THE

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ American and Mexican News Company, Mexico, are Agents for the SCIENTIFIC AMERICAN.

☞ Messrs. Trubner & Co., 60 Paternoster Row, London, are also Agents for the SCIENTIFIC AMERICAN.

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

VOL. XV., No. 12, [NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, SEPT. 15, 1866.

Contents:

(Illustrated articles are marked with an asterisk.)

THE RECOVERY OF THE CABLE OF 1865--DEEP-WATER FISHING.

One of Joe Miller's Irishmen carelessly let the teapot go overboard. His wit, it is said, saved him from the punishment which he otherwise would have deserved. After the captain had admitted that if he knew where a thing was it could not be considered to be lost, Pat was emboldened to assure the captain that his "taypot was at the bottom of the say." But the wit of this is greatly tarnished by a recent exploit at sea. We shall now need some new theory, and a better proverb than "a needle in a haystack" to convey a notion of what we consider impossible.

The exploit to which we refer is the recovery of the Atlantic cable which was lost at sea August 2, 1865. At the time of the parting of the cable, twelve hundred and thirteen miles had been paid out, and the many attempts then made to fish up the end and make a splice were fruitless. The new fishing expedition sailed with the *Great Eastern* on August 9th; on the 12th all was ready and the dragging the bottom of the ocean with grappling tools commenced; on the 17th the cable was brought to the surface and was greeted with cheers. but the rejoicing was only for a moment—the cable quietly slipped from its fastenings and sank again to the bottom of the sea. Three times was this success, ending in failure, repeated. But on the 26th, the cable appeared for the fifth time, and a permanent union was made with the coil on board the *Great Eastern*. An examination showed it had not been injured and was in perfect working order. It carried the good news to Valentia, which, in a few minutes, was returned to America. Since its recovery the cable has been in constant use. Cyrus W. Field, who was one of those with the expedition, asked the news from home by way of Ireland!

This, to our mind, is one of the most admirable engineering feats of the day. To think of finding the exact spot on the pathless ocean, and then from the bottom, two miles down, picking up a slender wire! It is only the science of the nineteenth century that could accomplish such an undertaking.

THE process of grinding the speculum used with the Rosse telescope occupied six weeks. A small steam engine furnished the motive power for the operation.

FUMIGATING.

The ancient Greeks, children as they were in science, and especially in chemical science, had, nevertheless, discovered that certain substances have the power to promote putrefaction; and this property they expressed by the word *septikos* from their verb *sepo*, to putrefy. Hence the word antiseptic to express the property of preventing putrefaction.

Since it has been ascertained that yeast and other substances which promote fermentation are growing plants, which are propagated by means of minute seeds or germs, it has been supposed that some, at least, of the antiseptics operate by killing these germs. Of all known substances the two which are most efficient in the destruction of septic germs are carbolic acid and sulphurous acid. Carbolic acid has been recently described in these columns; it is one of the many useful and wonderful substances that are produced when bituminous coal is subjected to destructive distillation. Sulphurous acid is the substance usually employed in fumigation, especially when fumigation is resorted to as a means of preventing the spread of cholera.

The advantage of sulphurous acid for fumigating is, that at ordinary temperatures it exists in a state of gas; consequently it diffuses itself throughout a house or apartment, and enters every crevice in the walls and ceilings, as well as every crack in the floors. Nothing could be more searching, thorough, and efficient in its operation. It destroys not only all septic germs, but also all kinds of animal life. When a house is filled with it, every rat, mouse, cockroach, and bedbug must flee from the premises or be instantly destroyed.

Sulphurous acid is composed of sulphur and oxygen, in the proportion of one atom of sulphur to two of oxygen ($S\ O_2$) and as the atom of sulphur weighs twice as much as the atom of oxygen, the proportion by weight is pound for pound. It is produced by the simple process of burning sulphur in the air. When the temperature of sulphur is sufficiently raised it enters into combination with the oxygen of the air in the proportion to form sulphurous acid.

There are some serious objections to the employment of sulphurous acid in fumigating. It clings to the surfaces of the walls, and nestles among the fibers of clothing, and, when thus exposed to the atmosphere, each molecule, $S\ O_2$, absorbs a third atom of oxygen, becoming $S\ O_3$, which is sulphuric acid—oil of vitriol. This liquid, it is well known, is almost as destructive to clothing and other organic compounds as fire itself.

Were it not for this objection, nothing would be more easy than to rid vessels of rats and other small animals by burning a little brimstone in the hold. For this purpose carbonic acid would be equally efficient, and, after doing its work, it would all mingle with the air in its gaseous state, and be blown away with the wind. But the sulphurous acid produces that peculiar irritating effect upon the nostrils and lungs which is perceived in the burning of a friction match, and it would cause rats and mice to flee before its advance, while carbonic acid, being inodorous, would quietly kill the animals in their lurking places, where their bodies might become offensive in decay.

From the recent report of Dr. Elisha Harris, the learned Registrar of the Board of Health, it seems to be the general conclusion of chemists and physicians in Europe and America, that, by means of carbolic acid and sulphurous acid, both of those awful scourges, the rinderpest and the cholera, may be as completely controlled as small pox is by vaccination. This power of carbolic acid is one of the most beneficent discoveries of this fruitful century.

RANCID BUTTER FOR COOKING.

Many persons sneer at the common notion that butter too rancid to be eaten raw upon bread, may be used without objection in cooking; but this notion, like many other popular ideas, is more in accordance with the truth of the matter than the imperfect knowledge which ridicules it.

All fats are compounds of acids with glycerin. Butter is a mixture of several fats, and one of them, constituting, however, only a small portion of its mass, is butyrine; this is a compound of butyric acid with glycerin. Butyrine, like other fats, is a neutral substance, but when it is decomposed—in other words, when the butyric acid is separated from the glycerin with which it is combined—we then have the two substances, the acid and the glycerin, exhibiting each its peculiar properties. Butyric is a very powerful acid, caustic and sour, and having that peculiar strong odor which is characteristic of rancid butter. One of the early steps in the decay of butter is the decomposition of the butyrine, which is made manifest by the odor of the butyric acid set free, and by the sour and biting taste of this acid.

Now, at a temperature of 315 degrees, butyric acid is evaporated, hence it is only necessary to raise the temperature of the butter to this point in order to drive off the acid which makes it rancid, and to leave the remainder perfectly sweet. If rancid butter is mixed in cake, a portion of the butyric acid will be absorbed by the water in the cake, and it may not be all expelled by the heat in baking; but if the butter is used for frying in an open pan, it is pretty certain that the butyric acid will all be evaporated. With a knowledge of the properties of butyric acid, a skillful cook ought to be able to use rancid butter in such ways as to retain none of the rancidity in the cooked articles.

Preservation of Wood against Decay.

A correspondent furnishes us an interesting article on the above subject, which want of space this week obliges us to condense. We merely give the important parts. After speaking of the advantages of charring wooden posts before setting, he says:—Scientific men have explained this superiority to reside in the peculiarity of charcoal for absorbing the gases arising from decaying substances. But charcoal retains this property but a short time unless kept from the air. The reason of this lies in its limited absorbing power. In less than twenty-four hours after being set, the charcoal becomes saturated, and is then entirely ineffective for protecting the wood. The cause of the preservative influence must then be sought elsewhere, and the following is my belief:—The microscope reveals the cause of decay as due to parasites feeding on albuminous substances. Dr. Schmoele gives the following conditions, all of which must be fulfilled before decay takes place: The presence of parasites or germs, albuminoids, moisture, free oxygen, together with a suitable temperature, and the absence of greater counteracting influences. Now, charring wood dispenses with the first two conditions, for the heat required to char the outside coating is more than sufficient for decomposing the albuminous substances, and destroying all parasitic germs. A temperature but little above the boiling point would answer for this equally well. I come then, to the conclusion, that, for preserving wood, charring is quite superfluous, a much less heat answering equally well. On this idea, original I believe with myself, and which I claim as my invention, I base my plan for the preservation of wood. I propose to store the timber, of whatever description, in large stone or iron boxes or rooms through which I circulate currents of hot air or superheated steam, till each piece is heated to the required degree.

This process offers the following advantages: greater simplicity, greater cheapness, requiring no expensive chemicals, greater expedition of the work.

As is well known, the albuminoids are highly hygroscopic, and in consequence expand or contract with every change of moisture in the air. Wood treated as above is no longer subject to such changes.

American Steel.

A correspondent from Newark, N. J., complains of American steel as not being uniform. He claims that we have in this country as good material for making good steel as is to be found anywhere. But the same advertised qualities differ in a single case of the steel. Some of it is so hard that it will not bear more than a dull red heat, and then, when hardened, will break when driven into a piece of hard wood. There is no reason, except want of care and a proper knowledge of working steel, why we cannot make as uniform a quality of steel as is made in England. Success will come with patience and perseverance. We do not despair of seeing good American cast steel.