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1918.
NEW ZEALAND.

MINES DEPARTMENT.

GEOLOGICAL SURVEY BRANCH.

ANNUAL REPORT.

Laid on the Table of the House of Representatives by Leave.

Geological Survey Office, Wellington, 20th August, 1918.

SUMMARY OF FIELD-WORK.

DURING the twelve months that ended on the 31st May the Director visited the State coal-mines (Greymouth), Dobson Flat, the Westland Gold-prospecting Syndicate's claims at Kanieri Forks and Arahura Valley, the Kaimata oil-bore, the Chertsey oil-bore, the Springhills coal-bore (Southland), Nightcaps district, Waikaia district, Mount Torlesse colleries (Canterbury), Waikari limestone outcrops, Maharahara copper-mine, the serpentine outcrops on the Griffin Range (North Westland), Thames, and Waihi. Dr. J. Henderson, Mining Geologist, was engaged chiefly in south-west Auckland and north Taranaki, with the object of determining the coal possibilities of those parts of New Zealand. He visited the Ohura, Waitewhena, Tangarakau, Mokau, and Awakino districts, &c., examining coal and limestone deposits. In consequence of the Government having been offered an option over a large area of supposed coal-bearing country in the Mohakatino and Mokau valleys, a detailed survey of what will be known as the Mokau Subdivision was begun in March and continued until the 22nd May, when Dr. Henderson returned to Wellington. In addition to the examinations already mentioned, Dr. Henderson in June and July, 1917, visited Hanmer, Kotuku, Thames, Whangarei, Tokomaru, Waipiro Bay, Gisborne, Morere, Wairoa (Hawke's Bay), Napier, Te Aute (Otane), and Takapau. The principal objects in view were to obtain information concerning the mineral springs and the limestone resources of the localities visited. In October, 1917, Dr. Henderson visited Reefton in order to make a special examination of the Inglewood Gold-mine. Mr. M. Ongley, Assistant Geologist, was in the military forces during the greater part of the year. From the 12th January to the 21st May he was on leave from military duty, and assisted Dr. Henderson in the examination of the coal and limestone deposits of south-west Auckland and north Taranaki.

OFFICE-WORK.

The editing of various publications occupied much of the Director's time. Until the 23rd October he also acted as Under-Secretary of Mines.

During the year numerous requests for information concerning New Zealand minerals and ores have been received and answered. These requests have led to the preparation of statements dealing with raw materials for electro-chemical industries; magnesite and dolomite, graphite, mica, talc, chrome-iron ore, manganese-ore, tungsten-ore, clay, and fuller's earth, most of which will probably be published in the *New Zealand Journal of Science and Technology*. A considerable amount of correspondence relating to minerals, ores, New Zealand geology, and more especially palæontology, has been handled. The usual amount of attention has been given to the library, which has been used and found helpful by various persons in addition to the officers of the Geological Survey.

MOKAU SUBDIVISION.

The detailed survey of the Mokau Subdivision has been planned to include the whole of Tainui, Mokau, Aria, Awakino, Awakino North, and Awakino East survey districts, together with portions of Mimi, Waro, Ohura, and Totoro survey districts. The subdivision therefore includes the coal-bearing areas contained in the Mangapapa and Mokau-Mohakatino blocks and the promising coalfield in the Waitewhena Valley, north of Ohura (see last year's report, pp. 8–9). The survey has been carried out under difficulties. Owing to the war, suitable field hands have not been easy to obtain. Much of the country surveyed is rough, bushed, and unroaded. Many of the streams that were traversed run in precipitous gorges containing deep pools impassable except by swimming.

LIMESTONE-DEPOSITS.

During the year covered by this report a number of special visits to limestone-deposits has been made by members of the staff, and considerable progress has been made in the writing of a detailed report on the limestone resources of New Zealand. It will have the scope indicated in last year's report, and is expected to be the longest bulletin hitherto prepared by the Geological Survey. Its publication will be merely the initial step in the development and proper utilization of the limestone-deposits of New Zealand, but it will clear the ground, so to speak, and enable agricultural associations, local bodies, farmers, and others interested in limestone to ascertain what deposits are known to exist in their own and neighbouring districts, what the probable quantity and quality are, what amount of exploration and especially of sampling for analytical purposes is required, &c. They will also be enabled to realize the problems that require to be solved, and generally to grasp the situation, both from a local and a national point of view.

Coal-deposits.

Last year attention was drawn to the importance of making a systematic examination of all our New Zealand coalfields. Owing to the lenticular and generally uncertain nature of the coal-seams it is desirable, and in fact usually necessary, that systematic boring should accompany or immediately follow the geological surveys. Large areas of coal-bearing or possibly coal-bearing land have, however, been alienated by the Crown, and therefore it follows that the owners will unfairly benefit, reaping where they have not sown, from the geological survey, and still more from any boring undertaken by the Government. It is impossible to make a geological survey of a district without examining privately owned lands, and it is equally impossible to prospect systematically by boring without entering on the private lands. There will be no difficulty in inducing owners to permit their land to be bored at the public expense, but it will be far otherwise when the costs have to be allocated and the ownership of the increased value given to coal-bearing land has to be determined. The situation can be adequately met only by special legislation.

The Crown, however, still holds the fee-simple of large coal-bearing areas, and in many cases where the surface has been alienated mineral rights have been retained. It may be suggested that the time has arrived when the coal of a great part of these domains ought to be reserved to the Crown, and the present system of granting leases to almost every applicant drastically modified, if not entirely abolished.

Palæontological Work.

During the year under review Mr. H. Suter, Consulting Palæontologist, of Christchurch, has continued his work on the Tertiary Mollusca contained in the Geological Survey collections. Large numbers of fossils have been carefully identified, including considerable collections recently made in the south-west part of Auckland and in north Taranaki. Lists of identifications made during past years are being prepared for publication. I deeply regret having to announce that Mr. Suter died on the 31st July last.

Dr. J. Allan Thomson, Director of the Dominion Museum, has done further work on New Zealand Brachiopoda, but has been too busy with his ordinary duties to complete the preparation of an exhaustive report which was begun some years ago. Mr. Frederick Chapman, A.L.S., F.R.M.S., of the National Museum, Melbourne, has written a report on the fossil fish-remains that were sent to him in 1914. This has been received, and will shortly be published. The grateful thanks of this Survey and of all who realize the importance of careful scientific research will readily be given to Mr. Chapman, who has performed the work without remuneration of any kind. Thanks are also due to the authorities controlling the Melbourne Museum, who gave permission to Mr. Chapman to undertake the work and facilitated it in every way. Mr. Chapman has also taken in hand the description of the Upper Cretaceous and Tertiary Foraminifera and Ostracoda, specimens of which have been sent to him from time to time during the past few years. He has made considerable progress in this work, which he is doing in his own time, and expects to have a report ready in a few months.

Some additional Cretaceous fossils were sent to Mr. Henry Woods, M.A., of Cambridge University, in July, 1916. These have been examined and identified by him, but owing to war conditions the fossils in question and other material are being retained in England for the present.

Dr. C. T. Trechmann, of Castle Eden, County Durham, England, has finished the examination of the Mesozoic fossils sent to him in 1915 and 1916. The material is being stored in England until the end of the war.

All the palæontological work mentioned above, with the exception of Dr. Trechmann's, has a direct bearing on the most important geological work in sight—namely, the detailed survey and exploration of our coalfields. The workable coal of New Zealand is entirely in Cretaceous and Tertiary strata, though there are some thin, unworkable seams, as it happens, in the Mesozoic rocks.

Alexander McKay.

Mr. Alexander McKay, who for many years was Assistant Geologist under Sir James Hector, and later Mining Geologist to the Mines Department, died at Kelburn on the 8th July last at the age of seventy-six years. He was first employed in geological work in New Zealand about 1870, when he acted as field collector and assistant to Dr. (later Sir Julius) von Haast. At the end of 1872 he was engaged as a collector for the Geological Survey, and later became attached to the permanent staff. He finally retired from the Government service in 1908. Mr. McKay was possessed of remarkable natural abilities, and in the opinion of those who are best acquainted with his work surpassed all his contemporaries both in geological insight and in the value of the results he obtained.

Publications.

The publications issued during the year under review were the following:—

Eleventh Annual Report of the Geological Survey (Parliamentary Paper C.–2B, 1917).

Palæontological Bulletin No. 4, "The Cretaceous Faunas of the North-eastern Part of the South Island of New Zealand," by Henry Woods, M.A., Cambridge. 1917.

Palæontological Bulletin No. 5, "Descriptions of New Tertiary Mollusca occurring in New Zealand, accompanied by a Few Notes on necessary Changes in Nomenclature, Part I," by Henry Suter. 1917.

Palæontological Bulletin No. 6, "The Earlier Mesozoic Floras of New Zealand," by E. A. Newell Arber, M.A., Sc.D., &c., Cambridge. 1917.

Bulletin No. 19, "The Geology of the Tuapeka District, Central Otago Division," by P. Marshall, M.A., D.Sc., F.G.S. 1918.

Bulletin No. 20, "The Geology of the Oamaru District, North Otago (Eastern Otago Division)," by James Park, F.G.S. 1918.

"Alphabetical List of New Zealand Tertiary Mollusca," by Henry Suter.

Various departmental and other reports, written by officers of the Survey, have been published in the *New Zealand Journal of Science and Technology* and in the *Journal of Agriculture*.

P. G. Morgan,
Director, Geological Survey.

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