

SCIENTIFIC MUSEUM.

Agricultural Science.

MINERAL THEORY OF MANURES.—Messrs. Lawes & Gilbert have published, in the Journal of the Royal Agricultural Society, the results of many experiments, made by them in the course of many years, to ascertain the correctness of the idea advanced by Liebig, that it is only necessary to apply the ashes of plants or mineral substances, for the support of crops. They took plots of ground of equal quality, containing equal superficies, and applied different substances to the same crop. In one instance, ground which had no manure, produced 16 bushels of wheat to the acre; 14 tons of yard manure produced 22 bushels; the ashes of 14 tons of yard manure, 16 bushels; mean produce of nine plots supplied with artificial mineral manures, 14 bushels 3 3-4 pecks; on other plots the addition of 65 pounds sulphate of ammonia, (which Liebig held was unnecessary), gave an average of 21 bushels. The increase by the use of the mineral manures recommended by Liebig, was, therefore, less than two bushels per acre, and the increase by ashes of manure nothing.

COPROLITES.—These are the remains of reptiles, in a petrified state. They occur in nodules and cylindrical shaped masses, and are composed essentially of phosphate of lime, whence they have become among farmers in England, a substitute for bones. They occur in enormous beds in England.

"To fertilize her fields, England requires an enormous supply of animal excrements, and it must, therefore, excite considerable interest to learn that she possesses, beneath her soil, beds of fossil guano, strata of animal excrements, in a state which will probably allow of their being employed as a manure at a very small expense. The coprolites discovered by Dr. Buckland—a discovery of the highest interest to geology—are these excrements; and it seems extremely probable that in these strata, England possesses the means of supplying the place of recent bones, and therefore the principal conditions of improving agriculture—of restoring and exalting the fertility of her fields.

What a curious and interesting subject for contemplation! In the remains of an extinct animal world, England is to find the means of increasing her wealth in agricultural produce, as she has already found the great support of manufacturing industry in fossil fuel—the preserved matter of primeval forests—the remains of a vegetable world. May this expectation be realized! and may her excellent population be thus redeemed from poverty and misery.—[Liebig.

LIQUID AND SOLID MANURE.—Charles Alexander, a careful and accurate farmer in Scotland, found that while 14 head of cattle would make six loads of solid manure, the liquid would saturate seven loads of loam, rendering it of equal value. He had repeated the experiment for ten years, and found the saturated earth fully equal to the best putrescent manure. How many dollars' worth are thus lost annually by each of the million farmers of this country? And what is the aggregate loss in the whole country taken together?

Agricultural Chemistry.

If land be comparatively unproductive, the sure method of determining the cause is, first, to ascertain the extra nature and relative qualities of the ingredients of the soil (which can only be done by chemical analysis), and then to supply the soil with the deficient materials requisite for the growth of such vegetables as it is best fitted to produce. The preparation of compost will only be of real use when materials which do not afford, singly, an efficient or convenient manure, are made to do so by their mixture. Every farmer has it in his power so to compound the best from his store of manuring materials, that the defects of his soil may not only be remedied, but that the crops may receive those substances in sufficient quantity which are required for their vigorous growth. To do this, however, it is requisite to know, not only the component parts of the soil, but also those of the crops. If these are not taken into account, no clear idea of the composition, much less of the action of manures, will ever be obtained; and

many substances of real value will be tried, and, from [misapplication, tend to useless, if not injurious, results. Perhaps some compound of iron, in injurious excess in the soil, unfits it for a particular crop; but by lime or some other alkali, it might be rendered harmless; or an excess of sand may be neutralized by the addition of clay. If there be an excess of undecomposed vegetable matter, it can be decomposed, rendered soluble, and immediately available to the growing plant, by the judicious use of caustic lime; or, by burning.—With the aid of chemistry, the precise value of any variety of limestone may be determined in a few minutes; and so its fitness or unfitness for fertilizing the soil may be determined by a less expensive experiment than waiting to observe its action upon the land. In the same way, peat-earth is an excellent manure; but there are some varieties of peat which contain so large a quantity of the compound of iron, such as bog-ore, as to be absolutely injurious, if not destructive, to grass and corn.

We know that, as soon as stable manure begins to decompose, it throws off its volatile or gaseous parts—it is necessary that this should be examined; such evaporation is not mere transposition—it is the actual loss of that which forms a most material ingredient in the food of plants; and so, whether this shall be supplied gradually to the growing plant, or all at once, is the question so often agitated among practical farmers, and determined frequently by individual caprice or fancy—whether the produce of the stable or the farm-yard is best, when spread upon the soil in a fresh or putrid state.

On some soils a plant will thrive—on others it will languish; and the same knowledge which will enable us to correct weak or faulty vegetation will enable us also to produce more abundant results.

On Boilers.—No. 18.
FIG. 34.

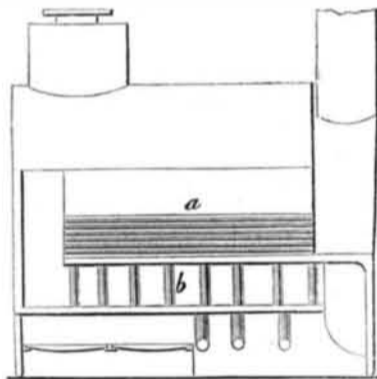
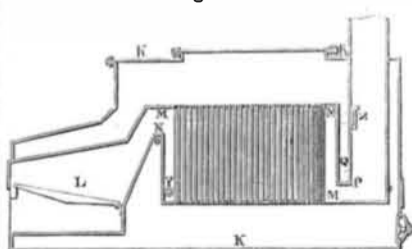


Figure 34 is a longitudinal section of the boiler of Thomas Halloway, of Phila., built in 1835. It has horizontal tubes, *a*, and vertical tubes, *b*. It has vertical tubes and water sides above the furnace. The tubes are not numerous, but the principle of their useful application is fully demonstrated. By an increase of tubes, an increase of fire surface is obtained.

Figure 35 is a section of Lord Dundonald's steam boiler, patented in 1843. *K K* represents a steam boiler; it may be of any shape; *L* is the fire place; *M M* is a rectangular chamber, with a number of vertical tubes in it, through which the water flows in consequence of the water therein becoming hotter than other parts of the boiler. The heat of the fire passes into the chamber, *M M*, at *N*, over the bridge, *G*, at the end of the furnace. The pas-

FIG. 35.



sage, *P*, from the chamber into the chimney, is situated as low as possible in order that the greater heat of the vapors may be retained in the said chamber. This invention was described in Vol. 2, 3rd series, London Repertory of Inventions. The peculiar arrangement of the chamber, *M*, within a boiler, when containing tubes, combined with the outlet, *P*, into the

chimney, so as to leave considerable space above it (for the more highly heated vapors to be retained in the chamber, *M*) was claimed by the inventor to constitute the peculiar character of his invention. *Z* is an opening into the chimney at the upper part of chamber, *M*, to facilitate the getting up a draught when the fuel is first kindled; it is closed at all other times; *Y* is a steam pipe in connection with the upper part of the boiler, and has a stop cock. This pipe is drilled with many small holes in the direction towards the chimney, by which numerous jets of steam can be projected among the tubes in order to sweep away the dust and ashes, when required. This boiler, for steamships, has been held to be superior to all that has preceded it.

Long before the Earl of Dundonald patented his boiler, tubular boilers were employed in Britain, but this does not appear to be generally known among our engineers. In 1829, James and William Napier, Engineers in Glasgow, Scotland, took out a patent for an improvement in tubular boilers for steamboats, the following claim of which patent deserves attention, as many suppose that the application of tubular boilers on steamships is of recent origin:—

"What we claim is a reservoir or chamber, into which the flue or flues coming from the furnace or furnaces terminate, and from which reservoir or chamber another set or number of flues commence, and return through the boiler into the chimney or outlet at furnace end of boiler."

In marine boilers made according to this patent, the furnaces are made in the usual form within the boiler; and each furnace is continued by a separate flue to nearly the after-end, where it terminates in a chamber which reaches across from outside to outside to the flues on opposite sides of the boiler. This chamber ascends to such a height above the furnaces, as to admit of the insertion of a series of returning tubes, varying in number, length, and diameter, according to the conditions of the case. The returned end of the tubes terminate in what may be called a smoke-box, at the front of the boiler, and over which the chimney is placed. The chamber at the after-end of the boiler as in the common construction of tubular boilers, so that the arrangement is not affected by variation of temperature and consequent expansion, in the external and internal parts.

The distinguishing principle of the boiler—as compared with the locomotive boiler—seems to be a much greater space for the process of combustion.

Floating Logs in a Tunnel.

In your paper of March 6th, I observed a communication about "a new form of overcoming resistance," made use of in Vermont; it may be new in that State, but has been in use in Maine over twenty-five years, and has been the means of transporting thousands of mill logs over rapids in rivers and in small streams where there was not sufficient water to float a log otherwise. In many cases they were made so as to conform to the shape of logs and thus save water, and a very small stream answered every purpose. Mr. Cochran is not the original inventor, as many can testify. There has been one in operation in Bridgeton, Maine, for a long time, which would not only transport railroad ties, but mill logs that would yield over 1000 feet of board, for miles. Let honor be bestowed where honor is due. M. C. H.

Savannah, Ga., March, 1852.

Trials of Anchors.

The committee of British naval officers and ship owners selected to test the relative properties and merits of ships' anchors, having, at a preliminary meeting held at Sheerness come to the following resolutions, the same are made known for the information of all parties who may be desirous of having anchors tested:—1. That the trials be open to anchors of all nations. 2. That the weight of the anchors for these trials be 25 cwt., including stock. 3. That every anchor previously to being allowed to enter into competition must be tested at Woolwich. 4. That the anchors be landed at Woolwich for testing by the 1st of May next, at Sheerness by the 1st of June, and the trials to commence on the 1st

of July next. 5. That the committee will not hold themselves responsible for any loss or damage that may be sustained by the anchors, nor be liable for any expense in bringing them to or taking them from Sheerness.

The anchors of any other nation but England have but very sorry encouragement to enter the lists.

LITERARY NOTICES.

SOUTHERN CULTIVATOR.—This able monthly Agricultural paper, published at Augusta, Ga., by the Editor, Dr. Lee, assisted by Mr. Remond, we are glad to see once more on our table, after the fire which recently destroyed their printing establishment.—The Southern Cultivator is a most able periodical. Dr. Lee is an excellent chemist—the Cultivator bears evidence of this, and he understands what it is to practice and teach agriculture.

PHOTOGRAPHIC ART JOURNAL.—The March number of this journal we have received; it is a very good one and contains many excellent articles. We should be very happy to notice this work from time to time, as it is devoted to a very beautiful branch of art, but we cannot do so, as we have not been made aware of its having, hitherto, a monthly existence—we have sometimes received a stray number. If the publisher does not send it regularly he may keep it.

PITTS VS. LAWYERS.—We have received from John W. Pitts, of Newborn, Ga., a pamphlet of 48 pages, against lawyer legislation and fees at the bar, for the benefit of the people, price 12-2 cents. The author evinces genius and discrimination, and has doubtless suffered by the profession. If "he speaks as a man having authority," it is worth something, because experimental knowledge is valuable as a guide-board to straying humanity. According to the statements made, the laws of Georgia are different from ours in regard to the collection of debts—and we are glad we have no occasion to invoke their protection—in this particular.

GRAHAM'S MAGAZINE, for April, contains 112 pages; the embellishments are numerous and well executed upon steel and wood. G. P. R. James, Milner, Hosmer, Bremer, Herber, and other well-known authors are among the regular contributors to this popular magazine. Dewitt & Davenport, Agents, Tribune Buildings.

GODBY'S LADIES' BOOK, for April, is received from Messrs. H. Long & Bro., 43 Ann st.—The first engraving represents James Watt, when he first conceived the Steam Engine. A full description is given of him and his improvements in the Engine, illustrated by numerous engravings. "The Old Farm Gate" is a spirited picture. The number has excellent contributions from well-known authors, and is interesting throughout.

SARTAIN'S MAGAZINE, for April, contains several spirited engravings: "The Magic Lake," "Cromwell before the Battle of Dunbar," and others of less note. The reading presents a great and interesting variety from authors of standing reputation. Dewitt & Davenport, Agents, New York.

PETERSON'S LADIES' NATIONAL, for April, contains four full page embellishments, and is choice supplied with the reading matter. Mrs. Stephens, Dana, Coe, and others, are among the contributors. Dewitt & Davenport.

"A STORY WITHOUT A NAME," is the title of a new novel by G. P. R. James, just issued by Stringer & Townsend; price 37 1-2 cents. As Mr. James is an author of high reputation, we take it for granted the story has a meaning if it has no name.

We have received a copy of "The Swamp Steed or, the Days of Marion and his Merry Men;" the incidents therein related are of a most interesting character. Price 50 cts. Dewitt & Davenport.

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Postmasters, being authorized agents for the Scientific American, will very generally attend to forwarding letters covering remittances.

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N. B.—The public are particularly warned against paying money to Travelling Agents, as none are accredited from this office. The only safe way to obtain a paper is to remit to the publishers.