Even allowing no greater per centages of pyrites than I saw in large masses of granite at Major's Creek,—the rich deposits of alluvial gold found in the Araluen valley are not more than might be expected to accumulate, from the denudation of the rock, in the wearing out of this large basin. In the Araluen alluvial claims, small patches of granite traversed by detached leads of gold-bearing quartz occur, and this accounts for the few particles of coarser gold found mixed with the fine granite gold obtained from the alluvial claims. At Major's Creek, small quartz veins, generally yielding pyritous gold, are also found traversing the granite rocks, having the same general bearing as the granite bands above described.

Art. V.—*On the Occurrence of the Diamond near Mudgee. By Mr. Norman Taylor (of the late Victorian Geological Survey), and Professor Alexander M. Thomson, D. Sc.*

(Read before the Society 7th December, 1870.)

Last summer the writers of this paper spent a few weeks in company at the diamond washings on the Cudgegong, near Mudgee, and were occupied in collecting the leading facts relative to the occurrence of the diamond in that locality. Having agreed to publish their results jointly, they now beg to lay before the Society the following brief remarks.

Though the subject is one which has engaged their attention, both in the field and out of it, it is upon Mr. Norman Taylor that the main part of the geological work out of doors has devolved. Such might be gathered from the previous references which have appeared, comprising four articles by Mr. Taylor, in the *Sydney Morning Herald*, also the remarks of our Vice-President in his inaugural address of this year.

The chief circumstance that led to the discovery was the gold rush of Two-mile Flat, on the Cudgegong River (nineteen miles N.W. of Mudgee), in June, 1867. The diamonds were at first overlooked, but gems of such unusual brilliancy did not altogether escape the notice of the diggers. Still, little attention was paid to the matter until the Australian Diamond Mines Company of Melbourne commenced active operations in July, 1869. The search was then taken up briskly by several independent parties of diggers.

As far as at present known, the localities on the Cudgegong which produce diamonds lie along the river, extending from its junction with Wialdra Creek (eighteen miles N. 30° W. of Mudgee), to a point further down seven miles S. W., known as Hassall's Hill. Along this line the distribution of the diamond is by no means general, but is confined principally to a few small outliers of an ancient river-drift, which occur at various distances from the present channel, and at elevations of 40 feet or so above it. These outliers of drift are capped by hard, compact, and in many instances, columnar basalt; they have all the characters of the wide-spread deposits in Victoria, which the Geological survey there has been accustomed to assign to Older Pliocene. They also agree with it in occurring underneath a basaltic rock, which presents, in Mr. Taylor's opinion, the characters of the Older Pliocene basaltic flows, such as are extremely common in Victoria. At present there is no direct fossil evidence from the diamond drift itself to assist in the determination of its exact age. Portions of a humerus and a molar tooth, the latter rather too much shattered to identify with certainty, but sufficiently distinct to show that it belonged to some huge herbivorous marsupial larger than anything living now, have been found in younger drift higher up the river, at Magpie Gully, near the Gulgong Diggings.

The patches of diamond-bearing drift (Older Pliocene) with their protective coverings of basalt, though once forming parts of a continuous deposit, have been isolated by extensive denudation. The point of eruption from which the basaltic flow emanated appears to lie to the eastward, but it has not hitherto been detected; its remnants can be followed up for at least seventeen miles along the river, in some spots still showing a thickness of seventy feet, which proves the igneous outburst to have been of considerable magnitude, sufficient to materially alter the physical aspects of the river valley; we may also infer, conversely, the enormous extent of the subsequent denudation. There is the clearest local evidence that the course of the river has been much altered since the older drift formed a portion of the channel.

Enumerating in descending order the outliers of this Older Pliocene drift which affords the diamond, the first area occurs at the starting point, the junction of Reedy or Wialdra Creek with the Cudgegong. The dimensions of this area cannot be fairly estimated, as much of the basalt has been covered up by various surface accumulations; it lies partly on private ground, and has been insufficiently explored. 100 acres might be taken as an estimate of the extent of the workings as far as yet developed.

2. Jordan's Hill.—Three miles below, on the left bank, a triangular basaltic area of about 40 acres.

3. Two-mile Flat.—Three miles below the last, at some distance on the left bank, comprising five basaltic knolls and ridges at various intervals along a large elliptical curve that the old channel followed but which the present river has cut off. Computed altogether at about 70 acres.

4. Rocky Ridge.—On the right bank, one mile below Two-mile Flat, a scarped basalt hill, extending a short way up a tributary creek. About 40 acres.

5. Horseshoe Bend.—On the left bank, opposite the Rocky Ridge, a crescent-shaped area of basalt, with its concavity facing the river. About 20 acres.

6. Hassall's Hill.—A similar crescent area, with its convexity towards the river, situated half-a-mile south-west of the Horseshoe, and covering about 340 acres.

Further down the river, on the east side, about 2½ miles west of Hassall's Hill, there is another small outlier of basalt resting on drift, as well as several uncapped drift or 'made' hills; these are as yet untried for diamonds, though formerly worked for gold. Below this there is no trace of basalt for 7 or 8 miles further down the river, when we reach a very small outlier on the right bank, but whether the older drift underlies it we cannot say. 'Made' hills of drift, apparently the Newer Pliocene, skirt the banks of river on both sides to its junction with the Macquarie; but there is no further trace of basalt.

River-drifts at high levels are traceable in many parts of the upper course of the Cudgegong, above Mudgee; but no diamonds have been discovered in them. In one patch a singular deposit of crystalline cinnabar has been found.

In all the above six localities the basalt has been sunk through and tunnelled under, and the drift containing diamonds is invariably found beneath.

The basalt, besides resting upon the drift, frequently comes into direct contact with the metamorphic shales, slates, and sandstone or greenstone rocks, which form the basis of the country.

In spots where the basalt has been denuded away, the drift has either disappeared entirely, or become scattered over the immediate neighbourhood.

The drift rests on vertical indurated strata, or on massive greenstone; it varies extremely in thickness from a few inches to 30 feet, according to the irregularities, in some cases, of its own upper surface, which is not uniformly level, and in other cases, due to the old river bed. Its composition is various, but it generally includes coarse and heavy material, some of the boulders weighing several hundred-weight; thus testifying a strength of current at least as powerful as, if not in excess of the force of the present stream.

Though the six localities of Older Pliocene drift, just enumerated, are the principal sources of the diamond, they are not the only ones. At Two-mile Flat it has been found in a younger drift, which we shall provisionally term Newer Pliocene, as it occurs at a lower level, and also contains decomposed pebbles of basalt, which appear to have been derived from the protective covering of the Older Pliocene drift. It is probable too that the diamonds in this drift have been washed out of the older deposit. We shall allude to this further on.

Many diamonds have also been extracted from the water-holes in the river, but wherever this occurs the Older Pliocene drift has been previously discharged there by the diggers when gold was the only object sought for. Except in such spots the river bed of the Cudgegong has not afforded a single diamond.

Before describing the general nature and contents of the Older and Newer Pliocene drifts, it will be as well to give a brief sketch of the geology of the Cudgegong basin, and of the neighbourhood more immediately surrounding the diamond district; this will assist in any inferences regarding the original sources of the various materials which compose the ancient river gravels.

The Cudgegong rises in the acute angle, open to the west, which the Dividing range forms in latitude 33° S., and the first part of its course is N.W. sixty miles. In this part it is bounded on the N.E. by the Dividing range, which presents a summit of horizontal sandstone with various coal seams; the range in its continuation southwards completely encircles the head of the Cudgegong, and presents a similar formation of Carboniferous rocks. Accordingly we find outliers of Hawkesbury sandstone and underlying Carboniferous deposits, which include Glossopteris shales and coal seams, occurring in great force about the upper sources of the river. Several outcrops and cappings of basalt also occur on summits and spurs of the Dividing range. The main area of the basin and the ridges which confine it on the S.E., are of tilted slate and quartzite, with a few fossiliferous limestone bands, which are considered to belong to Upper Silurian or Devonian age; these are interspersed with small areas of granite, greenstone, quartz-porphyry, and felstone. The presence of *Calceola* in the limestone of Mount Frome, 6 miles above Mudgee, may assist in determining the age of a portion of the beds, but it is not improbable that both formations are represented. At Wialdra Creek, where the diamond-drift sets in, the Cudgegong makes a remarkable alteration in its course; it suddenly bends to the S.W., and reaches the Macquarie at a point 28 miles distant. This part of its course presents a structure like that of the older portions of its upper basin, except that limestone bands are wanting. No members of the Carboniferous series occur in this portion. The whole course of the river lies through a rugged and mountainous country.

In the neighbourhood of the junction of Wialdra Creek outliers of Carboniferous rocks are frequent. They consist of sandstones, conglomerates, with shales containing Glossopteris and other plants. These outliers form links at trifling intervals, connecting the Carboniferous formation of the Dividing Range with the coal of the Talbragar. A few miles to the north of the junction the Carboniferous beds form horizontal cappings on hills of slate or granite, whilst at Guntawang they are met with in the river valley, and near the junction they occur at a similar low level, and have been covered up by the Older Pliocene basalt without the intervention of drift. The great differences in level which the Carboniferous beds occupy deserve consideration. For our present purpose, however, it is enough to show that vast masses of Carboniferous strata have suffered denudation, and along the main stream we find relics of these rocks not only in the present bed but also in the older drifts.

The rocks immediately surrounding the diamond localities are nearly vertical beds, with a general strike N.N.W., consisting of red and yellow, coarse and fine-grained, indurated sandstones; thin white laminated argillaceous shales; pink and brown fine-grained sandstone, beautifully banded by purple stripes, in concretionary layers; slates and hard metamorphic schists; flinty shales; hard brecciated conglomerate, containing nodules of limestone, flint, and red felspar, in a greenish siliceous base. The last is not unlike the trappean ash-beds of Ireland, described by Jukes. With these there also occur dykes and outbursts of intrusive greenstone, which follow the strike of the beds irregularly, and indurate the rocks with which they are in contact. The rocks in general are devoid of mica.

Having thus sketched the geology of the Cudgegong drainage area, and seeing that the diamonds occur in an ancient river-drift, we are led to enquire whether the diamond is of drift origin, like the materials with which it occurs. If so, which of the formations afford the diamond? The Carboniferous, Devonian, or Upper Silurian? Or have the diamonds grown in the drifts in which they are now found? Before dealing with such theoretical questions we will enumerate the materials which compose the drift, and give a more minute description of its structure.

The Older Pliocene diamond-bearing drift is a coarse and heavy deposit, for the most part loose, but portions of it are united into compact conglomerate by a white siliceous cement sometimes coloured light-green by silicate of iron; in other cases the consolidation is the result of infiltration of manganese and iron oxides, in which case the colour is black or brown.

Diamonds have been picked out of the loose material, and, by a special experiment, which Mr. Taylor conducted, they have been proved to exist in the consolidated portions. Five bags of the conglomerate, weighing seven or eight hundredweight, were burned, crushed, and subsequently washed, and yielded two diamonds and three-quarters of a pennyweight of gold. The diamonds do not appear to be confined to any particular level in the drift deposit, though the lower parts are in preference taken by the miners, probably in consequence of the certainty of finding gold in this portion. The mere fact of the not unfrequent discovery of diamonds on the waste heaps round the old shafts that were sunk for gold, is enough to suggest that the diamond may occur in the higher portions of the deposit, since the bottom layer has been invariably carted to the river for gold washing. One diamond which was observed *in situ* occurred three feet from the bottom, imbedded in a mass of loose quartz pebbles, about the size of peas. Huge blocks of hard slate, sandstone, quartz, greenstone, and felspathic rock, the two latter often wasted into masses of clay retaining the original shape of the boulders, lie at the base of the drift in many parts. The drift varies much in character, but is chiefly made up of boulders and pebbles of quartz, jasper, inferior agates, quartzite, hard flinty slate, shale, and sandstone, with abundance of coarse sand, and more or less clay. The quartz pebbles are milk-white like vein quartz, but are generally encrusted with a thin film of iron oxide, either brown or pinkish. Manganese is abundant, both cementing the drift in irregular patches, and coating pebbles with a black crust or dendritic markings, or, as if smoked, soiling the fingers when rubbed. Some of the boulders and pebbles are coated all over with a remarkable brilliant siliceous polish, which cannot be the result of friction, as the concave surfaces and irregularities are just as highly polished as the more exposed parts; it is most probably the result of infiltration of silica, and is analogous to the coatings of iron and manganese.

Water-worn boulders of silicified wood frequently occur in the drift; they precisely resemble the fossil wood which is so abundant in the coal formation of New South Wales, and have probably come from the waste of similar Carboniferous rocks to those which now occur in the neighbourhood of Wialdra Creek, or form the escarpments which follow the N.E. side of the river basin, and completely surround its head waters. Silicified wood from these sources is found in the present river-bed. Coal has been seen in the older drift, higher up the river.

Other relics of fossiliferous deposits have been found more sparingly. These comprise several large rolled pebbles of the

Silurian coral *Favosites Gothlandica,* beautifully preserved in silica; also, one slate boulder full of a small *Orthis.* Fragments of brown ferruginous wood have also been detected in the cement.

It is worthy of remark that the Older Pliocene drift is remarkably free from any detritus of the rocks of the immediate neighbourhood.

In the waste heaps round the mouths of the shafts in the neighbourhood of basalt and greenstone some curious natural changes can be observed going on; botryoidal masses of hydrated mixed carbonate of lime and magnesia gradually form and bind the loose material together. A hard mineral, not unlike opal in appearance, is also produced in a similar manner, encrusting gravel, timber, old tools, or any material with which it comes in contact. It is a pure hydrated carbonate of magnesia, containing:

Magnesia	46·99
Carbonic acid	49·78
Water	4·08
	100·85

Specific gravity, 2·94

We have now to add a list of the gem-stones and heavy minerals which exist in the drift, and accumulate in the processes of washing for the diamond :—

1. *Black vesicular Pleonast.*—This mineral occurs in small grains from 1-20th to ¼ inch, and is by far the most abundant. It has a dull black surface, but shows a brilliant fracture. Some pieces are coated bluish-grey, or ferruginous brown; but the interior is the same in all, and the differences would seem to be the result of surface decomposition. It never occurs in crystals, nor shows any trace of faces; it has no cleavage; its fracture is conchoidal and jet black, with a strong vitreous lustre. Hardness, 8; streak, grey; composition, found by analysis—

Silica (and undecomposed)	2·75
Alumina	64·29
Chromic oxide	4·62
Magnesia	21·95
Ferreous oxide	4·49
	98·10

Oxygen ratio, 3·2 : 1
Specific gravity, 3·77

The mineral is amorphous and vesicular. The latter character is remarkable; the grains do not all show it in the same degree; one variety with a lustrous surface shows it best, the grains resembling a perfect cinder when seen through a lens. Several pounds weight of this mineral are obtained from each cart-load of gravel washed.

2. *Topaz* occurs in water-worn fragments, and sometimes in crystals; transparent, and commonly white; rarely yellow or very light blue. The Topaz is the largest of the accompanying minerals, varying in size up to half-an-inch diameter.

3. *Quartz.*—Opaque double hexagonal pyramids, one-eighth to one-fifth inch diameter, are very common. Quartz pebbles occur of all sizes. The varieties comprise agate of poor quality, cornelian, jasper, rock crystal, smoky quartz, and a kind which appears bluish opaline when wet. Pebbles of grey quartz, imbedding felspar, derived from a granite very similar to that which occurs at Aaron's Pass, fifty miles higher up the river.

4. *Corundum.*—

(*a.*) Sapphire, transparent, blue, green, yellowish, or parti-coloured.

(*b.*) Adamantine spar, hair brown and black.

(*c.*) The opaque magenta-coloured variety of alumina, which has received the name of Barklyite in Victoria.

All these occur in small fragments in great abundance.

(*d.*) Another variety, which is characteristic of this locality, has to be mentioned. It is in six-sided prisms, slightly barrel-shaped or tapering, with flat end faces; $\frac{1}{4}$ inch long, not exceeding 1-20th inch diameter; bluish-white, with a few dark-blue spots; opaque; hardness, 9; specific gravity, 3·59; composition found by analysis—

Alumina	98·57
Ferric oxide	2·25
Lime	·45
	101·27

(*e.*) *Ruby.*—A transparent pink variety of corundum; is found sparingly in flat grains up to 1-10th inch; its shade often passes into violet and blue; hardness, 9; specific gravity, 3·96; composition found by analysis—

Alumina	97·90
Ferric oxide	1·39
Magnesia	·63
Lime	·52
	100·44

(*f.*) A few large rolled pebbles of corundum have also been observed, exceeding $\frac{1}{2}$ inch, of a mottled dirty white and pink colour, perfectly opaque. From their low and variable specific gravity, 3·21, 3·44, and upwards, they appear to be impure massive forms of the mineral; they possess the requisite hardness.

5. *Zircon.*—This occurs in small rolled pieces and as fine heavy sparkling sand in abundance. It is transparent; brown, very pale red, or colourless.

The sapphires and zircons very rarely exceed $\frac{1}{4}$ inch diameter, and are mostly very much smaller; it is worthy of remark that these gems are found higher up the stream in pieces of considerably larger average size.

6. *Tourmaline.*—Rolled black prisms, $\frac{1}{2}$-inch long, are common; small nests of schorl in quartz pebbles rare.

7. *Black titaniferous ironsand.*—Common.

8. *Black magnetic ironsand.*—Common.

9. *Titanic acid.*—Probably *Brookite,* in flat red transparent or reddish-white translucent plates, with striated surfaces, but too much worn to distinguish the exact crystalline shape. The plates vary in thickness up to 1-12 inch, and often measure $\frac{1}{4}$ inch across; hardness, 6; specific gravity, 4·13; composition found by analysis to be pure titanic acid except a minute trace of iron.

10. *Wood-tin.*—Small, rare.

11. *Garnet,* in minute icositetrahedrons.—Rare.

12. *Iron.*—Hackly fragments of the slightly rusted metal, averaging $\frac{1}{3}$ grain, which are evidently derived from the iron tools and apparatus. Analysis failed to detect in them the least trace of nickel.

13. *Gold.*—Fine, scaly, and occasional fragments enclosed by quartz. The quantity is variable, but the average is about 3 dwts. per load of drift washed.

14.—The *Diamond* itself is distributed through the Older Pliocene river-drift sparingly and irregularly. At Hassall's Hill thirty-three loads from one claim yielded 306; at the same claim they have washed from one to fifteen to the load, but the average has been about five, with 3 dwts. of gold. At another claim, on Hassall's Hill, a washing of from twelve to fifteen loads yielded at the rate of eight diamonds to the load, and 3 dwts. of gold; the average, however, was about three diamonds to the load. This yield afterwards fell off, and the ground is now worked out. Some of the drift at the junction of Wialdra Creek gave regularly four diamonds per load, but ultimately fell off to one per two loads. In other places the yield has been only one diamond to the load.

As regards the weight of the diamonds the following parcels will afford a fair average:—

306	diamonds weighed	$74\frac{1}{2}$	carats;	largest, $\frac{5}{8}$ carat.
81	„	19	„	largest, $1\frac{1}{2}$ carat.
110	„	$26\frac{1}{2}$	„	
16	„	6	„	
700	„	$151\frac{1}{3}$	„	

Giving an average weight of ·23 carat each, or close upon a carat grain. The largest diamond hitherto discovered in this locality was a colourless octahedron, weighing 5⅝ carats; it was found in the river, between Two-mile Flat and the Rocky Ridge, at a spot where the Older Pliocene drift had been discharged in gold-washing.

During the first five months of systematic washing over 2500 diamonds were obtained, and several thousand more have been since collected. They are mostly pellucid and colourless; many have a straw-yellow tint, and tints of brown, light or dark green, and black are more rarely met with. An opaque black one has been found, and another of a dark green colour, with the external appearance of having been rubbed with black lead. Black specks within the crystal are not uncommon. The specific gravity taken from a number of crystals is 3·44. They all show a well-defined crystalline form, though irregularities of development are frequent. It is very rare to meet with worn or fractured specimens. They are easily recognised by their characteristic lustre, which is never impaired by a superficial coating of foreign matter. Sometimes they are dull, but this is not due to water-wearing or incrustation, but to multitudes of minute angles and edges of structural planes, which give a frosted appearance to the crystal. The forms met with are the octahedron, twin octahedron, dodecahedron, tris-octahedron, and hexakis-octahedron; the two latter are frequently hemihedral, with curved faces, and are sometimes developed into flat triangular twins. One specimen of the deltoid dodecahedron has also been found. The curious flat triangular twin-crystals are derivable from the tris-octahedron. If we regard the latter as an octahedron, with a low triangular pyramid on each of its faces, and out of the eight pyramids we imagine that only two, corresponding to opposite and parallel octahedral faces, are developed, on applying these two pyramids together, they would not form a closed figure, but by twisting one 180° round, we form the triangular twin crystal. Or simpler, if we inspect a twin octahedron, there are but two of the original triangular faces entire; these are opposite and parallel, and by replacing these two faces by the corresponding planes of the tris-octahedron, the rest of the faces of the twin octahedron may be obliterated, and thus the triangular crystal will result. The structural laminæ are very distinct on some crystals, and many of the octahedrons show these successive layers of growth in a very beautiful manner.

The fluctuating yield, small average size of the gems, great expense in extracting the drift from beneath the basalt, cartage to water, and washing effectually, are the drawbacks which have hitherto stood in the way of the successful investment of capital in this direction.

The Newer Pliocene drift has afforded a few diamonds. Its materials appear to have been partly derived from the older drift. In one spot, where it rests on greenstone, it consists of a pure white clay, in which gemstones are concentrated in the most remarkable abundance. It is studded throughout with black grains of pleonast, and more sparingly with sapphire, ruby, &c. The accumulations looks like the result of some natural washing process upon the materials of the Older Pliocene, so that it is not surprising that a few diamonds have been discovered in it. In the Newer Pliocene we find Carboniferous conglomerates, pebbles of quartzite containing Spirifer, others of shale retaining impressions of Glossopteris, rolled silicified fragments of Favosites and other corals, pebbles of sandstone with crinoidal stems and Orthis, silicified wood, abundance of pebbles of flesh-coloured quartz, boulders of basalt and greenstone—all occurring in addition to the ordinary contents of the older deposit. It also affords the same gems and minerals, and, besides these, a few grains of *osmiridium* have been found.

The recent deposits in the present river channel are of local origin, being derived from the neighbouring rocks, including slates, sandstones, quartz of all kinds, greenstones, characteristic conglomerates from the carboniferous rocks, and silicified fossil wood. The minerals comprise gold, black titaniferous and magnetic iron sand, sapphire, topaz, zircon, stream tin, and brown garnets crystallised in minute rhombic dodecahedrons with edges either entire or truncated. Similar garnets are found in the bed of Lawson's Creek, a tributary which joins the Cudgegong at Mudgee.

The plan which is adopted in washing for diamonds is—first to screen the drift to separate the larger stones, then to rid it of clay as much as possible in a "tom;" the coarser portions are raked aside, whilst the gold and finer matter is carried by a stream of water through the grating of the "tom," on to the blanket boxes below, where the gold, and occasionally a diamond, is deposited. From the material which passes over the blankets, the heavier fragments are separated from the lighter by various contrivances, among which Hunt's ore-separating machine is the most in use. The heavier stones accumulate in the machine, whilst the specifically lighter materials are washed away. In the heavier portion, thus reduced to a small bulk, the diamonds can be readily distinguished.

In speculating as to the original source of the diamonds in this locality, many difficulties arise. Considering that we have not yet discovered the matrix of the pleonast, corundum, zircon, and topaz, which exist in such profusion, it is hopeless to advance any hypothesis on the origin of the diamond, which is so rare in comparison. But there are one or two facts about the diamond which do not equally apply to the other associated minerals. First, the diamonds are never waterworn, and very seldom fractured, while the sapphire and all the other gems are rolled excessively. The superior hardness of the diamond may account for this peculiarity. A few shapeless ones have been found, but if their want of crystalline form is due to abrasion, the lustre has not been in the least impaired by the process. Secondly, they are not so uniformly distributed as the other gems, but generally occur in rich patches, and wherever most abundant they are also largest and purest. The diamonds found at the Two-mile Flat are larger than those found at Wialdra Creek, which is higher up the river. These and other facts have led some to believe that the diamonds actually grew in the drift. The structural planes in many of the crystals also suggest this belief; but, if such is the case, those who hold this view cannot explain why diamonds do not occur in similar drifts which are common throughout Victoria, and in other parts of this colony.

Until chemistry throws some light upon the possible modes of formation of the diamond in nature, and demonstrates the necessity of its occurrence in metamorphic rocks, it is perhaps as easy to suppose that the gem may originate in a late tertiary drift deposit as in the most ancient strata of a somewhat similar origin. Quartzites and quartzose conglomerates occur in Australian tertiary deposits, having as highly metamorphosed an aspect as those in the Silurian rocks. If the diamonds have been formed in the drift, it will account for their absence in the present river bed. On the other hand, if the diamond has been drifted from its original matrix, either it might be expected to occur in the river, where it has never yet been detected, or its matrix has been entirely denuded away in Older Pliocene times. Large areas of Carboniferous and older strata, as well as extensive tracts of tertiary basalt, have disappeared from the river basin; others have therefore proposed to assign the original position of the diamond to local and limited deposits in the demolished palæozoic rocks.

The fact of the association of the diamond with other gems, which are mostly derived from igneous or metamorphic rocks, does not prove that they came from the same rocks. Innumerable creeks and rivers in the colony contain abundance of fine sapphires, topazes, zircons, &c., but do not yield the diamond. Beechworth in Victoria, the Macquarie, the Turon (Stutchbury), Calula Creek and the Cudgegong River in New South Wales, and, we believe, Hahndorf in South Australia, are almost the only Australian localities where the diamond is at present known.

The minerals characteristic of the Cudgegong diamond area are the lustrous black *vesicular* pleonast, brookite, and the variety (*d*) of corundum already mentioned. We are not aware that these minerals have been recognised in any other part of Australia with the exception of brookite, which has been found in Victoria. The source of these has not been traced, and it will be interesting to notice whether they accompany the diamond in any new localities which may be discovered.

In suggesting that future discoveries of the Diamond are very probable, we may state that at Trunkey Creek gold-field there is a drift in most respects similar to that of the Two-mile Flat; it is found similarly situated beneath basalt, and we have seen one diamond which has been obtained from it.