	459	417	385	360	365	378	387	398	398	388	392	377	386	379	388	408	422	04 45	722	00 15	148
22	411	409	439		502	497	494	486	457	395	371	378	386	375	346	347	394	390	382	392	392	380	387	377	373	407	03 46	517	13 29	272
23	383	397	416		456	520	499	444	407	394	382	377	362	362	376	386	388	388	376	368	357	337	320	313	367	391	21 24	607	21 34	057
24	432	448	482		477	481	492	559	478	417	375	376	366	326	307	281	246	246	255	292	305	271	303	310	332	369	06 51	612	16 10	173
25	402	448	535		619	536	455	412	441	422	360	362	362	360	343	311	301	372	370	361	369	350	345	345	351	397	03 15	692	15 11	257
26	342	419	498		660	675	480	439	414	399	382	370	370	369	366	370	370	368	371	370	367	361	359	374	327	409	04 23	792	00 09	241
27	439	476	471		497	491	473	469	425	421	378	378	369	332	329	307	343	349	363	376	360	311	332	339	356	391	01 20	505	14 28	284
28	368	428	513		544	529	466	421	398	397	418	396	385	344	339	331	332	341	365	368	368	335	234	294	353	386	03 43	581	22 40	040
29	382	437	528		620	615	515	456	432	381	365	335	336	348	368	388	375	376	366	379	295	233	276	378	413	400	03 55	701	20 06	132
30	428	457	493		556	633	546	461	411	386	386	373	362	346	341	318	330	329	345	358	371	382	358	361	344	403	04 22	658	16 31	284
31																														
Mean	376	408	462		529	556	543	499	454	422	396	381	378	368	349	339	337	327	325	336	320	320	315	325	341	392	DESIGNATIONS			618
Mean *	378	423	465		522	536	484	448	416	394	376	368	364	358	356	356	369	368	373	374	368	353	348	344	354	396	* Ten least disturbed days			377
Mean /	385	412	444		500	517	487	451	423	394	374	369	366	362	361	368	378	380	381	383	372	362	342	339	355	396	/ Five international quiet days			370
Mean ≠	343	359	415		559	524	673	679	554	496	497	467	448	441	360	321	302	251	205	223	182	236	232	273	280	388	≠ Five international disturbed days			1159
	a Means of 9 values						b Means of 8 values						c Means of 4 values						() Approximate											

TABLE 13

HOURLY VALUES OF DECLINATION

DECEMBER 1955

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

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 h m	Minimum h m	Range			
1	361	452	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	17 48	-049	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	00 01	182	943	
3	360	388	455		490	471	455	449	407	420	363	365	363	368	294	295	361	299	349	309	247	231	243	272	335	358	03 53	518	20 40	016	502	
4	423	263	496		540	556	603	416	394	405	361	382	370	371	371	380	384	384	390	386	382	382	370	339	339	404	05 15	814	01 49	182	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	22 32	136	468	
6	304	343	353		454	550	521	521	516	373	353	359	350	359	355	380	380	380	380	383	(363)											
7											(394)	370	353	359	371	388	388	393	380	392	385	374	373	337	341	411	20 40	846	20 59	079	767	
8	375	395	493		637	678	610	579	489	439	389	372	354	359	377	347	353	379	371	365	365	281	274	315	276	397	04 02	623	16 14	062	561	
9	334	419	448		541	556	567	565	542	400	341	352	388	347	352	311	295	307	384	388	318	359	334	348	325	382	04 37	583	19 13	077	506	
10	353	422	459		487	534	511	439	441	401	374	370	375	365	365	368	349	353	285	291	286	356	311	311	360	382	08 56	498	21 15	222	276	
11	338	423	439		437	450	436	449	405	426	367	347	359	357	369	370	358	384	361	361	379	341	312	345	353	382	08 56	498	21 15	222	276	
12	375	376	478		532	493	498	460	434	400	393	383	381	373	374	392	382	382	376	356	312	273	273	301	341	389	03 25	545	20 59	139	406	
13	357	411	487		532	492	463	443	424	403	389	376	365	373	381	378	372	372	359	385	386	377	366	352	360	400	03 21	547	00 34	304	243	
14	363	400	431		550	575	489	452	428	402	379	366	367	363	370	370	377	377	379	383	385	383	356	347	347	402	03 53	634	23 03	324	310	
15	351	349	446		571	607	565	487	424	396	367	367	365	366	366	370	369	358	353	312	327	335	292	288	340	390	04 33	643	22 05	243	400	
16	383	434	473		602	768	811	583	449	440	428	394	368	322	275	318	324	311	353	332	361	365	352	357	369	404	05 28	922	13 56	219	703	
17	360	434	531		579	584	557	481	434	411	405	368	359	349	349	346	336	323	336	370	374	362	359	337	359	404	05 36	639	16 03	296	343	
18	395	432	533		577	537	516	485	465	427	385	376	374	370	377	377	387	387	387	387	385	378	376	365	370	419	02 44	612	22 36	334	278	
19	365	415	464		533	505	469	456	444	481	435	331	333	336	317	245	276	247	279	245	234	244	251	279	300	354	03 49	548	18 56	041	507	
20	353	467	503		571	719	778	632	477	431	373	364	371	368	353	277	258	287	369	380	383	354	289	281	283	413	05 41	867	15 16	165	702	
21	301	385	529		658	736	608	543	466	426	396	402	358	314	390	337	298	284	342	353	361	283	224	276	345	401	04 29	793	21 29	131	662	
22	386	503	563		630	690	573	564	450	402	383	385	382	386	336	306	359	358	349	369	393	409	415	413	409	434	03 53	753	13 34	274	479	
23	439	479	581		579	657	556	467	435	410	390	375	359	367	358	365	377	371	373	376	361	353	352	336	347	419	04 05	678	23 37	300	378	
24	379	445	503		583	543	514	490	475	421	402	392	382	370	373	370	339	321	375	365	388	376	328	303	218	402	03 28	609	23 33	106	503	
25	240	446	541		643	684	906	695	533	377	356	383	379	348	381	341	303	323	228	214	227	109	240	312	365	399	05 28	1089	20 11	-041	1130	
26	394	436	434		557	676	660	554	429	405	400	420	479	516	422	429	385	247	363	337	262	225	132	163	221	398	04 36	705	21 25	-048	753	
27	335	457	537		555	703	829	591	464	439	372	402	394	371	326	349	362	345	362	397	370	317	244	300	370	425	05 11	1143	21 43	121	1022	
28	397	460	518		526	549	512	457	436	414	412	362	366	379	359	354	318	319	345	304	329	342	324	338	364	395	04 53	593	19 46	255	338	
29	398	458	489		539	540	471	439	405	392	402	383	383	383	395	407	410	399	402	394	390	388	386	346	363	415	03 40	567	22 47	310	257	
30	397	437	510		607	665	602	471	402	398	(394)	379	375	367	367	352	397	382	394	381	388	382	362	342	322	420	04 40	701	23 23	268	433	
31	339	376	461		542	750	869	817	574	416	392	375	364	339	352	359	336	336	347	348	187	259	230	230	263	411	05 35	1070	20 10	-103	1173	
Mean	360	413	486		562	601	596	530	463	420	390	379	371	364	357	351	346	338	346	340	335	321	309	311	327	401	DESIGNATIONS			566		
Mean *	377	420	492		550	560	515	463	426	406	387	372	369	367	371	373	376	374	372	370	369	357	343	336	350	404	* Ten least disturbed days			332		
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 days			293		
Mean ‡ c	332	448	501		596	659	720	571	467	416	395	400	401	388	354	369	315	284	261	247	266	206	207	236	291	389	‡ Five international disturbed days			909		
a Means of 9 values							b Means of 8 values							c Means of 4 values							() Approximate											

TABLE 14

HOURLY VALUES OF HORIZONTAL INTENSITY

AUGUST 1955

17500 plus tabular quantities expressed in gammas

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	*	✓																												
2	*																													
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														
11	*	✓																												
12	*																													
13																														
14																														
15																														
16																														
17																														
18																														
19																														
20	*																													
21	*																													
22	*	✓																												
23	*																													
24																														
25	*	✓																												
26																														
27	*																													
28																														
29																														
30																														
31																														
Mean																														
Mean $\times a$																														
Mean $\times c$																														
Mean $\times c$																														
	a Means of 9 values						b Means of 8 values					c Means of 4 values														758	DESIGNATIONS		366	
																										767	* Ten least disturbed days		214	
																										773	✓ Five international quiet days		165	
																										735	✗ Five international disturbed days		634	
																											() Approximate			

TABLE 15

HOURLY VALUES OF HORIZONTAL INTENSITY

SEPTEMBER 1955

17500 plus tabular quantities expressed in gammas

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	19 50	382	503	
2	708	749	711		305	498	511	595	706	754	781	745	726	817	817	823	830	826	834	820	759	726	724	656	707	714	15 09	868	03 19	221	647	
3	724	724	729		593	656	674	711	765	787	798	755	740	827	775	770	776	778	779	782	757	679	709	740	758	742	12 09	871	20 49	507	364	
4	437	616	714		672	680	788	773	769	765	744	794	831	810	796	872	832	860	823	812	763	741	465	576	685	734	14 48	921	00 20	139	782	
5	721	742	616		711	664	587	421	399	563	806	817	794	821	798	813	824	796	754	719	613	737	755	702	702	704	10 25	869	07 07	259	610	
6	636	762	766		711	576	527	715	717	739	759	785	804	812	791	799	808	792	820	765	635	683	779	768	678	734	17 45	855	05 25	449	406	
7	564	654	650		724	729	770	778	775	750	764	748	759	772	772	778	780	778	778	778	778	780	761	725	733	745	11 55	806	00 07	510	296	
8	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	395	23 35	607	288	
9	724	740	714		714	754	789	778	770	763	761	759	758	761	763	767	778	780	777	777	785	773	771	773	706	760	06 04	806	23 21	607	199	
10	716	733	721		716	681	647	705	724	758	770	774	758	766	771	793	790	785	787	780	777	753	735	731	673	744	14 12	808	23 05	591	217	
11	743	747	640		672	666	666	713	733	765	768	765	765	783	781	782	780	785	780	782	796	772	771	779	717	748	19 10	804	02 28	566	238	
12	677	703	706		714	732	622	614	(612)	757	766	773	777	792	780	777	791	791	797	793	801	781	780	781	650	740	19 20	815	24 00	152	653	
13	424	635	537		587	386	501	602	741	783	775	779	817	811	838	799	723	798	769	763	741	738	787	770	763	703	10 58	890	00 01	188	702	
14	765	765	755		760	769	742	717	677	712	780	791	799	792	788	793	820	796	794	800	793	769	722	758	735	766	15 11	837	08 19	634	203	
15	764	743	744		739	727	765	771	757	758	762	763	765	770	777	777	776	777	786	693	691	752	772	772	766	757	19 31	829	18 57	587	242	
16	765	605	643		752	759	730	717	(764)	770	760	773	800	831	826	866	835	812	805	779	774	768	759	658	624	757	14 14	890	22 44	494	396	
17	648	740	743		720	686	481	498	516	654	732	771	812	821	813	784	785	784	784	761	649	598	634	674	705	700	11 47	837	05 08	339	498	
18	732	765	701		593	628	717	731	730	754	798	794	800	809	819	831	851	822	746	764	760	771	771	779	781	760	15 57	899	03 30	551	348	
19	760	623	656		615	620	737	773	760	752	750	768	781	792	786	792	815	815	832	761	755	783	761	737	730	751	16 17	846	23 58	440	406	
20	607	713	733		714	677	740	784	766	746	718	755	759	760	771	776	778	776	772	772	769	705	715	640	746	737	06 39	799	21 41	421	378	
21	769	774	764		771	787	778	778	767	760	754	756	761	765	771	772	772	777	780	781	748	719	726	733	769	765	23 42	811	21 00	677	134	
22	786	786	598		624	737	795	791	782	774	764	762	764	771	773	773	773	773	774	787	753	697	747	707	763	752	01 56	841	02 43	373	468	
23	797	797	782		789	773	748	747	706	739	714	767	765	768	778	782	795	807	(770)	722	727	561	685	664	733	747	16 50	817	20 08	356	461	
24	621	556	729		731	772	781	775	767	765	764	764	770	767	773	777	778	786	737	672	811	797	788	767	773	751	19 55	827	00 59	374	453	
25	776	773	692		726	774	787	779	(770)	767	761	760	760	763	769	774	778	782	784	786	788	785	675	721	731	761	18 34	795	21 28	557	238	
26	763	781	738		767	784	781	778	767	760	758	760	762	764	768	771	774	777	780	786	781	778	781	786	771	772	22 50	795	02 38	703	092	
27	756	767	704		532	639	763	768																								
28								(644)	749		811	782	759	768	816	790	781	802	792	634	481	663	710	760	642		(13 18	891)	(19 09	194)	(697)	
29	589	738	581		669	661	716	729	(726)	731	768	777	761	778	778	820	812	674	676	692	744	775	504	676	638	709	15 17	872	21 42	274	598	
30	712	807	806		771	649	286	125	474	752	758	799	716	857	864	823	813	753	715	596	521	401	505	692	497	654	13 08	913	06 24	-188	1101	
31																																
Mean	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			426		
Mean *	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			230		
Mean /	763	764	716		735	748	755	764	759	762	761	761	763	769	773	775	776	780	782	766	761	761	745	758	755	760	/ Five international quiet days			189		
Mean ≠ c	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			753		
	a Means of 9 values							b Means of 8 values							c Means of 4 values							() Approximate										

TABLE 16

HOURLY VALUES OF HORIZONTAL INTENSITY

OCTOBER 1955

17500 plus tabular quantities expressed in gammas

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	596	745	753		776	789	766	766	734	740	748	789	818	795	799	808	784	780	790	791	752	714	718	770	785	763	11 49	875	00 01	349	526
2	797	793	772		723	742	771	758	719	714	729	778	778	798	801	831	875	804	644	700	610	567	791	766	766	751	15 23	895	20 14	272	623
3	797	781	759		739	749	658	719	729	721	721	795	807	785	764	778	833	757	785	829	794	774	774	775	778	767	15 38	858	06 00	578	280
4	681	704	650		697	643	653	699	744	741	766	767	799	794	794	794	775	766	776	794	776	743	653	758	719	737	14 36	828	23 35	504	324
5	645	689	726		738	731	786	790	759	754	754	751	789	804	807	834	768	766	703	632	669	711	751	571	749	737	14 35	892	22 19	270	622
6	759	759	740		605	484	623	776	775	732	788	799	761	754	787	825	779	697	762	757	752	769	734	729	686	735	12 54	850	16 46	403	447
7	621	613	636		751	785	772	776	762	757	762	771	770	791	793	812	856	840	813	799	786	774	759	743	785	764	15 47	872	02 07	579	293
8	809	808	807		780	767	767	743	708	721	743	750	756	756	762	768	770	776	779	781	783	783	792	759	758	768	02 39	862	22 45	666	196
9	773	791	792		742	762	791	782	759	761	751	751	755	760	763	773	774	783	807	798	782	779	420	192	619	728	17 27	823	22 05	039	784
10	783	807	805		775	776	740	755	749	726	753	827	821	828	804	794	831	797	805	834	791	767	786	788	792	789	10 17	886	08 22	659	227
11	791	772	779		731	745	758	713	682	703	791	828	835	843	840	845	822	845	813	759	795	786	784	783	779	784	16 32	890	07 58	669	221
12	778	767	757		750	753	764	759	756	745	734	740	749	756	759	762	762	769	774	778	778	776	747	774	775	761	22 31	788	21 41	707	081
13	747	732	758		768	747	740	744	755	753	749	761	768	772	786	790	801	801	801	779	731	749	773	759	743	763	17 20	814	20 02	619	195
14	727	713	711		690	741	716	669	673	689	724	753	766	769	784	773	779	779	790	788	780	773	783	719	736	743	12 59	808	22 22	587	221
15	746	760	744		725	725	763	755	751	741	741	753	759	763	765	770	770	772	775	780	790	776	761	783	668	756	19 47	802	23 55	531	271
16	605	668	718		754	797	766	766	757	747	759	759	764	768	772	776	781	775	779	783	786	791	791	732	759	756	04 43	806	00 08	502	304
17	788	783	732		683	759	797	783	777	762	753	750	755	759	764	767	769	771	775	785	779	779	769	774	794	767	05 12	807	03 09	657	150
18	783	787	786		789	781	782	776	764	756	753	754	759	763	768	772	774	776	778	779	781	785	786	793	793	776	23 48	800	09 28	752	048
19	786	785	798		803	805	795	791	778	770	758	757	757	761	770	774	778	781	786	786	789	791	753	735	779	778	03 17	810	22 41	697	113
20	785	774	745		669	713	781	780	760	740	729	736	751	793	822	851	858	859	829	800	777	774	759	757	757	775	14 57	889	03 39	626	263
21	791	795	796		791	791	766	757	751	759	755	758	768	783	802	807	806	840	816	784	774	779	708	685	718	774	16 55	855	21 31	446	409
22	729	741	753		791	791	788	788	769	754	745	749	768	816	885	896	914	914	817	745	816	807	786	797	794	798	16 07	972	18 50	641	331
23	802	768	699		710	771	794	788	770	758	750	746	772	782	784	788	787	797	792	792	798	794	794	795	792	776	16 05	815	02 29	678	137
24	801	796	785		787	788	781	771	757	750	738	744	752	765	765	767	771	774	780	788	790	790	795	793	781	775	00 02	809	23 59	687	122
25	790	577	408		460	434	513	589	595	617	828	733	714	560	682	771	678	546	518	727	666	313	692	780	691	620	09 58	1016	20 00	-051	1067
26	(312)	670	663		766	783	682	730	818	792	813	847	870	834	858	819	830	560	570	491	516	690	762	676	624	707	06 52	1095	00 15	-097	1192
27	661	709	750		723	654	646	715	761	810	816	778	820	816	809	849	840	785	870	817	720	741	659	753	741	760	17 20	893	21 01	528	365
28	733	738	717		720	698	753	742	749	768	773	797	856	891	879	849	853	793	756	763	770	787	717	737	737	774	12 51	909	21 48	575	334
29	758	751	715		624	571	641	743	767	753	764	754	794	809	820	858	858	855	809	710	781	769	744	707	760	755	15 49	905	18 28	378	527
30	768	766	774		801	798	787	779	765	757	754	754	788	802	813	770	781	812	738	696	646	782	759	755	763	767	13 20	851	19 09	456	395
31	781	747	689		491	362	523	681	725	730	728	776	769	829	883	920	855	884	853	834	791	484	655	782	815	733	14 05	937	04 09	058	879
Mean	733	745	733		721	717	731	748	746	743	757	768	780	784	796	806	804	782	770	764	753	739	740	733	750	756	DESIGNATIONS			385	
Mean *	775	769	757		750	766	770	759	753	748	746	752	760	767	775	777	780	786	787	784	779	779	767	761	758	767	* Ten least disturbed days			175	
Mean †	779	773	777		779	775	772	768	762	755	746	751	757	763	770	773	777	780	784	782	774	778	771	771	774	771	† Five international quiet days			112	
Mean ‡	657	688	645		612	559	625	713	734	725	782	781	781	756	803	834	782	691	681	688	679	593	719	708	713	706	‡ Five international disturbed days			841	
	a Means of 9 values				b Means of 8 values				c Means of 4 values																	() Approximate					

TABLE 17

HOURLY VALUES OF HORIZONTAL INTENSITY

NOVEMBER 1955

17500 plus tabular quantities expressed in gammas

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	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	728	03 37	832	18 46	286	546
2	757	753	773	761	730	783	756	758	760	760	801	820	841	844	860	855	863	870	865	816	785	794	804	812	801	801	18 18	908	04 15	707	201
3	810	814	804	785	767	781	780	764	757	755	755	761	768	767	764	774	774	775	775	799	769	816	810	813	781	781	23 17	841	20 35	737	104
4	675	555	564	350	236	276	276	718	745	774	803	798	782	770	772	808	802	809	794	733	561	717	707	680	654	654	15 40	841	04 56	-114	955
5	657	660	634	729	594	523	740	748	752	801	792	815	847	816	810	815	825	816	826	824	782	752	765	758	753	753	12 35	861	05 11	326	535
6	752	670	671	666	666	723	747	752	754	743	741	742	751	761	778	788	788	790	793	778	726	710	717	773	741	741	18 53	803	21 24	487	316
7	691	634	618	646	696	765	781	781	773	759	757	762	777	777	790	792	800	805	792	796	795	789	787	791	756	756	16 54	816	02 35	591	225
8	800	772	704	648	644	689	647	647	642	739	739	787	829	819	864	842	810	822	835	808	800	812	848	807	765	765	23 47	921	04 01	624	297
9	707	764	794	796	638	708	777	763	761	763	759	769	773	777	787	796	805	793	788	777	778	786	799	796	769	769	03 45	822	04 24	560	262
10	744	712	717	737	773	764	744	753	757	756	765	767	770	769	771	766	797	804	778	709	777	783	755	655	755	755	16 40	823	19 00	541	282
11	644	667	692	763	796	774	773	760	768	777	762	763	793	801	823	816	825	792	607	770	721	604	732	670	754	754	16 20	851	21 10	502	349
12	739	768	775	743	783	809	782	741	725	838	770	817	835	785	786	802	807	737	641	734	788	804	791	800	775	775	09 39	922	18 18	544	378
13	804	823	811	868	855	822	722	780	754	757	759	769	786	791	788	778	792	804	738	749	763	783	789	809	787	787	03 55	886	06 13	636	250
14	776	756	755	778	783	779	775	761	756	756	753	757	780	784	815	831	807	820	809	790	691	771	793	793	777	777	15 08	843	20 44	546	297
15	794	811	801	748	697	728	704	714	719	731	807	801	781	887	847	844	835	856	819	638	783	782	766	746	777	777	11 10	1053	19 24	509	544
16	684	772	777	480	573	544	356	543	786	(830)	820	887	887	904	853	872	817	747	717	694	755	790	674	768	730	730	13 52	954	06 19	207	747
17	743	804	706	673	429	687	772	778	771	768	767	770	800	863	865	827	772	775	775	787	791	761	757	789	760	760	14 54	886	04 11	207	679
18	820	814	823	799	796	513	621	750	744	(761)	759	764	813	888	863	857	843	314	331	657	856	882	761	810	743	743	13 11	914	17 30	071	843
19	884	883	820	804	792	783	771	766	770	777	675	682	570	471	302	515	723	656	753	804	806	857	844	838	731	731	00 51	925	14 41	116	809
20	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	693	04 15	1032	01 12	295	737
21	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	751	09 35	825	02 38	591	234
22	769	773	748	725	748	751	753	731	766	766	785	853	900	920	892	783	769	791	786	774	764	784	777	793	788	788	13 23	948	07 35	711	237
23	780	776	787	768	741	749	767	767	763	752	751	767	760	766	766	769	772	784	796	782	777	673	758	742	763	763	11 39	834	21 24	547	287
24	782	784	798	790	783	762	699	714	736	775	805	861	906	909	911	926	879	869	838	802	762	788	802	793	811	811	15 32	945	06 47	667	278
25	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	778	15 22	900	02 49	484	416
26	720	755	590	529	638	773	776	765	765	766	764	783	766	776	792	781	784	783	794	795	775	736	747	788	748	748	23 24	814	03 24	458	356
27	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	785	12 55	890	00 20	590	300
28	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	779	12 41	904	22 59	501	403
29	718	686	640	666	736	792	780	753	732	747	760	835	835	778	763	786	810	816	785	704	721	763	776	791	757	757	12 04	867	19 59	401	466
30	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	781	14 45	887	04 46	598	289
31																															
Mean	750.738	720	711	693	703	719	745	752	768	769	789	797	801	796	801	800	773	764	758	764	770	767	768	759	759	759	DESIGNATIONS			421	
Mean *	746	738	720	710	722	757	764	760	760	757	762	780	792	799	812	796	797	799	792	785	764	765	771	772	767	767	* Ten least disturbed days			269	
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	766	766	/ Five international quiet days			234	
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	710	710	# Five international disturbed days			818	
	a Means of 9 values				b Means of 8 values				c Means of 4 values																				() Approximate		

HOURLY VALUES OF HORIZONTAL INTENSITY

17500 plus tabular quantities expressed in gammas

779	DESIGNATIONS
780	* Ten least disturbed
	days
788	/ Five international
	quiet days
768	/ Five international
	disturbed days
()	Approximate

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	795	735	724	690	747	784	764	753	748	771	780	788	794	936	938	869	702	616	691	783	800	815	692	778	771	13	24	1016	22	15	423	593
2	808	759	694	598	747	784	508	512	713	816	847	825	838	798	773	771	771	778	758	806	793	807	818	807	727	12	45	867	05	30	213	654
3	808	821	803	799	807	789	769	768	766	746	766	752	907	940	845	887	922	799	797	837	738	776	803	774	813	16	12	978	20	37	495	483
4	820	855	902	780	722	703	783	785	770	779	775	766	771	772	769	781	795	799	800	798	793	776	750	895	785	02	04	946	05	12	617	329
5	806	829	822	786	796	787	790	780	778	766	761	757	766	784	802	831	826	813	819	813	777	808	726	537	782	22	36	895	23	08	362	533
6	690	729	738	880	904	829	817	647	728	748	798	829	841	780	774	777	777	773	779	(799)	779	779	779	779	779	779	779	779	779	779	779	779
7	737	711	611	623	590	595	597	632	718	752	772	772	782	797	853	911	889	816	811	804	675	749	766	791	740	15	24	942	20	42	452	490
8	761	652	741	735	830	780	753	723	717	752	772	860	856	841	959	842	877	822	802	742	758	772	792	803	789	14	23	1002	01	47	590	412
9	812	793	801	777	752	792	768	768	764	771	786	775	843	835	820	858	878	859	858	773	821	805	788	784	799	17	05	926	19	12	530	396
10	782	818	831	810	793	786	762	779	788	764	762	763	764	777	790	859	844	838	831	818	785	754	812	748	794	15	37	883	23	59	653	230
11	701	793	758	787	796	772	772	767	762	761	769	766	774	789	792	826	866	866	828	760	773	795	788	789	785	16	07	879	00	01	653	226
12	754	769	775	787	791	781	770	761	759	769	774	777	773	786	783	799	829	826	811	795	806	802	800	817	787	16	37	846	00	20	735	111
13	823	809	797	747	759	793	779	760	751	751	756	768	775	785	793	799	889	790	803	815	809	821	807	828	787	23	59	845	03	57	713	132
14	822	804	699	680	731	785	782	765	756	758	763	782	802	789	784	786	822	835	798	752	745	786	819	722	769	17	26	844	23	08	608	236
15	738	743	768	677	631	580	720	758	752	791	836	872	921	881	843	821	872	847	850	827	814	805	789	812	790	12	27	942	05	17	507	435
16	797	770	770	744	718	731	766	766	767	777	748	757	777	791	811	843	865	852	838	807	805	800	785	753	785	16	03	881	05	04	700	181
17	776	756	746	758	801	786	771	756	746	746	748	750	764	771	775	778	779	787	750	800	811	819	825	837	778	23	33	843	02	45	707	136
18	841	810	786	786	824	823	803	760	751	765	748	781	845	909	955	931	907	886	766	850	810	760	776	804	822	14	41	1004	18	53	709	295
19	749	665	697	616	611	625	680	737	754	772	796	877	953	916	987	942	896	853	815	809	813	778	765	788	788	14	21	1001	03	33	542	459
20	792	782	762	696	697	753	758	757	754	742	778	783	928	836	959	775	777	840	822	816	776	685	752	766	775	12	40	958	21	29	525	433
21	737	755	760	701	623	716	747	764	747	733	744	754	761	844	925	868	842	843	806	803	802	802	800	790	778	14	28	947	04	06	577	370
22	734	685	649	704	677	732	750	751	751	740	752	773	800	835	816	792	808	806	811	820	805	783	752	743	762	13	05	846	02	07	593	253
23	759	768	765	734	771	779	778	778	768	760	770	788	794	779	788	854	836	816	854	836	816	821	810	665	790	16	03	890	23	48	588	302
24	665	664	712	701	680	461	664	741	741	758	770	770	844	915	737	808	805	769	776	751	762	791	805	837	748	13	32	959	05	43	343	616
25	759	768	765	734	771	779	778	778	768	760	770	788	794	779	788	854	836	816	854	836	816	821	810	665	790	16	03	890	23	48	588	302
26	665	664	712	701	680	461	664	741	741	758	770	770	844	915	737	808	805	769	776	751	762	791	805	837	748	13	32	959	05	43	343	616
27	825	814	826	761	699	687	730	749	749	771	817	925	959	929	826	797	864	639	796	824	824	499	714	822	792	12	01	1006	21	24	289	717
28	798	717	733	589	347	421	740	789	786	770	832	851	851	870	698	875	857	815	815	817	769	725	746	825	762	14	20	913	05	14	166	747
29	792	781	777	781	766	772	772	760	757	777	756	751	768	823	867	890	882	867	805	781	827	802	796	797	798	15	04	913	05	25	725	188
30	785	820	802	778	761	806	777	757	751	752	749	765	773	777	767	772	782	793	765	786	760	757	756	749	776	02	14	835	22	58	710	125
31	749	724	724	703	686	737	769	762	752	750	754	772	799	832	867	864	805	793	793	799	806	759	819	634	779	14	43	892	04	45	665	227
	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	404	496
Mean	779	762	760	727	705	702	737	747	755	762	773	789	819	832	832	837	837	817	804	796	788	776	783	784	779	DESIGNATIONS				373		
Mean *	772	765	755	749	750	771	771	763	758	757	758	767	780	792	798	812	819	819	811	795	793	792	797	782	780	* Ten least disturbed days				186		
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	740	816	768	‡ Five international disturbed days				668		
	a Means of 9 values				b Means of 8 values				c Means of 4 values																							

TABLE 19

HOURLY VALUES OF VERTICAL INTENSITY

AUGUST 1955

48500 plus tabular quantities expressed in gammas

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																														
2																														
3																														
4																														
5																														
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21																														
22																														
23																														
24																														
Mean																														
Mean * a																														
Mean / c																														
Mean ≠ c																														

TABLE 20

HOURLY VALUES OF VERTICAL INTENSITY

SEPTEMBER 1955

48500 plus tabular quantities expressed in gammas

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	531	525	528		500	501	490	483	480	485	503	495	507	520	517	505	441	413	404	439	523	472	495	544	573	495	h m	h m				
2	598	609	638		686	555	453	409(435)	487		472	420	344	454	498	493	435	462	460	443	443	449	510	532	609	496	19 31	744	19 50	215	529	
3	499	553	626		656	519	449	449	476	512	509	430	260	508	527	515	515	511	510	500	498	534	410	534	567	503	03 13	725	11 22	145	702	
4	564	581	585		613	556	512	492	492	491	477	522	474	516	525	472	322	472	508	472	457	480	265	501	574	497	00 19	779	21 53	-154	580	
5	622	639	622		566	504	628	580	616	546	511	472	480	402	492	501	505	467	448	455	418	467	505	501	540	520	07 30	775	19 19	148	933	
6	578	550	552		598	587	480	472	458	461	475	514	521	513	511	514	526	517	492	467	483	378	443	506	640	510	23 43	765	20 00	184	627	
7	655	673	631		541	509	475	497	493	502	516	524	520	525	520	519	517	508	510	509	505	502	499	497	505	527	01 52	724	22 16	439	581	
8	510	516	524		509	497	479	483	490	489	492	498	512	515	512	470	466	415	454	508	508	491	501	525	534	496	23 06	704	23 21	374	285	
9	546	538	669		586	468	468	473	479	491	504	509	512	514	514	512	514	495	499	502	496	477	490	503	504	511	02 36	704	23 21	374	264	
10	526	526	535		518	478	449	428	466	486	503	502	517	530	525	525	526	521	522	507	497	488	478	514	566	506	23 55	612	22 08	404	330	
11	594	590	542		542	513	461	462	462	496	507	513	519	529	522	519	512	514	509	513	497	474	488	507	558	514	02 08	627	05 23	418	208	
12	539	534	534		548	509	412	538(465)	500		500	509	508	494	422	411	452	495	494	491	499	506	504	513	526	496	23 35	679	23 41	251	209	
13	603	743	796		739	620	504	474	485	534	498	499	468	507	458	414	408	313	295	345	384	407	468	497	510	499	02 10	916	16 29	260	428	
14	505	502	507		499	490	489	475(464)	458		487	496	506	505	514	510	511	520	517	510	497	497	529	526	518	501	21 30	587	08 25	425	656	
15	537	575	579		576	507	496	496	485	489	503	517	517	517	519	514	509	512	507	445	375	449	453	470	517	503	01 23	598	19 04	112	162	
16	542	639	611		532	485	448	454	486	491	496	479	485	505	505	454	482	480	499	502	502	507	520	561	645	513	23 38	715	22 37	395	486	
17	578	606	611		605	662	458	398	400	465	503	510	512	497	517	511	511	510	509	487	461	379	510	612	529	514	04 34	743	05 15	148	320	
18	541	541	651		589	532	479	458	462	482	529	507	507	498	509	521	486	393	389	402	457	477	488	489	503	495	02 51	681	17 53	349	595	
19	538	560	614		583	510	484	477	485	499	509	514	512	506	510	511	509	505	490	505	483	488	506	535	544	516	01 08	690	01 12	332	332	
20	609	554	554		587	532	495	499	491	508	510	510	509	520	521	518	514	511	510	510	509	526	602	578	600	532	00 46	729	21 38	347	358	
21	569	552	539		518	503	495	502	494	511	517	520	523	523	520	518	516	516	513	489	487	457	469	547	536	514	00 04	582	21 12	312	382	
22	565	636	659		605	539	527	502	499	504	506	511	517	520	520	516	513	511	511	510	513	474	545	517	567	533	02 33	750	20 52	392	270	
23	525	542	511		498	493	485	473	490	520	503	574	544	520	519	518	518	507	466	503	539	469	484	603	634	527	21 12	754	20 08	225	529	
24	684	668	579		529	490	497	501(510)	514		520	523	523	524	524	524	523	514	492	396	461	511	507	507	530	523	00 37	808	18 32	258	550	
25	540	559	626		547	499	498	500(503)	511		515	519	522	525	525	523	523	517	511	511	510	499	492	533	546	523	02 35	653	21 35	325	328	
26	551	544	551		508	492	486	493	497	502	510	515	519	519	519	516	513	511	509	505	498	504	507	514	555	514	23 25	591	05 32	477	114	
27	550	550	647		629	508	460	462																								
28								(473)	485		522	525	547	550	541	521	512	510	470	420	382	529	494	596	633		(19 17	655)	(19 06	068)	(587)	
29	599	617	623		531	495	457	438(462)	485		532	519	523	528	522	528	423	425	524	465	496	581	640	695	718	534	23 20	838	21 38	305	533	
30	672	606	563		524	651	698	815(771)	511		522	474	257	434	458	508	482	461	498	495	458	242	315	595	659	515	06 19	1091	20 04	-056	1147	
31																																
Mean	569	581	591		565	525	491	490	493	498	505	503	486	506	509	502	488	482	484	478	470	471	494	534	565	512	DESIGNATIONS				461	
Mean *	556	557	565		533	494	482	481	485	495	506	511	517	520	519	513	511	504	503	489	483	485	491	515	536	510	* Ten least disturbed days				292	
Mean /	558	564	567		538	503	487	491	488	502	510	517	520	523	521	518	515	514	510	493	473	477	482	514	542	514	/ Five international quiet days				281	
Mean ≠ c	624	651	651		590	568	572	577	584	519	516	491	432	468	482	488	454	416	441	440	364	424	482	572	607	517	≠ Five international disturbed days				741	
	a Means of 9 values							b Means of 8 values							c Means of 4 values							() Approximate										

TABLE 21

HOURLY VALUES OF VERTICAL INTENSITY

OCTOBER 1955

48500 plus tabular quantities expressed in gammas

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	622	583	554	530	518	492	488	487	512	523	528	510	523	531	515	518	519	511	495	498	543	562	536	548	527	00	16	715	11	49	341	374
2	551	550	585	585	511	490	493	495	497	538	527	523	509	523	447	449	423	421	484	484	631	511	501	518	510	20	05	849	19	40	223	626
3	538	558	624	641	545	464	488	474	481	526	509	513	513	513	513	489	409	407	481	503	506	509	521	527	511	03	07	666	16	48	359	307
4	608	626	570	567	546	470	430	497	521	508	518	528	532	527	528	520	521	521	503	489	503	461	502	587	524	23	52	678	21	19	403	275
5	594	591	599	556	485	496	502	492	507	509	520	509	493	435	464	356	394	445	461	667	602	600	664	628	524	19	56	1101	15	42	272	829
6	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	16	48	034	688
7	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	489	215
8	573	539	525	497	460	482	432	446	442	(479)	507	521	525	527	526	522	518	515	508	502	506	516	542	591	508	23	05	645	08	58	403	242
9	562	555	617	558	489	479	482	488	492	506	511	518	526	524	526	521	520	505	495	499	512	407	571	668	522	23	04	782	21	47	026	756
10	604	562	549	578	491	462	464	456	489	546	536	538	496	505	508	494	449	403	468	489	506	523	537	529	508	00	06	669	17	19	321	348
11	518	526	508	492	490	487	486	451	439	(421)	440	408	393	424	468	472	414	481	435	497	494	513	513	512	470	01	28	546	18	47	303	243
12	513	510	510	508	485	485	494	500	505	524	531	536	539	538	534	528	527	520	518	518	503	512	504	507	515	21	33	540	22	07	445	095
13	537	509	503	504	487	472	479	487	496	511	527	534	542	536	529	515	502	488	480	473	425	434	498	534	500	23	52	554	20	14	339	215
14	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
15	548	535	535	528	507	494	489	490	500	517	530	530	531	529	529	528	526	523	519	512	493	502	530	676	525	23	08	727	20	47	458	269
16	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
17	544	579	646	579	520	495	486	492	494	504	510	519	522	522	520	519	517	515	512	503	509	509	512	515	523	02	23	679	06	02	477	202
18	512	510	507	504	500	499	499	504	509	518	521	528	528	528	527	523	520	518	516	516	512	510	518	529	515	23	21	536	05	03	487	049
19	539	524	510	507	500	495	498	500	501	508	518	523	525	525	523	520	517	513	511	507	504	495	505	545	513	23	52	550	21	15	436	114
20	538	534	552	581	474	489	491	486	497	506	509	518	518	525	510	430	461	479	473	489	503	520	503	502	504	03	25	632	22	02	406	226
21	514	513	506	498	498	493	481	479	484	500	503	518	532	532	524	524	489	466	461	479	500	534	583	587	508	22	46	680	21	32	274	406
22	572	574	547	502	497	487	490	485	487	516	530	530	521	423	493	432	405	375	436	411	471	508	512	518	488	00	08	594	19	04	313	281
23	555	603	626	558	499	497	490	485	487	497	512	519	525	529	526	519	518	508	494	500	502	510	508	520	520	02	24	656	06	46	478	178
24	518	522	514	494	485	482	482	488	496	508	520	525	531	528	521	519	516	511	509	502	502	500	526	547	510	23	58	609	05	00	476	133
25	593	717	756	756	714	513	455	619	518	443	356	225	359	293	332	390	423	490	459	575	796	663	609	764	534	24	00	1057	11	24	057	1000
26	(766)	681	727	791	777	607	555	500	500	515	495	436	491	439	487	474	392	331	530	510	743	633	687	722	575	00	10	1180	17	20	-144	1324
27	633	639	601	662	625	543	475	478	496	491	513	515	524	525	509	492	375	420	447	496	607	592	528	587	532	03	48	708	16	44	238	470
28	589	588	606	603	541	497	472	483	492	489	503	476	396	352	343	469	525	527	520	520	520	510	504	492	501	04	04	666	14	14	262	404
29	518	500	504	487	471	513	494	500	500	511	515	530	535	535	521	416	487	456	419	388	487	569	535	580	499	21	49	733	18	31	190	543
30	566	554	529	512	505	494	500	500	511	506	522	530	532	532	530	527	525	456	496	455	483	510	525	559	515	19	11	602	19	16	234	368
31	561	649	773	753	793	661	626	514	531	543	543	542	538	510	397	274	416	487	474	520	503	747	600	600	565	04	15	983	20	38	-263	1246
Mean	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		
Mean *	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		
Mean /	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					

TABLE 22

HOURLY VALUES OF VERTICAL INTENSITY

NOVEMBER 1955

48500 plus tabular quantities expressed in gammas

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	587	575	637	661	771	553	534	528	514	534	553	554	550	544	544	538	531	495	439	338	513	556	615	581	552	04 34	910	19 16	037	873
2	552	571	586	555	500	498	503	498	509	523	517	553	522	543	405	482	452	406	454	465	497	533	538	545	509	02 57	611	14 25	308	303
3	534	540	532	503	495	489	499	511	516	528	527	533	538	535	530	527	524	522	518	516	456	464	470	466	511	01 09	553	21 53	386	167
4	474	510	634	734	874	983	705	623	521	517	547	565	544	534	538	541	523	517	508	510	595	655	684	654	505	04 25	1333	04 05	-219	1552
5	671	713	699	774	797	682	531	483	519	523	546	541	518	536	553	546	534	503	466	480	480	499	523	540	569	04 30	938	21 02	430	508
6	564	536	531	509	486	464	483	494	510	531	539	541	543	543	544	536	534	530	515	505	497	505	523	568	522	21 23	644	20 27	294	350
7	601	596	585	564	513	496	503	509	517	524	533	538	539	541	541	535	545	537	523	516	515	520	526	523	535	00 37	651	05 31	489	162
8	529	544	549	529	485	445	442	460	483	511	533	539	538	529	473	202	187	335	387	440	482	503	526	545	467	24 00	724	15 52	039	685
9	631	567	536	517	551	567	524	494	504	503	514	525	531	535	531	522	511	501	488	484	507	534	544	546	528	00 07	767	19 45	454	313
10	584	591	585	575	514	497	484	491	502	514	528	533	537	535	532	526	525	491	499	379	480	493	594	664	527	23 06	731	19 14	253	478
11	637	584	533	502	502	492	493	496	499	515	534	536	538	538	543	528	488	506	507	513	533	484	556	553	525	00 07	690	21 03	185	505
12	563	562	544	540	529	501	496	501	628	589	594	569	524	518	513	524	495	483	497	442	535	531	531	560	532	08 41	691	19 22	367	324
13	562	569	600	631	622	639	532	486	500	508	520	527	542	543	528	524	514	495	464	500	478	544	552	557	539	05 45	687	18 39	359	328
14	592	580	535	506	497	495	497	501	506	524	526	531	536	535	535	495	523	515	510	507	555	519	544	530	525	20 27	625	20 44	418	207
15	549	545	529	526	472	445	440	478	466	493	434	295	216	307	320	346	312	400	404	423	479	515	537	631	444	23 21	692	12 12	150	542
16	637	668	715	711	752	761	562	478	551	(511) 511	497	390	368	324	456	397	408	402	474	500	545	591	566	532	04 39	935	14 31	258	677	
17	618	668	609	730	565	543	533	517	525	520	529	536	550	529	509	506	524	522	525	512	515	541	549	549	551	04 14	801	04 17	342	459
18	562	558	597	696	706	633	512	479	558	(510) 520	544	549	545	542	539	471	343	531	623	492	547	639	596	554	05 50	773	17 29	051	722	
19	588	559	595	540	510	487	485	484	480	523	353	341	288	295	279	366	420	352	405	475	530	543	501	543	456	00 02	637	14 57	035	602
20	632	982	868	815	737	737	808	656	549	460	385	393	322	336	334	375	413	531	547	524	505	503	547	597	565	01 24	1300	12 40	227	1073
21	620	618	604	584	516	502	519	513	522	519	520	526	532	533	536	536	538	540	534	516	510	520	530	534	538	01 46	696	04 39	450	246
22	536	524	517	509	496	491	495	504	505	522	529	513	445	450	474	511	519	520	514	519	518	528	538	541	509	11 07	548	13 26	386	162
23	544	530	522	507	483	475	498	506	516	522	531	538	544	551	537	537	532	531	522	499	498	526	501	562	521	21 40	604	21 25	295	309
24	580	561	519	498	491	483	485	473	491	506	520	536	502	485	481	419	397	406	408	435	469	507	522	521	487	00 17	611	15 54	361	250
25	520	693	625	531	500	496	505	501	511	518	521	530	510	497	519	423	346	481	511	509	511	516	519	541	514	01 20	759	16 18	294	465
26	580	602	591	553	510	488	498	507	514	523	535	528	522	531	531	521	529	524	521	510	504	472	526	566	529	02 09	680	21 34	352	328
27	644	576	532	501	492	492	497	500	505	513	518	526	524	540	533	540	535	521	506	518	515	502	500	548	524	00 07	714	22 19	473	241
28	590	571	539	508	471	483	498	507	507	522	548	536	536	528	534	515	487	511	511	513	498	541	662	617	531	22 24	819	04 50	463	356
29	577	580	550	600	482	479	487	492	492	512	535	545	520	530	532	536	532	502	467	505	463	504	504	522	519	19 51	651	20 03	155	496
30	520	520	539	549	505	472	485	500	502	520	532	545	562	559	503	503	506	492	511	453	496	495	520	542	514	03 52	579	18 49	382	197
31																														
Mean	579	593	585	582	561	542	518	506	514	518	518	517	500	505	493	488	478	481	487	488	504	522	547	560	524	DESIGNATIONS			463	
Mean *	570	560	547	528	499	486	494	502	509	522	530	533	529	532	526	523	527	518	514	492	503	502	524	551	522	* Ten least disturbed days			260	
Mean /	556	545	537	518	495	483	496	505	513	525	532	533	522	524	525	529	531	528	518	511	497	509	512	532	520	/ Five international quiet days			230	
Mean ≠	579	655	682	699	716	720	614	544	532	504	463	468	419	416	403	455	445	430	479	527	524	559	592	591	542	≠ Five international disturbed days			925	
	a Means of 9 values						b Means of 8 values						c Means of 4 values						() Approximate											

TABLE 23

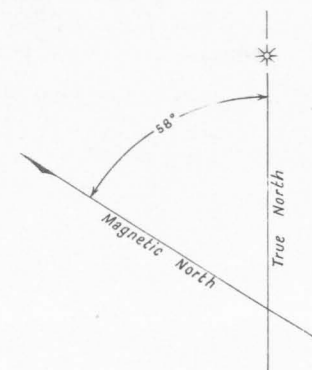
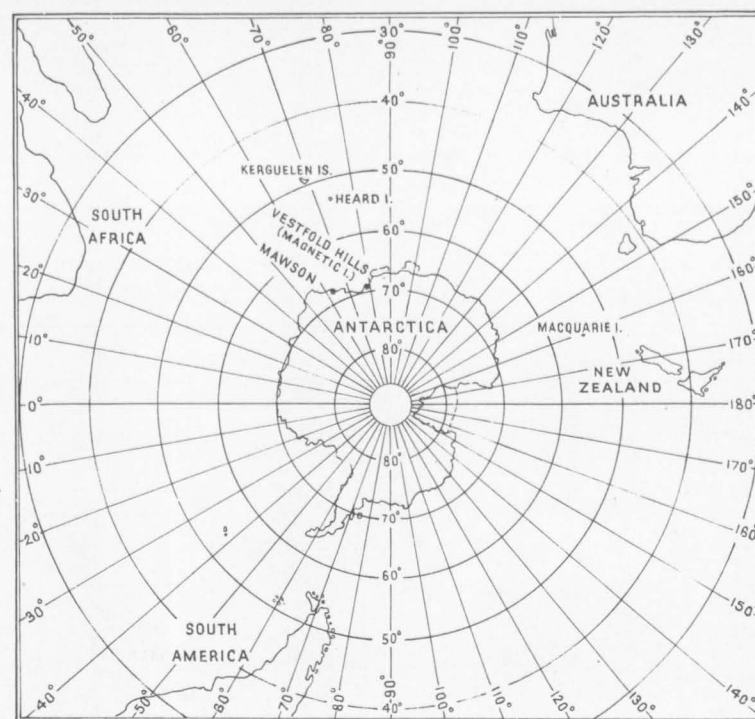
HOURLY VALUES OF VERTICAL INTENSITY

DECEMBER 1955

48500 plus tabular quantities expressed in gammas

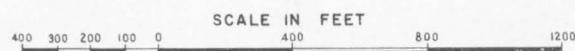
G.M.T. used

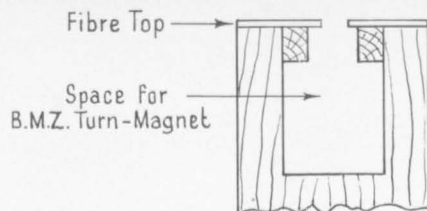
Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean	Maximum	Minimum	Range				
1	#	557	628	617	527	458	469	481	491	496	500	521	556	569	448	430	412	399	513	576	562	566	552	665	638	526	h	m	h	m			
2		652	734	745	805	873	878	851	617	573	547	560	583	566	568	568	556	547	545	546	533	537	536	540	534	625	05	13	01	00	305	496	
3		532	540	543	518	507	502	490	501	503	524	532	519	484	435	280	395	476	528	540	543	566	576	550	559	506	20	35	74	25	245	497	
4		548	635	576	585	544	475	499	528	536	532	527	546	542	529	538	545	545	528	521	520	507	519	537	574	539	01	48	69	22	29	417	280
5		565	576	588	541	477	488	499	505	514	517	526	528	532	545	556	556	524	508	480	501	568	554	544	706	537	23	30	77	22	38	427	349
6	#	692	683	704	750	785	720	764	564	496	498	536	564	563	537	534	532	531	529	535	(533)												
7											(544)	550	565	576	548	540	542	548	539	531	526	519	540	586	608	529	02	16	68	20	46	179	502
8		586	603	572	550	506	451	463	499	516	533	557	558	558	555	547	512	453	502	522	532	465	479	548	618	506	01	42	80	16	07	145	659
9		615	689	585	545	500	469	463	450	542	520	520	504	563	284	406	374	404	501	505	527	572	547	526	543	533	23	57	70	19	17	353	348
10		588	554	565	545	588	514	501	500	498	522	520	551	564	550	533	527	504	468	538	520	486	499	542	608	541	00	01	66	20	10	464	204
11	*	609	608	559	519	517	517	514	502	498	534	534	531	534	538	544	548	528	526	526	510	536	583	599	565	524	23	20	60	20	37	417	191
12	*	546	553	553	518	499	488	510	514	514	511	522	521	530	537	538	545	524	501	477	546	479	541	558	558	528	01	02	61	03	39	494	125
13	*	561	565	540	501	501	510	513	516	522	529	534	541	543	537	537	543	525	524	522	522	513	515	523	535	524	02	49	61	02	10	458	152
14	*	542	571	582	555	485	478	487	497	506	520	527	532	545	532	530	527	527	527	529	515	500	498	522	546	539	00	55	69	20	23	438	260
15	*	598	625	605	559	559	490	492	502	504	522	543	557	562	552	535	538	542	512	496	500	494	513	542	605	522	03	20	69	06	00	393	306
16		597	593	605	631	544	443	426	494	509	548	578	583	538	521	490	526	471	454	477	492	490	487	508	522	503	01	18	56	05	36	398	167
17	*	547	547	523	507	450	430	458	478	491	502	521	531	539	540	538	521	483	472	477	507	504	498	504	504	512	02	04	57	00	10	445	128
18	*	499	513	547	483	478	478	483	488	497	503	514	522	524	529	525	525	522	523	522	521	521	522	520	524	483	12	30	58	16	05	217	363
19		544	557	560	535	495	491	486	481	495	530	554	563	564	532	495	331	273	372	359	435	435	471	500	530	488	03	20	66	13	49	208	459
20		585	615	603	573	487	507	476	506	500	513	528	526	425	282	326	400	446	441	478	495	484	487	505	516	467	03	25	62	13	24	218	408
21		531	535	537	577	523	466	455	461	484	501	507	541	462	289	303	319	343	374	471	485	497	512	515	528	509	01	25	61	05	33	443	173
22		582	578	534	546	505	462	457	485	500	503	508	529	535	547	498	456	523	503	476	474	495	496	507	510	509	12	56	57	03	46	435	138
23	*	507	532	486	493	456	447	475	490	503	517	526	535	543	546	540	537	544	535	525	512	495	493	491	495	526	23	34	77	16	52	411	368
24		543	547	561	527	495	490	486	500	509	514	523	540	562	555	545	534	446	460	514	509	502	542	557	657	500	00	33	80	14	20	224	581
25	#	737	604	604	582	660	612	509	476	506	508	505	522	542	424	250	291	336	367	425	506	490	486	514	550	475	21	25	82	12	48	190	631
26	#	554	562	587	573	483	429	417	469	488	507	545	526	260	243	262	270	352	440	484	515	500	664	672	597	550	04	26	10	16	49	254	801
27	#	563	583	583	785	772	608	567	533	520	530	525	519	522	519	491	470	375	400	485	493	539	651	620	552	500	01	56	57	19	40	296	276
28		544	551	551	522	500	471	490	502	514	518	526	532	528	528	518	461	426	438	456	406	454	477	531	548	514	23	56	59	21	21	402	196
29	*	567	523	530	483	472	486	496	503	503	509	530	538	541	534	527	527	524	529	513	485	477	469	495	564	520	00	40	63	05	29	426	213
30	*	597	569	573	557	480	436	471	507	499	501	515	527	542	548	529	499	512	515	517	511	506	506	519	537	528	20	19	66	18	49	392	276
31		537	540	552	559	562	510	484	464	498	508	521	547	535	541	538	498	451	446	446	547	592	570	612	624								
Mean		570	580	571	559	530	500	497	499	508	518	529	538	526	493	480	474	466	481	497	508	509	526	544	564	519	DESIGNATIONS			345			
Mean *		557	561	550	518	490	476	490	500	504	515	527	534	540	539	534	531	523	516	510	513	502	514	527	543	521	* Ten least disturbed days			177			
Mean /		535	541	537	503	478	480	491	499	506	516	526	534	539	536	532	532	528	528	522	511	501	499	510	533	517	/ Five international quiet days			148			
Mean /c		603	594	598	617	593	530	494	492	502	511	524	531	473	408	358	361	366	430	492	519	524	588	618	584	513	/c Five international disturbed days			627			
		a Means of 9 values						b Means of 8 values						c Means of 4 values									() Approximate										



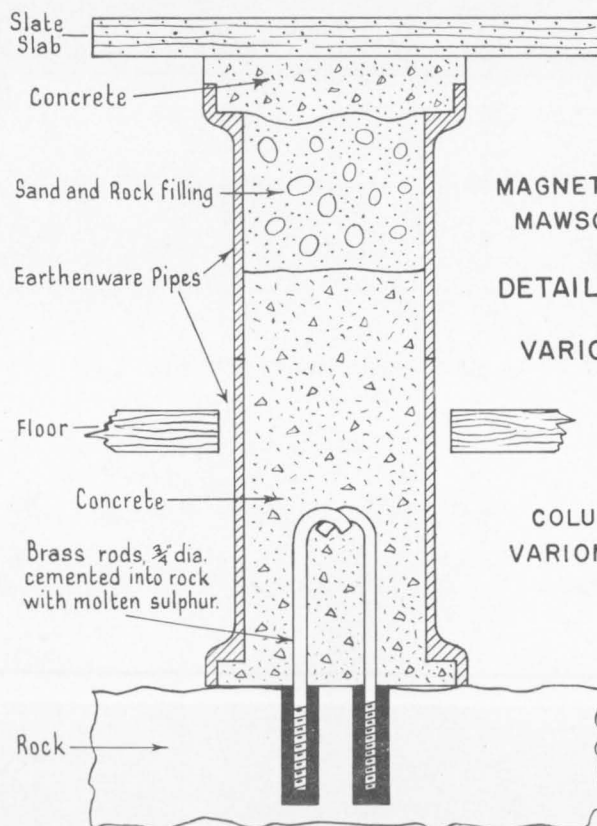
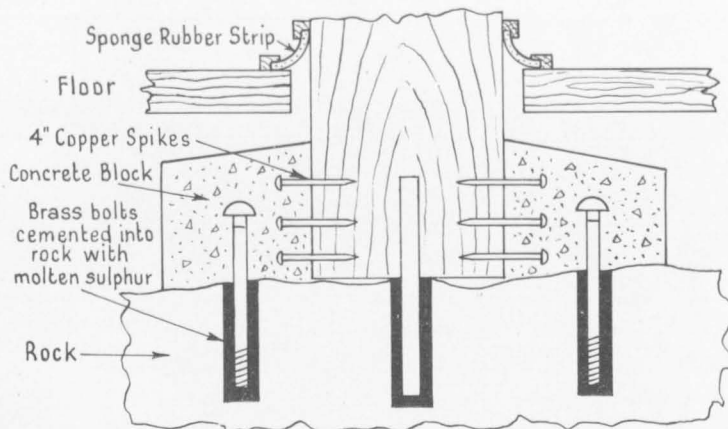
MAGNETIC OBSERVATORY,
MAWSON, ANTARCTICA

LOCALITY MAP





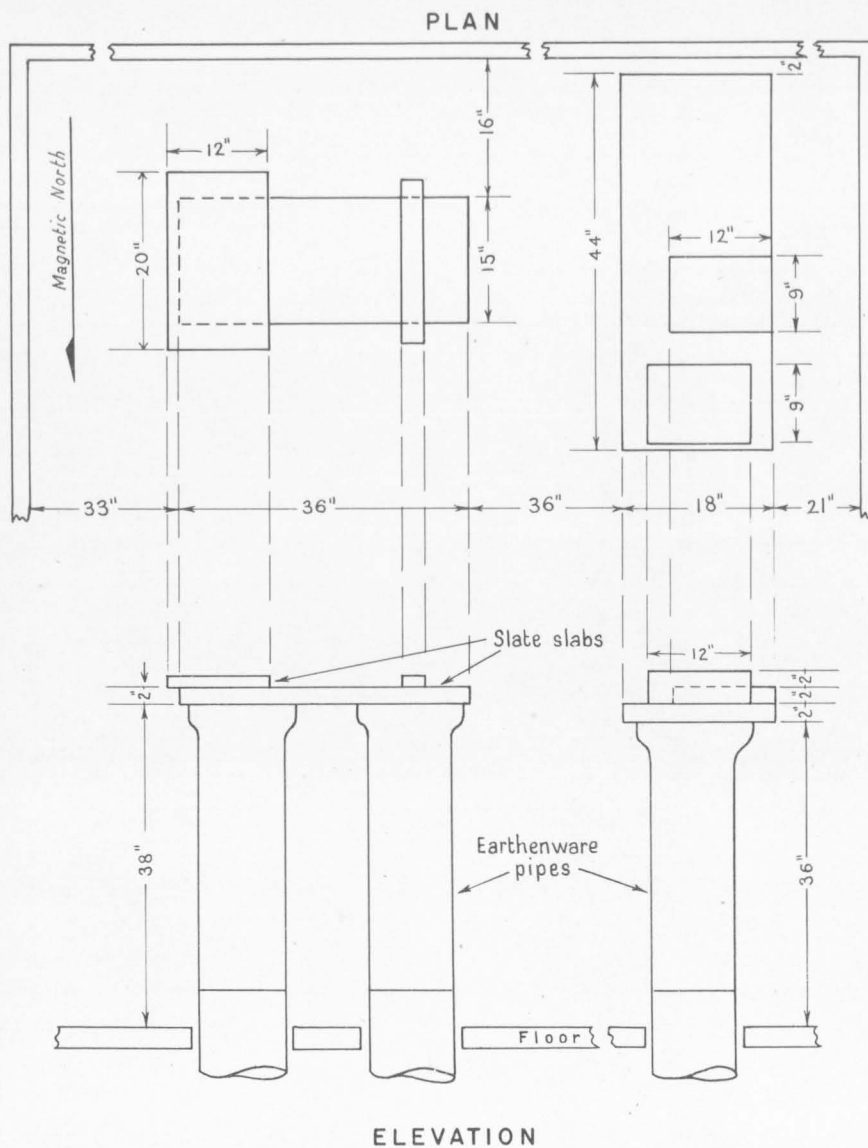
ABSOLUTE PIER
(12" X 12" OREGON)



MAGNETIC OBSERVATORY,
MAWSON, ANTARCTICA

DETAILS OF ABSOLUTE
AND
VARIOMETER PIERS

COLUMNS FOR
VARIOMETER PIERS



MAGNETIC OBSERVATORY,
MAWSON, ANTARCTICA

LAYOUT OF PIERS FOR
MAGNETIC VARIOMETERS
AND RECORDER

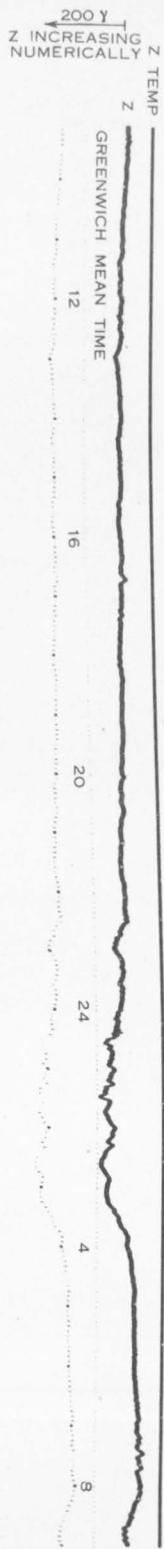
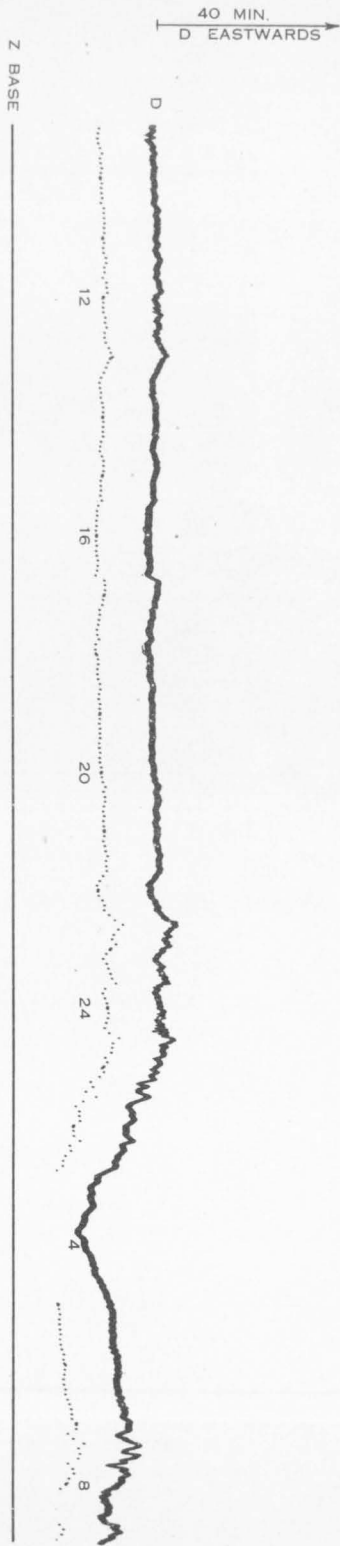
H TEMP
18/19 DECEMBER 1955

MAGNETIC OBSERVATORY
MAWSON, ANTARCTICA

CORRECTION TO
TIME MARKS
0 MIN. PLATE 4



D BASE



H TEMP
5/6 DECEMBER 1955

MAGNETIC OBSERVATORY
MAWSON, ANTARCTICA

CORRECTION TO
TIME MARKS
0 MIN

PLATE 5

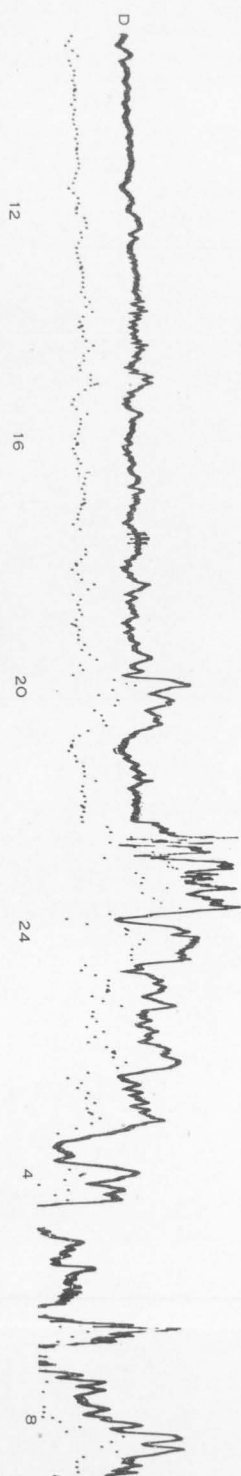
200 Y
H INCREASING



H BASE

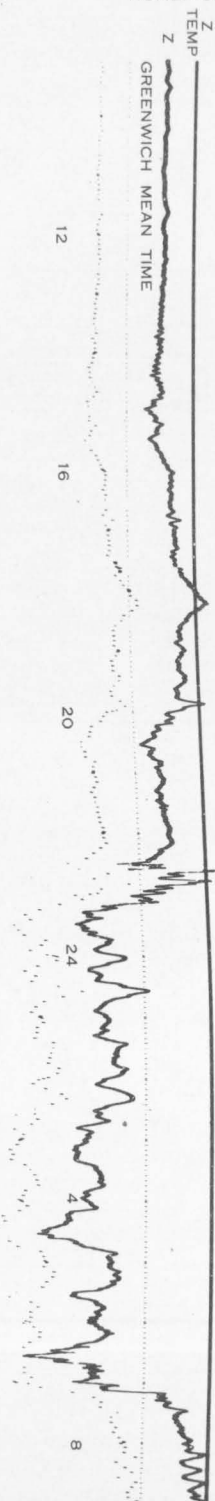
D BASE

40 MIN.
D EASTWARDS



Z BASE

200 Y
Z INCREASING
NUMERICALLY

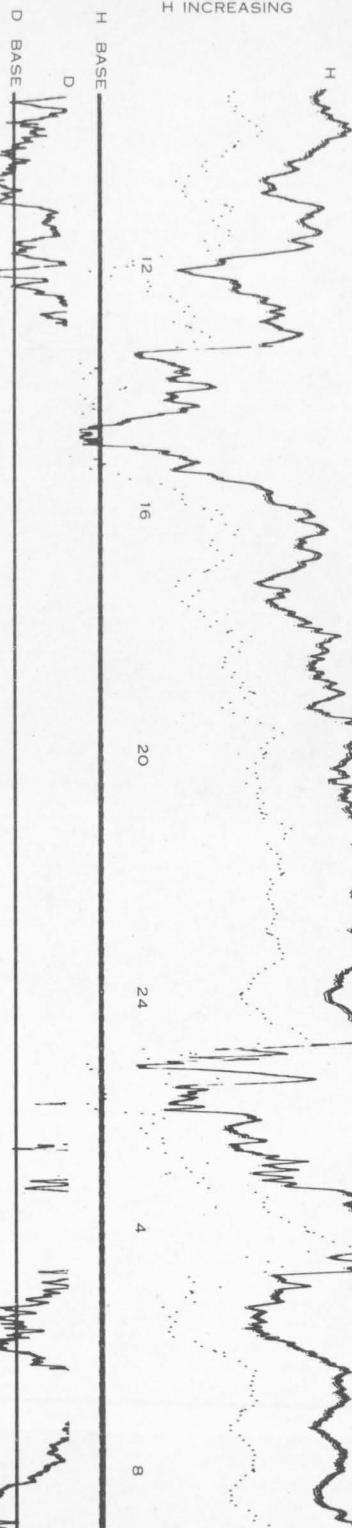


H TEMP
19/20 NOVEMBER 1955

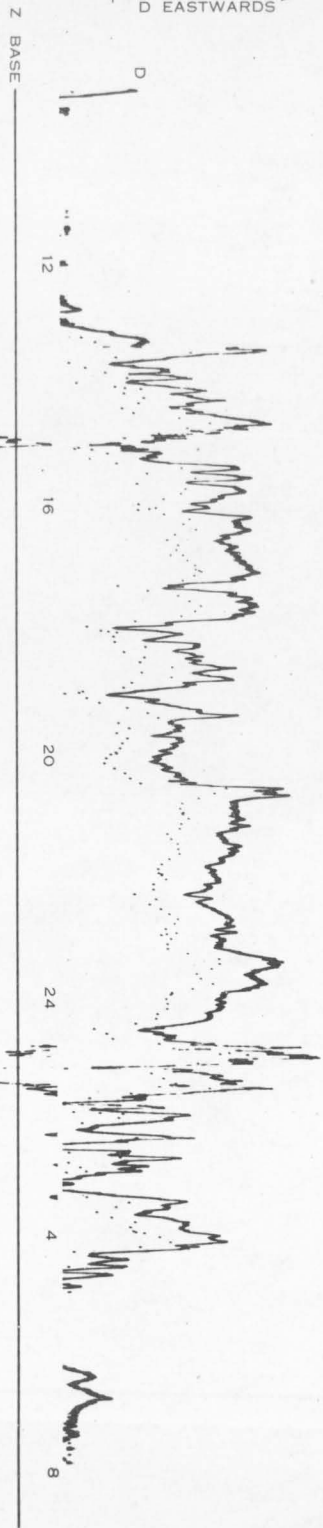
MAGNETIC OBSERVATORY
MAWSON, ANTARCTICA

CORRECTION TO
TIME MARKS
O MIN.
PLATE 6

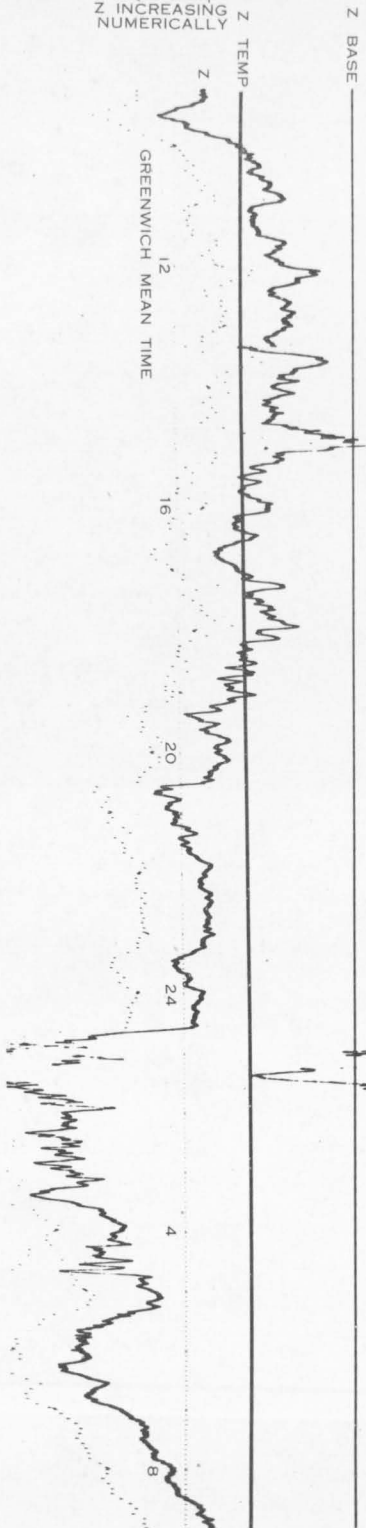
200 Y
H INCREASING



40 MIN.
D EASTWARDS



200 Y
Z INCREASING
NUMERICALLY



GREENWICH MEAN TIME