

PRELIMINARY REPORT ON THE EXPERIMENTAL AERIAL GEOLOGICAL SURVEY OF TASMANIA.

The experimental aerial geological survey consisted of a small number of reconnaissance flights (2), photographic flights (3) and combined reconnaissance and photographic flights (2). In each of the photographic flights, a number of small areas were photographed and photographic plans or "mosaics" will be built up for each of them.

The survey was carried out under the supervision of Dr. W.G. Woolnough, Geological Advisor to the Commonwealth Government, who recently made extensive aerial surveys in Australia. Two Air Force Wapeti planes were used, the pilots being Flight Lieutenant A.M. Charlesworth and Flying Officer J. Miles.

The object of the experimental survey was to ascertain to what extent aerial photographic methods were applicable to Tasmanian conditions or in other words as to how far such methods would assist in the elucidation of the geological structure of Tasmania, or portions thereof.

It might appear strange at first sight that aerial photographs could possibly assist in the elucidation of the geological structure of the land, and the following explanations will assist in the understanding as to how and why this is possible.

(1) Regions, where the rocks are exposed over large areas without any covering of soil and/or vegetation. In such regions, aerial photographs will register the different rocks by virtue of the differences in colour, hardness and other features, and the different effects of the weather on them just as ordinary ground photographs do in the case of cliffs etc.

(2) Regions where the surface is well soiled, but with little or no vegetation. In the case of all except transported soils, the soils are derived directly from the underlying rocks by ordinary weathering agencies. Different rocks will therefore produce different soils and the soil differences may be such as will be shown in aerial photographs. This has been proved in many districts and particularly in Central Queensland where the soil differences are clearly shown in aerial photographs, although the rocks are weathered to a depth of approximately eight feet.

(3) Regions covered by soils and vegetation. In such regions, it is possible that the different soils (which reflect the differences in the rocks) may cause differences, sometimes large and sometimes small, in the vegetation which will be shown in aerial photographs. Thus vegetation differences may often indicate differences in the underlying rocks. There are of course other factors e.g. altitude and rainfall which cause vegetation differences and such would have to be allowed for, either as a result of previous knowledge or later ground work.

(4) In most districts in Tasmania, the conditions will represent a combination of the above three, but more particularly those of (1) and (3). The rocky areas will readily show the geological structure and in the remaining parts, the vegetation differences and the pattern made by same, e.g. lines of trees etc., will assist in determining the structure.

The mosaics of the Tasmanian survey have not yet been completed, but from my observations during the flight made, the observations made by Dr. Woolnough on the remaining flights and the examination of the mosaics prepared some time ago for the Forestry Department, I consider that aerial photographic surveys will elucidate the geological structure in many parts of the State, but more particularly those parts occupied by the older rocks, (Proterozoic to Devonian). An examination of the Forestry mosaics of the Arthur River district confirmed this view. On two of them, the strike of the rocks can be detected as a regular pattern across both mosaics, even though the country is fairly heavily timbered. On the other sheets the sandy deposits near the coast have covered the older rocks, but indications of the strike are obtainable on several sheets.

It must be realised that an aerial survey does not replace ground geological surveys, but is rather an important auxiliary thereto. The aerial survey does its part, firstly, in furnishing a ground plan and, secondly, in delineating the geological structure. The ground plan is obtained in a fraction of the time and at a fraction of the cost possible by ground surveys. Similar remarks apply to the delineation of the geological structure.

Being provided with the plan and having an outline of the geological structure, the Geologist then visits the district to determine the various rocks and formations represented in the structure as shown from the air and to investigate any other features connected therewith. When it is realised that the occurrence of minerals (metallic and non-metallic), coal, oil, underground water, etc. depends upon the rocks and the structure, it is obvious that any method such as aerial surveys which assist in the geological survey of a district, is of the utmost importance to the economic geologist.

In Tasmania, the mineral deposits are associated with the older rocks which are likely to yield the best results from aerial surveys.

It is therefore recommended that an aerial survey be made of our most important mineral belt in the State, and the one that is most difficult to survey on the ground, viz. the west coast region from Queenstown to Waratah. In pursuance of this recommendation, it is suggested that inquiries be made from the Air Board as to the conditions under which such a survey could be made.

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