His proportions were about equal weights of copper and zinc; but he preferred an alloy of 60 of copper and 40 of zinc, which is like the second alloy of Mr. Collins, patented in 1800. A very small portion of zinc, tin or iron, mixed with copper, for sheathing, renders it far more durable.

THE PRESENCE OF SILVER IN THE WATERS OF THE SEA.

[Translated expressly for the Scientific American.]

We believe that we shall interest our readers by extracting from a paper, read before the Academy of Sciences, the following interesting historical details relative to the ascertaining of the fact of the presence of silver in the waters of the sea. This interesting discovery was made, according to Mr. Chevreul, more than 70 years ago, having been, if not perfected, at least indicated as probable by Proust. In support of this assertion, the following letter is cited, written on April 4, 1787, by that learned chemist, from Madrid, and addressed to La Metherie, who published it in the *Journal de Physique*, of the same year:—

OF THE ACTION OF THE WATERS OF THE SEA ON SILVER.—If the bed on which the waters of the ocean repose should one day become habitable land, the men who will then traverse that new continent will, without doubt, begin to recover those immense treasures which the voracity of the seas have ceaselessly swallowed ever since the New World has been frequented from the Old. The wrecking of the vessel, *Le Saint-Pierre d' Alcantarra*, on the coast of Portugal, has just put us in position to predict the metamorphosis under which silver will show itself in the times to come Marine acid—that first element of the saltness of the sea—overcoming the attraction which fixes it to its base, will have changed that metal into a mine of horn silver (chloride of silver). The short space of time in which the money was under the water after the wreck until it was recovered, sufficed to alter the surface of the coins to the depth of a quarter of a line. On being taken from the water they were found to be covered with a black film, which came off in scales, and which I have recognized as horn silver.

In another note of a little later date, published in 1799, in the *Journal de Physique*, we find the following passage relating principally to the indications of mercury in the waters of the sea and in sea salt:—

If some one, after reading this, will take the trouble to observe whether the copper sheathing of a new vessel becomes silvered in any part, especially when it goes to sea for the first time; if he will furthermore suspend a plate of gold in the water and observe the changes in it, he may be able, perhaps, on his return, to furnish one fact more to the natural history of marine salt. Who knows that the destruction of sheathings (sometimes so rapid and the cause of which is so unknown) may not depend on the existence of mercury being more abundant in certain seas than in others?

Such was the state of the question when, some years after, Messrs. Malaguti, Durocher & Sarzeau, by a series of the most interesting experiments, proved the existence of chloride of silver in the waters of the ocean. A short time after, a more distinguished *savant* (Mr. Forchammer, of Copenhagen) confirmed the fact in regard to the waters of the Baltic.

It would seem to result from the citations above, that Proust concluded, not that silver exists in solution in the ocean, but that silver cast to the bottom of the sea (by wrecked ships) is not preserved in the metallic state, but passes to the state of chloride of silver soluble in chloride of sodium, and that if the bottom of the sea should ever rise and become a continent, the precious metal would be recovered in the form of that ore. Furthermore, it will be understood that the quantity of silver dissolved in marine waters from the ingots or coins lost in wrecks would be too small, considering the great extent of the seas, to be perceptible. It was from an entirely different point of view that Messrs. Malaguti, Durocher and Sarzeau commenced their researches; the diffusion of silver in metallic minerals being a fact well established, these learned men thought that this metal ought also to be found in the waters of the sea. By multiplied experiments they have fully proved its presence in the waters of the ocean, and they have even succeeded in determining approximately the quantity, which amounts to about the one-thousandth part of a pound of silver in 100,000 lbs. of water. They have also detected the existence of a small quantity of silver in a sample of rock salt taken from the mines of the department of La Meurthe, where it constitutes, as is well known, a marine deposit formed in regular beds intercalated in marl; which leaves no doubt in the minds of these chemists that silver existed in ancient seas as well as in those of the present day.

It is, then, to causes inherent in the physical elements of the globe, and wholly independent of the existence of man, that the introduction of silver into the waters of the globe is to be attributed. Messrs. Maluguti and Durocher have pointed out two sources from which it may have come—one the emanations of the chloride of silver coming from the bosom of the earth, or more simply, by the slow action which salt water exercises on the argentiferous sulphurets of existing formations, either at the surface of continents or at the bottom of the sea.

We shall terminate this curious historical sketch by informing our readers of the experiments made in connection with this subject (during the last year) by Mr. Tuld, who, by repeating in America the experiments of Messrs. Malaguti, Durocher and Sarzeau, has confirmed in a very interesting manner the fact established several years ago by these chemists. Considering the reductive action which a plate of copper exercises on chloride of silver dissolved in chloride of sodium, Mr. Tuld thought that the copper and brass used in protecting vessels which have been some time in the sea, ought to contain silver. On examining a piece of copper sheathing taken from a ship which had cruised seven years in the Pacific Ocean, he found it so friable that it could be pulverized between the fingers. It contained more than a half per cent of silver. Another experiment was made on two specimens of copper sheathing, one of which had been used three years in the Pacific Ocean, while the other had never been in salt water. The former contained eight times more silver than the latter.

In a word, the silver contained in solution in the waters of the sea represents a mass more considerable than that which has been extracted by man since the origin of the actual epoch from the bosom of the earth! Mr. Tuld comes to the conclusion that the ocean contains at least 2,000,000 tuns of silver. What able chemist will find the practical means of extracting this enormous mass of treasure?—*L' Invention.*

ADULTERATION OF WINES.

Many people seem to doubt the extent to which wines and liquors are adulterated. The following cool letter, which we have just received from Indiana, may help to open their eyes. That liquors may be made by mixing oils with alcohol which will produce the same effect as genuine fruit brandy, we have no doubt is erroneous. Saratoga water may be analyzed and all the substances discovered in it by chemical tests may then be mixed together, and a liquid produced resembling the genuine, but all physicians know that the effect of this factitious stuff on the human system is entirely different from that of the real Congress water. The same principle holds in factitious liquors. The proof and the flavor may be closely copied, but the subtle and mysterious influence upon the stomach, nerves and other viscera is entirely different, the pure juice of the grape or current being healthful in many cases, while the mixed drugs are simply liquid death.

MESSRS. EDITORS:—The subject which I desire to bring before you is the fabrication of wines. My invention is founded on a quantitative and qualitative chemical analysis of natural wines, and consists in the fabrication of all kinds of wines, red or white, of whatsoever quality and in any quantity to suit, from pure vegetable ingredients representing the constituents of the grape-juice. The wines by this method, are made both without grapes and without fermentation; merely from mixing the ingredients, and after the short time of only 12 or 24 hours, a clear, sound wine, of a natural taste and flavor, is formed, improving more and more by age, so that wines made according to my method, after long keeping, have been mistaken for natural wines by good judges. The manufacture of wines by this method will pay large profits on the capital invested, as the cost of one gallon amounts to 25 cents only. According to my method, one acre of a single vineyard will produce as many gallons of wine as one vineyard of 40 acres will produce in the ordinary way.

A wine is wanting whose price would be within the means of all—a sound and pure table drink, to relish our dinners, enliven our too low spirits, help gently our poor digestion, correct our sour stomachs, expel the evil humors of our blood, and abate the whisky plague in our land. A continent without wine cannot but be a drunken continent! Please let me know (either by letter or through the journal) your opinion, of what has already been done in the matter under consideration, and oblige me by giving your advice accordingly. A. S.

Hankstadt, Ind., March 26, 1860.

CAN PARTICLES OF MATTER BE INHALED INTO THE LUNGS?

MESSRS. EDITORS:—The possibility of the inhalation of matter by the lungs is denied by some with plausibility. It is said that Claude Bernard made some experiments to determine this—that he tied a bladder containing a quantity of powdered charcoal about the nose of a rabbit. Except during feeding, the bladder was kept constantly on for several days, and when the rabbit was killed and opened no powder was found in the lungs or bronchial tubes; the *cilia* (which protect the lungs of all animals) having acted as a strainer to keep all particles from the air tubes. Is this statement correct? if so, many have a wrong idea of the subject. I take the account substantially from an article on "Animal Life," published in the *Cornhill Magazine*. E. T. C.

Philadelphia, Pa., March 26, 1860.

[We consider the *Cornhill Magazine* in error and the statement about Bernard of little or no value in comparison with other well-known facts which have never been disputed. Take the case of coal miners, for example. Some of them are troubled with what is called the "black spit" when they become old, and this usually ends fatally. The lungs of several who have died from this disease have been dissected and found perfectly black in color, and containing a substance similar to coal tar, which could only get in by being inhaled in very minute floating particles. Take the cases of stone-cutters and tool-grinders also, and we find testimony going to prove that many of them die by inhaling fine stone dust. It is well-known that the dry grinders of tools are very unhealthy; they die early of lung disease. Did they not inhale particles of matter, such as fine dust, we see no reason why they should not be as healthy as other men. We were recently informed of the case of a dry grinder of tools who died suddenly in a factory not many miles from this city, and when his lungs were dissected they were found entirely coated with stone dust and particles of iron. We had the information from one who was conversant with all the circumstances.

It puzzles us to conceive how the poor rabbit of Claude Bernard could live two or three days with its nose tied in a bladder. How could it breath at all?

STEAM FIRE-ENGINES.

MESSRS. EDITORS:—Here in Louisville we have disbanded the old companies of hand engines; we have five steam fire-engines of Cincinnati manufacture, I believe, and the wonderful change to the citizens is highly agreeable. The loss by fire is trifling compared to former times. Besides the saving of property and expense to the city, there is also the great luxury of resting after retiring to bed. Fires now seldom take place, and when they do, instead of the great noise and confusion usually attending them, everything is conducted quietly and with dispatch. When the alarm is given, the fuel is lighted, two horses in the meantime being attached to the engine (these operations occupying but four minutes), and the machine is driven through the streets with as much ease as a private carriage. When arrived at the fire, steam is up, and the engine ready for operation. The result is a quick extinguishment of the flames. Thus is seen the importance of small machines; but little time is required to get them on the spot, and when there they can be handled with ease—can be taken to alleys and back places, which it would be impossible to do with larger machines. There is not a town or city but would save a large amount of property by using small steam fire-engines. I trust the time is not far off when these kind of machines will come into general use. G. V. B.

Louisville, Ky., March 28, 1860.

BELTS FOR DRIVING MACHINERY.

MESSRS. EDITORS:—On page 150 of the present volume of the SCIENTIFIC AMERICAN, in an article bearing the above caption, Mr. W Barbour (of Lawrence, Mass.) gives a table of the power, width, &c., of belts (a very useful table for all persons interested in machinery), with a promise to extend the table at a future period to 30 inch belts. From Mr. Barbour's long experience, I conclude he has fully tested the relative merits of leather and rubber belting, and my main object in writing this note is to request him to give his experience on this subject. Which is the cheapest kind of belting in the end? INQUIRER.

Memphis, Tenn., March 29, 1860.