Flow and fragmental volcanic rocks, intermediate or sub-basic in composition, are exposed in several localities near the south-eastern edge of the Nelson lowland. They outcrop in the upper Motupiko Valley, at the head of Rainy River, about the northern end of Lake Rotoiti, and again in Bull Creek, a small branch entering the D'Urville from the west rather more than a mile from Lake Rotoroa. These volcanic rocks closely resemble those of Brook Street Valley described in Bull. No. 12 (p. 40).

The Hope Range and Mount Murchison are part of the great mass of granite extending along the west side of the Nelson depression to Separation Point, sixty miles north of the subdivision. It is a medium- to coarse-grained rock, in places containing large feldspar crystals. Ben Murray, a peak on the Trent Range, which separates the basins of the Matiri and Owen rivers, is also formed of granite, but the rock is quite distinct from that of the Hope Range.

Economic Geology.

Alluvial gold has been obtained for many years in the Murchison Subdivision. At present the chief diggings are in the basins of Louis Creek, a branch of the Howard, and New Creek, a branch of the Gowan. The gold-bearing gravels have been rewashed from the glacial deposits that here cap the hills. The detrital gold of other streams in this part of the Nelson depression has probably also been derived from the glacial deposits. The chief of these streams are Maggie, Maud, and Gibbs creeks, branches of the Howard, and many branches of Upper Buller, Rainy, and Motupiko rivers. The alluvial gold of the Owen basin was undoubtedly supplied by the auriferous quartz lodes of Mount Owen. These have been known for many years; in the "eighties" a crushing-battery was erected, but the veins could not be worked profitably. Much gold has been won from the beaches and terraces of the Buller, Matakitaki, and Mangles rivers. Dredges worked on the Buller and Matakitaki years ago.

Three seams of coal, from 3½ ft. to 5 ft. thick, occur in the Tertiary beds a mile and a half north-east of Murchison. All have been worked to some extent, and a little coal is mined to supply local needs. The coal is excellent, but at present there is no means of transporting it profitably to a market. A thick coal-seam outcrops in the basin of Frying-pan Creek, a small stream entering the west branch of the Owen near its junction with the east branch, but is vertical and contains many dirt bands.

Inflammable gas in small amount escapes from the Tertiary rocks in the Owen Valley, and at several points in the Buller Valley between Owen junction and Longford. A bore, which at the time of the writers' visit was 2,070 ft. deep, is being drilled near an oil and gas seepage in the Mangles Valley 20 chains up-stream from the Blackwater junction. A little gas and a few "shows" of oil have been obtained.

The igneous rocks of the plutonic complex and of the Hope Range could yield unlimited supplies of building-stone. Marble occurs in large amount in Mount Owen, but its transport would be difficult. A few years ago limestone was being crushed for agricultural lime at a point about a mile west of Murchison, but the plant has now been removed. There is abundant hard rock or gravel for surfacing roads everywhere in the subdivision.

2. SOIL SURVEY, CENTRAL OTAGO.

(By H. T. Ferrar.)

Introduction.

The soil survey of irrigation areas in Central Otago was undertaken at the request of the Hon. the Minister of Public Works, as mentioned in last year's annual report. The area surveyed at the end of May, 1926, was approximately 230 square miles. During the 1926–27 field season, which extended from 16th October, 1926, to 19th May, 1927, the total area mapped was 554 square miles, or 354,560 acres, and covered the Manuherikia Valley from Omakau north-eastward to Tunnel Hill, the Ida Valley from Mount Ida Water-race to Ida Valley Railway-station, and the Maniototo Plain from Mount Ida Water-race southward to Linnburn Homestead and eastward to the Kyeburn. This area includes the following irrigation projects: Ida Valley, Upper Manuherikia, Scandinavian, Hawkdun, and Maniototo, together with some irrigable areas in their vicinity. Next season it is intended to map the areas situated in the Clutha and Arrow River valleys.

Methods of Mapping.

The soil map in course of preparation is based on field-sheets, drawn on a scale of 1 in. to 20 chains, prepared from tracings of the Lands and Survey record maps. By means of prismatic-compass bearings and paced traverses between fixed points additional topographical features are added where changes in the character of the land make such additions necessary. Since water-supply is the factor that has most influence in the productivity of the land in Central Otago, symbols representing different types of land have been used in such a way as to show relief of land rather than textural or lithological differences. That the relief of land (situation of a soil) is a factor of importance has been strikingly exemplified by the results obtained from the soil survey of the Rotorua district which is being carried out by the Department of Agriculture. (See *N.Z. Journal of Agriculture*, vol. 34, No. 5, pp. 289–94, 1927.) Textural and lithologic differences, however, are shown by using differently coloured drawing-inks, and notes are added where exceptional pedological features, such as swampy or arid or salty patches, claim attention. The completed map, together with its descriptive explanation, will form a graphic inventory of the soil resources of the district and can be made the basis for more detailed research work.