CORAL FORMATIONS.

Hills have been leveled, valleys filled up and cities built by the might of man, and his works have been justly considered as great and mighty productions. But if man has built proud cities, he may justly feel humbled in comparing his works with the little coraline insects of the sea, who have built islands in the deep ocean with no other material for their walls than the matter held in solution by the waters. Coral is a stony product of the sea resembling the productions of the garden, rivaling trees and shrubs in the gracefulness and delicacy of their forms. In olden times it was believed that coral was a petrified vegetable production, as it was well known that vegetation could produce stately forests and minute plants and when it was first suggested that it was the work of little jelly-like animals, by the naturalist, Peysonnel, in 1751, scientific men pronounced the idea absurd. It is well known that coral is the stony frames belonging to coraline insects, and a piece of it may be said to be composed of millions of their skeletons. We have received a large specimen of this marine marble flora, sent to us by Geo. E. Harkness, engineer of Fort Jefferson, Fla. It is of the kind found at the Tortugas Islands, and is very beautiful, branching out into broad leaves, rivaling in their thin tracery the works of the most skillful sculptors. Coral is principally composed of lime; the insects secrete it from the waters of the sea, and as each generation expires, its successors continue the building until it arises from the ocean as floral rocks and islands. The operations of these marine insects are principally confined to the warmer waters of the ocean, such as in the Gulf of Florida and the Indian and Pacific oceans. It is remarkable that, at 50 miles back from the seacoast, in the Carolinas, as perfect specimens of coral are frequently dug from the marl pits as those obtained fresh from the sea. The limestone of New Jersey and of Missouri give evidence of their coraline origin, thus affording proof that many extensive tracks of this country were once under the waters of the great deep, and that these little creatures were the builders of many of the rocks and much of the dry land. But the coral insects perform another great office besides increasing the boundaries of the land. It is well known that silica, lime, magnesia, alumina, oxyds of iron, and other soluble impurities, are carried down into the ocean by the waters from rivers. The little coralines act the part of scavengers of the sea, as they secrete only the impurities and refuse the salts of sodium, and thus they build their houses from the very materials which otherwise would accumulate and render the ocean waters as bitter as those of the sea of Sodom. The coral insects and marine shell-fish store away the excess of lime water in the sea and tend to purify its waters, in the same manner that trees and vegetation absorb carbonic acid from the atmosphere and keep it pure for the welfare of man. It is thus that the operations of nature are conducted upon a wise, simple and sublime plan by the great Author of Creation.

SPONTANEOUS COMBUSTION OF SAWDUST.

The following are extracts from a communication of E. N. Horsford, Professor of Chemistry at Cambridge, Mass., on the spontaneous combustion of sawdust containing oil, by which it is said the Mechanical Bakery in Boston was burned down. The letter is addressed to the Boston *Journal* :—

"In a communication under date of Feb. 28th, the writer presented to your readers an argument in favor of the theory of spontaneous combustion, as a source of the fire which destroyed the Mechanical Bakery. Not the least of the considerations which led to the communication, was the wish to relieve the minds of parties interested from the suspicion that the fire was the work of an incendiary. At the time, the argument seemed to the writer sufficiently sound. It required, what was suggested in a concluding paragraph, an experiment where the circumstances of temperature, time, &c., should be as nearly like those in the Mechanical Bakery as might be. The reproduction of all the conditions in a parallel experiment was not an easy matter, and has not been attempted by the writer. But the experiment even has been rendered unnecessary by actual occurrences. The writer has learned that a machinist of long experience (whose address is herewith inclosed) has, in repeated instances, observed the spontaneous combustion of boxes of sawdust saturated with oil, in half an hour after they were taken down and broken up with a hoe. The differences between the facts witnessed by him and what it is conceived occurred in the bakery are these: In his case, the sawdust had been long in use, and having become no longer serviceable as an absorbent, was broken up and more perfectly exposed to the air. In the bakery the sawdust had been but a short time in use, and was still quite porous. In the case of the bakery, the heat of the atmosphere about the box of sawdust, and, of course, of the sawdust itself, as well as the air within it, was high. In the other case, it is probable that the heat from without was much lower. It is conceivable that the heat from without, in the one case, was quite an equivalent for the more perfect saturation and more thorough disintegration in the other.

"In addition to the experience of the machinist above mentioned, and this result of experiment in confirmation of the suggestion in the communication of February last, the writer has translated and presents the following extract from a recent report of Professor Balling, of Prague, published in the April number of the *Polytechnisches Centralblatt*. A case of inexplicable conflagration had been submitted to the learned professor by the authorities of the city. A velvet factory had been repeatedly burned to the ground under circumstances precluding suspicion either of carelessness or intentional firing. The report says: 'It is a well known fact that fatty oils exposed to the air absorb oxygen and become more or less heated. The greater the surface with which the air comes in contact, the greater is the absorption of oxygen and the greater the heat produced, until, at length, such is the increase of temperature, that spontaneous combustion of the body saturated with oil takes place. By employing new oil, and by warming from without, the inflammable condition is expedited, and the burning made more violent. In this way many conflagrations have already taken place, especially in woolen spinneries, in which the spun wool previously charged with oil was gathered in heaps, and where the waste wool was left in baskets. The same has occurred in carpenter's shops, where, in polishing furniture, the surface is first saturated with oil and then the excess rubbed off with shavings. The shavings absorb the surplus oil, and, where remaining in piles, spontaneously take fire.' The report goes on to say that, in view of these considerations, there was nothing new in the case of conflagration before them; and it closes with instructions obviously suggested by the facts presented, that where it is necessary to saturate with oil bodies like sawdust, shavings, cotton or woolen waste, care should be taken to avoid accumulation in heaps.

"The writer, now after the lapse of nearly three-quarters of a year, cannot escape the conviction that it is fairly probable that the burning of the Mechanical Bakery was a case of spontaneous combustion."

THE CEREALS OF THE UNITED STATES.

A statistical view of American agriculture, recently given in an address delivered by Mr. John Jay before the American Geographical and Statistical Society, in this city, gives a rather discouraging account of the progress of our national agriculture. In many staple products, the quantity raised has shown a marked decrease in 1850 (the date of our last census, from which Mr. Jay has obtained most of the purely statistical portions of his work), from that raised in preceding years. Until the census of 1860, there can be no means of obtaining further statistics of the kind; and unless there has been a marked improvement during the last seven years, the condition of our agriculture is not very promising. So far as concerns the wheat crop, the New York *Evening Post* considers that, although it has not decreased in its actual amount, it has not increased in proportion to the increase of population. In New England, its culture is rapidly declining; while, in the middle States, it is nearly stationary; and our chief supplies now come from the north-western district. In New York, the crop in 1840 was over 12,000,000 of bushels, while in 1850 it was but 9,000,000; a decrease of 25 per cent. With regard to the products of the entire country, without alluding to any particular State, we find that rye, oats, Irish and sweet potatoes, hay and tobacco have steadily decreased. Hops have increased at the rate of 500 per cent., owing to the enormous consumption of beer; rice has increased at the rate of nearly 300 per cent. In 1840, the cotton produce amounted to 800,000,000 lbs.; in 1850, to 980,000,000; in 1855, to 1,186,000,000, but the great staple production of the United States far surpassing in amount even our famed wheat, cotton and tobacco—is Indian corn. Its cultivation has retrograded in no State, and the crop may be roughly estimated at 400,000,000 of bushels in 1840, 600,000,000 in 1850, over 700,000,000 in 1855, and fully 800,000,000 in 1856. The corn crop is said to be somewhat deficient this year, but the wheat has been so abundant as to make up the entire deficiency.

THE POTATO BUG.

On page 408, Vol. XIII., of the SCIENTIFIC AMERICAN, we published an illustrated description of the potato bug, with a full account of its habits. It was afterwards denied that the potato rot was caused by insects, and so the matter was left for future experiments, according to our recommendations. In a late issue of the Cincinnati *Gazette*, a correspondent confirms the insect theory of the potato rot. He says:—

"The potato bug has committed its ravages extensively. This destructive pest is increasing from year to year, because it is not destroyed, and farmers make no effort at limiting its numbers. Birds and poultry, and nothing else, will destroy it, for it belongs to the *canthárides* or blistering-bugs. In Indiana I have met with two kinds, the yellow-striped and the ash-colored, but near Pittsburgh, Pa., I recently saw a small and black variety. Here the yellow-striped is the most destructive, for it appears in myriads. The ash-colored is a large variety, comes earlier and disappears later than the yellow-striped, but, being few in number, cause no material injury. The black variety is more numerous than these, but we have not seen them in sufficient numbers to be formidable. These bugs appear about the middle of July and remain from two to three weeks. They then go into the ground, deposit their eggs, and die. In three or four weeks the eggs are hatched, producing a slender, yellowish-colored grub, with a reddish head, and having six legs. These live upon fine roots, and in the ensuing year change into bugs which live upon the leaves of several plants, but especially upon those of the potato. When numerous, they will cover every leaf of many hills, and eating enormously, they soon go over a moderate-sized patch. This year they consumed for us a fifth of an acre in about two days. Hence, at the time of their appearance, the farmer should daily examine his potatoes. To keep down their numbers the bugs should be destroyed, for then they will not lay eggs for a next year's swarm. The most effectual method to do this is to take a pan half full of water and pour turpentine into it until it is about one-eighth of an inch thick. Put this basin under the vines with the left hand, and with the right hand brush the bugs into the basin. The turpentine will kill them immediately, and when the water will hold no more, sprinkle bugs and all over the vines. The scent of the turpentine is extremely offensive to them, and a knowledge that many of them have been destroyed frightens them away. Pursue this course three times a day, and in a day or two they will disappear. I tried the turpentine for the first time this year, and made but one visit to the patches. The next day I had to leave on a journey, and returning three weeks after, found no further injury done, and the leaves which had been eaten had again grown out. The turpentine did not injure the vines."

A LIGHT AND POWERFUL LIFTING JACK.—We have just raised 16 pigs of lead, weighing 2,178 pounds by means of a jack which weighs 1 lb. 11½ ounces. We saw the jack weighed ourselves, and the weight of the lead we received from John W. Quincy & Co., No. 98 William-street, this city. The jack was made by David L. Miller, of Madison, N. J., in accordance with his invention which was illustrated on page 148, Vol. XIV., SCIENTIFIC AMERICAN. Mr. Miller informs us that he has received about ten letters per day since our previous notice, last January; and we hope not less favorable results may flow from this, for we like to see the makers of really good implements find an extensive sale for them, and we have never known an instance but what they did, if they had machines of merit, and availed themselves of the medium of the SCIENTIFIC AMERICAN for bringing them before the public.

THE WAY TO DO IT.—We learn from E. A. Smead, of Tioga, Pa., that he has sold over ten thousand dollars' worth of rights of his device for changing motion (illustrated on page 236, Vol. XIV., SCIENTIFIC AMERICAN) for its application in sawing along