

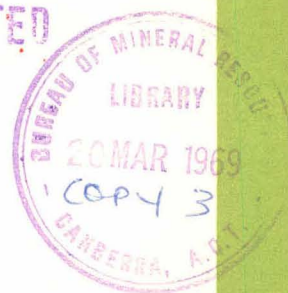
COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record No. 1968 / 135

RESTRICTED



Toolangi Geophysical Observatory Annual Report 1967

by

C.A. van der Waal

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SUMMARY

The operation of the Toolangi magnetic and seismic observatories and the supervision of the observatories at Macquarie Island and Mawson were continued.

Some improvements in the installation were carried out, but others had to be postponed owing to continued staff shortage.

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1. INTRODUCTION

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

The observatories were operated satisfactorily throughout 1967 despite shortage of staff for part of the year. Assistance was received from Head Office staff for comparison observations and for necessary changes in the equipment.

When R. Biggs was on leave in January the changing and processing of records was done by C. van Erkelens, and only the main earthquake phases were read during this period.

The staff movements and visitors are listed for 1967 in Appendix 1.

During the year, advice was received that Wentworth House had to be vacated in 1968 as it was going to be demolished to make place for a new office building. A proposal to establish an observatory office in the eastern suburbs was forwarded to Canberra but was eventually not approved.

2. TOOLANGI MAGNETIC OBSERVATORY

Buildings and grounds

Some minor repairs and alterations were done during the year.

The grounds were kept in good order and grass and bracken were burned off to reduce fire risk.

Operation

Recording with the La Cour magnetograph was continued throughout the year. Control observations and scale value determinations were made once a week. QHMs 288, 289, and 290 and BMZ 119 were used for the control of H and Z respectively. Until June the Ruska declinometer was used for the control of D, and Askania declinometer 640506 was used from October onwards. Both instruments were used during the change-over period from June to October.

In April and May the QHMs and BMZ were compared with the Elsec proton magnetometer.

Parallax tests were done in August.

During April, May, and June, E. Muir redesigned and replaced the old scale-value circuits and renewed other old wiring in the magnetic vault.

The Z scale-values were rather scattered, and in an effort to improve this the Z knife-edges were cleaned in July. However, this did not make any difference. It is hoped that the new scale-value unit, now being constructed, will improve this. A test with a prototype unit was too short to be conclusive.

In June it was discovered that the first reserve of H was not recording and all reserves were checked and adjusted. Some baseline jumps occurred during these adjustments, but they were well controlled.

Control instruments returned from the Antarctic stations were compared during March and April, and the instruments were used during the 1967/68 season in November and December. Head Office and Antarctic staff assisted with this work. Some comparisons were also done in July, August, and September. A list of comparison observations done during the year is shown in Appendix 3.

In November the weight drive of the La Cour variometer was replaced by a synchronous motor. An emergency power supply, consisting of a 50-watt AWA inverter with automatic switch-over in case of power failure, was installed. However, this unit is not very satisfactory as the output frequency is not better than 50 ± 12 Hz. It is proposed to install a crystal-controlled power supply when this becomes available.

In October a new azimuth mark (VMK) for use from pier A was established above the vault door. The azimuth for this mark is $9^{\circ} 26'.42$ (north meridian).

Analysis and distribution of results

The extraction of data from the magnetograms, the computation of control observations, and the adoption of preliminary baseline, scale, and monthly mean values, as well as the distribution of these data, were kept up to date.

A complete distribution list is shown in Appendix 5.

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

The 1967 magnetograms and preliminary parameters were regularly sent to Canberra for scaling.

Final temperature corrections for 1966 were computed and scale values and baseline values adopted.

All adoptions for the unpublished years 1959 to 1966 have now been completed. The magnetograms and parameters for 1965 and 1966 were sent to Head Office for processing.

3.

From the middle of November, new observation forms were used. These were designed to facilitate punching of data for automatic data processing at headquarters.

The text for the mean hourly values report 1959/60 was written and forwarded to Head Office.

Miscellaneous

An insulating cover for a regional magnetic fluxgate magnetometer was constructed and tested. Two thermographs were borrowed from the Bureau of Meteorology for the testing.

In October a surveyor due to go to Mawson was trained so that he could assist with the transfer of the magnetic station from the old to the new base at Wilkes.

During the ANZAAS meeting in January an excursion, was organised to the observatories; it was attended by eight people, (see Appendix 1).

A number of requests for magnetic data and copies of magnetograms were received and attended to.

3. TOOLANGI AND MELBOURNE SEISMIC OBSERVATORIES

Buildings and grounds

The building of the Toolangi seismic observatory remained in good condition and no maintenance was required.

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

The access road was graded in September.

Operation

The seismographs (see Appendix 2) operated continuously throughout the year. As there was still no bigger emergency power supply available some record was lost during power failures.

The long-period recorder was serviced and the vertical galvanometer adjusted in February. The short-period recorder was serviced in March and the optics adjusted in August. The long-period vertical galvanometer was replaced in September.

The cloth and motor of the dryer were replaced in October.

Six months long-period seismograms were dispatched to the Lamont Geological Observatory in January and July.

4.

The remote recording seismograph in the old Melbourne Observatory and Melbourne Office was operated continuously during the year. In June the equipment was adjusted; a valve in the Helicorder and a transistor in the modulator were replaced.

Analysis and distribution of results

Analysis of earthquakes and distribution of results were continued. On some occasions analysis was delayed or only first arrivals were read owing to staff having to attend to break-downs.

Final data were regularly sent to Head Office for punching and forwarding to ISC.

4. ANTARCTIC OBSERVATORIES

The observatories at Macquarie Island and Mawson continued to operate throughout the year. Results were received by telegram and distributed to the USCGS, World Data Centres, and other interested organisations. Magnetic results were also published in the monthly Geophysical Observatory Report by headquarters.

The distribution list is shown in Appendix 5.

Separate reports will be written about the operation of the observatories by the observers: J. A. Major for Macquarie Island and V. Dent for Mawson.

5. REFERENCE

van der WAAL, C.A.	1966	Melbourne Observatory Group Annual Report, 1962. <u>Bur. Min.</u> <u>Resour. Aust. Rec. 1966/173.</u>
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APPENDIX 1STAFF MOVEMENTS AND VISITORSStaff movements

C.A. van der Waal	On furlough 14th August to 4th December
C.H. van Erkelens	In Melbourne during the whole year
P. Woolley	Left 3rd March
B. Turner	Commenced duty on 15th February
F.J. Taylor	Returned from Wilkes 22nd February
P. Towson	Returned from Mawson 8th March
B.G. Cook(H.Q.)	Went to Macquarie Island 22nd February until 20th March
E. Muir(H.Q.)	In Melbourne 28th March until 9th June
D. Horne	Commenced duty on 5th June
D. Finlayson(H.Q.)	In Melbourne from 8th August until 6th December
J.B. Connelly	In Melbourne from 20th November until 1st December and 11th and 12th December. Left for Macquarie Island 12th December
R.S. Smith	In Melbourne from 20th November until 8th December
J.A. Major	Returned from Macquarie Island on 31st December

Visitors

P.M. McGregor	Head Office Observatory Group, 9th-12th January
J.C. Dooley	Head Office 11th January
I.B. Everingham	Mundaring Geophysical Observatory, 17th January
Miss D. Evans	Glen Iris, Victoria
Mr G. Shell	University, Broken Hill, NSW
Mr J. Campbell	University College, Townsville, Queensland
Mr M. Bowthorpe	University College, Townsville, Queensland
Mr A. Perriman	CSIRO Melbourne, Victoria
Mr K.E. Morrish	Nunawading High School, Victoria
Mr C.J. Maghew	Mobil Oil, Melbourne, Victoria

17th
January

J.M. Rayner	Director, BMR, 18th January
Mr R.E. Street	Royal Melbourne Institute of Technology, 15th May
Miss J. Harnall	Brighton Technical School, 15th May
Mr M. Jones	Port Moresby Geophysical Observatory, 29th-30th August
R.F. Thyer	Assistant Director (Operations), 5th September
Mr C. Kerr-Grant and 10 students of the Melbourne University,	26th September

APPENDIX 2INSTRUMENT DATA(a) Magnetograph (La Cour normal-run, 15 mm/hr)

Component	Magnet N pole	Scale value	<u>Standard deviation</u>	
			SV	BLV
D	N	1.18 min/mm	-	0.1
H	W	4.5 gammas/mm	0.02	0.9
Z	N	4.4-4.9 gammas/mm	0.03	2.2

(b) Magnetometers

Element	Instrument	Correction
D	Ruska 4813	-0.3 minute
H	QHM 288	-18 to -20 gammas
	QHM 289	-21 to -24 gammas
	QHM 290	-23 to -25 gammas
Z	BMZ 119	+32 gammas

(c) Seismographs

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

APPENDIX 3COMPARISON OBSERVATIONS AT TOOLANGI DURING 1967

<u>Month</u>	<u>Instruments</u>
January	QHMs 460, 461, 462
March	HTM 154; QHMs 174, 177, 301, 492, 493; BMZ 115
April	QHMs 288, 289, 290, 305, 306, 460, 461, 462; Declinometers 320, 812; BMZs 115, 119, 221
July	Declinometer 506
August	QHM 301
September	Declinometer C.I.W. 28
November	HTM 154; QHMs 174, 177, 301, 492, 493; Declinometers 333, 812; BMZ 121, 221
December	QHMs 172, 301, 492, 493; Declinometer 320; BMZs 115, 121

APPENDIX 4PRELIMINARY MAGNETIC MEAN VALUES

Month	D	H (gamma)	Z (gamma)
January	10' 35.3 E	22 492	-56 373
February	35.3	483	368
March	34.0	485	364
April	34.3	481	363
May	35.0	472	363
June	35.5	469	372
July	36.7	472	379
August	36.7	466	368
September	34.6	479	391
October	34.6	471	389
November	34.2	457	362
December	34.6	444	361
1967.5	10' 35.1 E	22 473	-56 371

APPENDIX 5DISTRIBUTION OF RESULTSMagnetic

World Data Centre A	Toolangi, Macquarie Island, Mawson
Washington D.C., USA	K-indices, Toolangi special events
	Microfilm copies of Toolangi magnetograms with prelim- inary parameters
World Data Centre A	Toolangi principal magnetic storms
Boulder, USA	
World Data Centre C1	Toolangi, Macquarie Island, Mawson
Charlottenlund, Denmark	K-indices and Toolangi special events
World Data Centre C2	As above
Kyoto, Japan	
Permanent Centre,	As above
De Bilt, Holland	
Kp Centre	Macquarie Island and Mawson
Gottingen, West Germany	K-indices
Mr B.H. Briggs	Toolangi K-indices
University of Adelaide, SA	
Department of Defence	As above
Melbourne, Vic.	
Ionospheric Prediction Service	As above
Sydney, NSW	
Mr B.J. Fraser	As above
University of Newcastle, NSW	
Dr G. Allcock	Macquarie Island K-indices
Lower Hut, NZ	

I.G.Y. Station

As above

Invercargill, NZ

BMR Head Office,

Canberra, ACT

Toolangi, Macquarie Island
and Mawson K-indices;
Toolangi special events.

Principal magnetic storms,
preliminary scale values,
baseline values and monthly
means, original magneto-
grams with preliminary
parameters.

Seismic

Preliminary main earthquake
phases 4 times weekly

By airletter to USCGS

Weekly bulletin

BMR Canberra

Mundaring Geophysical
Observatory

Port Moresby Geophysical
Observatory

BMR Darwin

Central Observatory, Rabaul

University of Tasmania

Riverview College Observatory

University of Adelaide

Australian National University

University of Queensland

Seismological Observatory
Wellington NZ

Apia Observatory, Western
Samoa

University of California,
Berkeley, USA

Seismological Laboratory,
Pasadena, USA

Section Geophysique, Noumea,
New Caledonia

Final results

On punched cards to ISC,
Edinburgh