

# NEWSLETTER

GEOLOGICAL SOCIETY  
OF  
NEW ZEALAND



# GEOLOGICAL SOCIETY OF NEW ZEALAND

Member Body of the Royal Society of New Zealand

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## EDITORIAL

I have taken over as Editor of the NEWSLETTER from Dr. W.A. Watters who has served the Society so well in this position since 1959.

The NEWSLETTER was started by Mr. B.W. Collins as a brief cyclostyled foolscap circular in March 1965. With issue 4 Mr. L.E. Oborn took over as Editor and the page size was reduced to quarto. Dr. H.W. Wellman, during a brief term as Editor, compiled issue 6. From issue 7 (1959) to 24 (1967) Dr. Watters has been Editor with some assistance initially from Dr. H.M. Pantin and Mr. G.C. Shaw. With issue 13 in February 1963, the NEWSLETTER changed to its present octavo form.

The NEWSLETTER is not a scientific journal. Its policy was formulated by Mr. Collins in issue 2 and this remains unchanged. "Personal notes, short items of geological and geophysical interest, news of the mineral and rock products industries, suggestions as to Society activities, reviews or criticisms of recently published work, letters on any relevant topic, and similar items will all be welcomed." I hope to keep the NEWSLETTER to the same high standard as established by my predecessors. Particularly I would welcome correspondence, reviews of recent publications, and interim reports of current work. The offset process used in printing the NEWSLETTER is suitable for the inclusion of line diagrams and other illustrations, including photographs.

D.R. Gregg  
Canterbury Museum  
Rolleston Avenue  
CHRISTCHURCH, 1.



# anzaas<sup>2</sup>

40th Congress Christchurch 24-31 January 1968

ANZAAS is over. The 40th Congress was held in Christchurch, 24-31 January 1968, and geologists there (together with other scientists) are glad that it is over. Christchurch was just able (or perhaps almost able) to cope with the needs of the 2750 enrolled members. The new buildings of the University of Canterbury at Ilam provided excellent facilities and surroundings for the Congress, and it would have been impossible to have held such a meeting in the old buildings of the University town site where previous science congresses have been held.

It is interesting to look back to January 1891 when the Australasian Association for the Advancement of Science held its third meeting in Christchurch. Attendance at this first major scientific meeting in New Zealand was a surprisingly high 550. At this time, before the formation of the Commonwealth of Australia, there was perhaps more reason for the existence of the Association; New Zealand was one of six isolated British colonies in the south-west Pacific. Sir James Hector, of course, took a prominent part in the organization of the Congress, having, as he said, rashly agreed to be President. R.A. Murray, of the Mines Department of Victoria, was President of Section C (it is perhaps characteristic of the Association that Section C has always been Geology). Vice-Presidents were A.P.W. (Later Sir Algernon) Thomas, Professor of Natural Science at Auckland, and Henry Hill, Inspector of Schools at Napier. The Secretary was John Enys, Cornishman and naturalist, who, with his brother Charles, farmed Castle Hill Station on the Arthur's Pass road from 1864 to 1890. In 1891, after the Congress, he returned to Cornwall and lived at Enys Castle, Penryn, till his death in 1912. There were excursions during the Congress to places of interest near Christchurch, and members and their ladies visited the Addington Railway Workshops, the Belfast Freezing Works, Lincoln College, and the Kaiapoi Woollen Works. There were post-Congress excursions to the West Coast Sounds by ship from Port Chalmers (lead by Professor F.W. Hutton), and to Ruapehu by coach from Napier (lead by Mr. Hill). Sir James and Lady Hector received the members of the Association at an afternoon reception in the grounds of Christ's College, and there was another reception arranged by Mr. and Mrs. Leonard Harper at Ilam.

To get back to 1968, the Editor has asked two New Zealanders, now resident in Australia, to provide contributions dealing with the recent Congress, and with ANZAAS Congresses in general; and the third contribution is an elegy invited from the Secretary of Section C.



## IMPRESSIONS OF ANZAAS (SECTION C)

by Edmund D. Gill

Assistant Director, National Museum of Victoria, Melbourne

It is difficult to think of a more attractive setting for the 40th Congress of ANZAAS than Christchurch. This city has remarkable natural advantages that make it one of the most attractive cities in the world of its size. Conveniently situated on a coastal plain, with a good harbour separated from the main city by attractive hills, and with high mountains not a great distance away, Christchurch has a delightful setting. Streams of clear water fed by springs, and so not liable to flooding, flow through the town. Much has been done to add cultural beauty to this natural attractiveness, and altogether the setting was an admirable one for ANZAAS. In Christchurch there could be no better setting for the Congress than the new university at Ilam. Visitors were very impressed with the fine buildings and the services available in them. Section C was well organised, and the programme was well balanced in its representation of the various aspects of geological sciences. Adequate provision was made for interdisciplinary symposia so that ideas were shared with biologists, geomorphologists, and physicists. The natives were very friendly indeed, entertaining us in their homes as well as in more formal places.

As the local geology presents exceptional opportunities for Quaternary studies, it was an excellent idea to invite Professor F.W. Shotton of the University of Birmingham in that he is a world authority on that era. Depth of scholarship and maturity of judgment characterised his contribution, and it was a privilege to have him present.

Special mention should be made of the excursions, which were well organised and led by knowledgeable enthusiasts. Such sections as that in the Waimakariri Gorge are of world note and really deserve more fame than that which they already command.

A review of this type, like the review of a book, is ever suspect unless something adverse is added to the praise. The piquancy of a mild criticism appears always to be expected. It is difficult to find such in a Congress as well run as that at Christchurch, but I think it will be acceptable if I reiterate what is said at nearly every conference, but so far has not been heeded. The final programme should be sacrosanct. When completed, it should stand. If speakers cannot fulfil their accepted obligation, they should not expect to be placed elsewhere on the programme. If they are not sure they can be present, they should not agree to be included in the programme. ANZAAS specialises in interdisciplinary activity, and people move freely between Sections. If the programme is altered, their careful planning is often ruined, which is very frustrating.

Christchurch was a memorable ANZAAS event, and I know for certain that great numbers of geologists would like to join with me in expressing genuine thanks to our hosts.

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## THE VALUE OF ANZAAS CONGRESSES

by D. A. Brown

Department of Geology, Australian National University, Canberra

These opinions are expressed in response to a request from the Editor of the Newsletter. I have long held the view that ANZAAS Congresses come round too frequently, yet I would surely be disappointed if any move to decrease their frequency resulted in the New Zealand venue being used less often. Perhaps it is the relatively rare occasion on which the Congress meets in New Zealand that makes it more attractive in comparison with the quickfire repetition of meetings in Australia. My own enjoyment of the Christchurch meeting was, of course, enhanced by the pleasure of meeting many old friends and revisiting old haunts, but I feel sure that most if not all of the Australian contingent share my opinion that it was a very well organized and efficiently run Congress. Insofar as Section C was concerned, the organizing committee deserve every praise for the splendid way in which they catered for one of the larger and more complex sections of the meeting.

It seems, however, to be one of the unfortunate features of all recent ANZAAS congresses, that sections are organized as though they were full-scale congresses in the individual disciplines themselves, with numerous, often highly-specialized papers that require multiple concurrent sessions. Thus, the members of Section C, for instance, have no opportunity of attending more than a fraction of the sessions in their own discipline, let alone a chance to "shop around" in other sections who, for the most part, organize their programmes in much the same manner. In this respect it is perhaps of interest to note that the list of papers read to Section C of the 39th ANZAAS Congress in Melbourne (Aust. J. Sci., 29, pp. 264-265, 1967) markedly exceeds that of any other section.

Thus the major objectives of ANZAAS -- "to work towards the bringing of scientists of different descriptions together with each other, and to bring them together with the educated and informed public" -- are in large measure thwarted. With few exceptions, such as the occasional public lecture, demonstration, or some of the symposia, we neither make geology attractive to the non-geological scientists nor justify the time to sample the non-geological fare ourselves. The very frequency of ANZAAS Congresses means that a high proportion of the papers presented are of doubtful quality or slightly variant repetitions of papers from earlier meetings, often drummed up to justify a claim for travelling expenses to the meeting. There are, of course, many people who would claim that only by maintaining Section C on a geological congress-type basis will the specialists and leaders in the field be attracted to attend.

As an Aunt Sally proposal, I would like to suggest that ANZAAS Congresses might be organized in a different fashion from that at present in vogue. I begin with the suggestion that they be held every three years, and that the Australasian region be divided into three zones embracing the following Congress centres:-

Zone 1. Adelaide, Perth, Hobart.

Zone 2. Brisbane, Sydney, Melbourne.

Zone 3. (a) North Island (b) South Island, New Zealand;  
(c) Canberra.



It is envisaged that the Congress meetings would move from zone to zone and rotate from centre to centre within the zones. Thus each zone would have a meeting once every 9 years and each centre in each zone would have a meeting once every 27 years. Places such as Port Moresby, Darwin and Suva would require special consideration. The three-year period would also leave ample opportunity for specialist groups to hold their own meetings non-currently with ANZAAS. On the other hand, if a more frequent meeting of ANZAAS is desired, say, every two years, four zones might be devised. The main object of the zoning system is to provide a more even distribution of meetings over the region. Under the present arrangement, as I understand it, there is a lengthy concentration in the eastern Australian states and the A.C.T.

Whatever happens to the frequency of Congresses, however, I do suggest that Section C, at least, reconsider its organization within the meeting. Rather than invite papers from all and sundry, I suggest that the organizing committee for the Section at each congress invite speakers or groups of speakers to present review papers on the current state of and advances in their various fields of interest with a particular view to presenting these in a form assimilable by those members in other fields and disciplines. These reviews and more well-organized symposia would, I feel sure, have a much greater rapport with the aims of ANZAAS than the present practice of producing a multiple concurrent programme that serves to segregate the geologists from their fellow scientists.

Insofar as excursions, which are an important feature of ANZAAS Congresses, are concerned, it is perhaps worth considering the recognition of two types -- the general excursion run by the Congress organizing committee for the non-specialist, and the specialist excursion run by individual sections. It will be recalled that Section C Excursion 02 (Auckland - Rotorua - National Park - Wellington) was taken up largely by non-geologists to the exclusion of many geologists who were late applicants. Thus the tour leaders, who did an excellent job, were somewhat circumscribed in their efforts to explain the magnificent features of the tour in terms geological and non-geological. It is a tribute to the popularity of the Section C excursions that so many participants are non-geologists, but I believe that if both the above types of excursion were provided, they would be patronized much more satisfactorily than under the present arrangements.

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## ANZAAS 1968 WAS IT ALL MUCH ADD ABOUT.....WELL, RATHER LITTLE?

by Guyon Warren

N.Z. Geological Survey, Christchurch.

### Post-mortem

Statistically, ANZAAS was a huge success -- 2750 people (including 80 overseas geologists, no less), 600 scientific papers, 30,000 cardboard coffee-cups, half a million sheets of cyclostyling. But numbers, regrettably, are not in themselves proof of success at a scientific conference. Quality, though harder to measure, is not less significant than quantity, and there are indefinables that deserve consideration. Were the papers relevant and stimulating, provoking vigorous discussion? Were physical arrangements convenient? Did geologists in fact go home glad that they hadn't missed it?

Certainly some did, but I suspect not enough. Having a large share of the responsibility for the geology section, I am conveniently placed for being critical, and believe that quite a lot of Section C's programme was uninspiring, and the physical arrangements were well short of perfection. But I attribute both these deficiencies quite largely to the ANZAAS system itself, which requires a programme that tries to be simultaneously interdisciplinary and specialized, and encourages participation of many more people than the available facilities or organising manpower can cope with adequately.

### Ideals vs. Reality

The stated objectives of ANZAAS Congresses include, and indeed emphasize, the bringing together of scientists of all kinds, including such groups as economists, historians, pharmacists, and architects. Interdisciplinary discussions, public lectures, exhibitions, and demonstrations are intended as a major, or the major, part of each Congress, and are perfectly appropriate to an "advancement of science" association. But the objectives also include "specialized scientific discussion", and if ANZAAS 1968 is any guide, most geologists clearly regard ANZAAS as primarily - almost exclusively - for this purpose. Although various "interdisciplinary" topics were widely canvassed in the early stages of programme planning, they failed almost entirely to attract support from potential contributors, and nearly all the 80-odd geological papers offered were strongly specialist in character. Not surprisingly, few non-geologists were to be seen at the various Section C meetings, and conversely few geologists attended non-geological sessions, with a handful of particular exceptions. Indeed, a surprisingly large number of geologists attended the Congress just long enough to hear one or two sessions devoted to papers in their own special field.

### Bucking the system

If geologists want ANZAAS Section C to be another gathering for specialized geological discussion, as it seems most do, why then can't they have it? The answer is that to a large extent they can, but while the present system lasts, only under highly unsatisfactory conditions. Contracting out of most of the "interdisciplinary" aspects of ANZAAS is reasonably simple for a section's organizers, especially if they are fairly thick-skinned, but they are left organizing their specialist conference - a hard enough task in itself - in intense competition for rooms and for facilities of every kind with many other groups of scientists. Times of sessions and breaks, arrangements for meetings, accommodation, and transport - all these have to be fitted in to the relatively inflexible overall Grand Plan. With maximum goodwill and efficiency on all sides, any individual section's freedom of choice is nevertheless greatly restricted, and the resulting physical inconveniences reduce heavily the likelihood that a stimulating, informative, and enjoyable conference can be arranged.

### Whither?

What then are the alternatives?

A. To blunder on as before, with the real possibility that the system will eventually collapse under its own weight. This would seem to me to be a pity, as we would lose the only real opportunity there is for substantial numbers of New Zealand geologists to make personal contact, even at long intervals, with a substantial group of their Australian colleagues.

B. To abandon the "specialized scientific discussion" objective, and to organize ANZAAS as an almost exclusively interdisciplinary and "science for the people" Congress. For any hope of reasonable success the great majority of prepared contributions would need to be by



direct invitation, closely directed as to topic, and available for general study in advance of presentation.

C. To subdivide ANZAAS into groups of related disciplines e.g. the earth sciences, each group meeting independently, in a different city and / or over a different period from that of other groups. Even this may not hold the number wishing to participate down to a desirable maximum, and I would personally strongly advocate, both for this reason of size and for its own sake, that the topics for consideration at any one conference be further limited. Detailed presentation and thorough discussion of relatively few topics - especially controversial ones - is almost invariably more fruitful for all concerned than brief dabbings in many fields.

The idea is currently being canvassed that ANZAAS Congresses be held in New Zealand about twice as frequently in future - i.e. every five years. I firmly believe that, at least from a geological viewpoint, they should be abandoned forthwith in their present form, but that with substantial reorganization they could give a welcome boost to trans-Tasman geological contact and co-operation.

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## NOTES FROM DEPARTMENT OF GEOLOGY, UNIVERSITY OF CANTERBURY

### ANZAAS

Since the last report, the Department of Geology has been involved with some of the organisation of the January 1968 ANZAAS Congress held at the University of Canterbury. According to Mr. G. Warren (N.Z.G.S.), the Section C Secretary, there were about 200 participating and visiting geologists contributing about 70 lectures in Section C.

The President of Section C was Professor David A. Brown, Department of Geology, School of General Studies, Australian National University, Canberra, and Chairman was Professor M. Gage of this department.

It is not possible to mention too many names but a record must be made of the visit of Professor F.W. Shotton, F.R.S., Department of Geology, Birmingham, England, who visited the meeting as a "Prestige Commonwealth Fellow".

As far as the Department of Geology staff are concerned, the ANZAAS meeting went off well and we are looking forward to the next one.

### Students

Ph.D. - Mr. P.A. Maxwell, N.Z.G.S. Paleontologist, is preparing a thesis on some New Zealand Cenozoic Mollusca.

- Mr. G. Warren, N.Z.G.S. Geologist, is preparing a thesis on a comparison of the late Cretaceous and late Cenozoic depositional environments in the Waiapu-Oaro area, North Canterbury.

M.Sc. - Mr. R.H. Hoskins is studying the planktonic Foraminiferida from the Paleocene - Eocene of the Middle Waipara River section.

#### Addition to Staff

Mrs. J.K. Campbell has joined the staff as a temporary Assistant Lecturer.

#### Visitors to the Department

Mr. I. Campbell, Western Mining Corporation, Perth, (February 1968). Professor J.N. Jennings, Australian National University (March-April 1968).

D. Graham Jenkins.

### NEW ZEALAND UPPER CRETACEOUS AND CENOZOIC STAGES

It is proposed to hold a symposium on the above subject in the Department of Geology, University of Canterbury, during August 1968. Contributions dealing with the present status, validity and workability of the Stages, justification for the New Zealand Stages, the relationships of New Zealand and European Stages and any related topic will be welcomed. Publication of a symposium volume is being considered.

A preliminary circular introducing the symposium will be distributed as soon as possible.

Enquiries should be addressed to:

Mr. P.A. Maxwell,  
Convener,  
"Symposium on N.Z. Stages",  
Department of Geology,  
University of Canterbury,  
Private Bag,  
CHRISTCHURCH. N.Z.



## NEWS FROM N.Z. GEOLOGICAL SURVEY, AUCKLAND

The annual migration from office to field got away to a good start toward the end of 1967 and the continuing good weather has favoured the many field projects currently under way. This season's most notable expedition by Skinner, Waterhouse and Kermode included a survey of the Mercury Islands off the east coast of Coromandel Peninsula and the Motukawao Group in Hauraki Gulf. This 10 day trip was made by courtesy of R.N.Z.N.V.R. 'Ngapona' and landings were made on the main islands in both groups.

The 1 mile mapping projects continue and at least 3 sheets are nearing completion. Latest reports are that Bob Hay (N7, Doubtless Bay) has nearly finished; Fred Bowen (N8, Whangaroa) N11, Kerikeri) has about  $\frac{1}{4}$  done; Jim Schofield (N43, Ponui) N48, Maungatawhiri) about 1/5th done; Bruce Thompson (N76, Rotorua) virtually finished; Barry Waterhouse (N51, Onewhero) about 2/3 done; and Dave Skinner (N33 and 36, Colville; N39, Moehau; N40, Coromandel) nearly finished. By way of a change from Coromandel where he did both his M.Sc. and Ph.D. theses, Dr. Skinner is preparing for another trip to Antarctica next season where he will be working in the Terra Nova Bay area.

With the exception of water supplies, there has been a welcome respite since Christmas from the usual spate of servicing jobs that crop up about this time of the year. Our work for N.Z. Steel Ltd, which occupied us almost continuously for 18 months, is now finished, as are the initial investigations for the Kapuni gas line, and copper at Coppermine Island. The economic projects that remain are limestone resources (Te Kuiti, L.O. Kermode; South Auckland, B.C. Waterhouse); coast sands (J.C. Schofield); geochemical prospecting (D.N.B. Skinner); nuclear power station, Kaipara Harbour (B.N. Thompson); miscellaneous copper, Northland (F.E. Bowen); city and county lithological map series (L.O. Kermode), and International Hydrologic Decade projects (B.C. Waterhouse and D.R. Petty).

B.C. Waterhouse.

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## NEWS FROM N.Z. GEOLOGICAL SURVEY, ROTORUA

Bill Crafer has been very busy making regular visits to local hot water wells and plotting lake level and rainfall records in an effort to produce some regional information on bedrock and groundwater conditions. Fluctuations in hot spring and geyser activity will also be correlated with rainfall records. He has also made ground temperature surveys at several localities where renewed activity or faulty installations have caused heating up of the ground in developed areas. Bill has completed relocation of our bench marks around Lake Tarawera, and work around the other lakes is in progress. Measurements of lake surface levels from these marks will indicate regional tilt movements.

Ted Lloyd and Bill have also been making periodic visits to Crater Lake, Ruapehu, to observe general conditions, record water temperatures, and take samples for chemical analysis. They have lately been engaged in installing flumes at Waimangu to measure the temperatures and flows from Frying Pan Lakelet and Inferno Crater. These will ultimately be monitored by automatic recorders.

Ted has also been involved in regular visits to White Island, in co-operation with Victoria University of Wellington, to observe the increased activity that has occurred during March. In addition he is engaged in long-term projects to measure the heat outputs of about 550 hot springs at Whakarewarewa, and in research into historic eruptions at Raoul Island together with recording and plotting of information supplied periodically by C.A.A. staff stationed on the island.

Don Rishworth has been dealing with a number of miscellaneous quarry problems, particularly in the Te Puke area and also at Matata and Tokoroa, and has been co-operating with Ministry of Works Hydrological Branch, Hamilton, in a detailed investigation of the Otutira Catchment in Western Bay, Lake Taupo. At present regular and frequent visits to Broadlands Geothermal Field are required to log the drill holes and correlate these with previous holes. This project has become urgent with the decision to produce a combined D.S.I.R. report for the consideration of the Power Planning Committee at their meeting in June. It seems quite possible, at this stage, that Broadlands may become a much larger producer than Wairakei; perhaps the largest in the world for some time.

Bruce Thompson came down for ten days' field work in Sheet N75. Don accompanied him for a week in the neighbourhood of Lake Rotorua and Haparangi, and later scrambled up the northern end of Horohoro Bluffs to lay the ghost of Marshall's ignimbrite hypothesis in this locality. The bluffs are rhyolite, as Grange and others have suspected.

We also conducted tours 02 and 06 of ANZAAS around Waimangu and Earthquake Flat and Jim Healy took them on a grand tour of Rotoiti, Kawerau, Matahina Dam, Matata and Otamarakau. Most people seemed to enjoy these tours although very few of them were geologists. There ought to be a moral - perhaps Ted and Don and Jim would be better employed in Tourist Department or maybe ANZAAS ought to sign up more touring geologists?

We had visits from Sompong Sriphvak from Thailand who toured the area with Don and Les Kermode, and from Dr. O. Gonzalez of University of Chile on his way back from the Antarctic. At present we have Mr. Gi Young Nahm from South Korea who is studying geothermal investigation techniques.

As most of you will know, Jim Healy is now away in Chile until about the end of June. Most of Jim's time recently has been devoted to the detailed investigation of Broadlands Geothermal Field and he has produced a detailed report on the structure and stratigraphy of the field, which has revealed several hitherto unsuspected features. Communication with Jim at present is very difficult as airmail appears to take some 10 to 12 days to reach Santiago and an unknown time to travel nearly 1,000 miles to El Tatio thereafter. At El Tatio, which is at an altitude of 13,800 feet, he is at present investigating hot springs and related phenomena while ensconced in a small caravan with jeep and arctic model sleeping bag. Conditions appear to be very primitive, to say the least, and it seems that administratively it takes tremendous patience and organization to get such a project into operation in these circumstances.

D. Rishworth.

## NEWS FROM N.Z. GEOLOGICAL SURVEY, LOWER HUTT

### Recent Staff Changes

Two recent resignations are those of Dr. J.J. Reed and Mr. R.S. Freeman who have both left to take up positions with the Planet Group of Exploration Companies in Sydney. New appointments are Mr. A.G. Beu to the Paleontology Section from Victoria University, and Mr. D. Clyma and Mr. N.W. Orr to the Petrology Section as technical trainees. Dr. R.P. Suggate will later in the year move to Lower Hutt from Christchurch and will continue to be in general charge of work on regional mapping; he will also look after the curating of the Survey's considerable library of New Zealand and overseas maps.

### Office Re-Shuffle

At present many of the staff at Lower Hutt are preparing to move to new quarters, and over the next few weeks there will be a good deal of migrating from one part of the building to another - a process that will no doubt temporarily cause some mystification to visitors to the building, and possibly also to some of us. The changes proposed have resulted largely from our obtaining additional space on the first and fourth floors (the latter following the recent removal of Mr. Webb's cartographic section to D.S.I.R. Head Office in Wellington). The main changes are that the office and administrative staff will move to the first floor from their present quarters on the second floor, the Petrology Section will expand into part of the space vacated by the office, and the area vacated by Mr. Webb's section will be taken over partly for offices (Dr. Suggate, Dr. Katz and Mr. Lensen) and partly for a map and air-photo library and the ancillary services - draughting facilities and stereo-viewers - associated with them.

### The Electron Probe

Undoubtedly one of the most important developments during the last few months has been the purchase of an Associated Electrical Industries electron probe. This magnificent (and expensive) piece of equipment, manufactured in England, was installed in the Petrology Section by AEI engineers after having been on display at the Wellington Trades Fair. Over the past five months it has operated very satisfactorily, with few teething and servicing problems.

The probe provides the only methods of analysing all the elements from boron to uranium in very small volumes - as small as one micron cubed - of mineral or other material. It can thus be used for identifying and analysing extremely small mineral grains or inclusions within grains and in tracing changes in chemical composition across single zoned crystals, thus providing information not otherwise obtainable. Besides its uses in mineralogy, it has very important applications in subjects as diverse as metallurgy and biology. Noteworthy mineralogical results so far obtained with the Lower Hutt probe have been the location of a possibly new zinc-bearing mineral in gabbro from the Longwood Intrusives, Southland, and the identification of minute opaque grains associated with pyrite and other sulphides in one of the drill-holes at the Broadlands geothermal field.

The potential application of the probe to problems of economic importance has been kept in mind. It is probably not exaggerating to state that the considerable cost of the instrument could be recovered to the country by a single observation in a critical field such as metallurgy. Since the purchase of a probe was first mooted it was always intended that one located at the Survey should be available for workers at other Government institutions, the universities, and private organisations such as the N.Z. Steel Company. Consequently Dr. Challis, who has been in

charge of the operation of the probe, has been very busy with enquiries from as far afield as Auckland and Dunedin and has been able to provide answers to analytical problems which otherwise would possibly have remained unanswered or at least solved only with great difficulty.

### Publications

Besides the usual flow of papers intended for publication in the N.Z. Journal of Geology and Geophysics, bulletins recently sent to the Editor, D.S.I.R. Head Office, include the following:

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|--------------------|--|
| Bull. 36           | Murchison Subdivision, by H.E. Fyfe (edited by R.P. Suggate)     |
| Bull. 82           | Cook Islands, by B.L. Wood and R.F. Hay.                         |
| Bull. 83           | Chatham Islands, by R.F. Hay, A.R. Mutch and W.A. Watters.       |
| Bull. 84           | Chemical Analyses of New Zealand Igneous Rocks, by G.A. Challis. |
| Bull. 85           | Orakeikorako, by E.F. Lloyd.                                     |
| Information Series | Westland Glaciers, by W. Sara.                                   |

W.A. Watters.

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### NEWS FROM N.Z. GEOLOGICAL SURVEY, GREYMOUTH

The Greymouth District Office is the oldest, smallest, and most isolated branch of the Geological Survey - in fact it is the only office of the D.S.I.R. on the West Coast. The present staff is W.A. Sara (Senior Technical Officer), M.G. Laird (on leave), and S. Nathan (Geologists), and J.T. Foster (Technician). Over the last eighteen months we have lost D.J. Young and R.G. Adamson to Australian mining companies, and R.I. McPherson has been transferred to the Dunedin office.

### Glaciology

Since 1951 regular measurements and photographs have been taken of the terminal face of the Franz Josef Glacier, and more recently the Fox Glacier has also been included. This and other work is summarised and discussed in a paper "Franz Josef Glacier, 1951-1966" by Bill Sara which is in press, and a D.S.I.R. Information Series Bulletin on the West Coast Glaciers is now being edited. At the time of writing the glaciers seem to have ceased their rapid 1965-66 advance and are slowly melting back in the hot summer sun.

### Economic and Engineering Work

With a large and complex bituminous coalfield on our doorstep coal geology has always been an important part of the work done by this office, although with the present advanced geological knowledge most of the day to day servicing work for both the Greymouth and Westport Coalfields is now undertaken by the State Coal Mines. All working mines on the West Coast and Nelson have been regularly sampled over the years by Bill Sara, and he is now occupied with a complete round of run-of-mine slack samples for the South Island. With the advent of the Coal Research Association routine sampling will be taken out of our hands, and the Geological Survey will then only be concerned with specialised sampling of particular areas.



At the moment the only other work connected with coal is a closer look at the more inaccessible parts of the Inangahua Coalfield, mainly as a more detailed part of regional mapping in the area.

For the last two years Roger McPherson has been working on the ilmenite-bearing beach-sands near Westport. Studies have included detailed late Pleistocene interglacial stratigraphy, petrographic and chemical analyses, and calculation of inferred reserves. A bulletin is in press, and the economic sections of this have already been published as NZGS Report 21.

As the Buller River is the only large undammed river in New Zealand, the M.O.W. have recently been casting covetous eyes westwards. Before he left, Bob Adamson prepared geological reports on two favoured sites. Preliminary drilling is to start soon, and the Geological Survey will obviously be called on more and more as work proceeds. Another major engineering geology job was the final stretch of Paringa-Haast road between the Whakapohai River and Ship Creek. Don Young was responsible for this, and a paper describing some of the complicated problems is in press. The stratigraphy is no less complex. During the 4-mile mapping what had always been thought to be a normal West Coast Arnold-Landon sequence was shown to contain Dannevirke limestone at the top. Recently Simon Nathan has been re-examining the road exposures, now washed clean, and the nearby coastal strip in the hope of tidying up the Tertiary Stratigraphy. There is now good macro and microfossil as well as microfloral evidence to show that there is a complete upper Cretaceous to Palaeocene sequence although there are still a few loose ends to be fitted in. Anyone interested in examining the magnificent roadside exposures of the almost vertical Tertiary sequence is advised to do so within the next 18 months before they become overgrown.

#### Regional Mapping

Malcolm Laird returns later this year to complete Sheet S37 (Punakaiki). Already published on this area is a paper on the field relations of the Charleston Gneiss and the Greenland Group, and another paper "The Paparoa Tectonic Zone" is in press. Simon Nathan spent the summer in Westport mapping Sheets S30 (Charleston) and S31 (Buller) which include almost everything found on the West Coast from the Charleston Gneiss to late Pleistocene glacial and interglacial sequences. Before he left Don Young had partly completed the Greymouth Sheet (S44) and this is being worked on as time permits, in the hope that Greymouth may be the first of the towns and cities in New Zealand containing a geological institution to have its own published geological map.

Simon Nathan.

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## ACTIVITIES IN MARINE GEOLOGY, NEW ZEALAND OCEANOGRAPHIC INSTITUTE

Two new tools have recently been added to the equipment of the New Zealand Oceanographic Institute which will have a marked influence on future operations in marine geology. One, a new coring system, produces 3 in. diameter piston cores in plastic liners, a great improvement compared with the old coring outfit. The increase in diameter and consequent greater length of core produced will enable better analysis of sedimentary structures using photographic and radiological techniques. It will also provide opportunity to measure the sediments remanent magnetisation which is becoming an important stratigraphic tool. The other instrument which has become operational only in the last few months after frustrating times of development and testing is the reflection profiler which provides continuous profiles of sub-bottom stratification down to a depth of several hundred metres (approx.  $\frac{1}{2}$  sec).

With these new tools it will become possible to study in great detail the Quaternary and Tertiary, and in some cases even the Mesozoic, history of bottom processes in shelf and deep sea environment. This forms a welcome addition to the techniques in use so far which were mainly a charting of ocean bottom features, of the earth's total magnetic intensity (in close co-operation with the Geophysical Survey) and of the distribution of bottom surface sediments. Interpretation of these last parameters however has led so far to new insights in the positioning of New Zealand with relation to the surrounding sea floor and the South West Pacific structure. A great number of bathymetric charts in the 1:1,000,000 series, forming the background for these interpretations, are in the process of printing or have already appeared. They give a fairly accurate definition of the morphology of the New Zealand region (a compilation of these sheets on a scale 1:6,000,000 rolled off the press earlier this year). Interpretation of large and small scale submarine features in terms of structural evolution has been one of the main topics of interest as testified by the number of papers produced in this field. Admittedly a fair amount of speculation is included in these analyses due to sparseness of information but certainly they defined the areas with interesting problems which deserve closer scrutiny applying both old and new techniques.

The interest in South West Pacific structure, which is anomalous and unique in many respects, has been demonstrated last year by an increase of American research activities in the area. Institute's staff participated in both the NOVA expedition of Scripps Institute of Oceanography and in the global cruise of the U.S. Coast and Geodetic Survey ship OCEANOGRAPHER. Geophysical observations carried out during both cruises provided substantial background for N.Z.O.I.'s current work.

Another aspect of the geologists' activities was taking stock of sediment distribution in the nearshore environment as well as taxonomic studies of micro-fauna and their areal distribution. Studies in these fields resulted amongst others in the preparation and publication of a number of sediment charts (1:200,000 coastal series).

Some past and recent investigations have resulted in more detailed exploration by overseas firms of offshore deposits of minerals of possible economic interest on the Chatham Rise and prospecting for heavy minerals can be expected in the near future on the shelf off Nelson and Otago.

Accommodation for staff has greatly improved in the last few years and better facilities have become available for analytical work and storage of samples.

W.J.M. van der Linden.

## NOTES FROM GEOPHYSICS DIVISION, D.S.I.R.

Recent and present work which may be of interest to solid earth scientists is as follows:-

Geothermal Exploration

The past two summers have seen an intensive geophysical investigation of the Broadlands field, one of about five hot areas of comparable size to Wairakei revealed by the 1800ft spacing electrical survey between Tokaanu and Waiotapu. All the Geophysical Survey resources were brought to bear on this problem including electrical, electromagnetic, gravity, magnetic, seismic, physical properties of cores and metre probe and shot-hole temperature surveys. The results continue to suggest that in general the hot water occurs as a vertical pipe of roughly circular shape with very sharp temperature gradients at the boundary. Initial publication will be as a report compiled by Peter Macdonald but a later Bulletin on the Broadlands Field is planned.

Deeper investigations to trace the vertical extent of the pipe are in progress. Successful orthodox resistivity measurements using overhead power lines, and dipole - dipole sounding have already been made. During the winter naturally occurring telluric potentials will be measured and in the spring a programme of transient decay experiments is planned. Thus four independent electrical techniques will be used in this study which will probably result in the Broadlands area being the most intensively surveyed area anywhere by electrical methods. The last named experiment above will be supervised by Dr. G.V. Keller of Colorado School of Mines, the western world's foremost authority on electrical exploration and we hope he will be able to help us with the co-ordination and interpretation of all the results. Dr. Keller will be with the division for six months as a Senior Research Fellow.

Pacific Islands and S.W. Pacific

The publication of a large number of papers on geophysical measurements in this region in the two special Pacific issues of the N.Z. Journal of Geology and Geophysics brings together a vast amount of work carried out as the logistic opportunities offered during the past ten years. Manfred Hochstein provided the push that brought all the results together.

Seismicity of New Zealand

During 1967 the seismograph network was extended by the addition of two stations in the north of the country, at Cape Reinga and at Great Barrier Island. The location of earthquake epicentres by computer has resulted in a better quality of the determined positions and a larger number of epicentres located. R.M. Hamilton and A.W. Gale have published (Journal of Geophysical Research) a new survey of the seismicity of the North Island based on the computer-determined epicentres from the much improved network of the past few years. The new study shows that the deeper earthquakes are limited to a slab-like volume, about 50 km thick, that dips westward and downward from the eastern edge of the North Island.

The earthquake swarm near Taupo in 1964-5 is being studied in detail and the course of the earthquakes in space and time is being determined for the swarm. Historical studies of early New Zealand earthquakes are continuing and an annotated list of all known earthquakes of note up to 1965 prepared by George Eiby is coming out in N.Z. Journal of Geology and Geophysics.

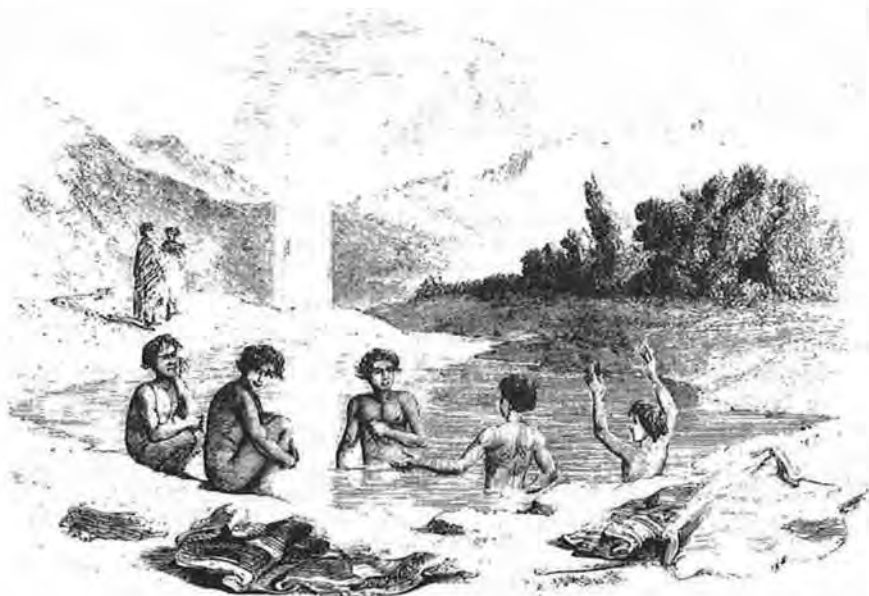
Gravity Maps

No gravity maps have been published during the past year as the complete programming

through the Elliott computer has only just been completed. The maps will be drawn by the computer too which, as it has no geological knowledge, will not "weight" the anomalies. (Do I hear G.S. men saying that the computer probably has more geological knowledge than the geophysicists?). However, the maps should be coming out faster than the speed of light next year.

Altogether, during 1967-68, 27 papers on solid-earth geophysics were published by Geophysics Division scientists, present and immediate past. In the special Pacific issues the N.Z. Journal of Geology and Geophysics showed parity of numbers between these two branches of earth science for the first time. Though the geophysicists are exhausted after that effort we hope we will have a higher ratio of the publications in the future than we have in the past.

Trevor Hatherton.



#### GEO THERMAL INVESTIGATIONS

(The Geysers of Orakorako from "Te Ika a Maui, or New Zealand and its Inhabitants" by Richard Taylor, 1855.)

## NEW ZEALAND SOCIETY FOR EARTHQUAKE ENGINEERING

The initial meeting of this new society sponsored by the New Zealand Institution of Engineers was held in Wellington on 8 April 1968.

Earthquake engineering is an art which relies upon the contributions made by people of many disciplines and occupations and the Society will afford the opportunity for a free exchange of ideas. Membership will not be restricted to members of the N.Z. Institution of Engineers, although the Society is affiliated to that body; indeed, the rules ensure that the management of the Society will be in the hands of engineers, scientists, architects and insurance interests, from all of whom membership is solicited.

One of the principal activities of the Society will be the dissemination of the most recent information available from within New Zealand and from overseas, and arrangements have been made for the publication of a bi-monthly bulletin distributed free to members. The bulletin will feature original articles of scientific and engineering interest with emphasis on the practical aspects of earthquake engineering and related topics in architecture. Material now being assembled includes contributions from eminent overseas authorities as well as papers by local authors. The first issue is scheduled for June 1968.

The Society proposes to operate a technical advice service for members, and this service will also be available to local or other authorities and associations.

Numerous bodies have conducted seminars in New Zealand related to earthquake engineering. The object of the Society will be to participate in and co-ordinate these activities where possible.

The Society will encourage research aimed to produce results of practical significance in the earthquake engineering field and will publish in its bulletin, research reports from domestic and foreign sources.

The rules of the Society provide for close collaboration with the New Zealand National Committee for Earthquake Engineering and through it with the International Association.

Substantial financial assistance from the Earthquake and War Damage Commission has been assured. Nevertheless, the strength and vigour of the Society will depend on a large active membership and all people interested in earthquakes and earthquake phenomena are urged to join. The annual subscription is \$5.00, and applications forms can be obtained from:

The Secretary,  
The N.Z. Institution of Engineers,  
P.O. Box 5036,  
WELLINGTON.

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## GEOLOGICAL SOCIETY OF NEW ZEALAND (INC.)

The 13th Annual General Meeting of the Society will be held in the Easterfield Building, Victoria University of Wellington (Council room, 6th floor) at 3.30 p.m., on Thursday, 16 May, 1968.

AGENDA

1. Apologies
2. Confirmation of Minutes of the 1967 Annual General Meeting.  
Matters arising.
3. Presentation and adoption of the Annual Report and Balance Sheet.
4. Election of Officers and Committee.
5. The following notices of motion have been received.

That the incoming Committee be asked to set up a sub-committee to examine the present constitution of the Society particularly with regard to the present rules for membership, and make recommendations for such changes as it deems to be desirable.

D.G. Jenkins.

6. That clause 12 (d) of the Society's Rules be replaced by the following clause:- 12 (d) A capitation fee to cover running expenses of Sections shall be paid annually to Secretaries of Sections by the Society, the amount of such payment to each Section to be calculated on the basis of 15 cents per capita of the membership of each Section or such additional amount as the Committee of the Society from time to time shall decide.

J.A. Grant-Mackie.

7. GENERAL BUSINESS.

D. Graham Jenkins,  
(SECRETARY)

Two seminars on new developments in geology have been arranged to precede the Annual General Meeting:

- 1.15 p.m. - Mr. G.H. Scott, on "Overseas developments in the use of computers in geology", and  
Dr. I.G. Speden on "The New Zealand Fossil Record File: its future?"
- 2.15 p.m. - Dr. G.A. Challis will talk on what can be done with an electron probe.

Afternoon tea will be served from 3.00 to 3.30 p.m.



## GEOLOGICAL SOCIETY OF NEW ZEALAND (INC.)

Annual Report for the Year ended 31 March 1968, to be presented at the Thirteenth Annual General Meeting at Wellington on 16 May 1968.

COMMITTEE: The Officers and Committee elected at the Twelfth Annual General Meeting at Hamilton on 12 May, 1967 were:

PRESIDENT: Dr. N. de B. Hornibrook (Lower Hutt)

VICE-PRESIDENT: Professor J. Bradley (Wellington)

SECRETARY: Dr. D.G. Jenkins (Geology Department, University of Canterbury, Christchurch).

TREASURER: Mr. Guyon Warren (N.Z. Geological Survey, P.O. Box 1471, Christchurch).

COMMITTEE: Professor J.D. Campbell (Dunedin)  
Mr. D.R. Gregg (Christchurch)  
Dr. J.J. Reed (Lower Hutt)  
Mr. J.C. Schofield (Otara)  
Dr. I.G. Speden (Lower Hutt)

AUDITOR: Mr. D.T. Daly

Additional Committee Members:

PAST PRESIDENT: Professor R.N. Brothers (Auckland)

REPRESENTATIVE ON  
THE R.S.N.Z. MEMBER  
BODIES COMMITTEE: Dr. G.R. Stevens (Lower Hutt)

EDITOR: Dr. W.A. Watters (resigned January 1968)

ACTING EDITOR: Mr. D.R. Gregg

The Committee met 3 times.

## MEMBERSHIP

The number of members at 31 March 1968 was 330, a net increase of 22 since 31 March 1967. It has subsequently been necessary, in accordance with Rule 3(c), to remove 6 names from the list of members.

## FINANCE

The year's accounts include several large amounts that have not appeared before - a \$100 donation to the R.S.N.Z. Building Fund, expenditure of \$96 on hospitality to overseas visitors at ANZAAS, and \$66 for travelling expenses to committee meetings. These extra expenses have been offset to some extent by a surplus of \$49 from the Hamilton conference (due largely to unexpectedly reduced excursion costs), \$23 from sales of the "Guide to Stratigraphic Nomenclature", and by reduced costs or greater receipts in most other accounts. The net result has been a reduction of the balance in the Accumulated Fund by \$97, leaving a credit of \$199.

## SUB-COMMITTEES

Mining Legislation Sub-committee: As it was known that a revision of the existing mining legislation was under consideration by the Mines Department, the Committee, in May 1967, requested Dr. R.P. Suggate to convene a sub-committee to "consider the geological aspects of mining legislation in New Zealand with a view to making recommendations which the Society might forward to the Mines Department concerning the proposed new legislation." The sub-committee members were: Messrs. A.C. Beck, J.C. Braithwaite, W.F. Heinz, J.M. Hope and Drs. D.G. Jenkins, D. Kear, R.P. Suggate (convener).

A report embodying eleven recommendations was forwarded to the Under-Secretary of Mines on 20 September. In general the recommendations were aimed at (1) simplifying the number and type of prospecting licence; (2) reducing delay in granting prospecting warrants where several authorities are involved; (3) better assessment of prospects by applicants for prospecting warrants; (4) ensuring that holding of a prospecting warrant be contingent on satisfactory compliance with the obligations of the warrant; (5) ensuring that transference of a prospecting warrant carries the full obligations of the previous holder; (6) institution of a delay period in availability of surrendered warrants or leases to prevent continuous holding; (7) availability of large areas for short term geochemical or geophysical prospecting; (8) certain types of prospecting in National Parks without prior approval of administering authorities; (9) payment of bounties on specified initial amounts of commercial production in a new mining field; (10) abolition of district warden's courts and substitution of a single wardens' court in Wellington or of jurisdiction by the Mines Department; (11) a time limit of three months for the Minister's decision on mining privileges recommended by the warden.

At the invitation of the Mines Department, Dr. Suggate and Dr. Hornibrook met Mr. E. Higgins in Wellington on 11 October and discussed the Society's recommendations. Although details of the proposed revision of the Act are necessarily confidential, both Drs. Suggate and Hornibrook were satisfied that many of the suggested points are likely to be satisfactorily met. It was also requested that the Society have the opportunity to study the draft legislation when it is in a more advanced form.

Greywacke Sub-committee: In response to a request by Dr. R.W. Willett at the Annual General Meeting in Hamilton the committee asked Dr. J.J. Reed to convene a sub-committee to "examine the use of the term 'greywacke' in New Zealand". Dr. Reed, after circularising the Geological Survey and the Universities, co-opted Dr. P.F. Ballance and Mr. C.A. Landis to a sub-committee

which has submitted a report which will be published in the Newsletter.

Fossil Record Data Retrieval Sub-committee: In response to a letter by Mr. G.H. Scott requesting that the Society consider adopting the computerising of the New Zealand Fossil Record System as a national project, the committee requested Dr. I.G. Speden to convene a sub-committee, including Professor P. Vella, Professor J.D. Campbell, and Dr. D.G. Jenkins and Mr. J.A. Grant-Mackie, to report on the project. A one-day meeting was held in Wellington in December and a provisional report was approved as a basis for discussion.

The McKay Hammer Award Sub-committee: has recommended that the McKay Hammer for the two previous calendar years be awarded to Dr. J.P. Kennett, Allan Hancock Foundation, University of Southern California, Los Angeles, for contributions to micropaleontology and stratigraphy of the Upper Tertiary of New Zealand published in 7 papers from January 1966 to October 1967.

#### THE SOCIETY'S FIRST CONFERENCE

The first National Conference of the Society was held at the University of Waikato, Hamilton, 10-15 May, 1967, and proved highly successful. It was attended by 101 members and an additional 30 undergraduate students.

The Society is indebted to Dr. D.R. Llewellyn, Vice Chancellor of the University, for making the excellent meeting rooms and facilities available for the conference, and both Mr. James R. Day and Mr. M.J. Selby were of great assistance with the arrangements for the meetings and field trips.

The organisation of the conference was initiated by Professor R.N. Brothers, and later carried out by a sub-committee comprising Messrs. J.C. Schofield (Chairman), J.A. Grant-Mackie (Secretary-treasurer), B.N. Thompson and L.O. Kermode.

The University Halls of residence in which it was planned to accommodate most of the participants were unfortunately not completed in time, and most were booked into hotels. Buses between the University and the hotels were arranged in the morning and evening.

The conference was opened with addresses by the Mayor of Hamilton, Dr. D. Rogers, (who is also the Chancellor of the University of Waikato), and by Dr. Llewellyn.

Thirty two papers were presented covering a wide range of subjects including geochemistry, stratigraphy, paleoecology and paleoclimatology, paleontology, volcanism, pedology, tectonics, and Quaternary history.

Several field excursions were conducted to examine Quaternary deposits, soils and geomorphology of the Hamilton basin, the Waikato Coalfield, and greywacke quarries, and a post Conference field trip to the Jurassic at Kawhia was led by Mr. Grant-Mackie.

A most enjoyable sherry party was held in the Students' Cafeteria during one evening, and a public address was delivered by Dr. D. Kear on the Geological History of the Waikato on another evening.

The Annual General Meeting of the Society was held at the University on the evening of 14 May.



Fuller details about the conference are given in the Society's Newsletter No. 23 for July 1967.

### NEWSLETTER

Dr. W.A. Watters resigned as Editor on 23 January, 1968, and the Society is deeply indebted to him for producing the newsletter so competently over the past 8 years.

Mr. D.R. Gregg took over as Acting-Editor in January 1968.

### SECTION MEETINGS

The Auckland Section (Secretary, Dr. P.F. Ballance) held 5 meetings:

- (1) 14 July 1967. Prof. A.R. Lillie on "Aspects of the geology of New Caledonia." At this meeting Mr. J.A. Grant-Mackie was appointed chairman, and Dr. P.F. Ballance secretary, of the Section for the ensuing year.
- (2) 4 August 1967. Dr. P.F. Ballance on "The Mawson 'Tillite' of Antarctica - glacial or non-glacial?"
- (3) 25 August 1967. Dr. D.F. Squires on "Recent advances in knowledge of N.Z. fossil and recent corals."
- (4) 8 September 1967. Mr. J.C. Schofield discussed his recently issued 4-mile map, Auckland, Sheet 3.
- (5) 22 September 1967. Mr. L.W. Wright on "The northern Kaipara: some denudation chronology problems". And Mr. T.R. Healy on "Shore platforms, primarily in the Auckland area." Both speakers were at that time members of the Auckland University Geography Department.

Meetings are usually well attended. There are approaching 50 names on our mailing list, plus students.

The Christchurch Section (Secretary, Dr. J.D. Bradshaw) held 2 meetings:

"Lower Paleozoic Plankton" by Professor O.M.B. Bulman.

"Continental Drift" by Dr. R.S. Dietz.

The Dunedin Section (Secretary, C.A. Landis) held 15 meetings:

Mr. R.J. Ryburn - The geology of the Upper Beardmore Glacier area, Antarctica.

Dr. W.A. Hodgson - Metastable carbonates and concretionary rocks.

Messrs. I.C. McKellar and B.L. Wood - Discussion of new geologic maps: Sheets 24 and 25 - Dunedin and Invercargill.

Professor S. Banno (University of Tokyo) - Sambagawa Metamorphic Belt of Japan.

- Dr. J. Aronson (California Institute of Technology) - Geochronology of New Zealand metamorphic and plutonic rocks.
- Mr. D.G. Bishop - The geometric relationships of certain structural features associated with major strike-slip faults in New Zealand.
- Professor Z.P. Bowen (University of Rochester) - Paleoenvironmental study of the Upper Devonian Sonyea Group, New York State.
- Dr. J.L. Talbot (University of Adelaide) - Interaction of basement and Adelaide System rocks during Paleozoic orogeny.
- Mr. A.F. Cooper - Wales and the Welsh borderlands during Lower Paleozoic time.
- Dr. R.S. Dietz (E.S.S.A.) - Astroblemes.
- Geology Department, University of Otago - Third Year Students - Project Reports.
- Mr. J.H. Lowery - Mineragraphy of the Waitahuna River copper ore body.
- Mr. C.A. Landis - Metamorphism of Upper Permian rocks of the South Island.
- Mrs. J.K. Campbell - The Alpine and Akatore Faults: a comparative study of Pleistocene chronology and Kaikoura orogenesis in southwest Nelson and southeast Otago.
- Mr. L. Harvey - A look at deep drilling.

A new Section of the Society was formed in Hamilton in May 1967 and is known as the Waikato Section.

In Wellington, meetings of geological interest are organised by the Geology Section of the Wellington Branch of the Royal Society of New Zealand.

#### ROYAL SOCIETY OF NEW ZEALAND

##### MEMBER BODIES' COMMITTEE

Dr. G.R. Stevens has represented the Society on this Committee. Action by the Member Bodies' Committee has, amongst other things, resulted in:

- (a) establishment of a Royal Society Newsletter, to be distributed amongst Member Bodies;
- (b) setting up of Royal Society Centennial Awards for secondary school science, to stimulate and encourage original scientific work and to recognize scientific achievement in New Zealand secondary schools;
- (c) appointment of a committee to study the application of science to New Zealand industry;

- (d) a proposal to the Council of the Royal Society to incorporate the name "science" in the proposed name for the Royal Society's headquarters, e.g. "Royal Society Science Centre."

The N.Z. Ecological Society, acting through the Member Bodies' Committee, has asked the Royal Society to reconvene its Conservation Committee (disbanded some years ago). It is anticipated that the Geological Society will be asked to nominate a representative to serve on such a Committee if it is established.

The N.Z. Archaeological Association, Institute of Fuel, and N.Z. Microbiological Society have been accepted as Member Bodies of the Royal Society.

#### R.S.N.Z. OFFICERS

The following members of the Geological Society are actively concerned in Royal Society:

- |          |  |
|----------|--|
| 1966-67: | Dr. C.A. Fleming (Home Secretary)  |
|          | Professor M. Gage (Canterbury Branch Representative on the M.B.C. and a Fellows' Councillor, National Committee for Geology) |
|          | Dr. R.W. Willett (Fellows' Councillor, National Committee for Geology)   |
|          | Dr. N. de B. Hornibrook (National Committee for Geology; Chairman, Centennial Membership Appeal Committee, Wellington)       |
|          | Dr. R.P. Suggate (National Committee for Geology)  |
|          | Prof. H.W. Wellman (National Committee for Geology)  |
|          | Dr. D. Kear (National Committee for Geology; Convener, National Committee Water Resources)                                   |
|          | Dr. T. Hatherton (National Committee for Geology)  |
|          | Prof. J.D. Campbell (National Committee for Geology)   |
| 1968-69: | Mr. D.R. Gregg (Canterbury Branch Representative on the M.B.C.)  |

#### FELLOWSHIPS

Three nominations for R.S.N.Z. Fellowships were forwarded to the R.S.N.Z.

#### UNESCO

Dr. N. de B. Hornibrook (President) and Dr. D. Graham Jenkins (Secretary) attended the National Commission for UNESCO Conference of Co-operating Bodies at Wellington on 30 October, 1967. As far as the Society is concerned it was established at the meeting that in future the National Commission will seek the advice of the Society on geological problems. This was confirmed in a letter from Miss Krystyna D. Kolydyska, dated 8 November, 1967.



"I confirm what I said to you and Dr. Hornibrook - i.e. that when appropriate, the National Commission will refer to the Society and seek its advice on any geological projects that may be included in UNESCO's programme. All co-operating bodies of the National Commission have equal status and their duties and responsibilities are referred to in the Commission's Constitution, a copy of which I enclose."

Mr. D.R. Gregg was appointed the Society's representative on the National Commission for Unesco's Sub-commission on Natural Sciences for the next 3 years (1968-70).

#### SUPPLEMENT TO STRATIGRAPHIC LEXICON

An index of new stratigraphic names and new usages of old names was completed in February 1968. This comprises approximately 1,330 entries.

The names were allocated to their respective authors in early March and it is hoped to have the completed entries ready for editing by late October 1968.

#### PRESERVATION OF GEOLOGICAL SITES

(a) Oamaru: The Minister of Lands approved the reservation of Hutchinson's Quarry and Target Gully Shell Pit as geological reserves vested in the Borough of Oamaru on 28 July, 1967.

(b) Cape Turakirae: In response to a letter from the President, the Commissioner for Crown Lands replied that although no specific progress had been made, the preservation of the marine terraces was under negotiation.

#### ANZAAS 40TH CONGRESS, CHRISTCHURCH 24-31 JANUARY, 1968

The Society was invited in 1966 by the Organising Committee to nominate a Secretary for Section C (Geology), and prevailed on Mr Guyon Warren to accept the post. About 2750 scientists registered for the seven main days of meetings and excursions, and about 80 earth science papers were presented in the various sections. Thirteen excursions, ranging from half to 6 days, were arranged by the geology section.

The Society held an evening function following the first day's sessions of the Congress on 25 January 1968. Dr. N. de B. Hornibrook delivered the Society's Presidential Address on "A new look at the record and purpose of the Geological Society", and the members and guests then adjourned to an excellent buffet supper with suitable refreshments, arranged for the Society by Mr. J.K. Hill, at which about 80 overseas visitors were the guests of the Society.

During the Congress it was announced that Dr. C.A. Fleming is to be the next President of ANZAAS.

#### ROYAL SOCIETY CENTENNIAL APPEAL

It is gratifying to note that in the Wellington district, where the appeal to members was organised on a member body basis, the Geological Society, made the best response with 60 per cent of its members having returned donations as at November, 1967. Information from other centres is not available for comparison.

8 April 1968

N. de B. HORNIBROOK, PRESIDENT.

D. GRAHAM JENKINS, SECRETARY.

# GEOLOGICAL SOCIETY OF NEW ZEALAND (INC.)

## RECEIPTS and PAYMENTS ACCOUNT for Year ended 31/3/68

### RECEIPTS

|   | 1967           |
|---|----------------|
| Balance 1/4/67 - cash at bank           | 429.73         |
| Subscriptions                           | 275.95         |
| Receipts for "Transactions"             | 69.30          |
| Interest                                | 10.42          |
| Surplus from Hamilton Conference        | 49.37          |
| Sales of "Guide to Strat. Nomenclature" | 22.70          |
| ANZAAS supper receipts                  | 224.75         |
|   | <u>1082.22</u> |

### PAYMENTS

|                                       | 1967           |
|---------------------------------------|----------------|
| Royal Society - annual contribution   | 20.00          |
| - travelling quota                    | 4.49           |
| - "Transactions"                      | 69.00          |
|                                       | <u>93.49</u>   |
| Stationery and postage                | 32.00          |
| Printing                              | 163.72         |
| Audit fee                             | 4.25           |
| "Transactions" postage                | 23.08          |
| Donation to RSNZ Building Fund appeal | 101.00         |
| Committee travelling expenses         | 66.05          |
| ANZAAS Supper                         | 320.38         |
| Miscellaneous                         | 2.99           |
| Balance 31/3/68 - cash at bank        | <u>219.46</u>  |
|                                       | <u>1082.22</u> |

## INCOME and EXPENDITURE ACCOUNT for Year ended 31/3/68

### EXPENDITURE

|                                       | 1967          |
|---------------------------------------|---------------|
| Royal Society - annual contribution   | 20.00         |
| - travelling quota                    | 4.49          |
| Audit fee                             | 4.25          |
| Stationery and postage                | 32.00         |
| Printing (Less provision 1966-67)     | 163.72        |
| Cost of "Transactions"                | 10.58         |
| Donation to RSNZ Building Fund appeal | 101.00        |
| Committee travelling expenses         | 66.05         |
| ANZAAS supper - net cost              | 95.63         |
| Miscellaneous                         | <u>2.99</u>   |
|                                       | <u>500.71</u> |

### INCOME

|   | 1967          |
|---|---------------|
| Subscriptions                           | 330.00        |
| Add bad debt recovered                  | <u>2.00</u>   |
|   | <u>332.00</u> |
| Deduct bad debts written off            | <u>11.00</u>  |
| 31/3/68                                 | <u>321.00</u> |
| Interest                                | 10.42         |
| Sales of "Guide to Strat. Nomenclature" | 22.70         |
| Surplus from Hamilton conference        | 49.37         |
| Excess of expenditure over income       | <u>97.22</u>  |
|   | <u>500.71</u> |

## BALANCE SHEET at 31/3/68

### LIABILITIES

|                                      | 1967          |
|--------------------------------------|---------------|
| Subscriptions in advance             | 57.95         |
| "Transactions" payment outstanding   | 2.00          |
| Provision for delayed Newsletter     | -             |
| Accumulated Fund:                    |               |
| Balance at 1/4/67                    | 296.57        |
| Deduct excess of expend. over income | <u>97.22</u>  |
|                                      | <u>199.35</u> |
|                                      | <u>259.30</u> |

### ASSETS

|  | 1967          |
|--|---------------|
| Cash at Bank of New South Wales, Christchurch  | 219.26        |
| Subscriptions and "Trans." payments in Arrears | 40.04         |
|  | <u>259.30</u> |

### CERTIFICATE

I have audited the accounts and vouchers of the Geological Society of New Zealand (Inc.) for the year ended 31 March 1968, and in my opinion the accounts and Balance Sheet show correctly the affairs of the Society as at that date.

Nelson, N.Z.  
8 April, 1968.

(Signed) D.J. Daly, A.P.A.N.Z.  
Auditor.

Guyon Warren

Honorary Treasurer

## A NEW LOOK AT THE RECORD AND FUNCTION OF THE GEOLOGICAL SOCIETY OF NEW ZEALAND

by N. de B. Hornibrook  
N.Z. Geological Survey, Lower Hutt

A Presidential Address delivered to the Society at  
ANZAAS, Christchurch, on 25 January, 1968.

I feel an obligation, at the outset of this address, to make an act of penance. Penance is defined by my dictionary as "external acts performed to manifest sorrow for sin, to seek to atone for the sin and to accept the punishment which, even after the guilt has been remitted, may still remain due to the offence".

As to the nature of my sin, it has been revealed publicly by B.W. Collins in his article "The Mystery of the Missing Asterisk and other notes on the History of the Society" (Geol. Soc. N.Z. Newsletter No. 19.)

He writes (P.4), "With the ground thus cleared it seemed that the way was open for the formation of a Geological Society, which could then, once established, seek affiliation with the Royal Society. The Committee drew up a set of rules, and at the 11th N.Z.G.S. Staff conference at Kaikoura in May 1955 I called another meeting of geologists.

"It is interesting to note that most of the few (including a University Professor and a well known micropaleontologist) who in the early stages opposed the formation of the society, on the grounds that it was unnecessary and would only divert the attention of geologists from productive to unproductive work, have since become active members, serving on its committees and sub-committees.

It is useless to deny, of course, that I was the apparently "well known" micropaleontologist. The identity of the University Professor is, however, a more serious matter retained on the Society's confidential files possibly to be revealed on some more appropriate occasion.

My atonement for my original sin will be to offer you an expression of my conviction that the Society has come a long way in the last 12 years and that it has been doing a worth-while job. I would also like to offer you my own thoughts on the way in which it is likely to develop and the activities in which it could best serve New Zealand geologists.

I will begin by asking the question "Has the Society received the full support of New Zealand geologists?"

### Annual Figures for Membership and Income

| 19-        | '56 | '57 | '58 | '59 | '60 | '61 | '62 | '63 | '64 | '65 | '66 | '67 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Membership | 100 | 178 | 160 | 190 | 200 | 220 | 240 | 255 | 268 | 285 | 280 | 300 |
| Income £'s | 12½ | 22  | 20  | 24  | 25  | 33  | 120 | 130 | 134 | 140 | 140 | 150 |

The answer is quite certainly Yes. Its membership has grown steadily from the initial 100 members in 1955 to over 300 in 1968. There have been some fluctuations in membership but

they have not had any real effect on its continuous long term growth. The Society counts nearly every professional geologist in New Zealand and many amateurs also as members.

The breakdown of the membership as at May, 1967, reveals some interesting, and to me, surprising factors.

| Professionally concerned with Geology<br>(including administratively) |     | Amateur         | Students | Total |
|---|-----|-----------------|----------|-------|
| <u>New Zealand</u>  |     | <u>Overseas</u> |          |       |
| States Services (N.Z. Geol. Surv.                                     | 56  |                 |          |       |
| (others   | 34  |                 |          |       |
| Universities  | 32  |                 |          |       |
| Retired   | 7   |                 |          |       |
| Others  | 8   |                 |          |       |
|   | 137 | 80              | 78       | 14    |
|   |     |                 |          | 309   |

The number of 78 amateur members is surprisingly high, and that of 14 students is surprisingly low. Since the majority of our amateur members have probably never attended a meeting or conference of the Society I can only surmise that they find the Newsletter of sufficient interest to continue as members.

The figure of 80 overseas members indicates to me that many expatriates look to the Society's Newsletter to keep them in contact with activities at home.

Let us next examine the objects of the Society as framed in its constitution and enquire whether or not they have been fulfilled.

The first is "To serve as a means of facilitating communication among members". I consider that the words "and co-operation" should be added. The third is "To serve as a channel of expression for the views of New Zealand geologists" and they can be considered together.

Both of these objectives have been well fulfilled by means of the Newsletter, the annual meetings, and by the activities of the local sections. The Society has, through the activities of various sub-committees, investigated and reported upon the views of New Zealand geologists on stratigraphic nomenclature, it is currently seeking out views on the use of the controversial term "greywacke", and last year it transmitted recommendations for the revision of the Mines Act to the Mines Department.

I consider that one of the Society's most useful objectives has been achieved through the Newsletter which has a role quite independent of the journals which publish scientific papers. If one looks back over the past several years one finds a record of comment and news reports on meetings and congresses, of progress of the International Sub-committee of Stratigraphic Nomenclature. In short, the Newsletter has served a most valuable purpose in keeping the membership abreast of both local and international geological matters. I consider that we should increase its scope and size by giving more space to reports of International Conferences and news and to decisions of international bodies such as the I.U.G.S. We should all be prepared to actively contribute lively and informative comment and reviews.

The second objective of the Society is "to foster investigations in the various fields of earth science". To my knowledge this objective has not been achieved and the Society has never taken



any initiative along these lines. I feel that this is because this objective is impractical and it would be better reframed to read "to investigate and report on matters of general interest to New Zealand geologists".

The fourth objective is "to organize an annual conference". This has definitely not been fulfilled since the Society has usually held its annual meeting during the Geological Survey's annual conference. The national conference at the University of the Waikato in Hamilton, last year, was the first which the Society could be said to have held in effect, and I am very dubious as to the present possibility of an annual national conference. I feel the objective would be better reframed "to hold conferences, and meetings of local sections" without specifying how often they should be held.

The fifth objective is "to participate in Royal Society of New Zealand Science Congresses". The efforts of the Society's nominee, Mr. Guyon Warren, in organizing the geology section of the present congress as its secretary, and our attendance at the present gathering, I feel, speaks for itself.

The sixth is "to seek such affiliations with other societies as may seem desirable". We have sought and gained member body status within the Royal Society of New Zealand following several years of pressing for affiliation in face of an unsympathetic response. Last year the Society became a co-operating body affiliated to the UNESCO National Commission for New Zealand and nominated Mr. D.R. Gregg as its representative to the Sub-commission on Natural Sciences.

But, in looking back over what the Society has achieved, I note that there are two areas in which it has done worthwhile things which are outside the scope of its stated objectives.

The first was the establishment in 1957 of the annual McKay Hammer Award for the most meritorious published contribution to the geology of New Zealand and its dependencies during the previous year.

I consider that this award has been of definite value in providing an element of competition to encourage not only publication, but publication of a high standard. It is only fitting that we should have a means of giving recognition to outstanding contributions to our science, and there could be no more apt symbol to invoke the warm-hearted response of geologists than an engraved hammer.

I consider that the objective for which I believe it was established, "to encourage and give recognition to high standards of geological research in New Zealand" should be stated as one of our objectives. I would also like to feel that geology should be liberally interpreted in this context to include geophysics.

The second area in which the Society has been instrumental in bringing about action is a most important one. It is "the preservation of unique geological sites", which I also feel should be one of our objectives.

As early as 1957 the Newsletter carried reports of efforts of the Society to prevent indiscriminate quarrying of the Auckland extinct volcanoes and in 1965 the reservation of the Branch River and Maruia River faulted terraces was gazetted, being the first real success the Society had achieved in preserving a geological site. Nevertheless the initiative came mainly from a particular member rather than the Society as such. The Waiohine faulted terraces were acquired by the Lands and Survey Department last year in the Society's name. As a result of an approach by

the Society to the Oamaru Borough Council in 1966. Hutchinson's Quarry and Target Gully have been gazetted as geological reserves and have attracted a surprising amount of interest from press and radio.

However, in spite of repeated requests to members to supply details of unique geological sites liable to destruction the response has been poor. Yet our success in Oamaru and the helpful response we are at present receiving regarding the preservation of another site at present under action is due very much to a sympathetic climate of opinion in official quarters. We have only ourselves to blame if we do not press our case.

From my own experience I have found that local bodies and landowners take considerable pride in unique geological sites when their significance is made clear to them. I believe that there is a great source of goodwill which is at present untapped because we geologists are not informing the local people of the features worth preserving. We need to put more thought and effort into defining our sites and informing the local landowners and authorities of their value.

The categories most urgently requiring protection are young fault scarps and coastal terraces providing evidence of recent movement and deformation. Other categories such as young volcanic cones, unique rock types, type localities and fossil beds also require attention.

I feel that we may make more progress in this field by asking particular members or local sections to take on the responsibility of preparing schedules of local features liable to destruction, on a regional basis. The Society could then follow up with an approach to the appropriate local body or landowner. Such documented schedules would also be of great help to geologists in the state services who are often asked for advice in land planning and development schemes.

The existing laws governing the preservation of sites are not of much practical help. It is possible for a freehold landowner to create a private historic reserve and place an area under the protection of the Reserves and Domains Act but this has no guarantee of permanence as it can be revoked by the owner. The most essential element in any practical form of preservation is the goodwill of the landowner and it is at this point that the Society could make its most valuable contact.

Geological reservations are probably better not vested in the Society's name, however, but in the name of the appropriate local body which has the means and responsibility for weed control in the district. The Society could be embarrassed by having the responsibility for many acres of land covered in weeds or gorse with which it lacked the resources to deal.

The Society is also likely in the future to have to face up to the necessity of making a convincing case to mineral clubs for preservation of unique outcrops.

Are there any other stated objectives the Society should have? Yes, I believe there is one. It is to encourage high standards of publication media for geology in New Zealand and of expeditious channels of publication.

I avoided the word 'provide' in relation to publication advisedly as I seriously doubt whether the Society should consider running its own journal at this point. I feel that at the moment our needs could be well enough served by the Transactions of the Royal Society of N.Z., the N.Z. Journal of Geology and Geophysics, the New Zealand Journal of Marine and Freshwater Sciences, and now we even have the Waikato Geological Society's Earth Sciences Journal. It is probably inevitable that the Society will publish its own journal in time, but I feel that we should



not undertake yet another journal for run-of-the-mill papers without very careful consideration as to whether by simply duplicating existing publishing facilities we are making the most effective and imaginative effort of which we are capable.

### The future of the Society

In attempting to foresee the future development of the Geological Society's activities and influence in New Zealand Science one must look at it realistically in relation to the established sphere of influence of the Royal Society which is accepted by Government and by overseas bodies as the premier scientific society able to speak for New Zealand Science.

The organisation of the Royal Society is now in two parts: the Council, in the hands of the Fellows, carrying the responsibility for the major part of the Society's functions, and the Member Bodies Committee consisting of representatives of each of the 19 Member Bodies, including the Geological Society.

The Stated function of the Member Bodies Committee is "To provide liaison between the member bodies and other scientific bodies and generally to promote the advancement of science in New Zealand", but it remains to be seen how this new body will develop for it has virtually no finance of its own and only a minor voice on council. Nevertheless I am certain that it would be extremely short-sighted to underestimate the increasing influence that the specialist member bodies must have because they represent the very roots of enthusiasm and vitality in New Zealand Science.

The Council appoints National Committees to represent the various sciences and all geological matters are referred to the National Committee for Geological Sciences.

Its objectives are in part:

- (a) to co-ordinate and promote research in the Geological Sciences in New Zealand;
- (b) to act as the New Zealand channel of communications with the International Union of Geological Sciences and other international and national organisations;
- (c) to make recommendations to Council on matters relating to the Geological Sciences;
- (d) to undertake enquiries or investigation as requested by Council.

Its membership comprises 8 members appointed by Council having regard to representation of University, Government, and other organisations in New Zealand active in the fields served by the Committee.

The position being what it is, it seems only realistic to me that any effective influence the Geological Society is likely to have on the integration of geology in the general sphere of science in N.Z. will have to be exercised through the Royal Society.

In my opinion the most useful independent role the Geological Society can play is to get New Zealand geologists to work together for the common interest in a non-partisan spirit. It would be idle to pretend that we geologists see all aspects of our geological activities in a detached non-partisan manner.

At present about half the professional geologists are employed by the Geological Survey, the other half by the Universities. We all know perfectly well that many issues in science can become political, not only between institutions, but also between different schools of thought. Healthy rivalry is good, but too easily it can descend to hole-in-the-corner sniping by rival groups who need to be brought together to talk around the same table in a co-operative spirit.

The Geological Society has already led the way in bringing a new spirit of co-operation among N.Z. geologists with its sub-committees on stratigraphic nomenclature, greywacke terminology, and the fossil record data retrieval project. I earnestly believe that this is the most valuable contribution the Society has to make to New Zealand geologists in the immediate future.

There are many aspects of N.Z. geology which, in my experience, have benefitted through strong leadership and positive action, and I believe this will always be the case. Nevertheless, there are changes, from time to time, in the balance of things, especially with the increase in numbers of specialists in the Universities over the past 10 years. The desirability of unilateral action in matters of national geological classifications has declined and the need has increased for greater all round consultation to achieve mutually acceptable decisions. I am even hopeful that the time is not distant when we may be able to consider working groups to tackle specific problems as they are doing in Europe.

#### Conferences and their problems

I consider that there are already certain trends apparent which are going to have a predictable effect on the future of this Society.

One of the principal activities of interest to geologists, especially those engaged in a professional capacity, is the opportunity to meet together at conferences. Since there are very few qualified geologists in New Zealand who do not practice in a professional capacity, the numbers who can attend such conferences depends heavily on the financial support they receive from the two main employers: the State Services and the Universities.

Now as the accommodation and travel costs of the 80 to 100 geologists who usually attend the annual conferences amounts to a considerable sum of money, the employing institutions have to be satisfied that they are worth the investment. This means that to receive official support, conferences must provide good professional papers, well organised field excursions for the professional geologist and, possibly most important of all, the most fertile conditions for professional geologists to meet and discuss their problems at a personal level.

Now it is obvious from our past experience that the size of such conferences must not be allowed to grow too large or they lose much of their effectiveness, and the task of organising them becomes unduly burdensome. As the numbers increase the venue of the conferences becomes more and more determined by the amount of accommodation available and this works against their success which is greatest in smaller centres. Furthermore, it is not possible to conduct effective field excursions with large numbers. These problems have been increasingly felt by the Geological Survey in organising its annual conferences over the past 20 years and whether the Survey or the Society is running a particular conference the problem is likely to be the same.

A possible answer to the increasing numbers could be for the Society to hold smaller specialist conferences devoted to particular topics, but this does not solve the problem of organising at least one annual meeting representative of geologists in general.

The time has come when the Geological Society must hold its Annual General Meetings independently of the New Zealand Geological Survey's annual conferences. I do not believe that the time has yet come when it should hold an annual conference of its own, but it might well alternate with the Geological Survey or hold a triennial conference which does not take place in the same year as a Science Congress, holding its A.G.M.s in one of the main centres in intervening years.

We have always had a small but faithful band of amateur members of the society who have become familiar faces at our annual gatherings, and we have come to regard them as old friends whom we welcome each year. So far their numbers have been so small that they had added little to the problems of organisation.

Yet, as the numbers of both professional geologists and amateurs grow in the future I see the present problems of national conferences being correspondingly magnified, and I foresee that if they are not deliberately restricted in size by the Society then they will be restricted by the reluctance of employing institutions to send a full representation of their staffs and by declining interest of professional geologists.

In short, I fear we may foresee some form of conference which is restricted in size primarily to the numbers of professional geologists who can effectively benefit from it.

It is hard to see how a growing amateur participation could be reconciled with this situation and I foresee, with regret, that conferences may have difficulty in making full provision for the amateur geologists to whom we extend so cordial a welcome at present, should their numbers substantially increase.

Furthermore, I foresee that the Society's role as a Member Body within the new organisation of the Royal Society of New Zealand and its position as the only organisation representing professional geologists in New Zealand could lead increasingly to concern with matters primarily of interest to the professional geologist.

The amateur geologist is already being catered for by a number of highly popular mineral clubs, and the Waikato Geological Society and the Wairarapa Geological Society are examples of thriving local groups with enthusiastic amateur support. Adult education courses, often conducted by staff from both the Universities and the State Services are providing valuable and appreciated extension courses, including both lectures and field meetings, to large numbers of people interested at the amateur level. The Geological Society has, in fact, never made an effort to enter this field.

It would be unrealistic, however, not to foresee the possibility of growing divergence in aims and outlook between the Geological Society and the activities of some amateur mineral collectors whose enthusiasm for rock hunting has threatened wholesale removal of outcrops. So far it is mainly the minerals and semi-precious rocks that have been their objectives, but fossils are likely to come in for an increasing share of attention. I think the following extract from the Canterbury Mineral and Lapidary Club Journal 3 (1): 5, June 1967, is very significant:

"Field Trip No. 13 - May 13th, 1967. Barbecue  
and Fossil Hunt ... Lower Waipara Gorge.

"Our finds were very good. We collected many specimens of barnacle encrusted oyster shells, giant cockles with interesting markings and remarkable preservation of colour, whelks, volutas, olives, and overgrown pipi shells.



Downstream, many people managed to find oysters and a few brachiopods. The day ended with a side trip to Amberley Beach, where one "hawk-eye" spotted three good pieces of petrified wood. This proves rockhounds are just beginning their march of discovery in 'Canterbury'."

In short, I foresee that an increasing divergence in the interests of professional and amateur geologists who are being catered for increasingly by other clubs, together with the need for the Society to cater effectively for the needs of the professional geologist, in the interests of its own survival, is likely to lead to a decreasing amateur support.

If my assessment of present trends is correct then the time is approaching when the Geological Society should consider more carefully whether or not it has an obligation to the growing number of amateur enthusiasts, who now number several hundreds, and if so, how that obligation should be met.

I consider that we should give every encouragement to independent amateur groups while being aware of the increasing need to maintain contact with them and keep them informed of the scientific value of particular geological localities.

### Conclusion

The Geological Society of New Zealand, born 12 years ago in a back room in the Adelphi Hotel at Kaikoura, is no longer a half-a-crown-a-year baby. It has grown up rapidly and has now come of age when it can take its place among the scientific societies of this country.

If it is to do this adequately, however, and provide a worthy representation for geology among the other sciences, it must be able to draw upon a membership which is interested and informed about general scientific matters in New Zealand, and especially about the activities of the Royal Society. It must continue to move forward by promoting active co-operation among New Zealand geologists and it must assume a more independent role from the activities of the Geological Survey.

To achieve these objectives its committee and sub-committees or working groups must be able to meet sufficiently often throughout the year to deal with the increasing business of the Society whose effectiveness is distinctly limited at present by insufficient and irregular contact of its officers.

I therefore consider that the time has come when the annual subscription should be reviewed in the light of the increasing expense in bringing the Society's officers together to transact its affairs.

Every organisation needs to take a hard look at itself from time to time and to ask itself where it is going. I said at the outset that I would give you my own personal views, and whatever their shortcomings, I can only hope that they will provoke thought and response, and above all, stimulate interest in our Society which a certain "well-known" but rather short-sighted micro-paleontologist once thought would direct the efforts of the geologists from productive to non-productive effort.

## INTERNATIONAL COMMISSION ON STRATIGRAPHY

## Circular 19

This circular contains comments on G. Cohee's "Draft Report on Lithostratigraphic Units" as presented in Circular 18, February 1967; notes on the meeting of the International Commission on Stratigraphy in Berne, May 1967, mainly brief statements of the activities of the seven sub-commissions and three committees of the commission; and two lists of references to 'Published Literature on Stratigraphic Classification and Terminology' - a) References published in Russian 1950 - 1965; b) Additional references 1961 - 67. The last includes the papers of the following New Zealand geologists - Allan, Gage, Scott, Vella and Waterhouse.

Copies of the lists of references can be prepared on request for individuals and institutions.

I.G. Speden,  
N.Z. Geological Survey, Lower Hutt.

15th January, 1968.





## SLIDES TO ILLUSTRATE LECTURES

Compiled by B. N. Thompson, N.Z. Geological Survey, Papatoetoe.

Roughly 90% of papers presented at geological conferences are illustrated by slides. As the presentation of many papers is keyed to slides, the success of the talk depends largely upon the use of clear illustrations projected without interruption. Conversely poor quality slides projected in a haphazard fashion can ruin a good paper.

The following factors affect the legibility of slides (Saxby, et al., 1954: pp. 192-3).

- (a) Letters too small and too thin
- (b) Too much written material
- (c) Unsatisfactory film
- (d) Screen too small for size of hall
- (e) Poor black-out conditions
- (f) Poor eyesight of viewer.

The lecturer has no control over (d) (e) and (f), and, if he does not make his own slides, of (c), but he has control over (a) and (b). Numerous experiments have been conducted on line height and thickness, size of screen for length and breadth of the hall, and the wattage of the projector lamp. The following recommendations represent the majority view.

#### Preparation of Diagrams

- (1) Keep your diagrams simple - one idea, one slide.
- (2) Avoid typewritten tables and text.
- (3) Use jet black (Indian ink) lines free from ragged edges or use coloured felt tips on good grade, white paper.
- (4) Capital letters are preferred to capitals mixed with lower case.
- (5) Use bold, clear lettering in height  $1/20$ th the length of the shorter side of the frame.
- (6) Line thickness not less than  $1/6$ th the letter height.
- (7) Space lines at least equal to the height of the tallest letter.
- (8) Line thickness for graphs
 

|            |  |
|------------|--|
| Curves     | $1/100 - 1/200$ of short side of frame |
| Axes       | $1/150 - 1/300$ of short side of frame |
| Grid lines | $1/200 - 1/400$ of short side of frame |
- (9) Vertical sans-serif type produces clear letters.
- (10) Remember the sides of the frame are in the ratio of 3:2.

- (11) Test your original diagram for legibility by standing at a distance equal to 9 times its longer side, e.g. a foolscap diagram (13 in. x 8 in.) from  $9 \times 13$  in. = 117 in. or about 10 ft away. If you can read the text and see the lines then the audience will read it easily.

### Slides and their projection

- (1) Use positive, black on white, on high contrast document film with a clear base; or colour transparencies.
- (2) Use full frame (1 in. x  $1\frac{1}{2}$  in.) not half frame (1 in. x  $\frac{3}{4}$  in.), for, unless special arrangements are made for projection, half frame slides will only fill half the screen area.
- (3) Mount all your slides in one type of mount, so that the sandwiches are of one thickness. This helps in maintaining focus, as the thickness of the mount determines the position of the film, plane in the projector.
- (4) Avoid plastic mounts as they are notorious for slipping out of boxes and off benches on to the floor.
- (5) Mark all slides with a large spot in the bottom left hand corner of the slide facing the viewer when the slide is viewed with the image upright.
- (6) Number each slide consecutively for this talk, preferably just to the left of the spot when the spot is positioned in the top right corner of the projector gate. Or else provide the projectionist with a list of slide numbers arranged in order of projection.
- (7) If your cardboard mounts have much extraneous information on them, it is worthwhile remounting and renumbering them for each new lecture. Card mounts cost about 2c each.
- (8) Present your slides to the projectionist in a box opening upwards, not sideways, as slides can fall out very easily.
- (9) Stack them in order with the first slide nearest to the projectionists, or on top of the stack.
- (10) Spend not less than 10-20 seconds talking about the slide, as this eases the pressure on the projectionist, who is trying to change the slides and keep them in focus.
- (11) To you, next to the screen, the image may be fuzzy, but to the projectionist 30 ft or so away, it is sharp. Unless the lines on your diagrams are clean and sharp, or the projectionist is supplied with binoculars, it is difficult to focus poor diagrams accurately.
- (12) Before your talk, arrange with the projectionist the signals to be used for changing slides and for focussing. Some projectors are so noisy that the operator cannot hear your pleas.

### Acknowledgments

The assistance of Mr. F. Puch, Auckland Industrial Development Division D.S.I.R., Mr. P.J. Gallaher, Fertiliser Manufacturers' Research Association, Otara, and Mr. L.O. Kermode, New Zealand Geological Society, Otara, who supplied information and helpful discussion, is gratefully acknowledged.

### Reference

- SAXBY, S.H., SCOTT, R.H., AVERIS, M.W., 1954: Legibility of Lantern Slides.  
N.Z.J. Sci. Tech. 36: 191-200.