

PORTABLE FLOUR MILL.

We illustrate on this page a portable mill, manufactured by Messrs. Clayton & Shuttleworth, of Lincoln, England. The framing is exceedingly strong and carefully designed. The mill may be regarded as an example of the best type of this class of machinery, and is far too simple to require description. We take our engraving from *Engineering*.

Electric Blowpipe.

At a recent meeting of the Academy of Sciences, M. Jamin submitted a new electric burner, which he also recommended to chemists and physicists as a blowpipe. Two carbons are supported vertically abreast, hinged below, and drawn together at the top by a spring. A current is sent up one, down the other, then round a rectangular circuit inclosing the two, and passing first round the first one by current attraction the carbons are drawn apart, and the arc appears at the top and descends gradually, consuming one or both carbons. When the action of the rectangle is sufficient, the arc driven beyond the points is like a gas flame, and M. Jamin receives it on a piece of lime, magnesium, or zirconium, getting intense light. It is also so hot as to fuse the lime. For the electric light this burner has considerable advantages, since it has no mechanism and requires no preliminary preparation beyond a support and the carbon points. The size of the flame is almost doubled and the light is augmented. The new foci are very powerful, and the quality of the light is far better, and the arrangement of the foci is more advantageous, the greatest quantity of light being directed downward, where it is wanted, instead of up into the air, where it is useless.

NEW THRASHING MACHINE.

We illustrate here a thrashing machine and straw elevator combined, made by Messrs. Nalder & Nalder, of Wantage, Eng. The prominent feature is the direct combination of the straw elevator with the machine, by which very important advantages are no doubt secured. The elevator will deliver the straw high enough for any ordinary

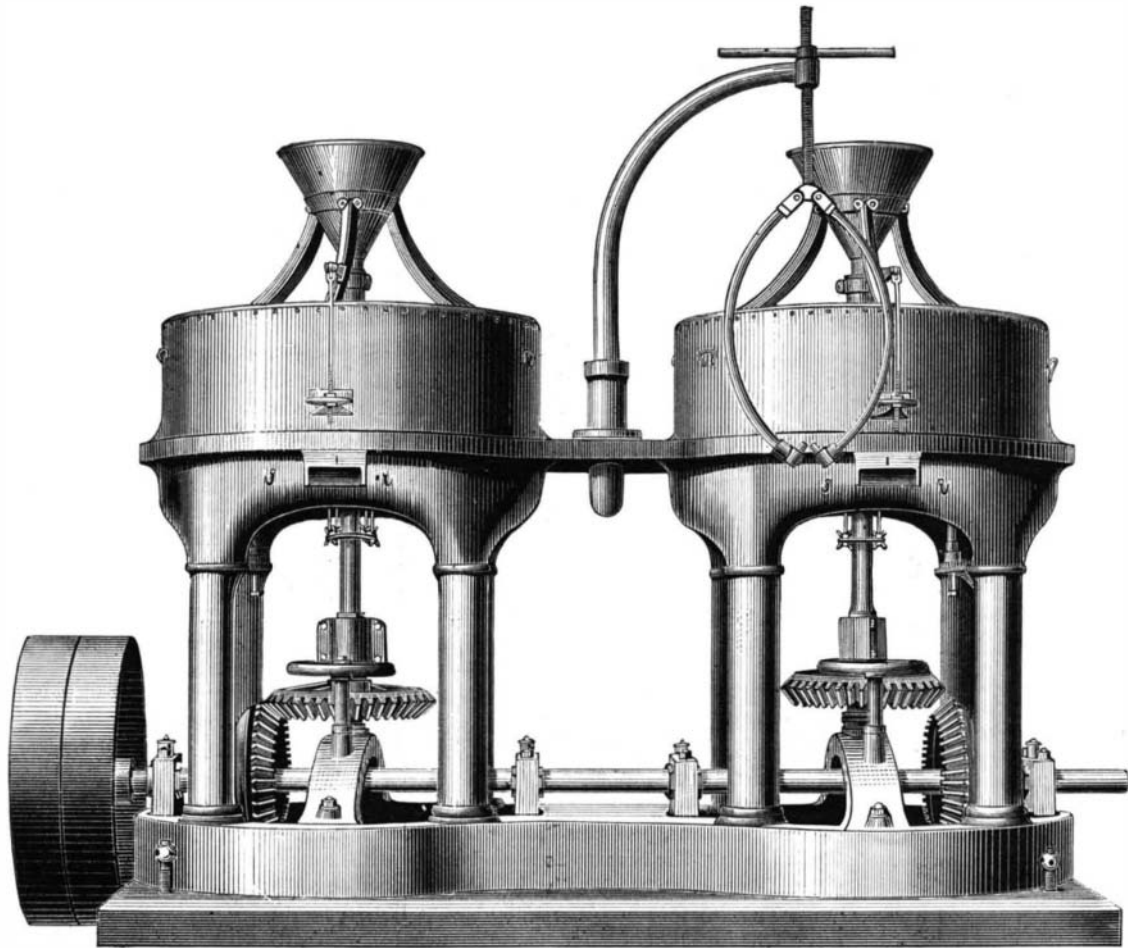
straw rick; at the same time this rick can be placed in any desired position, either in a straight line with or at any angle on either side of the machine. But going further than this, the side or angular movement, too, as well as the raising or lowering of the elevator, can, one or both, be performed without stopping the working of the machine

ground, and more particularly for angle delivery, and stoppages from the driving straps coming off, as they readily do when the pulleys are not carefully put in line, are all got rid of by the arrangement we illustrate. When set up for work, the elevator is part and parcel of the machine, and so no trouble from the above causes can arise, and the unpacking

and setting up of the elevator require little if any more time than the unfolding and raising of the ordinary separate elevator; a saving of time in getting ready for work may thus be fairly claimed for this machine.

In places where it is undesirable to use the elevator, the straw falls into the hopper and from there to the ground, this hopper always remaining in its place, so that although the owner has always the advantage of having the thrashing and elevating machine together ready for work, the latter need not be used if not required; it is simply not "set up." The weight of the elevator being about 8 cwt. only, one team of horses will draw the combined machine from place to place, whereas two teams are required when the machines are separate; and in the case of removal by a traction engine the men in charge have only one machine when traveling to look after—a great convenience in narrow roads and in turning sharp corners.

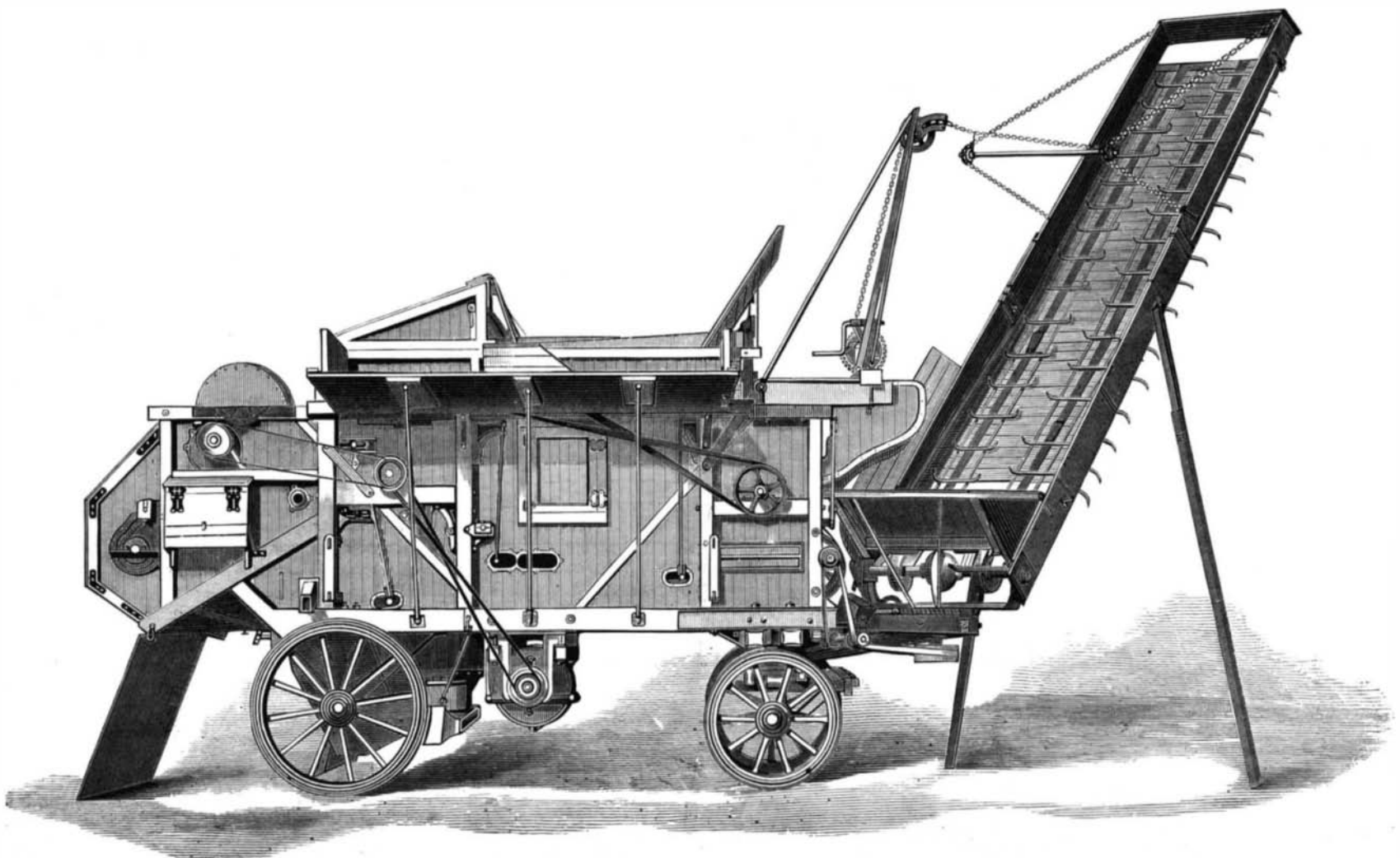
Our illustration represents the machine ready for work. It will be seen that the main frame of the machine is elongated at the upper and lower portion of the front or straw delivery end; on the lower part is fixed a turntable or

CLAYTON & SHUTTLEWORTH'S PORTABLE MILL.

Thus, the straw can be delivered from the elevator to any part of the rick that is required as the work progresses, and by this means is saved the labor of at least one man on the rick. Or a number of wagons placed in a line can all be loaded without any interruption to the work, or, if desirable, part of the straw can be built into a rick on one side, and the remainder on the other side of the machine, all without in any way checking the working of the apparatus. This is a decided advance on the ordinary separate elevator, and an improvement that will be appreciated.

The vexatious delay and time wasted in setting the ordinary separate elevator to the machine, especially on uneven

platform, to the upper portion of which is attached the hopper and trough of the elevator, and on the upper portion of the frame is fixed a crane or winch. Through the axis of the turntable is passed a vertical spindle, geared into another spindle, placed horizontally, and on this latter is fixed the two pulleys for driving the two rake belts for conveying the straw up the trough. These belts are of India-rubber, on each of which are fixed separate rakes, the usual heavy chains being dispensed with. Motion is given to the vertical spindle by a belt driven from any convenient pulley on the machine. This vertical spindle passes through the center of the turntable, the upper part of which is capable of

**COMBINED THRASHING MACHINE AND STRAW ELEVATOR.**

movement, and it forms an axis on which the elevator trough, with the hopper, partially rotates, and, as the guides of the crane are also fixed in line with this axis, the lateral movement of the elevator is obtained, so that the straw can be delivered in any required place, either in a line with or on either side of the machine, having the full range of 180 deg.

The horizontal spindle may be said to form an axial line on which the trough is hinged at the lower end, thus allowing of the raising and lowering of the same by means of the crane before referred to; this is also done without stopping the work.

The taking to pieces of the elevator for packing up is a very simple process. The trough is lowered nearly to the ground, when the rake belts are taken off, rolled up, and put under the hopper of the elevator, as also the top roller and winch board. The two tightening chains under the floor are now unfastened, which allows of the floor, made in sections, to drop out by extending the sides outwards. These sides are now lowered quite down, and the suspension chains taken off and stowed away. The sides, after detachment from the turntable, are uncoupled at the middle, one being placed, as seen in the engraving, on each side of the machine; the sections of floor placed endways on the hopper, the crane in rods taken off, and the crane itself turned back on the top of the machine, and the entire elevator is so conveniently and compactly packed on the machine as to be hardly noticeable. We are disposed to regard this as one of the most important of the many improvements which have been effected during the last dozen years in the construction of thrashing machinery, and it does not appear that to secure the advantage any increased expenditure of capital is necessary.—*Engineer.*

Curious Facts about Ants.

Mr. E. Gittins, of Tivoli, Queensland, in a letter to the editor of the *Journal of Science*, communicates some interesting facts concerning ants. He writes:—"If meat shows the least possible tendency to decompose—and it will do so in the course of twelve hours in summer—the ants will find it, though suspended by a wire or string from the house-top or the top of a tent. The ant perceives decomposing animal matter at a long distance, and does not go exploring for such matter, but goes straight to it from the ant-hill. A snake killed in the bush is generally placed on the branch of a tree, so as to be seen by travelers, and as soon as decomposition sets in the ants find it, and the flesh is soon carried off to the ant-hill; even their own comrades, when killed, are carried off to the underground cells. They never stay to feed, but they take up the booty and off they go." The writer then describes a number of experiments, showing that portions of meat placed near ant-roads were overlooked till putrefaction set in, and were then eagerly carried off. He remarks that "ants that feed on saccharine matter are as difficult to keep off as the carrion-feeders; they smell the sugar, and endeavor to get at it wherever it may be placed. The largest kind of sugar-ants will feed until the cold air of night comes on, and then fall into a stupor and there remain during the day." We should feel much obliged, says the editor, if our correspondent would determine the two following points: Whether his meat ants prefer tainted meat to fresh when both are placed equally near, as, *e. g.*, close to one of their roads; and whether they will attack animal matter in an advanced stage of decomposition? It certainly seems that they occupy a more prominent place among "nature's scavengers" than has been hitherto supposed.

TORNELIA.

This plant is indigenous in Mexico, and is cultivated in northern climes for its beautiful foliage. The fleshy spadices, bearing perfumed and well-tasted fruits of *Tornelia fragrans*, are habitually sold in Mexican markets, where they rival the pineapple as an article of food.

Progress in Fish Culture.

It is impossible to estimate the advantages which have already resulted from the efforts of our national and State fish commissions to restock our rivers with shad and other fish. This season alone 15,000,000 eggs have been hatched, and in the last eight years 48,000,000 young fish have been turned loose. It is noted that while formerly the fish were found rarely outside the rivers that empty into the Atlantic Ocean between Cape Cod and Florida, they are now in the Gulf of Mexico streams, the tributaries of the Mississippi, the California rivers, and those of Maine. They have increased in great numbers in Lake Ontario, although their

growth is very slow. Several of three pounds weight have been taken this spring near Sackett's Harbor, and it is possible that they may mature there.

Rapid progress has been made in the propagation of fresh water fish. So nearly perfect is the process of hatching brook trout eggs at the State hatching house in Caledonia that more than 98 per cent become healthy fish. The same success attends the hatching of salmon, black bass, white fish, and other varieties. These results are so satisfactory that the commissioners are turning their attention toward cultivating food for fish, rather than seeking new methods of hatching. The object is to fill streams which hitherto have been barren of fish. There are many watercourses in which the brook trout has not thrived, although the conditions of temperature and the quality of the water have seemed favorable. The reason was that the stream was wanting in food for the fish. The commission's investigations have proved that certain plants and shrubs attract insects which are the

professors at Yale College. Recently one of the staff of the *Agriculturist* has met Mr. Leech in Wyoming, where he holds a responsible position in the railway employ. This gentleman reiterates his original statements, and adds that if skeptics will come to Sidney, Nebraska, they will find convincing proof of the accuracy of what he says. There is a "town" of 25 or 30 pet prairie dogs about 5 rods from the track northwest of the Railroad Hotel. The owner of the dogs will show the visitor the well, and will inform him that the first move that the dogs made, after locating there, was to dig for water. At a point on the Kansas and Pacific Railroad, not far from Buffalo Station, the workmen in sinking a tank reservoir some time ago struck one of these prairie dog wells and followed it down to a depth of 200 feet. Mr. Leech's statements were verified by Prof. Aughey, the well known geologist at the Nebraska State University, who had also discovered such wells while making geological explorations along the Logan River in northern Nebraska.

Chemical Composition of Trees at Different Elevations.—

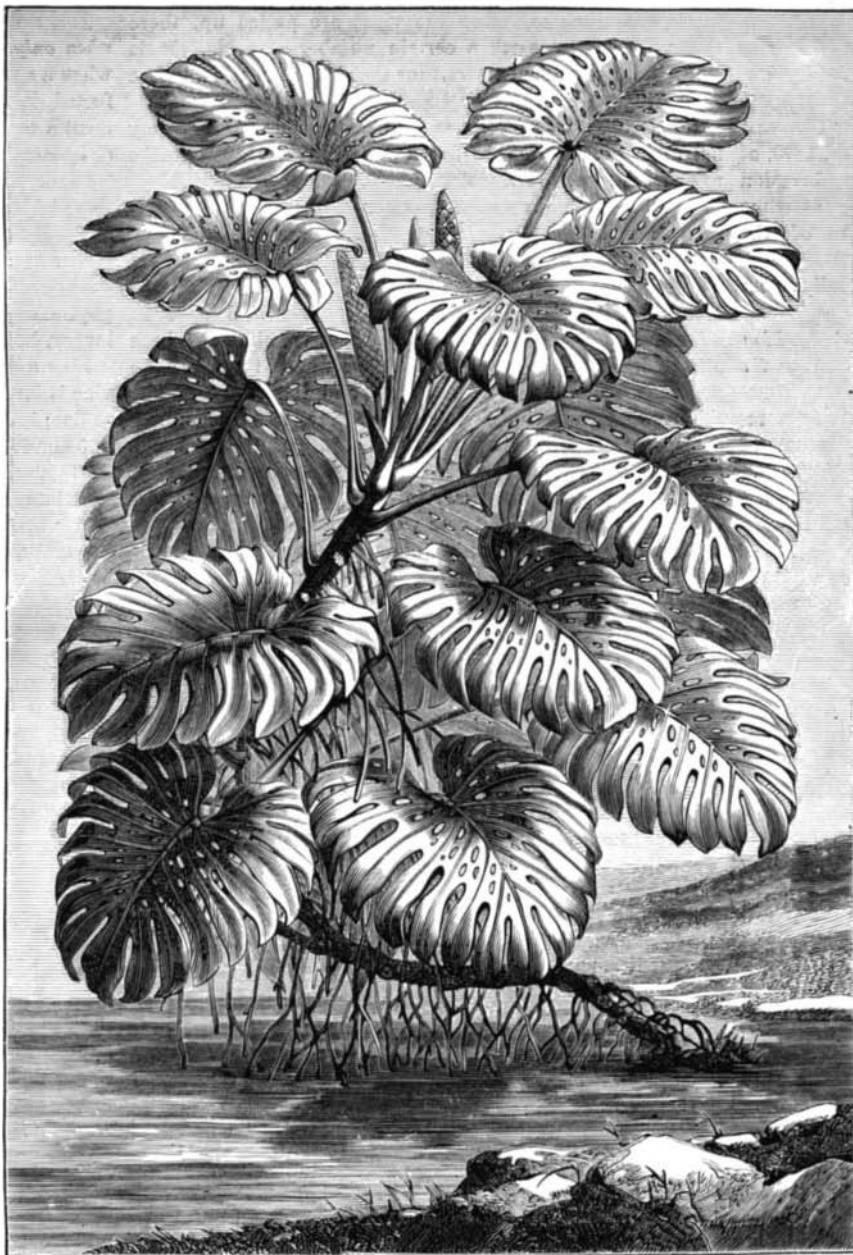
MM. Ch. Naudin and Radlkofer have been making observations on the results of the growth of trees—their development and their chemical composition—according to their height above the sea level, and have calculated the dimensions that the leaves of the beech assumed at altitudes varying between 150 and 1,400 meters (500 and 4,600 feet) above that level. An abstract of the author's paper in the *Annales des Sciences Naturelles* is given in *Les Mondes*. At the lowest level it was found, at the beginning of August, that a thousand leaves of the beech covered a space of a little more than 4 square meters. At the greatest altitude, beyond which the beech is no longer found in cultivation, the same number of leaves covered a space of only a little more than 1 square meter. Between these two extreme points, the dimensions of the leaves varied pretty regularly with the degree of elevation. It was also found that the leaf varied in its composition. Some of the leaves of the gray beech gathered at the same time in different forests gave, when they were collected at an altitude of about 260 meters (850 feet), a little more than 7 per cent of ashes; those that came from forests situated at an elevation of 1,400 meters (4,600 feet) gave only about 4 per cent. This diminution indicates that the most important constituent elements of the leaves undergo an alteration dependent on phosphoric acid, and shows that this product diminishes in indirect ratio to the quantity of ashes.

As to the distribution of matter in the tree, the attention of the experimenters was directed principally to the incinerable constituent elements. These elements exist in small proportion in the wood of the trunk, but are found in greater quantity, on the contrary, in the wood of the branches, in the bark, and in the leaves—parts which contain the greatest proportion of cinerary matter. Thus, if we take the beech, we find that the wood of the trunk furnishes 45 centigrammes of ashes per 100 grammes of leaves, while the branches give 1.8 gramme, the bark 3.3 grammes, and the leaves (in May) 4.16 grammes per 100 grammes of whole material. As every

portion of the tree enlarges with age, the leaf becomes the most productive part of it. The leaves, at first sight, seem to be an exception to the general rule, for their yield of ashes increases with age. This exception is due to the accumulation of lime and silica, which takes place in proportion as the phosphoric acid and potassa diminish. The fact that the young parts of the tree give a greater quantity of ashes than the old ones is of considerable practical importance. A copse, cut frequently, uses up more phosphoric acid and potassa (which are, pre-eminently, nourishing agents of the soil) than would a forest composed of large trees. A beech copse of a cubic meter in extent contains 1.6 per cent more ashes than the same extent of much more aged woods. A like quantity of twigs would equally give a yield greater by 2.3 per cent than that of the trunk. In the fir tree the difference is yet more marked, the figures being respectively 1.7 to 6.7.

An Electrical Railway.

Siemens & Halske, of Berlin, says the London *Echo*, have supplied a real novelty to the Exhibition held in that city. It is an electrical railway, with three carriages, capable of carrying twenty passengers. The road is about 220 yards long, and the train travels at the rate of ten feet per second—about seven miles an hour. A steam engine drives a dynamo-electric machine, and the current produced is transmitted to another machine which works the train. Deprez is exhibiting a model of his motor at Lille, and at the forthcoming Scientific Exhibition in the Palais de l'Industrie, at Paris, he will have a small train worked by a battery of twelve Bunsen cells. Deprez hopes to be able to work an aerial propeller by his motor.



TORNELIA.—*Tornelia fragrans*.

trout's natural food. The problem of how to raise the fish in barred streams was therefore successfully solved by planting in the streams the insect producing sedges and mosses. Once started, the vegetation increases of itself, bringing with it the animalcula. The learning of the botanist and the entomologist is thus brought to the aid of the pisciculturist.

If properly protected the food fishes of the State will swarm the waters in greater numbers ten years hence than they do at the present day. In many lakes and rivers there is already a noticeable increase. The black bass of the Delaware grow more plentiful every year. The white fish have appeared in increasing numbers in Cayuga and Seneca Lakes. The Mohawk River never contained more fish than now, the commissioners say, although it flows through a thickly populated part of the State, and is dragged with nets. Nearly every natural trout stream in the State has been replenished, and in many counties fishing has been prohibited for a certain number of years. In Central New York sportsmen's clubs are taking the protection of fish and game in hand, and for the first time in the history of the State the laws are being enforced. The State is the natural feeding ground for such a large variety of fishes, birds, and animals that under reasonable protection they will multiply rapidly.

NATURAL HISTORY NOTES.

The Wells of Prairie Dogs.—Some time ago the statement was made in the *American Agriculturist*, on the authority of Mr. M. T. Leech, of Nebraska, that the prairie dogs of the Western States dig wells, each "dog town" being provided with one. This statement has been widely copied, but has been denied by some persons, and among others by one of