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**A history of the Geological Survey and Geological Survey Branch,
Department of Mines, Tasmania, 1859-1974**

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THE FIRST SURVEY 1859-1869

Geological Surveys by the Government commenced officially in Tasmania with the appointment of Charles Gould as Geological Surveyor in 1859. Gould's duties, as defined by the Colonial Treasurer, were 'to effect a complete geological survey of the island, and to prepare a geological map'. The Government of the day viewed with some envy the economic boom in Victoria, resulting from the discovery of gold there, and in 1858 had offered a reward of £5000 (increased to £20,000 in 1861) to the discoverer of a workable gold field; no doubt it was hoped that Gould's appointment might help in such discovery.

Gould, although he appears to have been within a few hundred metres of the outcrop of the Mount Lyell copper deposits in February 1862, did not make any major mineral discoveries during his surveys. Nevertheless, he carried out many surveys throughout Tasmania and made important contributions to the geological knowledge of the colony. In 1869 Gould's contract was not renewed and the geological survey of the State lapsed.

THE RISE OF THE MINING INDUSTRY 1881-1922

The discovery of tin at Mt Bischoff in 1871, together with several discoveries of gold in the northern portion of the State from 1852 onwards, laid the foundation of the mining industry of the State and resulted in renewed interest by the Government so that in 1882 G. Thureau was appointed as Inspector of Mines and later his title was extended to Geological Surveyor. Thureau made many surveys of the various mineral and coal-bearing areas of the State and provided considerable assistance to the local prospectors and mines. His value to the mining industry was shown by a sharp rebuke issued by various mining interests when the Government proposed to discontinue his services due to economic depression. He finally retired in 1889 and was replaced by A. Montgomery who, before he resigned in 1896, carried out geological surveys in about 40 areas of the State, mainly the metalliferous mining areas in the west and north of Tasmania, as well as the coal mining areas.

J. Harcourt-Smith was appointed in 1897 and continued the work of examining mining properties and providing geological advice to miners and prospectors, as well as making valuable contributions to the geology of the State. Unfortunately he died whilst on duty on Flinders Island in 1899.

Until 1883 the administration of mining and the employment of the various Government Geologists had rested with the Mining Branch of the Department of Public Works. However, with the growth of the industry it was decided in 1883 that the Lands Department and the Mines Department should be formally set up as Departments in their own right under the control of their respective Secretaries. Thus the Mines Department, of which the Geological Survey became a Branch, was formally created in 1883.

In 1884 R. M. Johnston, Government Statistician and Registrar-General, was asked by the Government to prepare a work on the geology of Tasmania. His 400 page *Systematic Account of the Geology of Tasmania* was published in 1888: the difficulties of exploration are illustrated by his account of an unsuccessful attempt to reach the West Coast from Hobart by way of Lake Pedder.

Following the death of Harcourt-Smith, W. H. Twelvetrees was appointed as Government Geologist and this appointment laid the foundations for what was to become an active, well organised Survey which was to vastly increase the geological knowledge of the State and provide a proper scientific background within which the mining industry could work. Twelvetrees was an exceptionally well-trained geologist for his time, he had previously worked on mines in Europe and was a first class petrologist. Above all, Twelvetrees came to the position with proper, well-based views on the duties, functions and organisation of a Geological

Survey. He proceeded immediately to persuade the Government to increase the geological staff, and established a geological museum and library. Twelvetrees guided the Survey on to a course of mapping mining districts, as opposed to individual mines, and insisted on establishing the geological environment of the mineral field backed by proper surveys. He was, however, hampered by the lack of topographic maps and resented the time he and his staff had to spend on pure topographic mapping in order to be able to present their geological data.

During the next 20 years the Survey produced some 150 reports, 70 of which were prepared by Twelvetrees himself, on the geology and mineral resources of the State. From 1907 onwards the Survey published *Bulletins, Reports, Records and Mineral Resources* volumes for the first time. These publications contained careful accounts on most of the then known mining fields such as Zeehan, Mt Farrell, Dundas, Middlesex, Mt Balfour, Rosebery, Gladstone, Lisle and other areas. They also published reports on such diverse subjects as diamonds in Tasmania, tektites, fossils and new mineral species as well as *Mineral Resources* volumes on such commodities as tungsten, molybdenum, phosphate, iron ore, cement materials, coal and oil shale. At the time of his death in 1919 Twelvetrees headed an efficient and knowledgeable Survey which was deservedly respected throughout the State and Commonwealth. His death was therefore a sad blow to the Survey, and for geology in Tasmania.

However, fortunately for the State, Twelvetrees was replaced by an equally dynamic and knowledgeable geologist in C. Loftus Hills who not only took over and continued Twelvetrees' work, but expanded the Survey's activities into the fields of underground water investigations and engineering geology.

During Hills' first year in office the Survey commenced the systematic mapping of the midlands district to determine the groundwater potential. This work was carried out by P.B. Nye and eventually resulted in the production of four *Underground Water Supply Papers* by that author, covering the whole of the midlands and the settled areas of southern Tasmania. At the same time Hills initiated a thorough and comprehensive investigation of the coal resources of the State, a huge task undertaken by all four geologists comprising the Survey at that time, and resulting in the publication in 1922 of a large volume detailing the coal resources of the State. Other major investigations at this time were a continuation of the study of the Read-Rosebery zinc deposits, commenced earlier by Hills, the silver-lead deposits of the Magnet and surrounding areas, and a study of the osmiridium resources of the State, together with a large number of reports on the engineering geology of various hydro-electric and other engineering projects. The publication programme initiated by Twelvetrees was continued, drilling and boring plants were purchased, the library, laboratory, museum and drafting staff set up by Twelvetrees were maintained and expanded.

THE LEAN YEARS, 1923-1954

Hills left the Survey in 1923 and in the same year the laboratory was separated from the Survey under a newly created position of Government Chemist and Assayer. The Survey, which had previously been situated in Launceston, was moved to Hobart. The economic depression was felt by the Survey in that Hills' position was not filled and a field geologist's position was abolished. A. M. Reid and P. B. Nye alone remained as Government Geologists. In spite of these restrictions, the underground water investigations were continued and other important surveys, such as the investigation of the north-east alluvial tin fields, the Dundas mineral field, the Mt Bischoff tinfield and a further investigation of the oil shale deposits of the Latrobe district were made.

Reid was appointed Director of Mines in 1926 and in 1927 positions were created for an assistant geologist, a draftsman and a cadet geologist. During this year Nye, who made many contributions in all fields of geology, acted as lecturer in geology at the University of Tasmania in addition to his Survey duties. Reid proposed a scheme of systematic geological mapping of the State to the Development and Migration Commission which was supported by the Commonwealth Government adviser, Dr Woolnough, a project long sought by both Twelvetrees and Hills. This scheme was finally implemented in 1929 and a start made by Finucane and Blake in the Smithton area.

Early in 1930 the office of Director of Mines was abolished, not to be re-established officially until 1951, and Reid left. The depression resulted in the downgrading of several officers, but systematic mapping

continued at Smithton and Rosebery and was completed in 1931. However, after that time the economic conditions were such that the scheme had to be put aside to await better days. Geological investigations continued at a reduced pace throughout the remainder of the 1930s and in 1938 Nye and Blake published a full account of the geology and mineral resources of the State, which marked the culmination of some 50 years of work by the Geological Survey.

In 1940 W. H. Williams, a former Inspector of Mines, was appointed Director of Mines, but the strength of the Survey had dropped due to the Second World War.

In retrospect, Williams' term as Director of Mines was enigmatic. On the one hand he suppressed completely the publication of all geological reports and data, and frustrated the attempts of two successive, highly qualified Government Geologists, D. E. Thomas and S. W. Carey to push forward the geological investigation of the State, as they envisaged that it should be done; whilst on the other hand he, in later years, actively pushed forward a bold plan for the systematic geological mapping of the State and an assessment of its mineral resources. The latter scheme was initiated after the resignation of both Carey and Thomas and during the period when Keid, who had left the Survey in 1923, returned to the Department and had been appointed Chief Geologist.

Thomas, like Carey, was only with the Survey for a couple of years. However, during this period he made important discoveries and observations on the stratigraphy and palaeontology of the Lower Palaeozoic rocks of Tasmania and prepared reports on important mineral bearing areas such as the Blue Tier tinfield and the Mt Balfour mineral district, as well as a multitude of shorter reports on a wide range of other topics.

Carey also made great advances in the geology of the State. He synthesised all the known geology of the State at that time, brought a semblance of order to the conflicting views of the Lower Palaeozoic sequences, set out a tectonic framework for the State, published new geological and mineral maps of the State and made, together with his co-workers, many geological surveys of mines, prospects, engineering geology projects, groundwater and many other matters. He also attempted to bring the records and indexing of the Survey back to a semblance of order after years of neglect, and strenuously attempted to, once again, set up the basic framework of a scientific geological survey. That he was only partly successful in this was due to lack of co-operation by the then Director of Mines who failed to take proper advantage of the great talents that Carey brought to his position as Chief Geologist. For instance, he was unable to reverse Williams' long held policy of non-publication of geological reports etc.

However, whatever Williams' shortcomings with regard to the Survey may have been, he must be given the credit for laying the foundations and initiating once again a systematic geological mapping programme within the State. He commenced this by setting up regional geological bases, first at Zeehan, and then Lorinna and Port Davey from 1949 onwards. Despite these good intentions, the work of the regional geologists was hampered by the lack of suitable topographic base maps and in their early years these geologists spent more time on topographic mapping than on geological mapping.

DIVERSIFICATION AND EXPANSION, 1954-1974

With the appointment of the present Director of Mines, J. G. Symons, in 1954, the Survey was given the freedom and encouragement necessary to establish itself. The first step was to re-introduce and encourage the publication of all Survey Bulletins, Reports, maps etc. The regional geologists were able to change their areas of mapping to coincide with the 1 inch to 1 mile maps which were becoming available from the Lands Department, and thus be relieved of the burden of topographic mapping for the first time. As regional mapping proceeded the bases were phased out and all Survey activities were centralised in Hobart. At the same time the geological staff was increased from five geologists in 1954 to twenty-seven geologists at present. The Survey, at first under Keid, later Hughes and at present Jennings, was reorganised into three sections dealing with regional mapping, economic geology, and engineering geology and groundwater respectively. Alongside this reorganisation and expansion, various specialist officers, together with their supporting equipment and laboratory services, were appointed. These included, in addition to the petrologist and mineralogist appointed by Williams in 1949, a geophysicist, a palaeontologist and a geochemist.

Geophysical work by Geological Survey staff commenced in 1963 with a magnetometer survey of the Hampshire iron deposits, and within the next few years resistivity, seismic and gravity methods were being employed. Gravity methods have been particularly useful in the delineation of the Tertiary deep leads and in the interpretation of dolerite bodies, whilst seismic methods are now extensively employed in the evaluation of dam sites and of the foundation conditions for other civil engineering projects. Gravity anomaly maps have now been produced for the Hobart district and for much of northern and north-eastern Tasmania.

In recent years much of the time of the engineering geologists has been spent in the investigation of landslips. A landslip zone map of Burnie was prepared in 1963, and another for the Tamar Valley in 1972.

The results of the policies initiated since 1954 have now long been apparent. Over the years twenty 1 inch to 1 mile and 1:50 000 sheets have been printed and several others are approaching completion, 1:250 000 provisional maps of the mainland of Tasmania have been compiled and will be issued over the next few years as quickly as drafting and printing can be carried out. After a gap of 20 years with no publications, nine Bulletins, three Survey Reports, six Records, two Mineral Resources volumes, three Underground Water Supply Papers, 17 Technical Reports series, nine Explanatory Reports of Map Sheets, together with a new State geological map, a structural map of the State and mineral maps of the State together with the geological atlas maps mentioned earlier, have been published and there is now a significant backlog of manuscripts awaiting publication.

The drafting staff and library services have been strengthened to support the geological programme and in addition to mapping; economic geology investigation, groundwater and engineering geology investigations have been expanded and modernised. The Survey is now strongly research orientated, not solely on Tasmanian geological problems, but on an Australia-wide scale and in the relevant fields, participates in research in many fields within the whole realm of geological science.

[25 November 1974]

Histogram showing numbers of pages of Geological Survey of Tasmania published and unpublished reports, 1890-1974, arranged in five-year periods.

