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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD NO. 1968/42

Melbourne Observatory Group Annual Report 1966

by

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SUMMARY

The Melbourne Observatory Group operated the Toolangi magnetic and seismological observatories, maintained the Australian geomagnetic standard, and supervised the routine operations of the BMR Antarctic observatories throughout 1966.

A reduction in staff forced the postponement of several improvements to the Toolangi installations.

1. INTRODUCTION

A brief description of the Melbourne Observatory Group is given in the annual report for 1962 (van der Waal, 1966).

In June, R.G. Toy resigned, and without replacement it was only possible to do the most essential work to keep the magnetic and seismic observatories in operating condition and make basic analyses of results. For any extra work, such as instrument calibrations, assistance from Head Office was required. Usually on absolute days some time was spent on maintenance and necessary alterations and repairs.

On 12th July, Miss P. Woolley was appointed Clerk third division in the Melbourne Regional Office, but the Executive Officer, Department of National Development agreed to let her stay in the Observatory Group until a suitable replacement could be engaged. At the end of the year she was still working in the Group.

J. Major, an applicant for a position of Geophysicist Class 1 with the Bureau, was interviewed on 10th June. He was appointed in due course as observer for Macquarie Island 1967.

Appendix 1 shows the Staff for 1966.

2. TOOLANGI MAGNETIC OBSERVATORY

Buildings and grounds

During the year nothing was done to maintain the building in good condition although requests for repairs and some alterations were made.

The grounds were kept in good order and grass kept short to reduce fire risk.

Operation

The La Cour magnetograph recording the H, D, and Z components of the geomagnetic field was operating continuously throughout the year. Control observations and scale-value determinations were made once a week. The Ruska magnetometer 4813, QHMs 288, 289, and 290 and BMZ 119 continued to be used for D, H, and Z determinations respectively (see Appendix 2).

No calibration of these instruments was done this year.

Before R.G. Toy resigned, he designed and constructed a new scale-value unit and installed this in the store hut. Underground cables connect it with the vault. During the second half of the year some alterations and improvements were made. The 0 to 10-mA range of the scale-value meter was damaged by a relieving observer and was replaced by a separate 0 to 15-mA meter. This was mounted on top of the scale-value console. The new unit was only temporarily connected to the old wiring in the vault. The new wiring will be completed as soon as time becomes available.

In October an optical 'pricker bar' for making shrinkage marks on magnetograms was introduced. This makes the marks clearer and easier to scale.

The comparison of instruments returned from the Antarctic stations was commenced in April and completed in June. Several different officers from Head Office assisted with these observations. The instruments to be used for the calibrations of the instruments at the Antarctic stations during the 1966/67 season were compared again in November by the 1967 Antarctic observers J. Major and V. Dent. A list of the year's comparison observations is given in Appendix 3.

In October, the La Cour clock stopped and it was found that the minute hand fouled the electrical contacts. After bending the minute hand back slightly the clock operated again without interruption. However, the 55-minute mark is missing and it appears that an internal contact is not operating. This will be repaired as soon as another clock is available.

Analysis and distribution of results

All computation and extraction of geomagnetic data were kept up to date. The distribution was the same as set out in the annual report for 1965 (van der Waal, 1967).

Appendix 4 shows the preliminary monthly mean values and the annual mean of the elements D, H, and Z.

In March, magnetograms for 1959 and 1960, and all relevant data, were sent to Head Office for scaling and computing of final results.

Miscellaneous

A discrepancy of 1.2 minutes was found between the old azimuth mark on the tree and the new one on the concrete block to the east. It was suspected that a tractor working near the new mark had moved it, and a request to the Division of National Mapping to check this was met on 20th January. The azimuth from pier NM to the old mark (on tree) is now determined as 202° 03.7'. The azimuths from piers NE and SM were determined at the same time and are 276° 58.5' and 272° 17.1' respectively.

During part of the year students from the Melbourne University RAAF Academy under the direction of Dr. Thomas were using the test hut at the seismic site for measuring earth currents.

In April and May, J. van der Linden and D. Finlayson unsuccessfully tested a new fluxgate variograph.

Requests

As usual a number of requests for magnetic data and copies of magnetograms were received from local and overseas sources.

3. TOOLANGI AND MELBOURNE SEISMIC OBSERVATORIES

Buildings and grounds

The buildings remained in good condition and no maintenance was required.

Bracken and other growth was kept short to reduce fire risk.

Operation

The seismographs (see Appendix 2) were operated continuously throughout the year with only minor loss of records, mainly due to some power failures of short duration. The larger capacity emergency power supply, which was being made in the BMR laboratories, was not yet completed so that any power failures resulted in record loss.

In July, the crystal controlled power supply operating the time-mark dial broke down. It was found that the relay driving the dial was faulty and after replacement the power supply has been working without interruption. During the time the power supply was out of operation the time-mark dial was operated by the synchronome pendulum clock.

To make the time checks and general control of the instruments easier, a telephone, parallel to the one in the office, was installed in the porch of the valut, and all control equipment was moved from the office to this porch. The time-mark clock can now be checked directly and any adjustments can be made in the vault porch where all auxiliary equipment is also located.

The remote recording seismograph in the old Melbourne Observatory and Melbourne Office has been recording continuously. Some trouble occurred on the line in September but this was soon fixed by the P.M.G. technicians.

A strong earthquake, which was felt throughout eastern Victoria, was recorded on 5th May. Many phone calls for information were received from press, television, and individuals.

On 18th August a team from the Australian Broadcasting Commission filmed a Sprengnether vertical seismometer for a television school programme "How the earth is made".

Analysis and distribution of results

Analysis of earthquakes and distribution of the results to the USCGS, ISRC, and other interested organisations was kept as much as possible up to date. However on a few occasions when staff members were on recreation or sick leave, either analysis had to be postponed or only first arrivals were extracted and distributed.

4. ANTARCTIC OBSERVATORIES

The observatories at Macquarie Island, Mawson, and Wilkes continued to operate throughout the year. Results were received by telegram in the Melbourne Office and distributed to World Data Centres and other interested organisations, as well as published in the monthly Geophysical Observatory Report. Separate reports will be written about the operation of the observatories by the 1966 observers E. Muir, P. Towson, and F.J. Taylor respectively.

As sufficient staff to operate the three observatories during 1967 could not be found, it was decided to close the observatory at Wilkes at the end of the year. All instruments were dismantled and returned to Australia (March 1967).

All re-orders for 1967 were prepared by the staff of the Canberra office.

5. REFERENCES

van der WAAL, C.A. 1966 Melbourne Observatory Group Annual Report, 1962. Bur. Min. Resour. Aust. Rec. 1966/173.

1967 Melbourne Observatory Group Annual Report, 1965. Bur. Min. Resour. Aust. Rec. 1967/117.

APPENDIX 1

STAFF MOVEMENTS AND VISITORS

C.A. van der Waal	Melbourne during the whole year.
C.H. van Erkelens	Melbourne during the whole year.
P. Woolley	Melbourne during the whole year.
R.G. Toy	Resigned 14th June.
F.J. Taylor	Left for Wilkes 10th January.
P. Browne-Cooper	Returned from Wilkes 21st February. In Melbourne 27th June till 29th July.
J. Haigh	Returned from Mawson 11th March. In Melbourne 27th June till 2nd July.
J. Major	ANARE indoctrination course 24th to 28th October. Canberra 21st to 24th November. Left for Macquarie Island 30th November.
V. Dent	ANARE indoctrination course 24th to 28th October. Canberra 21st November to 17th December.
E. Muir	Returned from Macquarie Island 17th December.

Visitors

Mr. J.M. Rayner, Director, Bureau of Mineral Resources, 17th January and 12th August.

Mr. L.S. Prior, Assistant Director (Geophysics), 12th April and 18th November.

Dr. W.D. Parkinson, Head Office Observatory Group, 16th-20th May.

Mr. J. Milne, SEATO fellow 1966, 7th and 8th June.

Dr. R.D. Adams, Seismological Observatory, Wellington, N.Z. 16th June.

Mr. K.L. Svendsen, Geomagnetism Division, USGGS, 6th July.

Messrs. Almacen, Bundoc and Cruz, SEATO trainees from the Phillipines, 25th-29th July.

Mr. B.G. Cook, Head Office Observatory Group, 8th and 9th August.

Mr. J. van der Linden, Head Office Regional Magnetic Section, 15th-18th August, 2nd and 3rd November.

Mr. R.F. Thyer, Assistant Director (Operations), 21st November.

Mr. R. Underwood and Dr. J. Cleary, ANU, 28th November.

APPENDIX 2

INSTRUMENT DATA

(a) Magnetograph (La Cour normal-run, 15 mm/hr)

Component	Magnet N pole	Scale value	Standard deviation SV	Standard deviation BLV
D	N	1.17 min/mm	-	0.1
H	W	4.5 gammas/mm	0.04	1.3
Z	N	4.4-4.5 gammas/mm	0.01	2.2

(b) Magnetometers

Element	Instrument	Correction
D	Ruska 4813	- 0.3 minute
H	QHM 288	- 15 gammas
	QHM 289	- 17 gammas
	QHM 290	- 19 gammas
Z	BMZ 199	+ 32 gammas

(c) Seismographs

System	Components	Free period Seismo (s)	Free period Galvo (s)	Magnification (maximum)
Short period	Benioff	1.0	0.2	180,000
60mm/min	N-S, E-W, Z			
Long period	Sprengnether	15	90	Not known
30mm/min	N-S, E-W			
	Columbia	15	90	
	Vert.			
Visual	Vert.	1.0	Helicorder	Not known
30mm/min	(Willmore)			

APPENDIX 3

COMPARISON OBSERVATIONS AT TOOLANGI DURING 1966

MONTH	INSTRUMENTS
January	HTM 154, QHM 306, BMZ 221
April	Declinometer 320, BMZ 211 and 221
May	HTM 154, QHMs 172, 174, 178, 302, BMZ 121, 211
June	QHM 494, Decl. 333, BMZ 115, 121
November	HTM 154, QHMs 174, 178, 302
	Decl. 333, 812, BMZ 115, 221
December	QHM 172

APPENDIX 4

PRELIMINARY MAGNETIC MEAN VALUES

Month	D	H (gammas)	Z (gammas)
January	10° 32.8' E	22 536	-56 365
February	33.1	528	368
March	34.1	515	367
April	34.1	517	366
May	34.2	511	366
June	34.3	510	364
July	34.3	507	368
August	34.6	504	367
September	35.1	491	379
October	35.2	496	372
November	35.1	502	371
December	35.1	502	366
1966.5	10° 34.3'	22 510	-56 368