

of the piston) down to the minimum, so that it will be required to expend itself in keeping up continuous motion.

In adapting machinery for this use, the size of the cylinder could be reduced in proportion to the increase of the potency per square inch of nitroglycerin over steam.

In regard to the necessity of keeping the constituents of this potent substance in separate vessels until required for use, it is a marvel why this has not been required by law long ere now, as the frequency of awful explosions and the destruction of life and property are sufficient to call public attention to the subject. One might naturally suppose that the *Lycurgus* of "Free America" is just now taking a Rip Van Winkle vacation from his public duties.

St. Albans, Vt.

CHARLES THOMPSON.

[For the Scientific American.]

ANTS.

Every reader is familiar with the ants, at least as referred to in the Book of Proverbs, vi., 6: "Go to the ant, thou sluggard; consider her ways, and be wise." Again, in xxx., 23, we find: "The ants are a people not strong, yet they prepare their meat in the summer." Thus the Scriptures have noticed the habits of the ants, and their wonderful instinct has been described in several articles published in the SCIENTIFIC AMERICAN. The common ants, however, belong to the family *formicidae*, or genus *formica*, while my subject matter relates to the white ants, which must not be confounded with the common ants, as they belong to a different family, the *termitidae*, genus *termes*.

Those who are curious to read the wonderful accounts of the warrior termites (*termes bellicosus*, of Smeathman) will find the memoir of Smeathman copied in numerous works on natural history (Mauder; F. A. Pouchet, M. D., in the work called the "Universe," etc., page 185; Westwood, F. L. S., who, in his "Introduction to the Modern Classification of Insects," vol. II, page 11, illustrates and describes several species, all foreign to the United States). Mr. Fitch, in his reports on the noxious and other insects of the State of New York, section 196, says: "American white ant, *termes frontalis*, Haldiman (*neuroptera termitida*): Myriads of white ants, mining in and wholly consuming the interior of fence posts and stakes, while the outer surface remains entire." He also says it "is the only species of white ant which we have in the United States." These creatures I have been familiar with for some years, finding them in my rambles among decayed logs in the woods; but have not made microscopic examinations of the various individuals composing the colony, as I have of those I shall now introduce.

My neighbor, Mr. George Hensel, has an extensive greenhouse, and knows how to manage it. He set aside (on a broad shelf, covered with sand and loam, perhaps two inches deep) some choice pelargoniums for cuttings, also some geraniums, and among them a luxuriant *echeverria*, in the ordinary flower pots. The latter plant was set in its pot upon an empty inverted pot of the same size. Mr. Hensel discovered that these plants, from some unknown cause, were drooping, and to his surprise, in a few days after, discovered that nothing but a thin shell, apparently sound on the outside, was left of the roots and lower portion of the stem. He noticed among the *débris* and soil in the pot, a minute ant-like creature, to which he called my attention; this led me to investigate, and I found that these minute, blind creatures do all their mischief under cover; they build tubular, pendant passage ways (from an upper to a lower field of action) by agglutinating particles of sand, actually forming hollow "ropes of sand" (in which they ascend and descend) eighteen inches long. Under the sand on the shelf referred to, were tunnels as straight and direct as any engineer could make them, opening up directly under the hole in the bottom of the flower pot, by which they made their insidious approach to the root and stem of the plant it contained; and from this point beneath the pots, three to five such channels were noticed, radiating to various intersecting tunnels. But the most remarkable engineering skill was discovered in the inside of the inverted flower pot. In order to gain access to the roots of the *echeverria* above mentioned, their tunnels ended on the inner side of the pot at four points; then a tubular column of sand was constructed against the side of the pot (to which it was glued) to within a few inches of the top; then the tubes were built inwards, and met around the hole in the center of the bottom of the inverted pot, through which they established communication with the upper pot; and thus these sappers and miners, with consummate skill, made their attack so completely under cover that no one would suspect their presence, and without injury to the external epidermis of the stem of the plant. Their excavations are all confined to the interior of the plant, in this case a highly succulent one, belonging to the natural order of house leeks (*crassulaceae*). The fact that they killed one dozen choice plants during December, 1874, proves them to be dangerous insects in the greenhouse. Numbers of winged specimens were discovered in the greenhouse on December 18; these shed their wings in the course of a few hours, and disappeared. Mr. Hensel tells me that he has for years known the common white ants; but the males and females became winged in May, and confined their mining to dry soft wood only. Köllar, in his treatise on insects, mentions the *termes lucifugum* and *rusticolle*, of southern Europe, "where they cause great damage to the olive trees." He writes also of a third species, which he termed *termes flavipes*, "found in the hothouse of the imperial palace at Schönbrunn, where they were, no doubt, introduced with foreign plants. This species does no injury to the living plants, but gnaws through the tubs in which they stand, and the other woodwork of the houses."

I mention these facts simply to warrant me in expressing

my opinion that this is a new species, notwithstanding that an eminent entomologist (to whom I presented the facts), on inspection, believes that they are the same as those mentioned by Mr. Fitch, as the American white ant. In that case one thing is certain, they have acquired a new taste, and now relish living, succulent plants, instead of dead and dry wood; or if they had such a taste before, it was unknown to our entomologists. Harris does not mention them in his work, that I can see; nor does any one else allude to their feeding on living plants, with the exception of those mentioned by Köllar, on the olive.

It is well to give publicity to these facts; perchance the same may have been experienced in other hothouses without the culprit being detected or the fact made known.

The ants figured by Westwood and other authors are similar to these, except the class called warriors, with their enormously large heads, fully equal to one half of the whole insect. These do not have the curved or sickle-shaped jaws, crossing at the regularly curved tips; but the jaws are stout, long, and parallel to each other, straight out, but nearly bent at right angles at the tips, which also cross each other near the points. The workers have also very large heads, with no traces of eyes visible on them. The soldiers, so called, are also similarly remarkable, and are all of a uniform dirty white color. Mr. Hensel tells me that the winged members were of a darkish brown color. There seem to be four distinct classes in each colony (Latreille says five, but he includes the larvæ), pupæ, neuters, males, and females. They are sufficiently remarkable, and, in scientific engineering, they put to blush some of our learned tunnelers, who, with all their eyes wide open and instruments, can not excel them in finding a point, and hence the ants are entitled to enter an appearance in so classical a paper as the SCIENTIFIC AMERICAN. J. STAUFFER.

Lancaster, Pa.

A Harvest for Plumbers.

The long continuation of intensely cold weather has caused great trouble and discomfort in this city, by the freezing of water in pipes. Probably in more than half the houses the water in pipes has been frozen, or the pipes otherwise disabled. The trouble is generally in the street, where the pipes are most difficult of access, and it arises from the reprehensible practice of builders, who, after attaching the supply pipe to the main, carry the former up to within two or three feet of the surface of the street and then run it to the house, instead of running it in a direct line from the main pipes into the basement of the house, which is always so far below the street as to obviate all liability of freezing.

Persons erecting their own dwellings generally see to having the supply pipe laid as low as the main, or sufficiently deep to prevent the liability to frost; but builders who erect houses to sell save a little by avoiding excavating deep enough to lay the supply pipe below a freezing point, and hence the cause of so much trouble in our households. At the present time there are not good plumbers enough in the city to attend to all the demands, and those skilled in the business are put to their wits' end to execute all their orders.

Effects of Poisons on Mollusca.

Professor William North Rice, of Middletown, Conn., states that among the most interesting results of his experiments was the observation that certain poisons, which act with extreme violence upon the mammalia, are very feeble in their action on mollusca. This is especially true of hydrocyanic acid and woorara. Specimens of *Ulyanassa obsoleta*, immersed in dilute hydrocyanic acid on Friday, showed somewhat feeble signs of life on the following Tuesday. A specimen of *Lunatia heros*, into which a quantity of woorara had been injected, was found the next day to show no sign of any injury. Indeed, both of these poisons seemed to produce death very little sooner than the animals would have died in stale water. The sudden introduction of a large amount of carbonic acid in the manner which has been described, seemed to produce no decided effect. On the other hand, chloral hydrate seems to be very suddenly fatal, the animals treated with it becoming instantly contracted, and not resuming their activity when kept for a number of hours in sea water. Cyanide of potassium is similar in its effects, though not quite so instantaneously fatal. The effects of quinine are similar, though less energetic. Chloroform produces instantaneous contraction, and probably death.

Mammoth Cave Fishes.

Interesting additions to our knowledge of the fauna of the Mammoth Cave have recently been made by Mr. F. W. Putnam, of Salem, Mass., who, as a special assistant on the Kentucky State Geological Survey, of which Professor N. S. Shaler is the director, had great facilities extended by the proprietors of the cave, and he made a most thorough examination of its fauna, especially in relation to the aquatic animals. Mr. Putnam passed ten days in the cave, and by various contrivances succeeded in obtaining large collections. He was particularly fortunate in catching five specimens of a fish of which only one small individual had heretofore been known, and that was obtained several years ago from a well in Lebanon, Tenn. This fish, which Mr. Putnam had previously described from the Lebanon specimen under the name of *Chologaster Agassizii*, is very different in its habits from the blind fishes of the cave and other subterranean streams, and is of a dark color. It lives principally on the bottom, and is exceedingly quick in its motions. It belongs to the same family as the two species of blind fishes found in the cave. He also obtained five specimens of four species of fishes that were in every respect identical with those of Green river,

showing that the river fish do at times enter the dark water of the cave, and when once there apparently thrive as well as the regular inhabitants. A large number of the white blind fishes were also procured from the Mammoth Cave and from other subterranean streams. In one stream the blind fishes were found in such a position as to show that they could go into daylight if they chose, while the fact of finding the *Chologaster* in the waters of the Mammoth Cave, where all is utter darkness, shows that animals with eyes flourish there, and is another proof that color is not dependent on light. Mr. Putnam found the same array of facts in regard to the crayfish of the cave, one species being white and blind, while another species had large black eyes, and was of various shades of a brown color. A number of living specimens of all the above-mentioned inhabitants of the waters of the cave were successfully brought to Massachusetts after having been kept in daylight for several weeks, proving that all the blind cave animals do not die on being exposed to the light, as had been stated.—*Nature*.

SCIENTIFIC AND PRACTICAL INFORMATION.

A TUNNEL UNDER THE STRAITS OF GIBRALTAR.

A company has recently been formed in Spain, under the title of the Inter-Continental Railway Company, the main object of which is to unite Europe and Africa by a tunnel under the Straits of Gibraltar. This one, as projected, is to be a right line, extending between Tarifa and Algeiras on the Spanish coast to Ceuta and Tangier on the Morocco shore. The submarine portion will be 44,160 feet in length, or nearly nine miles.

This enterprise offers more difficulties than the similar work under the English Channel, although the latter will have more than twice the length. The maximum depth of the Channel at the point to be traversed is but 163.2 feet, while that of the Straits is 2,621 feet. Supposing that the tunnel under Gibraltar be bored at a distance of 1,000 feet under the bed, its total depth under the sea level would be over 3,600 feet, while the entry and exit galleries would be each three miles in length.

SULPHUR AS A FIRE EXTINGUISHER.

M. Tellier suggests the use of sulphur as a means of extinguishing fire on board ship. The material when burning in the air, as is well known, generates sulphurous acid, in which flame is not sustained. M. Tellier proposes to cover wicks with the sulphur, and to let them down into the burning portion of the vessel, through holes in the decks. Sixty-six pounds of sulphur ignited will entirely absorb the oxygen in 3,360 cubic feet of air; but as only half the oxygen need be removed in order to render the atmosphere unfit to support the combustion, thirty-three pounds are sufficient for the volume mentioned.

Stove Manufacturers in Council.

The stove makers of the United States recently held a convention in Chicago, and adopted the following resolutions:

"Your committee will call to your notice the question of guaranties exacted, by the retail dealers throughout the country from manufacturers, relative to the breakage of castings. Your committee are fully satisfied that the persistent claims made upon our trade for castings to be furnished free of cost upon the simple demand of the retail dealer, and under whatever pretext, has become burdensome and oppressive, and your committee respectfully recommend that in future all guaranties of this character be wholly discontinued. "Your committee desire to urge upon the convention the great importance of procuring the passage of a law by the Congress of the United States for the protection of the trade against those persons who take our castings and file and fit the same for the purpose of making duplicates therefrom, and supplying the retail trade in the various towns and cities of this country at prices far below the cost of such castings in our own founderies. Every member of the convention must see and feel the great importance of an effort upon the part of not only the convention, but of every member of the organization throughout the country, to put an end to this unwarrantable confiscation of our rights as manufacturers and dealers."

The latter resolution was referred to the Executive Committee. We do not see what more effective laws the stove manufacturers can wish for their protection than they now have. Under our existing patent laws, the most ample protection is afforded the inventor for either any new construction or any ornamental design.

SCHEDULE OF PRICES.

The Committee on Prices submitted the following report, which was unanimously adopted:

"Your committee, having carefully considered the subject referred to them, recommend the adoption of the following basis of prices: The price on common stoves to be 6½ cents; for the medium class, 7 cents; for the first class, 8 cents; for odd plates, 8 cents: with a suitable amount added for plated knobs, reservoirs, and other extras."

The convention adjourned to meet next June at St. Louis.

OUR staid cotemporary, the Boston *Daily Advertiser*, in alluding to the impracticable measures under discussion by the advocates for rapid transit in this city, and the twaddle on the subject in the daily newspapers, thus sums it up:

"If they want quick transit in New York, why don't they stop talking and go to work and get it? If they are only fooling, they had better go to a business medium. She will doubtless trance it as quickly as anybody."

ON February 10, a fire broke out in the city of Port au Prince, Hayti, caused by the explosion of a kerosene lamp; and the result was that a large portion of the city was destroyed. One thousand buildings, mostly frame, were burned. The city authorities will now, probably, be willing to purchase fire engines, of which they were almost entirely destitute.