

ST. JOHN, N. B., SATURDAY, FEBRUARY 4, 1899.

STRANGE GOLD FACTS.

IT MAY BE IN WATER WE DRINK AND AIR WE BREATHE.

Wealth That Has Floated Into the Sea—\$10 the Cost of Recovering a Cent's Worth of Gold From Sea Water—Origin of Deposits and Freaks of Chemistry.

The recent collapse of a company organized for the purpose of extracting gold from sea water has drawn attention to a very interesting question. Many people have doubtless smiled at what they supposed to be the credulity which could imagine such a process possible; but, a matter of fact, it is, though the expense would far exceed any possible return.

It has been demonstrated by many experiments that sea water carries gold in equal quantities. In fact, it has been found by experiments that sea water on the Pacific coast carries more gold in some localities than it does in others. All the experiments so far with sea water have been made with water taken from the surf, which does not prove that water taken from mid-ocean would carry the same quantity of gold. Books tell us that the chloride of gold is never found in nature; that all gold in its natural condition is in a metallic state; yet all agree in saying that the sea is the great receptacle for all mineral salts. If this is true, it is natural to conclude that it contains the soluble salts of gold. For, although soluble gold may never have been found in nature, gold is found in nature in such a condition as makes it subject to those natural laws which govern other minerals that are soluble. Prof. Smestad, a high authority, found, from careful experiments with the sea water of Ramsey Bay, Isle of Man, that sea water taken from the surf in that locality contains a little less than a grain of gold to the ton. He does not tell us whether it was the soluble salts of gold he found or metallic gold. Fresh water as well as sea water contains gold. In fact, the water in all the rivers which drain regions where mining is carried on contains more or less gold. Careful experiments with the water from many wet free gold crushing mills in California have demonstrated that fully 5 per cent of the gold contained in the ore, after passing over all the gold saving appliances, is held in suspension in the water and lost. Fully 25 per cent. of all the gold contained in auriferous gravel worked by hydraulic miners is lost in the same way. The sludges, as miners call the waste material which has filled the beds of the rivers and overflowed the valley lands many miles from the hydraulic mines, all contain gold in much greater quantities than sea water does.

In making experiments in Placer county, Cal., with a wet crushing mill, with a view to saving a larger percentage of the gold, I carefully sampled and assayed the ore. After passing through the mill the tailings were carefully compounded. At the end of two weeks' run the mill was cleaned up. I found that I had saved 65 per cent. of the gold in the battery and on the copper plates. After sampling and assaying the tailings and concentrates I found a loss of fully 10 per cent that could not be accounted for. Then as the water which contained the pulp came from the mill I conducted it into a tank, giving all the pulp that did not float time to settle. A sample of this water, analyzed by Kustl, in San Francisco, showed that it contained fully 5 per cent. of the assay value of the ore. This was assuming that I had used ten tons of water to one ton of ore, which was about the correct proportion. Further, to illustrate the manner in which water will hold metallic gold in suspension, take a nugget one penny-weight of the gold, which will adhere to the stone. Take a quart of clear water in a porcelain dish and wash every color of the gold from the stone into the water and you will see scarcely any change in the color of the water. Agitate the water and every ounce of it will be found to contain an equal proportion of the gold. A skilful chemist can take this gold out of the water and give it to you in a gold button, without any except a mechanical loss. Take this same pennyweight of gold and dissolve it with aqua regia and form the chloride of gold. If this is dissolved in 100 gallons of clear water, each drop of the water will contain an equal portion of the gold, which can again be brought back to a metallic state. I therefore plainly to be seen that the gold found in sea water can be in the form a chloride or metallic gold.

Some eminent geologists have advanced the theory that gold originated in the

waters of the sea and has been introduced into the veins and cavities of the rocks in the form of silicate, but they do not tell us how the gold was transmitted from the sea to the quartz. The waters of the ocean are no more the mother of gold than the quartz veins are the mother of pearl or any other organic matter of which the sea is productive. The waters of the oceans, together with the erosions of the atmosphere, have in past ages wasted away continents. Any gold found in sea water, no matter in what condition or form it is found, has been supplied from the decomposition of rocks in which it was originally formed.

Many of the old school geologists still adhere to the igneous theory of the formation of minerals. To sustain this theory they tell us that the heat gradually increases with the depth attained in the mines. During the last thirty years explorations in mines have proved that death has but little, if anything, to do with their temperature. Heat is produced by chemical action which can take place as well at a depth of 100 feet as it can at a depth of 1,000 feet. The deepest workings of any mine in the world are in the Calumet and Hecla mines of Michigan, which are now down 5,000 feet. There has been little or no change in the temperature from the 2,000 to the 5,000 foot level. In the Chollar-Norcross-Savage combination shaft on the Comstock the water on the 1,200-foot level had a temperature of 140°; from the 1,200 to the 3,200 foot level there was no perceptible change.

We have only three primary divisions of matter—solids, fluids and gases. There is no independent igneous element. Lava is not the result of the working of such an element, but of decomposition. In all mountain ranges throughout the world there are vast deposits of sulphates, mostly in the state of auriferous pyrites. When water, which is composed of oxygen and hydrogen gas, is brought in contact with these ores, the oxygen unites with the sulphur of the mineral and forms sulphuric acid and various other compounds. When this violent chemical action takes place the water becomes heated and the hydrogen, being liberated, in its efforts to escape often forces the heated water, at intervals, many feet above the surface, as may be seen at Steamboat Springs, Nev., and other places. We find no evidence to support the theory that minerals are formed by igneous heat. But experiments which have been made in the great laboratory of nature during the past thirty years have convinced me of the fact that all minerals in their natural state, together with all other substances with which they are combined, are in a solvent condition, and that the different metals are produced from the different rocks in which they are found with as much certainty as the different soils under different climatic influences produce the different fruits and vegetables. The processes in nature which cause the blade of grass to grow cause all vegetation to grow; and the same principle applies to the mineral kingdom. The exact manner in which minerals are formed in nature is one of her impenetrable secrets, as is incomprehensible to the human mind as is the exact manner in which the electric fluids are formed or set free by the digestion of food which is taken into the human stomach and carried or impelled by some unknown force to every part of the system. It is scarcely necessary to advance arguments proving that minerals in their natural condition are in a solvent state. Everything in nature must have been a solvent before it could become a solid.

Electricity being the only element or substance over which we have any control that enables us to transmit and redeposit metals from a solvent to a crystalline state, it is natural to conclude that it is the force which controls the reproduction of everything. The exploration and the findings made by American miners since the discovery of gold in California furnish incontestable evidence that all metals are continually being formed from the solvent salts of the rocks in place. In one section of the petrified forest belt that is found in New Mexico, where copper predominated all the petrified trees were found to be copper ore. Some of the ore carried as high 40 per cent in copper, with traces of gold and silver and all the other substances that were found in the copper taken from the veins in place in the same locality. A smelter was at one time constructed to smelt these ores. These forest trees had evidently been at one time under water, and the silicate, which con-

tained the silica and all the metals in a solvent condition, had percolated from the rocks in place. The wood for a nucleus of attraction. As the wood decayed and passed into some other form the metals, controlled by the currents, came in and took its place. In other sections of this petrified forest belt, where iron predominated in the rocks, iron was found to predominate in the petrified wood. In others, again, silica predominated.

I was once called to examine a copper mine in Arizona. In a tunnel a winze had been sunk about three feet below the level of the tunnel. In the bottom of this winze I found what seemed to be the skin of a rattlesnake, around which native copper had formed until it looked like a perfect copper snake. The water was strongly impregnated with copper in solution. This only went to show that iron was not the only substance that would precipitate copper from the solvent to the solid.

In the Leads, a silver mining district in Utah, a great number of specimens have been found that to all appearances were petrified wood, showing the grain of the wood, and in all other respects resembling petrified wood; but they were found to be pure horn silver. The wood had passed away and the silver in solution, like the copper, had come in and taken its place. The proportion of silver and the chlorine it contained was found to be about the same as the pure horn silver taken from the limestone rocks—25 per cent. of chlorine to 75 per cent. of silver. A shell taken from a mine in Utah, which resembles a clam shell, was found to be filled with metal which proved to be 54 per cent. silver of the value of brittle ore.

I once examined a mine in Mexico that had been mined out to a depth of 200 feet. One hundred feet of the fissure from which the ore had been taken had remained under water for over 100 years. When the water had been pumped out I found incrustations on the walls half an inch thick in places containing the same minerals which were in the original ore. In this same mine a number of specimens of native silver were found. Some of them had formed on the timber. If this open fissure had been allowed to remain under water for 10,000 years there is but little doubt that it would have been found filled with ore similar to that mined out. In the crevices of a piece of petrified wood taken from the Cunningham gravel mine in New Mexico crystallized gold can be seen. This gold formed on the wood after the wood was deposited in the gravel.

It is true that gold, silver and copper are being formed on wood, a substance which cannot resist intense heat. It is equally true that metals are formed in the same way, as nature does not have two ways of doing one thing. Gold is never found in its natural condition in nature in paying quantities except in the fissures or in the cavities of the massive rocks in places in combination with silica, which is quartz. The same rocks will be found to produce a great variety of minerals each after its own kind, in the same way that the same soil will produce an endless variety of plants and fruits. All gold found in the soil and known as placer gold is gold that has been freed by the decomposition of the quartz caused by erosion. When we look at nuggets of gold, called wash gold, mined from the placers, we are apt to think that such metals must have been produced by some intense igneous heat instead of being worn smooth by the action of the water and grinding between the rocks. If, however, a piece of quartz carrying free gold is examined through a glass it will be seen that the smallest, as well as the largest, piece of free gold which it contains is irregular and presents a rough surface, identical with the surface found on gold formed in the humid way by electro magnetic action. Take any number of these pieces of gold as they come from the quartz and attempt to grind them so that they will be smooth and will correspond in shape to those taken from the placers, and you will find that you have worn away fully one-half of the gold in the operation. It has been estimated that in fully as much gold has been worn away this manner by natural erosion as has ever been mined from the placers. When we consider that seven-tenths of all the gold that has been mined has been taken from the placers, we get some idea of the billions of dollars worth of gold which have been mined. This gold is still in existence. It has not been destroyed. It is in the same condition that

the gold rubbed off on the whetstone was in. It is taken up by the water, carried down the streams and more or less of it finds its way to the ocean. This accounts in part for the presence of float gold in the sea water and on the seacoasts.

Near the mouth of the Klamath River, on the Pacific coast, there is for a distance of two miles along the beach a bluff of auriferous gravel. In places the bluff is from forty to fifty feet high and the gravel all carries more or less gold. The surf has been wearing the bluff away for ages, freeing the gold until the beach sands in the vicinity of these bluffs have become very rich in gold and have been worked by miners for many years. There are large deposits of these sands that carry from \$1 to \$5 to the ton in value of float gold. A great deal of time and money have been spent in trying to find some method to save this float gold, but without success, of the fact that the gold is lighter than the sand, and when brought into contact with water will float off.

In making experiments with a view to saving this float gold I made a test of the water taken from the surf. I filled a forty gallon cask with the surf water, adding to it a solution of alum water, and allowed it to stand forty eight hours. This water was then carefully drained off with the exception of one gallon. An analysis of this gallon showed that the sea water at this point contained one and a half grains of gold to every ton of water. The same experiment was made on the water taken from the surf near the Cliff House at San Francisco. That showed less than one-half grain of gold to a ton of water. These tests proved that the water of the sea does not contain a certain uniform amount of gold. I fully satisfied myself that the gold I found was float gold. It may have contained gold in some other form which I did not save by this crude process. I also found by experimenting that there is a great difference in the value of the sea sands in the different localities along the coast. The sand hills on which San Francisco is built contain gold and silver to the value of about 40 cents to the ton. On being concentrated it yields 10 per cent of magnetic sand that assays on the average about \$2 60 a ton in gold and silver—75 per cent silver and 25 per cent. gold, and it carries fully 20 cents a ton in value in float gold that cannot be saved by concentration. In other localities these concentrated sands assayed much higher in gold and I showed a larger amount of float gold. The assays in silver were about the same.

The beach sands in the vicinity of the Klamath Bluffs were found to be much richer in both float and fixed gold than were the sands in any other locality. This of course, is accounted for by the fact that the surf has, for ages, been freeing the gold from the gravel worn from the bluffs. Experiments made in different localities along the coast show that a ton of beach sand contains, on an average, 20 cents in float gold and 10 cents in fixed gold, which is the name given to the gold found in magnetic iron sands. Assuming that all the beach sands from Oregon to San Diego carry 30 cents a ton in gold, it is evident that these sands contain more gold than has yet been mined in the world. Likewise, if the ocean contains only one-fifth of a grain of gold to every ton of water, it still contains many times more gold than has ever been mined.

But, as I have said earlier in this article, the fact that the water near the coast, particularly a gold-bearing coast, contains gold, does not establish the fact that the whole ocean contains an equal amount. Even if this were the case, any scheme for removing the gold with financial profit must be a failure, as the outlay would far exceed the output.

The process of attracting solvent gold from water is one of the most difficult and costly known to chemistry; a chemist charges from \$15 to \$20 to analyze one gallon of water. Four cents' worth of gold to a ton of water is the highest average

that has been asserted for sea water; in reality sea water does not average more than one cent to a ton. To extract this one cent's worth of gold would require at the lowest calculation an expenditure of \$10.

If there are men who feel that for the good of science one cent in float gold is ample return for the \$10 in mined gold, I can recommend to them no better investment than salt water gold mining. On the other hand, those people who take a mercenary view of the subject would do well to confine their mining to dry land.

HUMOR OF THE INSANE.

Their is Plenty of it, Says the Superintendent of an Asylum.

'I was sitting in my office the other day' said the superintendent of the insane asylum at Parlor City, 'when one of the patients, a harmless fellow who is allowed to have the freedom of the building and grounds, came in pale with indignation, and said that he had a complaint to make. "What is it, your Highness?" I said, for it was the Prince of Wales I was talking to.

'Are the rules of the palace to be observed or not?' he demanded. 'I want to know whether our rules can be broken with impunity.

'Certainly not, 'Your Highness,' I said, 'what is it?'

'I was coming down the corridor this morning,' he said, 'and in a rack on the wall I saw a dozen red pails, marked "For fire only." Now, is that right or not?'

'It is,' I said. 'The sign is correct.'

'Well, then,' he said, 'John [referring to a keeper] must be punished. As I stood there he came along and filled the pails with water.'

'He shall be executed at once,' I said, and the Prince bowed with great seriousness and walked out of the room.

This incident illustrates a trick which few people know anything about,' continued the superintendent. 'That is, that there is more unconscious humor about a lot of lunatics than there is genuine humor among sane people. Some of the things that my patients say and do are funnier than any of the things I read or hear from the outside world. I tell, life isn't so prosaic as you'd think in an insane asylum.'

Surprised Him.

Of course, every young mother thinks her baby the centre of the universe. There have been several boy babies born in the little town of A—during the past summer. This is not intended as a startling piece of news, because their arrivals have been duly and appropriately chronicled, but it is only stated as the basis of a little joke. Some days ago four of the happy young mothers, all of whom had fine boys at home, met in one of the larger shops. They completed their purchases about the place, within speaking distance of each other, a fresh young assistant, in an effort to be pleasant, fired the stereotyped question at one of them, 'How is the boy to day?' In an instant four beaming faces were turned towards him and four pleased voices answered in chorus, 'Oh, he's all right, thank you. The assistant nearly fainted.

'So you want to marry my daughter, eh?'

'Do you think you have the patience and forbearance to make her a kind and indulgent husband?'

'I don't know sir,' replied the would-be son-in-law. 'I can button a six-inch collar on a shirt that is a half-size larger without getting angry and I—'

'Say no more,' interrupted the old man.

'Say no more, but take her my son, and my blessing goes with her.'

ADVICE TO MINISTERS.

Given by a Minister.

Preachers who practise it will preach better.

No class of people is so liable to throat trouble as the great class who make up the Gospel ministry. The strain put upon the vocal organs by constant exercise; the sudden change from a heated building to the cool air when the vocal organs are in a state of complete relaxation; the fact that a minister feels impelled to use his voice when actors and lecturers would take the needed rest; these are among the reasons why "Clergymen's sore throat" is known as a special disease. The Rev. E. M. Brawley, D. D., District Secretary of the American Baptist Publication Society, writes from Petersburg, Va., the account of an experience of his own which is profitable reading to those afflicted with bronchial or other throat troubles. The substance of the letter is as follows:

PETERSBURG, VA.

J. C. AYER CO.,
DEAR SIR: Three months ago I took a violent cold which resulted in an attack of acute bronchitis. I put myself under medical treatment, and at the end of two months was no better. I found it very

difficult to preach, and concluded to try Dr. Ayer's Cherry Pectoral. The first bottle gave me great relief; the second, which I am now taking, has relieved me almost entirely of all unpleasant symptoms. To ministers suffering from throat troubles, I recommend Dr. Ayer's Cherry Pectoral, as a safe and reliable remedy.

"Prevention is better than cure." A bottle of Dr. Ayer's Cherry Pectoral kept in the house, will effectively prevent the rooting of a cold and its consequent development into some dangerous malady. This remedy has no equal in Bronchial troubles. The most stubborn cases have yielded to its use. It is equally effective for Asthma, Croup, Whooping Cough, and every disease that attacks the throat or lungs. Anyone who is sick is invited to write to the Doctor who is at the head of the staff of our newly organized Free Medical Advice department. The best medical advice, on all diseases, without reference to their curability by Dr. Ayer's medicines. Address, J. C. Ayer Co., Lowell, Mass.