

How Clay Was Found Three and a Half Miles Under the Ocean.

Will the time ever come when the fast-multiplying millions of human beings shall cover the face of Mother Earth so thickly with brick buildings that clay deposits will fail to meet the demand for material for structures, streets, etc.? In many places this plastic bounty of nature is represented only by holes, out of which wealth has come, but into which it cannot be put back. Each year sees about seventy-five million dollars worth of clay products come from the factories of such industries in the United States, and each year leaves a corresponding vacancy in clay banks—a large run on the banks—if a pun may be perpetrated. And if the distant future—

When we've all gone to bed,
With a covering of clay or dirt
Above each tired head—

finds man looking in vain for clay in lowland or on the hills, with no refuge but holes, where could he turn for more clay? Now this seems a foolish question—and perhaps it is—but “there are more things under heavens than are dreamt of in your philosophy, Horatio.”

And one of these “things” is clay. And the “philosophy” of the matter lies in the fact that many rivers, lakes, streamlets and ponds. “though often disappointing on surface are good at bottom”—good clay, and costly clay, too, to get. The clay producer of the far-away future (is it many centuries, if we consider the building industry of the one just closed?) when his working material becomes so very scarce, must become, in part, a waterman—and, perhaps, a seaman—laboring on his “full-rigged” dredge-boat and flying his admiral’s flag on a mud scow.

And just see what a revolution in affairs—national affairs, at that—this will cause. It will cut down the river and harbor appropriations, put the be-diamonded lobbyist out of a job and make less talk and jobbery in Congress. It will also open to commerce many streams now navigable only for catfish and eels, but which sometimes come in for more or less large slices of pie, cooked in committee rooms, carved in the Cave of the Winds and passed over the Treasury counter.

I said that the coming worker in clay might become a seaman—and he will sure enough, if he must sail the raging main in search of plastic material. And it can be gotten there, but by a process almost as costly as that employed in searching for treasure in the silent depths of the voiceless mere. Millions and millions of tons of clay lie beneath the mighty “waste of waters” in their profound depths, and in shallower neighborhoods, where the sea sings a siren song to the unwary.

I have not been down and interviewed Neptune in his cave to find out this news—and no clay man need think he can employ me to dig clay down there—but Uncle Sam, of America, got the “news” by wire from “below seas,” and I got it from a man whom the old gentleman employs in his fish business—but it isn’t a “fish story.” Uncle Sam seems to be constantly trying to find out about everything under the sun—and in the sun, too; and the manner in which he does some things, prying into nature’s secrets, etc., is most interesting and instructive.

The fish business of our famous Uncle is not connected with his clay business, which properly belongs to the department of geology. But there is one branch of the former industry which also embraces several other important features connected more or less closely with the work. And this has to do mainly with the deep sea, its depth, bottom, fish and other things, that can only be investigated by the use of a big steamship and costly apparatus made especially for the purpose.

The U. S. Fish Commission ship Albatross is the principal deep

sea-craft employed in this work. She is a twin-screw, brigantine-rigged vessel, 234 ft. long, and is splendidly equipped as a sea-going ship, and for scientific research. There are on her laboratories with their tables, tanks, jars, instruments, etc., for investigating what is drawn up from the black depths of ocean; chart room, state rooms, ward room and other arrangements for work and comfort. The mechanical equipment includes an electric plant for light in all parts of the ship—and sometimes used in making collections near the surface of the sea—and a sounding machine, the latter being the medium through which came the “news” mentioned above.

That this news came by “wire” is seen in the fact that wire (piano wire) is used for a sounding line. To this is attached a sounding-rod, made of metal, hollow and having sharp edges at bottom, where is located a valve. The rod has also a heavy sliding, iron ball weight (weighing about 50 lbs.) through which it extends; and being further equipped with thermometer and water-specimen cup, is ready for the plunge. Usually about seven miles of wire lie coiled around a reel on the ship’s deck ready to follow, over wheels and pulleys, the investigating rod.

When the signal for lowering is given, wheels begin to revolve and the sounding cylinder with its staff of mechanical newsgatherers sinks down, down into darkness and cold until bottom is reached. When this occurs the sharp edges of the metal rod plunge into the ocean’s floor, the heavy ball slides downward, and the valve closes, securing the material forced into the cylinder. The knowledge that all this has taken place is found simply in the slacking of the wire and relief of tension on the apparatus on ship-board. Now hoisting begins, and soon the nature of the bottom below is learned—whether the land is good for a brickyard, an eel farm, a sponge farm or what—usually “what.”

And that is how the news came from the Kingdom of Neptune. And you see, it came by wire. The story, as further set forth by Uncle Sam’s servant, is connected with a most interesting cruise of our good ship Albatross, which was made in the southern Pacific Ocean for the purpose of making soundings of, and collections from, the sea and also collections in the fields of ethnology, geology, zoology and botany, from a number of islands.

It is a well-known fact that there are some very deep “holes” in the sea; some of them are more than five miles from surface to bottom, being often the craters of extinct volcanoes (they ought to be “extinct,” with so much dampness over them), and some are of wide extent. It was in one of these huge depressions that the Albatross found clay. Between Nukahiva Island, in the Marquesas Archipelago, and San Francisco a basin several hundred miles in length and width was discovered during the cruise of this ship. When the sounding cylinder reached bottom at that well-filled basin, the wire had run out a length of about three and a half miles; and when the sounder came up it contained a quantity of red clay and manganese—two materials used by the maker of clay products.

This “ready-mixed” material extends over the bed of the great basin, occurring in slabs and in small nodules, and often contains bones and teeth of fish.

There is no doubt that these clay beds can carry off the premium for “depth and size”—they are truly “out of sight.” And their combination feature can’t well be beaten. There is the clay for the ware, the manganese for coloring and the teeth for making flux. Now will we have a South Sea Clay Company? If so, the stock will certainly be watered right up to the limit; and there will be another “South Sea Bubble.” If anything happens in this line we will hold the Fish Commission responsible. They are great people for hatching out fishy things.

The clay in the deep “pockets” of the sea should, according to the nature of things, be very hard—not because it is mixed with

manganese and fish bones and teeth, but on account of the great weight of water above it. This pressure is so ponderous that no human being, though outfitted in any kind of diving apparatus, could live at bottom for a moment. At such immense depths water forces through some very compact substances, and is extremely cold—not freezing, of course, but altogether too cold for a "bath," even for many kinds of fish.

Once the heavy sea pressure was demonstrated in a not satisfactory manner to the "demonstrators." The officers of the old Fish Commission steamer Fish Hawk, while at sea one Fourth of July, desired to open a bottle of champagne in honor of the occasion. They also wanted their extra liquid cold. So the bottle was secured to a sounding line and lowered down to old Nep's cold-storage domain, where it was allowed to remain until the desired effect was gotten. Then the bottle was drawn up, the cork "popped" and the sparkling spirit of the grape distributed to the patriotic expectants. They raised their glasses and swallowed—only one swallow—and then abandoned that champagne. It was highly seasoned with a fine brand of old Nep's best salt water. This had forced through seal and cork; and it took away a fine frill from that Fourth of July feast. Moral: Champagne should be taken "cum grano salis"—in the abstract, and not from the sea.

ing for fairer fields afar; fruit and fish and fiber are his for the taking; and here he sits him down in contentment 'till the white man comes with the burden of civilization. Then the burden is the Indian's, without the asking; and the land is the white man's—also without the asking. But the polyp labors on—and asketh nothing.

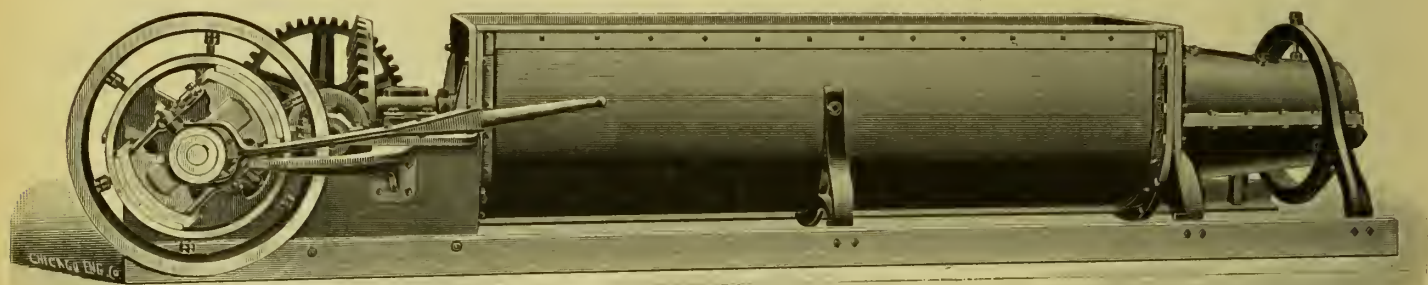
J. E. Price.

The Brewer No. 3 Pugmill.

We herewith illustrate a recent addition to the machinery made by H. Brewer & Co., Tecumseh, Mich., in what is known as the No. 3 pugmill, and a brief description of this machine will be of interest to our readers. It is constructed of the best materials, and has a 30-in. shell made from $\frac{1}{4}$ -in. sheet steel without points or rivets. A heavy bridge tree cast in one piece carries the driving pulley, gear, and one of the main shaft, which is of 4-in. square steel.

The front end is made with a tapering nose-piece, and all parts of the machine are firmly secured to heavy steel angles, in such a manner that the shell is relieved of all mechanical stress except that of the weight of the clay within.

In the standard 12-in.-mill the open portion is 9-ft. long, the additional 3 ft. being the length of the tapering nose-piece men-



THE "BREWER" NO. 3 PUGMILL.

When a bottle of once good hilarity-maker thus comes out of the sea to belie the music of its popping, it is as "lifeless" as the fish that, when brought from way down below, "pop" when they reach the surface; their eyes pop far out of the head and their bodies enlarge. The relief of the great pressure of their habitat turns them suddenly into permanent expansionists; whereas, before coming to the light, they were somewhat hidebound. The squid is another curious inhabitant of the deep, because it lives at depths of much pressure, and yet has a very soft body. The explanation of this is, that the water passes through the porous flesh of the fish, which, in great measure, is thus relieved of the crushing force.

One of the very interesting products of the South Sea is the maker of atolls and coral islands, the coral polyp, a minute marine animal that surrounds itself with calcareous matter, budding out, one from the other and producing various beautiful shapes in the substance deposited, representing leaves, branches, fans, etc. Myriads of these little laborers attach themselves to rocks, then build, one upon another, unseen as the years roll on, and then, behold! the sea begins to ripple about the growing island that now glistens in the sun; shells and other matter collect there; stray cocoanuts and other germ-bearing flotsam make lodgment, and soon green fronds are waving to the waves that lap the coral shore, murmuring the song of a new creation.

Then comes the savage, the red Columbus, in his dugout, seek-

tioned. The back thrust of the pugging shaft is taken by a heavy phosphor-bronze bearing with a very convenient and efficient oiling arrangement. The design is executed with the idea of attaining the maximum strength and durability.

The driving parts are so constructed that the mill may be driven in either direction from either side, ensuring convenience in location of belting. A friction-clutch pulley is also attached, the controlling lever of which is within easy reach of the operator.

The manufacturers claim great advantages for the tapering front, stating that the open part of the machine allows ample room for the dumping, mixing and tempering, while the front guarantees a thorough final pugging and grinding before the clay is discharged. The machine weighs 7,000 lb. Further information concerning these machines may be obtained by addressing H. Brewer & Co., Tecumseh, Mich.

A new pottery company has been incorporated at Des Moines, Ia., with a capital stock of \$50,000. C. N. Carpenter seems to be the moving spirit.

Extensive improvements are being made at The Trenton Potteries Co., who plants are all located in Trenton, N. J. The improvements will cost in the neighborhood of \$40,000, and among them will be a new kiln department, a new warehouse and new boiler and engine rooms.