

Erastria Scitula—an Important Predatory Insect.

An interesting paper upon the habits and metamorphoses of a predaceous lepidopter destructive to bark lice has just been published by Dr. H. Rouzaud, of Montpellier, France.

The adult insects of both sexes resemble each other closely, and both afford a striking example of protective resemblance, simulating in repose sparrow droppings. The moths issue at the close of the day, and upon emerging from the cocoon are extremely active. Whatever the position of the cocoon, whether upon the leaves, branches, trunk, or base of the tree, the moths drop immediately to the ground after emergence from the cocoon. They jump, roll over on the back, and vibrate the wing pads actively for forty seconds, and finally become perfectly motionless. Three or four minutes after birth their wings become expanded, and they fly up among the leaves and branches of the tree from which they have previously fallen. During daylight the moths remain motionless, the wings held close to the body, in which attitude, on account of their size, coloration, and general aspect, they bear the close resemblance just mentioned to the excrement of small birds. Copulation, which is of short duration, always takes place at night, the period during which the moths are active. The males live only one or two nights, in all probability, while the females in captivity live ten or twelve days at the least. Egg laying lasts several days, and each female produces about a hundred. These are deposited one at a time, and each is separated from the other by a large interval of space. The female scatters them by preference upon the leaves or the young buds, although they are often laid directly upon the back of the bark louse.

The young larva at once enters its host, devouring all the internal organs, leaving only the dorsal carapace, which is more or less thick and hard. A coccid which has been attacked always shows at some point or other on the dorsal surface an opening by which the predatory larva has entered. The young larvæ are of a red-wine color, except the head, which is brown, and this coloration lasts until just before the transformation to chrysalis. At the time of the transformation, however, a bluish white color is assumed. Although the size of the younger larvæ is not greater than that of the bark lice which they attack, they spin no silk at first and the spinnerets are rudimentary. As soon as the contents of one bark louse have been devoured the caterpillar abandons it and seeks a new prey, and is sometimes found exposed upon the twigs. Apparently realizing the necessity for protection, as well as additional food, it hastens to bury itself in a new victim, which usually is a matter of but some minutes. After having entered a bark louse it seems to be effectually protected from parasites.

M. Rouzaud has kindly offered to transport to this country for experimental purposes living specimens of this extremely valuable insect, and we have arranged to accept his kind offer to attempt the introduction of the species into California upon a somewhat extensive scale.

Although the black scale possesses in California, as well as in Hawaii, an efficacious parasite in *Dilophogaster californica*, the latter does not breed rapidly and seems to have but two annual generations. In *Erastria* we have a much more rapid breeder, and if it should accommodate itself to the somewhat changed climate, as we anticipate, its introduction will prove a boon to the California fruit grower.

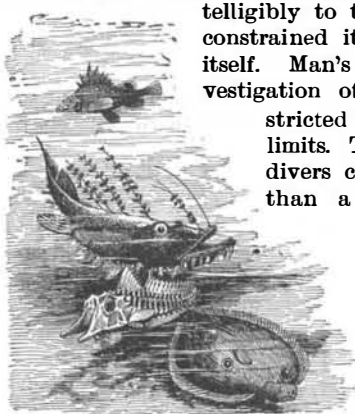
Other things being equal, the *Erastria* will prove a most profitable insect to introduce into California for work against the black scale. It comes from the native home of the scale insect and is there an effective enemy of the species.—*Abstract from Insect Life.*

Water Proof Masonry.

What was at first considered a doubtful experiment, viz., the use of coal tar as a means of rendering masonry impervious to water, especially in positions exposed to direct contact with the latter, has proved a practically valuable resort. Used as a coating for masonry built up of very porous stone, tar renders it quite impervious, even at a depth of some fifty feet of water, and, according to the opinion of those whose experience has been extensive with it, the article should be utilized in all public buildings, particularly those designed for the preservation of works of art, the dissolving action of water, even upon mortar of superior quality, being well known, and also the unfavorable effect of the exudation of water charged with lime salts from the mortar. Two methods of using the tar are named, viz., in a boiling state in one or several layers, this being suitable for surfaces exposed to the air; or it may be made to flame up before using, this being appropriate to surfaces which have to be covered up. It is stated that when boiling coal tar is employed in three coats on masonry the result is a black and very brilliant varnish, which perfectly resists the action of frost, water and sun, being likewise absolutely impervious; and the tendency of the black coating to absorb heat may be overcome by white-dusting the whole before the tar is quite dry.—*National Builder.*

IN OCEAN DEPTHS.

The greater part of the surface of the earth is hidden deep under the waves of the ocean. The area of the dry land is 136,000,000 square kilometers, while the water surface is approximately 374,000,000. This vast submarine area remained for long an unknown world. It is only in recent years that science has called in-

**TYPES FROM INTERMEDIATE DEPTHS.**

telligibly to the vast deep, and constrained it to give account of itself. Man's direct personal investigation of the sea floor is restricted within very narrow limits. The most experienced divers cannot remain more than a few minutes at a depth of sixty fathoms. Investigation of the depths is now carried on by apparatus on ship-board. The ordinary deep sea lead is dispensed with, and a metal tube substituted. The tube is heavy and is further hung with weights which are increased with the depth of the floor. For great depths the weight is five or six hundred weights. The line, strengthened with steel wire, is several miles long, and is kept rolled on cylinders which are operated by steam power. The work is heavy, and to test the bottom at a depth of three or four miles occupies hours or even a whole day. Attached to the deep sea tube are other instruments for determining the temperature of the several strata of water passed through, and also for bringing to the surface samples of the water from various depths. But it is also desired to know whether the various depths of ocean are inhabited, and by what creatures. To this end specially designed nets are employed. A great deal of ingenuity has been spent on these nets, some of which open and shut automatically at prescribed depths. These arrangements admit, not only of exploring the sea floor and of bringing up samples of the ooze for investigation, but also of securing specimens of the types of life proper to various ocean depths

During the last thirty years, several countries have fitted out deep sea expeditions, and thousands of deep sea soundings have been made, but our knowledge is still very fragmentary. We have learned that the ocean floor is not a level surface, but furrowed like the surface of the dry land, and similarly diversified with hill and dale; but the mountains of the sea, instead of being subject to erosion like those on the dry land, are covered with a continuous soft shower of mineral and organic matter, interspersed with occasional bones and teeth. The ocean bed is almost invariably a loose material. In the neighborhood of the shore, the rock is covered with debris wrested from the land, or with sediment brought down by the rivers; but this extends only to a short distance from the land. The ocean depths are covered with a soft ooze. Everything that falls into the sea, and that has a greater specific gravity than its waters, sinks sooner or later to the bottom. Its floor is the sepulcher of all that lives and dies above—the treasure house of all that is committed to it. Meteoric stones innumerable have been quenched in it, and the floor is composed, in great part, of minute particles of iron—the so-called cosmic dust—and volcanic fragments and dust are widely distributed. Icebergs from the polar regions, freighted with rocks and other land debris, are often wafted into tropic waters before they melt and release their burdens. The sea receives everything, but, for the most part, the character of its floor is determined by its minutest denizens, the *diatomaceæ*, the *foraminifera*, and the *radiolaræ*. These short-lived creatures multiply and die, and their shells sink slowly, but surely, to the bottom, their innumerable multitudes falling in a perpetual soft shower. The floor of the Atlantic, from 1,000 meters to 4,000 meters deep, is, over large areas, covered with a characteristic material known as deep sea slime.

Microscopic investigation shows that it is, for the most part, composed of microscopic shells of the *globigerina*, of which we present a magnified illustration. These are subjected to enormous pressure at great depth, and form chalk and limestone strata. Thousands of years may be required to form an inch of this deposit.

On the surface of the deep sea, and again on its floor, life is abundant; but, at intermediate depths, the types are few and poorly represented. Fish which make their home in this desert of the sea are often exposed to hunger. Many of them are provided with a peculiar sac under the jaws—a bread bag—in which the fish stores the surplus when he has made a good catch.

It is remarkable that many deep sea fishes have very large eyes. It is, hence, evident that the depths are in some sort illuminated, even although the rays of the sun do not reach them. But many of the fish are themselves highly luminous—they carry their own lanterns about with them, in fact; and some, at least, of them can flash and extinguish their light at will.

The thousands of mariners who have gone down at sea will leave no durable remains, the minute dwellers of the deep leave nothing unconsumed, even the bones of whales dredged up are found bored through and through; but the depths of the Pacific have yielded countless thousands of sharks' teeth—thousands even at a haul—but the greater portion of them belong to extinct species.—*C. Falkenhorst, in the Literary Digest.*

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Southern Inventors.

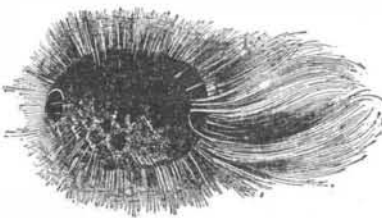
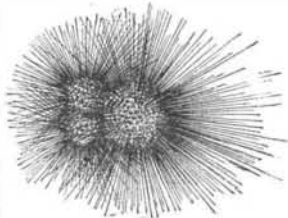
The *Boston Journal of Commerce*, alluding to important inventions made by Southern men, names a number who have contributed many notable inventions to science.

Despite the fact that the people of the South were but little engaged in scientific or mechanical pursuits, and that their intellectual energies have for the most part been absorbed with other thoughts, yet many notable inventions and contributions to science have been made by Southern men, writes Barton H. Wise, in the *Popular Science Monthly*. Cyrus H. McCormick, a native of Rockbridge County, Va., and the inventor of various agricultural implements, among them his famous reaper, received the thanks of the French Academy of Sciences for having done more for the cause of agriculture than any other man living. "Owing to McCormick's invention," said William H. Seward, in 1860, "the line of civilization moves westward thirty miles each year." Richard J. Gatling, of Hertford County, N. C., devised various machines and the Gatling gun, now an arm of the United States service and adopted by foreign governments as well. Both McCormick and Gatling moved west, the former to Chicago and the latter to St. Louis—the country districts of Virginia and North Carolina affording them poor fields for their endeavors. Henry J. Rogers, a Baltimorean, was the practical adviser and assistant of Morse in the construction of the first telegraph line in the United States, which was built in 1844, between Washington and Baltimore. He was the superintendent of it, and made many improvements in it, and was the inventor of several telegraphic instruments. Rogers also devised the first system of pyrotechnic signals in the United States and the one by means of flags that was adopted by the navy in 1846. The author of international fog signals was Samuel P. Griffin, of Georgia; and the inventor of the first complete system of ciphers used by the Associated Press was Dr. Alexander Jones, of North Carolina. The name of Maury stands above that of every other Southerner, if not of every American, in his contributions to science. Maury's writings demonstrated that meteorology could be raised to the certainty of a science, and Humboldt credited him with being its founder.

Sir Samuel Baker.

The distinguished African explorer Sir Samuel Baker died at his residence at Newton-Abbot, Devonshire, England, on December 30. He was born in London, June 8, 1821. In 1861 he formed a small party to proceed to the source of the Nile. Without guide or interpreter, he discovered, on March 23, 1865, the great fresh water lake which he christened Albert Nyanza. He proved that the Nile was navigable for large vessels as far as Gondokoro, 1,450 miles south of Khartoum. The slave trade of the interior, with Khartoum as its base, had grown to enormous proportions. In 1869 Sir Samuel Baker was appointed bey by the Viceroy of Egypt. In the face of great difficulties he worked his way through the hostile tribes, subduing them and abolishing the trade in slaves, until the name of the "White Pacha" was known and feared all through Central Africa. When his commission expired the slave trade was resumed with all its horrors.

As a writer, Sir Samuel was very entertaining, and his books had an enormous sale. Sir Samuel Baker takes a high place among the explorers of the dark continent, and his name will be ever remembered along with those of Livingstone, Grant, Speke, Schweinfurth, Stanley, and others.

**DEEP SEA SPONGE.****SEA LILY. (Metacrinus.)****GLOBIGERINA.**