SOME CONTROVERSIAL NOTES ON THE DIAMOND.

By J. R. Sutton, M.A., Sc.D., F.R.S.S.A.,

(With one Text-figure.)

1. Spontaneous Breaking.

The 40th Article of Religion in Kimberley affirms that light brown smoky-looking diamonds always burst to pieces. So profound is the faith that a débris washer who finds such a diamond—which may have been out of the mine for forty years—will at once race off with it to a dealer, and will return triumphantly explaining how he "offloaded" it before it burst. In the same way a river digger who finds such another—which may have been tumbled in the gravels of the Vaal for ages—will carry it about in his mouth, or inside a potato, trembling until he has transferred the risk of its exploding to some buyer.

The thought that naturally arises upon reflection is that surely the dealers know all about the risk, and that the 40th Article is altogether in their own interests.

In recent times writers on the diamond, almost without exception taking the 40th Article for granted,* have suggested how the bursting might come about. G. F. Williams attributes it to dryness, or to heat, which may expand hypothetical contained gases when a diamond is taken from a mine; Crookes favours the idea of decrease of pressure in the space surrounding the diamond; Wagner goes the whole distance and claims that diamonds exhibiting the phenomenon of cracking or bursting are clearly in a state of great internal tension, like Rupert’s drops.

Such explanations seem to be not specially applicable to brown or smoky diamonds; they would apply equally well to those of any other colour. Apart from that they are redundant for the reason that there is no indisputable evidence that diamonds: (1) burst; (2) contain gas in sufficient quantities to set up great internal strain under the small range of tempera-

* "... sapiunt alieno ex ore petintque
Res ex auditis ... ."—Lucretius.
ture to which they are exposed in the ordinary way of mining*; or (3) are in the condition of Rupert's drops.†

In other words, diamonds have not been known to burst, and, besides, there is no certain reason why they should do so. This was a principal argument in "Kimberley Diamonds: Especially Cleavage Diamonds" (Trans. R.S.S.A., 1918), and it is proposed to amplify it here, to answer some of the criticisms which have been launched against it, as well as to try to explain how the idea of bursting arose. Here the verb "to burst" is used in the ordinary sense as defined by the 'Oxford Dictionary': "To break suddenly, snap, crack, under violent pressure, strain or concussion. Chiefly said of things possessing considerable capacity for resistance, and breaking with a loud noise." That the verb has been understood in this sense, and not merely in that of a gentle breaking, disintegrating, pulverising, is evident since "to explode" is used as its equivalent,‡ and the behaviour of Rupert's drops has been invoked by way of illustration.

A friend writes me the following interesting remarks:

"I can form but little notion as to the extent to which your paper on Kimberley Diamonds may have reached the eyes of early diggers, of whom I was one as you know; but I am very sure that each one of such has been surprised at what you have written under the heading of 'Spontaneous Breaking.' To each this phenomenon is an established fact, and as such offering no possible ground for argument. The stones most liable to break up were sharp-edged octahedrons such as are most plentiful amongst the finds in the western portion of Kimberley Mine and (so far as I can recall) in Kimberley Mine only. In very many cases these stones had a more or less perceptible smoky cloud in one corner, and it became quickly known that such stones generally broke up spontaneously sooner or later. Various treatment was resorted to in the hope of saving, e.g. embedding in potato, wrapping in oil-rag or cotton-wool, and no doubt others of which I

* Cf. Sorby and Butler, "On the Structure of Rubies, Sapphires, Diamonds, etc.":—Brewster "thought that the black specks, which were surrounded by a black cross when examined with polarised light, were minute cavities; but at the same time he admitted that they were so small that it was not possible to say whether they contained a fluid or were empty. Judging from what we have seen of such small examples, we consider it impossible to say whether they are cavities or enclosed crystals," 'Proc. R.S.,' 1869.

† Some artificial diamonds may be likened to Rupert's drops—perhaps because they have been cooled too quickly. Crookes, in his magnificent Kimberley lecture, mentioned one which burst and covered with fragments the slide upon which it was mounted.

‡ E.g.—"It is notorious that the strain is occasionally so great that a diamond explodes into powder shortly after removal from its enveloping matrix of blue clay." A. E. H. Tutton, 'Crystals,' 1911, p. 207.
have no recollection if I ever had knowledge, but I cannot recall any case of success beyond securing a sale.

"A case: W. found a 2½ carat, pure, sharp, glassy. T. saw and coveted the same to send to his wife, but funk'd a slight cloud in one corner. Eventually it was agreed that W. should hold the stone for three months, and if it were still sound T. would give £30 for it. The time passed, the stone was sound, and the sale was completed, and the proud T. put it with its pill-box full of cotton-wool in his pocket. Next morning I overtook T. on his road to work. His face was long, his brow was puckered. 'Look here,' quoth he, and produced the pill-box. 'This is the diamond I bought from W.; on going to bed I put the box on my dressing-table; I awoke startled from my first sleep, lit a candle, opened the box, and look what I found.' I looked —cotton-wool and splinters! This case about mid-1872.

"Another case: I was buying diamonds in partnership with J. at this time. B. was in an office across the street. I happened to be alone when in came C. 'What will you give me for this?' 'This' proved to be a rather kidney-shaped smoky lump of 1½ carats. 'What do you want?' 'Fancy stone! I want £10 a carat.' 'Give you bort price, 10s.' 'Rats' (if not more so). Talk. At last I offered 20s. as a spec.—it might not burst. 'That your best? Then I'll go to B.' Stone in hand he started across, I carelessly watching. He stopped suddenly, looked hard at his hand and turned back: 'All right old man, I'll take your offer; give the cheque.' 'Just let me look at the stone.' It was flawed through and through though still holding together. Th above was as near to seeing the catastrophe as ever I went, and would have been near enough to convince me had I doubted. This about 1874."

It will be observed that the writer of the above letter considers that only Kimberley Mine diamonds were liable to burst, which limitation would still leave us without an explanation why there are broken diamonds (brown, yellow and colourless) in other mines. Also that W. held the suspected diamond without mishap for three months before T. bought it. Now when one asks believers in the 40th Article why diamonds do not burst in the De Beers sorting office, the answer commonly given is that they burst beforehand in the mine as soon as their matrix is disturbed—a quite reasonable argument if it had any tangible basis.

Another critic tells me that a diamond once broke (he does not say "burst") to fragments in his mouth, and that he had a very bad time before all the sharp pieces could be got out—which is scarcely consistent with the belief that diamonds kept in a wet place will not burst.

Heddle—writing from hearsay, of course, like the rest—about 1877, gives quite a different version of the story: "The cleavage of certain of the
African diamonds is so eminent that even the heat of the hand causes some of them to fall to pieces. Such diamonds, generally octahedra, may be recognised by a peculiar watery lustre: they are called plate diamonds."

2. Observations and Experiments.

Some of my own observations and experiments bearing on the question of broken diamonds may be of interest:

(1) A broken Koffyfontein diamond of good whiteness, of about four carats, and one-half the size of the original whole stone. There was a hole in the middle of the fractured face containing small pieces of foreign minerals, chiefly black. Held in a strong light under magnification a tiny crack, transverse to the fractured face, could be made out in the vicinity of the hole. A sharp jerk between thumb and finger broke the specimen through the crack as easily as a match can be broken. Some apophyllite had penetrated the crack. It is a fair inference that the original diamond crystallised and broke, about some mineral inclusion. The half examined was in so precarious a state that merely dropping it on the table might have broken it. Anyone overlooking such a crack, as they easily might, and putting such a diamond away, say by tossing it in its paper envelope or pillbox into a safe, would find it broken the next day. And the incident would be quoted as another proof of the bursting of diamonds. Koffyfontein diamonds, it may be added, show more tendency to crack in two directions at right angles than do the diamonds from the Kimberley area—perhaps because of their prevailing irregular shape.

(2) Mr. Scott Ronaldson was good enough to show me a dull brown Kimberley Mine octahedron recovered from old débris which was seen to be slightly cracked when he bought it. Later it split in twain, showing then that it had crystallised about a smaller octahedron of somewhat similar colour and appearance, though of different orientation. Here again there is no need to invoke bursting. The case is just the same as those mentioned in my previous paper, namely, the unequal expansion and contraction of enclosure and inclusion.

In the De Beers collection there is a specimen resulting from the same process, half a diamond with an octahedron projecting from its broken face. The corresponding detached half has not been found. The projecting octahedron is remarkable in having rough edges like a Vaal River diamond.

In my own collection is a beautiful little colourless specimen in which a cup-like shell of diamond (one-half its original size) holds fast an octahedron. There is no indication of what filled the space between the inner and the outer diamond. There is a better specimen in the De Beers collection, a white octahedron penetrating the face of another, the second being attached to a cup-shaped shell like the previous one. Between the cup and the inclusion is a yellowish foreign matter containing black grains. Portions of diamond
shells, are often found. The original whole shells evidently held inclusions nearly as large as themselves, then broke and the inclusions fell out. In some analogous cases inclusions have pushed holes through opposite faces of diamonds, leaving natural diamond beads.

Sometimes portions of such shells are found containing a material not unlike cement in appearance. I have a specimen whose dimensions are 6.5 x 5.5 x 2.5 mm., the shell being no more than a millimetre thick. The specific gravity of the specimen is 3.56, indicating a denser material than diamond though softer—possibly diamond containing some impurity. Fragments of rounded specimens are occasionally found in which the cement and the transparent diamond are in alternate layers like the coats of an onion. Whatever the nature of this cement it sets up more strain than the thin diamond shells can resist.*

(3) Some experiments were made with a clouded brown Wesselton diamond of about three carats weight, much flawed and somewhat strained internally, with the object of increasing the strain or extending the cracks. These experiments consisted of heating the diamond in a test-tube in the flame of a spirit lamp, and of boiling it in water. The result was negative, and to all appearance the diamond is in the same condition now as it was before it was experimented upon many months ago.

(4) A nice rounded octahedron from Dutoitspan, of about three-quarters carat, in my collection, had a beautiful, slightly flawed smoky corner—just the sort of specimen to explode spontaneously according to the 40th Article. It was heated in the test-tube until the glass became soft, and was then placed under the receiver of a good air-pump and subjected to a considerable exhaustion of air. The flaw may have developed slightly under this drastic treatment.

3. Deductions.

The generalisation here proposed is that owing to the small coefficient of expansion of diamond almost any inclusion will set up a state of strain in

* Sorby and Butler (Proc. R.S., 1869) noticed that foreign inclusions exerted pressure on the surrounding diamond. And they say, "We, however, do not imagine that the crystals [inclusions] have increased in size, but that probably they have prevented the uniform contraction of the diamond, which must have been very irregular even when no such impediment was present." This suggestion ignores the contraction of the inclusion. There is something remarkably like hailstones in the structure of these specimens, and no doubt they have been formed like hailstones by alternate phases of crystallisation and accretion. Their characteristics must have an important bearing upon any rational theory of the genesis of the diamond. Could the old philosophers, who taught that precious stones were petrified ice, have seen such things they could have claimed a very decisive corroboration of their doctrine! "Other minerals, as fluor-spar, apatite, idocrase, heavy spar and calc-spar, disclose a similar structure by bands of different colours. A growth rendered intermittent through the deposition of a thin layer of foreign matter is thus developed" (A. F. Heddle, Ency. Brit., 9th ed., 1878, Art. 'Mineralogy').
a diamond sufficient at times to cause breakage under robust treatment. Many of the broken diamonds in the De Beers production may have fallen to pieces in the mining operations before they reached the sorting office. This is not an admission, of course, that they have been smashed by the machinery, for broken diamonds are found in the matrix: the hypothesis is that they are ready to break up, and that the mining operations, by shaking them up, help them to do so right out.

Fundamentally there is no difference between the spontaneous breaking of a pure colourless crystal diamond containing an inclusion and that of opaque or clouded diamond. In the former case there is a relatively large force concentrated at one place, and causing a definite split there; in the latter the distributed particles and finely divided colouring matter set up many small strains which, acting together, cause disruption of a similar sort to the pulverisation of the blue ground when this is exposed to the air.

The terms "bursting" and "exploding," therefore, must be regarded as exaggerations of a simple tumbling to pieces. Opaque diamond will often break up quite easily. Wesselton black bort, when on the sorting tables, is mostly in fragments, or otherwise so much cracked as to be easily broken. From outside appearance there is more indication of bursting (as the term has been defined above) in a colourless diamond containing an inclusion than there is in any clouded stone. But no early digger has ever suggested the extension of the scope of the 40th Article so as to comprise the former.

4. PSEUDO-CLEAVAGE.

Some of the cleavages found in the Wesselton and Bultfontein mines appear at first sight to be fragments of broken diamonds. Closer inspection, however, shows that many have not the sort of freshly fractured surface that is got when a diamond is deliberately broken, but seem to have undergone some natural process of growth and solution subsequent to their disruption. And many, as said before, seem to have crystallised in a tight corner, where they had no chance to grow symmetrically. An inkling of what may sometimes take place is given by a Bultfontein diamond in my collection. This specimen is a clouded brown macle of the orthodox spinel
twin habit (a somewhat rare thing in the Kimberley mines),* measuring 6.7 mm. from corner to corner, and 5.5 mm. thick. To cursory inspection one of its triangular faces seems to be much cracked, but under moderate magnification the simulated cracks resolve themselves into deep natural grooves penetrating from a half to the whole way down to the seam (i.e. from a quarter to half way through the stone), the sides of these natural grooves not probably being in actual contact anywhere. On the face of the stone the sides of the grooves are striated like the edges of octahedra commonly are, or like the faces of rhombic dodecahedra from Bultfontein. It really seems as though the stone must have grown outwards from the seam in separate portions all at the same rate, keeping, that is, the overall dimensions to the correct spinel twin habit. The annexed picture is from a rough pen and ink sketch of the appearance of the stone. The thick lines indicate the grooves. This diamond evidently could be broken up into distorted fragments having pseudo-cleavage faces.

Sometimes two diamonds appear to have formed, one on either side of some foreign matter, the two together making one stone of passable shape. An interesting though not exceptional case is that of a Koffyfontein diamond of about two carats, one half of the diamond being white and the other half yellow with a tinge of brown. A light tap on the diamond with a metal weight, and it fell into two parts along the plane dividing the two colours. Inside there were two tiny zircons and some apophyllite. This was certainly not a case in which the diamond had formed normally about the zircons and split afterwards, for the crystallisation had proceeded by two separate intentions. Precisely similar cases of crystallisation on either side of flakes of diamond are met with.

5. Groups and Clusters.

Sir H. A. Miers observes (Ency. Brit., 1910) that “the majority of minerals are found most commonly in masses which can with difficulty be recognised as aggregates of crystalline grains, and occur comparatively seldom as distinct crystals; but the diamond is almost always found in single crystals, which show no signs of previous attachment to any matrix.” The examination of many hundred specimens prompts me to suggest that his statement needs some modification. It may be granted that regular octahedra and other tesseral forms were almost certainly formed as single crystals; but the statistics given in “Kimberley Diamonds” show that these only make up a quarter of the whole production. Is it safe to dogmatise about the remaining three-quarters, even if there were no direct evidence? As it happens there is a good deal of direct evidence. Leaving out of account bort (which may be regarded as aggregates of crystalline grains), and interpenetrating crystals (found by the hundred at Bultfontein),

* Most Kimberley macles have rounded edges without re-entering corners.
and the terraced stones of Jagersfontein, groups and clusters of diamonds are by no means uncommon. These groups and clusters consist sometimes of diamonds of apparently perfect symmetry, sometimes of irregular lumps; and they may be all of one colour or there may be two or three different colours and textures. A brief description of one or two will suffice:

(1) A close cluster of separate diamonds, of which upwards of fifty can be counted on the outside. Originally it must have contained many more than it does now, for it is in so fragile a state that individual components are continually breaking away. Indeed, it is a wonder that it ever reached the sorting office as a cluster at all. The components are variously coloured from white to grey. Those that break off have fractured surfaces as well as surfaces of arrested growth.

(2) A crystal diamond surrounded by a cluster of lumps of bort.

(3) A branching group of five tiny dark grey diamonds, possibly coated stones. They seem to be rhombic dodecahedra, and are what is left of a larger group.

(4) A beautiful group of three tiny white diamonds, two of which are well-shaped octahedra and one rounded.

(5) An irregular group of ordinary grey bort of twenty or more components of irregular shape and of various shades of grey.

(6) A Bultfontein cluster of yellowish diamonds of different habits. The principal member is a macle of 8.7 x 5.1 mm., one of whose seamed sides has developed into an octahedral face. Another side and one corner are distorted where a satellite diamond has broken away; while a well-shaped macle, of the same thickness but smaller and not lying quite in the same plane, has grown into the third side. Close to the second macle is a distorted octahedron, one of whose corners shows where there was once another diamond. Wedged between the second macle and the distorted octahedron are two dodecahedra—there seem to have been three originally.

This list could be extended indefinitely; and considering that the chances are against a group or cluster surviving intact the ordeal of mining and winning it seems a fair inference that groups and clusters must be very common in the original matrix, and that it is immaterial to a diamond whether it forms individually or socially. In fact, saving lack of material, there is no reason why a group of diamonds should not extend from one side of the mine to the other.

It might be argued against this view that possibly the components of a group have started from closely situated independent centres of crystallisation and coalesced by natural growth. Without going so far as to assert that such a thing had not happened and could not happen, it may yet be said that chances and appearances are against any such phenomenon. Moreover, the case of the Bultfontein spinel twin macle described and figured above, also the case following it of the Koffyfontein diamond, show in a way how
Some Controversial Notes on the Diamond.

Separate diamonds can grow outwards independently from a common starting-place. Then there are occasional diamonds which seem to have set out by first intentions to be cubes, but have developed incipient octahedral forms at each corner, thus assuming a distant resemblance to the rare form in which the octagon and the cube combine symmetrically—the corners of the octahedron projecting through the centres of the cubic faces. Equally significant are the octahedra with re-entering corners. Three of these have been preserved as good specimens—rounded octahedra of different sizes and colours. It was not easy to interpret the indented corners, but it seemed reasonable to suppose that they must once have contained octahedron diamond satellites. Later on another such diamond was found with the corner satellites in situ and strongly held.

Now these cases do seem to indicate a group-forming tendency. The corner satellites surely must have formed after the primary diamond had reached an advanced stage. For it is not in reason that seven distinct centres of crystallisation should start so symmetrically placed that six outer ones should be exactly at the places of the final corners of the central one. Still less is it in reason that the same process should be repeated again and again.

I would submit that a theory of growth into groups and clusters after the manner of calcite and rock crystal affords an explanation of the habit of many "cleavages," whose irregular contours are not bounded by broken surfaces. It explains, may we say, why so many diamonds appear to have been formed in tight corners, and why so many have what look like surfaces of attachment. The so-called cleavages found in situ in the matrix are more often such misshapen diamonds from clusters than fractured fragments derived from single crystals. A flat white diamond in its blue-ground matrix, from De Beers Mine, is one of these misshapen stones. Its exposed length is 10 mm.; its thickness varies from 1 to 3 mm. It projects 5 mm. from the blue ground, while its outside edge is broken off, accidentally or otherwise. It has all the appearance of having once been in a cluster, and its exposed faces are much the same as that which prevails when two diamonds have crystallised together in easy contact.

Bultfontein Mine produces more groups and clusters than other mines do, perhaps for the same reason that it produces more interpenetrating crystals than all the other mines put together. Cross-grained stones in general, however, are not uniformly distributed throughout Bultfontein, so that, consequently, some market assortments contain great numbers, whereas others have much fewer. This same mine is pre-eminently a source of rhombic dodecahedra, a good half of its symmetrical stones being of this habit; and the groups also seem to favour diamonds inclining to the same class.
6. Rhombic Dodecahedra.

Bultfontein rhombic dodecahedra merge on the one hand into occasional tetrahexahedra, white, yellow and green, and on the other hand by imperceptible gradations through rounded octahedra to some glassies. Those of the midway class are of special interest. For purposes of description they may be regarded either as octahedra whose edges have disappeared in solution, or as dodecahedra whose corners have been truncated by octahedral faces. The octahedral faces are usually much indented with triangles, the dodecahedral and tetrahexahedral faces never. When these two are indented at all it is with small round pits. It is curious that it is only in this midway class of Bultfontein diamonds that triakis—and hexakis—octahedral affinities are seen, namely when the dodecahedral or tetrahexahedral edges invade the faces of the octahedron. The typical Wesselton octahedron, for example, shows no such affinities.* The prevailing striated surfaces and rounded forms of Bultfontein diamonds create refraction troubles which make it difficult sometimes to see whether the interiors are flawed or spotted.

7. Twins.

Interpenetrating twins are common enough at Bultfontein and relatively rare elsewhere. The two members of a twin combination are usually of the same habit, i.e. they may be both octahedra, or both dodecahedra, or both macles. But there is no hard and fast rule, and any possible form may occur twinned to any other. As to their origin, Crookes suggests that “two drops, joining after incipient crystallisation, might assume the not uncommon form of interpenetrating twin crystals.” Some of these twins certainly look as if they might have been formed in some such way—say two octahedra or two dodecahedra joined point to point by the slightest of bonds, or a macle joined to almost any isometric. Yet outside appearances on the whole point to consecutive rather than to concurrent growth. For there is unbroken gradation all the way from simple contact between two complete crystals down to absolute inclusion of one by another. It would be quite easy to arrange a collection of Bultfontein twins showing progressively one of a pair more and more deeply embedded in the other, i.e. a point buried, a quarter buried, a half, three-quarters, and so on, then only a point sticking out, and lastly complete immersion.

It is not antecedently improbable, of course, that in each case the pair might have started together, and that one outgrew and in some cases finally, so to speak, overflowed the other. But it is just as likely that one might have started first, run its single course to the end, and then served as a nucleus for the other. And this view is supported by the venerable aspect of some inclusions.

* The green octahedra from the Rand banket show such affinities to perfection.
Again, on the hypothesis of concurrent growth, how can we explain the twinning when one member has octahedral characteristics (¿ indicating growth) and the other dodecahedral characteristics (¿ indicating resorption), both members being nearly of a size.

The mutual orientation of twins does not appear to be governed by any law: the axes of one member may be set at any angle to those of the others. There is a likelihood, however, that certain alignments may be favoured. Two macles, for example, interpenetrate by preference either nearly in the same plane though in opposite directions, or nearly at right angles, intermediate intersections being shunned. Even when the macles degenerate into bort they incline to the same rule. The McGregor Museum at Kimberley has a nice specimen of this interpenetrating macled bort.

Almost without exception there is great strain over the area where one of the twins cuts the other, whatever the depth of the union, due it may be to confused crystallisation about two sets of independent axes unsymmetrically co-ordinated.


Diamond is admittedly the hardest mineral in existence. But there is a good deal of misconception about the purport of the fact. Thus we are told (and can well believe) that there is a greater difference between the hardness of diamond (10) and that of corundum (9) than there is between the hardness of corundum and that of talc (1); and thence we are asked to infer that nothing else on earth will scratch diamond. Herbert Smith, for example, says that Borneo diamonds “are remarkable for excessive hardness; they can only be cut with their own dust, ordinary diamond dust making no impression” (‘Gem Stones,’ p. 154, 1912). Miers says that because of their hardness diamonds obtained from sands or gravels are rarely, if ever water-worn (‘Ency. Brit.,’ 11 Ed., 1910).

Now in order to be quite emphatic we will begin with the round assertion that there is nothing on earth that will not scratch a diamond. Drops of water wear away the stone. Every mineral will scratch every other. It is only a question of time and quantity of material. Given time enough a wheel of gypsum, if large enough, would grind a diamond to powder. The point of a glazier’s diamond wears out in time; and so does carbonado used in a rock drill. Some years ago a large diamond was used in the De Beers workshops to take half an inch from the circumference of a corundum wheel fourteen inches in diameter. It did the work, but suffered grievous wear in the process.

Thus the water-worn aspect of innumerable diamonds obtained from gravels is no matter for wonderment. I have seen a Vaal River diamond worn as round and as rough as a marble, with scarce a trace of its original
surface left.* More than that, a large yellow diamond belonging to the estate of the late Mr. B. Peiser a few years ago was scored with “criss-cross” glacial striae. Hence the argument that a diamond could not have been used in the breastplate of the High Priest (Exodus XXVIII, 18) because the Hebrews knew of no means of engraving a sign upon it loses some of its force.† Besides, it is only surmised and has not been proved that no lapidary of old had ever found out how to engrave a diamond. Arts are acquired and perish: e. g. the way to cleave diamond was learned and forgotten before Wollaston’s time.

Note.—Speaking of things that are hard Lucretius says that:

“In quo iam genere in primis adamantina saxa
Prima acie constant ictus contemnere sueta.”

H. A. J. Munro gives “diamond stones” as the equivalent of “adamantina saxa.” But cf. *Ovid,* Fasti III:

“Immolat hunc Briareus facta ex adamante securi,”

which certainly cannot be a diamond axe. F. A. Paley suggests basalt.


(2) “The distinct wear seen on many of the river diamonds suggested the same source (the Dwyka) for many of these gems, as the attrition due to a slow-moving ground moraine, especially at or near its base, would be great enough to wear and triturate even the diamond.”—H. S. Harger, “The Occurrence of Diamonds in Dwyka Conglomerate, etc.” *ibid.,* 1909.

† Apart from that a diamond in the breastplate might have had a natural mark upon one of its faces which simulated the signet sign of one of the tribes. Diamonds occasionally carry remarkable intaglio outlines suggestive of the art of a runic scribe. On the other hand, the Septuagint (Lee Brenton’s Version) does not use the word diamond (ὁ αἰθάμαυς) at all, but supplies some variant in every case, e. g., ἑσπάνες in Ex. xxviii, 18, σφάραγιον in Ez. xxviii, 13, and curiously, ἑσπαστάσις in Ez. iii, 9.
Sutton, J R. 1919. "SOME CONTROVERSIAL NOTES ON THE DIAMOND." 
Transactions of the Royal Society of South Africa 8, 125–136. 
https://doi.org/10.1080/00359191909519992.

View This Item Online: https://www.biodiversitylibrary.org/item/181697
DOI: https://doi.org/10.1080/00359191909519992
Permalink: https://www.biodiversitylibrary.org/partpdf/175664

Holding Institution
Smithsonian Libraries and Archives

Sponsored by
Biodiversity Heritage Library

Copyright & Reuse
Copyright Status: Not in copyright. The BHL knows of no copyright restrictions on this item.

This document was created from content at the Biodiversity Heritage Library, the world’s largest open access digital library for biodiversity literature and archives. Visit BHL at https://www.biodiversitylibrary.org.