SCIENTIFIC MUSEUM.

(For the Scientific American.)

Agricultural Science.

CABBAGES.—The cabbage has lately been chemically examined, in consequence of the failure of the potatoe, with a view to its substitution for that root. It is found to be richer in muscle-forming matter than any crop we grow. It contains more fibrin or gluten, of which substance the muscles are made, and hence is richer in the material essential to the health, growth and strength of an animal; wheat contains about 12 per cent. of it, beans 25 per cent., but dried cabbage contains from 30 to 40 per cent. of this all important material, of which the principal mass of the animal structure is built.

An acre of good land will produce 40 tons of cabbage; one acre of 20 tons of drum-head cabbage will yield 1,500 lbs. of gluten; one acre of Swedish turnips will produce about 30 tons, which will yield 400 lbs. of gluten; one acre of 25 bushels of wheat will yield 200 lbs. of gluten; one acre of 12 tons of potatoes, will yield 550 lbs. of gluten. Such is the variation in our general crops, as to the amount of this gluten, this special kind of nourishment, this muscle-sustaining principle, which accounts for the preference given by experienced farmers to the cabbage as food for stock and milk cows.

The cabbage flourishes best in a moist rich soil, such as reclaimed swamps; it is more hardy than the turnip in its incipient growth; and at a stage when the whole fields of turnips are liable to be swept off by the fly, cabbage plants enough to set an acre can be effectively protected under a few panes of glass, or a yard or two of gauze in a frame in the garden.

It is best for those farmers who plant cabbages, to raise the plants from the seed carefully in their gardens, in beds like onions, and then transplant the sprouts, when about six inches high, to the field.

In the early stage of growth the cabbage requires careful cultivation, most of which, however, may be done with the plow and horse hoe; as soon as the leaves expand and shade the ground, weeds are effectively prevented from growing enough to injure the crop or propagate their own seed. This leaves the field in as fine condition for the next crop as could be desired.

Cabbage roots should have plenty of room to shoot away down. The ground for them should be deeply spaded in a garden, and deep plowed in a field.

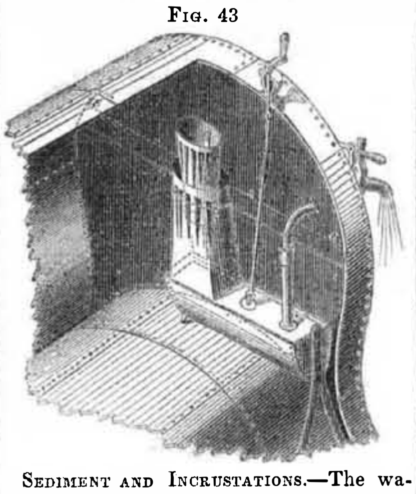
Any rich compost or well rotted manure is good for cabbage; coarse or unfermented manure is not good. Ashes, plaster of Paris, bone dust, poudrette, and a little salt will be found beneficial, but above all, if our farmers could save the urine of the stable and apply that mixed with two-thirds of rain water during a shower, just on top of the ground, they would find the cabbages grow to a very large size, and with fine firm heads. This plan of manuring has been long practiced by the Dutch, English and Scotch gardeners.

Solid Gas.

Dr. Lyon Playfair, in a recent lecture at the Royal Institution, London, on "Certain applications of Chemistry to the Industrial Arts," referred to Mr. Young's process for obtaining paraffine from coal by slow distillation. Some years ago Liebig stated that one of the greatest discoveries of chemistry would consist in converting coal gas into a solid form, thus enabling it to be burned like a candle. This had, in a manner, been accomplished by Mr. Young. About three years since, Dr. Playfair drew the attention of Mr. Young to a spring of mineral oil containing paraffine, and occurring in a coal mine in Derbyshire. The liquid had been extensively applied by Mr. Young as a lubricating agent, a use to which Reichenbach had long ago suggested it might be turned. After a period, however, this spring ceased to flow, when Mr. Young applied himself to the investigation of the theoretical conditions under whcih it might be artificially formed. This gentleman saw that it would be difficult to convert gas into an allotropic form, whereas it was evident that gas must first come from a solid; hence he hoped to succeed in hitting upon the intermediate state. He stated the illuminating portion of coal gas to consist chiefly of olefiant gas (?), and the latter was isomeric with solid paraffine; but the allotropism does not end here—the peculiar slow distillation of coals yielding solid paraffine, also yielded other isomeric or allotropic compounds in the form of a lubricating oil, burning oil, and naphtha. Dr. Playfair explained, by the aid of a diaphragm, the slow distillation process of Mr. Young, employed in generating his allotropic form of olefiant gas, and directed the attention of his audience to some candles made of coal paraffine on the table.

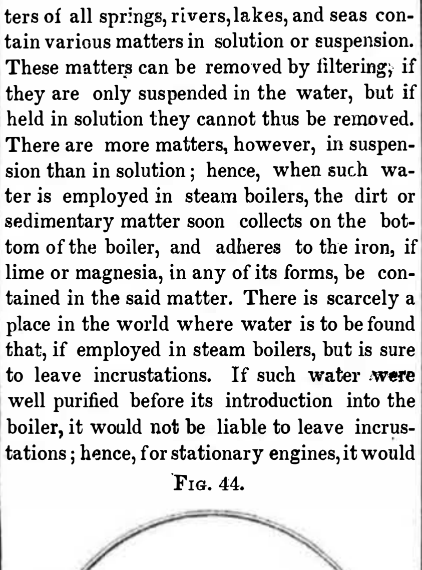
On Boilers.---No. 22.

FIG. 43



SEDIMENT AND INCRUSTATIONS.—The waters of all springs, rivers, lakes, and seas contain various matters in solution or suspension. These matters can be removed by filtering, if they are only suspended in the water, but if held in solution they cannot thus be removed. There are more matters, however, in suspension than in solution; hence, when such water is employed in steam boilers, the dirt or sedimentary matter soon collects on the bottom of the boiler, and adheres to the iron, if lime or magnesia, in any of its forms, be contained in the said matter. There is scarcely a place in the world where water is to be found that, if employed in steam boilers, but is sure to leave incrustations. If such water were well purified before its introduction into the boiler, it would not be liable to leave incrustations; hence, for stationary engines, it would

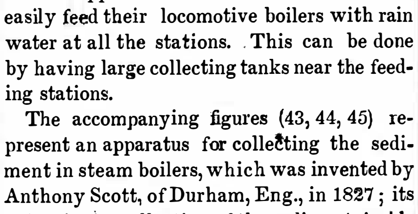
FIG. 44.



be well to use nothing but filtered or rain water. It appears to us that all our railroads can easily feed their locomotive boilers with rain water at all the stations. This can be done by having large collecting tanks near the feeding stations.

The accompanying figures (43, 44, 45) represent an apparatus for collecting the sediment in steam boilers, which was invented by Anthony Scott, of Durham, Eng., in 1827; its object is the collection of the sediment inside of the boiler. The principle of it is the placing of a series of trays or shelves in the boiler, answering the purpose of a false bottom. The object of these vessels is to operate like the still places along a river bank, which shelter and receive the sand brought down by the

FIG. 45.



current. In a boiler the water is always agitated, but it is prevented from boiling in the inside of this sediment vessel, consequently the more violent the water boils in the boiler, the more rapidly is the sediment collected. For calcarious incrustations, this sediment collector will not prove of any essential service, but then there are many places where it will answer well; the vessels themselves must be cleaned out frequently. In fig. 43 the upper conical vessel is made with narrow collecting apertures, adjusted partly above and partly below the surface of the water. In this way it is used by opening the valve at the end of the boiler, and putting the handle of the agitator in motion for half a minute, by which the contents of the sediment receiver, at the bottom of the boiler, are discharged through the pipe as represented. This is an easy way of cleansing out the "collector," and the operation can be performed very often. The sediment collecter is merely a series of trays, placed one above another, with apertures through their sides.

In figs. 44 and 45, the apparatus is applied to a double flue boiler 30 feet long, fig. 45 being a boiler of an egg-end shape; and one sediment collector, in such long boilers, should be placed on the middle of the flues, and another at the end of the boiler farthest from the fire. The lower collector (as shown in fig. 44) is merely a shallow tray standing on four legs; this was the form originally recommended by Scott, but the form in fig. 43, with the plan of cleansing out the sediment, is an improvement on Scott's principle, invented by Robert Armstrong, the author of the work on boilers. In a large boiler, he recommends half-a-dozen of these sediment collectors to be placed.

The waters of seas and rivers contain lime in solution, which forms in a hard crust in the inside of steam boilers, and is oftentimes the cause of explosions. In every case an incrustation on a steam boiler is a serious loss, for it is a non-conductor, and a great quantity of the fuel used is thereby rendered non-effective. We have known a boiler that was fed with water from a well on a limestone formation, which became incrusted with a scale of carbonate of lime one half inch thick every month. The engine had to be stopped one day every four weeks, and the scale cut off with a chisel-pick, made for the purpose. Every steamship that crosses the Atlantic, if her boilers are clean when she starts, has a scale of lime on them when her voyage is completed.

To remove incrustations, the boiler is emptied, and heat is applied in the furnace; the iron being a good conductor, expands quickly, and this somewhat loosens the scale, which, by the blows of a hammer on the outside, is broken off, and then it is swept out from the inside. Another plan is to fill the boiler partially with fresh water, and mix some sulphuric or muriatic acid to act chemically on the scale. This plan, however effective, is not a good one, as the acid acts on the iron as well as on the scale.

The grand remedy is a preventive. Many compositions for this purpose have been patented. A quantity of sal ammoniac put into the boiler, frequently has been very effective in preventing incrustations in the boilers of sea steamers. A composition of sal ammoniac and tannin was patented in England a few years ago for the same purpose. Mahogany saw-dust was patented in our own country, a few years ago, for the same purpose. Indian meal, potatoes, and flour have been used with very good effect. It is believed that resinous, oily, and starchy matters envelope the particles which form the scale, as they are set free, and prevent them from adhering to the iron; they are then easily blown out by the blow-off cock. Lead balls rolling on the bottom of the boiler have been used; and using the water into which the high pressure exhaust passed—which always contains oil or grease—has prevented scale forming. A composition of grease and black lead has been used with very good success; tar has also been used, and we believe it is a most excellent preventive; the way to employ it is to mix the coal tar of gas works in the proportions of 1 gallon to 1 pint of turpentine, and apply it to the boiler with a large brush, when it is empty. The fire is then kindled and the boiler gently heated. The boiler should be thus treated every three weeks; care must be exercised not to over-heat the plates while heating the tar to make it run evenly. Many other compositions have been used; in every case, where it can be had, rain water should be employed, that is if lime is held in solution in the common water around the location where the boiler is used. In many places, we believe, a great disregard to the collection of rain water in tanks involves an expense by the use of limous water, which could easily be prevented. Although we here present Scott's sediment collector, we believe that it is far cheaper to filter the water before it goes into the boiler. In New York city, the Croton water deposits a great deal of sediment, but otherwise it is very excellent for boiler use. The sediment can almost be kept free from doing injury by blowing off frequently.

Lubricating Oil.

Boil 500 lbs. of American potash in 125 gallons of water in an iron vessel, by means of steam, or in any other convenient way, until the potash is dissolved. After which add a sufficient quantity of water to supply the loss caused by evaporation. Let stand for 12 hours, and then draw off the clear solution for use. Next place in a suitable iron vessel, 4 tons of southern oil, and one ton of cocoanut oil, and to it gradually add, with constant agitation, the potash solution made as above stated; continue the agitation for two hours after the addition of the potash, then let the whole stand for twenty-four hours, at the end of which time draw off the oil, from the dregs, and heat it by means of free steam in a wooden vessel with half its weight of water; after standing 12 hours draw off the the water, and repeat the operation a second or even a third time, if necessary. Should the southern oil employed contain a large quantity of gummy matter, a large proportion of cocoanut oil or lard oil should be used.

LITERARY NOTICES.

THE YEAR BOOK OF FACTS—This work, for 1852, by John Timbs, re-printed by A. Hart, of Philadelphia, has been published in London for a long time; it contains, in a condensed form, a description of many inventions in the mechanical arts, chemical discoveries, and also discoveries in every branch of science. We hope this work has a good sale; it is a useful and instructive book, and is in England what the Annual of Scientific Discovery is with us

AMERICAN WHIG REVIEW, for May, contains a portrait of Hon. W. L. Sharkey, of Mississippi, with a biography; an able article on the American Iron Interests,—and various literary articles of considerable merit. It is a well-conducted publication.—Terms, $3 per annum; Champin Bissell, publisher, 120 Nassau st, N. Y.

ECLECTIC JOURNAL OF MEDICINE, Rochester, N. Y., conducted by Drs. Reuben and Dolley, is an able monthly. Terms, $1 per annum.

AMERICAN RAILWAY GUIDE, for May, is now ready, by Curran Dinsmore, 22 Spruce st., and for sale by booksellers generally. It is, we believe, the only guide published in the country upon which any reliance can be placed as a general reference.

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