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NEW ZEALAND.

MINING RESERVES, WESTLAND AND NELSON.

(REPORT ON THE MINING RESERVES WITHIN THE NORTHERN DISTRICT OF WESTLAND AND THE BULLER AND GREY VALLEYS, NELSON.)

Presented to both Houses of the General Assembly by Command of His Excellency.

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SIR,— Mines Department, Wellington, 10th August, 1895.

In accordance with the instructions of the Hon. the Minister of Mines we proceeded to the west coast of the Middle Island, for the purpose of making an examination of the areas reserved for gold-mining purposes from the Mikonui to the Arnold River and Lake Brunner, in the Westland County, and throughout the Grey and Buller Valleys, in the Nelson Provincial District.

We arrived at Greymouth on the 10th April, and were employed in the work above indicated till the 12th June following. During the two months we were thus engaged, each of the reserves made within the districts mentioned were, with two exceptions, examined more or less carefully as the circumstances at the time, or the importance of mining on the block, admitted of or seemed to require. The exceptions referred to were the examination of block XII., of the reserves within the Westland district, which both of us had examined with sufficient care on previous occasions; and of block XXX., a small area in the Upper Buller district, lying between the lower course of the Maruia and of the Matakitaki River. This embraces part of the valley of Doughboy Creek, within which, as gathered from trustworthy persons, the conditions are exactly those of the lower part of the Matakitaki Valley.

Our object was in all cases to ascertain the present state of mining on the blocks; the number of miners engaged, or men engaged in pursuits accessory to mining; the extent of the works executed and machinery placed on the ground for the purposes of mining.

In order to guide us in forming an estimate as to the future working on mining reserves—of mining on blocks on which the form of mining was mainly alluvial—we had to regard the past history and present condition of mining on each block; and the different classes of alluvial workings had to be discriminated, from the fact that some forms of alluvial mining are likely to have more permanence than others; and some, strictly speaking, alluvial deposits, workings in which could not be regarded as alluvial workings in the ordinary sense of the word, had also to be considered apart, they being cement workings, in some cases requiring to be mined from beneath a considerable thickness of superincumbent strata, or, as in others, forming widespread formations of great thickness and considerable age, from the denudation of which have been derived the more modern auriferous gravels that lie along the valley bottoms of the different watercourses, intersecting the area of such older gravel formations.

In discriminating thus between alluvial deposits of different ages and diverse conditions with respect to their origin, fluviatile or marine, it necessarily followed that the general geological condition of the whole region, or of distinctive parts of it, had to be considered, and the review necessarily carried us back, in time, not only to the period of the deposit of the earliest and first-formed beds of the coal formation, which are gold-bearing, but also to make the attempt to determine a period anterior to that of the coal formation during which the reefs in the Maitai series were formed, but more especially, because of greater importance, a subsequent period during which the formations containing quartz reefs were disturbed by upheavals and dislocations that renders the following of lode-fissures very often a matter of great difficulty. We had in one or other of these connections also to consider the general tendency of the drift of the alluvial gold-bearing formations, and the probable source from which the gold had come, and thus through knowledge gained by a study of the hysteromorphous deposits to trace the original source of the gold, or to determine whether a particular area or mountain range might reasonably be regarded as containing auriferous-vein deposits.

Consideration of all these different subjects were at times, and from time to time, forced upon us, and to a right understanding of the evidence leading up to the conclusions we have arrived at it is needful that the salient features of this should be given to show the grounds on which these conclusions rest.

The oldest quartz-lodes within New Zealand occur in Silurian strata, and were denuded in part prior to the deposit of some parts of the Te Anau series, there being thick beds of quartz conglomerate (vein quartz) in that formation near the source of the Baton River, in the north-west district of Nelson. The most productive auriferous reefs that occur on the west coast of the Middle Island are found in the rocks of the Maitai series of Carboniferous age, and these were infiltrated or formed prior to the deposit of the great sequence of formations including deposits, both of Permian and of Upper Jurassic age, that were laid down during a period of quiesence that continued from the close of the Palæozoic period to that of the Middle Secondary period.

The conglomerates belonging to the different formations of the Middle and Older Secondary sequence are not distinguished by the presence of quartz in them, and it is therefore probable that the reef-forming period was at the latter date indicated. This is rendered the more probable since, though it is generally considered that the Matai series was upheaved and partly denuded before the Permian formation began to be laid down as above indicated, it does not appear that the beds were very greatly disturbed, fissured, or mineralised.

Subsequent to the deposit of the highest beds of the Middle Secondary series—the Mataura series of the New Zealand Geological Survey—there was a considerable period during which no important formation was laid down within the New Zealand area, more especially within that of the Middle and South Islands. There is evidence of the existence of high land during the interval between the deposit of the Mataura series and the formation of the lower beds of the Cretaceous and Cretaceo-tertiary series, of the crumpling and involvement of strata, and the probable consequent production of fissures that in time were filled with mineral matters in part metalliferous. This action was more pronounced in the middle and northern parts of the Middle Island than in the southern part, or in the middle and northern parts of the North Island, the Middle and Older Secondary sequence not being greatly disturbed in Otago and Southland, nor on the west coast of Auckland in the North Island. In Canterbury and south-east Nelson the same beds are greatly disturbed and deeply involved as strictural rocks on the eastern slopes of the chain of the Southern Alps. On the west coast of the Middle Island there are no Middle or Older Secondary rocks preserved, and consequently no evidence of great disturbances during the interval between the deposit of the Jurassic and younger Cretaceous formations of New Zealand.

The Older Secondary sequence was probably deposited over the area of the West Coast and afterwards completely removed by denudation. This was effected prior to the deposit of any considerable part of the coal-bearing formation. This assumption is supported by the fact that the rocks referred to were at the time wide-spread over the areas of the east coast of the Middle Island and the west coast of the North Island. There are no grounds for assuming that a barrier existed preventing their continuous deposit in a north-west direction, so as to cover the region of the West Coast. But it is not pertinent to our present inquiry, nor at all necessary to the things we would advance, that these rocks were ever present on the area of the West Coast, the condition of which during early Cretaceous time we shall endeavour to describe. What is more particularly insisted upon is the existence of an elevated mountain tract coextensive with, and probably far exceeding, the area of the West Coast at the present time.

The rigid, abrupt, and unequal character of the surface is indicated by the nature of the material, the proceeds of denudation, that has been preserved, and now form the lower beds of the coal-bearing series. That a mountain region covered with perennial snows and supporting large glaciers reached into and carried immense loads of material to the low grounds, is shown by the vast accumulations of very coarse, angular, and partly-rounded material that at many places form the lowest beds of the coal-bearing series. There are three great areas of such deposits within the district of the West Coast presently under consideration; the first and better known, also the most extensive, is that which extends along the Buller Valley from the Ohika-iti River to Grainger's Point, in the Lower Buller Gorge, and having thus an extension east and west of fully eight miles, it in the opposite direction has a breadth of four or five miles. Though a local deposit it was probably at the time it was laid down much more extensive than at the present. It consists throughout of angular detritus, in some parts of moderate size and of extreme regularity as regards both size and material. At other places the material is coarse, with the frequent occurrence of large angular blocks of granite, some of which are of very great size. The beds at Grainger's Point are the lowest in the sequence; shales, sandstones, and well-rolled conglomerates, and one or two thin seams of coal separating these from the higher and coarser breccias of Hawke's Crag. These latter rise into mountains that reach a height of 2,500ft. above sea-level, and are composed of angular brecciated material throughout. The formation is largely developed on both sides of the Buller Valley within the limits described.

The second considerable area of exceedingly coarse and angular matter lies between Moonlight Creek and the left branch of Big River, and on the north-west side of the Grey Valley, forms the lowest beds of the coal-bearing series. The beds pass under the coal-seams and associated finer measures that stretch across this part of the Paparoa Mountains to the low grounds on the western slope of the same. On the south-east slope of the range the coarse, breccia beds have a very great development, and in the main the material is of an exceedingly coarse description, angular blocks, reaching an amplitude 10ft. or 12ft., being of frequent and quite common occurrence in the valley of Black Sand Creek. It requires but a cursory examination of these beds to be convinced that they could have originated in no other way, or reached their present position by other means, than the agency of ice. Large quantities of granite as boulders are included with other rocks to form this Slaty Creek or Big River deposit.

The third principal area of coarse brecciated material lies along the valley of Boatman's Creek, on the east side of the Inangahua Valley. This in many respects resembles the deposit in the Grey Valley, which has just been described, but the material is yet of greater dimensions and quite as angular in character. There is also perhaps a greater proportion of granite in the brecciated mass, which as a range of mountains strikes across the valley of the upper part of Boatman's Creek, and extends south to the valley of the north branch of the Inangahua River. This deposit presents in the gorge of Boatman's Creek a most remarkable appearance, and is convincing beyond all dispute as to the agent concerned in its production.

Along the east side of the northern part of the Mount Davy Range there is a considerable development of coarse breccias that stretches along the lower slopes of the range to the south, rises to higher levels, and passes into heavy beds of more rounded gravels on the south-east face of Mount Sewell, and thence descends to lower levels towards the upper end of the Brunner Gorge. At Charleston, and at the mouth of the Fox River, lesser and more local deposits of the same kind are met with.

These coarse and brecciated beds are at most places followed by well-rolled conglomerates, composed of a mixture of sandstone- and quartz-pebbles, but at many places the material is moderately small and well-rounded—as, for instance, on Mount Davy and along the east side of the Inangahua Valley, and by a mixture of sandstone- and quartz-pebbles in the Upper Buller Valley. These beds are more widespread than the underlying breccia conglomerates, and consequently often rest directly on the underlying unconformable formation of older date.

Coal-beds and brown sands, or dark-coloured mudstones, overlie, and these also overlap the preceding members of the same series, and at places rest directly on the older rocks. Limestones succeed, and in like manner these also, at places, rest on the older slates that underlie the lowest members of the series.

All this shows that the accumulation and deposit of the lower beds of the coal-bearing series was made from a high and irregular surface, capable of producing and feeding glaciers that reached into the lower grounds where were deposited the proceeds of a violent and rapid denudation of the higher elevations. The succeeding rocks, consisting of conglomerates and quartz grits, give evidence of the action of water, and more complete grinding and assortment of the material denuded from the high lands; also of a tendency to a lowering of the general average height of the country, either by denudation itself, or that combined with depression, which sinking of the land gave the opportunity for the spreading of the latter proceeds of denudation over a wider surface, and in like manner each succeeding member of the series overlapped, till the country—the amount of denudation gradually lessening—eventually was submerged wholly or in greater part, and the chalky limestones, the last of the great series of deposits, was spread over the entire area of the west coast of the Middle Island, from Ross to the Owen River, and from Charleston to the Maruia and Matakitaki Valleys.

It becomes necessary now to consider the auriferous character of some of the different members of this great series of younger Secondary and Cretaceo-tertiary rocks. It is well known that they are auriferous to a degree that should pay for working in the vicinity of Reefton, and along the east side of the Inangahua Valley. (This fact will be more particularly adverted to when describing the different blocks within which such auriferous quartz drifts are found.) At the present time it is proposed to prospect the lower beds of the series at Charleston, with a view to the discovery of gold which is believed to exist in them there, and at the mouth of the Fox River.

On the coast-line, farther to the south, between the Twelve-mile and the Seven-mile Creeks, north of Greymouth, there is a very great development of a mixture of sandstone- and quartz-gravels, and every evidence that at places these are gold-bearing. Here, also, they are regarded as being staniferous, tin stones having been found between the Ten-mile and the Twelve-mile Creeks under circumstances that strongly support this inference.

In the Grey Valley the gold found in Langdon's and other small mountain streams coming from the east slope of the Mount Davy Range, is in part referable to this source, and the source of the bulk of the gold found in Ford's Creek is inexplicable unless it be referred to the breccia conglomerates at the base of the coal-bearing series, and the quartz conglomerates and coarser grits that overlie the breccia-conglomerates throughout this part of this mountain range that lies between the lower Grey Valley and the coast-line.

With respect to the auriferous character of the Hawk's Crag breccias, nothing is known with certainty, the only evidence being that certain prospectors found gold in the valley of the Blackwater as far as these breccias continued up the valley, but on passing these and entering upon the gneissic rocks of the higher part of the Paparoa Range the gold gave out and could not be traced any further.

In the Upper Buller Valley gold is known to occur in the conglomerates at the base of the coal-bearing series, both above and below the lower coal-seams, and as there is here a great development of these conglomerates in the Maruia Valley, in the Matakitaki and Glenroy Valleys, and in that of the Mangles River, it does seem to us that these conglomerates will shortly be the means of a revival of mining in that district. Fuller evidence of their auriferous character will be given when describing the different reserves made within the Upper Buller Valley, within which these auriferous Cretaceous gravel or cement-beds are situated.

The facts of the case being as above stated, it will therefore be apparent that the auriferous reefs found in the Maitai series had been already formed, and that they suffered in the denudation that preceded the laying down of the earlier-formed members of the coal-bearing series on the west coast of the Middle Island; and, without attempting to argue in a circle, this should be manifest from the fact that a great denudation of these beds did take place, and that the proceeds of such denudation is auriferous.

Prior to and during the deposit of the Cretaceous and Cretacea-tertiary, or coal-bearing series, the Maitai rocks, it may be presumed, were not disturbed to the degree in which we now find them. Certainly a great disturbance took place subsequent to the formation of the reefs and the introduction into them of the gold. This may be proved in various ways: Firstly, and most directly, by the broken and dislocated character of the reefs in the condition in which they are now being explored; and also by the fact that the gold is often, due to movement of parts of the reefs, twisted, striated, and sliken sided—characters that necessarily are exhibited in the greater mass of the lodes themselves and of the adjoining rocks.

Throughout the Grey and Buller Valleys there is abundant evidence to show that this great disturbance of the auriferous Maitai rocks took place subsequent to the deposit of the highest member of the Cretaceo-tertiary series, and probably at a considerably later date, or towards the close of the Miocene period. There may have been an elevation and a subsequent sinking of the land during the Eocene period, but on the west coast of the Middle Island there are no evidences supporting this assumption, the unconformable relations of the Cretaceo-tertiary and Miocene rocks not having been satisfactorily determined or fully worked out. On the opposite coast, and in the southern part of the Island, it is thought by some there was an upheaval of the land in the interval between the Lower or Middle Eocene period and that of the Lower or Middle Miocene period. But whatever the evidence may be, and whatever the amount of elevation induced, this did not suffice towards the production of any marked degree of unconformity between the Eocene deposits of the northern and central parts of the Canterbury District, or of north-eastern Otago, where only Eocene deposits are supposed be to found. Much and more marked disturbance of the strata of these districts took place at a later date, whereby even the Miocene rocks on the east side of the Southern Alps were elevated considerably above the level of the sea, and at the same time were deeply involved, with other and older rocks, along the eastern slopes of the Southern Alps; and in the Amuri and Marlborough Districts even younger rocks are found deeply involved along the lower slopes of the Kaikoura Mountains.

As therefore there is little to support the assumption of any serious disturbance taking place between the middle of the Eocene and Miocene periods, it is to the latter part of the Miocene period and the commencement of the Pliocene that the movements that did take place are to be referred. Therefore, during the whole of the period between later Jurassic and late Miocene times we have to assume that the Maitai rocks were not protected from the forces of denudation in the manner that they are at present, and consequently that during the period of the deposition of the lower beds of the coal-bearing series they were greatly eroded and yielded large quantities of gold to the gravels of that formation.

During the latter part of the Cretaceo-tertiary period, or while the Amuri and Cobden limestones were being deposited, there was depression of the land within the New Zealand area to such an extent that the higher calcareous members of the formation being deposited were laid down continuously over the whole of the northern part of the Middle Island. The depression might have been less during Eocene times, but a great part of the area continued under the sea up to about the middle of the Miocene period, when a rapid elevation of the southern area of New Zealand began, accompanied by flexures and crumplings of the strata subjected to movement.

Before the close of the Miocene period high land was in existence, and a rapid denudation of this was being effected; and now commenced the accumulation of the great series of gravels that are found on both coasts of the Island and in Central and Southern Otago, locally known by different names, such as "Maori bottom," from the brown colour of the beds exposed at or near the surface; "Terrace bottom," from Brighton Terrace, near Kanieri, on the Hokitika River; "Old man bottom," as being a sort of "farewell rock" of the alluvial gold-miner. By the Geological Survey the series is called the "Moutere gravels," from the fact that the Moutere Hills, Spooner's Range, and large areas within the adjoining Motueka Watershed are formed of these gravels, which are variously regarded as being of Upper Miocene or of Older Pliocene date. As the land increased in height, and watercourses were determined upon its surface, one principal line of erosion would appear to have been, approximately, a line drawn from the mouth of the Mikonui River to the sinking of the Moutere Hills to Blind Bay, in the Nelson district. The depression along which these gravels accumulated may be considered as in part due to movements, and in part due to erosion of the land; but however effected, it is clear that indications of two distinct systems of mountains began to appear towards the north-east; these tending to coalesce with each other as they were followed to the south-west. This is even now evident in the approximating parallel, but slightly convergent, ranges of the Spencer Mountains, and of the main range farther to the southward on the one side of the depression, and of the Collingwood, Mount Arthur, Merino, and Lyell Mountains; Papahua and Paparoa Mountains on the other side. South of the Grey Valley this western line of mountains are ended; but it is easy to imagine their continuation in a southerly direction till the range, or system of ranges, made junction with the eastern line in the region where Mount Cook now stands.

There is evidence that a valley depression was continued to the south-west as far as Ross and the mouth of the Mikonui River, where the river gravels of the "Old man bottom" are now some 300ft. below the level of the sea. It is generally admitted, and we hold the opinion that from Ross to Reefton the "Old man bottom" is practically the same and one continuous deposit. The gravels of the "Old man bottom" were therefore supplied from both the eastern and the western ranges; and in the south it may have been principally from the western ranges now disappeared below the waters of the sea.

With or immediately following on the elevation of the lands to heights that could be rapidly denuded by atmospheric agents there commenced a series of movements involving crush and fracture of the rocks upon a large scale, oft repeated along certain determinate lines of displacement, till by this means the more superficial rocks were lowered or caught between masses of older rock, and so

protected were preserved. In this way areas of Maitai auriferous slates have been preserved between gneissic and other older rocks, and, in like manner, the Maitai rocks have protected and preserved outlying patches of the coal-bearing series, both at Reefton and in the Grey Valley. This is shown by the manner in which the Maitai series and the coal-rocks are in contact along the east side of the Mount Davy Range, and by the manner in which the Maitai rocks are in contact with the gneissic rocks of the Paparoa Range, near the source of Moonlight Creek. And, again, the same thing is exemplified in the Reefton district, and in the gorge of the Buller at and above the Lyell. In these movements the quartz reefs suffered dislocations and displacements that affected them vertically, as well as in a horixontal direction. A study of the movements affecting the coal-rock along the upper part of Murray Creek, and in the range to the eastward, will clearly indicate what the effect of crush and movement has been in the country-rock and auriferous reefs of the neighbouring Maitai series.

The gravels of the "Old man bottom" were now deposited and extended in one unbroken sheet from Ross to Reefton; they also filled the greater part, probably the whole, of the Inangahua Valley. They covered the low grounds of the northern part of Westland from the foot of the granite ranges to what is now the sea-coast; and, by way of Big River and the sources of Antonio's Creek, they extended farther to the north-east than at the present time they can be traced. Whether at any time the deposit was continuous and connected with the extensive area of the same gravels in the district south of Blind Bay, is perhaps matter for debate. In a previous report* Mr. McKay seems to assume that they are continuous across the upper valley of the Maruia, Matakitaki, &c., and of the Buller itself, into the Motueka Watershed. In this matter he has been misled since the conglomerates in the Upper Maruia, Glenroy, and Matakitaki do not belong to the Pliocene, but to the Cretaceous or Cretaceo-tertiary period, and, as has been noted, are found associated with the coal-bearing beds of that part of the district.

We, however, determined the presence of the "Old man bottom" in the district around Merrijigs, at such elevations that the gravels belonging to this formation might very well at one time have extended into the Upper Buller Watershed; and their absence in that part can easily be explained on the assumption that a somewhat greater elevation took place, locally, in this part, which favoured a greater activity of denudation, and, as a consequence, the entire removal of the gravels in question.

Upheaval of the land was general, and continued throughout the early part of the Pliocene period, till elevations were reached that induced the accumulation of perennial snowfields, which finally had to be relieved of their excess of snow by glaciers, which, reaching into the low grounds, accumulated morainic matter over surfaces already occupied by gravels of the "Old man bottom." Evidences in proof of this are to be met with at Ross, in Mont d'Or, in the upper part of Orwell Creek, in Napoleon Hill, and in the head of the left branch of Noble's Creek, and at the source of Duffer's Creek, and, to a less degree, along the south-east side of the Little Grey Valley as far as Antonio's Flat and Slab-hut Creek. These evidences consist in the presence of angular and very coarse breccia-gravels, containing masses of rock that are quite angular, and of such great size that it would seem that no agency other than that of ice could reasonably be supposed concerned in their transportation from the mountain region to the places where they are now found. In the left branch of Noble's Creek examples came under our notice that were 10ft. to 12ft. across and about the same in thickness. The glaciers, and afterwards the rivers in altered courses, cut down and removed the gravels of the "Old man bottom" from the foot and for three or four miles to the west of the granite range between the Big Grey and Lake Brunner, and at the same time, or subsequently, from the country drained by Snowy Creek.

Great changes in the physical outlines of the country began now to be effected, principally through the formation of gigantic faults, which lowered the country along particular lines, disturbing and altering, or completely obliterating, former lines of drainage, and substituting for a general north-east and south-west direction of the drainage a more westerly and direct course to the present sea-board. This was favoured by the disappearance of the western mountains south of the present mouth of the Grey River and the Buller, the Grey and Teremakau, the Arahura and the Hokitika—all of them formerly affluents of the great river that collected, carried forward, and deposited the gravel of the "Old man bottom"—now assumed independent courses, courses as direct to the sea as circumstances would admit of. The results were that at many places the gravels of the "Old man bottom" were trenched across, cut down, and carried away, and at others, at a later date, covered up and obscured by glacier deposits that, due to a further elevation of the land, especially along the axis of what are now the Southern Alps, produced glaciers that invaded the lower grounds of the sea-board along the valleys of the Mikonui, Hokitika, Arahura, and Teremakau.

These new main drainage-channels favoured—or rather necessitated—the establishment of lesser streams along minor valleys, which, with their several tributaries, cut deep into the gravels of the "Old man bottom;" and in process of time even the least important of these cut deeply into the plateau-like area which they drained, and carried away immense quantities of gravel into the main drainage-channels, which in turn were carried to the sea-board by the rivers, or arranged by them as massive terraces along their lower courses. In time the flat-terrace surface of the area over which the "Old man gravels" extended were sculptured into hills and valleys, while along the lower grounds of the valleys were accumulated gravels, the concentrates of a much vaster amount carried away, which still retained such a percentage of the gold originally in, and washed out of, the older gravels that, on the advent of the gold-miner on the West Coast, these deposits proved to be amongst the richest of the class designated "creek-workings." At the same time it was discovered that the higher beds of the "Old man bottom," which immediately preceded the

* Geological exploration of the northern part of the Westland Goldfields and Mining Reports, 1893, p. 132.

deposition of, and partly were formed by the glacier or sub-glacier deposits first above mentioned, were also auriferous enough to pay for working *in situ*, more especially in the district between the Arnold and the Big Grey Rivers; and of this class the workings in Napoleon Hill have long been famous. Further to the south, between the Arahura and the Kanieri Rivers, in the "Old man gravels" some of the richer strata of the Humphrey's Gully Range were worked by being "driven out"; but now the entire face from top to bottom is being worked by hydraulic sluicing.

Further south, at Ross, in Mont d'Or, the upper morainic parts of the drift are not considered gold-bearing, but the gravels which underlie this drift are known to contain gold, and it is from this part of the deposit that the Mont d'Or Company obtain the greater part of the gold that comes from their claim.

In the Reefton district the middle portion of the "Old man gravels" are auriferous, and are worked between the head of Soldiers' and Devil's Creeks, within the Devil's Creek Watershed. At Boatman's this also is the case, and there also the lower beds are auriferous, as will be further and more particularly detailed when describing the gold-workings on the different reserves.

The area over which the "Old man bottom" extends is shown on the map accompanying, and it must be at once apparent that within this lie a very great proportion of the digging centres within the Grey Valley. This is less marked further to the south, for the reason, not that the gravels of the "Old man bottom" are unproductive, but on account of other sources of gold, on the sea-beaches, in raised marine terraces, and in glacier drifts.

The gold found in the marine terraces along the coast-line, or near it, and on the beach itself, can, a good deal of it, be correctly referred to the gravels of the "Old man bottom" as a source, though not the primary source, from which it has been derived.

The terraces along the larger rivers—for instance, those between the Big Grey and the Big River—it is presumed, contain no little gold derived from the destruction of the gravels of the "Old man bottom"; and it is only along the belt of slate, from Coal Creek to Big River, along the east side of the Inangahua Valley, and the south-east side of the Little Grey Valley; in the Paparoa Range, from the source of Moonlight to Langdon's; at Bell Hill; at the Seven-mile Creek, in the Taipo Valley; in the Arahura, and in the Totara and Mikonui Valleys—that gold is obtained as directly liberated from its matrix in the rock-formation in the central and southern parts of the district examined, and in the Alford and Glenroy Valleys, and Lyell Creek, in the Upper Buller district. What further information necessary to a right apprehension of the subject we have dealt with in the above will be found in the description of the reserves made, which immediately follows.

DESCRIPTION OF DIFFERENT BLOCKS OF LAND RESERVED FOR MINING PURPOSES.

NELSON.

Block I.—This embraces an area of 5,000 acres. It extends along the coast-line from a point three miles east of the Buller River at its mouth, to the Waimangaroa River, a distance of six miles. The average width of the block is about one mile and a quarter. The surface is a gentle slope from the ranges inland to the sea. The reserve may be divided into the following areas: (1) The beach within tide-mark, and as far inland as affected by great storms; (2) the low coastal plain and "pakihi" country; (3) the Waimangaroa River bed and its valley for two miles back from the mouth of the river; and (4) the high level terraces stretching along the foot of the Mount Rochfort Range, and the south-east boundary of the block.

(1.) Gold-mining, in the form known as "beach-combing," and as workings in black-sand deposits at higher levels, has been carried on along the whole sea-frontage of the reserve. As the gold-bearing sands accumulate on different parts of the beach, there, as a consequence, the gold-workings are for the time being located. During April, May, and June, 1895, most of the miners within the block were located on the beach, immediately south-west of the mouth of the Waimangaroa River. The land is generally extremely poor, and over the "pakihi" unfit for cultivation, and scarcely of any value for grazing purposes. Along the banks of the Waimangaroa, and within a narrow belt close to high-water mark, it is of better quality, and over these areas settlement to some extent is possible. As a rule, however, what land is capable of being utilised as farming- or grazing-lands has already been alienated. The source of the gold is partly what is carried into the sea by the Buller River, and swept northward along the coast-line, and partly what is washed out of the older deposits in shore; the sea now encroaching upon deposits formerly laid down by it.

(2.) The open swampy plain called "pakihi" has to be regarded as formed by the action of the sea, and along certain lines on this, gold-bearing gravels or auriferous black-sand deposits may be expected to occur. Due to an impervious substratum of cemented gravel, the water accumulating on the "pakihis" render them swampy, totally unfit for settlement, and difficult to prospect for gold. As regards gold-mining, the conditions here are similar to what are met with on Addison's Flat, where gold-mining is extensively carried on.

(3.) The Waimangaroa River bed and valley yields gold-bearing gravels that are at the present being worked with satisfactory results. The most of the claims are perhaps higher up the valley than the boundary of Block No. 1, but seaward of the Wellington Mine a considerable number of miners are engaged in claims on the banks of the river.

(4.) The high terrace flanking the western base of the Mount Rochfort Range, if actually within it, may be considered as the most valuable part of the reserve. Along this line runs the high-level raised beach which further south has yielded very great quantities of gold, and which here has been worked to a considerable extent; but to an extent much short of what might have been had better and more abundant water-supplies been available. Extensive works are at present

in course of construction at Fairdown for the purpose of obtaining the fall necessary to work a portion of the high terrace where gold-mining has been carried on for a long series of years. This company has fair prospects of success, and will probably be the initiative of a series of such undertakings at various places along the line of terraces to the Buller River. Over the "pakihis" mining would have to be carried on by means of elevators.

Block II.—This in outline forms a parallelogram, and has a frontage on the coast-line, commencing at a point two miles and a quarter south of Cape Foulwind. The frontage of the block extends south along the coast-line two miles and a half, and, in depth, inland for six miles, the back boundary reaching to Bald Hill at the north-eastern corner of Addison's Flat. The area comprises 10,000 acres. Towards the coast-line the country is covered with bush, and east of Wilson's Lead there is a low range also covered with forest; but the greater part of the area is swampy "pakihi" country that can maintain nothing but rushes and semi-aquatic plants, and is therefore totally unfit for cultivation. The block may be divided into three areas, the better to facilitate a description of it. There are—(1) the coastward region; (2) the open "pakihi," with bush along the low ground of the north tributary of the Okari River; (3) the succession of terraces to the Buller River, two to four miles from its mouth.

(1.) Beyond the rocky coast immediately south of Cape Foulwind the sandy beach, commencing within the boundaries of the block, extends the whole frontage to and beyond the mouth of the Totara River. Gold is obtained by "beach-combing" on the coast-line, but immediately inland of that the thick and tangled character of the bush prevents the efficient exploration of the different black-sand leads and the continuation of the coarser auriferous deposits that are known to be present in the next block to the south. This is the only area within the block in which there are any patches of land that could be cultivated, but these are totally unimportant, the better lands of the limestone hills lying towards Cape Foulwind being outside the block.

(2.) The "pakihis" are generally swampy, and where dry the surface is constituted of low elevations formed of black sand, which form ridges and mounds, or low and broad but only slight elevations above the general nearly dead-flat of the plain. The "pakihi" plain has a gentle slope to the south-west and south. The rocks present are lines and isolated patches of auriferous black sand, and coarser granity gravels that also contain payable deposits of gold. Along the higher grounds of the east end of this area there are heavy and extensive deposits of black sand, which would probably pay to work were it possible, short of great expense, to bring a sufficient hydraulic-head water-supply on to the ground. As matters are, a promising field lies untouched; the only workings on this area being Wilson's Lead on the west side of the bush-clad ridge, already mentioned. This lead is continued to the north, and is worked in Bradshaw's Terrace, within less than a mile of the beach between Cape Foulwind and the mouth of the Buller. Could water under pressure be brought on to this central part of the block there can be little doubt that gold would be worked at many places now either abandoned or unopened.

(3.) This comprises the eastern end of the block, and consists of the two higher of the series of terraces that have been cut by the Buller from the level of the north-eastern part of Addison's Flat.

On the higher of these terraces there is clearly an old channel of the Buller River, and at a lower level gold-workings (now abandoned) have been carried on. The gold was said to be in the surface-gravels only, but with a powerful water-supply results would have been different, and the general body of the stuff to a moderate depth might have been made to pay. Over this part the surface of the ground is not so marshy, except towards the south-west side of the terrace flats, but for all that the soils are exceedingly poor, the dry stony ground growing only a stunted variety of manuka scrub. The miners located on this block are on or in the neighbourhood of Wilson's Lead and Bradshaw's Terrace, which should have been included in this or a separate reserve.

One favourable feature, as furthering the interests of mining over this and the adjoining blocks, is that the depth of wash, black sand, or granite shingle, as the case may be, is not inordinately great, and the bottom, consisting of blue tertiary sands, or sandy clay, is easily reached in all ordinary workings.

Block III.—This block lies immediately to the south of Block II., and is of equal area—viz., 10,000 acres. It has a frontage on the coast-line of three miles, and extends back to the eastward a distance of six miles at the north and south extremities of the back line, but in the middle of the block the distance from the beach to the boundary-line is only four miles. This is due to the fact that a portion (the north-western corner of the south-western extension) of the Buller Coal Reserve occupies part of the rectangular area that would be included inside the maximum measurements. This triangular area of coal reserve extends west to the forks of the Okari River near where crossed by the Westport–Charleston Road. The Okari River, with its tributaries Dirty Mary's Creek and Mountain Creek, drain the block, and form convenient channels for the discharge into them and the carrying away of silt and the fine tailings from the various claims working within the boundaries of the block. The surface of the block is a gently-sloping plain from the foot of the Big Terrace, along a line between Bald Hill and the point of the terrace half a mile south of the Shamrock Claim to the sea. The heights along this line vary from 140ft. to 100ft., and constitute the amount of fall across Addison's Flat to the sea. The surface is totally barren, and, from appearances at the present time, utterly irreclaimable. Despite the drainage-channels cut across and into the "pakihi" by the Okari River and its various tributaries, within a few chains of the brow of the depressions within which these run, the ground becomes swampy, and generally in wet weather so boggy as to be impassable on foot. Even where comparative dry and hard ground is met with, the vegetation is akin to that found on the softer grounds, except where low black-sand ridges rise a few feet above the general level. On these, and along the banks of the different streams, moderate sized forest trees break the dull uniformity of the swampy plain. The character of the vegetation over the forestless "pakihis" retains the rain-water, and, acting like a sponge, prevent its escape down declivities over

which it could easily find its way into the water-channels, but thus held it encourages the growth of the semi-aquatic plants, which retain more water, and the dead parts of the vegetation are prevented, partly by the water, and partly by their own nature and constitution, from decomposing into humus capable of fostering the growth of plants of a higher class. Even where drained and attempted to be cultivated, as gardens, &c., the soil appears wholly a tangled mass of tough fibrous stems and roots, that nothing but fire seems capable of reducing to powder.

Extensive gold-mining is carried on within this block. This may be best described by taking the block in three areas—(1) the coast-line; (2) the "pakihis"; and (3) the lead along the foot of the high terrace bounding Addison's Flat on the east side. The high terrace east of Addison's Flat, extending from the Buller to the Totara Valley, has not been reserved for mining purposes; but it is desirable that, if necessary, this should be done. Had this terrace afforded good agricultural ground or pasturage it had probably been alienated, and difficulties with respect to the passage of water-races across private lands would have resulted.

(1.) On the coast-line "beach-combing" is, even at the present time, conducted so successfully that a considerable number, forming a colony of Shetlanders, have settled down near the mouth of the Totara River, and gain their living by gold-mining on and near the beach.

(2.) Seaward of the principal lead on Addison's Flat, and east of the Westport–Charleston Road, there are at least three lines of black-sand deposit, in which auriferous workings are being carried on, and several large claims working the grey or granite shingle on the main bottom of blue Miocene clay. The grey shingle appears to be auriferous at points irregularly scattered over the flat, while the black-sand deposits, except towards the north-east, take more a linear direction, and must be considered as marking a line of equal elevation in relation to a rising coast-line and emergent land. A number of important claims are being worked by the owners or companies concerned, and these but indicate what the possibilities in the future are. All opinions are one on this subject—viz., that the gold is there, and awaits but the development of the means of its profitable extraction, which is confidently anticipated.

(3.) The principal lead on Addison's Flat lies along the foot of the terrace, limiting the flat on its eastern side. It has been and is still being worked continuously from Bald Hill, at the entrance into the Buller Watershed, to the end of the Shamrock Lease, where the Totara watershed is entered upon.

Dirty Mary's Creek and Mountain Creek have broken through and partly destroyed the lead where, in their present courses, they cross its line at the surface; but it may be safely anticipated that where the "blue bottom" lies at a lower level than the scouring action of these creeks have reached to, the deeper and more western part of the lead yet remains under the modern surface-shingle or beds of these creeks. This lead was formed during a depression of the land, prior to which the high-level terrace at the back extended seaward to the coast-line. The action of the sea gradually cut this westward portion of the big terrace away till from Bald Hill to Croninville was the shore-line, backed by a line of cliffs 300ft. in height, except where the Totara debouched into the sea towards the southern end of the line. But a time came when the land emerged at a greater rate than the sea could cut down and remove material from the face or foot of the great gravel cliff; and then the deposit of Addison's Lead began. Piled at the foot of the high shingle cliff were massive boulders fallen from the face, and now resting on the "blue bottom" which formed the lower part of the cliff, the action being exactly similar to what is now going on between Cape Foulwind and the mouth of the Buller River. A variable depth of material was thus piled up at the foot of the terrace cliff, amongst which were layers of sea-formed gravel and beds, seldom far continued, of black sand. Further out from the foot of the cliff, and over the greater breadth of the "pakihi," a pavement of coarse shingle and large boulders had been left during the encroachment of the sea upon the land. The spaces between these, as by the retreat of the sea they successively came to be on the shore-line, were filled in and covered up by layers of finer gravel and black sand, and where, for any considerable time, the land was stationary there accumulated lines of black sand on the surface. When emergence was more rapid the black sand was deposited, interbedded with the finer shingle. Towards the north end of the lead the black sands form thick beds, covering up the coarser granite shingle and boulders underlying. Near the township of Addison's the black sands form thinner layers, inclined to the horizon, and overlapping each other.

Most of the claims along this line have had to drive long tunnels, usually exceeding 2,000ft. in length, in order to get drainage and fall for the finer tailings. In many of the claims the coarser material is elevated and stacked by means of water-balance arrangements, and vast quantities of the coarser shingle are so disposed of. At the northern end of the line a hydraulic ("blow up") elevating-plant was at one time in use, but this has been discontinued, and of this class the Shamrock plant at the other end of the line is the only one in use. On Piper's Flat a stamper-battery is used for crushing the partly-cemented black sand, and over the north-eastern part of the block such means will have to be generally adopted for the extraction of the gold. There is a fair supply of water on the field brought from the main source of the Totara River, or from smaller streams rising in the granite range to the east, or from dams on the higher terrace, or on Addison's Flat itself; but, evidently, much larger supplies of water could be utilised with profit, and a scheme is mooted and strongly advocated at the present time, in conformity with which it is proposed to bring a large supply of water from the Big Ohika River. This would be a work of great cost and no little difficulty, but the proposal and the advocacy of the scheme shows unmistakably the confidence the miners have in the extent and permanency of the field.

Block IV.—This lies immediately to the south of Block III., and contains an area of 8,500 acres. It has a sea-frontage of about three miles. The reserve extends up the Nile River to the Limestone Gorge two miles and a half from the mouth of the river. The inland south-east boundary has been determined by a line drawn from the eastern end of the south boundary of Block III. to the point indicated on the Nile River. The surface of this block is varied, both as regards the physical

features and the quality of the land. Towards the north it has the character of Block III., and consists of open pakihi lands which towards the middle part are, if possible, more barren, unapproachable, and uninviting than Block III. generally is. Towards the east and along the south-east line the ground is harder, but equally as barren as the other parts are. Towards the estuary of the Okari and Totara Rivers, there is a low bush-clad ridge, the higher levels of which are formed of black sand. On the north side of the North or Big Totara there are some terraces standing above the general level that have been left during the cutting-down of the yet higher terrace on the level of the east and northern parts of the block.

The valley of the Big Totara is fringed with bush, and towards the mouth of the river, where it forms with the Okari a tidal estuary, there are some better lands occupied as farms. Between the Totara and the Little Totara there is a high terrace, having the level of the southern part of Addison's Flat. Towards the sea this is bush-clad, but eastward of the Westport–Charleston Road it is again open rush-covered "pahiki" to the foot of the highest terrace, which, corresponding with the high terrace at the back of Addison's Flat, is covered with bush. Croninville diggings are situated on the lower "pakihi" flat at the foot of this high-wooded terrace. In the valley of the Little Totara there are some good lands below the road-line to Charleston and towards the mouth of the river, but they are limited in extent, and have been acquired as freeholds.

Between the Little Totara and the lower part of the Nile Valley in the north and south line, and between the Limestone Range and the sea, lies Brown's Terrace. This is heavily covered with timber, and the soil is of moderate quality, and but for the presence of heavy beds of ironsand the influence of drainage and *debris* from the Limestone Range at the back of it had insured soil of good quality.

From the mouth of the Nile to the mouth of the Totara and Okari Rivers "beach-combing" is carried on by the Shetlanders, and near the northern boundary a claim is being opened out in the forest-clad ridge of black sand that has already been mentioned. One party is also working west of the road-line, on the high terrace between which the two Totaras run; but the Shamrock Claim and the Croninville diggings are the most important in the parts of the block away from the coast-line. Brown's Terrace has not yet been developed. On this there are extensive deposits of black sand; but there will be considerable cost in bringing water on to the ground. Various proposals have been made, but as yet nothing definite has been undertaken. So far as prospected, the black-sand deposits, though likely enough to pay if properly worked, are yet of rather low grades.

The works of the Shamrock Company, holding their claim at the southern end of Addison's Lead, are the most complete and extensive within the block. These include a hydraulic elevator, having in the pipes a pressure of 350ft. from the top of the high terrace to the eastward. The material is elevated to a height of 54ft. from the bottom of the working-face. The coarser material is shot off on a screen-table, and the lighter material, with the gold, is passed over tables, from which the finer tailings escape into the sludge channel. The company at one time proposed driving a tunnel about a mile in length, in order to drain from the main bottom in the claim, by which it was hoped a considerable saving in water-power would be effected, and the claim worked at a less cost than at present. This scheme has, for the present, been laid aside, the present method being considered equally effective at not greater cost. Between the Shamrock Claim and Croninville the lead has, since its formation, been buried underneath a great shingle-fan formed by the Totara River. Afterwards, by the action of the same river, this has been cut through, and in part carried away, and a series of descending terraces have been formed, which are three to the level of the river. The lead between the Shamrock and Croninville was thus first covered up and then destroyed by the action of the Totara. It is likely, however, that the auriferous lead will be traced for some distance under the fan of the Totara, where from the north it passes under it.

Block V.—This has from the mouth of the Nile a frontage along the coast of eight miles, and an average width of two miles and a half. The area of the block is 9,600 acres. The centre coast-line is bold, and rocky highlands up to 700ft. immediately overlook the sea in the southern part, while the Limestone Range, fully 1,000ft. above the sea-level, runs along the back boundary throughout its entire length. Between these two lines of higher land there is in the northern part lower lands, forming terraces and flats along the left bank of the Nile River; and, by a succession of terraces, rising one above the other, the ground towards the south, before entering the watershed of the Four-mile Creek, has attained to a height of fully 400ft. above the sea, while to the south of the Four-mile, broken terraces, with black-sand deposits, can be traced to a height of fully 600ft. above the sea. In Constance Bay, and at the mouth of Candlelight Creek, these deposits reach sea-level. Except, it may be, along the foot of the limestone ranges the northern part is very poor as regards the quality of the soils; and, where the best soils are—namely, along the valley of the Four-mile Creek—the areas are so limited that they scarcely merit notice in considering the general quality of the land within the reserves. Over the whole area west of the Limestone mining has been carried on, and the district included within this block was at one time the most famous of all the West Coast Goldfields. Large quantities of gold were got from the black-sand and beach deposits of Constance Bay. At the higher level, near the Township of Charleston, black-sand deposits, underlain by granity wash, was also very rich in gold, and have been worked over an extensive area towards Candlelight Creek. The principal workings are now situated along the western base of the Limestone Range, where there are heavy deposits of black sand rich in gold, but for the most part oxidized, so as to form a ferruginous or dark-purple cement that requires to be milled before the gold can be set free; but, however carefully the operation may be conducted, it is at all times imperfectly accomplished, and the sand-tailings passing along the different channels liberate more gold, which is recovered by ripples, blanket-tables, or other means placed so as to intercept the gold.

There is still a considerable population engaged in mining at Charleston; but, on the working-out of the richer ground, unless parties were in possession of water-rights such as would enable them

to work poorer ground, they were forced to leave the district, and thus the population has gradually diminished to what possesses, and is sufficient to manage and apply the water that can be conserved on, or is already brought on to the ground.

On the Back Lead there are at the present time nine milling-plants for the reduction of black sand cement. Many more might be employed in different parts of the field.

Of late, prospecting for deep leads under the coal measures has been proposed, and the Mining Association of Charleston have taken active steps for the furtherance of this laudable purpose. The gravels, proposed to be tested, show in the face of the terrace inland of Constance Bay, and could easily be proved at that place. There is thus a possibility of a revival of mining at Charleston.

Auriferous quartz reefs are liable to occur in the gneissic rocks of the coast-line, but the quartz is of a type not generally considered auriferous. The plateau between Candlelight and the Four-mile is covered with deposits of black sand, but very little appears to have been done in the way of prospecting there. The table-land affords many favourable sites for the collection of water, and to this end it is to a considerable extent utilised.

In the Four-mile Creek, and thence on the high lands to the south boundary of the block, there is little mining going on at the present time, principally owing to the difficulty of getting water on to the ground; the rich patches payable for cradling being worked out.

Block VI.—This extends from the southern boundary of Block V. south-west along the coast, a distance of seven miles, and has at the northern end a width of three miles and a quarter, while at the southern extremity its width is less than a mile. The total area of the block is 5,600 acres. Its surface, except a small area at the mouth of the Fox River and thence extending north as a narrow strip to the rock on the beach at St. Kilda, is broken and rugged; the south end of the gneissic high lands of the coast being within the northern limits of the block, while along the south-east boundary the Limestone Range extends to the Fox River, south-west of which a broken limestone plateau, interrupted by a single granitic boss, extends to the southern limit of the block. The gold obtained on this block comes chiefly from black-sand and other sea-beach deposits, the more important workings being from Welshman's Terrace, north to the high-level black-sand leads of St. Kilda, and south to the Seal Rocks, as "beach-combings," on the shore of Woodpecker Bay. Further to the south gold-workings are confined to the moving sands between low and high-water mark, or to such more stable deposits as have accumulated between the present high-water mark and the foot of the cliffs. There are few important workings as aids to mining on this block. The land, where it is found level, is of better quality than more to the north, but the areas on which settlement for agricultural or pastoral purposes is either too small, or so covered with dense and heavy bush that the clearing of it would prove very costly.

Block VII.—This is constituted by a parallel strip along each side of the Buller River, from the junction of the Ohika-iti or Little Ohika to and opposite to the Eight-mile Creek in the Gorge of the Buller, above the Lyell Township. The total area of the reserve is 8,900 acres. It contains some small areas of good arable or pastoral lands, mostly on the south bank of the river; but these have already been alienated from the Crown, and now for the most part are occupied as grazing lands. The long narrow strip along the Buller River that this reserve embraces, will for clearness and convenience be described under the following heads: (1) Little Ohika to Grainger's Point; (2) Grainger's Point to the junction of the Inangahua; (3) from the Inangahua Junction to the Lyell Township; and (4) from the Lyell Township to the east, through the Buller Gorge to the boundary of the block.

Little Ohika to Grainger's Point.—Between the Little Ohika and Grainger's Point the Buller River runs through a deep gorge, the sides of which are exceedingly rugged and abrupt. In this part, therefore, there are but few localities where alluvial deposits can accumulate or have accumulated above ordinary flood-mark, or where shingle-beds are formed between high- and low-water mark, under conditions favourable for mining of gold. At the Twelve-mile (Powell's) there is a moderate-sized area of alluvial ground on the south bank of the river, and the river-bed on this part might also be dredged for gold. On the opposite or northern bank there is also a thick accumulation of alluvial deposit, and evidences of considerable workings, now discontinued. On the south side also a considerable extent of the alluvial bank of the river has been turned over; but in the bed of the river no evidences of work done have been preserved.

The next point where gold-mining might be carried on is immediately below Hawk's Crag, where a large beach is formed on the south side of the stream. This has partly been supplied from material brought down by a large-sized creek here making junction with the Buller; but to a very large extent the gravels are brought down from higher lands up the valley by the Buller, and should therefore be auriferous. Some old workings lie on the higher banks at this place, but these are now overgrown by a fresh growth of scrub.

Above Hawk's Crag there should be gold-workings on the banks and south beaches of the river, and at the junction of the Blackwater also; but in the latter locality so great is the quantity of shingle brought down the Blackwater that shingle from this source must for a time predominate, and so far the Blackwater has not proved a gold-bearing river. Here, therefore, conditions are not so favourable for mining. Between the Blackwater and Lovel's Point there is a considerable length, and more than an ordinary breadth, of alluvial bank to the river on its south side, and here, both on the higher bank and on the shingle banks of the river, are gold-workings. A miner working on this part of the river stated that he could easily make 10s. per day when the river was moderately low.

Above Lovell's Point to Berlin's the south bank of the river has an alluvial deposit of from 2 to 5 chains in width. Part of this is occupied as garden cultivations or grass lands, and part of it is being mined upon. On the opposite or north bank of the river there is also a moderate extent of alluvial lands, and a number of claims that from the early days of mining on the Buller River have been worked on the bank of the river, and are still being worked. Some of the reaches on the river

between Lovell's Point and Grainger's Point are suitable and promising localities r the establis ment of dredging plants on the river.

At Grainger's Point the river is confined to a nārrow gorge, and consequently rushes through this with considerable force. Alluvial deposits on the immediate banks of the river are here absent, but at the upper end of the gorge high-level river-gravels have been formed, resting against the range on the south side at fully 100ft. above ordinary flood-level.

Grainger's Point to the Junction of the Inangahua.—Above Grainger's Point the Buller Valley widens considerably, and between the road and the river lies a somewhat extensive area of flat land—partly swamp, to some extent drained and reclaimed, and partly brier bush-covered lands—along the immediate bank of the river. The western end and middle part of this is known as Walker's Swamp or Farm (Rocklands). Above Mr. Walker's homestead the breadth of the low grounds rapidly becomes less, till two miles and a half from the Inangahua Junction the river runs close under the limestone range, which here terminates in high cliffs, along the narrow space between which and the river the Westport–Reefton–Nelson Road has been formed. On the northern side of the river there are also low grounds, forming partly the banks of the Buller River and partly the lower valley of the Orikaka or Mackley's Creek. No information respecting gold-mining on this section of the Buller Valley was obtained, but it does seem probable that dredging on the river between Grainger's Point and the Limestone Bluff, where the river is again confined to a gorge, could be profitably carried on at many places. From the limestone spur to the Inangahua Junction but little gold-mining has been done on the south bank of the river, but on the northern side a moderate-sized creek (Welshman's) here makes junction, and from the valley of this a considerable quantity of gold has been obtained.

From the Inangahua Junction to the Lyell Township.—In this part of the Buller Valley there is a moderate breadth of low alluvial lands along the south bank of the river, part of which must be considered as belonging to the Inangahua Valley, the Buller River in reality breaking across the northern end of the depression along which the Inangahua flows. Less than three miles from the Inangahua Junction the Buller Valley is distinctly marked, and the alluvial lands along its banks are due to its action during times of high flood, or when running at a higher level than at the present time. Gold workings are carried on on the bānks of the river to some extent, principally near Junker's Hotel; but this part of the valley is important chiefly on account of the auriferous character of the bed of the river. One dredge only, the "Cock-sparrow," is at present at work on the river, and as of late this has been very successful there, it is probable that shortly others will be built to exploit the gold from other parts of the river-bed. On the northern bank of the river there is a fringe of high terrace-lands over which gold is supposed to be present, but at the present it is undeveloped. In the upper part of this section, below the Buller Bridge, the alluvial flats along the banks of the river are for the most part cultivated and in English grasses.

From the bridge across the river to the junction of Lyell Creek the south-west bank of the gorge, which here begins, is very abrupt, and no gravels are retained. Such as are in this part of the valley lie on the opposite or north-east bank. Here a number of claims are at work, but the works are on a small scale, the water supply being limited.

From the Junction of Lyell Creek, East, through the Gorge to Boundary of the Block.—At many places in this gorge there are on both banks of the river alluvial workings, which are at so considerable a height above the river that very little water is available for mining purposes. Small catch-water races have, therefore, to be brought on to the points, patches, or fringing terraces, from whatever source is most convenient or where water can be obtained. The result is that at most places mining is carried on with a totally insufficient supply of water, and ground is thus worked, it is presumed, so as to pay small wages, that otherwise should be made to pay handsomely.

Block VIII.—This block extends to the eastern boundary of Block VII., along both banks of the Buller River to the junction of the Mataira and Matakitaki Rivers. Like the previous block, it takes in but a narrow strip along each bank of the river, the alluvial banks of which have been hitherto the great source of gold in this part of the Buller district. The area of the block is 4,320 acres. The gorge of the river continues to the lower end of Fern Flat, but there are a few places at which there are small alluvial flats—as, for instance, at Newton Hotel, the junction of the Maruia, &c. There are also between the Newton River and Fern Flat some high level terraces covered to a considerable depth with river shingle, which are known to be gold-bearing, but on to which no water-supply can be or has yet been brought.

At the mouth of the Maruia the terraces on the south side of the river have been worked extensively, and is still being worked, according to the measure of the water-supply, for gold. At Fern Flat the river banks, on the northern side principally, have been worked, and a dredge, the "Buller Dredge," moored to the bank, is here at work in the bed of the river. From this point to the east limit of the block there should be several localities offering facilities for dredging the river-bed, but in the meantime little or no mining is being carried on. On the north side of the valley the Buller flows under high banks till the Mataira Valley opens out, and on the south side the comparatively extensive alluvial plain, east and west of the junction of the Matakitaki, stretches from Doughboy Creek to Long Ford.

Block IX.—This extends between New Creek and the Eight-mile Creek, up the Buller Gorge from the Lyell Township. Its length east and west is five miles, and its breadth irregular. The block comprises an area of 9,800 acres. Within it lie the rich alluvial diggings of Lyell Creek, famous for its "patches" and the coarse character of its gold. The area west of Lyell Creek is rugged and mountainous, utterly unfit for agricultural or for grazing purposes. To the east of Lyell Creek, and lying between the middle part of that, the Buller Gorge, and the Eight-mile Creek, is a high alluvial plateau known as Manuka Flat. This is covered with an alluvial deposit which is known to be gold-bearing, and to some extent payable. Gold has not yet been found so abundantly as to lead to extensive workings, but all agree that the flat has not been sufficiently pro-

spected. The prospecting of this flat was stimulated by the finding of rich gold high up on the slope from Lyell Creek to the flat. This gold was supposed to have broken away from the edge of the flat, and it must be confessed that this was probably the case. How far it was concentrated in its passage down the slope towards Lyell Creek is another matter, which future enterprise must determine. In Lyell Creek itself the alluvial gold-workings are confined within the limits of a very narrow valley; at many places extremely gorgy, and practically a gorge throughout.

Quartz-mining is now and will be the most important form of gold-mining. There are in the valley of Lyell Creek some old-established mines—notably the United Alpine and the Low-level Extended Companies, the former has been a prominent mine for the past twenty years. The Low-level Tunnel must be mentioned in this place as a work of great importance to mining in the district. In the New Creek district the different mines are not yet fully equipped, and the initiatory prospecting stage has yet to be passed, but, as an area for auriferous quartz-mining, its prospects are similar to those of the Lyell Creek, the rocks being the same, and continuous between these places.

Block XXV.—This extends along both banks of the Maruia, a distance of thirteen miles from the southern boundary of Block VIII. The average width of the block is one mile, and the total area 8,320 acres. The surface is constituted by steep mountain slopes on each side of a narrow valley. The whole area is heavily timbered, except where there have been some clearings made by man. The level lands in this part of the valley are very limited, and are confined to the east or right-hand bank of the river. There are a few miners scattered along the bank of the river, and probably their number would be increased were freer communications to be had with the more settled districts of the Buller Valley. Land fit for settlement is of very limited extent, and it is just such lands—the alluvial flats along the banks of the river—that are required for mining purposes. Where not too gorgy, dredging for gold might be carried on in the bed of the river itself. Payable gold, but nothing remarkably rich, seems to be got along the river banks at almost any point where gravel or finer shingle has accumulated.

Block XXVI.—This block also extends along the Maruia, a distance of thirteen miles, and has the same average width as Block XXV., and its area is the same—namely, 8,320 acres. For the first five miles, following the river upwards, the mountains are close to the river on the east side of the valley, but on the west side there are some flat lands between the river and the ranges which towards the lower end of the block may be distant half- to three-quarters of a mile. Between five miles and nine miles the river valley is more confined and gorgy, and for about two miles is difficult to pass even on foot. In this part of the valley a number of miners are settled, and were the cost of provision less than it is, there can be no doubt but that a considerable population would be engaged in gold-mining along the banks of the river. A good track requires to be made along the whole length of the valley, from the Buller to the Maruia Plains, where it would join the track over the range to the Matakitaki. Above the gorge the Maruia is joined by the Warbeck coming from the east. At the mouth of this small stream some gold-mining is at present being carried on, and higher up along the banks of the river to the gravel gorge of the old glacies-moraine stretched across the valley a mile above the juncture of the Warbeck. Above this the river runs along the foot of a high terrace on its left bank, and it has some flats at a lower level, principally on the left bank.

Block XXVII.—This forms an area of about three miles square, and contains 6,250 acres. It extends across the Maruia River from a mile up Station Creek to the foot of the Granite Mountains, on the opposite side of the river. At one time thirty to forty miners were working in Station Creek, but at the present time no work is being done on this stream. As part of the Maruia Plains, the land within this block, although fully averaging in quality the whole plain, cannot be classed as good grazing land. The climate is cold in winter, and vegetation is completely checked from April to October.

Block XXVIII.—This extends along the upper valley of the Maruia from the boundary of Block XXVII, for a distance of thirteen miles, with an average width of one mile and a quarter. The area of the block is 8,320 acres. For the most part the land is flat river-bed, poor shingle-bed, or grassy flats of better quality bordering the river, or bush-clad mountain slopes, where these confine the valley and the river to a width of a few chains or a quarter of a mile. The country away from the river-flats is bush-clad. Some parts of the banks of the river are good grass lands, but the back of the stoney plain bears but a struggling grass vegetation of tussock. Above the junction of the Alford the river valley becomes a ravine between two mountain ranges of mica-schist. Gold is known to exist on the hill slopes on the left side of the valley, and a number of miners are at present working on the Alford, but these are outside the limits of the block.

Block XXIX.—This extends along both banks, but principally along the eastern bank, of the Matakitaki River to Horse Flat, one mile above the junction of the Glenroy with the Matakitaki. The total length is twenty-one miles, the average breadth half a mile, and the area 3,400 acres. On the west side of the valley, to the junction of the Glenroy, the range descends abruptly to the level of the river, and there are thus no flat lands of any considerable extent on that side of the valley. On the opposite or east side of the valley a variable breadth of flat bush-covered land extends twelve miles up the river. Beyond this the hills form high slopes, overlooking the river on both sides of the valley, and to the junction of the Glenroy the extent of flat terrace-land is much more limited. In the lower part of the valley there is a considerable extent of flat terrace land, but this is mostly covered with birch bush, an exclusive growth of which indicates very poor land. These lands, wherever of any value, have already been taken up, and are for the most part occupied. From the ford and bend in the river below the junction of the Glenroy River, to the south boundary of the block, the level lands of limited extent form high terraces on both banks of the river. Their value as agricultural lands is very little, and they are mostly being worked for gold.

The gold-workings in the Matakitaki Valley are chiefly along the banks of the river and on the lower river flats. There is generally a poor supply of water, and all the water that can readily be

brought from the range on the east side of the valley has already been utilised. Were a more abundant supply of water available there would be an increase in the number of miners and a corresponding increase of the gold production of the district. The miners state that almost anywhere payable gold deposits can be found on the banks of the Matakitaki from Hampden to the junction of the Glenroy. A dredge, the "Matakitaki Dredge," is at work on the river, and employs a number of hands in this form of gold-mining.

Block XXX.—This block is of small extent; it is four miles in length, and extending along each side of Doughboy Creek, contains an area of 2,560 acres. The lower part of it lies within the Buller Valley, on the south side of the river, from the head of Fern Flat to Long Ford. Beyond this the creek enters the hills, and for a time the valley is narrow, but it soon again opens out to a moderate width, and narrow flats extend along this upper part, along which gold-mining has been carried on for some considerable time. The lower lands outside the hills only are of any value; these have, however, been alienated, and are in the possession of private individuals. The upper part of the valley is surrounded by mountains formed of the rocks of the coal-bearing series, and it is thus a matter of importance to determine the immediate as well as the original or primary source of the gold found in this part of Doughboy Creek. From the upper part of the valley a low saddle gives access to the lower part of the Maruia Valley, and from this direction or from the Upper Buller the auriferous gravels may have come. There is, however, another source whence the gold in this valley may have been derived—namely, the conglomerates at or near the bottom of the coal-bearing series. This matter need not be dwelt on here, as some further reference will have to be made to it in speaking generally of the source of the gold in the Upper Buller Valley, more especially of the Matakitaki, Mangles, and Maruia Valleys. At one time 200 miners were located within the area fo this block.

Block XXXI.—This extends five miles and a half along the lower part of the Glenroy River, and its area is 800 acres. For the last one and a half or two miles the Glenroy River has its course in a deep gorge excavated in granite, but on entering the Matakitaki Valley rocks of the coal-bearing series are found near its junction with the Matakitaki. Beyond the granite range the valley widens somewhat, and here the river has cut a narrow channel in conglomerate rocks and sandstone belonging to the coal-bearing series. Beyond this again the valley yet further expands, and open flat lands are found along the banks of the stream. Yet higher up the river the conglomerates of the coal-bearing series are repeated, and thence extend into the Maruia watershed. Towards the source of the river, and beyond the limits of the block, there are a variety of rocks—serpentines—belonging to the Maitai series, and Devonian breccias and slates, and mica-schists. These latter may possibly be the source of part of the gold found in the valley of the Glenroy, but it is evident that the greater part has been derived from the conglomerate, in connection with the coal-bearing series, as described in the first part of this Report.

The prospecting of these conglomerates is a matter that, in the interest of mining in the Upper Buller district, should not be delayed; for it is evident that not in the Glenroy River alone, but that over the whole area drained by the Maruia, Matakitaki, Glenroy and the Mangles, they have been a great, if not the chief, source of gold to the recent alluviums worked for gold in the lower grounds of these valleys. It has been noted that in the Matakitaki, Glenroy, and the Mangles, where these conglomerates cease and are not found higher up the valley, there also is the finish of the coarser and richer deposits of gold; the gold found higher up the valleys being fine and by no means as abundant as where, and below where, the conglomerates begin. This is specially the case in the Mangles Valley, where the conglomerates terminate at or near the junction of Blue Duck Creek; the coarse and richer gold deposits follow that for some distance, till the conglomerates trending away to the westward in Blue Duck Creek, the gold is less or absent towards the source of the creek.

Block LI.—This is the most northerly of the blocks of land reserved for gold-mining purposes in the Inangahua Valley. It is of irregular shape, but rudely a triangle in outline, the blunted apex of which nearly reaches the Westport–Reefton Road, between Larry's and Landing Creeks. The boundary follows the right bank of Larry's Creek to the heights overlooking the second or main forks of that stream. Thence the south-east boundary is part of a line between Trig. H H and Trig. G, the north-eastern trig. being the corner of the block in that direction. From thence the line runs nearly due west to where it crosses Landing Creek. It embraces an area of 9,900 acres, and has two principal streams—Landing and Coal Creeks—running through it, each of which has many tributaries that are of importance in connection with the gold-producing quality of the gravels in these or the larger streams. Little Landing Creek has been extensively worked for gold, which appears to be derived from two if not three different sources. Between Landing Creek and Coal Creek there is a high plateau or tableland over which a considerable amount of working for gold has been carried on, and over all the higher lands, where alluvial deposits are within this block, large sluicing claims might be worked with profit. The back part of the block reaches across the Cretaceo-tertiary coal-bearing belt on to the auriferous slates of carboniferous age, and within this part there is a probability of reefs being found in continuation of those found on Larry's Creek. Then there are the quartz cements at the base of the coal-bearing series, which here have not been prospected, and which should be prospected both here and elsewhere much more than has been done. In front of the coal-bearing series, that is to the westward, lies a very considerable development of older Pliocene gravels ("Old man bottom"). These rocks extend to within a quarter of a mile of the road line, and form a plateau or table-land deeply cut into by gullies or sculptured into hills of a nearly uniform height. These rocks are gold-bearing, and although within this block no claims are being worked in them, there cannot be a doubt that, with a good water supply, they could at places be made to pay for working, The Chinamen working in the bed of Little Landing Creek admitted that, perhaps, more than a colour of gold could be found in these older Pliocene gravels that there form the bottom on which the recent gravels of the creek bed rest.

More to the north, between Landing Creek and Coal Creek, there is a table-land recently explored by Mr. Caples, of Reefton. Over this there have been workings of very considerable extent. These workings are now old, the place having been abandoned by European miners for some time. With a sufficient water supply much of this ground might again be worked, and also an extended area of ground too poor to work in the first instance. At the present time Chinamen only are working on the block.

The mountain slopes, and the areas over which the coal-rocks and "Old man bottom" are found, constitute land having poor soils, and are not suitable for settlement. In the valleys of the main creeks, and over a narrow belt east of the road line, the land is of better quality; but settlement here and in many of the lesser valleys would interfere with or bar mining operations that in the future are likely to be carried on in the different formations and horizons, from the slates of the mountain range to the most recent gravels of the creek-beds.

Block LIII.—This is of irregular outline, and towards the west embraces—first the country east of the main road between Larry's Creek and Boatman's, and secondly excluding an area of freehold land extending along the south-west side of Boatman's—a considerable area lying between Boatman's Creek and the Waitahu or north branch of the Inangahua River. The back boundary is formed by part of the line Trig. H H to Trig. G, and part of the line from Trig. G to Trig. N. The total area is 9,000 acres. Naturally the block is divisible into two parts—first, that lying between Larry's and Boatman's Creeks; and second, that between Boatman's Creek and the north branch of the Inangahua. Over that part, between Larry's and Boatman's Creeks, there are extensive gold-workings in Little Boatman's Creek, Burke's Creek, Ryan's Creek, and Italian Gully; more especially in the latter. In Italian Gully the main area of workings are continuous for about a mile along the valley, and are workings in recent mountain wash brought down from the range to the east, which consists of slates and sandstones of carboniferous age, referable to the Matai series of the New Zealand Geological Survey. This is evidence that between Specimen Hill and the different quartz claims at Larry's the auriferous slates are continuous on the range. They are seen to extend across Italian Gully to the western part of the slate area at Larry's; between which two places the slates are seen to be directly overlain by the older Pliocene gravels forming the "Old man bottom." Below the junction of Burke's Creek with that of Italian Gully the gold-workings are on "Old man bottom."

The rocks in Burke's Creek are partly limestones, sandstones, coal-measures, and the conglomerates underlying the last mentioned, resting on the auriferous slates of Specimen Hill, and, with the next succeeding member of the coal-bearing series, are overlain by the gravels of the "Old man bottom." On the tops of the spurs between Burke's Creek and Boatman's Creek, and the lower part of Italian Gully and Boatman's Creek, there is reported to be gold-bearing gravels. These may be a rewash of the "Old man bottom," or may be strata more auriferous than is commonly the case, interbedded therewith; probably the latter is the case. In the upper part of Burke's Creek heavy beds of gravel, forming part of the Older Pliocene series, have been mined in Howell's claim, and a very deep face is there exposed, which has been extensively worked.

Little Boatman's has been worked from the slopes of Specimen Hill to or almost to its junction with the main branch of Boatman's. Mainly its gold has been derived from the adjoining auriferous slates to the eastward, many rich reefs lying in that direction, though these have not been traced through the spur into the valley of Little Boatman's, nor at lower levels under it. Rich specimens are, however, met with in the creek, and one large block of quartz lying in the creek bed was found so impregnated with gold that a great part of it has been removed as specimen stone. On the north side of the valley of the main branch of Boatman's Creek alluvial gold working at low levels have apparently been exhausted, but on the higher slope of the hill, at the back of the township (Capleston), rich gold has been found in the lower beds of the "Old man bottom." And from information afforded by Mr. Rodgers, of the Crown Hotel, Capleston, it appears that along the contact between the "Old man gravels" and the coal rocks, that the lower part of the auriferous band gave gold at the rate of 1dwt. to the dish, and the upper part at the rate of 1dwt. to the ton. It may be assumed that the deposit will extend considerably along the contact of the two rocks under the higher part of the range, striking towards Howell's claim on the one hand and south-west across Boatman's Creek on the other hand, and, gradually dipping westward, should pass below the water-line of the main valley. This lower auriferous band in the "Old man bottom" will again have to be noticed in dealing with the other, or south-west, division of the block. There are other and higher bands of the "Old man bottom" that are known to be auriferous, one of which has been tested on the south-west side of the creek. This, from its strike and dip, would correspond in position, on the north side of the creek, with the immediate locality where gold, on the authority of Mr. John Gallagher, is said to occur on the top of the spur between Boatman's and Burke's Creek.

At Capleston the slate-rock makes its appearance in the bed of the creek, and underlying the coal-rocks, extends north and south, and forms the range of higher hills to the northward and the western slope of the range between Boatman's Creek and the north branch of the Inangahua. The core of this range to the south-west is formed of Devonian rocks. One mile and a half to two miles above Capleston the slates pass under rocks belonging to the coal-bearing series, and towards the middle part of this belt of slate the chief quartz-mines of the Boatman's district are situated. The Just in Time, the Fiery Cross, the Welcome, and many other claims of lesser note are situated in this part of the slate belt. These have all at one time or another, and each in their turn, been famous gold-yielding mines. Nothing more need be said in justification of the area over which they extend being withdrawn from sale and reserved for mining purposes.

Towards the source of Boatman's Creek the conglomerates at the base of the coal-measures are likely to prove auriferous; but, although a good deal of prospecting has been done in this part of the district, the idea of testing the cements at the base of the coal-bearing series is novel to the miners, and hitherto attention has been directed wholly to the recent wash in the creek beds.

On the south-west portion of the block alluvial diggings alone exist. The slates of the auriferous series do extend from Boatman's Creek to the Waiatahu, or north branch of the Inangahua, opposite the Sir Charles Russell Battery; but up to the present time auriferous quartz-reefs have not been found in this area of the slates. Resting on these follow the conglomerates and quartz cements, or coarse or fine sandstones of the coal-bearing series. These are, or should be, gold-bearing, since the same beds are auriferous at no great distance to the south-east. The Pliocene gravels, or "Old-man bottom," next follow, and are known to be auriferous. There are also, towards the north-west, terraces of early recent, or of Pleistocene date, probably also auriferous.

A tributary of Boatman's Creek drains part of this portion of the block west of the slate range, and its modern gravels have derived gold principally through the cutting down of the "Old man bottom," but also in part from the older formations lying farther to the eastward. Frying-pan Creek, more to the south-west, has, however, been the chief seat of alluvial mining in this part of the block, and has undoubtedly derived its gold from all the sources here enumerated, the early-recent, or Pleistocene terraces, excepted.

Along the hill-sides bounding the valley of Boatman's Creek the "Old man bottom" is developed between the disappearance of the coal-bearing series at Capleston and the creek mentioned a mile and a quarter further down the valley. The lower beds of the Pliocene gravels, as on the opposite side of the valley, are on this side auriferous; and along the junction between these and the coal-rocks rich coarse alluvial gold was found. This was worked out in the beds of the small creek without leading to the prospecting of the underlying Older Pliocene gravels, from which the gold in the creek had been immediately derived. Some distance further down the valley a claim has been opened out, and partly worked, on Mr. Boardman's farm. This is so clearly in an auriferous band of the Older Pliocene gravels that it is thus of peculiar interest and importance. The average result as yet obtained is 5dwt. of gold to the ton of gravel put through the boxes. Mr. Boardman works the ground himself when water is to be had. Work can only be done in wet weather, or when an old prospecting drive has sufficient water in it to supplement that collected on the surface.

Block LIV.—This embraces the Reefton mining area between the two branches of the Inangahua from the Town of Reefton to the source of Murray Creek, and from the battery-site of the Sir Charles Russell Mine to the mouth of Lankey's Gully. The block contains 7,000 acres, and is throughout of a mountainous character. Its agricultural or even its pastoral capabilities need not, therefore, be considered. It was the early great centre of quartz-mining in the Reefton district, and is still in the premier position in that respect. It would therefore be superfluous to at length describe a block, the proceeds and capabilities of which are so well known. It is only necessary to mention the fact that, along the south-east boundary of the block, along Lankey's Gully and the upper part of Murray Creek, cement-workings in quartz gravels at the base of the coal-bearing series is a promising phase of gold-mining, which has possibilities along the range between the two branches of the Inangahua as far as Garvie's Creek. That the Lankey's Gully Cement Company's operations failed to be remunerative merely goes to show that the right place, or the right method of working the cements, was not hit upon or adopted. These cements extend over parts of the proposed reserves Nos. 58 and 60, and are also largely developed on Block LV., which also should have been a proclaimed reserve.

Block LIX.—This lies south of the Inangahua River, from Reefton to Rainy Creek Junction, and, with the exception of some inconsiderable flats on the left bank of the Inangahua, and a small area of level land in the lower part of the valley of Devil's Creek, the area of the block is decidedly mountainous. It is of irregular figure, and comprises an area of 10,000 acres. The land is therefore unsuited and unfit for either agricultural or pastoral purposes, and, being covered with bush, would scarcely pay to clear, as the abrupt slopes would not retain the soil, and the flatter lands are of very inferior quality, these latter being generally covered with mountain pine, growing on a poor swampy and peaty soil. Valuable mines are situated on this block, the principal of which are the Globe, the Progress, Sir Francis Drake, the Cumberland, and in Rainy Creek, the Inkerman. Alluvial mining has also been, to a very considerable extent, carried on along the valley of Devil's Creek, Soldiers' Gully, and Maori Gully, and on the higher lands around Merrijigs. At the head of Soldiers' Gully, and between the middle part of Devil's Creek and Reefton, there are heavy deposits of Pliocene gravels that have been extensively worked, and sluicing operations are still being carried on. In Maori Gully work is still being carried on in the lower part of the creek, and towards its source and around Merrijigs there are a number of workings in high-level gravels, respecting which the exact age and manner of deposit might be matter for debate. Patches of "Old man bottom" appear in the valley of Maori Gully, and to the neighbourhood of these the present gold-workings appear to cling. There is also, between Maori Gully and the upper part of Slab-hut Creek, a sort of table-land, covered with gravels that are promising, but do not appear to have been sufficiently prospected.

Block LXI.—This lies to the south-east of Block LIX., and stretches along the south-western bank of the Inangahua River, a distance of ten miles, with an average breadth of about two miles and a half. Its area is 10,000 acres. The whole is mountainous, and fit only for mining purposes. There are several quartz-mines on the block, the most important of which is the Golden Lead and Merrijigs Claims, the surface portion of the lodes in which have been worked to a considerable extent. A low-level adit is being driven from Deep Creek into the Golden Lead, which, it is expected, will cut other reefs besides those already found, and the latter at lower levels. In this part of the district the rocks, though belonging to the Maitai series, are, at least where the quartz-veins usually occur, mainly sandstones, and the lodes, so called, are thin leaders of gold-bearing quartz, which, varying from 1in. to 3in. in thickness, are rich enough in the precious metal to make the working of them remunerative.

The south-eastern part of the block is probably occupied by part of the granite area surrounding the source of the Inangahua River, but to the limit of the Maitai rocks in this direction, round the sources of the Big River, there are prospects of a continuation of these thin but very rich leaders of quartz in the more arenaceous rocks of the Maitai series. Coal is developed over a considerable extent of this block, and will yet prove of great value in connection with the working of mines known and to be discovered; as where wood only is dependant on for steam-raising purposes large areas are soon stripped of their forest growth.

Block LXII.—This extends along the south-east side of the Little Grey Valley, from Slab-hut Creek to Big River, a distance of fully seven miles. The greatest width of the block is three miles, and the area it contains is 10,000 acres. The block may be characterized as broken and hilly country, physically not suited to agriculture, and, as regards the quality of the soil, this, except along the banks of the more important streams, is of very poor quality. In the lower part of Slab-hut Creek a considerable amount of gold-working has been carried on, now principally by Chinamen. Beyond the gorge in the upper part of the watershed, the low grounds of the creek valley, and many of the tributary streams, have been worked. The fundamental rock is Maitai slate, overlain on the high lands by the gravels of the "Old man bottom." Quartz-reefs are likely to be found in the older rocks, and masses of reef-quartz are not infrequent in the wash of the various creeks.

In the valley of Antonio's Flat and creek of that name the low grounds show shingle, partly derived from the destruction of the Maitai slates, which is the prevailing rock higher up than the forks of the creek, at the upper end of Antonio's Flat; but from this point downwards to the junction of the stream with the Little Grey the material, carried into the main water-channel by the action of lesser contributory streams, is wholly derived from the Older Pliocene gravels, which are present on both sides of this part of the valley, to the exclusion of any other rock. Along the many lesser gullies cut back into the gravel-hills gold-working is being carried on almost to the water-partings leading into the adjacent watersheds to the north-east and south-west. In the upper part of the valley the main workings lie along the right branch of the creek, the bed of the creek and the lower slopes of the hills being slate-rock, while the tops of the hills are formed of the gravels of the "Old man bottom." Both of these rocks may, therefore, have been a source of gold to the gravels of the creek-bed. There appears to be an air of decadence in mining throughout the whole of the valley of Antonio's Flat, while the work done shows that it must at one time have been a prosperous and a flourishing place. This state of things, as shall immediately be shown, may shortly change when enterprise undertakes the prospecting of the deep ground on the middle and upper parts of Antonio's Flat, or prospectors have found out that large sluicing-claims can be worked to profit in the gravels of the "Old man bottom."

At Adamstown the creek draining the valley joins the Little Grey a little below the Mawheraiti Railway-station, where there were formerly workings of considerable extent which, like those in the valley of Antonio's Flat, were confined to the side gullies or those parts of the main valley where bottom could easily be reached. Lately, however, enterprising miners—Chinamen and Europeans alike—have attempted the deeper ground, and this, as regards both class of miners, with encouraging and satisfactory results. The Chinamen, in large parties, strip the ground from the underlying gold-bearing wash, which may be 16ft. to 20ft. below the surface. The European prefers to sink shafts and drive out as much of the wash as can be safely won. The consequences are that what was lately what might be claimed to be a worked-out and deserted gully is now on the fair road to a greater degree of prosperity than formerly the mining population in it enjoyed.

The southern portion of the block terminating on Big River is high-terrace lands or hills formed of "Old man bottom" intersected by gullies, all of which are liable to contain gold-bearing deposits, but of which the particulars have not been ascertained. The principal workings in this valley, the lower part of it, lie along the Blackwater, and, strictly speaking, these have to be considered when dealing with the next adjacent to the southward.

Block LXIII.—This lies to the south-east of Block LXII. and is wholly rugged, hilly, or mountainous country. The block forms an irregular square, the greatest length of any of the sides of which is six miles. The block contains 10,000 acres. It comprises within it the upper portions of the valleys of Slab-hut Creek and Antonio's Flat Creek, and Big River runs across its south-western end. Along the north-west boundary, and for some distance into the block, the rocks on the spurs are Older Plicene gravels, underlain by Maitai slates, exposed at first along the beds and sides of the gullies, and finally on the crests of the ridges. The eastern and south-eastern parts include a plateau-like mountain-top, covered with stunted pine-trees, favouring a wet and boggy soil and subsoil. Little of this part of the block has been explored, but a road to the Big River Mine is being so improved that explorations will in future be carried on with greater ease.

The mining population within the block are chiefly in the valley of Antonio's Flat, and towards the source of Slab-hut Creek and around Merrijigs, Merrijigs Hill occupying the eastern corner of the block. Through this, from Block LIX., extends the belt of sandstone, with the small but rich leaders of auriferous quartz, that have been mentioned as occurring in the Golden Lead Mine. On the western slopes of Merrijigs Hill there are heavy deposits of gravel, which in working them for gold are being sluiced on a moderately extensive scale.

Block LXV.—This lies between Big River and the Big Grey, from the Greymouth–Reefton road and railway-crossing to four miles up the Grey Valley. Snowy Creek and Blackwater (a tributary of Big River) are the principal streams that intersect the block. The surface over the north-east part is hilly and broken to the Blackwater, and on the south-west side of Blackwater hilly country, formed of Older Pliocene gravels ("old man bottom") continue, perhaps half the distance, towards Snowy Creek. This portion of the block, except in the Valley of Big River and the lower part of the Blackwater, is without lands fit for settlement. Along Big River the low-lying lands have been already acquired and held in freehold by private individuals, while the lower part of Blackwater is

largely taken up by alluvial mines in active operation. Between Snowy Creek and the Big Grey there is a succession of broad terraces, by which descent is made to the level of the river. The first two or h gher terraces are covered with forest, while the last two to the river-flat are, for the most part, clear of forest. The two highest terraces are of great extent, and, overlooked from a distance, appear as though their area would be splendidly adapted for farms and settlement. Experiments in this direction have proved utter failures on the lower and open terraces, and the higher terraces, birch-covered, are held to be even less encouraging for settlement than the second terrace proved to be.

Gold has been largely mined in the valley-bottom of the Blackwater, and along the immediate lower hill-slopes bounding the valley, but the Older Pliocene gravels that have yielded most of this gold lie comparatively untouched and unprospected. In Snowy Creek, in like manner, for the first three miles from where it opens out on to the lower valley of Big River, workings are general along the creek-banks and the flat ground between the watercourse and the high river-terrace to the south-west. There has, however, been no regular and systematic working of the ground, and it is evident that, with a good supply of water under hydraulic head, such as might be afforded by, or obtained from, the neighbouring terraces, the whole of the valley-bottom would pay for hydraulic sluicing. Some few of the gullies, cut back into the south-west terrace, have been worked; but on the whole, from an examination of the workings, Snowy Creek has been incompletely worked, but will probably yet again be worked when the required water-supply is brought on to the ground. The workings are for the most part comparatively shallow, hence the ease with which the ground has been turned over in search of the richer patches of gold.

On the banks of the Big Grey, towards the south-east corner of the block, the beaches and low banks along the river are auriferous, and as reported would pay for working, but the water requisite for this purpose has to be brought across private lands, and as the owners object this cannot be done. Hence, only two men, or two parties, are working on this part of the block.

Block LXVI.—This lies to the south-east of Block LXV., and is partly on both sides, but mainly on the north-east side of the Big Grey. It is of irregular figure, but roughly a parallelogram, each of the sides of which are about five miles in length. The block has an area of 9,000 acres. The source of the Blackwater lies within the block, and part of the course of Snowy Creek is through it. It crosses the Big Grey above Mackley's, and includes part of the high open terrace land on the south-west bank of the river. On the northern side of the river the block immediately away from the river-banks is wholly covered with forest, mostly birch. Gold-workings within the bounds of this block have been very limited, and, for the most part, confined to workings along the river, and some prospecting along the more accessible creeks and gullies. On the north-east side of the river the land is of the same quality as over the greater part of Block LXV., only towards the east it is higher and more sterile still. The lesser area on the south-west bank of the river is open terrace land covered with native grass or low scrub, and may be considered second-class pastoral land.

Block LXIX.—This block lies to the south-west of Big Grey, but, except at one point, unreserved or freehold lands exclude it from having frontage on this river, or to the Grey River below the junction, the Big Grey, and the Mawheraiti or Little Grey. Its figure is irregular. The greatest length of the block, south-east and north-west, is seven miles; and its greatest breadth, in the opposite direction, three miles and a half. Its area comprises 9,000 acres. Throughout, except in the south-east part, it is formed of broken hilly country of considerable elevation. Towards the east it includes part of the terrace plain that, north-west of the granite mountains, lies between the Big Grey and the Ahaura Rivers. Two principal streams drain the block: The Waipuna, falling into the Big Grey, drains the central and more rugged parts; while the upper part of Duffer's Creek and of its tributary, Half-ounce Creek, drain the north-western part. The only land that can be considered of any value for agricultural or pastoral occupation is the eastern part of the block round the source of Waipuna Creek, and a narrow strip of land along the left bank of Half-ounce Creek. The Waipuna area is a hard, stony, high-level terrace, fit for pastoral purposes only. The area along Half-ounce Creek is a narrow strip along the left bank of the creek, under and on both sides of which mining is being carried on, for the purposes of which this land is necessary. There is therefore no land fit or available for settlement within the block.

The principal mining operations are carried on in the watershed of Waipuna Creek, Noble's Creek (both branches of it), and Mosquito Creek, these being wholly within the block. The lower Waipuna is confined to a narrow channel in a deep gorge, and the bed of this, though auriferous, cannot readily be worked. The Waipuna Gold-mining Company drove a tunnel from the middle part of the gorge through the intervening spur to the river-bed, but this did not serve the purpose for which it was intended; and the bed of the Waipuna, from the junction of Noble's downwards, has yet to be worked. Considerable workings have been at and near the junction of Noble's Creek with the Waipuna, and both branches of Noble's Creek itself have been worked almost to their very sources. The gold in most cases is found in the first terrace above the creek-bed, and mainly it lies along the right bank of the creek. From the terraces on both sides of the creek to the foot of Napoleon Hill, and from Wellington Terrace at the foot of Napoleon Hill, a very great amount of gold has been raised. A few claims are working at higher levels on the left bank of the main branch of Noble's.

In the left-hand branch workings seem mainly to affect the right-hand side of the valley, and the reason of this appears to be that on this side the greater elevations have near their summits heavy deposits of coarser gravel than forms the bulk of the hills, which also seems to be much more auriferous than the middle and lowest exposed parts of the "Old man bottom," as developed in this part of the Grey Valley.

These high-level gravels form the top of Napoleon Hill, and some of the higher ridges in the direction of the upper part of Half-ounce Creek, the source of Duffer's Creek, and the head of the

left-hand branch of Noble's, and often contain huge angular blocks of stone which seems to indicate the agency of glaciers as being concerned in their aggregation and deposit. The popular idea among miners is that the gravels of Napoleon Hill are the deposits of an old river, the bed of which is preserved in the higher part of the hill, the lead in which fills this old channel from bank to bank. This question need not be discussed in this place; it is enough to say that the gravels are auriferous, and that they are distinguishable from the middle part of the Pliocene gravels on which they rest. They gradually decline to lower levels, as they are followed from north-east to south-west, as far as the south-west bank of the Ahaura River, beyond which the same beds (the higher part of those forming the "Old man bottom") pitch to the north, and thus it is shown that no one river could have deposited the beds in the two localities, unless since deposition the deposits have been disturbed, inclined, and elevated, which to some extent they have been. These beds are worked in the head, Duffer's Creek, in Napoleon Hill, also in the ridge of hills between Orwell Creek and the Ahaura River; and they have unquestionably yielded, it might be safely said, the sum-total of the gold that has been found in the higher parts of Mosquito Creek, the several branches of Nobles, Duffer's, and Orwell Creeks; the recent alluviums along the beds and valleys of these several creeks being clearly due to no other agency or action than the denudation of the Pliocene hills formed of these gravels, which are here grouped under the general term of Older Pliocene or "Old man bottom."

In Half-ounce Creek the gold found in the terrace along its left bank might possibly be referred to the same source as that in the terraces bounding the low grounds of the Grey Valley, east of Totara Flat. These have resulted from the action of the Grey River, and belong to the left side of the valley of Duffer's Creek; they extend and unite with the lower part of the terrace stretching along Half-ounce Creek, so as to appear as one. This merely shows that the valley of Duffer's Creek was partly excavated at the time when the outer terraces along the Grey Valley were being formed.

Duffer's Creek Gold-mining Company's works are the most important on this block at the present time. With greater supply of water there may be many such claims, even more prosperous, established.

Block LXX.—This block lies between Duffer's Creek and the Ahaura River, above the township of that name. It is of irregular outline; its greatest length south-west and north-east being about five miles, and its greatest breadth about three miles. It comprises an area of 6,500 acres, the greater part of which is covered with bush, the Ahaura Plain being excluded from the reserve. Towards the north-east, or between Orwell Creek and Duffer's, the surface of the block is formed of hills composed of the same material and of like character to that which, it has been said, characterize the greater part of Block LXIX. In like manner, the area of flat lands in this part of the block is exceedingly small, and of no consequence whatever. Along the middle part of Orwell Creek, and thence to the Ahaura River, the upper levels of the Ahaura Plain are flat slightly-terraced lands, having soils of a light and stony character. Towards the river this is thickly bush-clad, and by a succession of two or three descending terraces, also bush-clad, the level of the river is reached. Along this part the Ahaura River runs in a deep gorge, between the terraces on this block and the hills on the south-west side of the river, to where it enters on the main valley of the Grey River at the Ahaura Township. It may be contended that these level lands along the northern bank of the Ahaura River are of value for settlement, but as nothing in the way of settlement is being done on the contiguous open lands outside the reserve—whether freehold or not—the contention seems very doubtful.

Recent developments have gone to prove the existence of gold in the succession of terraces that rise one after the other on the north-east bank of the Ahaura, and as all of these, even the broader and higher terrace-plain extending to and across Orwell Creek, have been formed by the Ahaura River, similar gold deposits are probable over the whole area of these flat lands. Also, where Orwell Creek debouches from the hilly country towards its source it must have carried gold, with the other products of denudation, on to the surface of the plain, originally formed by the action of the Ahaura River; and it is fair to assume that over part of its course along the north-east margin of the plain paying gold-deposits will be found, the auriferous deposits being augmented by what has been brought down by the smaller tributary-streams draining from the hilly country to the north-east. Several gullies have been worked in hilly country, the gold necessarily being derived from the gravels of the "Old man bottom" in the hills referred to. The new rush on the banks of the Ahaura River is at present giving encouraging results, and several important works are in progress, which are intended for the development of this new find.

Block LXXI.—This lies to the south-east of Block LXX., and to the south of Block LXIX. It stretches for eight miles along the north-east bank of the Ahaura River, and has an average width of two miles and a half. The block includes an area of 9,000 acres. It includes the important district of the upper part of Orwell Creek, and towards the south-east, part of the terrace-plain described as extending east of Napoleon Hill, and lying between the Big Grey and Ahaura Rivers. Along the Ahaura River there is a continuation of the terrace-plain described under Block LXX. This is backed by hills of Older Pliocene gravel, separating this part of the Ahaura Plain from the valley of the upper part of Orwell Creek. From the point where it enters the hills the whole upper valley of Orwell Creek is gold-bearing, and alluvial mines are being worked throughout the whole length of this part of its course and that of its various tributaries. The recent alluvial deposits of the creek-beds have been derived from the waste of the surrounding hills, composed entirely of "Old man bottom," thus showing most conclusively the auriferous character of that deposit. It is true that the higher part of this deposit, the so-called "old river-bed" of Napoleon Hill, has yielded the greater part of the metaliferous wealth that has been taken from the recent wash deposited in the low grounds, but it is also true that, at many places besides Napoleon Hill itself, these gravels are rich enough to pay for working in the original and unconcentrated deposit, and have, as a matter of fact, unknowingly been so worked; as, for instance, opposite the north-

west base of Napoleon Hill, on the south-west side of the valley of Orwell Creek, where the dip of the beds bring them nearly to the creek-level, and at various heights in other parts of the block. The existence of these gravels will enable the continuance of mining in the valley of Orwell Creek long after all the accessible recently-formed deposits of the creek-valley have been worked out.

Block LXXIV.—This lies between the lower Arahura and the Lower part of Nelson Creek, below Hatter's Terrace, and has a frontage of five miles to the Grey Valley. The block contains an area of 8,800 acres, and is divided into two nearly equal parts by Callaghan's Creek, which runs nearly parallel to the lower course of the Ahaura. The flat and arable lands within the block lie along the right bank of the lower part of Nelson Creek to the point where the Ahaura–Nelson Creek Road enters the valley, and occupies the lower valley of Callaghan's Creek; and there is also a small area of level and low-lying land on the south-west bank of the Ahaura River, at the northern corner of the block. Most, if not all, of these lands have been alienated, and are held by private individuals; the lands in Nelson Creek Valley and along Red Jack's being, for the most part, improved and in grass. There is also a broad terrace, timber-covered, along the north-western part and frontage of the block, but this, in relation to the whole, is of limited extent. The existence of these freehold lands within this and other blocks to the north-east have been a great bar and detriment to the progress of mining, and large sums have been paid by the Government to those in possession of riparian rights in the way of compensation and settlement of claims for future damage. All the other parts of the block are an assemblage of gravel hills, with exceedingly abrupt slopes and steep narrow gullies or simple watercourses between, and are nowhere fit to be profitably utilised as agricultural or pastoral farms. Fair soil there may be along the low grounds of some of the larger gullies, but, generally, the country is too steep to retain the soil were the bush cleared.

Mining is carried on in several of the smaller creeks falling into the Ahaura River, in the line of the south-west extension of the Napoleon Hill lead, and in Callaghan's, on approximately the same line, and lower down the valley. In Callaghan's, where the gold-bearing wash of the low ground has been wholly derived from the immediately adjacent hills, there appears to be ample employment for the miners, with their present supply of water, for many years to come. In Nelson Creek the lower terrace flat on the right bank of the stream, from the crossing below Hatter's Terrace to where the hill-spurs cut it out, has been extensively worked; and the hill-slopes at the upper end of this flat are at the present time being worked on as extensive a scale as the water-supply available will permit. The ground and workings on the range-slope here indicate the presence of the auriferous higher part of the Older Pliocene gravels that stretch south-west from Napoleon Hill, and are considered to be distinct from the finer-grained middle and lower parts of the "Old man bottom." Gow's Creek has its lower course through this block, but for the most part it lies within contiguous Block LXXV.

Block LXXV.—This lies to the south-east of Block LXXIV., and extends from the eastern boundary of that block along Nelson Creek to Lake Hochstetter. This block has but a small frontage (one mile) to the Ahaura. It includes an area of 8,600 acres, and may be said to be wholly hilly land, unfit for cultivation. The principal gold-workings on this block are along the valley of Gow's Creek, and near its junction between it and Nelson Creek. In the lower and middle parts of the valley of Gow's Creek the whole of the low grounds have been worked over. Towards the source of the creek there are yet considerable areas that will have to be worked.

The Nelson Creek Water-race, taken from Lake Hochstetter, runs along the side of the range on the northern side of the valley, but it is not high enough to command the auriferous gravels that, as the equivalents of the Napoleon Hill gravels, are said to occupy the top of the ridge between Gow's Creek and the source of Callaghan's Creek. These gravels were identified, and are largely developed on the track over the range from the Hatter's Terrace to the middle workings in Callaghan's.

Block LXXVII.—This lies between the lower part of Nelson Creek and No Town Creek (the Twelve-mile Creek), and has a frontage to the Grey Valley of four miles, and extends back to the south-east nearly four miles. The block includes an area of 7,500 acres. Towards the Grey Valley the front part is formed of the high terrace that on the south-east side of it fringes the Grey Valley. These terraces are covered with bush, birch prevailing; the soil, as usual in such cases, is poor in quality. If cleared and sown down in English grasses these during the second and third season gradually die off and disappear. Less than a mile back into the block the Older Pliocene gravels begin, and form the whole of the other parts of the block, except the lower flat lands along the Twelve-mile, where they are considerable, only from one to three miles up the creek from the main road. Red Jack's, Kangaroo, Sunday, and Wyndham Creeks are the only other considerable creeks that drain the block, and along these, especially the first named, the only areas of low-lying alluvial land are found. These, however, though considerable in the case of Red Jack's Creek, form but a small proportion of the total area of the block.

Gold-mining is carried on principally in the beds and alluvial banks of the streams bounding or intersecting the block, also to some extent in the high outer terrace formed by the action of the Grey River. Mining in the lower part of No Town Creek is confined to the south-west side of the valley, the hill-slopes on the opposite side being exceedingly abrupt. Near the eastern side of the block the principal workings are on the opposite side of the main valley, near the junction of the first large creek below the Township of No Town.

Block LXXIX.—This lies to the south-east of Block LXXVII., and has a greatest length of six miles, with an average breadth of three miles. The block contains an area of 10,000 acres. Dead Man's Creek and the left-hand branch of Red Jack's take their rise in this block. The surface is hilly, and the rocks present are exclusively the gravels of the "Old man bottom," underlain by a soft-brown sandstone, which also shows along the banks of Nelson Creek. From these gravels the recent alluvial deposits found along the beds of the different creeks have been derived.

Block LXXX.—This lies to the south-west of Block LXXIX. Its greatest length north-west and south-east is four miles and a half, and its greatest breadth four miles. The block contains

10,000 acres. No Town Creek (the upper part of the Twelve-mile, with its various branches), drains the greater part of the block; Candlelight and some smaller creeks draining the south-west slopes of the No Town Hills towards, and to, the Arnold. The whole of the block is hilly, broken country, and not likely to be soon required for other purposes than mining. The chief mining has been carried on along No Town Creek, from the north-west boundary of the block to some distance above the township, and along several branch creeks coming from the south-west. Candlelight Creek also has yielded a large amount of gold. At the present time there is a considerable number of miners on the block, though the great extent of the former workings make it appear as though the miners were few, the men being scattered over a wide area and in many gullies. The gravels of the "Old man bottom" and the brown sands underlying are here seen to be underlain by blue sandy clay, such as is met with in the Arnold and New River districts, which shows that, while from the Big Grey to the Ahaura the plunge of the gravel formation is to the south-west, between Hatter's Terrace in Nelson Creek and No Town the dip is reversed, and here for the first time the marine Miocene beds make their appearance; consequently, the higher auriferous beds of Napoleon Hill are likely to be found only on the tops of the higher of the No Town Hills, and here also will be afforded an opportunity of testing the lower beds of the Older Pliocene bottom, which it has been shown are auriferous in the Inangahua Valley.

Block LXXXI.—This lies to the north-west of Block LXXX., and occupies the space between the lower part of the Twelve-mile Creek and the Arnold River. Its area is 4,500 acres. Part of the Arnold Flat is included in this block, but the greater area is occupied by the north-western end of the No Town Hills. These, together with the confluent terraces of the Grey and Arnold Rivers, constitute the whole of the block. The land over the lower grounds might be improved, and saw-milling, followed by settlement, is likely to be the means of clearing the forest from this part of the block, and the bringing of the lands under grass or cultivation.

Mining in this block is limited, and mainly carried on in the hilly part within the valley of Candlelight Creek. Much speculation has been indulged in with respect to the auriferous character of the Arnold Flat. Here it is intended to clearly lay down the opinion that the higher margins of the flat along the foot of the No Town Hills are likely to prove gold-bearing. This assumption is based on the fact that the No Town Hills have been largely denuded by ordinary creek-action since the Arnold Flat was formed, and thus, over the eastern part of it, a fresh, and to some extent an auriferous deposit has been laid down. The prospecting of these younger beds thus form a legitimate undertaking, and a matter that should be attended to. On the other hand, how far it is warrantable or even advisable to undertake deep-sinking, with the view of passing through the series of gravels that form the Arnold Flat, is a matter respecting which there is diversity of opinion. And they may be right who hold the view that the Arnold Flat is composed of shingle originally brought down from the Upper Teremakau Valley by ice, and afterwards distributed to its present position, and, reassorted by the action of the Teremakau, at that time an affluent of the Grey, or by a volume of water much greater than that which the Arnold now carries to the sea. According to either of these views it would not be a hopeful undertaking to sink deep shafts on the Arnold Flat, except at the very base of the No Town Hills, where already a shaft has been sunk to a depth of about 100ft. from the surface. According to Mr. McDonald gold was got at the furthest depth reached, but not enough to pay for working, under circumstances that would have compelled the "driving-out" of the wash. Mr. McDonald is, however, hopeful that good payable gold exists on the Arnold Flat in the vicinity of where the prospecting-works were carried on by him.

Block LXXXV.—This lies along the coast-line from the mouth of the Grey River north to Point Elizabeth and the Seven-mile Creek. In this direction the block has a length of four miles and a half, and from the crest of the limestone range to the sea a breadth of one mile, one half of which is raised beach and terrace, and the other, the steep slope of the limestone range, thickly covered with bush. The area of the block is 3,000 acres. Towards the south the raised beaches and terrace lie at a low level in relation to the sea, but on Darkies' Terrace and at Port Elizabeth marine deposits reach to at least 100ft. above the level of the tide. The hill-slopes at the foot of the limestone, and the limestone-slopes themselves, grow good grass when cleared of the bush and scrub, but the greater area of the available parts of the block consist of raised beaches, on which there is little or no soil. Gold-workings were formerly extensively carried on on the beach between high- and low-water mark, but the beaches from repeated workings have for a time been rendered poor, and the mining now going on is mainly along the inner raised beach, where various hydraulic or steam elevating-plants are being worked.

Towards the northern end of the block lies Darkies' Terrace, which for a long time maintained the reputation of being very rich in gold. In this is represented the high-level black-sand leads of the northern part of Westland, from the Hauhau Lead, near Kanieri, to north of Rutherglen. Here, in Darkies' Terrace, the level above the sea is somewhat less than further to the north or to the south; but, looking at the outlines of the end of the Cobden Range, as seen from the south side of the Grey River, it appears as though a plain of marine denudation had been cut at a higher level than Darkies' Terrace, and on this it is possible that auriferous deposits are preserved. This, however, would be as much too high as Darkies' Terrace is too low to correspond with the ordinary average level of the inland black-sand leads.

At the mouth of the Seven-mile Creek, on the south side, there is a terrace-flat which is intermediate in height between the present beach and the higher auriferous level of Darkies' Terrace. With improved appliances and means of working, gold-mining on the first raised beach may be long and prosperously conducted within the limits of this reserve.

Block LXXXVI.—This block extends along the north-west bank of the Grey River, from the south-east corner of the Grey Coalfield Reserve, a distance of four miles and a half. The western boundary, from the point indicated, runs north along the Mount Davy Range, a distance of seven miles, to Trig. K at the source of the Seven-mile Creek, the north-eastern boundary converging on

the same point. The block comprises an area of 8,000 acres, all the land within it, with the exception of a narrow strip along the Grey River, being either steep hill-slope or mountainous, Langdon's Farm is, however, excluded from the block. Across the middle part of the block a belt of Maitai slate extends in a north-east direction. In this, within the watershed of Langdon's Creek, are a series of reefs and leaders of quartz, carrying gold- and antimony-ore. The lodes run nearly east and west, or across the north-east and south-west extension of the slate-belt, and, consequently, nearly straight up and down the face of the range, and so continue till at higher levels the formation in which they occur is overlain by the lower beds of the coal-bearing series that, in Bald Hill and in Mount Sewell, consist of conglomerates, probably auriferous. Down the slope of the range the same rocks continue till the slates again disappear by being brought in contact with the higher beds of the coal-bearing series along a line of fault which strikes along the lower middle slope of the Mount Davy Range, through this, and into the next block to the north-east. Working or prospecting of the antimony and of an adjoining quartz reef, has long been discontinued; but the prospecting of some quartz reefs in the Julian Claim, 400ft. to 500ft. lower down the range, has been persistently carried on, in the hope that what were reckoned favourable indications, and the occurrence of some choice specimens, would lead to a paying reef. During the present year the Messrs. Curtis found a rich leader or small reef not far from the Julian boundary, and on this being further prospected stone of a rich description was found at a lower level, and there is hope that quartz-mining for gold may develop to considerable importance over the whole area of slate. Active steps are being taken to test the value of the find.

On the higher part of the range conglomerates form the base of the coal-measures. These conglomerates are sometimes coarse (usually the lower beds), and sometimes they are wholly composed of well-rounded quartz pebbles, cemented hard into a rock-mass. These beds as they are auriferous at other places, in all likelihood are so here; but none of the miners seem to have tried them. On the lower slope of the range there is an accumulation of coarse mountain-wash containing much *débris* from the slate-belt, as well as a considerable percentage of the rocks of the lower part of the coal-bearing series. It is in this mountain-wash that the principal alluvial gold-workings are now and have been situated for many years past. Gold is also found along the banks of the Grey River, and sometimes the prospects obtained appear to be excellent, but somehow no one seems to systematically set to work along this part of the river. There is the possibility that in the near future a great mine may be located on this block. At the present time there are not many miners at work.

Block LXXXVII.—This lies to the north-east of Block LXXXVI., and has but a small frontage to the Grey River (about a mile). The north-east boundary of Block LXXXVI. forms the south-west of this. The north boundary runs east and west from the north-west angle of Block LXXXVI. to Healy's Saddle, between the Upper Blackball Creek and the Roaring Meg Creek, from which the east boundary runs south to the Grey River at the mouth of Blackball Creek. The area of the block comprises 7,000 acres, and by far the greater part of it is rugged broken country, a large part of it being mountainous up to 3,000ft. and over. The block, however, contains a valuable coalfield—the Blackball Coalfield. The only flat lands within the block lies within the lower parts of Blackball and Ford's Creek, and between the foot of Kinsella's Peak and the Grey River. The main area between Blackball Creek and Ford's Creek is in part occupied by the Blackball Township, while the rest of the Terrace Flat to Kinsella's is still under bush. Along the right bank of the left branch of Ford's Creek there are some open terrace lands, but the soil is poor, and the area is mostly covered by gold-workings, races, dams, &c. The Blackball coal-leases extend over the whole of the gold-workings within the watershed of Ford's Creek, except between the south-east boundary of the lease and the Grey River.

The most extensive diggings are those within the valley of the left branch of Ford's Creek. These do not lie along the bed of the creek, but on a terrace 100ft. to 150ft. above the level of the creek. As the coal-bearing series forms the bottom on which the auriferous gravels rest there are no slates within the watershed. The wash consists of Matai slates and sandstone from the slate range towards the head of Coal Creek and the upper Blackball, mixed with a large percentage of breccia-conglomerates derived from the base of the coal-bearing series. Along the right branch of Ford's Creek (Soldiers' Creek) the gold is chiefly confined to the lower levels, and the first high terrace on one or other bank of the stream. The gold must have been mainly derived from the breccia-conglomerate at the base of the coal-bearing series, or from the pebbly quartz grits that overlie.

Opposite the mouth of the Blackball Coal-mine, during the past year, a small rush took place to where gold was found in the clayey subsoil of the hill-slopes on the opposite side of the creek. Over 100oz. of gold was obtained at, or quite close to the surface in the course of a fortnight or three weeks, principally by inexperienced gold-miners from the coal-mine, boys and even women being amongst the number engaged in digging. This comparatively rich patch had escaped detection ever since the commencement of the rush to the Grey Valley—the Blackball being opened early during the rush.

Immediately below the Coal-mine begins the deep gravel-terrace that has been extensively mined opposite the junction of the two branches of Ford's Creek. This extends north to the Blackball Creek, and the auriferous gravels underlie the township and terrace flat to Kinsella's Accommodation-house. The ground is partly worked by hydraulic sluicing, and partly driven out, both methods of working still continuing to afford fair wages. The wash is coarse and full of disseminated iron-oxide, which does not seem to have resulted from the oxidation of pyrites in the wash, or to have been brought from the surface by water, but is rather due to the decomposition of the green slates of the Matai series that form the great bulk of the wash. This iron-oxide, by coating and filling cavities, affects the value or rather, the selling qualities of the gold. But the gold of Ford's Creek also contains copper which reduces its value in some cases to £3 9s. per ounce.

Where this cupriferous gold comes from is a problem that till now has not been solved. In the Upper Blackball is the Minerva quartz reef, which until recently was worked and yielded a return that might warrant further prospecting of the mine.

The alluvial claims in the Upper Blackball extend from the forks downwards about a mile. The workings at the present time are mainly on the right bank of the stream, and consist of sluicing-claims that apparently deal with old creek-gravels, overridden by slope deposit from the adjoining hill-slopes, which at frequent intervals form heavy talus-fans, between the foot of the range and the present channel of the creek. The gold in the Upper Blackball seems to come from the head of the right-hand branch of the creek, little gold being traceable in the eastern branch.

On the mountain range, between the Blackball and the Ten-mile Creek, there are a number of quartz reefs that should be prospected more than has been done. One massive reef in particular appears to have yielded most of the gold found in the upper part of Blackball Creek.

Block LXXXVIII.—This block has a frontage on the Grey River, between the mouth of the Blackball and Moonlight Creeks, a distance of four miles. The western boundary extends north a distance of six miles. The total area of the block is 9,000 acres. It includes nearly the whole of the Meg Watershed, and that of Moonlight Creek below the junction of Garden Gully. Except a small proportion of the whole that lies along the banks of Moonlight and Meg Creeks, the land on this block is high-lying and generally worthless.

Gold-mining is carried on in German Gully, and along the left bank of the lower part of Blackball Creek, in Healey's Gully, and between the head of this and German Gully.

In German Gully the gold in part is obtained from the gravels of the "Old man bottom," which on a line of disturbance is faulted, and in contact along a vertical junction with the Maitai slates of the neighbouring range.

A water-race is being cut from the gorge of the Meg to bring water on to the higher ground, between the head of Healy's and German Gullies.

There can be little doubt that a good deal of gold will be obtained from the downs between the Grey River and the foot of the range to the north-west; but very little prospecting has been done over this part of the block.

Along Moonlight Creek the only gold-workings are in the northern part of the block, B.A. Creek and Fitzherbert Terrace being the sites of the principal workings.

Block LXXXIX.—This has a frontage to the Grey River of three miles and a half, or from the mouth of Moonlight Creek to that of Slaty or Big River. From the mouth of Moonlight Creek the block extends due north a distance of seven miles, with an average width of two miles and a half. The block contains an area of 8,500 acres. Within the block there is a strip of land along the banks of the Grey River extending back to the road-line that, cleared of the bush on it, will probably prove fairly good land; and there is also a strip along the right bank of Slaty to the junction of Slaty and Big River which has for the most part been alienated, and is already partly cleared and in grass. Johnston's Farm lies on the north side of Slaty Creek between that and Big River. This is the farthest north freehold, hills rising into mountains lying immediately to the north-west. In the valley of Caledonian Creek there are some good lands no great distance up from the road-line. Further up the creek high stony terraces and broken hills formed of "Old man bottom" form the rocks within the middle part of its valley.

Gold-workings are carried on in Baxter's Creek, lying between Moonlight and Caledonian Creeks, in Caledonian Creek, in Slaty, and other smaller creeks; but the number of European miners is small. There are some thirty Chinamen engaged within the valley of Caledonian Creek. In this valley it is more than possible that the "Old man bottom" will at places afford gold in such quantities as will enable the working of these gravels on a large scale.

Block XCIII.—This block is one of a group of four lying between the Punakaiki River and the Ten-mile Creek, north of Greymouth, having a frontage to the coast-line of two miles and a half, and is of irregular outline; it extends inland to and includes the source of the Ten-mile Creek. This and Baker's Creek are the only streams of any consequence within the block. Its area is 9,000 acres. There are no lands fit for settlement within the block, the whole of it being, though not reaching greater heights than 3,600ft., excessively hilly. Gold-mining is carried on on the beach at and near high-water mark, and one man is supposed to be working in the upper part of the Ten-mile. The Upper Ten-mile is not easily worked by prospectors, more especially from the coastward side; and hence it is that a valley, within which there are great possibilities as regards quartz reefs, cement at the base of the coal-measures, and alluvial of recent date in the beds and banks of the creeks, has not been sufficiently prospected. The Upper Ten-mile and the north-west source of the Blackball, both their valleys and the surrounding ranges, should be carefully prospected for gold-bearing reefs.

Block XCIV.—This lies immediately to the north of Block XCIII. It has a frontage to the sea of fully three miles, and along its north boundary it extends inland for seven miles. The south-eastern boundary-line is somewhat irregular. The block contains an area of 7,500 acres. For about a mile back along the coast-line the ground is low and swampy. All the other parts of the block are mountainous, and there are no lands fit for settlement except immediately aback of the beach, where there is but a narrow strip, or along the foot of the hills, where a slightly broader belt of improvable land is met with.

Mining on this block is chiefly developed along the foot or lower slopes of the front hills, the Barrytown Lead extending north and south throughout the block. Gold is also worked in Fagan's Creek, in which valley rich specimens and patches of gold are found. It is strange that no gold has ever been found in Granity Creek. The next considerable stream to the north, Canoe Creek, has been extensively worked, and its gold, partly derived from the reefs in the range between its upper part and the sources of Moonlight Creek, and partly from the destruction of the Barrytown Lead, has, where more accessible, been worked out. The lower part of Canoe Creek, however, lies in the next

block to the north, Block XCV. The beach throughout the frontage of the block is gold-bearing, and, although repeated washings have gradually diminished the percentage of gold to be found in the black sand, there are still a number of miners engaged in this special form of gold-mining.

The Barrytown Lead is an old raised beach corresponding to the 200ft. level black-sand leads to the north towards Westport, and south as far as the Hauhau lead, near Kanieri. At Barrytown the lead consists mainly of moderately coarse granite shingle, &c., and black sand is no distinguishing feature of it; but that it is of marine origin and corresponds with the black-sand deposits to the north and south is beyond doubt. A great deal of gold has been obtained from this lead, and good wages are still being made by those having water-rights and holding ground on the lead. Many of the miners, however, believe that the swampy plain between the foot of the hills and the sea is rich in gold, and rich because it is thought that the creeks, breaking through the lead at different points, scattered a great deal of gold over the adjoining flat. This being evident, many of the miners think that were they assisted to bring in a tail-race or sludge-channel there would be a revival of mining at Barrytown, and a return of the old days. There can be no doubt that a great deal of gold washed out of a once continuous terrace has been carried on to the low grounds of the swampy tract between the front hills and the sea; yet, though this may be admitted, it has not been shown that the operation of the carrying forward of the gold has not resulted in a dispersal rather than in a concentration of the precious metal.

There are many reefs in the back or inland parts of the block, and these give every indication of being gold-bearing, and they should be prospected more than they have been.

Block XCV.—This lies on the coast-line immediately to the north of Block XCIV. It has a frontage to the sea-coast of rather better than three miles, and extends inland, or east, from the coast four miles. The block has an area of 7,500 acres. From the beach for a mile and a half, or back to the foot of the hills, the ground is swampy. Though possibly this part might be drained, any improvement of this kind would be effected at great cost. These remarks apply with equal force to the block immediately to the south. The area of the block east of the foot of the hills is generally mountainous.

Gold-workings are at the present time confined to the north continuation of the Barrytown Lead, and now and again one or two parties on the present beach. There is a good deal of speculation amongst the miners respecting the cutting of the tail-race proposed to intersect the swamp between the hills and the beach, it being an impression—nay, a firm belief amongst them—that the greater part of the gold once held in the Barrytown Lead is lodged in the swamp. This, without question, is to a certain extent true, but whether all that is anticipated as the result of this work would be realised may be doubted; since it is possible, and even probable, that the re-arranged auriferous gravels mixed with other creek gravels will prove less concentrated as regards the gold than the original deposit in the Barrytown Lead.

Block XCVI.—This lies immediately to the east of Block XCV. Its length is three miles and a quarter north and south, and its extreme measurement in an east and west direction is four miles. The area of the block is equal to 6,500 acres. The whole surface is excessively mountainous, and rugged in the extreme. There are no lands fit for settlement. A large part of the area shows Maitai slates at the surface, consequently reefs and creek gold may be found over the greater part of it; but such are the difficulties of prospecting that but few people, it can be said, have any acquaintance with the block. The north-east part lies within the limits of a coalfield, extending from the head of Bullock Creek, across the mountains, to the Grey Valley Watershed, as has already been described. ("Geological Report on the Grey," and "Buller Valleys and the Paparoa Range": See Mining Reports, 1895.") There is no settled population, miners or others, on this block at the present time.

WESTLAND.

Block I.—This lies within the County of Westland, and embraces the Kumara Goldfield and part of the watershed of Big Kapitea Creek. The block has a frontage to the Teremakau of about four miles; its greatest length north and south is four miles, and its average width in the opposite direction is two miles. The block contains an area of 5,250 acres. The only land fit for settlement lies along the bank of the Teremakau, on the lower terrace above Dillmanstown. It may be the head of Larrikin's Flat could have been settled, but this now is a mass of claim-workings, and is out of the question. Any flat lands that lie within the Kapitea Watershed are worthless for settlement, being for the most part yellow-pine swamps.

As regards mining, this is carried on extensively over the north-western end of the block, the Kumara and Dillmanstown gold-workings being situated on that part. The south-east part of the block is in the direction in which the present gold-workings are likely to be extended under the morainic deposits that form the ridge of hills between the Loopline Road and the Teremakau Valley. It needs here nothing to show the importance of the Kumara Goldfield or the propriety of the making the reserves.

Block II., 9,900 acres; and Kapitea Block adjoining this to the north-north-east, 5,170 acres; and the Sandy Creek Block, to the west of the Kapitea Block, 1,500 acres; forming in the total an area of 16,570 acres, may be taken together under the general designation of the "Waimea–Kapitea Block." The area thus designated has a frontage towards the sea-beach of four miles and a half, and its greatest depth, south-east and north-west along the southern boundary is seven miles. Towards the south-east the block stretches to the Kawaka, near Blake's Farm, on the Hokitika–Christchurch Road.

With the exception of the south-east point of the block, the whole area has been proved highly gold-bearing, and many mining-centres lie within the block—namely, Goldsborough and Staffordtown, in the Waimea Watershed; Chesterfield and Callaghan's, in the Kapitea; and Fox's, on the fall towards the Kawaka. All the branches and tributaries of the Waimea, German Gully, Sandy Creek, and the Kapitea proved gold-bearing, and have been, or are being, worked. There is a

limited extent of lands cultivable within the block, but in all probability agricultural settlement could but struggle along, and to a certainty would but block and hamper mining enterprise.

From Ballarat Hill to Chesterfield runs the northern continuation of the Hauhau Lead, and there are many points along the line that have yet to be prospected. The recent discoveries near Blue Spur will stimulate prospecting, and it is just possible, and even probable, that a revival in mining matters will shortly take place in this part of the Waimea district.

The new branch-line of water-race passing Duffer's and Greek's, and intended to be utilised mainly at Italian Gully and Callaghan's Hill, will serve to stimulate mining all along the line from the point where this work touches the eastern slopes of the Waimea Hills, south of the Kumara–Hokitika Road.

Block III.—This is of irregular outline; its greatest length south-east and north-west is six miles and a half, and its greatest width in the opposite direction three miles. The block contains 8,250 acres. It embraces the middle part of the Three-mile or Hauhau Creek, and part of the course of the Kanieri River. It reaches the Hokitika River at the Kanieri Township, and there it is separated by the river only from Block IV. Everywhere else the block is surrounded by unreserved lands, or lands reserved for other purposes, or alienated by sale from the Crown. The flat and arable lands of the district have been carefully excluded from the reserve, which, therefore, is altogether hilly, covered with bush, and generally of such character of soil that it would not pay to clear for grazing purposes.

Three mining-centres are situated within the block—(1) The Blue Spur, including the Hauhau Lead, and the recent discovery lately made on the north side of the Blue Spur, within the Arahura Watershed; (2) the Kanieri Township and Commissioner's Flat, and other workings of lesser note in the same neighbourhood; (3) the Kanieri Forks, including the Kanieri North Branch, Butcher's Gully, Coal Creek, and other gullies in the same neighbourhood. In the Blue Spur area lies the line of the celebrated Hauhau Lead, and it may be noted that the Big Paddock, lying between the lead and the brow of the terrace overlooking the sea-beach, is not reserved. Unless these lands are alienated from the Crown they should have been reserved. They should have been reserved, because the whole terrace has resulted from the action of the sea, and other black-sand leads, and leads similar in character to the Hauhau Lead, are liable to be present, and may yet be found. The Hauhau Lead is the furthest east shore-line of the period to which it belongs, and from this the terrace was built out to the seawards. As has been seen, the deposits of the same time and level contain two or three lines of black-sand deposit or leads; for instance, between the Kapitea and Greymouth, sometimes three or more, as is the case at Addison's Flat, in the Buller district. In the Three-mile or Hauhau Creek the workings cover nearly the whole of the flat, and though it may be that the bulk of the gold has already been won from the low ground on each bank of the creek, it is otherwise with the northern continuation of the Hauhau Lead in the Blue Spur; more especially on the northern slope of the spur, where lately there has been a rush at Dwyer's, and land engaged by the Midland Railway Company to be parted with as a freehold to Mr. Dwyer has been proved to be very rich in gold, and its resumption by the Government has become a necessity. This shows that many such areas of alluvial lands in the vicinity of former workings may prove to be gold-bearing, and should not be alienated from the Crown.

(2.) Kanieri Township, &c.: Here were formerly extensive and rich diggings, and here also the conditions are in some cases exceedingly similar to those obtaining at Kumara—namely, the presence of auriferous old river-gravels underlying the the sub-angular glacier drifts of the ridge of low hills near the Township of Kanieri. The auriferous gravels under these hills, and on the flats adjoining, lie at too low a level, in relation to the Hokitika River, to be worked with the same facility as at Kumara, consequently the working of them has not been as extensive as it might have been.

(3.) Kanieri Forks and surrounding neighbourhood: In this part of the district gold-mining is carried on as ordinary alluvial creek-workings, and as heavy sluicing-works carried on in glacier morains. The first form of mining is carried on on the banks of the river and in the different creeks already specified; the second, chiefly at the Kanieri Forks, where a good water-supply from Lake Kanieri is available, under a fair hydraulic head.

Block IV.—This lies on the south-west side of the lower part of the Hokitika River, and has a frontage to the river of fully five miles. Craig's Freehold interposes between the northern part of the reserve and the river. On the west boundary it extends fully six miles in a north and south direction, or from the Hokitika River, opposite Hokitika Town, to within half a mile of Eel Creek, less than a mile from where it enters the Hokitika. The average width of the block is two miles, and the total area 5,700 acres. The surface is not so rugged as that of the blocks already described and to be described, and there is a small area of level land along the banks of the Hokitika River that might be utilised as pastoral or agricultural lands, but these, where not already alienated from the Crown, bear no proportion of importance to the mining interests that would affect it if the land parted with by the Crown.

There are three principal mining centres in this block—namely, (1) Rimu, (2) Woodstock, and (3) Back Creek and Seddon Terrace. The principal gold-workings at Rimu comprise an old high-level channel of the Hokitika River, and some workings in the face of the terrace fronting the river valley of the present time.

This is by no means as busy a centre as it once was, but discoveries in the neighbourhood are far from improbable, and there can be no doubt that on the providing of a much-needed water-supply for mining purposes the place would permanently revive.

Woodstock lies at a low level near to the Hokitika River. The nature of the workings is similar to those on the north side of the river at Kanieri, fragments of an old terminal moraine being observable at a low level on both sides of the river valley.

At Back Creek and Seddon Terrace are the most important and promising workings within the block at present. Here the principal deposit of gold-bearing wash underlies a great thickness of morainic accumulation, brought to the coast-line from the mountains of the interior by the vast glaciers that in former times covered the whole of the low grounds of the West Coast south of the Hokitika River. The auriferous gravels worked at Back Creek and Seddon Terrace are the deposits of rivers prior to the advance of the glaciers, and are therefore liable to, and probably do, extend under the glacier accumulations to the west and south-west. Mining is at present carried on by means of hydraulic sluicing on the open face overlooking the Hokitika Valley, and at further distances into the terrace by adits driven from the face, to enable the working of the ground by the method of "driving-out." Yet further from the brow of the terrace shafts are sunk, and the auriferous wash driven out in the usual manner.

There can be little doubt that for the development of this district the great desideratum is a water-supply to enable the working of the ground on a large scale, such supply as is at present available being totally inadequate for even the proper prospecting of the country known to be auriferous, much less the working of it.

Block V.—This extends along both sides of the valley of the Big Hohonu, or Greenstone River, from its junction with the Teremakau, opposite Kumara, to Maori Point, and the lower slopes of the Granite Mountains from which the river takes its rise. The block has a frontage of about four miles to the Teremakau River, a greatest length of eight miles, and a width of two miles and a half. The block contains an area of 10,000 acres. That part of the block which lies on the north side of the Greenstone Valley is hilly and broken towards the west, except on the immediate banks of the Teremakau, where, in Cape Terrace, there is some extent of level lands. On the same side of the Greenstone Valley there are no level lands till reaching the Duke of Edinburgh Terrace, whence level terrace-lands stretch to the foot of the Granite Mountains. Though these lands be level, and at places have the appearance of a good soil, it seems that they are not well adapted for cultivation or grass growing, no one taking the trouble to test the qualities of the soil in these respects. On the opposite side of the valley from the Teremakau to the Greenstone Township the country is hilly. Abreast of and above the township a level terrace stretches south to the Teremakau River, and eastward to Maori Point. The land over this part is in the same condition as that in the north side of the valley.

As regards the auriferous resources of the block, they have been remarkable, and are still very great. It was in the Greenstone Valley, at Maori Point, that gold was first found on the west coast of the Middle Island, and at the present day it is one of the busiest and most flourishing of the older and first-found West Coast Goldfields. This has been largely owing to the comparatively abundant water-supply that has been brought on to the field, and there can be little doubt that even much more water could be utilised with profit.

The water-race of the Greenstone Company brought from the Hohonu River, falling into Lake Brunner, is utilised on the Duke of Edinburgh Terrace by the company alone, and on ground that pays for a return of 1d. per yard of material removed from the face. This, of course, is owing to their possessing an ample supply of water and facilities for the disposal of tailings. The Erin-go-Bragh and the Dobson Creek Water-races, which are on the south side of the valley, carry a less volume of water, but yet are important work towards the development and maintaining of gold-mining in the district.

Block VI.—This lies on the south-west bank of the Teremakau River, from two miles below the Greenstone Junction to within nearly two miles of the mouth of the river. The block is of irregular outline, and two small outlying areas are included within it, making a total of 3,500 acres. The whole of the area is included in the sloping coastal plain that extends on the south-west side of the Teremakau from Kumara to the sea. The reserve is for the most part heavily timbered, except along Hughes's Creek, where clearings may have been made in the neighbourhood of former gold-workings. The land naturally may be supposed to be good, but while in the end it may be made so, generally those who undertake the work of subduing the wilderness have not on such land succeeded well. There is a good deal of timber on the block that in time will be of value for mining purposes generally, either on the block itself or on Block I. As regards the auriferous character of the reserve, there seems to be no doubt that it contains gold in such amount as would pay well were water easily brought on to the ground, and that the workings on Hughes's Creek were discontinued in great part, was not for the want of gold, but the want of water under sufficient pressure, and the lessening fall as the flat was encroached upon. It is rather remarkable that the workings within this reserve lie nearly in the line of the north continuation of the Hauhau Lead, which, traced as far as Chesterfield and the Lamplough Lead, has already been described as continued to the north to the New River and Greymouth districts, and through Reserve VI. such line should run. The probabilities are that the Teremakau, in its wanderings over the flat, has destroyed in great part the lead, and where this has not been carried away it has surely been covered up by river-shingle. Prospecting is warranted on this block in hopes of finding the counterpart of the rich finds lately made on Dyer's section, near the Blue Spur.

Blocks VII. and IX.—These lie contiguous to each other, and in such a manner that they cannot well be described apart. They include the country between the south continuation of the Limestone Range from Greymouth to Marsden and the sea, excepting a considerable area of freehold lands that lies between and divides the northern part of the block. The greatest length north and south of either or each of the blocks is eight miles, and the greatest breadth of the two combined is five miles. Block VII. has a sea-frontage of nearly seven miles, and extends along the north bank of the Teremakau a distance of three miles. The outlines and surface of the blocks vary. On the coast-line within Block VII. there is a narrow belt of raised beach from the outlet of the Teremakau to Greymouth; this is backed in the south by a terrace of moderate elevation, also due to the action of the sea. Inland of this the formations at equal distances from the coast-line vary

in different places. In the south are the high terraces of the Teremakau Valley; in the higher grounds of the New River Valley "Old man gravels," and in the lower grounds recent river alluvium. Between the lower part of the New River Valley and Saltwater Creek the high-level marine deposits representing the Hauhau Lead are present, as they are farther to the north in the same line, or a little nearer the coast. In the valley of Saltwater Creek, in the low grounds about Rutherglen, and thence to the saddle by which the road leads to Marsden, the auriferous deposits are river-wash, apparently due to a stream of greater volume and strength than with the rainfall could be collected at the present time from the drainage area of Saltwater Creek.

Between Saltwater Creek and Greymouth there is a range of hills formed of "Old man bottom," and tertiary marine beds resting against the Cretaceo-tertiary limestones and the slopes of the Limestone Range itself. All of these formations are auriferous except the two last. In the southern part of the two blocks creek-gravels, resting on "Old man bottom" or on the limestone of the Cobden Range (which is continued south across the New River to and beyond the boundary of Block VII.), is the main auriferous wash as far as Cameron's Terrace. In Fuschia Creek the auriferous wash in the low grounds is partly derived from glacier deposits, and partly from the gravels of the "Old man bottom" which form the range of hills between Fuschia Creek and the middle part of the New River Watershed. In the southern part of Block IX. are the limestone diggings in the right-hand branch of the New River, and the alluvial low grounds of the main valley itself. The whole of the area thus more particularly described is gold-bearing, and many important mining-centres have flourished on it.

The beach, and inland of high-water mark to the first terrace, have been extensively worked from Greymouth to south of Saltwater Creek and the Teremakau.

The Back Lead, immediately behind the sand-dunes piled along the high-water mark can yet be made a great source of wealth by dredging or other means of recovering the gold from depths, and conditions of water with which in the early days the digger could not cope. The development, or further working, of the higher terraces is necessarily dependent upon the amount of water that at a reasonable cost can be brought on to the ground. In working this class of ground patches and even whole leads overlooked in the early days are likely to be found, while at the same time the systematic working of the poorer ground will pay the costs of those who venture on the bringing on to the ground that which is necessary to effectually work it. In the shallower grounds, near and above Rutherglen, moderate quantities of water and less elaborate appliances will, for the most part, suffice for the effectual working of the ground by small parties.

Regarding the agricultural and pastoral capabilities of the block, near Greymouth, where the Limestone Range has been denuded of timber, English grasses flourish well, also on the hills of tertiary-clay and sandy strata a little further south. As well as in the New River Valley the alluvial lands along the bottom of the valley may be cultivated or grassed at pleasure, these lands being of good quality. But, having said this much, all has been said that can be advanced in favour of the capacity of the block, for settlement, unless great cost is entered upon in the way of clearing of bush and tempering of the soil, to fit it for what may be designed. When all that can be done for the improvement of the soil is accomplished, there are the adverse conditions of climate to contend with, which man cannot alter, and it may safely be asserted that, whatever the final condition of these two blocks may be, for a long time to come their chief product must be gold, though gradually the area of land improved and rendered fit for grass or cultivation will be increased, and this will be due to the necessities of the settlers, not that such work will be done with a view to immediate profit.

Block VIII.—This includes areas within the upper part of the New River Watershed and the middle and upper parts of the Stillwater Creek, which lie on the opposite fall, and drains into the Grey River. There is also an area of 1,700 acres on the left bank of the Arnold River, which will have to be taken with Block VIII. The total area of the two blocks is 11,700 acres; the Stillwater and Maori Creeks area containing 10,000 acres. The agricultural and pastoral capabilities of the land in the upper part of the New River Watershed are very poor; though in some places, towards the western end of this part of the block, cultivation (such as alluvial miners require) may be successfully undertaken, though at considerable cost. Farming would be out of the question. Near Maori Creek Township there is a paddock of cleared land which, after having some £500 spent on it in the way of clearing stumps and sowing the land with grasses during the past year, grew nothing but rushes to the great disgust of the proprietor. In the valley of the Stillwater, below Maori Gully, there are some lands that might be cultivated, but the area is small.

As regards mining, there has, at one time, been a considerable population, both in Maori Creek (New River) and Maori Gully, within the Stillwater Watershed, and there are still a considerable number of miners engaged, but as they are scattered about in the different gullies, the casual visitor might think the number less than it really is.

Block X.—This includes the low grounds between the Township of Ross and the Mikonui River, and the hilly country to the south forming the western slopes of Mount Greenland. Within these bounds are comprised the Ross Goldfield, celebrated for the amount of gold obtained from the more superficial working, and the greater depths of Ross Flat, during the first years of the rush, and still celebrated on account of the extensive hydraulic-sluicing works which are being carried on along the southern margin of Ross Flat, and on the lower slopes of the front hills overlooking the Flat. The block has a frontage to the sea of about two miles, from the mouth of the Mikonui River north; thence the boundary goes inland in a south-east direction to the Town of Ross; and thence east and south-east to the Totara River. The greatest length of the block east and west is six miles; and the average breadth, at the Town of Ross, one mile and a half. The total area includes 5,000 acres. About one-third of the block is level land, lying between the front hills and the sea. This includes but the southern half of Ross Flat, the northern portion to the Totara River being outside

the block. Large sums of money have been spent by the Government by way of compensation to holders of land on Ross Flat, powerfully illustrating the evil of parting with the freehold of land in the neighbourhood of mining-centres. The rest of the block is hilly and mountainous, and in no way suited to the pursuits of the agriculturist or even the pastoralist.

The different auriferous strata within the block comprise—(1) The superficial deposits of the creek-beds and shallower workings along the east margin of Ross Flat, but these for the most part have been exhausted; (2) the deep ground of Ross Flat from the working-face of the United Ross Gold-mining Company's Claim, west and south, as far as gold has been traced, at whatever level, under the surface of Ross Flat.

The general character of the auriferous gravel, or wash forming the Ross Flat deposit, seems to indicate a series of river-deposits vertically superimposed on each other, but each distinct from the other, and consisting in each particular stratum of very coarse gravels passing upwards into gravels of a finer description—in some cases into fine shingle that resembles beach-shingle. Thick bands of gravel so distinguished rest on a similar series underlying, which, for the time being, constitutes bottom, or the particular stratum may have overlying it just such another stratum to which its upper surface is a bottom. These different strata yield gold, are often in places rich in gold, and seven, perhaps nine, such are to be met with superimposed on each other on Ross Flat. Towards the south margin of the flat the different strata are of lesser thickness than further out towards the middle of the flat, and thus here the gold-bearing layers are not easily to be distinguished one from the other. One or more may disappear, and only the lower stratum of all, or an overlapping stratum, reach the south boundary of the area of the general deposit.

Within a short distance of the outcropping underlying rock the majority of the auriferous bands are to be distinguished, and, as followed to the westward, the thickness of the non-auriferous part of each stratum increases; and while the auriferous washes may not be less, nor their richness decrease, the depth from the surface at which they are found increases towards the central part of the flat. However, probably a maximum will be reached, beyond which, to the westward, the thickness of the non-auriferous gravels will not increase, nor the total depth to the "Old man bottom" on which this series of auriferous gravels are seen to rest along their southern outcrop. Formerly mining was strenuously prosecuted with the endeavour to mine the gold drifts of the deeper and middle parts of Ross Flat, and the energetic enterprises of Mr. Cassius deserve mention in this connection. At the present time the idea of working Ross Flat is not abandoned, and until this working be accomplished it will be the dream of those who have a knowledge of the great wealth that underlies the surface of the flat.

The Ross United Company's works are being carried along the margin of the flat, rather than into it. This is owing to the want of drainage to lower levels than they are now working at, and it will be a long series of years before they will be able to reach ground that has not already been proved and partly worked out.

(3.) Gravels resting on the "Old man bottom": "Old man bottom," &c., in Mont d'Or are extensively developed from the Township of Ross along the front hills to, or some distance beyond, the Mikonui. These gravels are extensively mined by hydraulic sluicing in Mont d'Or, the Prince of Wales, and other claims along the same line further to the south-west. The gravels have a great thickness, and make an imposing appearance in Mont d'Or. At places they appear as rough river-gravels, while at other places they have the appearance of glacier drifts. The gold chiefly lies in the more rounded gravels, though the material of the whole face has, of necessity, to be passed through the boxes of the tail-race.

4. The gravels of the "Old man bottom": These are reported to be auriferous in the Ross United Company's Claim at the south margin of Ross Flat, and they undoubtedly are in the Mont d'Or. They have not, however, always been clearly distinguished from the gravels that immediately overlie them, the error being that at several places they may have been worked under the belief that they formed part of the upper series. Indeed, it is hard to say that in places they do not, as there is often no unconformity between them and the other gravels, and it requires the practical knowledge of an experienced manager or foreman to determine, often on very slight grounds, what is the true line that marks the limit of the gold-bearing gravels. The gold found in the "Old man bottom" in the Mont d'Or Claim lies at some distance below the false bottom on which the upper gravels rest.

Block XI.—This has a frontage to the southern bank of the Teremakau River at Jackson's, and thence extends across the intervening range to, and so as to include, the auriferous ground in the valley of the Seven-mile Creek within the Taipo Watershed. The block is of irregular outline, its length from the Teremakau to the Taipo being four miles, and, from its junction with the Taipo, four miles along the valley of the Seven-mile Creek. The block contains an area equal to 3,000 acres. Except in the low grounds of the Teremakau Valley the surface of the block is exceedingly mountainous, and in parts very rugged. As agricultural land it has no value, and for pastoral purposes it can be very little reckoned upon, although the higher part of the mountain range rises above the forest-line, and is covered with alpine vegetation. It is valuable for mining purposes only.

Gold is found under two conditions: First, as alluvial, chiefly confined to the valley of the Seven-mile Creek, which has had some notoriety on account of the coarse character of the gold found in its bed and along its banks. For the most part, the easier got gold and shallow gold-bearing deposits have been worked out. However, there is a triangular flat, at and near the junction of the Seven-mile with the Taipo, where prospecting and mining have during the past few years been going on, with the object of proving and working this flat. At the present time the work seems to be suspended. Formerly the Seven-mile was regarded as the boundary of where a man might reach with safety in exploring the Taipo Valley. Now that a good track has been made, by which a dangerous ford of the Taipo River may be avoided, there is reasonable hope that more

miners will find their way to the Seven-mile, and thence explore the Upper Taipo Valley, which is the only mountain stream between the Otira and the gorge of the Hokitika in the valley of which anything like important gold-deposits have been found. Secondly, gold occurs in the range between Jackson's and the Seven-mile in quartz reefs that strike approximately north and south across the range. A massive outcrop of quartz was found high on the side of the range, facing the Teremakau Valley, which, giving prospects of gold, was considered sufficiently encouraging to open out and work as a gold-mine. A crushing and gold-saving plant was erected at the foot of the mountain, and this was connected with the mine by means of an aërial tramway. Despite the prospects and all these preparations, the crushings did not turn out satisfactorily, and work has for some time been discontinued. Besides the leader opened out on particularly there is another showing at the foot of the steep part of the range, and other outcrops of quartz are known to exist. The presence of gold in these reefs justifies the extension of the reserve from the Seven-mile across the range to the low grounds of the Teremakau Valley, but, on account of a geological peculiarity, the same lines of reef do not continue on the north bank of the river opposite Jackson's, but are to be looked for at and above the junction of the Otira with the Teremakau. It may be explained that on the northern bank of the river opposite Jackson's schists appear, and on that side of the river constitute the mass of Mount Alexander; and the semi-metamorphic Devonian rock, and the Carboniferous or Matai series, are displaced by a thrust fault, a distance of about four miles to the eastward of what should have been their line of continuation if followed from south to north. This fracture opposite Jackson's runs along the river-bed, and thus the reserve includes all rocks of the Matai auriferous series, but no unnecessary part of the series that lies to the northward, which, though not unlikely, has not yet been proved gold-bearing.

Block XII.—This lies between the Upper Totara and the Mikonui Rivers, and embraces the area within which the Cedar Creek auriferous quartz reefs have been discovered. The block is about two miles in length in a south and northwest direction, and one mile in width in the opposite direction. The country is rugged and worthless for occupation as regard the products of the surface, with the exception of timber for mining purposes. Alluvial gold is or has been found in paying quantities in the Upper Totara and in the Mikonui Watershed; but the reserve has been made principally to cover the reefing district along Cedar Creek and on the east slopes of Mount Greenland. The principal mines hitherto prospected are the William Tell and the Swiss Republic, on both of which properties a considerable amount of prospecting has been done. At first, more especially from the William Tell Claim, very fine specimens of gold-bearing quartz were obtained, but the gold was of a coarse description, and lay chiefly along the selvages and wall-faces of the rib of quartz, and did not when sampled yield what might have been expected from the appearance of the stone. The auriferous stone also ran out, and for some years prospecting has been but feebly prosecuted, although a thorough prospecting of the mine is still contemplated by the shareholders. The Swiss Republic is, as regards its development and prospects, in much the same condition as the William Tell.

In concluding our remarks on the mining reserves, we would point out that we visited and examined each reserve with the view of not only determining the extent of the present gold-workings, and the number of persons engaged in connection with mining on these reserves, but also to ascertain the probable extension of future workings. It may be said, generally, that the whole of the ground on the west coast from Collingwood to Jackson Bay is auriferous, and mining being the paramount industry in this part of the colony, the alienation of any land from the Crown has a tendency to curtail the expansion of mining and the development of the mineral wealth.

We may also remark that if the whole of the 750,000 acres prescribed in the Midland Railway Company's contract were taken as mining reserves, this will not be sufficient to cover the area required for mining and mining purposes, as water-races have in the past had to be constructed over many miles of country. Large areas of land in the future will be required to construct extensive water-races and reservoirs, as it is only by having a large supply of water on the goldfields that auriferous ground can be worked economically. At the present time forty-three reserves have been made in the Nelson Provincial District, comprising an aggregate area of 338,050 acres, and sixteen reserves in the Westland District, comprising an aggregate area of 83,973 acres 1 rood 20 perches, making the total area of reserves 422,023 acres 1 rood 20 perches; but these reserves do not represent anything like the area required for mining.

We have, &c.,

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REFERENCE.

1	Recent & Post-Pliocene Reconstructed Moraines &c	Gold-bearing Alluvial formations
2.	Pleistocene & Newer Pliocene. Moranic Deposits	
3	Marine Deposits prior to the advance of Glaciers	
4.	Older Pliocene & Newer Miocene. Humphrey's Gully Beds.	
	Lower Miocene. "Blue bottom."	
6.	Cretaceo-Tertiary Coal-bearing formation	Gold-bearing cements
	Triassic	
8.	Carboniferous	Containing Quartz Reefs
9.	Devonian (Semi-metamorphic)	
10.	Upper Schists	Containing Quartz Reefs
11.	Magnesian Rocks, or Mineral Belt.	
12.	Middle & Lower Schists	
13.	Gneissic Schists & Granite.	
	Midland Ry Line open for traffic.	
	" " " proposed.	
89	Boundaries & Numbers of proclaimed Mining Reserves.	

GEOLOGICAL SKETCH MAP OF THE S.W. PART OF NELSON & NORTHERN PORTION OF WESTLAND.

To illustrate Report by Messrs H A Gordon F.G.S. and Alexr Mc Kay F.G.S. on the

MINING RESERVES PROCLAIMED WITHIN THE MIDLAND RAILWAY Co's AREA OF SELECTION.

Scale of Miles

0 5 10 15 20

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