general use of coal in the neighbourhood for household and other technical purposes, but I have no doubt that in years to come some of these seams will offer a good field for industrial enterprise.

The principal locality is situated near the junction of the River Stour with the Ashburton, where in Coal Gully a seam of 14 feet thickness, dipping 8° towards E.S.E., and of which the lower portion of 8 feet is extracted in an adit of proper construction, has been worked for the last eight years. The lessee of the mine is selling only about 150 tons in the year, which is sold at £1 per ton at the pit's mouth. It is a fine pitch coal with smaller layers of glance coal interstratified, possesses considerable hardness with conchoidal fracture, and is of the same quality as the average brown coals of the Malvern Hills.

The principal seam reposes upon porphyry tufas, is covered by shales with smaller seams of brown coal and sandy clay marls, the whole overlaid by post-pliocene alluvium. On the opposite side, and on the southern bank of the River Ashburton, I observed in the banks of a small creek two other seams about 4 and 5 feet thick, which I partially opened up, belonging to the same formation; and near the banks of the River Stour in Alexander Creek, shales and irregular deposits of coal are also met with; without doubt a portion of the same field, although the seams of coal are there irregular and of inconsiderable thickness.

Extent.

It appears from the geological configuration of this country that a range consisting of quartziferous porphyries stretched before the deposition of the coal seams across the present valley of the Ashburton about a mile below the present junction of the Stour, and that thus behind this barrier a somewhat triangular basin existed, about two miles long, and in its largest diameter one mile and a half broad, in which the coal-bearing strata were formed.

Only in a few localities on the sides of the hills these beds have been preserved from the destructive agency of the post-pliocene glaciers, so that they can be worked level free; however, they may nevertheless exist in other spots which are at present covered by post pliocene-alluvium.

The seam in Coal Gully is worked level free, and will be found to extend over 20 acres, so that there are at least 100,000 tons of coal available. The beds on the opposite side of the River Ashburton, from which coal can be obtained also level free, are of smaller extent, but still of sufficient size to be opened and worked with profit.

We have as yet no data from which we could ascertain if the seams in this basin extend to the centre of the valley—if they gradually thicken or diminish—or even if they are confined to the edges of the basin only; but, judging from other localities in this Province which present similar features, we may assume with some degree of confidence that they will be found to stretch across the valley covered by post-pliocene alluvium, and to be reached only by pits.

A second locality where brown coal of excellent quality is exposed is situated on the western slopes of the Clent Hills, where a seam of 28 feet 6 inches in thickness, divided only by small shaly bands, stands at an angle of 63° dipping towards E.S.E., or towards the range.

Except the cast of a cyrene in some clay marls, I did not observe any fossils associated with these beds, so that also in this case we have no data to compare their age with that of other brown-coal measures in New Zealand.

These beds appear to be only portions of a larger formation, which has generally been destroyed by the enormous ice-plough, in post-pliocene times so effectually at work in the outrunning ranges of the Southern Alps. However, as on the other side of the broad valley on the banks of the River Cameron small seams of brown coal also appear below the morainic accumulations, we may not hope in vain that also in this large opening in the ranges round Lake Heron extensive deposits of brown coal may lie hidden which will be of considerable use in years to come.

Finally, in the bight which is formed by the junction of the Cox range with Mount Somers, a series of seams of lignite occurs, probably being portions of beds of larger dimensions, which in other localities in that district are either hidden below post-pliocene and recent alluvium, or removed by glacier or fluviatile action. This series, which has an average dip of 14° towards N.N.W., reposes here upon quartziferous porphyries, and begins with beds of porphyry, tufa, and fireclays, covered by a succession of shales alternating with seams of coal 2 to 5 feet thick, the coal consisting of distinct layers of earthy brown coal and lignite, the latter exhibiting quite clearly the woody structure.

As all these beds do not apparently enclose any fossils, it will be difficult to fix at present their exact age, although I have no doubt that they belong to the lowest portion of our tertiary series, called the Curiosity-shop beds.

The next beds under review, which by their hardness have resisted well the action of glacier agency, or of the huge torrents issuing from the enormous ice-masses once filling the upper portion of the country, consist of a series of sands, shell-sandstone, palagonite tufa, calcareous and tufaceous sandstones and limestones, forming often bold and picturesque cliffs. They contain a great variety of shells and other exuviæ, all indicating that they belong to the above-mentioned tertiary Curiosity-shop series, the principal fossils being *Pecten Hochstetteri, Turitella Gigantea, Pectunculus laticostatus,* and *Waldheimia.* They do not contain any workable seams of brown coal, but abound in fine quartzose sands, building stones, and limestones.

Summing up the results obtained, the examination of the Clent Hills district has proved the existence of workable seams of good brown coal, and of which those in the Ashburton-Stour Basin are easily accessible, of fireclays, white quartzose sands, limestones, and building stones, and which will in years to come be of considerable value to the adjoining districts.

Christchurch, 12th June, 1872. JULIUS HAAST.