# Newsletter of

# The Geological Society of NEW ZEALAND

No. 12 JULY 1962

GEOLOGICAL SOCIETY OF NEW ZEALAND NEWSLETTER

No. 12 July, 1962

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## UNIVERSITY OF CANTERBURY GEOLOGY DEPARTMENT

This year has been one of continued expansion and alteration in the department. Academic staff has been increased to six, and there is now a full-time Senior Technician. Additional space for laboratories and students' studies has been obtained from the old engineering school. Mr David Jones, formerly a technician with the Falkland Islands Dependencies Survey at Birmingham University, arrived at the beginning of the second term. His wide experience is being used to great advantage by both staff and students.

The sedimentary laboratory, established jointly with the Geological Survey, is now functioning. The laboratory has most of the standard equipment required for basic sedimentary research, and student laboratory classes in this subject can now be carried out more effectively with the better facilities and increased space. Besides laboratory classes, the laboratory is used by geography and geology research students; by two members of the Geological Survey, Dr Kingma and Mr Andrews; and by Dr Sevon, who is studying the lateral variation of sands along Farewell Spit.

Professor Allan, who has been overseas on sabbatical leave since August, 1961, is returning this August. He travelled to England by way of the United States, where he lectured at several universities and inspected the geology displays at various museums en route. On arrival in England he settled into the Sedgwick Museum, Cambridge, where he is working on Recent Antarctic brachiopods. Dr Gage has been Acting Head of the department in his absence.

Dr H.S. Edgell left the department for Australia during the May vacation.

There has been an overall in crease in student numbers this year, bringing the total to about 240, including engineering students. This number includes six M.Sc. students and one Ph.D. student. Mrs Dawn Seed, who graduated with first class Honours in Physics, is the first student to enroll for a Ph.D. in the department. She is making a study of the properties of New Zealand glauconites, with special regard to their structure, in the hope that this will lead to some correlation of structure with origin.

Three M.Sc. students are working on theses, namely: Jocelyn Adamson - The structural geology of the Lake Rotoiti area; Kelvin Ligget - The stratigraphy of the Mt Herbert area of Banks Peninsula; and Dave Phillips - The geology of the Inangahua district. Don Young presented his thesis on the loess deposits of the Oamaru district earlier this year, and has now taken up an appointment with the Geological Survey in Greymouth.

- Dawn Beck

GEOLOGY DEPARTMENT, VICTORIA UNIVERSITY OF WELLINGTON

New Appointment. Mr M.H. Briggs, who has been a lecturer in biochemistry at the Chemistry Department for some years, has been appointed Senior Lecturer in Pedology. He is no stranger to the Geology Department, having interests in fossil amino-acids and in possible life forms in meteorites.

Arrivals from overseas. Dr Donald H. Kupfer, Associate Professor of Geology, Louisiana State University, arrived in June for a stay of one year on a National Science Foundation Senior Fellowship. He is a structural geologist and will be studying the Alpine Fault and associated faults.

Miss N.J. Downing, from Smith College, Massachusetts, has received a Fulbright Grant and is expected here shortly to work on present day foraminifera from the Oceanographic Institute collections.

Departures. Jim Aronson, that jet-propelled Texan, departed for California at the end of June. He shipped back much of New Zealand for absolute dating work.

Mr W.R. Lauder departs in August for extended refresher leave overseas and will not be back until the beginning of 1964.

Research.

1. Mapping. Roger Cooper and Ian Willis have carried out some fine detailed mapping in the lower Palaeozoic rocks of north-west Nelson. The former has mapped the Pikikiruna Range and Upper Takaka Valley, determined a detailed stratigraphic column for the area, and discovered several new fossil localities, most of them in the Mount Arthur Marble, but a few in other parts of the column. Four new fossil localities in the marble were also discovered farther to the north, by part of the Stage II class during their excursion to Takaka in May this year. Ian Willis has determined with a fair degree of certainty the relationship of the Baton River Devonian to the surrounding rocks, has mapped the band from which the well known Baton River fossils were collected, has collected and mapped several other fossil bands, and has determined the stratigraphic column.

Des Cowie, Soil Bureau, Palmerston North, preparing a thesis for M.Sc. on late Pleistocene and Holocene deposits and surfaces in the Manawatu district, has mapped isopachs of the ash first discovered at Aokautere, determining its direction of origin. He has also mapped isopachs of loess overlying the ash and gained good evidence of the source of much of the loess.

Colin Laing, late of B.P., Gisborne, and Noel O'Byrne, Soil Conservation, Palmerston North, are mapping areas of upper Cretaceous and Tertiary rocks in north Wairarapa - southern Hawkes Bay. Colin Laing's area includes Weber and part of the Whangai Range, and his work involves some revision of the old stratigrapgic divisions, Whangai, Wanstead, and Weber.

Gerrit Neef's mapping of the Eketahuna district is near completion. By careful examination of lithologies he has succeeded in defining facies changes in what was a fairly deep basin, and has been able to show them on a geological map.

Jim Wilkinson is taking up the Ngahape area in the Wairarapa. A week was spent there last year by members of the V.U.W. Geological Society, and a fair number of Cretaceous fossils were found, including several ammonites. Jim Eade is engaged in field work in Cretaceous - early Tertiary rocks north of the mouth of the Pahaoa River, Wairarapa.

2. Palaeontology. Jim Kennett has completed two short papers on Kapitean foraminifera. One is an account of the Kapitean succession at Cape Foulwind, with a range chart of species. The other is a description of gradual change in the Textularia miozeakapitea lineage in the Tongaporutuan, Kapitean, and Opoitian stages in the Cape Foulwind section. Graham Gibson is pushing on with the description of Tongaporutuan foraminifera, and expects to be finished by next April.

So far Tom Haskell has palynological samples fully prepared from a section in the Clarence Valley, and from the Mangaotane Stream section, Raukumara. Samples collected at Motu proved to be barren. Graeme Wilson is to commence work on a palynology thesis. We are very much indebted to Dr Harris and Mr McIntyre at the Geological Survey for their advice and assistance.

Mr P. Vella is at present writing up an account of foraminifera in upper Miocene turbidites near Mauriceville, Wairarapa. The foraminifera include key species of several different biofacies representing different depths inferred to range between 0 and more than 2,000 ft. The proportion of deep- and shallow-water shells changes from the bottom to the top of each turbidite rhythm. Work has been started on foraminifera dredged by the N.Z. Oceanographic Institute from the Ross Sea. Two papers on foraminiferal taxonomy and two on stratigraphic palaeontology are in press, and two papers on Pleistocene stratigraphy of the Wairarapa are being prepared.

3. Petrology. Roger Martin is studying refractive indices of igneous glasses. Dick Walcott is about to commence work on the petrology and structure of part of the Red Hills. Bob Brathwaite will be working on the petrology and structure of the Boulder Lake area, north-west Nelson. Professor Clark is examining the serpentinites in the Collins Valley, following up work carried out in California on the fusion temperature of a serpentinite.

4. Structural Geology. Dr Wellman is working on two short papers, one on distortion of fossils at Reefton, the other on crustal shortening in the Hawkes Bay area at the time of the Napier earthquake.

5. Antarctica. V.U.W.A.E. 6, under the leadership of Ian Willis, and including Dr Charles C. Rich of Bowling Green University, Ohio, U.S.A., already well known to N.Z. geologists, will carry out geological and

topographical reconnaissance and glaciation studies in the Darwin Glacier area. They may be joined there for a short time by V.U.W.A.E. 2 leader, Dr C. Bull, now of the Institute of Polar Studies, Ohio State University. Two possible additional parties, V.U.W.A.E. 7 and 8, may continue studies of solar-heated lakes begun by Drs Wellman and Wilson last year.

6. Publications. A limited number of reprints of papers published from the department during the last 18 months or so are available, and can be obtained by writing to the Secretary, Geology Department, Victoria University of Wellington.

- Paul Vella

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## V.U.W. GEOLOGICAL SOCIETY

In July, 1961, a very successful field trip of one week's duration was held to the Ngahape district in the eastern Wairarapa. The party of 14 was accompanied by Mr Vella, and Dr Wellman was present for three days.

During 1961, two symposia were held by the Socie ty. The first, on "Slaty Cleavage", was chaired by Mr Willett, with Dr Ewart, Dr Evison, and Dr Wellman as speakers. The second, entitled "The Origin of Petroleum, Inorganic or Organic ?", was chaired by Mr Vella. Speakers were Mr M.H. Briggs, Dr A.T. Wilson, and Dr Wellman. Both symposia were well attended, as were the Society's other evenings throughout the year.

After the 1962 Annual General Meeting, the Society combined with the V.U.W. Biological Society, to hear a talk by Dr C.A. Fleming, on "The Biogeography of New Zealand".

This year the field trip during July is to be to the lower Awatere Valley in Marlborough, and will be led by Dr Wellman.

- J.C. Wilkinson,
Secretary.

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From Geotimes Vol. 6, No. 5, January-February, 1962.

"Much as we would like to, we are unable to evaluate "Project Ideas in the Earth Sciences", a pamphlet recently issued by the U.S.G.S. The copy that we received contains the following ing pages in order: 3, 4, 3, 4, 9, 10, 9, 10, 13, 14, 15, 16. The first part seems both disjointed and repetitive. It picks up a bit towards the end." - Robert L. Bates.

NOTES FROM AUCKLAND

Auckland Section.

On June 1 the Auckland branch of the Society held the first of the winter series of meetings, and the topic for discussion was the four-mile maps of Northland so far published (sheets 1, 2A, 2B). David Kear and Bruce Thompson outlined some problems met with during construction of the maps as well as compromises adopted in stratigraphic correlation and age assignation.

Geology in Northland always produces debates, and this was reflected in the two and a half hour question-and-answer period that followed. Some of the points raised are worthy of record.

The occurrence of Permian fossils in the Whangaroa - Bay of Islands area was not unanimously accepted as a good reason for extrapolation of a core of Permian sediments in the greywacke belt to as far south as Whangarei. Similarly, there was resistance to the Taranaki age given to Arnold, Dannevirke, and Mata sediments which had slumped or been overturned subsequent to deposition; this was felt to be a tectonic feature comparable with the superposition of Alpine greywackes over Pleistocene moraine in the South Island. A Taranaki age for the Silverdale serpentinites appeared equally anomalous since in the field they are not known to intrude any beds younger than Mata.

Sediments and volcanics of Waitemata Group still provide many problems. Fossiliferous members at Hukatere Peninsula have been mapped as Pareora, including the Altonian macrofauna of Pakaurangi Point, and re-definition of some Pareora and Southland stages is obviously needed. Intrusive and flow rocks of Tangihua Volcanics, Manukau Breccia, and Kerikeri Volcanics always raise difficulties; these difficulties were emphasised on the four-mile map (sheet 2A), where olivine basalts in the Tinopai-Tokatoka area have been variously included in each of these three formations.

The use of faults on the map was discussed at some length, particularly where inferred lines were drawn between widely separated serpentinite bodies. The symbols for "inferred" and "concealed" faults possibly are not adequete since a number of faults appear on the map to be both inferred and concealed. In an error of omission the Whangarei Harbour fault and a major east-west break through Parua Bay were not inserted.

The meeting closed in a stimulating atmosphere of cordial debate, with those in the body of the hall very thankful that they had not been asked to attempt a synthesis of Northland geology.

- R.N. Brothers

At the same meeting the section's annual meeting was held, the new officers being Mr B.N. Thompson, Chairman, and Mr J.A. Grant-Mackie, Secretary.

Future meetings will continue to be held in the Geology Department, University of Auckland, usually on the first or last Friday of each month (July to October) at 8.00 p.m. It is anticipated that speakers will include Dr D.F. Squires (Smithsonian Institution, Washington), Dr R. Coleman (U.S.G.S.), and Professor E.J. Searle.

Geology Department, University of Auckland.

Since the last Newsletter was issued three Honours students have completed their M.Sc. and taken up positions: with the West Australian Geological Survey (D.C. Lowry), the South Australian Geological Survey (D. Smale), and in the Greymouth office of the N.Z. Geological Survey (M.G. Laird). Three new thesis studies have been commenced:

Miss P.M. Black, on the petrology of volcanic rocks and associated skarns in the Tokatoka area, Northland.

Mr J.M.A. Chappell, on Quaternary levels and deposits of the south-west Auckland - north Taranaki region.

Mr G.D. Mansergh, on the petrology and geomorphology of the Kerikeri Basalts in the Whangarei district.

Last summer Mr V.R. McGregor was a member of the D.S.I.R. Antarctic Division's southern field party (see p.11), and next summer another Honours student, Mr P.J. Barrett, will accompany the University of Minnesota expedition to the Ellesworth Mountains, an extension of the Grahamland chain, West Antarctica.

Academic staff remains the same as last year, but Miss Black has been taken on as a technician and is to be concerned primarily with curating the department's rock collections.

- J.A. Grant-Mackie

Geological Survey, Otahuhu.

As the office became increasingly boxed in with double-decker houses durint last summer, work from Otahuhu proceeded on the mapping for 1:250,000 sheets 3, 5, and 7, on investigations into iron sand resources, and on the detailed water supply problems of the Silverdale-Waiwera region of Northland. The prospecting, production, and utilization of local industrial minerals has become an increasing source of enquiry and investigation. The most topical are limonite for steel mills and cement making; high-alumina clays and high grade limestone for a wide variety of uses; copper, manganese, and serpentine for fertilizers; silica sand, principally for glass products; white fine clays for paper fillers; and all the more usual and recurring diatomites, pumicites, road metals, sands, hot waters, and the like. Industry appears to be increasingly aware that the "traditional" industrial minerals of Europe and America are not used widely without considerable technological investigations. Similar investigations with industrial minerals here are showing that far more than were realised can produce equally good results when, perhaps, slightly different techniques than those used overseas are applied.

There have been several overseas visitors. Dr R.G. Coleman had a look at the three different types of North Island serpentinite deposits, and stimulating arguments and discussions resulted. Mr Burton Ashley, the Minerals Officer of the U.S. Embassy in Canberra, whose territory includes

the S.W. Pacific, came to see North Island mineral deposits, especially iron sand and coal. Monsieur R. Priam, Inspector of Mines at Port Vila, New Hebrides, whose normal responsibility is a single manganese mine, but whose interests include volcanology, was here as a guide for Professor Geze to see the North Island ignimbrites.

- D. Kear

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## FREDERICK THOMAS SEELYE, F.R.S.N.Z.

### AN APPRECIATION

**(Editorial note: The late Mr F.T. Seelye was not a member of the Geological Society of New Zealand, but was very well known to New Zealand and overseas geologists for his analytical work. He was with the Dominion Laboratory in Wellington for many years, and gained an international reputation for the quality of his rock and mineral analyses, very many of which are published in geological papers and bulletins over the past thirty years. Professor C. Osborne Hutton, of Stanford University, California, has kindly sent the following appreciation of Mr Seelye and his work.)**

I have just been informed that Mr F.T. Seelye, an officer of the Dominion Laboratory for many years, has passed away. This unhappy news vividly recalls to mind a very pleasant period of association with him when I was with the New Zealand Geological Survey, then situated on The Terrace, in Wellington. From a purely personal point of view, I should like to acknowledge fully my indebtedness to this fine chemist, for without his remarkable skill much of my own work would have been rather pointless. In particular, I recall the care that he took and the intense interest that he displayed during the study of radioactive minerals some twenty years ago. It was such characteristics as these that made one doubly careful to be quite certain that a mineral fraction was absolutely pure before one ever thought of submitting it to him for analysis. So upon a second point I am grateful to him.

His ability to determine, with great precision, a large number of constituents when he was presented with a meagre half-gram of pure mineral powder was quite astonishing. I can recall many occasions when I would visit him in his attic-like laboratory in Sydney Syreet West to inquire anxiously about his progress with some particular problem. There I would find Mr Seelye, usually in an atmosphere made quite hazy by ammonium chloride, bent over some work on the bench that faced a small window looking out towards the rear of Parliament Buildings, and in his quiet, gentle way he would show me his figures for the constituents he had been asked to determine. Almost without fail, he would add that it had just been possible to determine a number of extra constituents, by the way, because he thought that such additional data might be helpful. It was especially typical of the man that he would always attempt to do more than was requested of him and that the extra information was always significant

from a mineralogical point of view.

The details I have noted here represent but a very small proportion of his contribution. The contents of the bulletins of the New Zealand Geological Survey, for many years back, have been greatly enriched by the analyses that were the work of this able officer, but all too commonly acknowledgement may be covered by the matter-of-fact statement that "--- all analyses are the work of the Dominion Analyst and his Staff." Furthermore, through the courtesy of the Directors of the Geological Survey and Dominion Laboratory, Mr Seelye contributed very significantly to the research work of several members of university geology departments in New Zealand.

After the end of World War II, the U.S. Geological Survey, the Geophysical Laboratory of the Carnegie Institution of Washington, and the Geology Department of the Massachusetts Institute of Technology cooperatively prepared uniform powders of two rock samples - granite sample G-1, and diabase sample W-1. The purpose of this work was to provide a means whereby analysts anywhere could check their techniques, and at the same time provide control both within and between different laboratories. Mr Seelye was one of 34 analysts, throughout the world, asked to submit analyses of each of the standard samples. Eventually the results were collected together from all sources, and published, but analysts were not identified beyond the fact that they had submitted analyses. I believe that it would not be a breach of confidence now to state that Mr Seelye's analyses fell into that very small select group of first class data.

Mr Seelye's work was especially valuable to the geologist because of his awareness of problems that faced the mineralogist and petrographer, and, furthermore, this led him to analyse and study a wide variety of petrological materials on his own initiative. I am unable to catalogue each of these individual items of research, but let me note a few of them. He discovered the pantelleritic nature of a number of New Zealand obsidians, noted the interesting Mg/Fe ratios in a pinite and the cordierite from which it was derived, undertook some significant work in connection with the estimation of divalent iron in refractory silicates and other compounds, and made me aware of the need for a modern and very complete analysis of a very carefully selected, representative sample of dunite. And so one could go on. I will always regret, however, that Mr Seelye did not publish more of his own researches, but he was a man of extreme modesty; far, far too often he tended to hide his light under a bushel, but I must confess that I respected him the more for it.

I deeply regret the passing of this fine, humble scholar and gentlemen. It was indeed an honour and a privilege to have been associated with him.

C. Osborne Hutton,
School of Mineral Sciences,
Stanford University,
Stanford, California, U.S.A.

## INTERNATIONAL UNION OF GEOLOGICAL SCIENCES

The International Union of Geological Sciences was formed at a meeting held in Paris on 9-10 March, 1961. The Union is an offspring of the International Geological Congress, which has held 21 sessions. The first session was in Paris in 1878, and the twenty-first session was held in Copenhagen in 1960.

The statutes of the Union were adopted at the inaugural meeting and list the following objects:

(a) to promote and encourage the study of geological problems.

(b) to facilitate international cooperation in geology and related sciences.

(c) to provide continuity in international cooperation in geology and related sciences.

(d) to assist the International Geological Congresses, it being understood that the long-established activities of the Congress shall be safeguarded.

The complete statutes were reprinted in Geotimes 6 (5), Jan.-Feb., 1962. At that time there were 41 member countries, as follows:

Argentina
Australia
Austria
Bolivia
Belgium
Canada
Czechoslovakia
Cyprus
Denmark
Federal Republic of Germany
Federation of Malaya
Finland
France
German Democratic Republic
Ghana
Guatemala
Hungary
Iceland
India
Italy
Japan
Luxembourg
Madagascar
Morocco
Netherlands
Nigeria
Norway
Poland
Republic of China
Republic of South Africa
Rumania
Spain
Sweden
Switzerland
Tanganyika
Thailand
Tunisia
United Kingdom
United States of America
U.S.S.R.
Yugoslavia

The Executive Committee is:

President: J.M. Harrison, Canada
Vice-Presidents: L.I. Gorski, U.S.S.R.
L. Hawkes, U.K.
T. Kobayashi, Japan
Lamego, Brazil
J. Lombard, France
B.C. Roy, India

General Secretary: Th. Sorgenfrei, Denmark
Treasurer: J.A. Dons, Norway

The business address is:

International Union of Geological Sciences,
Secretary-General,
Tranegaardsvej 20,
HELLERUP,
Denmark.

The IUGS was admitted to membership of the International Council of Scientific Unions in September, 1961.

A country may be represented in the Union by either its national committee for geology, its national academy, or through another representative body of geologists appointed by the Government of the country. At present the annual subscription ranges from 150 U.S. dollars, entitling the country to one vote, to 2,250 dollars with eight votes.

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## TWENTY-SECOND INTERNATIONAL GEOLOGICAL CONGRESS

The next International Geological Congress will be held in New Delhi, India, from the 14th to 22nd December, 1964. There will be field excursions to various parts of India both before and after the Congress. The President of the Organizing Committee in Dr A.N. Wadia, and Mr B.C. Roy is Secretary-General.

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## COASTAL RESEARCH NOTES

A review of the first issue

Coastal Research Notes is a cyclostyled report on the activities of coastal workers throughout the world, and is produced under the auspices of the Geological Society of America. Their aim is "to provide a ready means of exchange of information among workers in the wide variety of scientific disciplines concerned with coastal research." It is not a medium for the publication of completed works but gives notice of research currently in progress or being planned. These, including "announcements, trips, visits, conferences, conventions, meetings, reviews, and other items of interest should be submitted to: Dr W.F. Tanner, Florida State University, TALLAHASSEE, Florida, U.S.A."

Two issues a year are being considered, the annual subscription being one dollar (U.S.) for subscribers in the U.S.A., but may be more for those overseas. The next issue will probably be published in October, 1962. Subscriptions should be sent to: Dr David Smith, Coastal Studies Institute, Louisiana State University, BATON ROUGE, Louisiana, U.S.A.

The first issue of 23 quarto pages and of close on 100 contributions was produced in February, 1962. It covers a wide field including coastal processes, coastal sedimentation, coastal morphology (past and present), oceanographic studies (including deep water sedimentation and subaqueous erosion), zoological and ecological studies. Miscellaneous contributions include chemistry of sea water, fluid mechanics, reviews, changes of address, notice of lectures, reports of meetings, and available literature. Although most of the contributions come from the U.S.A., others are from Holland, Israel, Sweden, France, Germany, England, South Africa, Australia, Canada, and New Zealand.

Those responsible for the "notes" are to be congratulated. Not only do they give notice of fresh names, with addresses, in any one particular line of research, but contributions on fringe topics give some idea of whether their results may or may not be of use. Presentation, however, could be improved without much additional time or cost being involved. It would help tremendously if the contributions were numbered and arranged under headings such as Coastal Processes, with cross references to contributions that contain information concerning two or more such headings.

- J.C. Schofield.

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## ANTARCTIC FIELD WORK, 1961-62

### New Zealand Southern Party

This summer, field parties of the N.Z. Geological Survey Expedition were engaged in topographic and geological mapping on the Polar Plateau (south-western) side of the mountains bordering the Ross Ice Shelf. The Northern Party covered the portion between the Nimrod and Beardmore Glaciers, while the Southern Party's area was from the Beardmore to the Axel Heiberg Glacier, 160 miles to the south-east. Most of the Southern Party's geological work was done in the Dominion, Commonwealth, and Grosvenor Ranges on the east side of the Beardmore, where relatively large ice-free areas are present. On either side of the Shackleton Glacier, 100 miles to the south-east of the Beardmore and also fed from the Polar Plateau, are other large ice-free areas, but only the most southerly of these was visited. Beyond the Shackleton, no further geological work was done from the Plateau, as the mountains are almost completely ice-covered, apparently a reflection of the very heavy precipitation noted by the party while working in the area.

The party, ably led by Wally Herbert, F.R.G.S., was landed by U.S. Navy R4D at an altitude of 9400 ft at the head of the Mill Glacier, a large tributary of the Beardmore. Throughout the following three months we travelled at high altitudes, never below 7000 ft, and the average height at camp sites was a little over 9000 ft. Near the head of the Wade Glacier, one dog team sledged to the summit of a 12,000 ft snow dome with the other in close support a little lower down. During the first half of the the journey the weather was generally fine but with temperatures between 0° and -30° F. The rocks first encountered were a thick sequence of sheet-like flows of olivine-free basalt, and dolerite sills, both of which may be highly altered in their upper parts, with spectacular amygdales of zeolites, well crystallized quartz, and banded chalcedony. They comprise the youngest formation of the Beacon Group in the area. At the foot of a nunatach composed of these lavas, the most southerly point reached, a small erratic boulder of dark shale containing a relatively rich flora was found. The pteridosperm Thinnfeldia is dominant, and the plants appear to belong to the Thinnfeldia flora which characterises the Triassic of other Gondwanaland areas. The discovery of these fossils, only 260 miles from the South Pole, on what must be one of the bleakest areas of exposed rock in the world, was a great boost to the party's morale at a time when we were all suffering from minor frostbite.

Following this, we sledged north and crossed the 14-mile-wide Mill Glacier to visit the Dominion Range, then retraced our path, and travelled down a broad valley to the edge of the Kellie Glacier, another tributary of the Beardmore. There is some magnificent mountain scenery around the latter glacier, and a highlight of the work was an ascent of Mt Usher (ca. 12,400 ft), the highest peak of the Commonwealth Range. Most of the geological work was done in these two areas. The rocks belong to the Ferrar Dolerites and the upper part of the Beacon Group. Six sections of Beacon sediments were examined, but since they were of limited vertical extent compared with the thickness of the lithological groups, there is some uncertainty about the sequence of formations. Coal measures are the most widespread unit and include composite seams up to 30 ft thick (including shaly partings). One was found altered to a good quality graphite by an adjacent dolerite sill. Silicified branches and stumps are relatively abundant, and fairly well preserved floras were found in situ in three places. One of these consists almost exclusively of Glossopteris. Dolerite intrusion in the upper part of the Beacon sequence seems to be much less regular than usual and gives the impression of blocks of sediment immersed in a "sea" of dolerite. Baking of sediments seems to be rather more intense than has been found elsewhere.

Some interesting examples of glacial capture and reversal of drainage occur where the active Wade Glacier, draining an area of relatively high precipitation, is back-cutting into the upper tributaries of the Kellie Glacier. This is presumably because of the lower base level of the Wade, which drains directly onto the Ice Shelf, whereas the Kellie drains into the upper Beardmore.

After leaving the Kellie we sledged across the Plateau to the head of the Shackleton Glacier. Several sections of Beacon rocks were examined there but cannot be accurately correlated with the Beardmore sequence.

Over Christmas the party was pinned down by the first of a series of long blizzards which became more frequent towards the end of January. Between the 21st December and the 1st February we had only one fine day, which was used to advantage by the Americans to drop long-overdue Christmas mail and a sledge runner to replace one broken some weeks earlier. As time began to run out, the topographic survey work became increasingly more critical, and geological work was shelved in an attempt to complete the minimum number of survey stations. The efforts of surveyor Peter Otway and field assistant Kevin Pain were finally successful, and the total area surveyed was about 16,000 square miles.

The climax to our trip came towards the end, when we climbed the 13,700 ft Mt Fridjof Nansen and made the second descent of the steep Axel Heiberg Glacier, first used by Amundsen 50 years ago on his journey to the South Pole. We were flown back to Scott Base from the Ice Shelf at the foot of Axel Heiberg, having sledged 755 miles in 95 days.

- V.R. McGregor

## Northern Party

The northern party of the two parties landed near the head of the Beardmore Glacier consisted of two surveyors and two geologists - R.I. Walcott and the writer. The geology of the Beardmore-Nimrod region, where we worked, had been briefly examined by the Polar parties moving up and down the Beardmore Glacier and by the southern party of the Trans-Antarctic Expedition. None of these parties included trained geologists, although the plant fossils brought back by Scott's party from Mt Buckley made the first record of the Permian Glossopteris flora from the Antarctic continent. On last season's traverse, this record was abundantly confirmed and extended, collections being made from about a dozen localities between the head of the Beardmore and the southern part of the Queen Elizabeth Range, 80 miles to the north. The section of Beacon sediments in the Queen Alexandra Range is probably the thickest and most complete yet examined, totalling about 13,000 ft, of which about 6,000 ft consist of interbedded dolerite sills and basaltic lavas, referable to the Ferrar Dolerites. The Beacon sequence examined shows a great resemblance to the continental sediments of Gondwana age in South Africa, South America, Australia, and India, as well as elsewhere in Antarctica, especially the Horlick Mountains, 300 miles to the east. The most notable feature is the occurrence, near the base, of Permo-Carboniferous tillite containing abundant striated boulders of granitic and metamorphic rocks. Varved sediments indicating a sub-glacial climate were found higher in the sequence interbedded with the Glossopteris-bearing coal measures.

A new discovery, for Antarctica, was the occurrence of a small lens of sediment containing reptile bones in the Glossopteris-bearing coal measures at the head of the Beardmore Glacier.

Basement rocks were examined in three areas. In the ranges bordering the plateau edge at the head of the Nimrod Glacier are folded high-grade

metamorphic rocks of the almandine amphibolite facies intruded by syn-tectonic granites with sillimanite-bearing border facies. In the eastern part of the Queen Alexandra Range are low-grade schists and phyllites intruded by post-tectonic granites, similar to those exposed in the Mt Markham region to the north. At the head of the Beardmore Glacier occur abundant erratic blocks of Archaeocyathus-bearing limestone, together with indurated calcareous conglomerate. These sediments, not seen in place, are similar to the Cambrian fossiliferous beds of the lower Nimrod Glacier found by the 1960-61 expedition, and shown to be part of the basement rocks of that region.

In all, the party spent about 8 weeks in the field, sledged over 500 miles, and surveyed a total area of some 10,000 square miles, including three previously unmapped or partly mapped mountain ranges. The largest of these - the Queen Alexandra Range, flanking the Beardmore Glacier - is 120 miles long and averages 30 milesin width, equivalent to a good part of the Southern Alps. Fortunately the geology was relatively straightforward. Twenty survey stations were occupied, including one in the Marshall Mountains of 12,500 ft. In addition, a peak - Mt Falla, 13,500 ft, and third highest in the Queen Alexandra Range - was climbed for geological reasons.

- G.W. Grindley

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## AUSTRALIAN ACADEMY OF SCIENCE - J. ELLERTON BECKER FUND

The Australian Academy of Science has sent the following information regarding Fellowships being offered from the J. Ellerton Becker Fund. The Academy has a sum of money available from this Fund to provide substantial assistance to several senior scientists to make short-term visits to Australia. Great flexibility is intended in the administration of the Fund; no restrictions are imposed with respect to subject, nationality, or occupation of the men to be appointed.

The Academy would welcome enquiries from scientists of professional standing or the equivalent who may wish to visit Australia in connection with their own scientific researches or to confer with Australian workers.

Fellows would normally be expected to take part in colloquia, and to deliver a limited number of lectures in one or more of the major cities of the Commonwealth. They would, however, largely determine their own programmes. A minimum period of one month would be desirable for any visit, but visits of longerduration would be welcomed.

Information about the Fellowships should be sought from one of the Secretaries - Professor L.G.H. Huxley (Physical Sciences); Dr D.F. Waterhouse (Biological Sciences); Australian Academy of Science, Gordon Street, CANBERRA, A.C.T.

## SAM (DICTIONARY) JOHNSON - GEOLOGIST

Contributed by W.R. Lauder

In the Autumn of 1773 Sam Johnson and James Boswell toured the highlands and the western islands of Scotland. Both wrote accounts of the journey (1). Boswell, interested only in human nature, admits (p. 272) that "---- I find a great difficulty in describing visible objects." Johnson, however, has the analytical mind of a scientist (p. 35),

> "As we see more, we become more possessed of certainties, and consequently gain more principles of reasoning, and find a wider basis of analogy."

and he realised the difficulty of objective scientific observation (p. 26):

> "Lough Ness is about twenty-four miles long, and from one mile to two miles broad. It is remarkable that Boethius, in his description of Scotland, gives it twelve miles of breadth. When historians or geographers exhibit false accounts of places far distant, they may be forgiven, because they can tell but what they are told; and that their accounts exceed the truth may be justly supposed, because most men exagerate to others, if not to themselves: but Boethius lived at no great distance; if he never saw the lake, he must have been very incurious, and if he had seen it, his veracity yielded to very slight temptations."

Johnson's paragraphs (p. 34) on the heights of mountains are interesting:

> "The height of mountains philisophically considered is properly computed from the surface of the next sea; but as it affects the eye or imagination of the passenger; as it makes either a spectacle or an obstruction, it must be reckoned from the place where the rise begins to make a considerable angle with the plain. In extensive continents the land may, by gradual elevation, attain great height without any other appearance than that of a plane gently inclined, and if a hill placed upon such raised ground be discribed as having its altitude equal to the whole space above the sea, the representation will be fallacious."

His knowledge (p. 34) of the importance of floods in carving stream channels is well in advance of scientific thought on the subject at that time:

> "We passed many rivers and rivulets, which commonly ran with a clear shallow stream over a hard pebbly bottom. These channels which seem so much wider than the water that they convey would naturally require, are formed by the violence of wintry floods, produced by

> the accumulation of innumerable streams that fall in rainy weather from the hills, and bursting away with resistless impetuosity, make themselves a passage proportionate to their mass."

Living in London, Johnson was in touch with scientists and was aware of recent discoveries (p. 56):

> "A proof much stronger of the distance at which the first possessors of this island [Raasay] lived from the present time, is afforded by the stone heads of arrows which are very frequently picked up. The people call them Elf-bolts, and believe that the fairies shoot them at the cattle. They nearly resemble those which Mr Banks has lately brought from the savage counteries in the Pacific Ocean, and must have been made by a nation to which the use of metals was unknown."

Johnson knew of the importance of economics in mineral exploitation, and his generalization on the relation of ore deposits to mountains is interesting (pp. 73 & 74):

> "In the Islands I have not heard that any subterraneous treasures have been discovered, though where there are mountains, there are commonly minerals. One of the rocks in Col has a black vein, imagined to consist of the ore of lead; but it was never yet opened or assayed. In Sky a black mass was accidentally picked up, and brought into the house of the owner of the land, who found himself strongly inclined to think it coal, but unhappily it did not burn in the chimney. Common ores would be here of no great value; for what requires to be separated by fire, must, if it were found, be carried away in its mineral state, here being no fewel for the smelting-house or forge."

Johnson theorised on the relative importance of rain and wind in sand-dune formation (p. 113):

> "Noise is not the worst effect of the tempests; for they have thrown the sand from the shore over a considerable part of the land; and it is said still to encroach and destroy more and more pasture; but I am not of opinion, that by any surveys or land marks, its limits have ever been fixed, or its progression ascertained. If one man has confidence enough to say, that it advances, nobody can bring any proof to support him in denying it. The reason why it is not spread to a greater extent, seems to be, that the wind and rain come almost together and that it is made close and heavy by the wet before the storms can put it in motion."

Johnson, however, could not put forward a reasonable explanation for the erratics on Col (pp. 113 & 114):

> "For natural curiosities I was shown only two great masses of stone, which lie loose upon the ground; one on the top of a hill, and the other at a small distance from the bottom. They certainly were never put into their present places by human strength or skill; and though an earthquake might have broken off the lower stone, and rolled it into the valley, no account can be given of the other, which lies on the hill, unless which I forgot to examine, there be still near it some higher rock from which it might be torn. All nations have a tradition, that their earliest ancestors were giants, and these stones are said to have been thrown up and down by a giant and his mistress."

Reference.

(1) Chapman, R.W. (Edit.), 1957.

Johnson's Journey to the Western Islands of Scotland, and Boswell's Journal of a Tour to the Hebrides with Samuel Johnson, LL.D. Oxford University Press, London.

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## ON THE ORIGIN OF EARTHQUAKES

The researches of the "Wellington Independent" reported in the last issue of the Newsletter (No. 11, pp. 18-19) appear to have been pillaged from earlier studies. Ammianus Marcellinus (A.D. 358) reports (Bk XVII, Ch VII):

> "Earthquakes are engendered either in small caverns under the earth, which the Greeks call _surigges_, because of the waters pouring through them with a more rapid motion than usual, or, as Anaxagoras affirms, they arise from the force of the wind penetrating the lower parts of the earth, which when they have got down to the encrusted solid mass, finding no vent holes, shake these portions in their solid state, into which they have got entrance when in state of solution. And this is corroborated by the observation that at such times no breezes of wind are felt by us above ground, because the winds are occupied in the lowest recesses of the earth.
>
> "Anaximander says that the earth when burnt up by excessive heat and drought, and also after excessive rains, opens larger fissures than usual, which the upper air penetrates with great force and in excessive

quantities, and the earth, shaken by the furious blasts which penetrate these fissures, is disturbed to its very foundations; for which reason these fearful events occur either at times of great evaporation or else at those of an extravagant fall of rain.

"And on this account in all priestly ceremonies, whether ritual or pontifical, care is taken not at such times to name one god more than another, for fear of impiety, since it is quite uncertain which god causes these visitations."

Contributed by J.D. Raeside

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## RECENT AWARDS

The congratulations of the Society are extended to the following members, for recent awards:

Mr M.C. GUDEX, Hamilton, was awarded the M.B.E. in the last Queen's Birthday Honours.

Professor D.S. COOMBS, University of Otago, has been given the Mineralogical Society of America Award for 1962.

Mr N. de B. HORNIBROOK, N.Z. Geological Survey, Lower Hutt, has been awarded a Nuffield Foundation Travelling Fellowship in Natural Sciences. He will leave later in the year to work in the British Museum of Natural History. Mr Hornibrook is also the recipient of the McKay Mammer Award for 1961 (see p.19).

Mr P.N. WEBB, N.Z. Geological Survey, Lower Hutt, and Mr B.C. McKELVEY, at present at the University of New England, Armidale, N.S.W., were awarded the Hamilton Memorial Prize of the Royal Society of New Zealand for 1962, for their geological work in South Victoria Land, Antarctica.

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## PERSONAL ITEMS

Dr C.A. FLEMING, N.Z. Geological Survey, Lower Hutt, is at present President of the Royal Society of New Zealand. Recently elected Fellows of the Royal Society of New Zealand include the following members of the Geological Society: Professor D.S. COOMBS, Dr M. GAGE, Professor A.R. LILLIE, Dr W.M. HAMILTON, and Mr R.W. WILLETT.

Mr J. HEALY, N.Z. Geological Survey, Rotorua, spent several weeks in Japan during May and June of this year. He attended the International

Symposium on Volcanology at Tokyo, and later visited several hot spring areas on consulting work.

Mr M.G. LAIRD and Mr D.J. YOUNG have joined the Geological Survey and are stationed at the Greymouth office.

Professor D.S. COOMBS, University of Otago, attended the Washington meeting of the International Mineralogical Association during April.

Dr D. GRAHAM JENKINS, who spent two years as micropalaeontologist for B.P., Shell, and Todd Petroleum Development Ltd in Gisborne, is at present on leave in Britain. He has been given a special appointment for 3 years by the N.Z. Geological Survey to study N.Z. Tertiary planktonic foraminifera, and will return to New Zealand in November.

Mr J.D. CAMPBELL, Geology Department, University of Otago, who was awarded a Nuffield Foundation Fellowship last year, left for Britain early in June. He will be working at the Sedgwick Museum, Cambridge, and will probably also visit Vienna in connection with his work on Mesozoic brachiopods.

Professor N.E. ODELL, who has been lately S.E.A.T.O. Professor of Geology in the University of Peshawar, West Pakistan, is returning shortly to England.

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McKAY HAMMER AWARD

The McKay Hammer for 1961 has been awarded to Mr N. de B. Hornibrook, N.Z. Geological Survey, Lower Hutt, for his bulletin "Tertiary Foraminifera from Oamaru District (N.Z.). Part 1 - Systematics and Distribution."

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Foot-note

Geologists' English is well known as needing persistent amendment by editors. A recent overseas editorial improvement resulted in:

"The Buller uranium deposit ---------- is so radioactive that long ropes, suspended from trees, have to be used for climbing down to many outcrops".

- D.K.

## TOWARDS A STABLE AND UNIFORM STRATIGRAPHIC NOMENCLATURE

by Paul Vella

The standard column of New Zealand Cretaceous and Tertiary stages, as originally established by Finlay and Marwick and later emended by Wellman, contains some anomalies which have recently become obvious. The anomalies can be eliminated in several ways, and all New Zealand geologists should give some thought to what should be done.

Before adopting any change as "standard" we should decide what is intended by our series and stage classification. A stage is a time-rock division - that is to say, it consists of rocks and is intended to be bounded by time planes. A series is merely a group of stages, and a system (one step higher in the classification) is a group of series. Stages are intended to be applicable to all facies, and over large areas - ideally, as Arkell thought of them, over the whole world - and the stage names are used as a standard language for classifying rocks according to their age.

A different kind of time division which has been recognised comparatively recently is the pelagic (planktonic) zone. This is a special, usually circum-global type of zone, different from stages and from conventional fossil zones, and to avoid confusion they should be carefully distinguished, especially from stages. In the future pelagic zones may replace stages for time-rock classification, but so far they are coarser and less useful than stages for most purposes.

The necessary changes can be made in accordance with either one of two guiding principles: they may be kept to a minimum to conserve the classification as nearly as possible as at present; or they may be made without restriction to make stratigraphic classification essentially a faunal classification. One change that has already been suggested - the change in the Cretaceous - Tertiary boundary, and another about to be put forward - follow the second principle, and are a precedent for extensive changes. The suggested suppression of the Wangaloan Stage represents yet another kind of possible change, although it is questionable whether the Wangaloan Stage can be considered as suppressed when the Wangaloa beds cannot be classified in any other stage.

The accompanying table shows three stage classifications for the late Cretaceous and Tertiary. Column A gives the classification as it was in 1959; Column B gives a possible reclassification which eliminates known anomalies with minimum changes; Column C gives a possible reclassification with changes which should be made if we are to be consistent with changes already suggested. It should be noted that in Column C any stratigraphic boundary may be different from its namesake as originally defined, whereas in Column B boundaries remain the same.

What are the advantages of each of the two alternative courses of action outlined above?

| A: Classification at 1959 | | B: Revised Classification with minimum change | C: Revised Classification consistent with changes already proposed |
|---|---|---|---|
| Castlecliffian | Wc | Wc | Wc |
| Okehuan | Wok | Wok | Wok |
| Nukumaruan | Wn | Wn | Wn |
| Hautawan | Wh | Wh | Wh |
| Waitotaran | Ww | Ww | major faunal break |
| Waipipian | Wwp | Wwp | Nw |
| Opoitian | Wo | Wo | Nwp NEW |
| | | | No SERIES |
| | | | Nk (Kapitean faunas marked Pliocene) |
| Kapitean | Tk | Tk | |
| Up.) | | Tu (Urenuian to be | Tu |
| M.) Tongaporut- | Tt | Tt revived?) | Tt |
| L.) uan | | | U. Tw (Waiauan faunas are |
| | | | L. Tw essentaally Tara- |
| | | | nakian) |
| Waiauan | Sw | Up. Sw (former L. Tt) | |
| | | L. Sw | |
| Up.) Lillburnian | Sl | Up. Sl (or three | Up. Sl |
| L.) | | L. Sl new stages) | |
| Clifdenian | Sc | Sc | L. Sl |
| Up.) | | Up. Sa | Sc ) (boundaries |
| M. ) Altonian | Sa | L. Sa | Sa ) changed) |
| L. ) | | | Saw (Awamoan faunas essentially Southland) |
| Awamoan | Pa | Pa (incl. old L. Sa) | Pareora Series |
| Hutchinsonian | Ph | Ph (local) | disappears |
| Otaian | Po | Po | |
| | | | Hutchinsonian and |
| | | | Lo Duntroonian supp- |
| Waitakian | Lw | Lw | Lw ressed for the |
| Duntroonian | Ld | Ld (local) | same reason as |
| Whaingaroan | Lwh | Lwh | Lwh the Wangaloan |
| Runangan | Ar | Ar) (probably | |
| Kaiatan | Ak | Ak) local) | Ak-Ar (commonly indist- |
| Bortonian | Ab | Ab | inguishable) |
| | | | Ab |
| | | | Ap (Porangan faunas clos- |
| | | | est to Bortonian) |
| Porangan | Dp | Dp | |
| Heretaungan | Dh | Dh | Dh |
| Mangaorapan | Dm | Dm | Dm |
| Waipawan | Dw | Dw | Lw |
| | | | Dt |
| Wangaloan | Mw | Mw (local) | |
| Teurian | Mt | Mt | |
| Haumurian | Mh | Mh | Mh |
| Piripauan | Mp | Mp | Mp |

If unrestricted change is accepted, then palaeontologists will achieve a more satisfying grouping of fossil faunas, though perhaps never one which will be satisfying to all kinds of palaeontologists. Column C in the table is the grouping suggested by a micropalaeontologist with slight pretensions to macropalaeontology, but it might not suit the more serious student of molluscs or corals or echinoderms, and it might be totally different from the grouping which would be suggested by palynologists and palaeobotanists. If we are prepared to make these kinds of changes we must be prepared to consider seriously a shift of the Cretaceous - Tertiary boundary to coincide with the major floral change between the Albian and the Cenomanian. There is as much justification for basing boundaries on plants as on animals. Somewhat easier determination of series boundaries might result from a reclassification along the lines suggested in Column C, but determination of series boundaries is not a serious problem with the present classification.

If the other course of action were desired, and changes were rigidly controlled and kept to a minimum, a satisfying grouping of fossils would never be achieved, but nomenclature would be stabilised. Stability is a great advantage in a standard nomenclature used frequently and extensively for reference, and should not be discarded lightly.

The question facing New Zealand geologists is whether extensive changes in the standard time-stratigraphic classification are worth while when balanced against the outdating of the last 15 years' literature which would result. This question might well be considered at the next meeting of the N.Z. Geological Society. If a stable classification is desired this can probably be achieved by means of a set of rules analogous to some of the International Rules of Zoological Nomenclature. If, on the other hand, change in accordance with present trends is desired it would be better to make them all at once. If changes are made piecemeal, they will be spread over a long time, particularly as differences of opinion must arise, and published criticisms must suffer the usual publication time lag. If geologists want a standard time-rock classification which will be uniform for the country, and stable, they might give some consideration to the formulation of a set of rules, or alternatively to possible ways of making all desirable changes at once in order to make a classification which will be stable for some years to come.

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Members of the Society are reminded that the Annual General Meeting for 1962 will be held in Christchurch on Thursday, 16th August, at 8.00 p.m., during the Tenth New Zealand Science Congress. At the conclusion of the Meeting, which will be held at the Geology Department, University of Canterbury, the retiring President will give an address entitled "The Alpine Fault."

## GOLD NEAR WELLINGTON

by W.F. Heinz

It is not usual to have a goldfield within a few miles of a large city, so that it is of interest to recount some of the highlights of the old Terawhiti Goldfield, situated close to Cape Terawhiti.

The greywacke formation widely exposed around Wellington is not generally known to be auriferous. Alluvial gold has been recovered from a number of streams, while prospecting tunnels were driven many years ago on quartz veins in the greywacke near Kelburn.

At Terawhiti alluvial gold was found as early as 1862, and the old Makara track leading through the suburb of Karori was the way to the field. About 1880 gold was found in quartz at this locality, and there is some evidence that its discovery caused excitement in the city, for, judging from the number of mining leases granted, there was a rush to peg out claims. Their names, however - Perserverance, Eureka, Welcome, Wealth of Nations, Albion, Golden Crown - mean nothing today.

The so-called reefs, which were later proved to be minor lenses of quartz in the bedding of the greywacke, and therefore to have no roots, were situated close to Reef and Darkie's Creeks. A steam engine and stamp battery were erected to crush and dress the ore, and the remains of these can still be seen in the valley running towards Oteranga Bay.

The earliest report of these occurrences is a Mines Statement of 1882, which merely stated that further prospecting of the reef at Terawhiti was carried on. In 1883 there is the following brief statement: "This goldfield extends on the ocean side of a line drawn between Oterongu [Oteranga] and Ohau bays -------- The reefs that have been found are on or near the surface. The Albion claim is the only one that has done any stoping, and they are at present erecting a crushing battery of ten head of stamps."

In 1884 there is another brief statement: "This field is about at a standstill. The Success and Golden Crown mines are driving a low level tunnel to try and cut the lode."

For the following four years there is no mention of Terawhiti in any report I have had access to. In the Geological Survey Reports of Geological Explorations for 1888, however, there is statement on the field by James Park, who mentions: "Visited the old Terawhiti goldfield FOR THE PURPOSE of ascertaining the value and extent of the new find of auriferous quartz lately reported there. Hard white quartz containing gold was not uncommon among the loose material at the mouths of the tunnels or drives ---- I picked up several pieces of quartz showing gold very distinctly to the eye, and from a few pounds of rusty quartz and mullock obtained what would be considered a fair prospect by panning."

In October, 1888, Park again visited the area, checking over the work done in the previous six months: "At different levels underground I selected large samples of stone, all of which by rough crushing and panning yielded fair prospects. Before leaving the ground I examined most of the old claims, and judging from the directions of the drives, it is quite apparent that those previously engaged on the field did not understand the character of the lodes, thousands of pounds being wasted driving with the country."

Up to 1884 the gold returns were 101 ounces. The total official return was in the vicinity of £500 for the life of the field.

So the Terawhiti goldfield passed into oblivion. Government publications give the stark facts, but we can visualise the prospectors on their way across the Makara Hills, and the excitement in Wellington at the time the mining companies were being floated.

Some alluvial gold must remain, for in 1946 I met in Wellington a Mr Gillespie, an old West Coast miner, who was busy with a small claim at Terawhiti. He said that the gully he was working in was very steep, and that the only water obtainable was from a small dam which allowed him to work for a short time after rain. Nevertheless, he had returns, and proved it by producing a bottle containing about two ounces of gold.

There is a report that a small nugget was picked up on Kelburn Hill, and it appears likely that the drives on the city side of the Karori Reservoir, above Chaytor Street, are earlier than the prospecting drives at Terawhiti. From the appearance of the work some small quartz blows had been stoped out. In the rock cutting at the junction of Raroa Road and Plunket Street there are several small quartz leaders which cut the greywacke at a high angle, and in a property above the cutting, where a small quartz blow was found cutting across a path, I panned a small amount of bright thin stringers of gold from a small quantity of crushings. There seems little doubt that other exposures in rock cuttings in Brooklyn and other areas may prove slightly auriferous.

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Contributions for future issues of the Newsletter will be greatly welcomed. Please send them to the Editors, C/o N.Z. Geological Survey, P.O. Box 368, LOWER HUTT, New Zealand.

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Exercise for the reader: Determine what is meant by "the reverse" in the following sentence - "This is not to say, however, that argillized sediments are less common along channels of mineralization than elsewhere, for the reverse is true."

From "How to Write Geologese", by Nicholas Vanserg (the late Professor H.E. McKinstry), Econ. Geol. 47 (1952), pp. 220-223.