GLADSTONE ON NATURE AND ART.

At the late opening of the Liverpool School of Science, Mr. Gladstone, M. P., certainly the most learned and eloquent member of the House of Commons, made a speech from which we select the following paragraphs as eminently suited to our columns.

RAILROADS.

My honorable friend, the President of the British Association, Mr. W. Fairbairn, in phraseology befitting his position, described the progress by the number of the pounds of pressure on the square inch. I will venture to refer to another mode of illustration, more familiar to us all, even if not so strictly accurate or profound—namely, the number of miles that we travel in the hour. Now, sir, I would recommend those who wish to measure practically the advancement of the kind we are now describing in this country to take the pains to read the evidence which was given by the elder Mr. Stephenson before the first committee of the House of Commons, which was appointed to consider the first bill for the purpose of making a railway from Liverpool to Manchester. When that gentleman appeared as a witness in the face of able and learned men, whose business it was to convict him of being a mere dreamer and enthusiast, he judiciously avoided stating what, perhaps, his prophetic spirit had divined of the great results that were about to be achieved; and I think that when Mr. Stephenson was asked at what rate it was probable that the locomotive engine would carry passengers along that railway, he judiciously confined himself to the statement that he was sanguine enough to believe that such an engine would be able, under favorable circumstances, to draw those passengers at the rate of eight or ten miles an hour. But even that did not satisfy the relentless ingenuity of those who cross-examined him, and they solemnly adjured Mr. Stephenson to say whether, upon his credit as a man of practice and a man of science he would undertake to assure that committee that he thought that such an instrument as a steam engine ever would draw people along the iron rails with such velocity as the speed of eight or ten miles an hour. And Mr. Stephenson was so wise in his generation that he would not adhere to the speed of eight or ten miles. I do not recollect the figure to which they brought him down, but I think at last he would not absolutely commit himself to promise a speed of more than five or six miles an hour. Mr. Harrison was the leading counsel against Mr. Stephenson. He was not satisfied with the modesty of that eminent man, and the prediction he had made. He ridiculed those predictions, and said; "Woe be to the unfortunate gentleman, who, living in Liverpool or Manchester, and having an engagement to dine in the country at a particular hour shall trust himself to one of our trains with the expectation that it will bring him in time for dinner." Well, ladies and gentlemen, we have passed by that scene; and I believe I should be correct in saying that even since the locomotive began to display its powers in practice—since the railway system was established—those powers have been far more than doubled; and we do not know at what point the limit of their application may be reached.

SCIENCE OF NATURAL HISTORY.

It may be asked what is the use of the science of natural history? Well, ladies and gentlemen, I must confess it appears to me that its moral uses are almost infinite; but I will venture to detain you for one moment upon its material uses. Nay, I will venture to take only one of those material uses—I mean this, the use of suggesting to the mind of man that he should copy the finished and exquisite, yet simple as well as beautiful processes by which the Author of Nature in the works of Nature has attained His ends. Now, it is not at all difficult to point out what I think are striking instances of this truth—that man in all periods has derived his most valuable inventions from the observation of nature. I believe there was a time when it was desired for an important purpose connected with the population on the banks of the river Clyde, to introduce pipes of a particular description under that river. The man who solved that difficulty, I believe, was no less a man than James Watt. And how did he solve that difficulty? Why, it is upon record that he solved that difficulty by learning how to construct the pipe to get water under the Clyde, from observing the construction of the shell of a lobster. Well, now, ladies and gentlemen, we often hear of the part which is performed by lobsters on certain occasions, chiefly festive and convivial occasions. I must say, as far as I know, we often hear of mischief resulting from a too free observation of lobsters upon those occasions, but Mr. Watt observed his lobster to some purpose, and he learnt from the construction of its shell, a great mechanical secret, which he applied to the solution of an important problem for the comfort and well-being of his fellow-citizens. Sir Isambard Brunel, in placing the Thames Tunnel, took his lesson from a very insignificant personage, and yet a personage wise enough to teach him more than he had known before—I mean that personage whom we know by the name of the earth-worm, for it was the manner in which he, I believe, bores the earth, that suggested to Brunel the mode of making that very remarkable work, the Thames Tunnel, with which his name is associated.

THE OAR, WHEEL AND PLOW.

I want to show the truth—the broad truth—of this doctrine, that in the observation of nature lies a great part of the means of scientific progress, and will you allow me to go back to the rudiments, to the very cradle of the whole matter. The three most important inventions, lying at the very root of social progress, are—the oar, the wheel and the plow. The history of the inventions is so old that it is lost sight of in the darkness of antiquity. If it be true that man in his infancy learned from the observations of nature, depend upon it nature has not told all nor a twentieth part of her secrets. She has a great deal more to tell for the benefit of those who come after us. Well, now, I believe there is little doubt, judging from such considerations of indirect evidence as can be brought to bear upon the question, that the oar—that instrument by which men passed from one continent to another, and from one island to another, a process otherwise impossible—that the oar was simply learned from the motion of the wing of a bird in cleaving the air. How came the wheel? I believe the wheel was learned from observing the circular motion of certain birds, and particularly of one description of hawk when in its flight—a description of hawk which, in the Greek tongue, still bears the name from which our word "circle" is derived. Well, then, thirdly, I come to the plow. Now, I must confess I think it is a question of great interest to know how it was or how it probably could have been, that man should have been directed to the use of that most valuable instrument the plow; because, if we consider ourselves in a primitive condition, it is by no means a simple or obvious matter. One would think that a man, beginning with the use of his hands, and with the use of some simple form of instrument, was a long way from the idea of the plow, which is rather an artificial formation, and supplies the double motion of direction from behind, traction from before, and then again a somewhat complex form of instrument. Gentlemen, I am not presuming to dogmatize, but I do believe that the most probable account that can be given of the invention of the plow is this, that it was founded upon an observation which, perhaps, may excite your mirth—upon the observation of that which is done by a very humble but useful animal—by the snout of the pig. If you will take the opportunity of observing the action of the pig when he gets upon the turf with his snout free, and when he has a mind to plow, you will soon perceive that he is an excellent plowman. I don't mean to say that he runs his furrows quite as straight as it is desirable that the human plowman should; but the idea of turning up the ground, which was what man soon found was necessary in order to bring in action the power of the atmosphere, and make it fertile for his purposes, is an idea the pig fully understands, and when he is free from the ring that annoys him, he constantly puts it into practice.

WEDGWOOD.

There is one name eminently connected with the observation of nature and works of the useful and beautiful in art—I mean the name of Wedgwood; and I don't believe that a greater name is to be found in the history of art in this country. Wedgwood was one of those who had begun, as we may say, from nothing; and I trust there are many that are now beginning from nothing; that there are some possibly in this hall that are making their commencement from nothing, but yet that are destined to leave a name honorable in the annals of their country. (Applause). You all know that the industry and skill of Wedgwood were directed to applying those clays and earthern materials which in this country abound to the formation of pottery and porcelain, especially of porcelain. Well, now, it is recorded in that most valuable work of Mr. Smiles—perhaps as valuable as his "Life of Stephenson"—which is designated "Self Help," as one of the earliest of the stages of Wedgwood's operations, that, while he was still a mere laborer and hardly of full age, he used to make earthenware knife-handles in imitation of agate and tortoise-shell, and table plates in imitation of lemons and vessels to hold pickles in imitation of leaves and such like articles. And I do not believe there is one of those things that proceeded from the hands of Wedgwood that is not at this moment worth, six or eight times the price which Wedgwood himself put upon it. All I can say is, that I saw to-day, in a shop in this, town two little black cups which Wedgwood would have put up at 4s. or 5s., and the price asked for them—which was, no doubt, a moderate price, and the dealer had a right to ask it; but the price asked was £2 10s.

DISTINGUISHED MEN.

It is no small satisfaction to us to reflect how often the pursuit of science has been the means of bringing forth from an obscure and lowly lot those who deserve to be eminent among their fellow citizens. We have seen such men as Robert Stephenson, Faraday, Sir Humphrey Davy and Hugh Miller, beginning life in the condition of laborers, but ending in a station that was eminent in the face of their fellow countrymen. We have seen others, such as Watt and Crompton, beginning their services humbly—services in a manner that have contributed in a degree it would be impossible to describe to the general wealth and power of the country. We have seen Arkwright and others themselves reaping a large share of the rewards and benefits they have procured for others, and becoming the possessors by the most honorable means—by means most beneficial to the country as well as to themselves—of colossal fortunes. And I do not desire, in mentioning the progress achieved by individuals, that we should appeal to merely selfish motives. It is not the mere possession of money that constitutes the benefit. It is not the mere rising of this or that man that constitutes the benefit. It is the healthy action which is communicated to the whole social frame in a country where class mixes with class, where no man can stand simply upon tradition, although tradition is justly respected here; but where the very lowest and humblest of the community, by diligence and perseverance, by making a full and regular use of the gifts which Providence has committed to him, may bring himself forward into the foremost ranks, and thereby not only reap advantages for himself, but may yield to others an example that will again become the spring and the spur to an honorable industry.

STUDY OF GOD'S WORKS.

When a man comes to study and observe the kingdom of nature, he finds himself in contact with vast and gigantic forces that he cannot for a moment resist. He feels himself absolutely in the power and at the disposal of an Almighty Being, and he sinks into humility before the majesty of that being. But while he thus learns humility, and while he might almost be appalled by the evidences of power—on the other hand, he sees those cheering proofs, multiplied from every side, of beneficent design, which encourage him to repose a filial trust in the goodness of that God who has so richly throughout the natural kingdom provided for the support, the comfort and the advancement of human nature. And if we are told that intellectual pride is to be the result of scientific knowledge, all I can say is that intellectual pride was not its result in the mind of Bacon, in the mind of Newton, in the mind of most of those great men who have most faithfully and successfully dedicated themselves to those pursuits; because they have always felt that whatever nature told to us was but a light which glanced upon other regions as yet unexplored, and which testified to the existence of an infinity of knowledge not as yet communicated, entirely transcending that limited province within which it has as yet been given to man to walk. In that humility, in that modesty, in that thankfulness, in that sense of wisdom and goodness of the Almighty, which all His works, with one voice and from every quarter, proclaim—surely we ought to find lessons, aye sermons I may call them, as effective perhaps even as those which may be delivered from the pulpit of religion, teaching us the lowliness of our condition, but teaching us also that there is One who cares for us, and who, while we trust in Him, and strive to follow Him, will never abandon us in our low estate.

Lime in Agriculture.

In a paper lately read by Boussingault, before the Paris Academy of Sciences, he stated that lime introduced in an arable soil very quickly sets at liberty a certain quantity of azote in the state of ammonia; the azote elements were before united in insoluble combinations, not assimilable by plants—the action of the lime sets them free, and permits a part of the capital buried in the soil to be utilized for the next crop. Boussingault thinks that certain mineral matters, such as potash and silica, may be liberated in the soil by the lime; that other substances injurious to plants, are destroyed or modified by the same agent, and that to these effects is added besides a physical action, changing the constitution of the land. The action of lime is thus excessively complex, and its good effects can only be explained by studying attentively the special circumstances under which they are produced. The grand fact proved by the present researches of Boussingault is, that there exists in mold, as well in the form of organic matters, as in that of mineral matters, a host of substances completely inert for vegetation, until the moment when some proper agent renders them assimilable by plants. The continuance of experiments can alone clear up these complex facts, and point out to our agriculturists the most effective processes.

Australian Acclimatizing Efforts.

From a report of a lecture delivered at the Melbourne Mechanics' Institute by Mr. Edward Wilson, of the *Argus* newspaper, it appears that the work of acclimatizing European birds and fishes is being pursued vigorously, and with considerable success. The skylark and the thrush were breeding freely in a wild state, and "not only making various neighborhoods vocal, but absolutely, by force of example, compelling the native birds to improve their song notes." A number of fallow deer had been turned out, and taken readily to bush life. Several kinds of English pond fish had been safely brought over, and transferred to the native waters. A collection of birds, amongst others the Indian curassow, gold, silver and common pheasants, Ceylon peafowl, American and other waterfowl, were being prepared in the Botanic Gardens for transfer to wild land, and it was thought that all would eventually thrive. The lama has been acclimatized and its wool has become one of the products of Australia.

FORMIDABLE WEAPON.—A very formidable weapon is, we understand, about to be introduced into our army on the Potomac. It is an improved Congreve rocket, so contrived as to be made to fly a distance of four to five thousand yards. For service against masses of cavalry and infantry, or "setting fire to towns and villages, or anything that will burn or has life," it is said to be one of the most fearfully destructive weapons ever devised by man. This terrible instrument of war, we presume, will also be employed to protect the coast, and for other purposes, on board the iron-clad ships and floating batteries of the United States. At the right time and place, there can be united with it another still more remarkable invention, whose name we withhold till it shall be required by the government, but which, properly used, will utterly annihilate any hostile fleet that may threaten our ports or seaboard.—*Boston Transcript.*

THERE is a lathe in Forrester & Co.'s Foundry, Liverpool, England, which has a face plate twenty feet in diameter, a slide rest twenty-five feet in length, it weighs seventy tuns, and is capable of boring a cylinder ten feet in diameter. Two eighteen-inch mortars have been cast in this establishment for the British government.

A NEW steam mail line between France and the West Indies has been projected and a firm in Scotland has obtained contracts from the French government to build eight iron paddle-wheel steamers for it, each of 3,000 tuns burden, with engines of 700-horse power. Screw steamers would certainly be more economical for such a purpose.

Improved Plow and Seeding Machine.

After all the seed planters that have been invented it is somewhat surprising to find one with as much novelty as is embraced in the one here illustrated. It is designed for sowing wheat and other small grains, and plowing in the seed at the same operation. By a slight alteration it is readily adapted for cultivating corn or potatoes, plowing four furrows at the same time, and throwing the dirt either toward or from the row as may be desired.

A light but stiff frame, A, supported upon two light wheels, is drawn by two horses. Four plows, B B B B, are attached to this frame by metallic rods, C C C C, pivoted at their forward ends, so that the plows may be raised clear of the ground in turning at the ends of the furrows, or in transporting the machine to and from the field. For each pair of plows a lever, D, connected with the rods, C C C C, is brought within reach of the driver's arm, to enable him to raise the plows with facility.—Notches in the upright standards, E E, hold these levers so as to suspend the plows in their raised position, or to confine them in the ground when lowered. The pivot pins, F F, are made of wood, and break in case the plows encounter any solid obstruction, and thus save from fracture other portions of the machine, the repair of which would be more expensive. The depth of the plows in the ground is adjusted by varying the hight of the rods, G G G G, either by means of nuts and screws, or by slots and keys, as may be desired.

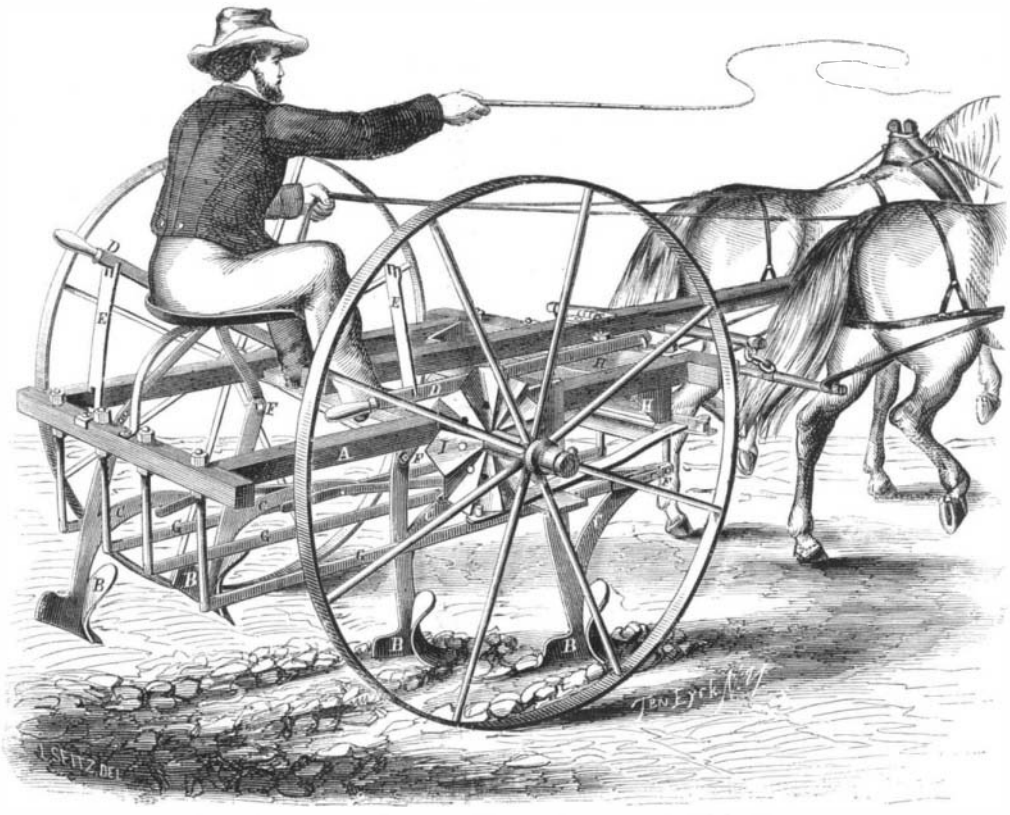
The seed box, H, which is placed across the forward end of the frame, A, is of peculiar construction. Upon its bottom are two metallic plates, lying one over the other, both perforated with holes and made adjustable, so that the holes may be brought to coincide more or less perfectly, to vary the size of the openings for the discharge of the seed, and thus to regulate the quantity per acre which it may be desired to sow. This double plate receives a reciprocating motion from the cam plate, I, on one of the driving wheels. Between the holes are brushes, under which the holes are carried to drop the seed, the bottom of the box having holes directly beneath the brushes. It will be seen that this arrangement prevents the grain from being cut or broken.

For plowing corn or potatoes two of the plows are left, one diagonally in the rear of the other, as shown, and the other pair are brought forward in a similar position, directly opposite. The horses walk one upon each side of the row, and thus the row is completely plowed at a single passage through the field. It will be seen that by reversing the position of the two pairs of plows, the dirt may be thrown either toward or from the row.

It might be supposed that plows running in gangs would be more likely to become clogged with weeds, but the very reverse is found to be the case. A rear plow throws the dirt upon the ends of weeds caught by the plow before it, and thus the weeds are drawn out and the plows cleared.

By this machine the seed is sown directly in front of the driver, and plainly in his sight, which enables him to instantly check any irregularity in the sowing. As a cultivator it enables a man to plow an acre in half the usual time, and consequently to raise forty acres of corn instead of twenty, if he has the land.

Application for a patent for this invention has been made through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventors, Jacob Early and J. B. Parvin, at Hightstown, N. J.



EARLY AND PARVIN'S PLOW AND SEEDING MACHINE.

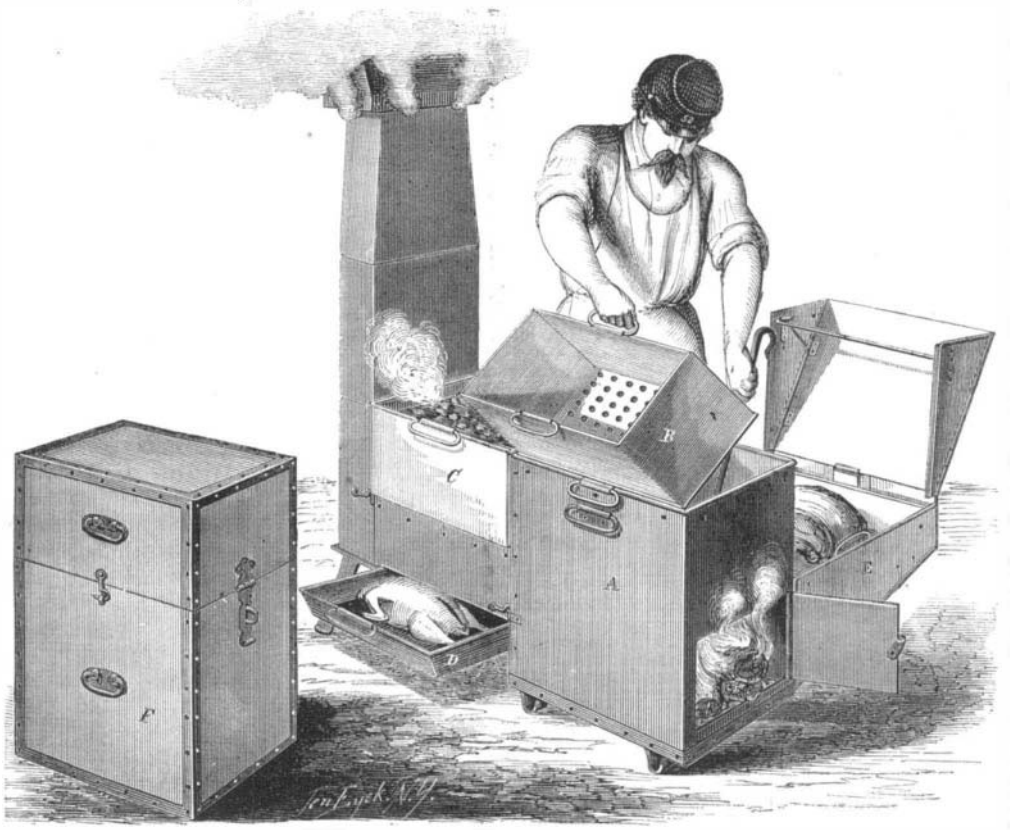
Improved Camp Stove.

It is difficult to conceive of a stove at the same time more compact when packed away, and affording more extensive and varied conveniences when unfolded than the one here illustrated.

The main body, A, of the stove is made of sheet iron, with the space for the fire in the lower part, as shown. A boiler fits into the upper part of the stove, and on this rests the steamer, B, for cooking vegetables, rice, &c. A third boiler, C, fits upon an opening in the horizontal portion of the flue, and a broiling pan or oven, D, slides like a drawer under this portion of the flue. A supplemental oven is suspended by hooks upon the side of the stove, with bright tin reflectors at the top and bottom for throwing the heat upon the articles to be baked.

In packing away, the three boilers, one within another, are placed in the upper part of the stove. The drawer, D, and the several sections of the upright part of the flue fit in the horizontal portion of the flue, which is placed in the fire space of the stove. The whole is then placed in the box, F, and the several plates of the oven, E, are folded together, being hinged for the purpose, and are slipped into the box by the side of the stove.—The box, F, is made water tight so that it may be used for washing dishes or other articles.

A patent for this invention has recently been obtained through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, Geo. A. Higgins, at 19 Beekman street, New York.



HIGGINS'S IMPROVED CAMP STOVE.

PHOTOGRAPHY IN THE REFORMATORY.—A novel and interesting application of the art is now in daily use at the famous Mettray colony, near Tours, which is the first and most celebrated reformatory established in France for young convicts. Every urchin brought to this house of correction has his portrait taken the moment he sets foot in it, and another is made on the day of his leaving. The first represents the rags, dirt and misery, the physical and moral degradation, the prematurely careworn features, the scowling, cowering, timid, uneasy and withal ferocious look of the born thief. The second shows the same individual transformed by the magic of judicious discipline, which includes physical comfort and kind treatment. His dress is now clean and neat, and his countenance is redolent of health, contentment, benevolence and energy. Philosophy had never, in any age, a grander subject for contemplation than two such pictures. More than one of the English reformatories adopt a similarly interesting record of the good they effect.

OF the total tunnage of shipping which enters the port of Liverpool annually about one-half of it comes from the United States.