

creeks, where, as it progresses along the different tail-channels, it is gradually liberated from contact with the ironsands, and, as free gold, is caught on tables called "fly-catchers," placed in the channel to intercept the gold.

There are large areas of black-sand and gravel deposits in the Charleston district that are as yet untouched, but all of them lie to the west of the limestone range.

East of the limestone range, between that and the foot of the Paparoa Mountains, lies a depression lower than the country to the west, yet over this there are no black-sand deposits. This fact may be explained by supposing that the marine sands have been removed by the more energetic denudation of the eastern low-lying lands, or by the inequality of elevation affecting the areas east and west of the limestone. The first of these suggestions, from the evidence met with north of the Totara River, would seem to be the correct one, since on the high terrace at the back (east) of Addison's Flat the black-sand deposits are yet preserved. To the north of the Buller the higher level of the terraces between the granite range and the coastal plain is also to be considered a continuation of the high-level black-sand lead. This series of old raised beach deposits in the beginning has been spoken of as the Houhou Lead; but it will now be evident that such local designation fails entirely to indicate the true character and the great importance of the deposit; and in future it will be best to speak of this as "Marine beds of Pliocene age," the different auriferous parts of which might still retain their local designation, as "Houhou Lead," "Lanplough Lead," "Darkies' Terrace," &c.

So far as this report is concerned, the deposits under consideration may be said to terminate at Fairdown, on the lower slopes of Mount Rochfort, where extensive works are at present being carried on for the proper development of their deposits, the success of which will probably lead to future and even more extensive undertakings.

#### IV. LOWER PLIOCENE AND UPPER MIOCENE.

Formerly the higher and lower parts of these beds were considered as distinct from each other; but it must be confessed that it is not always easy to distinguish between the gravels referred to under one or other heads. In some localities there appears evidence that the conditions under which the higher beds were deposited approached those of a glacier period, there being in some localities large erratic boulders, and sometimes heavy deposits of what appears as angular morainic material of large size; and at places such evidences of glacier action appear at the top of a local development of the beds, at others in the lowest member of such local development. The lower part of this great series of gravels does not exhibit brecciated or angular material of great size. Angular material of any size is present to a very limited extent only. With these differences it has to be considered how far the upper and lower parts of these gravels are unconformable to each other. The evidence of unconformity is strongest in the district between the Big Grey and the Ahaura, and especially in the neighbourhood of Napoleon Hill. In Napoleon Hill the unconformity is by many miners declared to be very marked, and the upper gravels are said to lie in what resembles an old river-bed, excavated in the underlying "Old-man bottom." Some facts thus favouring the division of the beds, and it being the opinion of many that there is a distinct and very marked separation between the higher and lower parts, they will be here described accordingly—that is, as a double series.

(a.) *Humphrey's Gully Beds.*—In the higher part of Mont d'Or, at Ross, there is, at the head of Sailor's Gully, clear evidence of glacier drift occurring in the higher part of the "Old-man bottom," as developed at that place; the same thing is seen on the north-west and south-west faces of the hill, which has been cut into on three sides by gold-workings. These glacier drifts are thought not to be gold-bearing, but this has yet to be definitely ascertained.

In Humphrey's Gully Range, near the Humphrey's sluicing claim, angular brecciated material lies at the bottom of the gravel series, and to some extent is interbedded with the underlying sandy clays. The same glacier-looking deposit is largely developed beyond German Gully in the steep bluff that there overlooks the Arahura River. At this point the whole bluff is composed of a species of "till" or less clayey brecciated material. There may also in Humphrey's Gully Range be the presence of the lower beds of this series; but, as the upper series is very thick, and the lower not discriminated, it has been considered that only the upper or Humphrey's Gully beds are present. In Donegal Creek, six miles from Kumara, on the road to Christchurch, there is a considerable thickness of coarse well-washed gravels that have been referred to this upper part of the series, and the same gravels again appear one mile and a half nearer Kumara, there showing in the road cuttings. North of the Tereunakau this higher part of the series has not, apart from the lower beds, been discriminated.

Within the northern part of Westland these beds, at Ross, are important as gold-bearing gravels both in Mont d'Or and in the Ross United Claim, because it can hardly be doubted that some of the many gold-bearing strata in the latter claim represent this upper series of Older Pliocene or Upper Miocene gravels, seeing that gold-bearing layers rest directly on the "Old-man bottom" in the company's ground, and probably throughout the greater extent of Ross Flat. In the Humphrey's Gully Company's claim, and probably throughout the extent of the same gravels in the Humphrey's Gully Range, these gravels are gold-bearing, and, on account of the facilities for getting away large quantities of the wash, are likely to reward enterprise for a long series of years to come.

In the Grey Valley the higher beds of these, the higher beds of the series, are developed on the tops of the hills, on the northern side of Nelson Creek opposite Hatter's Terrace, and thence it is likely that a line of the same gravels will be found to have extended, with a breadth of from one to one and a half miles, across the various creeks and larger streams flowing north-west to the Grey, for the whole length of this particular block of hilly country formed of Older Pliocene or Upper Miocene gravels. The younger and richly auriferous part of the series is found on the ridge of hills on the left or south-west side of Orwell Creek, and, crossing this, occurs to the north-east, forming the