Sun-dried bricks made from the clayey soils resist the weather well, especially if shielded from rain. Houses built of these bricks—and there are many such—are eminently suited to temper the vicissitudes of the Central Otago climate.

There is no native timber in the subdivision, but the State pine-plantations near Naseby will meet this deficiency to some extent.

Roadmaking Materials.—An abundant supply of good roadmaking material is obtainable from the outcrops of gravel on the edges of nearly every terrace. Quartz-grits, river-shingle, and tailings are also employed for road-surfacing. In the Ranfurly district basalt is also used.

Lignite.—The small patches of lignite that are found at several places are of value to the settlers for household purposes. The lignite-seams are 15 ft. to 20 ft. thick or more, and pits are kept open at Cambrian, Pegleg, Oturehua, Idaburn, and near the head of the Ida Burn. In addition settlers obtain lignite from small outcrops elsewhere.

Oil-shale.—Oil-shale of fair quality was discovered at Cambrian in 1896 by Osmond Hughes, but the bed was not seen by the present survey. Another bed of poor oil-shale occurs in the Idaburn lignite-pits. These shales may be of value in the future.

Clays and Sands.—Occasional patches of decomposed schist yield a white clay that has good plastic properties and does not crack when air-dried. Coloured clays, in places containing numerous rosettes of gypsum, are abundantly associated with the lignite-beds.

Deposits of white quartz sand occur at several places, some of which are suitable for glassmaking; others might be used as moulding-sands.

4. WAIROA SUBDIVISION.

(By M. Ongley.)

Wairoa Subdivision lies on the east coast of the North Island of New Zealand, between Gisborne and Napier, and during the field season, from November, 1926, to May, 1927, 200 square miles of it was examined, including the survey districts of Nuhaka North, Paritu, Mahanga, and Mahia. This area embraces part of the Raukumara Division, Gisborne Land District, and part of the Napier Division, Hawke's Bay Land District. It adjoins along its northern boundary the Gisborne Subdivision described in N.Z. Geological Survey Bulletin No. 21. On the east it faces the ocean and on the south Hawke Bay; at the south-east corner is Mahia Peninsula, joined to the mainland by an isthmus three miles long, formed of sand-dunes. The subdivision consists of dissected uplands 2,000 ft. high in the north-west and 1,000 ft. in the south-east, lying between the Huiarau Range in the west and the east coast, drained by the Te Arai and Maraehara rivers, flowing north, and the Kopuawhara, Nuhaka, and Wairoa, flowing south. The chief town, Wairoa, on the Wairoa River, is much the largest centre of population between Gisborne and Napier.

The rocks of the subdivision are nearly all Upper Tertiary sediments, mainly sandstones, some of which are tuffaceous, mudstones, and limestones. A few small areas are covered by Cretaceous strata. The Tertiary rocks are folded in wide regular folds; one anticline, the Morere, trends north-east across the subdivision from Nuhaka, on Hawke Bay, to Paritu, on the east coast, and another, the Mangapahi, trends north across the west of Nuhaka North Survey District from Tahaenui Stream to the head of the Mangapoike.

Topography.

Although the subdivision forms part of the east coast of the North Island, the streams do not flow east to the sea, but in the greater part of their courses flow north or south. In the middle of Nuhaka North Survey District the Te Arai flows north into Patutahi Survey District, and, joining the Waipaoa, empties into Poverty Bay. The Maraehara also flows north into Turanganui Survey District, and turns east through a gap in the coast hills into the sea. Rising on the south side of the divide at the head of the Maraehara, the Waiau flows south into Mahanga Survey District, where it is called Kopuawhara Stream. It is turned south-east by the dunes forming Mahia Isthmus, into the shallow tidal lagoon that escapes into the sea at Horaka, north of Mahia Peninsula. Rising a mile south of the head of the Te Arai, Nuhaka River flows south-south-west and south through Nuhaka North and Nuhaka survey districts into the north-east corner of Hawke Bay. In the north-west of the area examined the Mangapoike rises near the head of Te Arai Stream, and, flowing west into Opoiti Survey District beyond the district examined, joins the Wairoa River.

Between the streams flowing north and those flowing south is the divide extending inland from Whareongaonga, where it is 600 ft. high, south-west for three miles to Whareata (1,500 ft. above sea-level), west for a mile to the road-junction (1,700 ft.), north for a mile to Trig. Station 236 (1,906 ft.), north-north-west for two and a half miles to Trig. Station 78 (2,365 ft.), south-west a mile to the inland road (2,000 ft.), north-north-west four miles along the ridge by the road (1,500 ft.), west three miles to Paparitu Trig. Station (2,230 ft.), north four miles to Trig. Station B in Patutahi Survey District (1,989 ft.), west two miles to Parikanapa (2,301 ft.), and north for ten miles to the hills west of Ngatapa.

Depending largely on the topography is the selection of the railway-route between Gisborne and Wairoa. The watershed at Ngatapa was found impassable when the attempt was made to build the line there in 1915. The divide must be crossed between Ngatapa and the coast, or it can be skirted round at the coast. Possible routes run up a river, through the divide, and down the adjacent river. The Maraehara and Kopuawhara valleys, a mile inland, and the Te Arai and Nuhaka valleys, seven miles inland, are in line and could be used; but neither route would be easy. A simpler route follows the Te Arai and Mangapoike valleys, but involves a long tunnel, and the coast route is considered preferable.