AFRICAN DIAMONDS.

The diamond, as we all know, is composed of pure carbon crystallized, and is the hardest substance known. Like most other jewels it is found generally in granitic gneiss, and in torrents of rivers or in alluvial deposits that are worked for gold. Distributed more or less over the whole world, it is in tropical countries, however, that this most prized of the "flowers of the mineral kingdom" (as gems have been called) is principally found. Indeed, it would seem that where the sun shines with most splendor, where the animal and vegetable creation put on their most gorgeous colors, there also, in the depths of the earth, this gem assumes its largest proportions, and sparkles with its greatest brilliancy.

The diamond was long known in Asia, in Hindostan, Borneo, Sumatra, and in the Ural Mountains before it was discovered elsewhere; the district from Cape Comorin to the Bay of Bengal, including the famous mines of Golconda, furnishing the world until 1728, when the mines of Brazil were discovered. Recently the latter region has ceased to be profitable, and many of the mines are abandoned, and few retain their full number of laborers. In the United States diamonds have been discovered in North Carolina, Georgia, Virginia, and California, but in small quantities and of little value. In Australia they have been met with in the valley of the Turon, in the bed of the Macquarie River, at Victoria, etc.

On the eastern coast of South Africa two rivers, the Vaal and the Orange, take their rise within a few miles of each other in the Drackensberg Mountains, and, at first flowing in opposite directions, at length gradually sweep around to the west, and unite at some two hundred and fifty miles from their sources. The inclosed space is the republic of the Orange Free State. In 1868 a trader and hunter on his way from the interior, stopping for the night at the hut of a Dutch farmer living at the junction of the rivers, observed the children playing on the earthen floor with some pretty pebbles that they had found long before in the river. The beauty of one of these stones having attracted his attention, he picked it up, and observed to the father that "it might be a diamond." With a smile of incredulity the latter presented the pebble to his guest, remarking that there "were plenty more around there." The stone proved, indeed, to be a diamond of 22½ carats, and was sold for $3,000, which amount was divided fairly by the trader with his host. The farmer now remembered that he had seen an immense stone in the hands of a native; he therefore sought him out, purchased the stone—giving him in exchange 500 sheep, horses, and nearly all that he possessed—and sold it the same day to an experienced buyer for $56,000. This diamond was the famous "Star of South Africa." Thus arose the discovery of the South African diamond fields. Regarding this latest fruitful source of supply of the precious gem, the following information, gleaned from a lengthy paper read by Dr. Wm. J. Morton, before the American Geographical Society, may not prove uninteresting.

The diamond fields of South Africa are located in the small western angle of the inclosure formed by the rivers Vaal and Orange, on a vast plateau which has a general elevation of 5,000 feet above the level of the sea.

The discovery of diamonds in 1868 and 1869 was followed by an excitement that became more and more intense; and from all parts of the colony and from foreign lands people swarmed, and soon a tented city of ten thousand and more grew at Pniel and Klipdrift, on the banks of the broad and beautiful Vaal. Here diamonds were found plentifully and of excellent quality, by sorting over the bowlder drift of the banks. Shifting their quarters up and down the banks, the excited crowds continued to make new discoveries during 1870 and 1871. The tide of fortune soon turned into other directions and assumed mightier proportions. The last stage in the journey to the "River Diggings" is a place called Dutoit's Pan, situated on the open plain, twenty-five miles from the river. Here, in the sand, small diamonds were discovered, and even in the mud that plastered the sides of the proprietor's house. There now occurred a stampede for this place. The mine proved to be a diamondiferous area of about 23 acres, and soon a seething population of 40,000 people had built up a town around it. Old De Beers, a small mine only a mile away, was next discovered. Then came the last and, up to the present time, final discovery of "New Rush," or Kimberly, the site undoubtedly of more natural wealth than any other spot on the globe. In 1871 the British Government stepped in, and by a formal proclamation annexed the whole diamond producing district, under the title of Griqualand West, although it had as formally abandoned and ceded it to the Free State in 1854.

Thus far we have followed the mining population from the "River Diggings" of 1869 and 1870 to the "Dry Diggings" of Dutoit's Pan, Bultfontein, Old De Beers, and Kimberly. Here, then, within a radius of a mile, is the diamond producing industry of South Africa, or rather of the world. Each town is built around its own mine. Three of these no longer enjoy their palmy days; and practically, at the present time all the labor and energy devoted to diamond search is centered in the fourth town, Kimberly—a city in the desert, built of tent cloth and corrugated iron and wood, and here and there substantial brick, and having a population of about 8,000 whites and 15,000 blacks. Six years ago nothing distinguished this spot from any other on the plain of the semi-desert. A party of prospectors from Dutoit's Pan, scratching about in the sand under a tree, found a few small diamonds. Here the soil proved unexpectedly prolific in the gems. At first it was a fine, red, alluvial sand, such as covered the surrounding country. From two to four feet beneath this material a layer of chalk nodules and chalky clay was reached. These nodules also contained diamonds, but were so very difficult to break that the digger, in his haste, threw them aside, and they lie in forgotten heaps about the mine still unbroken. Under the chalk layer came a brittle, yellowish white mass of soft rock; this, too, quite rich in diamonds, and easily workable. As the basin deepened it was found to have a regularly defined edge, of talcose shale, rising like a cliff all around. Outside of this no diamonds could be found, and it was therefore left undisturbed, receiving the name of the "reef." It will make the nature of this "reef" clearer to state that, wherever one excavates either quite near the mine or a hundred miles away, there is found immediately underlying the chalky deposit a layer of this soft, stratified shale, from twenty to thirty feet thick. But over the mines, or diamondiferous pockets, no such layer exists. Some force from below seems to have punched a hole out of this crust, leaving a round basin with edges accurately defined by the rugged edges of the shale. The contents of this pocket or mine—that is, the diamondiferous soil or rock—lie pressed up against the "reef," fitting into its every undulation or crevice.

At a depth of from fifty to sixty feet a very solid conglomerate rock was reached, of a gray-blue color, which received the name of "blue stuff." This at first was supposed to be "hard pan," but proved to be very rich in diamonds, and work was therefore pushed into it with vigor. Most of the large diamonds—that is, from twenty carats upward—are found during the "picking" down in the mine, owing to the fact that the cement like "blue stuff" fractures most easily through the spot occupied by any hard pebble, such as the diamond.

The character of the diamondiferous ground is identically the same in all four of the neighboring mines. It appears to be a pudding stone formed in the presence of water. Its general character is that of a soft, pulverulent ground mass, composed of a mineral soapy to the touch. In this mass are interspersed fragments of shale, round water-worn pebbles of trap, agate and jasper, bronzite and smaragdite, garnet and ilmenite, hyalite and hornstone, calcite and diamonds. After this rock has been thoroughly dried in the sun for several weeks, and then wet with water, it falls to pieces into a soft, slimy, muddy mass. Diamonds are scattered with remarkable evenness throughout this conglomerate. Two are never found together, nor near each other.

In regard to the formation of the mine, the favorite theory is that it is the throat of a mud volcano, and that its contents are the result of decomposition of an original rock below, which contained diamonds. A strong point in favor of such a theory is the fact that the diamonds of each of the four mines are characteristic of it, and their locality generally recognizable. It is certain that the diamond was not formed where it is now found, for every variety of fragment occurs, as well as the perfect stone, imbedded alike in the conglomerate. A half stone with ragged edges of cleavage was certainly never crystallized in a casing which surrounds all its fractured inequalities.

And now a word about the Cape diamond. In general it contains yellow coloring matter, ranging from the faintest straw color to deep orange yellow. But there are also stones as white as any from India or Brazil. With regard to their degree of yellowness they are arranged thus: "White," "Cape white," "bye water," "off color," and "yellow."

A few milky white are found, and now and then pale blue, and even blue, but small. Brown and pink are usual and common, next to the off-colored and yellow. Small green stones are also found. Black and perfect are seldom seen, but black and fractured are common. A curious fact is the "bursting" or "splitting" of a diamond. This occurs only to "glassy stones," which have, be it ever so faint, a tinge of brown in them. Such a stone comes clear and brilliant from the mine, and perhaps in an hour a little "feather" or fracture points towards its center; or, laid aside for the night, it is found in the morning lying in fragments. The "splitting" is due, probably, to the water absorbed between its laminæ having dried out. The Cape diamond has no adhering skin or envelope, as is the case with the Brazilian; it shines like a piece of bright glass wherever it is found.

As before stated, the diamonds from the river and the four mines have recognizable peculiarities. Those from the river are invariably water worn, looking like ground glass; but they are noted for being whiter, and bring a higher price than any other.

Stones from Dutoit's Pan are large, off-colored, and yellow.

The stones from Bultfontein are entirely different. They are small, beveled octahedrons, and pitted so that they appear frosted.

The diamonds from Kimberly are, as a rule, not as large as those from Dutoit's Pan, but they are whiter. The popular notion that the Cape diamonds are all yellow is a myth—many of them are white. As to their yield they may be thus classified: 10 per cent first quality, 15 per cent second quality, 20 per cent third quality, and the remaining 55 per cent consisting of "bort," used for cutting diamonds and other stones. There is no "carbon" or "black diamond," such as found in Brazil, and which is now so generally used in the various diamond saws and drills. The exports from the Cape mines up to the end of the year 1876 reached the sum of $85,000,000. This does not represent the total product, for both digger and diamond buyer carry home privately large packages of diamonds whose value would largely increase this amount.

Although the diamond, in value, ranks below the ruby, it is always supposed to take precedence of other gems; the reason being, perhaps, that its commercial value is most constant. It will always remain a royal gem; it never can become common. Nature has placed it in lands difficult of access; and as far as known the world's future supply is sparsely scattered in the depths of a seven acre mine.

PHYSIOLOGICAL EFFECTS OF THIRST.

Last summer a company of the 10th U. S. Cavalry nearly perished of thirst during a four days' march without water, among the arid sand hills of the Staked Plain of Texas. They set out in pursuit of a band of marauding Indians, and toward sunset of the first day the trail they had followed broke up into a multitude of ill-defined tracks, making further pursuit useless. By this time their canteens were dry, and the men were so exhausted by the intense sun heat that many fell from their saddles. All the afternoon their guide had searched in vain for water among the hills, and now the horses were suffering from thirst scarcely less than their riders. The captain's private horse, the toughest of the party, was given to the guide, who set out in search of water, but was never seen again.

The next day an attempt was made to fall back upon "Double Lakes," where water was expected, but having no guide they lost their way, and wandered for three days among the hills before water was found. During this time their suffering from heat and thirst was terrible. The salivary and mucous secretions were dried up, and the sensibility of the mucous membranes of the mouth was so much impaired that they could neither swallow nor even perceive when anything was in the mouth. Brown sugar remained like dry sand in the mouth. Their voices became weak and strange; all were deaf, and appeared stupid to each other, questions having to be repeated several times before they could be understood. Vertigo and dimness of vision affected all. Many were delirious, and all tottered on with feeble and stumbling gait. What little sleep they could get was disturbed by dreams of banqueting, with visions of every imaginable dainty to eat and drink.

At this stage all would probably have perished had they not resorted to horses' blood. As the animals gave out the men cut them open and drank their blood, almost fighting for the little moisture contained in their viscera. Later the horses' blood became so thick from lack of drink that it could not be swallowed. It coagulated instantly, and had to be broken up between the teeth and slowly forced down the parched throats. And when swallowed it gave no relief, quickly passing through the bowels, developing diarrhea. Their own scanty urine was sweetened with sugar and thankfully drunk, and a few drank horses' urine. Usually, however, it was caught in cups and given to the suffering animals.

To avoid the terrible mid-day heat they traveled as much as they could by night. As they toiled on they suffered severely from tightness of breath and a sense of suffocation. It seemed as though the sides of the trachea were adhering. To mitigate the consequent distress they breathed through the nose with closed mouth, prolonging the time between the breaths as much as possible. At this stage the lips were covered with a whitish dry froth, and presented a ghastly aspect. The fingers and palms were shriveled and pale; and some who had removed their boots suffered from swollen feet and legs.

As the situation became more desperate, mental tortures were added to the purely physical. The feeling of despair was made worse by suspicion and loss of confidence in each other. Toward the end persistent wakefulness aggravated the mental anguish, though they tried to sleep at every halt. At last, on the morning of July 30, a part of the command succeeded in reaching Double Lakes, and a supply of water was sent back to those along the road. The fortunate arrival of a detachment of Yonkoway scouts at this moment helped to save many. On reaching water the desire to drink was irresistible. They could not refrain from pouring down water, though it was immediately rejected by the stomach. Warm coffee was the only thing that revived them at all.

Assistant Surgeon King, from whose report this account has been condensed, remarks that the failure of water to assuage the thirst, though drunk again and again to repletion, seems to show that the sense of thirst, like that of hunger, resides not in the stomach, but in the general system, and could not be relieved until the remote tissues were supplied. And the activity of the regenerating process was prevented by the deficiency of water in the absorbent vessels themselves. The same condition explains the overpowering dyspnœa which threatened the existence of the company. Their lungs were filled with the purest air, yet the lining membranes were so dry that the free passage of the oxygen to the blood was prevented.

It is a noteworthy circumstance that while the horses suffered much as the men did, and many gave out completely, the mules suffered little, and were able to graze at every halt. The total loss on this disastrous scout was two men dead and two missing, probably dead, out of twenty-six privates and two commissioned officers.

La Nature says that a French inventor has recently proposed a perpetual clock, based on the difference of atmospheric temperature by day and by night. The heat of day causes a liquid to rise into a reservoir, whence it falls by gravity, so operating the mechanism. This is a very old idea. More than twenty years ago we saw a form of perpetual clock in this city which was wound by the diurnal rise and fall of a column of oil.