

again above the roof of the drive, and finally dropped away very steeply as indicated by a bore sunk in the floor of the incline a few feet beyond the point of disappearance of the schist. The dip of the main incline was steepened, and a further drive to the west at greater depth encountered the schist still sloping steeply to the east. This contact and the last one in the main incline are crushed and slicken-sided and suggest the presence of a fault, whereas at the first-mentioned two contacts the conglomerate apparently rests normally on the schist.

At the top of the vertical shaft brown "cement" has been encountered at a depth of over 600 ft. from the surface, its contact with the blue conglomerate being crushed and suggestive of faulting. Evidently the fracturing was not along a single fault, but was complex and along several breaks. The in-faulting of a small wedge would account for the brown "cement" at such a great depth. The conglomerate at the bottom of the winze is crushed and the pebbles well polished, suggesting that the workings are very close to one of the fractures.

#### CROMWELL GOLD-MINING CO.'S LOW-LEVEL ADIT, BENDIGO.

(By J. HEALY.)

An adit has been driven southwards through schist for a distance of about 1,800 ft., in which distance several minor lodes have been crossed. At the present face, and again 75 ft. to the north, are lodes of 18 in. thickness striking north-east and dipping at angles of 60° and 50° to the north-west. They are stated to be respectively the Bee and Cromwell lodes, although at the surface these two lodes strike east-south-east.

A strong crush-zone, 9 ft. wide and with well-defined slicken-sided walls, crosses the adit about 940 ft. from the entrance, and a similar zone, 14 ft. wide, occurs at 1,045 ft. These, as well as several other fractures, strike about north-east and dip steeply south-east. A few small calcite veins and more rarely quartz veinlets traverse the crushed rock of the breaks. A few other fractures were observed which strike east-south-east and dip north or south generally at low angles.

#### PAHI GREENSAND.

(By Dr. J. HENDERSON.)

At Pahi, Kaipara district, greensand, exposed between tides, clearly underlies the argillaceous limestone forming the south end of the peninsula. This has been noted by Hector, Cox, Park, McKay, and Marshall. The late Dr. H. T. Ferrar, in N.Z. Geological Survey Bulletin No. 34, p. 31, 1934, maintained that this greensand "is down-faulted, overturned, and stratigraphically overlies the limestone," and he adduces evidence from other parts of the neighbourhood showing that greensand overlies the limestone. The writer, who recently spent a few days in the district, saw no evidence of the three faults by which Ferrar lets down the greensand on the foreshore, though rock exposures are exceptionally good. On the west shore of the peninsula, a mile north from the point and on the outer edge of the tidal bench, greensand rests, as Ferrar states, on hydraulic limestone, which in fact is exposed at low tide on the seaward side of the bench edging the greensand of the peninsula along both the Paparoa and Pahi arms. This sandstone is much disturbed, and the underlying limestone is traversed by so many joints and other partings that its bedding is rarely determinable.

In the writer's opinion there are two glauconitic sandstones in the area, one below and the other above the hydraulic limestone. The lower, which in places grades laterally into glauconitic mudstone which grades upward into hydraulic limestone, is occasionally fossiliferous, is black-green when wet, and is gritty at many points, and in places pebbly. Pyrite is abundant, and the rock is traversed by many irregular rusty partings, though visible bedding is rare. A sample examined under the microscope contained mammillary aggregates of glauconite up to a millimetre across and constituting about 40 per cent. of the rock. The abundant pyrite was moulded on the glauconite and angular grains of feldspar. The higher greensand has a decidedly lighter-green colour, and is everywhere well-bedded, the thicker greensand layers being separated in the lower part of the sequence by narrow bands of white clay. No pyrite was seen, and the rock is decidedly finer in texture. In places there are thin lenticular bands largely made up of small angular fragments of argillaceous limestone. The fragments, which average about a millimetre across, are probably, like the white clay mentioned above, derived from the underlying Onerahi beds of which the hydraulic limestone is an important member. Under the microscope the glauconite particles were seen to be scaly and not to exceed  $\frac{1}{10}$  millimetre across.

There is no evidence to determine the age of the higher green sandstone, which may belong to the lower part of the Waitemata Series (Upper Oligocene) rather than to the Whangarei Series as Ferrar maps it. All the greensand, shown on the map on page 32 of N.Z. Geological Survey Bulletin No. 34, south of the strong fault crossing the peninsula about 60 chains north of the township belongs to the older group (Eocene).

#### OIL-DIVINING.

(By Dr. J. HENDERSON.)

On several occasions during the past year the press has given wide publicity to statements by diviners that petroleum is present in commercial amount at a number of localities (Tokatoka, Waipukurau, Wanganui). "Divining" is a subject of perennial controversy. Some enthusiasts claim that the rod is effective in discovering oil, ores, or buried treasure, and is even able to analyse alloys, and to diagnose disease; but except for searching for water its use is now generally abandoned.