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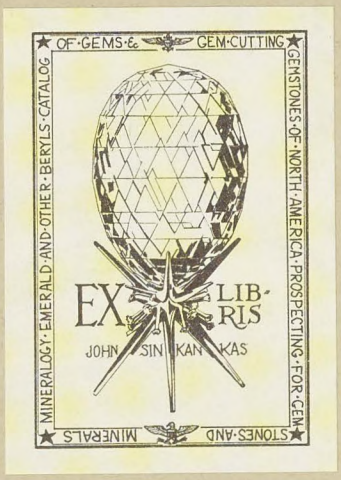
A NOTABLE BRAZILIAN DIAMOND.

By Orville A. Derby.


OF·GEMS·& GEM·CUTTING
GENSTONES·OF·NORTH·AMERICA·PROSPECTING·FOR·GEM·
STONES·AND MINERALS
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Art. XXI.—*A Notable Brazilian Diamond;* by Orville A. Derby.

A diamond of large size and of certain interesting peculiarities of form and surface recently appeared in Rio de Janeiro from the river Bagagem district, in the southwestern part of the state of Minas Geraes, in the headwater region of the river Paraná. This district, in which diamonds were first discovered about the middle of the last century, became famous in 1853 through the finding of a stone that took the name of Star of the South and which is until to-day the largest well authenticated diamond known from Brazil. Its weight in the rough is given as 52·276 grams, or 254½ Paris carats (=255 international carats). It was found in or near the river Bagagem, a few kilometers below the town of the same name, and a few months later and in about the same place a second large stone, known as the Dresden diamond, was found which weighed in the rough 119·5 carats or 24·1172 grams. The present stone, to which the name of Estrella de Minas (Star of Minas) has been given and which weighs 35·8754 grams (175 international carats of 205 milligrams), is reported to have come from or near the same spot.*

The shape and size of the present stone could be very approximately represented by quartering an elliptical rubber ball representing a medium-sized hen's egg, and then distorting

* The upper Paraná diamond field and the neighboring one of the river Abaeté on the opposite side of the Paraná-São Francisco watershed are the only ones in Brazil that have afforded diamonds of over 100 carats weight. In the older Diamantina field, which has been worked continuously since 1728, a stone of an *oitava* (an eighth of an ounce, the most frequently used Portuguese unit for precious metals and stones) was considered such a rarity that in the days of slave labor liberty was given to the finder. Apparently only some scores, or at most a few hundreds, of such stones were found in this field, and those of a weight of 50 to 100 carats can be counted on the fingers. The same is the case in the productive Bahia field, in which, however, black diamonds or *Carbonados* of hundreds and even thousands of carats (the largest known weighed 3148 carats or about 120 carats more than the famous Cullinan diamond) appear. According to information that is considered reliable, the largest diamond ever found in Brazil was destroyed in 1906 by the stupid sledge and anvil test for hardness. It was found in the river Verissimo district in southern Goyaz adjacent to the Bagagem district and is reported to have been of about the size and shape of an ordinary matchbox, that is to say a parallelopipidon of 60x36x16 millimeters. On this basis its weight was calculated as over 600 carats, or roughly between two and three times that of the Star of the South. A parcel of powder and fragments which one of the interested parties had saved as his share was shown me by a local lapidary who had taken pains to gather reliable information regarding the matter. The parcel when purchased by him contained something over 100 carats and from the largest fragment he cut a stone of 8 carats.

one of the pieces in such a way as to produce an obtuse ridge extending diagonally across the curved face from end to end, but without distorting, except in shape, the two plane faces. The accompanying figures, all of natural size, represent very accurately, in Nos. 1 and 2, the two plane faces; but, owing to light effects, the curved faces shown in Nos. 3 and 4 present an appearance of being made up of subordinate faces (sugges-

FIG. 1. FIG. 2.

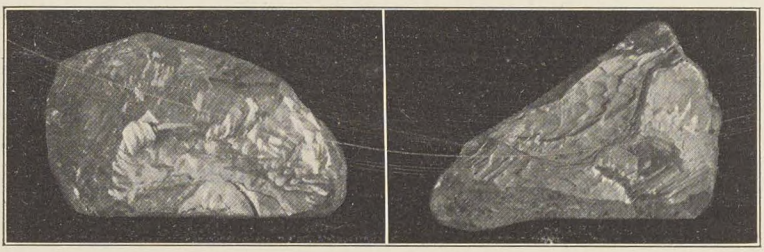
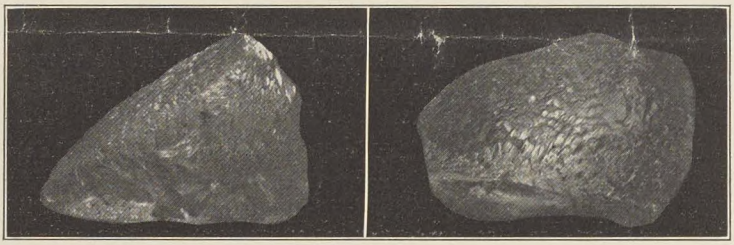


FIG. 3. FIG. 4.



tive of distorted dodecahedral crystallographic planes) that do not appear on the stone itself.

Greatest	length	38^{mm}
"	width	22^{mm}
"	height	23^{mm}

As is well shown in these figures, all the faces, both plane and curved, are covered by sharp-cut lines and depressions similar to those produced by etching, though in this case it seems much more probable that they are features of crystalline growth. The large semi-circular depression in the middle of the base line of fig. 1 is, however, an artificial fracture due to a blow that raised a thin scale along a plane of octahedral cleavage characteristic of the mineral. The small cleavage

face thus produced is parallel to the main face and to several subordinate platform-like faces that rise above its general surface. The face shown in fig. 2 also shows, with still greater distinctness, several parallel platforms as well as a sharply defined pit with coarsely ridged walls, suggestive of an external mould of the point of an octahedral diamond crystal of the size of about a carat.

According to the description and figures given by Dufrenoy* the Star of the South was in the rough a semi-ellipse and thus strikingly similar in general form to the present stone.† It is also on record that the original form of the Dresden stone was such that it suggested the hypothesis that it and the Star of the South were cleavage fragments of an original elliptical (distorted dodecahedral) unit. It is thus highly probable that the three stones, representing a limited area of diamond-bearing ground, were characterized by a quite similar original shape, that is to say, a vaguely defined combination of curved faces constituting a dome rising from a plane face. In the case of the stone here noted a considerable portion of the ideal dome is cut away by a second plane face, and judging from No. 2 of Dufrenoy's figures, this was also the case with the Star of the South. Without entering into crystallographic considerations, a comparison may be suggested with fig. 7, pl. 1, of Rose and Sadebeck's memoir on the crystallization of the diamond,‡ which represents a dome-shaped diamond with a flat base which is interpreted as a case of hemimorphism.

An interesting question, which must, however, be left to crystallographers, arises as to the significance to be given to the plane faces and to the surface markings of this diamond. The first and most natural impression is that the plane faces are cleavage planes, and the fact that a small artificial fracture shows that one of them is strictly parallel to an octahedral cleavage seems to confirm this view. In this case, however, they represent a superinduced feature, and the superficial markings on them must also be posterior to the formation of the crystal and thus can only be attributed to etching; a process which is difficultly conceivable in the case of the diamond. If, on the other hand, the markings are an original (growth) feature, the plane faces must also be original, since the markings on them must have been produced at the same time as on the curved faces. In the Star of the South, which

* Traité de mineralogie, 2d ed., vol. 2, p. 95, pl. 225, figs. 1, 2 et 3.

† It is to be strongly suspected that the sharply defined dodecahedral faces shown in Dufrenoy's figures 1 and 2 are the crystallographer's interpretation of such obscure indications of crystalline faces as are seen on our figures 2 and 3, and thus might receive a materially different interpretation from another observer.

‡ Abh. d. K. Akad. d. Wissensch. in Berlin 1876.

according to his description had everywhere a *chagriné* surface, Dufrenoy thought that evidence of adhesion to a matrix was to be found on a part of the flat face, but in view of the present stone this explanation is evidently inapplicable. Equally inapplicable seems to be the explanation of such features as the pit shown in fig. 2 (three such are reported on the Star of the South) as due to the imprint of smaller diamonds which have fallen away. It is for crystallographers to say if the hypothesis of hemimorphism above suggested is admissible or not to such dome-shaped diamonds as are here discussed and perhaps also to the great Jagersfontein and Cullinan stones as well.

Serviço Geologico e Mineralogico de Brasil,
Rio de Janeiro, May 20, 1911.