CARBOLIC ACID.

A lecture delivered by Dr. Crace Calvert, before the Society for the Encouragement of Industry in France, contains most important details of the manufacture of carbolic acid, and its application in the arts. We shall endeavor, as briefly as possible, to give an abstract of the facts embodied in his lecture concerning this substance, which is attracting increased attention as its applications become more numerous and important.

When coal is heated to a dull red in a retort, gaseous products, water containing ammonia and salts of ammonia, and coal tar are distilled over, coke remaining in the retort. Carbolic or phenic acid is extracted from coal tar. Laurent was the first to discover an easy method of separating carbolic acid from the substances with which it was mixed and combined. His method was to submit the light oils obtained from the distillation of coal tar to fractional distillation, and then to treat those which distilled off between 160° and 200° C. with a strong solution of potash. This process was improved upon by Mansfield and Bobeuf, who treated with caustic soda the whole of the light oils, instead of a portion as Laurent had done.

The acid thus obtained was very impure, but it was found to be of great use in the production of picric acid, in preventing the transformation of tannic acid into gallic acid, in the process of tanning, and in the preservation of subjects in the dissecting room. M. Bobeuf also applied it to the preservation of other organic substances from putrefaction.

In 1859, Dr. Calvert discovered that a better way to obtain carbolic acid was to treat the impure benzines or naphthas of commerce with *weak* alkaline solutions. By this means he obtained a semi-fluid blackish product, of a density of 1.06 which contained 50 per cent of carbolic acid. Still further experiment resulted in the production of the crystallized acid of considerable purity, but the tarry and sulphurous smells which remained were serious obstacles to its use in medicine. In 1864, the firm with whom Dr. Calvert was connected succeeded in removing the sulphurous smell. The acknowledged therapeutic value of carbolic acid had already attracted the attention of medical men, and from this time its use in medicine and surgery became largely increased. Since that time, however, the Messrs. Calvert have also succeeded in producing an acid entirely freed from disagreeable odors and tarry flavor, and as pure as that obtained by the processes of Wurz and Kékulé, or that which is obtained from salicylic or nitrobenzoic acid.

This acid differs from Laurent's in its solubility, its fusibility, and the tempera- ture at which it boils. It requires 20 parts of water for its solution, fuses at 41° C., and boils at 182° C. Laurent's requires 33 parts of water for its solution, fuses at 34° C., and boils at 186° C.

From the fact that Laurent's acid had a constant boiling and crystallizat ion point, it was formerly supposed to be a pure and definite substance. The production of this new acid shows it to be only a mixture of carbolic acid and a liquid homologue; for when a certain proportion of water is added to Laurent's acid. and the mixture is allowed to stand at a temperature of 4° C. it deposits a crystalline substance in large octahedrons. This substance is a hydrate of carbolic or phenic alcohol, that is, carbolic acid combined with an equivalent of water of crystallization—the only example known of an alcoholic hydrate in a crystalline form. By removing the water from this hydrate, carbolic acid is obtained in its purest state.

The applications of this substance for sanitary purposes in medicine, agriculture, and manufactures are already extensive, and are likely to be rendered of much greater importance than at present. As a disinfectant and antiseptic it is exceedingly efficacious. It acts directly upon the microscopic vegetation and animalcules, to the presence of which fermentation and putrefaction have been attributed, destroying them and thus neutralizing the effect of their diffusion, through the atmosphere. It is superior for this purpose to chlorine, permanganate of potash, or Condy's fluid. The latter substances act indiscriminately upon all organic substances with which they come in contact. Carbolic acid, on the contrary, only acts directly upon the causes of putrefaction. A very small quantity of it is required to prevent decomposition, it is therefore economical. Being volatile, it meets with and destroys the germs and sporules which vitiate the atmosphere,—a property possessed by none of the above mentioned disinfectants except chlorine. It was therefore used with great success in England, Belgium, and Holland, during the prevalence of the cattle plague and the cholera. Dr. Calvert stated that ·001 or even ·0002 would prevent the decomposition, fermentation, or putrefaction of urine, blood, glue solution, flour paste, fæces, etc., for months. Its vapor alone will preserve meat in confined spaces for weeks, and protect it from flies. Sewage may be kept free from fermentation by the use of .0001 part. The British government have desided to use it exclusively in the navy and other government departments.

In medicine, besides its properties as a disinfectant, its caustic properties are found beneficial. It is used with benefit in cases of carbuncle, quinsy, and diphtheria; hæmorrhoids, internal and external fistula, and other similar complaints. In surgery it is applied with great success to purulent sores, preventing the disagreeable smell which issues from them, and keeping them in a healthy and cleanly condition. It has also been found of great service in cases of syphilis and phthisis.

In agriculture it has been found of the greatest use in the treatment of diseases common to sheep. Scab is cured by dipping the sheep in water containing a small portion of the acid, and allowing it to remain about one minute. For this purpose the pure concentrated acid is too expensive, and an emulsion of the crude acid in soap and water is to be used instead. A bath containing .017 of it is sufficient to effect a cure. For foot-rot an ointment should be made of the crude acid and grease, placed in a shallow stone tray, and the sheep driven through it. If cattle or horses are annoyed with flies or other insects, a weak solution of carbolic acid rubbed through the hair will be found an effectual protection.

In manufactures, this substance has been successfully applied to the preservation of wood, hides, and bones designed for shipping to great distances, in the preservation of guts at the gutworks, the preparation of anatomical subjects, and the preservation of all animal matter. It is also used to prevent the decomposition of gelatin and albumen, used in spinning, dyeing, and calico printing.

It is used in the manufacture of certain beautiful colors, very much resembling the famous aniline dyes, and in the manufacture of picric and picramic acids. We have not space for the enumeration of all the uses of carbolic acid, as given by Dr. Calvert, who, in closing, expressed his regrets at being unable to give in a single lecture, all the important applications of this valuable agent, which, after having rendered important services to most of the world's industries, still offers to chemists and to manufacturers a wide field for new applications.

Matters at Quarantine---The West Bank Hospital Buildings.

Ever since the memorable "Sepoy" riots of 1858, in which the old Quarantine establishment at Staten Island was destroyed by a mob, many of them, by the way, gentlemen of property and standing, the important business of quarantine has been carried on in temporary and floating accommodations. In 1865 Dr. Swinburne, the present efficient Health Officer, was appointed by Governor Seymour, and in the following year, mainly through his energetic efforts the Legislature despairing of obtaining from the State of New Jersey the coveted site of Sandy Hook, authorized the erection of Quarantine buildings on the West Bank, a well known shoal in the lower bay, at a point some fifteen miles from this city. The work was not commenced, however, until March, 1867, when the board, vested by the act with power in the premises, viz., Messrs. Curtiss, Cobb, and Anderson, with the Mayors of New York and Brooklyn *ex officio*, contracted with Mr. Frank Swift for the structure, which has since been vigorously proceded with.

The shoal at West Bank is even at low tide from seven to nine feet below water, and being composed of soft and shifting sand, grave doubts were felt whether the erection of a permanent structure on such a site was a practicable feat of engineering, and the progress of the work has been watched with much interest. The experiment bids fair to be entirely successful.

The first step in the undertaking was the construction of cribs of the heaviest timber. These were floated to positions designed to form the exterior line of the structure, and then sunk by being filled with stones. Other cribs were in like manner sunk upon them, and in this way a solid wall has been formed, 25 feet in hight, 30 feet in width at the bottom, and 20 feet on the top. The cribs thus sunk form a six sided wall 1,300 feet in length, in its exterior line; and 240 feet in its greatest width, and enclose an area of about two acres. The space thus enclosed is then filled with sand dredged out from the neighboring shoal, and heavy stones are then thrown into the sea around the exterior of the crib, forming what is termed a "rip-rap" wall, which is designed to be carried up to a level with the summit of the structure, which, it is claimed, will thus be rendered permanent and indestructible. Some 53,000 cubic yards of sand, and 23,000 yards of stone will be required to complete the work, which is now more than half done. The work is to cost, by contract, $310,000. On the plateau thus constructed, which will be about 12 feet above high water mark, six ranges of one story hospital buildings, capable of accommodating about 1,000 patients, are to be erected, and a landing pier some 400 feet long constructed to the ship channel. Another similar structure will be built at a point about three quarters of a mile to the north, which will be used to accommodate the healthy passengers taken from infected vessels. It is much to be desired that the experiment should prove successful, as it will in that case solve at once the tangled quarantine question and sundry weighty problems in engineering. Depots for infected cargoes will probably be erected at a point in the upper bay.

The hospital steamships Falcon or Nightingale and Illinois are now moored at a point near the West Bank, ready for the reception of yellow fever patients, who are expected shortly to arrive in considerable numbers. They can conjointly accommodate some three hundred patients. They are models of neatness, and in their cool and breezy anchorage furnish at this season a really delightful accommodation for the sick.

Dr. Swinburne is entirely confident that with the new structures completed all infectious and contagious diseases can absolutely be held at bay at the entrance of the harbor.—*Sun.*

AT a recent foreign meeting of the Society of Friends, many of the most influential members expressed their wish that the denomination might more actively and generally cooperate with the efforts of the Peace Society; and in lamenting the increase of military armaments of late years, one of the speakers dwelt particularly upon the condition of the France, where nearly eight hundred thousand men are compelled to lead the demoralizing life of soldiers, being withdrawn from useful civil industry and taught only to slaughter and destroy their race. Another member, from Maine, stated that $1,250,000,000 are annually expended upon military armaments by Christian nations, while hundreds of thousands of their citizens are suffering from misery, ignorance, poverty and starvation.

Editorial Summary.

DURING the present warm weather attention should be specially directed to whatever may have a tendency to produce disease. The basements of houses situated in the very best localities often contain dust bins, drain pipes, and other matters in so neglected a condition that they may at this season prove very prolific sources of fever and diarrhea. Particular care should be taken to prevent the admixture of vegetable and animal matter with the cinder asb. A means of obviating this, and of counteracting the lazy, extravagant habits of domestics, who rarely sift the cinders, is to provide the dust bin with an iron grating made to fit the top like a lid and having a padlock to prevent removal save at the time when the dust is to be taken away by the carts. This will be found by householders to promote both health and economy. The grating being small, or sufficiently fine to permit only the dust to pass through, the cinders will remain on the top, and can there be collected and replaced in the coal scuttle. Cisterns should be examined and all sediment and deposit at once removed, for at no other time of the year is pure water so essential to health, or impure water so certain to cause illness. As a disinfectant, we cannot mention a more effective agent than carbolic acid, the nature and properties of which have been noticed before in our columns, and are very fully treated in another place in our present issue.

WHAT MODERN CHEMISTRY CAN PERFORM.---The chemist takes a quantity of Sombrera guano, mixes it with sulphuric acid, and the result is an excellent manure. If instead of converting this substance into material for the practical agriculturist, he extracts phosphoric acid therefrom, this acid can be made to give the igniting property to lucifer matches. So the same article that will aid in producing wholesome, strength-giving food for man and beast, will also afford a light for the cigar of the fop; it can build up the hay rick and corn stack, or form a principal component of the instrument with which the incendiary burns them down. The farmer rejoicing in his plentiful harvest and fat cattle, the street Arab who sells matches at ten cents a box, and the housewife as she kindles the kitchen fire and prepares the daily food, may thus be dependent for the success of their labors upon a sea bird inhabiting a lone rock in the ocean.

A RUBBER CARRIAGE.—A carriage has been made in Bridgeport, Conn., which is an open buggy and weighs but 125 pounds. The body is one piece of hard rubber, one eighth of an inch in thickness. It is without the usual carriage bolts and screws, and presents a perfectly smooth surface, which is not soiled or tarnished by rubbing or by handling. The rubber is tougher than wood, and very much more elastic. The running gear is of wood, but the next carriage made will be entirely of rubber. The material is unaffected by wet, hot or cold weather, and was prepared at a temperature of 300 degrees, the body having been first got into a plastic mass, like dough. A company has been formed, called the "Hard Rubber Wood Company," with a capital of $250,000, and consisting of fifteen stockholders, for the purpose of carrying on the business in Bridgeport.

ORNAMENTAL METALLIC TUBES.-- Ornamental metallic tubes are now manufactured in the following manner: A tube or foundation of wrought iron of the required strength, is placed in a tube of thin brass, and by a drawing process, conducted in the ordinary manner, the iron tube is coated with brass. Ornamental figures are then impressed upon the surfaces by passing them through engraved rollers, after inserting a steel mandril into their bores to prevent compression. On being removed from the mandril the ornamental tube resembles a solid brass tube.

WHETHER the "grip" of the horizontal brake wheels of the Mont Cenis Railway will be seriously affected in winter by the hard frosts remains to be proved, but at this season Mr. Fell's railway transports one in a far pleasanter manner over Mont Cenis than the dilligence. Six hours and twenty francs a head are saved by it, to say nothing of the greater comfort and less fatigue, and as soon as the communication has been established throughout Italy, any one may leave London at 7:30 A. M. on Monday and dine at Rome on Wednesday, to say nothing of breakfasting at Naples on Thursday morning, if such rapid motion should suit him.

AGRICULTURAL EXHIBITION IN CHILI.—We call attention to the programme published on another page of the particulars concerning the above exhibition. Some of the circulars before issued announced that it would open on the 15th December next. The time has been changed to April 1, 1869, which will enable our agricultural implement makers to send on their productions.

HENRY LEWIS, an American artist residing at Dusseldorf, Prussia, has been appointed U. S. Vice Consul for that city. Mr. Lewis has been a faithful friend of our countrymen visiting that place, and is in a position to execute any art commission that may be entrusted to his care.

THE Prussian government has authorized the Krupp firm at Essen to execute a considerable order of cast steel guns for the Russian military administration. Russia intends to transform all her artillery into the Prussian pattern.

ENGLISH AND AMERICAN REAPING MACHINES.—By the cable we learn that at a trial which took place in Germany, July 11th, the English reapers bore off the international prize.