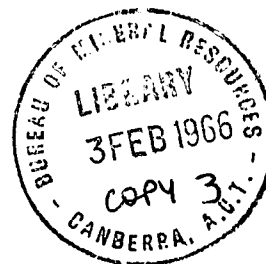


COMMONWEALTH OF AUSTRALIA



**DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS**

RECORDS:

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INTERNATIONAL SYMPOSIUM ON VOLCANOLOGY, NEW ZEALAND, 1965

by

N.H. Fisher

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INTRODUCTION

The International Symposium on Volcanology was attended by Dr. N.H. Fisher, Assistant Director (Geology), as Chief delegate, by D.W. D'Addario, Officer-in-Charge, Vulcanological Observatory, Rabaul, nominated by the Papua-New Guinea administration, and the Department of Territories, and, in a private capacity, by Dr. D.H. Blake and Dr. W. Oldershaw.

Altogether there were about 167 active participants, representing 26 countries, in the Symposium, comprised as follows:

New Zealand	57,	U.S.A.	35,
Australia	16,	Japan	10,
Italy	8,	England	6,
France	5,	U.S.S.R.	4,
Canada	4,	New Caledonia	3,
Fiji	2,	Philippines	2,
West Germany	2, and		
1 each from Belgium, China (Taiwan) Finland, Hungary, India, Indonesia, Kenya, Netherlands, New Guinea, New Hebrides, Rumania, Spain and Switzerland.			

The Conference was preceded by two tours of areas of volcanic interest in North Island and by four post Conference tours; one of the active volcanoes of the North Island, one of the geothermal areas, one of the areas of volcanic interest in the South Island and, a subsequent one to Dun Mountain.

The standard of papers presented was good throughout and the organization of the Symposium, by a local Committee under the chairmanship of J. Healy of the New Zealand Geological Survey, was excellent, particularly considering that the exceedingly large number of participants introduced problems in accommodation and movement of the personnel that some of the centres were not well equipped to handle.

Transport in the form of five tourist buses was provided by the New Zealand Government.

Outstanding features of the Symposium were a display of seismological equipment which had been developed by the Geophysical Division of the New Zealand Department of Scientific and Industrial Research and, the demonstration of the use of carbon dating in volcanic centres.

The seismograph equipment consists of a Willmore seismometer coupled to a tape recorder with an inbuilt radio receiver for receiving and recording time signals. The impulses from the seismometer are recorded on a tape 1200 feet in length which can be programmed to last for 1, 2 or 3 months. Four channels are recorded, at 3 different gains, one high magnification, one medium, and one low, and the fourth channel records the time signals. The recorder can be played back at any required speed so that extremely good

resolution can be obtained; the complete record is available and no part of it is lost as happens with photographic recording when the light spot is moving too quickly to register. Noise can be filtered out through a playback apparatus; and the record can be reproduced on photographic paper at any required magnification. The equipment was displayed attached to a Television screen and a microphone which together gave a very spectacular picture of events during seismologically active periods on a volcano. The apparatus has particular application in New Guinea as it can be left unattended for periods up to three months, and requires very little installation, so that it could be used for observations of volcanoes where impending activity is suspected; and it also could be most useful for detailed observation of tremors that are being recorded within the Rabaul seismic network when it is fully operative.

Carbon 14 dating has been used very extensively to determine the age of the eruptions from each volcanic centre, which are abundantly annotated by fragments of charred wood. Virtually the complete record of this activity has been worked out in many areas, right to the limit of effectiveness of the Carbon 14 method. Particularly useful information has been obtained on the rate and type of soil development from volcanic products of various lithologies.

An impressive array of ignimbrites, ash flows, ash falls, lahar deposits, explosion breccias and every type of volcanic ejectamenta was demonstrated and extensively argued over by the participants.

PROGRAMME

The following is the programme of the Symposium:

MONDAY, 22 NOVEMBER

University of Auckland

- 9.00 a.m. Registration, Maclaurin Chapel Hall, Princes Street.
- 11.00 a.m. Official opening ceremony, Garden Lecture Theatre.
- Speakers: His Worship, the Mayor of Auckland, Dr. R.G. McElroy.
The Director, New Zealand Geological Survey,
Mr. R.W. Willett.
The President, International Association of
Volcanology, Professor H. Kuno.
The Minister of Science, the Hon. B.E. Tallboys
- Address: The volcanoes of Auckland.
Professor E.J. Searle, University of Auckland.
- 2.00 p.m. Field excursion to the Auckland volcanic field. Buses leave from the University.
- 8.00 p.m. Civic reception to the participants in the International Symposium on Volcanology, at the Concert Chamber, Town Hall, Queen Street.

TUESDAY, 23 NOVEMBER

- 9.30 a.m. Garden Lecture Theatre, University of Auckland
Chairman: Professor H. Kuno
Plenary session, International Association of Volcanology

10.50 a.m. - 12.30 p.m. Scientific session.

R.D. Adams and R.R. Dibble, New Zealand. Seismological studies of the Raoul Island eruption, 1964. Paper 1.

B.G.J. Upton and W.J. Wadsworth, England. The volcanoes of Reunion Island, Indian Ocean, Paper 109.

A.T.J. Dollar, England. Genetic aspects of the Jan Mayen fissure volcano group on the mid-oceanic submarine Mohns Ridge, Norwegian Sea. Paper 27.

H. Williams, U.S.A. Volcanic history of the Galapagos Archipelago. Paper 116.

12.30 p.m. Official Symposium photograph.

1.30 p.m. Buses leave the University for Rotorua.

5.45 - 6.15 p.m. Arrive in Rotorua.
Evening free.

WEDNESDAY, 24 NOVEMBER

Conference Room, Sportsdrome, Rotorua

Chairman, Professor Howel Williams

9.15 a.m. Scientific session.

S. Aramaki and T. Ui, Japan. Aira and Ata calderas in Southern Kyushu, Japan, and the related pyroclastic flow deposits. Paper 3.

H.R. Blank, Jr., U.S.A., S. Aramaki and K. Ono, Japan. Aeromagnetic surveys of Kuttyaro and Aso caldera regions, Japan. Paper 4.

I. Yokoyama, Japan. Crustal structures that produce eruptions of ignimbrites and formation of calderas. Paper 121.

G.A. Eiby, New Zealand. New Zealand earthquake swarms and volcanism. Paper 28.

M.T. Zen, Indonesia. The formation of various ash flows in Indonesia. Paper 123.

J. Green, U.S.A. Water content of ignimbrites ; lunar implications. Paper 42.

J.G. Moore, U.S.A. The recent eruption of Taal Volcano, Philippine Islands.

2.00 p.m. Buses leave Brents Hotel for field excursion to Whakarewarewa hot springs and Lake Tarawera.

8.00 p.m. Mayoral reception to participants in the International Symposium on Volcanology.

THURSDAY, 25 NOVEMBER

Conference Room, Sportsdrome, Rotorua

Chairman : Dr. J.M. Harrison

9.00 a.m. Scientific session.

R.L. Smith and R.A. Bailey, U.S.A. The Bandelier Tuff :
A study of ash-flow eruption cycles from zoned magma chambers.
Paper 99.

W.P. de Roever, Netherlands. Dacitic ignimbrites with
upwards increasing compactness near Sibolangit (north-
east Sumatra, Indonesia) and their peculiar hydrology.
Paper 23.

G. Marinelli and M. Mittempergher, Italy. Petrology of some
magmas of typical Mediterranean suite (alkali-potassic).
Paper 70.

V.I. Vlodavetz, U.S.S.R. On the terms "ignimbrite" and
"ignimbrite deposits". Paper 111.

A. Ewart, New Zealand. Review of mineralogy and chemistry
of the acid volcanic rocks of the Taupo Volcanic Zone,
New Zealand. Paper 31.

J. Rogers, New Zealand. Hydrothermal melting of some New
Zealand greywackes and argillites. Paper 87.

S.R. Taylor and A.J. White, Australia. Trace element
abundance in andesites. Paper 107.

H. Kuno, Japan. Lateral variations of magma types in
volcanoes in island arcs and continental margins.
Paper 58.

2.00 p.m. Buses leave Brents Hotel for field excursion to Rotoiti
and Rotoma.

8.00 p.m. Field evening in the Conference Room at the Sportsdrome.
Films of volcanic interest, including some brought to
the Symposium by participants from several countries.

FRIDAY, 26 NOVEMBER

Conference Room, Sportsdrome, Rotorua

Chairman : Professor K. Yagi

9.00 a.m. Scientific session.

L.S. Denholm, Fiji. Structure and economic aspects of
the Vatukoula caldera, Fiji. Paper 22.

W.S. Wise, U.S.A. Zeolitic tephrite from south-eastern
California. Paper 119.

G. Piccoli, Italy. Subaqueous and subaerial basic
volcanic eruptions in the Paleogene of the Lessinian
Alps (southern Alps, north-east Italy). Paper 83.

R.W. Nesbitt, Australia. The Giles igneous province,
Central Australia. Paper 77.

G.A. Challis and W.R. Lauder, New Zealand. The genetic
position of the ultramafic rocks of the "Alpine" type.
Paper 18.

K.E. Bullen, Australia. The bearing of dunite on sub-
crustal problems. Paper 17.

W.H.K. Lee, U.S.A. The present state of heat flow
observations. Paper 60.

J.W. Elder, U.S.A. Penetrative convection: its role
in volcanism. Paper 29.

- 2.00 p.m. Meeting of the Working Group on Petrology and Volcanism, Upper Mantle Committee, in the conference room, Government Building, Haupapa Street.

SATURDAY, 27 NOVEMBER

Conference Room, Sportsdrome, Rotorua

Chairman, Dr. A.T.J. Dollar

- 9.00 a.m. Scientific session.

R.G. Luedke and W.S. Burbank, U.S.A. Volcanism in the western San Juan Mountains, Colorado. Paper 62.

B.P. Ruxton, Australia. A late Pleistocene to Recent rhyodacite-trachybasalt volcanic association in north-east Papua. Paper 93.

G.P.L. Walker, England. Acid volcanic rocks in Iceland Paper 112.

M.H. Battey, England. The "two-magma theory" and the origin of ignimbrites. Paper 8.

D. Radulescu, Roumania, The rhyolites and secondary ultra-potassic rocks in subsequent Neogene volcanism from the east Carpathians. Paper 86.

A.R. McBirney, U.S.A. Rhyolitic magmas of the Central American Volcanic Province. Paper 63.

I.G. Gass and D.I.J. Mallick, England. Acid volcanism on the South Arabian coast. Paper 39

W.B. Bryan, Australia. Eruption of soda-rhyolite and trachyte, Socorro Island, Mexico. Paper 15.

- 2.00 p.m. Buses leave Brents Hotel for field excursion to Waimangu hydrothermal area, returning via north-eastern end of the Ngakuru Valley (graben)

SUNDAY, 28 NOVEMBER

- 9.30 a.m. All participants leave by bus for Wairakei, and travel via Atiamuri to Mangakino along the north-western margin of the Taupo Volcanic Zone. The Whakamaru and Maraetai dams near Mangakino are built on ignimbrite. In the Maraetai Gorge downstream from Maraetai dam are some of the best exposures of ignimbrite in the district.

- 2.00 p.m. Further inspection of the ignimbrite, and the buses leave Mangakino and proceed to Wairakei. The route lies through the Maroa Volcanic Centre, a late Quaternary accumulation of rhyolite extrusions, the youngest of which is less than 10,000 years old.

- 5.00 p.m. Arrive at Wairakei, where the party splits, some going on to hotels in Taupo. five miles farther on.

MONDAY, 29 NOVEMBER

Conference Room, Taupo Hall

Chairman, Dr. J. Goguel

- 9.00 a.m. Scientific session.

D.E. White, U.S.A. Geothermal energy. Paper 186.

T.E. Hatherton, W.J.P. MacDonald and G.E.K. Thompson, New Zealand. Geophysical methods in geothermal prospecting. Paper 45.

M. Hayakawa, Japan. Geophysical study of Matsukawa geothermal area, Iwate Prefecture, Japan. Paper 46.

I. Iwasaki, T. Ozawa, and M. Yoshida, Japan. Differentiation of volcanic emanations around the boiling point of water in geothermal regions in Japan. Paper 53.

T. Noguchi, Japan. Exploration of Otake steam field. Paper 78.

M. Chiba, Japan. Genesis of magmas producing pumice flow and fall deposits of Towada caldera, Japan. Paper 19.

K. Yagi, Japan. Experimental studies on pumice and Obsidian. Paper 120.

G.W. Grindley, New Zealand. Geological structure of hydrothermal fields in the Taupo volcanic Zone, New Zealand. Paper 43.

2.30 p.m. Buses leave Wairakei Hotel for a tour of the Wairakei geothermal field. Present production, approximately 178 MW of electric power.

8.00 p.m. Films of New Zealand scenic interest, shown in the conference hall.

TUESDAY, 30 NOVEMBER

Conference Room, Wairakei Hotel

Chairman, Dr. N.H. Fisher

9.00 a.m. Scientific session.

A.J. Ellis, New Zealand. Volcanic hydrothermal areas and the interpretation of thermal water compositions. Paper 30.

R.O. Fournier and J.J. Rowe, U.S.A. The deposition of silica in hot springs. Paper 36.

G. Sigvaldason, Iceland. Chemistry of thermal waters and gases in Iceland. Paper 98.

F.W. Dickson, U.S.A. Solubilities of metallic sulphides and quartz in hydrothermal sulphide solutions. Paper 26.

R. James. Power life of a hydrothermal system. Paper 54.

D.L. Peck, T.L. Wright and J.G. Moore, U.S.A. Crystallisation of tholeiitic basalt in Alae lava lake, Hawaii. Paper 81.

J.F. Schairer, U.S.A. Silicate systems bearing on the crystallisation courses in alkali basalts. Paper 95.

P.L. Roeder and E.F. Osborn, U.S.A. Fractional crystallisation trends in the system Mg_2SiO_4 - $\text{CaAl}_2\text{Si}_2\text{O}_8$ - FeO - Fe_2O_3 - SiO_2 over the range of oxygen partial pressures of 10^{-11} to $10^{-0.7}$ atmospheres. Paper 86.

H.S. Gibbs and N. Wells, New Zealand. Volcanic ash soils in New Zealand. Paper 40.

2.00 p.m. Buses leave hotels for field excursion to the Aratiatia Rapids and the pumice ash deposits at Taupo. At Aratiatia a dam has been built on rhyolite injected into sediments and tuffs of the Huka Formation. The ash formations exposed by road cuttings in a recent highway deviation are the best sections in the district.

WEDNESDAY, 1 DECEMBER

9.00 a.m. Buses leave the hotels to travel to Wellington, making a limited number of stops on the way for geological and photographic purposes.

5.30 - 6.00 p.m. Buses arrive in Wellington.

Evening Free.

THURSDAY, 2 DECEMBER

Easterfield Building,

Victoria University of Wellington

Chairman, Dr. F.F. Evison

9.30 a.m. Scientific session.

S.H. Wilson, New Zealand. Application of sulphur isotopes to volcanological and geothermal problems. Paper 118.

D.C. McDonald, New Zealand. Hydrogen and oxygen isotope ratios in the waters of the Ngawha geothermal regional. North Auckland, New Zealand. Paper 66.

J. G. Funkhouser, I.L. Barnes and J.J. Naughton, U.S.A. Problems in the dating of volcanic rocks by the potassium-argon method. Paper 37.

J.G. Moore, U.S.A. Gravity slide origin of rift zones of some Hawaiian volcanoes. U.S.A.

R.W. Decker, D.P. Hill and T.L. Wright. Horizontal deformation of Kilauea Caldera, Hawaii. Paper 21

A. Malahoff and G.P. Woollard, U.S.A. Magnetic surveys over the Hawaiian Ridge and their volcanological implications. Paper 68.

R.R. Dibble, New Zealand. Seismic recordings of the subterranean volcanic activity at Ruapehu during 1964. Paper 25.

12.45 p.m. Scientific sessions end.

Afternoon, free.

2.00 p.m. Meeting of a recently formed New Zealand geochemical group. Speakers:

S.R. Taylor. Geochemical research at the Australian National University.

J.F. Schairer. Phase relations in the common rock-forming silicates.

Interested participants invited to attend.

5.30 - 6.30 p.m. Reception to all participants by the Royal Society of New Zealand.

8.

FRIDAY, 3 DECEMBER

Easterfield Building,

Victoria University of Wellington.

- 9.30 a.m. Chairman, Professor H. Kuno.
Plenary session, International Association of
Volcanology, Business, resolutions, etc.
- 11.00 a.m. Chairman, Mr. J. Healy
Valedictory session, International Symposium on
Volcanology, New Zealand. 1965.
Speaker: Dr. C.A. Fleming, President of the Royal
Society of New Zealand.
- 2.00 p.m. Visits to scientific institutions in the Wellington area.

END OF SYMPOSIUM

SATURDAY, 4 DECEMBER

Post-sessional tours B and C leave Wellington on the
morning of 4 December.

PUBLICATIONS

The following literature (in addition to tour guides and
tourist and general information on New Zealand), was provided for the Symposium
and has been placed in the Bureau library:

- (1) General Programme and detailed list of participants
and the organizations they represent.
- (2) Abstracts of the papers submitted, of which rather
less than half were actually presented during the
proceedings.
- (3) Some additional abstracts and the text of a few of
the papers.
- (4) Three Handbooks prepared by the Organizing Committee
on Volcanology of New Zealand dealing with, respectively,
Northland, Coromandel and Auckland; Central Volcanic
Region; and South Island.
- (5) 1:250,000 geological maps of Rotorua and Taupo.
- (6) 1:2,000,000 geological map of New Zealand.
- (7) 1:4,000,000 gravity maps of New Zealand.

The papers submitted for the Symposium will be published in a
special issue of the Bulletin Volcanologique.