# GOLD, SILVER AND PRECIOUS STONES.

It would seem scarcely necessary to occupy a page of this report with a statement of the fact that there is no gold or silver to be mined in paying quantities any where in Indiana, and yet as many as three hundred letters have been answered in one year by this department on this subject. Scarcely a day passes that does not bring to the State Geologist, a package, large or small, whose contents can be described as "fool's gold," or pyrites of iron, accompanied with the inquiry: "Is this gold?" or, "Is this silver?" This phase of the matter is not, however, the most serious one. Designing parties, with a view to speculation, have been creating excitement in a number of localities by claiming that rich deposits of precious ore have been found. No year passes that does not see our newspapers giving wide circulation to these malignant and demoralizing untruths. There is no geological formation in Indiana, within less than two thousand feet of the surface, in which gold or silver could possibly exist in paying quantity. Every report to the contrary has been based upon either ignorance or fraud. Only a year ago great excitement was created all over the Southern part of the State by the loud claims of interested persons touching vast deposits of silver ore said to have been found. Now, if the people were as willing to believe science, when it speaks, as they are to believe charlatanism when it makes its preposterous statements, there would be little trouble about preventing nearly all the gold swindles and silver frauds of the kind under consideration. The office of this department is always open to the inquirer, and every question relating to the mineral deposits of Indiana will always be answered promptly and without prejudice or favor; but it should be, if possible, settled once for all that any and every person who reports the discovery of gold or silver deposits in this State, is either wofully ignorant or wilfully dishonest. So great and so glaring have been the frauds perpetrated by would-be speculators and their coadjutors, and so numerous have become the inquiries connected with this subject that it appears absolutely incumbent upon this department to put an end to the whole matter, if possible.

If every one who receives a copy of this report will read this paper and then ask the school teachers of his neighborhood to explain its contents

to the students, we shall soon get rid of these excitements and swindles, than which nothing could be more demoralizing to the public mind.

The following simple statement will make clear to any mind why it is preposterous to believe for one moment any report, no matter who makes it, which locates a gold mine, or a silver mine of any value in Indiana.

GOLD.

In its native state, gold is found, if in place, connected with and usually woven into the substance of the crystalline primitive rocks, the traps or trachites and the transition rocks. In other words, gold is found in rocks which far underlie all the limestones and shales of Indiana. To cut down to the primitive or igneus rocks in this State in the shallowest place would require a well of at least three thousand feet in depth; probably the distance would be much greater at the most favorable point. But even after the old rocks have been reached and they never yet have been in Indiana, the probability of touching a gold-bearing area would be absurdly small. Gold is often found in great quantity in the Silurian and superior rocks, but only where these rocks have been transformed by heat. The sedimentary rocks of Indiana have not been transformed by heat, therefore there is not the first condition for the presence of gold. What is termed by geologists *metamorphosis*, always accompanies the presence of gold in workable quantity in stratified rocks. This metamorphosis has been brought about by a degree of heat sufficient to change the structure of the rock. Now, in Indiana, the only metamorphic rocks nearer than 3,000 feet of the surface of the ground are mere bowlders and fragments found in the drift. Hence it is simply preposterous to think of finding gold in the stratified rocks of this State, and the delusion should be driven from the minds of the people at once and forever.

But gold is often found in dykes or up-flows of trap, trachyte and other ancient rocks, which, in a molten state, or other somewhat fluid condition, have been sent up through rents in superior strata. No such dykes exist in Indiana, nor are there any quartz veins or gold-bearing formations of any sort whatever. The only rock disturbance in Indiana is a low irregular upheaval across the central and northern parts of the State, and this is so slight that it has not lifted any of the archean rocks to within 3,000 feet of the surface.

When gold is not in place, or in other words, when it has been freed from the rocks by the action of water or other disintegrating forces it may be found in the clays or sands of alluvial deposits. Mere traces of gold n the form of minute scales or flakes may be found in such deposits in Indiana, but no man, even by the most prudent management and the most faithful labor, can average one dollar a day washing for gold in the richest sands discoverable in this State, and it would be a boon of incalculable value to many an overstrained imagination if all the newspapers

of Indiana would set this truth before the people in the strongest terms, and furthermore stamp as false and fraudulent every reported gold discovery in our State from this on to the end of time.

## SILVER.

In a general way, what has been said of gold may be said of silver; but the latter is never found in notable quantity save in the body of the metal-bearing rock where it is usually associated with gold, copper or lead, and other and baser substances. The volcanic and primary rocks bear silver, but most of the extensive deposits in America are "pockets" in a disturbed and broken limestone formation. If found in Indiana at all silver would be in a galena ore, most probably, and there is not within the State the slightest approach toward such a deposit, and if found here the galena would, we may assume, have but a trace of silver along with the lead, so that in any light we may sensibly view it, there is no more probability of a paying silver mine in Indiana than there is of a paying diamond mine.

Competent chemists have been defrauded into making assays of ores, sometimes quite rich in silver, falsely said to have been found in certain so-called mines in Indiana. It would be wrong for the public to blame the assayer; but it is to be hoped that in the future no shares in any so-called mine of silver or gold in this State can be sold at any price. Indiana is rich in minerals. She has iron, coals, clays, marls, glass-sands and building-stones; but, let it be repeated until everybody knows it, *she has neither silver nor gold.*

## PRECIOUS STONES.

Another delusion with which thousands of very sensible people are beset is the precious stone delusion. It is a pathetic fact that many persons are monomaniacs on this subject to such a degree that they spend a great deal of time delving nervously and surreptitiously in gravel beds and sand deposits, pouncing upon every shining bit of quartz-crystal or feldspar which chances to meet their eyes. Since I have been State Geologist a number of cases coming under my observation may be taken as indicative of a class. Men and women of average intelligence bring a collection of ordinary crystals (usually water-worn pebbles in form) to the office and, in the most secret and impressive way, exhibit them, evidently expecting to be told that a priceless value attaches to them. Now, if this were mere inquiry there would be nothing unusual about it; but, in a considerable number of instances the gnawing hope of finding something precious has eaten into the imagination to such an extent that it has become a monomania. It is a great pleasure to impart information, and it is not particularly annoying to satisfy mere idle curiosity, but when it

comes to dealing with unscrupulous persons who "salt" limestone with silver ore, or when a placid maniac besets one's life with flint pebbles for a series of years, it has a tendency to make one wish that practical geology were taught in the common schools. As an instance of the would-be shrewd tricks which have been attempted in this connection, I may mention the act of a man who at the time no doubt thought that he should "surprise the authorities" in a great way. He came to me with the usual handful of small crystals of quartz, feldspar and calcite, and demanded information as to their value. I glanced over them and answered that they were utterly worthless. A gleam of absolutely malignant triumph shown in his eyes as he picked out one of the crystals and held it up. "You're a beautiful geologist!" he cried. "Don't know even a *cut diamond* when you see it!" He was not aware that I had noticed, at the first glance, a setting taken from some cheap imitation-diamond ring. It was not even rhinestone—simply cut glass, and not of a very fine quality at that!

Indeed, it would be a very curious and most interesting study if a record of the many instances like the above were kept in this office. It would show that there is great need of popular enlightenment upon the simplest and most obvious facts in nature. Such a condition of things is the only excuse for inserting here the reasons why precious stones are not to be looked for in Indiana.

## DIAMONDS.

It would appear to be most probable that diamond is the result of heat or of some other metamorphic force, and that wherever found it can be immediately or remotely traced to volcanic or eruptive action which has thrown it to or near the surface. Where it is found in alluvial deposits its presence is due to the disintegration of diabase or some other and kindred igneous rock whose residuum has been brought there by water currents. Nowhere in Indiana is there any formation showing even the remotest resemblance to diamond-bearing rock. Four-fifths of the State's area are covered with drift to a depth of from ten feet to four hundred feet, under which lie the stratified rocks of Silurian, Devonian and Carboniferous ages. Nothing like a dyke or igneous vein is anywhere discoverable, nor are there any clays referable to the decomposition of igneous or metamorphic rock. Therefore, to hunt for diamonds in Indiana is simply ridiculous, the last refinement of folly. It is possible that within the immense mass of our drift there may be a few stray bits of the precious crystal brought from far northern volcanic fields by the glaciers, but to look for these would be as hopeless and senseless an act as it would be to spread a butterfly net with the hope of capturing a meteorite.

### EMERALDS.

There are no emeralds in the Indiana geological formations. Some pretty pieces of allophane, clear and of a pure green color, have been found in the body of our kaolin beds and in our flint deposits. Persons have believed this to be emerald, and with little show of argument, on account of its color and clearness, and, furthermore, because it is found so often in aluminous deposits. Emerald is a silicate of alumina colored with oxide of chromium. Allophane when green owes its color usually to oxide of copper. Emerald is a regular crystal, occurring in six-sided prisms; allophane, as found in Indiana, is amorphous, filling interstices in flinty formations, or lining irregular cavities in kaolin. There is not the slightest probability that emerald will ever be found in Indiana.

### GARNETS.

Coarse, worthless garnets may be found occasionally among the drift gravels of Indiana, but the gem garnet is not present. Most of the red crystals found are feldspar from broken up granite brought down from Canada by the glaciers. It is sufficient to say that there are no valuable garnets to be found in this State, and search after them is labor thrown away.

### JASPER, AGATE, TOURMALINE.

None of these possessing any value is found in Indiana. Stones often brought to this office for examination, and thought by the possessors to be one or another of the precious crystals, turn out to be quartz (either clouded or tinted) worn by the action of water.

### OPAL.

There are no valuable opals in Indiana. A lady brought to me for examination a small fragment of coarse granite, smoothly water-worn, in one corner of which was a crystal of quartz that gave forth beautiful irridescent gleams when turned in the light. The quartz had a yellowish cast, and its resemblance to opal was quite striking. The flashes of color were due to cracks in the crystal's substance breaking up the light and reflecting it prismatically. Bits of "opalized wood" are found in the drift, but these are of no value.

### SAPPHIRE.

Nothing at all closely resembling the gem sapphire has been found in Indiana. Many pebbles of pink feldspar and rosy quartz have been brought to this office and exhibited as red sapphire (rubies), but the bearers were at length convinced that, after all, their pretty little rolled crystals were of no value, and they went away disgusted, but not discouraged to continue their fruitless poking in the gravel and sand.

### TOPAZ.

Crystals of an almost colorless (very faintly smoky) tint and unimportant in size, were shown me as having been found in a gravel bed of Tippecanoe County. One of these, for about half its length, was pale blue and much resembled a topaz; but no amount of friction could make it electric in the least. There is no formation in Indiana wherein topaz can be expected. A stray crystal might possibly be found in some granite or trachyte bowlder, but it would be worthless when found.

In conclusion, there is no true gem stone to be found, high or low, anywhere within the limits of Indiana, and the only way by which an Indianian can remain in this State and obtain these beautiful and precious crystals is to work hard, earn the money and then buy them. A like statement is true touching the acquisition of gold and silver; the only method of obtaining these from the earth in this State is that of steadily and persistently following the plow. Every person who claims to have discovered in Indiana mines of precious metal or deposits of valuable gem-stones should be treated with the utmost caution. He is dangerous, if he is not ignorant, and if he is not crazy he soon may be, for that way madness lies. Bnt let it be remembered that every citizen of Indiana has the right to send to the State Geologist samples of any substance he may discover and inquire as to its value. Such inquiries are always gladly answered, and it is to be hoped that they will continue to be made. It is by such investigations that the truth is to be reached touching the mineral deposits of the State. Although Indiana has no gold, or silver, or precious stones, she has a wonderful variety of valuable minerals out of which great wealth will flow in the near future.