GEOLOGY.

The rocks comprising the country consist of the following sets:—

Thickness.	——	Series.
700 ft.	Terrace and river gravels; coarse conglomerate and lignite; soft massive mudstone	Waipaoa ?
2,500 ft.	Arenaceous mudstone; pebbly limestone	Petane.
	Limestone	Te Aute.
1,500 ft.	Soft arenaceous mudstone; mudstone with beds of white crystal tuff ..	Mapiri.
3,000 ft.	Mudstone and sandstone, with conglomerate beds	Tutamoe.
	(Unconformity.)	
1,000 ft	Massive mudstone with frail shells	Ihungia ?
	(Unconformity.)	
1,500 ft.	Light mudstone with thin sandstone; fine white sandstone with fucoids ..	Weber=Wheao.
	(Erosion interval.)	
3,000 + ft.	Pink and light-coloured limestone; light-bluish mudstone; light sandstone spotted with glauconite; white siltstone; chocolate mudstone; light shaly mudstone and sandstone; dark mudstone with *Inoceramus*; light coarse pebbly sandstone with 2 ft. pebble-beds; hard dark mudstone with thin sandstone	Mangatu and older Cretaceous.
5,000 + ft.	Greywacke and argillite	Pre-Cretaceous (unfossiliferous).

These formations have been followed in the field and mapped. The Cretaceous beds probably belong to several formations, but no section shows how to divide them. Also, no fossils have been found in the greywacke. In places, too, it is difficult to assign, with certainty, the Tertiary beds to a formation.

The geology may be summarized by stating that unconformably above the tightly folded greywacke are steeply dipping and contorted Cretaceous sandstones and mudstones 3,000 ft. thick, overlain by 10,000 ft. of unindurated shallow-water marine sedimentary rocks which are separated by several breaks into the formations listed and folded into anticlines and synclines.

Evidence of some value in the interpretation of the subdivision as an oilfield has been obtained. The beds constitute a petroliferous province, the strata and folding being suitable. Several vents of natural gas have been tested and found to be dry. The mapping shows that the wells at Waipatiki were bored in a syncline.

3. AMURI SUBDIVISION.

(By H. E. FYFE.)

The greater portion of this subdivision is in the Marlborough Land District, but a small area comprising the Waiau, Terako, Towy, and Hawkswood survey districts is in the north of Canterbury Land District. Work was commenced on this area during mid-November, and until mid-February the writer was assisted by S. J. H. Sylvester, B.Sc. From mid-March to the end of May J. Marwick, D.Sc., assisted with the field-work. The 206 square miles so far mapped are confined to portions of the above-mentioned survey districts, and to portions of the Acheron, Greenburn, and Hundalee districts.

PHYSIOGRAPHY AND STRUCTURE.

The two principal mountain-masses of the subdivision are the Inland Kaikoura and the Seaward Kaikoura ranges, mountains of the fault-block type. Cloudy Range and Sherwood Range are the southern continuation of the Seaward Kaikoura, and are separated from the lowlands to the east, the northward continuation of the Hurunui–Waiau depression, by the great Kaikoura Fault of McKay. East of this fault the continuity of the depression is interrupted by minor elevated earthblocks. The Mount Parnassus block and its northern extension determines the eastern boundary of this depression.

The bulk of the mountain-masses consists of pre-Cretaceous rocks, and the Cretaceous and Tertiary strata flank the lower slopes of some of the highlands and occupy portions of the relatively depressed areas. The general north-east strike of the younger rocks and of the Kaikoura Fault is slightly oblique to the more northerly strike of the pre-Cretaceous rocks.

Broadly speaking, the structure west of a line from Whale Back to Isolated Hill may be considered as a wide syncline with axis striking north, obliquely truncated by the Kaikoura Fault on the north-west and by a fault-zone trending north-east from Isolated Hill, and much complicated by faulting and minor folding. At Combe Hill an anticlinal fold is overturned to the west.

GEOLOGY.

Pre-Cretaceous Rocks.—The basal rocks consist of banded greywackes and argillites probably of early Mesozoic age, intensely folded and, in some localities, highly sheared and fractured. Some of the beds are decidedly calcareous, and are then usually concretionary. In places they are interbedded with pillow-lavas. A conglomerate containing pebbles of granite, diorite, porphyritic rocks, red argillite, and greywacke crops out at several localities. A few calcareous pebbles resembling closely the