NEWSLETTER

GEOLOGICAL SOCIETY OF NEW ZEALAND

No. 16 JULY 1964

NEWSLETTER

GEOLOGICAL SOCIETY OF NEW ZEALAND

Member Body of the Royal Society of New Zealand

o. 16 July 19

CONTENTS

contd.

NINTH ANNUAL GENERAL MEETING

The Ninth Annual General Meeting of the Society was held in the R.S.A. Hall, Takaka, on Thursday, 14 May 1964, at 8 p.m. There were about 90 members present and the President, Mr J. Healy, was in the chair.

The Annual Report and Financial Statement circulated to members was adopted. Mr Healy reported that the negotiations for the preservation of examples of faulted river terraces had been transferred from the N.Z. Historic Places Trust to the Nature Conservation Council. The Financial Statement for the year ended 31 March 1964 showed a total income of £142 and an excess of income over expenditure of £18. The Society has assets of £176.

The amendments to Rule 6, as circulated to members with the notice of meeting, were passed. The amended rules will be printed and distributed to members.

The following were elected for 1964-65:

President	:	Mr J. Healy
Vice-President	:	Professor R.N. Brothers
Secretary	:	Mr D.R. Gregg) C/- N.Z. Geological Survey,
Treasurer	:	Mr Guyon Warren) P.O. Box 2110, Christchurch.
Committee	:	Dr P.F. Ballance
		Mr J.D. Campbell
		Dr F.F. Evison
		Dr M. Gage
		Mr B.N. Thompson
Honorary Auditor	:	Mr D.J. Daly

The following are also members of the Committee:

Dr R.P. Suggate (Past-President)
Mr B.W. Collins (Representative on RSNZ Council)
Dr W.A. Watters (Editor, C/- N.Z. Geological Survey, P.O. Box 368, Lower Hutt.)

The McKay Hammer for 1963 was presented to Mr B.L. Wood for his paper "Structure of the Otago Schists".

The proposal to publish addenda to the N.Z. Stratigraphic Lexicon as outlined in Newsletter 15 was discussed. The discussion was in favour of having the addenda in the form of the present Lexicon. Subsequently, at the invitation of the Committee, Dr G.R. Stevens, N.Z. Geological Survey, Lower Hutt, has undertaken to act as compiler-editor. (See p. 6 of this issue.)

Possible geological uses of lottery funds were discussed. Various suggestions were made including the purchase or protection of endangered geological features, deep stratigraphic holes and publication. If any members have specific suggestions, they should submit them to the Secretary with detailed supporting arguments.

Stratigraphic Code

The possible adoption of a New Zealand stratigraphic code was discussed at length. The following statement had been distributed to members at Takaka on the morning of the meeting.

> "The Committee of the Society has discussed the correspondence in the Newsletter and considers that, before the Society should sponsor the adoption of a code, more information should be available concerning the usefulness of such a step. It recommends that the annual general meeting should not at this stage be asked to accept or reject any proposal that would result in a New Zealand code being drawn up.
>
> If such a proposal were adopted, the resultant code might later be rejected by the Society on the grounds that it was no more satisfactory than an existing one - the effort would then be wasted. If a proposal for a code were rejected, geologists as a whole would know neither how strong was the support for the principle of codes in general or a New Zealand code in particular, nor what sorts of problems have faced New Zealand workers when trying to use existing codes.
>
> Because of the comprehensiveness of some other codes, notably the American one, and the amount of thought that has gone into their preparation, any New Zealand code would certainly adopt much that is in others. Where some New Zealand geologists disagree with existing codes, this is commonly in matters that have always been particularly contentious, and unanimity within New Zealand may not even be approached.
>
> It will be moved at the Annual General Meeting that -
>
> > "The Committee of the Society appoint a subcommittee to report on (1) the desire for and desirability of New Zealand adopting a stratigraphic code; (2) suggestions made to it for changes in the particular existing code that the subcommittee thinks the best; (3) the likelihood of general support for any such suggested changes; and (4) the desirability of and means of enforcing a code in New Zealand"."

This motion was passed in spite of a move to have it amended so that the subcommittee would be appointed by the Annual General Meeting.

Mr Healy later announced at the concluding session of the Geological Survey Staff Conference on 18 May, the members of the subcommittee: Mr N. de B. Hornibrook (Chairman), Mr B. W. Collins, Drs M. Gage, D. Kear, P. Vella and J. B. Waterhouse.

- D. R. G.

TRANSACTIONS OF THE ROYAL SOCIETY OF NEW ZEALAND

Members of the Geological Society of New Zealand as members of the Royal Society of New Zealand are entitled to receive the Transactions. Since 1961 the Transactions have been issued in four series: Botany, Zoology, Geology and General. The Geological Society pays the Royal Society a levy of 10/- annually for each member who receives one series of the Transactions. The annual levy for each additional series is 5/-. The General Series and the Proceedings are issued without charge.

The Committee of the Geological Society prefers that members of other member bodies of the Royal Society should continue to obtain their Transactions through these bodies. Other members who require Transactions should write to the Secretary, C/- N. Z. Geological Survey, P. O. Box 2110, Christchurch. Orders are now being taken for the 1965-66 year. The Committee has decided to reduce the charge for postage and packing starting with the 1964-65 year; this was formerly 5/- per year, but will now be 2/6, making the total charges to members 12/6 per year for one series, 17/6 for two series and £1. 2. 6 for three series.

- D. R. G.

Preservation of Geological Features. The Committee of the Society is prepared to submit cases for the preservation or protection of specific geological features or outcrops to the Nature Conservation Council. If members know of geological features sufficiently important to warrant preservation, would they send details to the Secretary (C/- N. Z. Geological Survey, P. O. Box 2110, Christchurch)? A good argument should be put forward for preservation and details of the locality, including exact area involved, land status and ownership, should be submitted.

- D. R. G.

ADDENDA TO NEW ZEALAND STRATIGRAPHIC LEXICON

The New Zealand Stratigraphic Lexicon included stratigraphic names published up to 1957, and also some that were in course of publication at that time. The first stage in the compilation of Addenda will be the indexing of stratigraphic names published since 1957 and the inclusion of names originally omitted from the Lexicon.

The annual New Zealand Geological Abstracts, edited by B. W. Collins, will be of great assistance in the indexing of new names, but the discovery of old names originally omitted, and new usages of old names, is less easy and I would like to take this opportunity to ask Society members for help with this aspect. If you know of any names that have been omitted from the Lexicon, and yet should have been included, I would be most grateful if you could contact me at the Geological Survey, P. O. Box 368, Lower Hutt.

- G. R. Stevens
Editor-Compiler

Old Reprints from Transactions

The Royal Society has in stock some reprints of articles in past volumes of the Transactions (both of the old New Zealand Institute and of the Royal Society). These are available for sale at current rates (12pp. 1/6d; 12-24 pp. 2/6d; additional pages at 1d each). Members are invited to write to the Secretary, RSNZ, C/- Victoria University of Wellington, asking for specific papers (by author, title, and volume number), or if in or visiting Wellington to call at the Society's office. Not all papers are still in stock, of course; and, on the other hand, papers other than on geology are also available. Some complete volumes of the Transactions are still available (for prices see inside back cover of the latest issue of the Proceedings).

Discount on New Zealand Geological Survey Maps

Members of the Geological Society may purchase geological maps from the N. Z. Geological Survey (P. O. Box 368, Lower Hutt) at a discount of 33 1/3%. This is the same discount as that on maps purchased from the Department of Lands and Survey. The discount does not apply to bulletins or other publications.

INTERNATIONAL SYMPOSIUM ON VOLCANOLOGY

The International Association of Volcanology is holding a Symposium in New Zealand in 1965. The Symposium, which is being organized under the auspices of the National Sub-Committee for Volcanology and the N. Z. Geological Survey, will open in Auckland on 22 November 1965 and will end in Wellington on 3 December.

Two special subjects will be discussed:

1. Rhyolites, ignimbrites and pumice, and associated volcanism.

2. Geothermal resources, with emphasis on the origin and geology of hydrothermal systems of possible economic importance, including chemical and geophysical aspects.

During the Symposium there will be field trips to the Auckland basaltic volcanics, and to rhyolites, ignimbrites, volcanic ash, hot springs and geothermal fields of the Taupo Volcanic Zone. Volcanics in other regions will be visited during a pre-sessional tour to the North Auckland peninsula and a post-sessional tour to the South Island; post-sessional tours will also return to the Taupo Volcanic Zone for more detailed inspections of volcanic areas and geothermal fields.

The Symposium will be open to volcanologists and others interested in the subjects being discussed. Participants should make their own travel arrangements to New Zealand, but accommodation and travel arrangements here can be made by the Organizing Committee.

All those interested should contact the Organizing Chairman, P. O. Box 499, ROTORUA, New Zealand, as soon as possible.

"Granite to the geologist is classic ground: from its wide-spread limits, and its beautiful and compact texture, few rocks have been more anciently recognized. Granite has given rise, perhaps, to more discussion concerning its origin than any other formation. We generally see it constituting the fundamental rock, and, however formed, we know it is the deepest layer in the crust of this globe to which man has penetrated. The limit of man's knowledge in any subject possesses a high interest, which is perhaps increased by its close neighbourhood to the realms of imagination."

- Charles Darwin - "The Voyage of the Beagle", entry for December 30th, 1834. (Everyman's Library Edition, 1955, p. 271.)

8TH COMMONWEALTH MINING AND METALLURGICAL CONGRESS

This will be held in Australia and New Zealand from February to April, 1965. The New Zealand technical sessions will be held in Wellington from 7 - 8 April 1965, followed by concurrent North and South Island tours, and a subsequent scenic tour to Fiordland and the Southern Lakes over Easter.

The New Zealand session will take the form of the Mineral Conferences formerly held at the University of Otago. Papers are being requested in the following fields:

(i) Electro-chemical and electro-metallurgical industries
(ii) Coal utilization
(iii) Oil and gas
(iv) Iron and steel
(v) Non-metallic minerals
(vi) Secondary metallurgy

It is hoped to attract to New Zealand an eminent guest speaker, probably in the field of Economic Geology.

One of the Congress Volumes (Vol. IV) "The Economic Geology of New Zealand" is edited by Professor G. J. Williams who is writing the metalliferous section, whilst the Geological Survey is preparing sections on coal, oil and gas, limestones, etc., and the Soil Bureau a chapter on clays.

If any member of the Geological Society of New Zealand has unpublished information which he feels might usefully be included, this would be gladly accepted and acknowledged. Communications should be addressed to the Secretary, A. M. Anderson, Faculty of Technology, University of Otago, P. O. Box 56, Dunedin.

The Canterbury Museum, Christchurch, is at present advertising for an Assistant Keeper or Keeper in Geology. The salary will be dependent upon qualifications and experience but will be within the ranges: Assistant Keeper, £1250 - £1500; Keeper, £1550 - £1800. An apointee to the post of Assistant Keeper will have the opportunity of advancement to the post of Keeper.

Anyone interested in further particulars may obtain them from the Director, Canterbury Museum. Applications should reach the Director not later than 15 August 1964.

AN ANSWER BLOWING IN THE WIND ?

Two Bodies or One to Lead New Zealand Science ?
(Report of Royal Society of New Zealand Annual Meeting)

By B. W. Collins

(GSNZ Representative on the Council of the Royal Society of New Zealand)

As most members will know (especially those who were able to hear Dr C.A. Fleming address the Society at Takaka recently), the future constitution of the Royal Society of New Zealand is very much in the air at present, and in fact has been a major topic of discussion for several years (see Newsletter No. 13, p. 8; No. 14, pp. 5-8). The winds of change have been blowing quite strongly lately and some fresh breezes have turned over a number of leaves. Since all members of the Geological Society are members of the Royal Society by virtue of our affiliation with that body, the subject affects us all.

A special meeting of the RSNZ Council was held on 20 May last to discuss possible changes. Although no details were decided (these being left to the Standing Committee to thrash out and present for the approval of Council and Member Bodies and later the Government), some general principles were adopted with a surprising degree of agreement.

It has become clear in recent years that the Royal Society is dealing with two sorts of matters that can really not be efficiently and adequately dealt with by a single body. These have been labelled the "National Academy functions", and the "Advancement of Science functions". It may be as well to list some of these, so that we know what we are talking about.

Academy Functions

1. Election of Fellows and organisation of their activities.

2. Administration of the Society's awards and distinctions.

3. Responsibility for international relations in science - with ICSU and the International Unions and with other national academies overseas.

4. Communication with and advice to the Government on behalf of the Society.

5. Appointment of Sectional Committees on various branches of science, National Committees for overseas contacts and ad hoc committees for special projects such as IGY and IQSY.

6. Appointment of representatives of the Society on other national organisations (National Parks Board, Dominion Museum, Carter Observatory, etc.).

7. Appointment of delegates to overseas meetings.

8. Administration of the finances and property of the Society and of research grants.

9. Control of the Society's publications and library.

10. Responsibility for the annual report and accounts.

Advancement of Science Functions

1. Promotion of the dissemination of science to the public of New Zealand through the arrangement and encouragement of public lectures, radio programmes, etc., and assisting member bodies in this type of work.

2. Control of arrangements for N. Z. Science Congresses and N. Z. participation in ANZAAS.

3. Appointment of committees or the holding of meetings to further the advancement of science in any general or special field.

4. Serving as a channel for the expression of the opinions of organised groups of scientists on any aspect of New Zealand science, such as proposed legislation or the organisation of and conditions for scientific research in New Zealand.

5. Recommending matters for the consideration of Fellows.

6. Dealing with matters referred to it by Fellows.

It will be seen that, though there is some overlap, in general these two classes of activities are fairly distinct. One of the most important matters for consideration by the recent meeting was whether the RSNZ could be so organised as to cope with both types of activities or whether two separate bodies should be set up. If there were to be two bodies, which should retain the name Royal

Society? Various suggestions had been made - from the extreme view of the Auckland Institute that the RSNZ should consist of Fellows only and that member bodies should become independent of it, to that of some smaller branches that valued highly their association in the RS and thought things should remain much as they are or that the Fellows should split off and form a National Academy independent of the RS. There have been many other intermediate or mutually conflicting suggestions, one being the proposal of Dr C. A. Fleming (Roy. Soc. President 1962-64) for a "two-tiered structure" with an Executive Council (of Fellows only) and a General Council (of Member Body representatives). The relation between the two proposed councils has never been defined and has been a major stumbling block to agreement.

The GSNZ Committee has given much time to discussion of this matter and has offered its own suggestions, which, as it appears at present, have now a good chance of being adopted in the main.

The Council meeting opened in a somewhat turbulent atmosphere (to retain our metaphor), but with less trouble than had been expected adopted almost unanimously the first three principles listed below. Cross currents then flowed freely. (Two bodies or one? Two councils or one?). It was a gust from the south that cut the Gordian knot: Professor J. B. Mackie of Otago proposed that it be built into the new Act that the Society (with a Council of Fellows only) be legally obliged to set up a representative body consisting of representatives from Member Bodies (Branches and affiliated societies), and that this body be given responsibility for the "Advancement of Science functions". This suggestion found general agreement.

So, in the event, a compromise was reached, something like the "two-tiered structure" suggested by Dr Fleming but with an "Advancement of Science" body subordinate to the "Academy" body. A two-tiered arrangement with two bodies of almost equal status would certainly have been difficult to organise and administer.

The following points summarise the general principles adopted. (It must be emphasised that these are only the personal views of the GS representative as to the outcome of the meeting: the minutes have not yet been written, much less confirmed, and I do not envy the RS Secretary her task.)

1. The control of the Royal Society of New Zealand should be in the hands of its Fellows.

2. The Society should continue to provide a link with and between other scientific bodies.

3. The purposes and functions of the Society fall into two classes - generally distinguished as those of a "National Academy of Science" and those connected with the "Advancement of Science".

4. A Council, consisting of Fellows only, should deal with the "Academy" functions.

5. The Society, under its new constitution, should be charged with setting up a committee for the "Advancement of Science" functions, on which member bodies (other scientific societies) shall be represented.

6. There should be no Government Representatives on the new Council (there are at present 4).

7. There should be only one class of member body or affiliated society.

8. Member Bodies should not have to contribute substantially to the Royal Society or be required to devote a certain proportion of their income to any designated object. (At present Member Bodies must spend a third of their income in support of a local museum or library, or contribute 1/6th of their income to the Royal Society. The GSNZ does the latter.) An affiliation fee of say £2 or £5 was suggested.

9. Fellows, Officers and members of the new Council should be nominated by Fellows and by member bodies and elected by Fellows.

10. Member bodies should retain the right to the name Branch of the Royal Society N. Z. and their members the status of members of the RSNZ.

These changes will of course necessitate changes in the Royal Society Act and will take some time (perhaps years) to effect. It is known, however, that the Government is sympathetic to the Society's desire to bring its constitution more into line with those of similar bodies overseas, and would welcome the existence in New Zealand of an organised body of top-rank professional scientists of all disciplines to which it could go for advice (we hope) and which could express (and appear to express) the considered opinions of the best qualified scientists in the country. In its present form (with no legal bar to the inclusion of laymen on its Council) the Society cannot strictly be said to perform these functions - however well, in practice, it has been performing them in the past. By retaining a representative committee (? advisory board, ? federal chamber - the name is not yet decided) for the "Advancement of Science", the RSNZ is avoiding a break with its long tradition of democratic organisation and its association with its branches. (See Dr C. A. Fleming's Presidential address to the RS, 1963; published in Proc. Roy. Soc. N. Z. 91:89-100, April 1964.) It seems reasonable in a small country like New Zealand and in view of our history that one learned society, with the appropriate organ (Council and committees), can do the work that in most other countries is done by two. (Australia, the National Academy and ANZAAS; Britain, the Royal Society and the British Association; U. S. A., the National Academy of Sciences and AAAS.)

With these principles adopted (it took most of the day), the atmosphere cleared, forces on the Beaufort scale diminished, and the Council settled down the next day to deal with more routine business. Matters of some interest to geologists were:

Sectional Committee on Geology and Geophysics

The following were elected or continue in office: Dr R. P. Suggate (Chairman), Professor R. S. Allan, Dr F. F. Evison, Dr M. Gage, Dr D. Kear, Dr H. W. Wellman.

National Committee on Geology

This consists of the sectional committee as above with Mr R. W. Willett (Chairman, Director NZGS, and Mr J. Healy, President GSNZ.

Benson Fund

Under the terms of his will the late Emeritus-Professor W. N. Benson of Otago, who died in 1957, left one-tenth of the residue of his estate to the RSNZ "to supplement funds available for the publication of scientific papers". The Council has adopted rules for the control of this money (to be known as the Benso Fund), which state that the revenue is to be applied towards the preparing or printing of geological maps or other scientific illustrations. The capital value o the Fund is not yet known but is expected to be several hundred pounds.

President's Fund

Dr C. A. Fleming, President RSNZ 1962-64, generously gave £5,000 to establish a fund the revenue from which is to be made available to future Presidents of the RS during their term of office for such purposes as hospitality and entertainment, travelling within New Zealand or overseas, stationery, invitations and secretarial services.

New Member Body

An application was received from the N. Z. Institute of Chemistry for affiliation with the Royal Society, and was approved subject to compliance with th rules respecting admission of Member Bodies. As the first disciplinary (as opposed to regional) Member Body of the RS, the GSNZ warmly welcomes the NZIC to the fold, and confidently hopes the benefit will be mutual.

International Hydrological Decade

The Royal Society has agreed to support this project and has appointed the writer of this report its representative on the N. Z. National Committee for IHD, set up under the auspices of the N. Z. National Commission for UNESCO. For further details see elsewhere in this issue of the Newsletter.

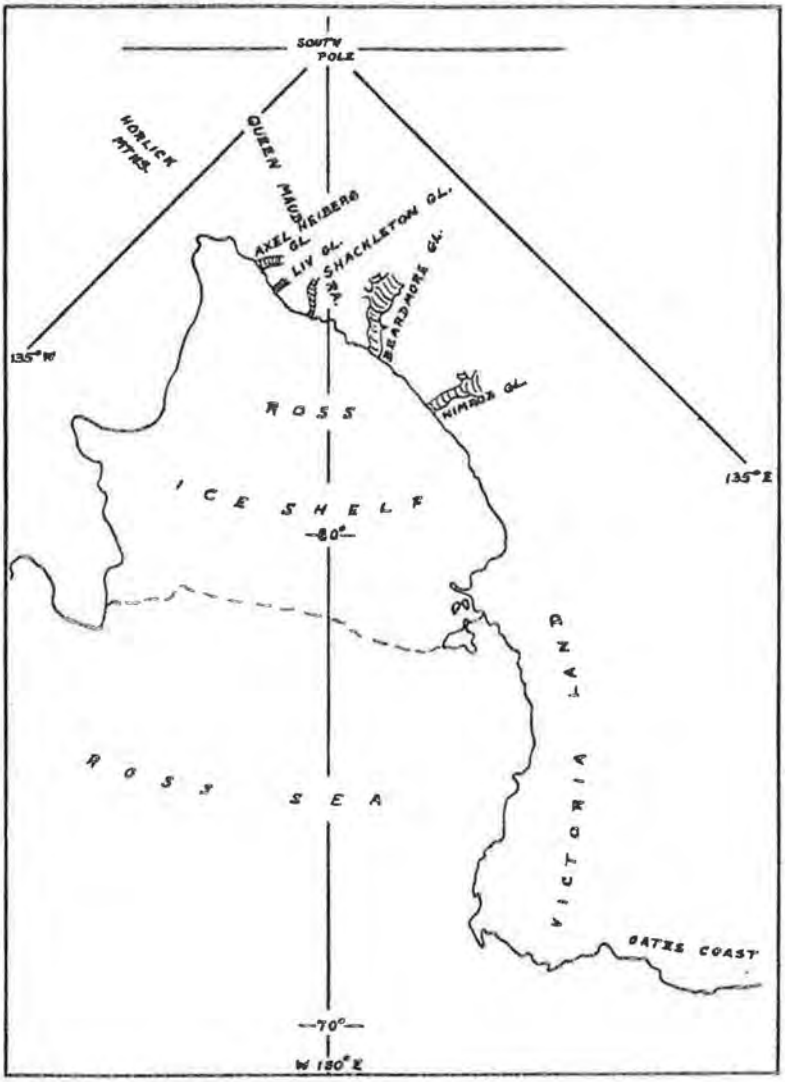
SUMMARY OF THE WORK OF THE 1963-64 SOUTHERN FIELD PARTY IN THE QUEEN MAUD RANGE, ANTARCTICA

By V. R. McGregor

In the past five years the geological work done by DSIR field parties in Antarctica has been of reconnaissance mapping type and has been carried out in conjunction with a programme of topographic mapping, the object of which is to provide topographic map coverage of the whole of the mountain chain bordering the western side of the Ross "Embayment" (Ross Sea and Ross Ice Shelf). The field parties have often covered very large areas, and geological coverage has necessarily been rather sparse. The work done by the 1963-64 Northern Field Party in the Oates Coast region has virtually completed this programme.

As a result of suggestions made at a Seminar on Antarctic Geology and Mapping held by Antarctic Division last May (1963) the Ross Dependency Research Committee decided that New Zealand's geological research programme should proceed with (1) more detailed studies of areas where relations of the major rock units might be elucidated, and the elimination of gaps in the reconnaissance mapping, both aimed at the compilation of a geological map of the Ross Dependency on a scale of 1:1,000,000 or 1:2,000,000; (2) specialist studies of problems of importance to Antarctic geology in particular and to geology generally. The 1963-64 Southern Party was the first DSIR party whose chief objective was detailed geological work.

The mountain chain which extends along the western side of the Ross "Embayment" from Oates Coast to the Queen Maud Range and beyond was the site of a Lower Paleozoic orogenic belt bordering the Precambrian Antarctic Shield. The supracrustal rocks (Ross Supergroup) involved in this Ross Orogeny accumulated in what has been called the Ross Geosyncline during later Precambrian and Cambrian times and were folded, metamorphosed and injected by a varied suite of plutonic rocks during the Ordovician. (In the extreme north-east, in the Admiralty Mountains, there are indications that folding began much later and that the post-tectonic plutonic rocks may be as young as Carboniferous.)


SOUTH POLE
HORLICK MTNS.
QUEEN MAUD MTNS.
AXEL GL.
LIV GL.
SHACKLETON GL.
BEARDMORE GL.
NIMROD GL.
135°W
135°E
ROSS
ICE SHELF
-80°-
ROSS SEA
VICTORIA LAND
GATES COAST
-70°-
W 180°E

By the end of the Silurian the orogenic belt had been deeply eroded and on the "peneplain" surface cut in its rocks terrestrial sediments of the Beacon Group were deposited. In the Horlick Mountains the lowest beds contain a Lower Devonian marine fauna, and in the McMurdo sound area plant remains suggest that the thick sandstones which comprise the lower part of the Beacon Group may be Devonian. In some places between these two areas the oldest sediments resting on the "peneplain" are as young as Permian, and in northern Victoria Land the Beacon Group is very thin and probably entirely Upper Triassic to Lower Jurassic. The period of continental sedimentation ended in the Middle Jurassic with intrusion of huge sills of tholeiitic dolerite and extrusion of comagmatic flood-basalts (Ferrar Group). There have been no folding movements in the area since the Silurian and almost everywhere the Beacon and Ferrar Groups dip at low angles away from the coast. Elevation of the present mountain chain has been accompanied by gentle tilting only, probably caused by uplift along a major fracture zone just off the present coast and approximately parallel to it.

One of the problems regarding our knowledge of the Ross Orogeny concerns the highly deformed metamorphic rocks (Nimrod Group) that outcrop in two isolated ranges on the western edge of the mountain chain at the head of the Nimrod Glacier. G. W. Grindley has suggested that the Nimrod Group was deposited, folded and metamorphosed before the initiation of the Ross Geosyncline, and that it formed part of a stable foreland bordering the geosyncline and orogenic belt. This interpretation has been supported by recent absolute-age determinations. However, glaciers separate the ranges where the Nimrod Group crops out from the mountains to the east where the Ross Supergroup occurs and the contact between the two units has not been seen.

Accounts of rocks collected by Amundsen's South Pole Party on 1912 and of the work of the Geological Party from the first Byrd Antarctic Expedition in 1929-30 both mention apparently high-grade schists and gneisses cropping out in the area between the Axel Heiberg and Liv Glaciers in the Queen Maud Range. We decided to make a more detailed study of the geology of this area and to investigate particularly the relations of the high-grade metamorphic rocks, which we thought might be related to the Nimrod Group. There was a gap in the topographic survey west of the Liv and we intended to work westwards through this unsurveyed area to the Shackleton Glacier, where we would be able to connect with the geological investigations made by a Texas Technological College party under Dr F. Alton Wade. A third objective was to examine the lower part of the Beacon Group, which is well-exposed on the high, steep, northern faces of the mountains bordering the Polar Plateau. The gneisses turned out to be contact migmatites locally developed around small post-tectonic stocks of granite and trondhjemite which give Ordovician K-A dates and are therefore much younger than the Nimrod Group. We did, however, find an excellent sequence of metasediments assignable to the Ross Supergroup and a very varied and interesting suite of plutonics intruding them.

The party originally comprised three geologists: Peter Barrett, who was interested chiefly in the Beacon Group; Peter Le Couteur; and myself as leader and geological co-ordinator; with one surveyor, Alan Gough. After Le Couteur was injured in a crevasse accident his place was taken by David Massam, mechanic and field assistant. For transport in the field we used two Polaris motor toboggans pulling two sledges each. We found the toboggans much superior to dogs for our type of work. They are faster, pull heavier loads, do not tire when run for long periods, can be left unattended while the drivers look at geology, and are more predictable in crevassed areas.

Barrett, Gough and McGregor were landed by US Navy Dakota on the Ice Shelf near the mouth of the Strom Glacier on November 6th and Le Couteur joined us on November 14th. Our second camp was at Mt Betty, a small nunatak on the eastern side of the mouth of the Strom which Amundsen had visited on his South Pole journey. We were the fourth party to visit Mt Betty and found the cairns left by Amundsen on his way back from the Pole, and by Professor L. M. Gould's party in 1930. We followed Gould's route up the Strom to the foot of Mt Fridtjof Nansen (13,350ft), a huge massif which, as a member of the 1961-62 Southern Field Party, I had climbed from the Polar Plateau. On one of its spurs we examined a 2,000 foot section of Beacon Group rocks. After a circuit around the head of the Strom we returned to the Ice Shelf and worked westwards along the front of the Mountains to the mouth of the Liv Glacier. On the air photos this had looked the most difficult glacier to cross. The Ice Shelf at its mouth is heavily crevassed and an impassable belt of crevasses, about five miles off the coast, extends westwards to the Shackleton Glacier. On a reconnaissance, however, Barrett and Le Couteur found a spectacular but safe snow corridor through the middle of the lower icefall, and from its head we reached the western side of the Liv without much difficulty. The following day, while he and Barrett were attempting to reach an outcrop up-glacier, Le Couteur had the misfortune to break through the bridge of a concealed crevasse and fell 50 ft, gashing his face and tearing tendons in one knee. We drove on a difficult thirty miles to a depot of food and fuel, midway between the Liv and Shackleton Glaciers, which had been flown in during our reconnaissance flight. The surface had become much rougher in the month since the first landing, but a US Navy Dakota was able to land and flew Le Couteur back to Scott Base for medical attention.

After a short recuperation period we drove up a large unnamed glacier and through a steep, narrow pass to a glacier which drains the northern slopes of Mt Wade (13,330ft). From a camp at about 3,500 ft we twice climbed 3,500 ft up the north ridge of Mt Wade to the peneplain and the second time reached a height of about 11,000 ft while examining the lower 2,000 ft of the Beacon Group. Up to this time the weather had been very poor, with blizzards, heavy snowfalls, and days of whiteout or near-whiteout conditions when lack of surface definition

made toboggan travel impossible. By December 27th, 22 out of the 52 days spent in the field had been enforced lie-up days, and we were badly behind schedule. Then came a welcome spell of fine weather and the toboggans really showed their worth. Working long hours we travelled 254 miles in nine days and mapped some 550 square miles in detail. This completed all of our objectives and on January 8th we returned to Scott Base after a most enjoyable and successful two months in the field.

We found this part of Antarctica to be remarkably warm for its latitude: between 84° and 85°S. The average temperature during November and December was plus 20°F and the lowest we recorded plus 2°F. We discovered quite rich floras of mosses, algae, and lichens on warm north-facing slopes, this being several hundred miles farther south than mosses had been found previously. Meltwater was abundant, especially after fresh snow.

Geology

The broad structural pattern is typical of the mountains west of the Ross Ice Shelf. The lower coastal ranges are composed of a "basement complex" of strongly folded metasedimentary rocks intruded by large and small plutonic bodies, mostly of granitic composition. Behind them are great flat-topped mountains composed of Beacon Group rocks which rest on a flat surface cut in the "basement complex" and are intruded by conspicuous dolerite sills which give the mountains a very large-scale banding.

Metasedimentary rocks crop out only within 12 miles of the coast; beyond that they are cut off by a large batholith. Although nearly everywhere metamorphosed to amphibolite or hornblende-hornfels, they appear to be of Ross Supergroup-type. In the mountains between the Strom and Liv Glaciers the sequence is:

(4) A thin unit of pelitic schists or hornfelses, seen only at one locality; top not exposed.

(3) Creamy-white marbles and cream, grey, and brown limestones, with a few thin quartzitic layers; intruded by concordant pods of black, medium-grained igneous rock.

(2) Massive quartzitic rocks with some thick bands of stretched or flattened conglomerates; large-scale cross-bedding in places.

(1) A very thick unit of pelitic and quartzofeldspathic hornfelses and schists; graded bedding seen at one outcrop.

In most places bedding features have been destroyed by cataclasis which is thought to have preceded metamorphism, and in a north-south-trending

belt along the eastern side of the Shackleton Glacier the rocks have been converted to mylonites. Metamorphism and cataclasis have destroyed any fossils that may have been present, but lithologic similarities suggest that unit (1) may be a metamorphosed equivalent of the late Precambrian Goldie Formation of the Nimrod-Beardmore region. Unit (3) may be a correlative of the Lower Cambrian Shackleton Limestone.

The plutonic rocks are very variable indeed. A large batholith of coarse-grained granitic rocks is exposed continuously across the southern part of the area. The parent rock seems to have been a very coarse granite. Where it is in contact with earlier basic rocks the granite is crowded with small basic xenoliths and contaminated to tonalite. Between the Axel Heiberg and Liv Glaciers the main rock-type in the batholith is a homogeneous, well-foliated granodiorite which contains abundant lens-shaped basic xenoliths and may also have been derived from the granite by contamination. It is cut by patches of xenolith-free granite. Towards the west, in what is probably the roof of the batholith, relations are very complex. Over a large area the granite, which is rather variable in composition, has been intruded by a swarm of basic dykes, and afterwards remobilized so that the dykes are broken up and cut by the granite that they originally intruded. In another place the granite contains huge pods of very pure, extremely coarse-grained calcite. The calcite may have been derived from marbles within a granitized sequence, for at a third locality we saw a sequence of granite-like rocks which contained stratiform bands of marble.

South of Mt Wade there is a body of coarse gabbro which is older than the granite. The gabbro is unusual in that the chief mafic mineral is an amphibole (actinolite in some varieties, hornblende in others) which often encloses cores of colourless pyroxene. Along the coast between the Liv and Shackleton Glaciers large areas consist of a complex of basic rocks and earlier granites, some of which have been involved in the same folding movements as the metasediments and possess a strong schistosity. They are cut off to the south by the main batholith and are intruded by smaller granitic plutons which appear to be intermediate in level between the main batholith and high level stocks which cut the metasediments on the coast east of the Liv Glacier.

The latter are strongly discordant bodies, are probably the youngest of the plutonic rocks in the area, and are composed of two phases of markedly different composition. The earlier is a trondhjemite which contains scarcely any potash feldspar. It has been intruded by a microcline-biotite-muscovite granite, very like the type Hope Granite of the Beardmore Glacier area. It is not chilled against the trondhjemite but has rafted it off as large slabs and must therefore have been intruded after the latter had solidified. The trondhjemite encloses huge agmatitic rafts in which angular blocks of basic rocks

are enclosed in coarse pegmatitic leucogranite which contains abundant pink garnet and black tourmaline. Very abundant dykes of similar pegmatitic rocks which cut the country rocks also contain much tourmaline and garnet as well as blue beryl. In places the metasediments adjacent to the stocks have been mobilized and intimately injected by the trondhjemite and granite, especially the former, and are now intensely contorted contact migmatites.

Structure

Folds in the metasediments near the Liv Glacier trend fairly uniformly NW to NNW, are isoclinal, and are overturned towards the SW. They appear to make up a major synclinorium whose axis reaches the coast at the mouth of the Liv*.

Beacon Group

Sections of the lower 2,000 to 2,500 ft of Beacon sediments were examined at three localities: the northern face of Mt Fridtjof Nansen, the north ridge of Mt Wade, and on the coast near the Shackleton Glacier. The stratigraphy is similar at all three. Above a very thin, discontinuous basal conglomerate filling hollows in the peneplain come about 200 ft of laminated shales and fine, fissile sandstones, followed by 600 to 900 ft of sandstone in which ripple-drift bedding is abundant. These two units are probably lacustrine, and are separated by a minor disconformity from the overlying deltaic beds of coal measure type. Within the 800 ft of coal measures we saw several seams of impure coal, and sufficiently recognisable plant remains to indicate that the formation can be correlated with the Permian coal measures which have been found to the north and south of our area.

No faults were observed to displace the peneplain on which the Beacon Group rests except on the coast near the mouth of the Shackleton where our discovery of Beacon and Ferrar Groups at sea level supports the idea of a great fault zone just off the coast. In the Shackleton area this must have a total throw of at least 18,000 ft.

---

* Wade reports that on the western side of the Shackleton Glacier the fold axes trend east-west and are overturned towards the north. The belt of sub-vertical mylonites which extend along the eastern side of the glacier marks a major Lower Paleozoic tectonic dislocation, possibly a transcurrent fault, along which blocks with fold axes almost at right angles are juxtaposed.

NOTES FROM GEOLOGY DEPARTMENT, VICTORIA UNIVERSITY OF WELLINGTON

Roger Martin, who completed a Ph. D. on ignimbrites late last year, left New Zealand recently on his way back to the United States. Graham Gibson, who also completed a Ph. D. recently is now micropaleontologist at New Plymouth for the Shell Oil Company. Ian Willis, having won a Shell Scholarship, is in Greece, working for a Ph. D. from the University of London. Tom Haskell is now a demonstrator at the University of Queensland, Brisbane, working for a Ph. D. on Australian Cretaceous spores and pollens.

Professor M. Carman returned to Houston in October last year after a stay that was profitable and pleasant for all of us. Mr Dan Karig, recently graduated from the Colorado School of Mines, arrived here in February on a Fullbright Scholarship, and expects to stay about 18 months or two years. Mr D. Palmer, from Princeton, is a visiting petrologist due shortly. Many readers will already have met Mr Max Banks, senior lecturer at the University of Tasmania, who arrived in the middle of the Geological Survey Conference for a three weeks' visit, lecturing and looking at New Zealand geology.

A new lecturer in petrology, Dr E. Ghent, from Yale and Berkeley, is due to take up his appointment in July. Two new technicians were appointed in the department last year. Fred Schaffer is concerned with the petrology side, and Alex Frame with palaeontology. Mr Frame is looking after the Fossil Record Master File and any request for fossil record numbers may now be addressed either to me, as previously, or directly to him (full name: A. R. Frame).

At the beginning of this year Bob Henderson commenced a Ph. D. thesis on Cretaceous ammonites, assisted by a U. N. Z. Research Fellowship. Graham Wilson is describing early Tertiary microplankton for an M. Sc. thesis, and Warwick Prebble is mapping the Kekerengu area, Marlborough, also for an M. Sc. thesis.

Last summer, V. U. W. A. E. No. 8 continued work on the lakes of Taylor Valley, and also commenced investigations of lakes in the Wright and Victoria valleys. A party collected snow samples at Pole Station to examine for salt and meteorite contents. A recconnaissance of Black and White Islands was also carried out.

Proposed work for next season is a fuller investigation of Black and White Islands, further work on Lake Vanda, and a detailed mineralogical examination of the Koettlitz Glacier area.

- P. Vella

NOTES FROM AUCKLAND UNIVERSITY GEOLOGY DEPARTMENT

The beginning of the 1964 academic year has seen a number of considerable changes from the previous years. Student enrolments at most levels have jumped so that lab. space and equipment have become inadequate or nearly so.

Students: Student numbers are now as follows (with 1963 enrolments in parentheses Stage I 120 (87); Stage II 19 (16); Stage III (1) 8 (6); Stage III (2) 11 (4); Honours 15 (9); Ph. D. 3 (1).

The following research topics are at present being studied by post-graduate students:

Miss P. M. Black	- Igneous intrusions and contact rocks from the Auckland Province (Ph. D.).
D. N. B. Skinner	- Geology and mineral deposits of Coromandel County. (Ph. D.)
J. D. Elliot	- Greywacke studies in the N. E. Whangarei area.
J. C. Hopkins	- Hokonui strata west of Pio Pio, S. W. Auckland.
W. S. Hughes	- Geology of the Tangihua Range, Northland.
G. A. Jamieson	- Geology of the Pio Pio-Aria district, S. W. Auckland.
E. C. Leitch	- Geology of North Cape.
W. Mayer	- Geology of Motutapu, Rakino and the Noisies, Hauraki Gulf.
K. A. Rodgers	- Petrochemistry of ultrabasic nodules in basalts of the Auckland Province.
R. K. Tarvydas	- Geology of the Waipu area, Northland.

Three Masters students completed their degree studies last year, each with First Class Honours, and two of them have remained in the Department to work for Ph. D. The third, V. R. McGregor, who was awarded the Bartrum Memorial Prize and the Fowlds Memorial Prize in Science for 1963, has joined the N. Z. Geological Survey, and led a field party in the Queen Maud Mts, Antarctica, during the last season. A member of this same party was P. C. Le Couteur, a member of our Honours school.

Another Honours student, J. M. A. Chappell, accompanied a party from the Anthropology Department of this University into the highlands of New Guinea during last summer and is doing a petrological study of the stone tools collected.

The other student to complete M. Sc. within the last 18 months, P. J. Barrett will soon be leaving New Zealand to begin Ph. D. studies at Ohio State University.

Staff: The teaching staff, consisting of 6 members for the last 4 years, has now increased to 10 by the addition of 2 Junior Lecturers (Messrs E. C. Leitch and K. A. Rodgers), a temporary Lecturer (Mr M. R. Gregory), and a Lecturer in Economic Geology (Dr D. O. Zimmerman, B. Sc. Hons (Queensl.), Ph. D. (London), D. I. C.). The appointment of an economic geologist, who has had practical

experience in Europe, N. America and most recently in the Australian Bureau of Mineral Resources, is a particularly important step in providing a more complete geological training and research facilities which were previously not able to be offered. Dr Zimmerman is now planning extension of the geochemical lab. established last year. Also during last year X-ray apparatus was installed and has already proved useful for mineralogical research by both staff and post-graduate students.

Professor Searle left last November on sabbatical leave which took him first to the U.S.A. for 3 or 4 months. He is now in the U.K. and his future itinerary includes the International Geological Congress in India.

Visitors: It is always pleasing to see and hear from past graduates of the Department, and over this summer Messrs R.H. Barron (Mt Morgan Mines, Queensland), L.N. Clarke (Anglo-American Corp. of South Africa), E.N. Milligan (Bureau of Mineral Resources, Canberra), and D. Watson (North Broken Hill Pty, Queensland) returned on leave.

In addition, a large number of other overseas geologists visited the Department, including Dr D.F. Squires, who is becoming quite well known around here now, Prof. O.A. Jones (University of Queensland), Professor W.H. Mathews (University of British Columbia), Dr T. Kasama (Osaka City University) and Professor T. Matumoto (Kumamoto University).

Mr George Eiby (Seismological Observatory) and Mr Harry Gibbs (Soil Bureau), both of Wellington, were "borrowed" for short and extremely valuable lecture courses in their particular fields last year, and Dr A.W.G. Whittle (Adelaide University) has just concluded a brief, concentrated course on mineragraphy.

J.A. Grant-Mackie

Third World Conference on Earthquake Engineering - Members of the Society are reminded of this meeting, to be held in New Zealand from 22 January to 1 February 1965 (see Newsletter 14 August 1963). Further information on the Conference may be obtained from:

The Administrative Secretary,
Conference Organizing Committee,
Third World Conference on Earthquake Engineering,
P.O. Box 5180,
WELLINGTON, New Zealand.

11TH NEW ZEALAND SCIENCE CONGRESS, AUCKLAND, FEBRUARY, 1965

EARTH SCIENCES SECTION

Final details of the Congress have not yet been completed but some idea of the programme for the Earth Sciences Section can be given. Dr Maxwell Gage, Geology Department, University of Canterbury, has consented to be the Chairman of this section. The section is responsible for two of the General Symposia to be held during the afternoons. These are:

(1) "Antarctic Research"
(2) "Exploitation of Mineral Resources"

The morning sessions for the section will probably include the following topics:

"Physiography, geology, soils and oceanography of the Auckland district"
"Aspects of Evolution" : This will be held jointly with the Biological Sciences Section and will include the Biological Sciences Chairman's Address by Dr C.A. Fleming.
"The Benthic Environment"
"The Nature of the Earth's Crust"

All papers are to be by invitation but anyone wishing to make a prepared statement up to two minutes long during the discussion of any particular topic on the programme should give a copy of it to the Chairman or Secretary before or on the first day of the Congress.

- F.E. Bowen,
Secretary, Earth Sciences Section

UNIVERSITY OF CANTERBURY GEOLOGY DEPARTMENT

Dr Maxwell Gage returned from the United States in April after spending three months lecturing at various universities. Dr Gage was one of seven distinguished scientists invited by the Visiting International Scientist Programme of the American Geological Institute, and the only one from the Southern Hemisphere. During his tour he lectured at eleven scheduled universities as

well as several others. This lecture tour came soon after a lecturing visit made to Canberra, Australia, last September at the invitation of the Australian National University. Needless to say, Dr Gage's lecture topic on both tours was glaciation with particular reference to New Zealand.

Mr Simon MacDonald attended the ANZAAS Conference in Australia last January. He has also been spending considerable time examining granites and pegmatites on the West Coast, and agrees with Dr Gage that a University of Westland geology department would be an excellent idea.

Dr A.E. Cockbain has started research on the larger foraminifera of New Zealand and is now often found in his darkened office peering into the television-like screen of the Visopan. Drs M.J. Frost and W.D. Sevon have been spending a considerable amount of time writing programmes for the University of Canterbury's IBM-1620 Digital Computer. It is often suggested that the only results they get are long lists of "Error F. 7", but in reality the computer seems to be a promising geological tool.

The Department has enjoyed the visit of Professor W.H. Mathews, University of British Columbia, and will be sorry to see him leave at the end of June. As near as we can tell Professor Mathews has been investigating all of New Zealand geology, but he seems to have some preference for the Pleistocene. We shall particularly miss his stimulating comments at our weekly seminars.

Mr David Jones, Senior Technician, thought that some of his burdens would be eased with the arrival of Mr Alan Smith, Assistant Technician, but Parkinson's law still seems to be in force. Recently the technical staff has been engaged in a project of enhancing the attractiveness of the Geology Department corridors by hanging mounted copies of the published 4-mile geological maps.

Mr S. Carryer, graduate student, spent the summer season with the Northern Party, Antarctic Division, D.S.I.R., as an assistant geologist. He has been working on his Antarctic reports ever since his return, but hopes to resume work on his thesis in the very near future. Mr P. Maxwell, who gave a paper at the recent Survey Conference, Mr R. Adamson, Mr R. Gregg and Mr K. Liggett, are all working on their theses and hope to be finished within the next year. Mrs D. Seed is often seen using the DTA and X-ray equipment, and there are rumours that she is having a certain amount of success in her attempts to learn the secrets of glauconite. The three new graduate students this year are Messrs R. Farmer, S. Nathan and B. Riddolls. Mrs W. Campbell (nee J.K. Adamson), Mr T.D. Phillips and Mr J. Read have now completed their theses.

A large group of the Department staff and graduate students recently made a tour of the new geology building at the Ilam site. The main structure of the building is now complete and some work is starting on the interior. We were all impressed by the fact that there almost appeared to be sufficient space.

- William D. Sevon

GEOLOGICAL SOCIETY LEAVES LONDON

Only for two days mind you - but as this is the first time in 157 years it's news. The Geological Society of London, as most or all Commonwealth readers know, is a national society rather than a civic institution as the name might imply. Founded in 1807 it is the oldest and probably best known geological society in the world. Since 1874 it has held its meetings during late afternoon in the staid atmosphere of Burlington House, Piccadilly, W.1. Here meetings start with afternoon tea which is followed by papers read to both dextrally and sinistrally contorted Fellows who sit on sedate, leather-covered benches arranged along two sides of the meeting room in tiers which strike at 90° to the plane (S_p) of slide projection. Fellows always establish themselves permanently on one side of the room - much as Members do in the House of Commons. It's not tradition or custom or habit but just physiological necessity. Once you have developed a right-handed or left-handed 'off the shoulder' look, in order to view the slides it's uncomfortable to change - as you would have to if you crossed the floor of the House.

For two days, however, Fellows will be looking ahead - due to the seating arrangements in Glasgow. On February 14-15 the Society will leave its London quarters and move there for a joint meeting with the Geological Society of Glasgo which will feature both a symposium on the Phanerozoic time scale and sessions on constructional works and raw materials. The symposium papers are schedule to appear in a separate publication of the Geological Society of London."

- From British Commonwealth Geological Liaison Office Newsletter for January 1964

EARLY NEW ZEALAND GEOLOGISTS AS ARTISTS

A collection of early watercolours of New Zealand has been assembled by the Auckland City Art Gallery and is at present touring New Zealand. The paintings mainly date from before 1880 and present a fascinating picture of New Zealand as it was when seen by Hochstetter, Haast and Hector. Many of the pictures are of some geological interest, as for instance Hoyte's detailed painting of Mount Tarawera in 1873, 13 years before the eruption.

The works of two geologists are included in the exhibition. There are five wash paintings by John Buchanan (1819-1898) who was on the staff of the triangulation survey in Otago and in 1862 was appointed to Hector's staff in the Otago Provincial Geological Survey. After the establishment of the New Zealand Geological Survey in 1865 Buchanan was appointed draughtsman and botanist, and illustrated most of the earlier volumes of the Transactions of the New Zealand Institute. He also acted as a geologist and his published papers include a report on the Kaikoura district. Of his five paintings in the exhibition, 4 were painted in 1856 and are of the Clutha and Taieri valleys; the other is of Gabriels Gully in the 1860s. All are from the Alexander Turnbull Library.

The other geologist artist is Julius von Haast, Canterbury Provincial Geologist, and founder and Director of the Canterbury Museum. His four colourful watercolours are of the head of the Rakaia and Brownings Pass visited during his expedition in the autumn of 1866. They are probably some of the originals for the lithographs accompanying his report to the Provincial Council on the trip. These paintings are also from the Turnbull Library.

In the days before cameras became easily portable, landscape sketching was an important skill for the field geologist. The beautiful lithographs in Hochstetter's publications based on his field sketches show that he must have been at least a very competent draughtsman. Hector's field books in the Hocken Library, Dunedin, are illustrated with some delightful little watercolour sketches that show he had an artistic feeling beyond the needs of his scientific observations.

Geology is indebted to the camera, but the camera has to a large extent destroyed the geologist-artist.

- D. R. G.

THE INTERNATIONAL HYDROLOGICAL DECADE

At a meeting in Paris in May 1963, called by Unesco, international experts in hydrology reaffirmed the need for an International Hydrological Decade to stimulate long-term research in scientific hydrology, as proposed by Unesco. New Zealand was represented at this meeting by Dr R.G. Simmers.

One of the recommendations of the meeting was the setting up of National Committees to plan the programmes of each country and to make arrangements for the Decade to begin in 1965.

The overall objective of the international programme in hydrology is "to accelerate the study of the regimen and resources of waters with a view to their rational management in the interest of mankind, to promulgate the need for hydrological research and education in all countries, and to improve their ability to evaluate and utilise their resources in the best possible way. That is, the programme will focus on science but will give strong consideration to utilitarian factors."

The International Hydrological Decade will be concerned primarily with water on the land areas of the globe. It will be concerned with oceanic waters only in relation to specific problems in land areas. It will not be concerned with meteorology as such, but with precipitation as a major element of the hydrological cycle.

The New Zealand National Committee for IHD

The N.Z. National Commission for Unesco late in 1963 set up a National Committee for the IHD, whose present constitution is as follows:

Mr A.P. Campbell	:	Ministry of Works (Chairman)
Dr R.G. Simmers	:	Meteorological Service
Mr J.H. Fyson	:	Ministry of Works
Mr R.W. Willett	:	DSIR
Mr J.A.D. Nash	:	DSIR
Mr F.M. Henderson	:	University of Canterbury (representing universities)
Mr N.H. Taylor	:	(Representing Unesco Subcommission on Science)
Mr A.F. Greenall	:	Otago Catchment Board (representing Soil Conservation interests)
Mr P.G. Evans	:	Manawatu Catchment Board (representing N.Z. Institution of Engineers)
Mr C. Toebes	:	Ministry of Works (representing N.Z. Hydrological Society)
Mr B.W. Collins	:	DSIR (representing Royal Society of New Zealand)
Mr D.G. Shouler	:	N.Z. National Commission for Unesco (Secretary)

New Zealand Participation in IHD: Early this year the Minister of Education announced Government support for New Zealand's participation in IHD and the establishment of the National Committee. To the end of March 1964 the committee had met twice. Technical subcommittees with conveners as follows have been set up:

Snow and Ice	(Mr A. F. Greenall)
Experimental Basins	(Mr C. Toebes)
Education	(Mr F. M. Henderson)

Mr L. C. McKellar (representing N. Z. G. S.) was appointed to the Snow and Ice Subcommittee.

Others suggested or in process of formation are:

Water Quality	(Mr J. H. Fyson)
Hydrometeorology	(Dr R. G. Simmers)
Ground Water	(Mr R. W. Willett)
Hydrological Mapping	(Mr N. H. Taylor)
Stream Beds	
Climate Changes	
Evaporation and Transpiration	
Publicity and Information	

Draft programmes for research were requested from government departments and research institutions and were correlated for submission to a preparatory intergovernmental meeting of experts held in Paris in April this year. New Zealand was represented at this meeting by Mr C. Toebes.

Points of interest to the Society include:

(1) The N. Z. Geological Survey proposes to expand its activity in groundwater research in the Hutt Valley, Franklin County, the Heretaunga Plains, the Canterbury Plains, the Maniototo Basin, and the Southland Plains. The Soil Bureau plans to continue and intensify its hydrological studies in the experimental catchments at Taita and to study the effect of water on the erosion and leaching of soils. The Chemistry and Applied Mathematics Divisions, the Physics and Engineering Laboratory, and the Institute of Nuclear Sciences will also assist in various ways.

(2) The Meteorological Service has already a satisfactory coverage of rainfall and climatological stations in the more densely populated areas of the country, but will continue to try to fill in gaps in mountainous areas. It is planned to increase the collection of data on evaporation, soil moisture and net radiation; and to do further research on probable maximum precipitation (design storms), climatic fluctuations, and the exchange of moisture between earth and atmosphere.

(3) The Ministry of Works will be concerned mainly with the collection and analysis of hydrological data from various types of experimental and representative basins, and the training of workers in hydrology.

(4) The Universities will probably be concerned with research on the dynamics of the runoff process, model catchments, flood prediction, and stream-bed evolution. They are of course also most interested in the training of hydrologists.

The N. Z. Institution of Engineers proposes to hold a Symposium on Water Resources and the Control of Water in New Zealand on 2 and 3 September this year at Victoria University of Wellington.

The Committee is to prepare a submission to the Government seeking financial support for the enlarged research programme proposed. Projects calculated to advance the science of hydrology rather than merely practical aspects are favoured, and the international and regional aspects of the IHD programme as a whole are regarded as important. It is hoped that New Zealand may be able to assist the less developed countries by the exchange of workers and trainees.

Suggestions from individuals and societies interested in hydrology will be welcomed by the Committee. It is hoped that interested scientific societies will give all possible support and publicity to IHD. Adequate knowledge of the amount, quality, and movement of natural waters above and below the surface of the earth is of paramount importance to agriculture, industry, and all aspects of life in New Zealand. We may reap great benefits from this international programme, and we should also have much to contribute to it.

- B. W. Collins

GEOTHERMAL INVESTIGATIONS IN THE PHILIPPINES

by G. W. Grindley, N.Z. Geological Survey

The writer visited the Philippines during December and January 1963-64 at the request of the United Nations Special Fund, to examine the possibilities of utilising geothermal steam for the generation of electric power. Although the survey was primarily concerned with the appraisal of various hydrothermal fields, it was possible to gain an insight into broader geological problems during field trips to various parts of the country.

Like New Zealand, Philippine geology is dominated by a major transcurrent fault - the Philippine Fault - which practically bisects the archipelago from Lingayen Gulf in Luzon to Davao Gulf in Mindanao. Apart from stream offsets, obvious fault scarps, rift zones, sag ponds and other geomorphic features, little is known of the fault's history. One would suspect from its great length (800 miles) and probable bifurcation into adjoining island are structures, that the fault has been in existence as long as the Philippine island arc, and that the total strike-slip displacement must be large. Recent offsets are sinistral. Much of the fault zone is covered by alluvium, recent volcanics, late Tertiary sediments and the sea.

The basement geology of the Philippines extends back to the Mesozoic. The oldest fossils are Tithonian ammonites found in one of the western islands; the Tithonian beds pass down into schists. The late Mesozoic and early Tertiary beds are partly metamorphosed geosynclinal greywackes with altered spilitic volcanics and cherts, intruded by peridotite, pyroxenite, serpentine and gabbro. These ophiolitic rocks are widespread throughout the Philippines occurring as basement inliers, diapiric intrusions and slivers along faults. Some of the complexes are layered and extremely large (120 miles x 30 miles); the most prominent layering is tectonic and cuts an earlier compositional banding. Chromite segregations are even later and unrelated to the earlier layering; they support two of the world's largest chromite mines. Nickeliferous laterite is also mined for both nickel and iron.

The Miocene and younger Cenozoic sediments, commonly unconformable on the early Tertiary but locally gradational, are extremely variable, ranging from coal measures to limestone and from conglomerates to turbidites. The sediments appear to have been deposited in seaways within a volcanic archipelago similar to the present islands, and contain much volcanic material. Foraminifera provide the chief fossil control and macro-fossils are scarce until the Pliocene. Correlation with the Indonesian Tertiary is reasonably good and they use the same letter-type stages.

Volcanism and volcanic land forms are most spectacular. Large andesite cones surrounded by ring plains built up by lahars are a common sight and at least a dozen of these are still active. Mt Mayon in SE Lyzon, said to be the world's most perfect cone and used to advertise the local San Miguel beer, is active almost continuously. Taal Island, a complex of young basalt cones within a large caldera lake south of Manila, has a reputation for lethal steam-blast and ash eruptions and Hibol-hibok in the Mindanao Sea has produced locally destructive nuées ardentes. These and lahars during typhoons constitute the greatest risk to settlers on the fertile ring plains, and are kept under continual surveillance. Acid volcanics are rare, and ignimbrites unknown.

Hydrothermal fields are as widespread as the Quaternary volcanism and many fields are simply heated by shallow pockets of cooling magma. Only a few fields have many boiling springs, and these are associated with the Philippine Fault and other transcurrent faults and appear to tap plutonic magmas at greater depth. These, of course, are of greater interest for geothermal power. In the mountains of North Luzon, a late Tertiary andesite province has been intruded by quartz diorites and has many hot springs. Gold-silver mineralisation similar to Thames-Coromandel is important here, and many of the productive gold mines have exceptionally high geothermal gradients, which prevent deep mining. One such mine was examined and found to have a geothermal gradient of 1°C. every 20 feet (over 5 times "normal"). This mine boasts an underground geyser, drill-holes commonly "blow", and cooking eggs for lunch is no great problem. Probably mineralisation is still in progress at depth in such areas.

The writer was accompanied in the field by geologists from the Bureau of Mines and Commission of Volcanology. The Bureau is divided into a General Geology section which deals with regional mapping, mining geology and petrology, and a Petroleum Geology section which includes all the paleontologists and geophysicists. This group studies the Tertiary basins of interest to Oil Companie Like New Zealand the Philippines have a little natural gas and even less petroleu but are still hoping. Unlike New Zealand they have a thriving mining industry wit large ore-deposits of gold-silver, lead-zinc, copper, chromium, nickel, iron and asbestos. Most of these are associated with late Tertiary intrusives or with the ultramafic bodies. The standard of geological mapping is quite high, and a 1:1,000,000 geology map is due to be published this year. They will then proceed with 1:250,000 maps. The Bureau consists of over 80 geologists and a small arm of technicians and other non-professional staff. Accommodation is poor and many of the basic facilities are lacking. The tropical climate, appalling roads and the uncertain temper of some of the back-country inhabitants (they still have a few head-hunters, bandits and Communist guerillas) tend to discourage field work in some areas. Despite these drawbacks, the lot of the geologist is not unduly harsh and the islands are well worth a visit for their spectacular scenery, complex geology and friendly inhabitants.

SUMMARY OF THE REPORT OF THE MINERAL RESOURCES COMMITTEE

by D. O. Zimmerman, Department of Geology, University of Auckland

The recently published report on the mineral potential and the encouragement of mineral development in New Zealand is of particular interest to all geologists because any development must inevitably begin with geological investigations. The Committee states that very much work remains to be done before any reliable assessment of the country's mineral future can be made. It draws attention to successes in mineral development in recent years such as natural gas, geothermal power, the iron and steel industry (including its less apparent demands for raw materials such as coal, limestone, silica, bentonite, dolomite and magnesite), china clay, perlite, pozzolan, pumicite, diatomite, the discovery of uranium and bauxite, and surveys of coal and limestone resources. These successes in themselves seem sufficient justification for increased work, but the Committee also stresses the facts that increasing industrialization of the country demands increased supplies of raw materials, both metallic and non-metallic, and that new techniques for discovery and exploitation of minerals should be used more extensively in New Zealand.

Any development requires increased expenditure and the Committee recommends that D.S.I.R. should be granted an additional £119,000 and an additional staff of 23 during 1964-68, and that an extra £10,000 should be made available annually to the Mines Department for assistance in exploration and development. Further, grants to New Zealand universities for research on topics such as smokeless fuels, coal briquetting, anode carbon for aluminium smelting, etc., should be considered, and increased research into development and uses of coal, cement, concrete, clays, crushed rock, etc., should be fostered. It is proposed that research should be carried on in existing organisations by provision of additional staff and funds.

Among immediate short term projects proposed by the Committee are an increase in geological, geophysical and geochemical aid to oil prospecting companies, search for suitable fuels and minerals for the proposed steel industry and utilisation of slack coals at present being stockpiled. Nationwide surveys of the quantity and quality of limestone, bentonite, aggregate and sand, and surveys of potential metalliferous areas are called for during the next five years. The specific areas in the latter project are as follows:

1. A detailed survey of the Nelson-Buller area with particular reference to asbestos, chromite, coal, copper, dolomite, feldspar, gold-silver, lead-zinc, magnesite, marble, scheelite, serpentine, talc, wollastonite, etc.

2. A broad survey in Northland with particular reference to bauxite, clays, copper, geothermal steam, groundwater, limestone, manganese, silica sand, etc.

3. A broad survey in Westland with particular attention to coal, copper, feldspar, gold and lump silica, etc.

4. A broad survey in West Otago with particular attention to antimony, base metals, gold, scheelite, serpentine, etc.

Survey of the Hauraki Mineral Field is deferred until the second quinquennium. A list of long term projects was also submitted by the Committee. These include basic research such as regional geology and geophysics, geothermal investigations, and research on electro-chemical industries, mineral beneficiation, etc.

Comment

The report shows thorough consideration of the mineral industry and it also calls attention to the necessity of being ready to take advantage of new developments in this industry. However, the recommended increase in staff and expenditure for D. S. I. R. and the Mines Department seems rather modest in proportion to the national benefit which can accrue from increased mineral development, e.g., self sufficiency in petroleum products alone would save the nation about £19,000,000 in imports each year. It is to be hoped that if promising indications are found during a regional survey, additional finance and experienced manpower can be added to carry out the necessary detailed studies, and at the same time allow the regional survey to continue. Further, the Committee has approached the problem of mineral development mainly in terms of what can be done by the Government and Government sponsored agencies. It is hoped that the first five years of the programme will bear sufficient fruit to encourage greater participation by private enterprise, and in turn lead to consideration of additional incentives for private participation.

Finally it is worth remembering that the vast underground workings at the Waihi gold mines began from a single small outcrop area. It seems reasonable to assume that most such outcrops of metallic minerals have been found, but have they been properly investigated in depth? Unless we geologists enlist the help of techniques and specialists who can show more definitely what lies beneath the surface, especially drillers, we cannot hope to do much better than the prospectors of the last century. We must also become accustomed to taking calculated risks in prediction, and to being proved wrong, especially where drilling is involved because no drilling is really wasted if it provides reliable information.

OBITUARY

Michael Christian Gudex

Michael Christian Gudex, a foundation member of the Society, died in Hamilton on 9 February 1964, aged 76. He was born in South Canterbury and received his early education there. He attended Canterbury University College where he graduated M. A. with Honours in French and German in 1910 and M. Sc. with Honours in Geology in 1915. While at university he taught at Christchurch Boys' High School and in 1915 was appointed first assistant at Hamilton High School. An attack of poliomyelitis forced him to retire in 1916, but he rejoined the staff in 1911 and continued to teach at the school until his retirement in 1953. He was awarded the Loder Cup in 1956 for his work on the New Zealand flora, and in the Birthday Honours List for 1962 received the M. B. E. for his services to education and horticulture. He was a member of the Foundation Committee of the University of Waikato, and an active member of the Royal New Zealand Institute of Horticulture.

His geological work was largely confined to the period when he was at university and before he became partly disabled. It was during this time that he published three papers:

Some Striated Stones from St Bernard Saddle, Upper Waimakariri Valley. Trans. N. Z. Inst. 41 : 33 (1909).

List of Fossil Mollusca from Bluecliffs, South Canterbury. Trans. N. Z. Inst. 46 : 278 (1914).

The Succession of Tertiary Beds in the Pareora District, South Canterbury. Trans. N. Z. Inst. 50 : 244-62 (1918).

The last of these articles is an accurately detailed account of the stratigraphy of the highly fossiliferous area traversed by the Pareora and Otaio rivers, a district of basic importance in the nomenclature of Tertiary stratigraphic classification. Unfortunately for Gudex, no adequately intensive study of New Zealand Tertiary Mollusca linked to stratigraphy had been carried out at this time. Consequently, the benefits that could well have resulted from his careful fieldwork and fossil collecting were not realized to anything like the extent that they deserved.

In later years he developed an intense interest in the flora of New Zealand and his 14 papers published in the Transactions of the Royal Society of New Zealand between 1954 and 1963 give a detailed and comprehensive account of the native flora of the Waikato.

On 15 March 1964 the Governor-General (Sir Bernard Fergusson) handed Mrs E. I. Gudex the insignia of the M. B. E. at a private reception in Cambridge. Ill health had prevented Mr Gudex from attending previous investitures.

- D. R. G. & J. M.

George Leslie Adkin, 1888 - 1964

George Leslie Adkin joined the Geological Survey staff in 1946 and retired in 1955. He was employed as Technician to the Paleontology branch and his very wide range of knowledge and interests, combined with his willing cooperation, outstanding neatness and consistent application to the job in hand, were greatly appreciated. His few highly useful years with the Geological Survey culminated in a major contribution to New Zealand stratigraphy: "Bibliographic Index of N. Z. Stratigraphic Names to 31 December 1950" (Dept. Sc. & Ind. Res.; N. Z. Geol. Surv. Memoir 9). He was the very man for this job and he certainly got a lot of pleasure in doing an exacting, thorough, accurate piece of work. He went on to compile a Bibliography of New Zealand Geology that has not yet been published.

For most of his life Mr Adkin was a farmer in the Levin district but his keen scientific interest showed up when he was still a young man. His first paper, "The Post-Tertiary Geological History of the Ohau River and of the Adjacent Coastal Plain, Horowhenua County" (Trans. N. Z. Inst. 43), was read before the Wellington Philosophical Society in 1910 when he was only 22, and must have entailed several years of careful observation before that. He was one of the early purposeful trampers in the Tararua Ranges, and his next paper (Tr. N. Z. I. 44) furnished convincing evidence of glaciation there, discovered by him in 1909. Altogether, he published some dozen geological papers, mostly dealing with geomorphology.

Later Mr Adkin became interested in Maori history and culture which became his main study but a strong geological slant remained to illumine this. His first publication on the subject, "Horowhenua: Its Maori Place-names and Their Topographic and Historical Background", appeared in 1948 (Polynesian Soc. Mem. 26), followed in 1959 by a similar work on Wellington district, "The Great Harbour of Tara". His knowledge of the geological history of the Paekakariki-Horowhenua area, with its raised shore lines, formed a solid basis for his study of the early Waitaha Middens, and it was to deciphering the history of the very earliest of the Maori colonizers of this area that his later energies were directed.

- J. M.

TARGET GULLY SHELLBED

Target Gully Shellbed has been re-exposed. Through the good offices of the major of Oamaru, Mr W.R. Laney, a large volume of overburden has been bulldozed away to remove overhanging loess and to improve the exposure previously available for collecting. This announcement is made only after much endeavour - some of it strenuous - by Otago staff and students over the last three years.

The locality is on a surveyed road line on the eastern side of the gully in a reserve which forms part of Oamaru Town Belt, and just to the north of a stand of timber (grid reference S136/539677.5). It is not marked on Gage's map in N.Z. Geological Survey Bulletin 55. Until the recent bulldozing it was still possible to recognize the excavation figured by Park with three boys for scale.

H.J. Finlay wrote of the Target Gully Shellbed "..... it is the richest fossil deposit in New Zealand", and noted its obvious importance as a standard for the Awamoan macrofauna. The excavation removes it from the list of localities which have deteriorated since Park's descriptions were made forty years ago.

- J.D. Campbell, R.M. Carter & B.D. Fahey

PERSONAL ITEMS

Mr H. HATTORI of the Geological Survey of Japan is spending a year with the N.Z. Geological Survey on a Japanese Government grant. He is attached to the petrology section in Lower Hutt and is working on the mineralogy and petrology of some high-grade gneisses from west of the Alpine Fault in Westland and Nelson.

During the Geological Survey conference at Takaka in May, many members of the Society met Professor T. MATSUMOTO, who has not long retired from the chair of geology at Kumamoto University, Kyushu, Japan. Professor Matsumoto, who is especially known for his detailed studies of the Aso Volcano calderas in Kyushu, has just spent several weeks examining the Rotorua - Taupo region, and is now in Australia for a short visit before returning to Japan.

Dr E.I. ROBERTSON, formerly Director, Geophysics Division, was recently appointed an Assistant Director-General of D.S.I.R. in Wellington. His place at the Geophysics Division has been taken by Dr F.F. EVISON, who was previously Superintendent of the Seismological Observatory, Kelburn. Dr Robertson

was on the committee of the Society from 1962 to 1964, while Dr Evison is at present a committee member. Congratulations are extended to them from the Society on their appointments.

Dr W. D. MEANS, Senior Lecturer in Geology, University of Otago, has resigned and is now holding a NATO Fellowship at the Department of Geophysics, Australian National University, Canberra. During his stay of nearly four years in New Zealand his primary research interest has been the study of mesoscopic structures of metamorphic rocks, both description and analysis of them in the field and, latterly, on an experimental basis, production of them artificially. In this he has done much to excite and influence work on the schists in Otago and in New Zealand generally. Because of his competence in research and his extremely able teaching, it is New Zealand's loss that only a comparatively small number of students should have been privileged to come under his care.

Mr D. G. BISHOP and Mr D. KER have recently joined the N. Z. Geological Survey. They are attached to the recently formed Economic Geology section and will be based in Lower Hutt.

Dr G. NORRIS, formerly in the Palaeobotany section at the Geological Survey, Lower Hutt, resigned recently and is now in Canada, where he has a post-doctoral fellowship at McMaster University, Hamilton, Ontario. During his stay in New Zealand he worked particularly on fossil microplankton, mainly from the Mesozoic. The best wishes of the Society are extended to him and his family for the future.

Congratulations are extended to Dr JANE SOONS, lecturer in geography at Canterbury University, who has been awarded an Erskine Travelling Fellowship to study in the United States. She will leave New Zealand for three months in August 1965.

Dr ROGER MARTIN recently left Wellington for Sydney on his way back to the United States after completing a Ph. D. at Victoria University. During his stay in New Zealand he carried out research on the volcanic rocks, particularly the ignimbrites, of the Taupo - Rotorua region. He also worked for the Geological Survey, both in Rotorua and Lower Hutt, and for some months did surveys for underground water supplies for N. Z. Forest Products Ltd, Tokoroa. The Society extends best wishes to him and his wife for the future.

Mr R. M. CARTER has joined the staff of the Geology Department, University of Otago, as Assistant Lecturer. He spent seven weeks on Pitcairn Island during the summer as geologist to the Otago University Anthropological Expedition.

NEW MEMBERS

The following people have joined the Society since the last list was published in Newsletter No. 15.

Mrs A. Campbell, 419 Main North Road, Christchurch 5.

Mrs J. K. Campbell (née Adamson), Geology Department, University of Canterbury, Christchurch.

Mr E. T. Coppard, Waiomu, Thames Coast.

Mr R. Farmer, Geology Department, University of Canterbury, ChCh.

Mr R. A. Garrick, Geophysics Division, D. S. I. R., Wellington.

Mr W. R. Lauder, Geology Department, Victoria University, Wellington.

Mr J. A. D. Nash, Head Office, D. S. I. R., Wellington.

Mr S. G. Nathan, Geology Department, University of Canterbury, ChCh.

Mr P. C. Rickwood, Geology Department, University of Otago, Dunedin.

Mr B. W. Riddolls, Geology Department, University of Canterbury, ChCh.

Mr J. B. Seeley, 20 Burnley Terrace, Mt Eden, Auckland.

Mr R. D. Stanley, 12 Totara Ave, Matamata.

Mr D. J. Stanton, Cawthron Institute, Nelson.

Miss D. P. Warren, St George's Hospital, Papanui Road, Christchurch 1.

Dr D. O. Zimmerman, Geology Department, University of Auckland, Auckland.