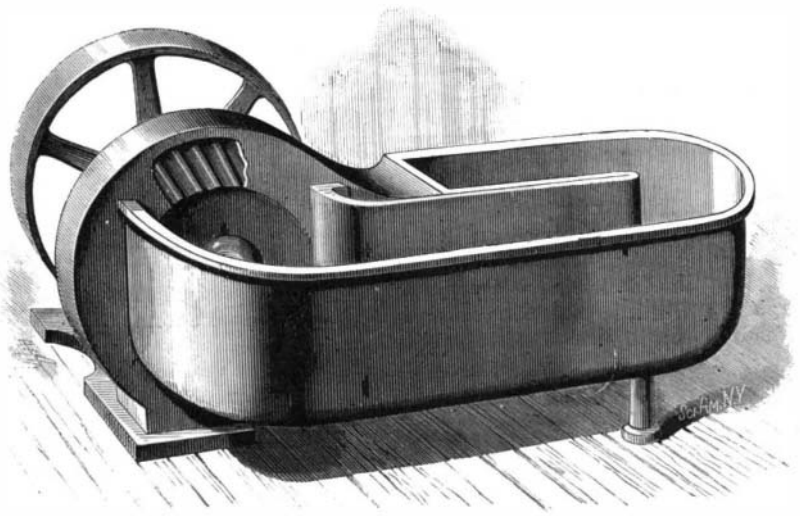
PULPING MACHINE.

The engraving represents a machine for washing, beating, pulping, grinding, ragging, disintegrating, shredding, mixing, or preparing the various materials and fibrous substances used for making paper pulp and for other like purposes, or for grinding colors, dyes, paints, and other materials.

The invention consists in a roll or disk provided with bars or ribs on one face, and fitted for revolution within a chamber at the end of a cistern or trough. The inner surface of the chamber is also faced with bars, between which and the bars on the disk the material is ground. The revolving disk is fitted with lifters at its outer edge, which act to carry the material around in the chamber.

This invention was lately patented by Messrs. E. B. and J. Cooke, of London, and Mr. G. Hebbert, of Richmond, England.



MACHINE FOR PULPING AND GRINDING FIBROUS MATERIAL.

Poisoning from Quassia.

It is a very rare thing to hear of poisoning from quassia, so often used as a bitter tonic, although the fact is known that it possesses some narcotic properties. The *Lancet* records a recent case of poisoning from an overdose given in the form of an enema. As no antidote has been published, it may be of interest to state that the remedies used in this case, and which proved effectual, were powerful stimulants, such as ether, sal volatile, and brandy, aided by hot-water applications to the feet. The pupils were strongly contracted, and the symptoms exhibited appeared to somewhat resemble those following poisoning by opium.

IMPROVED STONE CRUSHER.

The engraving shows in perspective and in vertical section an improved stone crusher lately patented by Mr. S. L. Marsden, of New Haven, Conn., and now being manufactured by the Farrell Foundry and Machine Company, of Ansonia, Conn. It possesses several points of novelty which are shown in the small sectional view. The machine is driven by an engine secured to one side of its heavy frame, and connected directly with its shaft, thus avoiding the friction and the expense of belts or intermediate machinery.

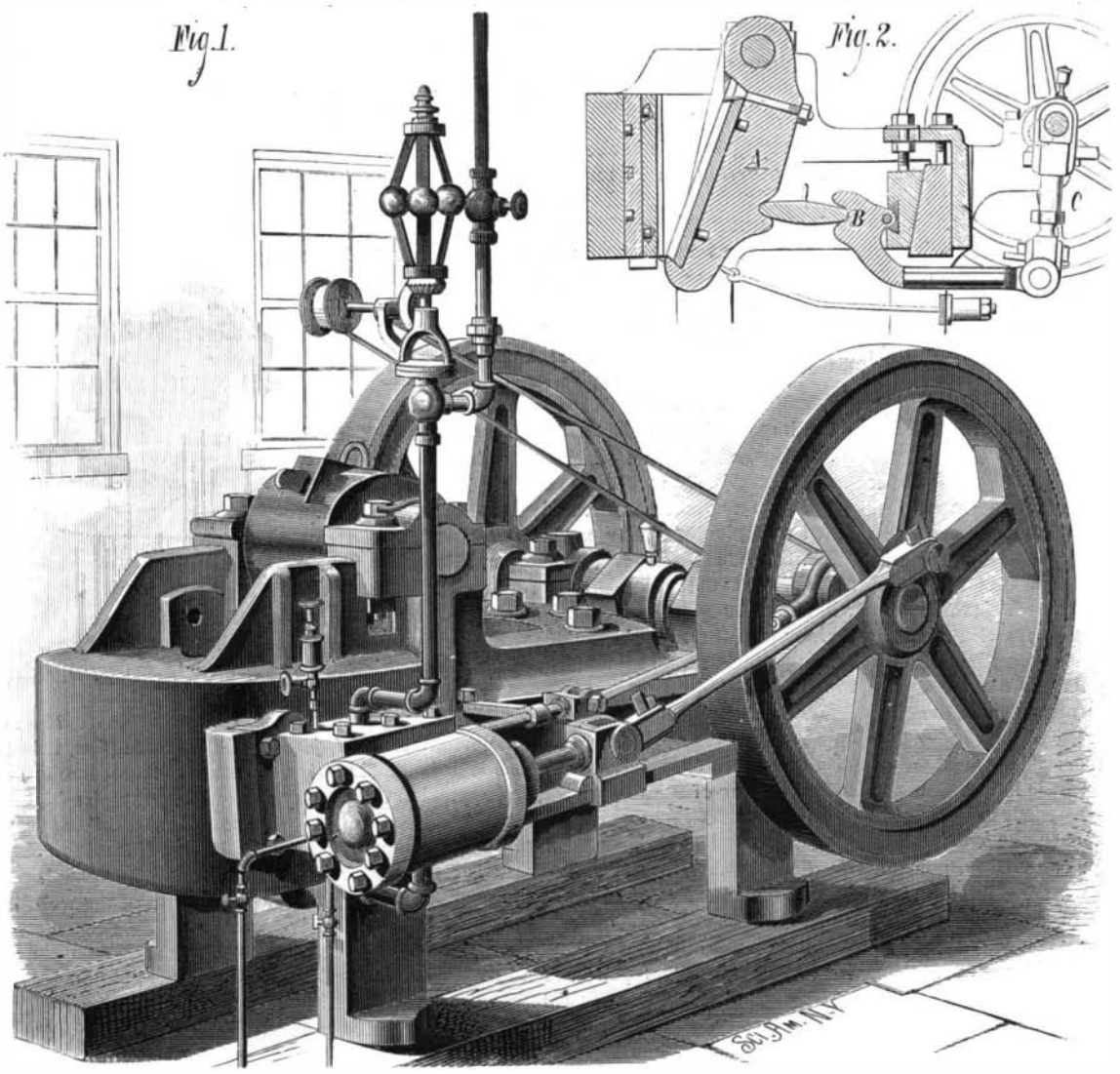
The jaws in this machine do not differ materially from those of other machines of this class, but the mechanism for operating them is materially improved. The movable jaw, A, receives its motion through a toggle from the lever, B, which is fulcrumed in a beveled block suspended from the top of the frame, and backed by a wedge that may be drawn up more or less to compensate for wear and to adjust the working distance between the movable jaw, A, and the fixed jaw. The beveled face of the wedge is concave, and the adjoining face of the fulcrum block of the lever, B, is made convex to render the block self-adjusting and afford a uniform bearing for the lever, thereby avoiding breaks due to bringing all of the strain upon a small surface.

The pitman, C, is made in two parts, adjustable by a screw, so that the length may be varied and at the same time the rigidity of the pitman is maintained.

To compensate for wear the parts of this pitman may be partly unscrewed from each other, and when the worn parts of the crusher are renewed the pitman may be shortened by screwing them together.

This machine is on exhibition at the Fair of the American Institute, crushing hard bowlders and cobble stones with perfect facility.

The machine is provided with a pulley so that it may be driven independently of the engine should occasion require. And on the other hand the engine may be used to drive other machinery by disconnecting the stone crusher pitman.



MARSDEN'S STEAM STONE CRUSHER.

Charcoal.

If we wish for some substance which will catch fire from the smallest spark, we find that among thousands of bodies, simple and compound, that exist in nature or are produced by art, the most suitable for our purpose is pure carbon in the form of tinder. On the other hand, when we want a crucible that will bear without taking fire the flame of the hottest furnace, we make it of pure carbon in the form of plumbago.

The wax mould of the electroplater is a non-conductor of electricity, and is, therefore, necessary to cover its surface with some good conducting material; it is found that the best material is finely pulverized plumbago; but this same element when crystallized, as in the diamond, is the most perfect of all non-conductors!

Carbon in one state is as soft as lampblack, in another it is the very hardest substance known; in one it is brilliantly transparent, in another it is perfectly opaque; in one it is the most costly ornament in the crowns of kings, in another it is shoveled out of the way as worthless!

In all these changes in the condition and properties of carbon no law can be discovered, with the single exception that the temperature at which various kinds of charcoal will take fire are in fixed relation to the temperature at which the several kinds are prepared. This is of the utmost importance to the manufacturers of gunpowder; they have caused it to be investigated with great care.—*Monthly Magazine, London.*

The Improvement of the Mississippi River.

The Mississippi Valley Interstate Convention, having for its object the improvement of the navigation of the Mississippi River and its tributaries, was organized at New Orleans, November 17. The officers elected were: Hon. H. F. Simrall, of Mississippi, President, with vice-presidents from Louisiana, Missouri, Kentucky, West Virginia, Pennsylvania, and Ohio; Secretaries, H. Dudley Coleman, John Henderson, James N. Scuddy, and T. Wharton Collens.

Enemies of the Wheat Plant.

BY REV. C. J. S. BETHUNE.

[Read before the Dominion Agricultural Commission.]

The most destructive insect pest to the wheat crop is the wheat midge, or *Cecidomyia tritici*, which had been first observed in America in 1820, when it was discovered in the State of Vermont, having been imported, like most of our destructive insects, from Europe. It spread with great rapidity over the Eastern and Central States and Canada, and in 1856 the loss to Canadian agriculturists from its ravages was estimated at $2,500,000, while in the following year, 1857, it was calculated that $8,000,000 bushels of wheat were destroyed in the Province of Ontario alone. From that time up to 1868 it continued to be very destructive, but since 1869 it had been almost unknown. It is probable that the checking of the midge plague was due partly to a parasite which preyed upon the insect itself, and which was well known in England and the countries of Europe, though owing perhaps to its extreme minuteness it had never been detected in this country, and partly to the general introduction of what were known as midge proof varieties of wheat. Some of these varieties resisted the midge on account of the hardness of the envelope which inclosed the kernel, and some on account of their maturing either before the midge became formidable, or after it had ceased to be so. The midge resembles the Hessian fly in appearance, the main difference being that the color of its body is yellow, while that of the Hessian fly is black. It frequents the ripening ears of the grain, and lays its eggs in the blossom of the wheat. As soon as the larvæ are hatched they begin to feed upon the juices of the grain, causing the latter to gradually shrivel up and become useless. When the period of the ripening of the grain arrives, the midge descends into the earth, remaining there throughout the winter. In the following spring it emerges into the pupa state, and in the month of June becomes a perfect insect. It is fond of moisture, and therefore likely to be found in low-lying lands, or lands not thoroughly drained.

The Hessian fly, or *Cecidomyia destructor*, is of older standing on this continent than the midge, its first appearance in America being about the year 1776. It was first observed in Ontario in 1846, and since then has been a very familiar insect, though its ravages have not been serious of late years. Although the insect is very similar to the midge, its mode of attack is entirely different. It appears first in the fall of the year at the roots of the plants, lays its eggs, and the larvæ are hatched out and remain in the earth all winter, the brood appearing in the spring. There is a second brood in the spring which attacks the stalk, and it is upon this portion of the plant that the Hessian fly is most commonly observed. There are happily a number of parasites which prey upon this pest, the chief being a species of apis, ichneumons of various kinds, and probably some of what are more properly termed bugs. Spring wheat is not so much affected by this pest as fall wheat, as the grain ripening the same season in which it is sown affords no place for the larvæ to hibernate during the winter. This fact would point out as a remedy for the Hessian fly the abandonment for a time of the cultivation of fall wheat, and the substitution of spring wheat. Another remedy would be the sowing of fall wheat as late as practicable in the fall, in order that the larvæ might not find the plant sufficiently advanced for its attacks at the root before the winter sets in. Thorough cultivation would also aid in lessening the damage done by this pest, as the stronger and more healthy the plant, as a matter of course, the less it would suffer from the ravages of the fly.

The chinch bug, or *Micropus leucopterus*, might be called the most powerful insect foe of the United States agriculturist, but it has never been known to be destructive in Canada. Our proximity to the States, however, renders us liable to an invasion by this plague, and there is nothing except a slight difference in climate that would warrant the belief that it would not thrive in this country. It is an in-

sect that requires heat and drought, to long-continued spells of which the Western States are much more subject than the older provinces of Canada. There is, however, great danger of its importation from Minnesota into Manitoba, where the climatic conditions are very similar. It has been seen in Canada, and in 1866 the writer published a description of it in the *Canada Farmer*, from specimens which had been forwarded to him from Grimsby. It attacks other grains besides wheat, and like many other insect pests, it is hibernating, existing throughout the winter in its perfect state. In the Western States, where it is abundant, there are a great number of broods during the year. One of the remedies used is the application of water. A heavy thunderstorm during the seasons of its ravages is worth millions of dollars to the farmers of the Western States. It attacks the heads of the grain, clustering round them, and extracting their juices by means of its proboscis. A number of the larger carnivorous insects prey upon this creature, such as the lady-bird, the lace-winged fly, and the syrphus fly.

The same parasites are useful in this case as in the case of the grain fly, or *Aphis avenæ*. This latter belongs to the widely distributed family of *aphidæ*, or plant lice, which were so destructive to flowers grown in conservatories, windows, etc., and which were consequently well known to everybody. The ravages of the grain aphis were never so serious as to give any cause for alarm, though in 1861 it was quite a plague to the farmers of the Province, but it had not been very destructive since. Its diminution was attributable to the parasites which he had already mentioned as preying upon this insect in common with the chinch bug. Thunderstorms also wash off and kill large quantities, as they have no means of regaining their position on the plant.

The joint worm, or *Isosoma hordei*, is especially injurious to barley, but it is not common in America, though in 1866 and 1867 it was somewhat prevalent in Ontario. It attacks the grain near the second joint, and the result of its work is to raise a gall or excrescence somewhat like a joint, hence its name. It does not attack the ear. The best artificial mode of dealing with it is to burn the stubble of the grain infested by it.

The army worm, *Hencania unipuncta*, is much more common in the United States than in Canada, and receives its name from the fact that it assembles in large numbers when its food is exhausted in any particular locality, and moves away in search of fresh supplies. New Brunswick was lately visited by this pest in such numbers as to put a stop to railway trains through the quantities slaughtered on the tracks, but they have never yet visited Ontario in anything like considerable numbers. A good way to meet this approach is to dig a deep trench and allow them to accumulate in it, afterward covering them with straw or shavings and setting the trench on fire. A number of parasites both of the ichneumon and beetle kind prey upon the army worm.

The wire worm, or *Agriotes mancus*, is sometimes very troublesome to wheat. It receives its name from the fact that it is a long, slender grub; it attacks the root of the plant underground, and is consequently seldom observed by the farmer. It is sometimes seen in plowing, and where it is observed, a good plan would be to have children follow the plow and gather the insects up and destroy them. Turkeys and ducks also eat them.

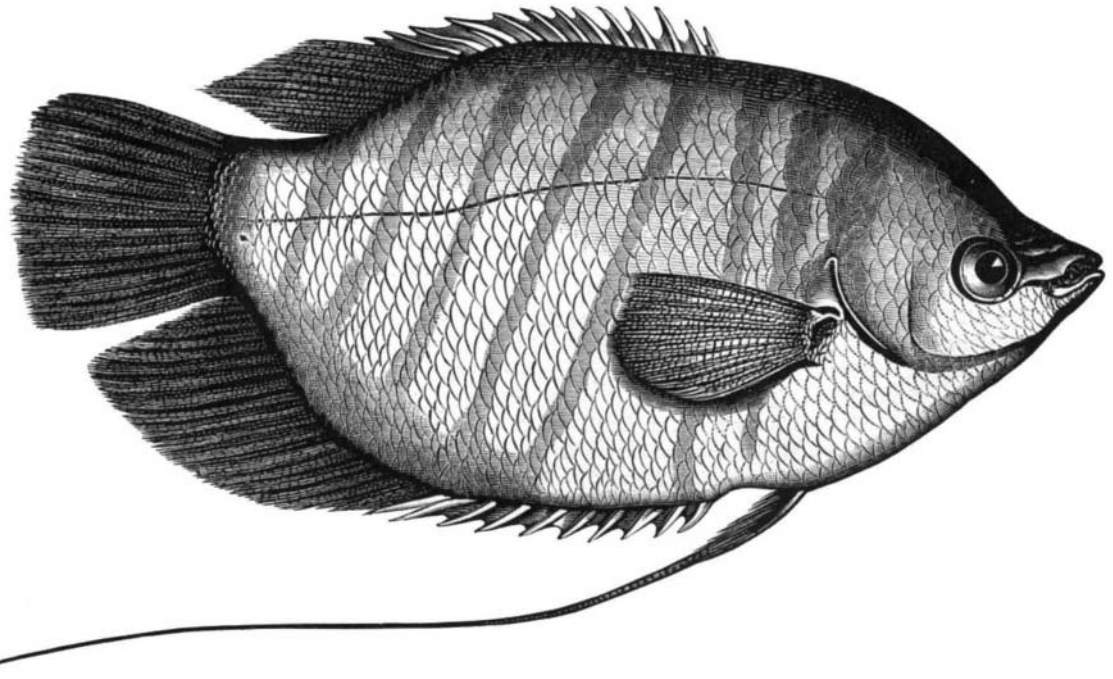
THE GURAMI.

The gurami (*Osphromenus olfax* or *Trichopodus mentum*) attains a length of from 6 to 7 feet and a weight of about 25 lb. The back is brownish-red in color, and the abdomen of a silver color, with brown spots, and dark brown-red stripes pass from the back to the abdomen of the fish.

The fish originally was an inhabitant of Chinese waters, but was taken to Java, Sunda Islands, etc., on account of the good quality of its flesh. It lives on potatoes, salad, bread, rice, beans, worms, raw and cooked meat, small fishes, and frogs, and in fact will devour almost anything.

The male fish builds a nest among the plants of the pond, in about five to six days, and the female lays in it from 800 to 1,000 eggs.

As the gurami is very easily acclimatized it might with advantage be introduced into our rivers, it being very hardy and easily fed, and its flesh is of a very good quality.



THE GURAMI—(*Osphromenus olfax.*)

Mr. John H. Salter, of St. Mary's, Pa., has patented an improvement in magazine firearms, which relates to that class of breech-loading firearms, particularly magazine arms, wherein the breech-block is moved longitudinally back and forward by means of a lever; and the objects of the invention are to obtain a direct and solid resistance against the breech-block when closed and to permit rapid loading and firing with the gun at the shoulder.

THE GLUTINOUS SALAMANDER.

BY C. FEW SEISS.

This batrachian (*Plethodon glutinosus* (Green), Baird), which is known by some authors as the viscid salamander, can be distinguished from our other salamanders by the following characteristics: Head oblong, not as broad, short, and rounded in front as in the amblystomas; form rather robust for the genus (the amblystomas are generally much stouter); tail cylindrical; limbs short and rather stout, with the inner toes small, but distinct. There are 14 folds in the

THE GLUTINOUS SALAMANDER.—(*Plethodon glutinosus*, Baird.)

skin (*costal plicæ*) on the sides of the body between the shoulder and the groin, while the red-backed species (*P. erythronotus*) has 16 to 19. The general color is black, sometimes with a violaceous tinge; the throat and abdomen are generally paler in color, with a whitish band across the throat fold. The head, body, and legs above are sprinkled with white or bluish white dots and small spots, most numerous on the sides, the spots generally disappearing half way down the tail. Beneath spotless, excepting the lower jaw and throat. Total length (our specimens) $3\frac{1}{2}$ to $5\frac{5}{16}$ inches.

We have not been able to find this salamander near Philadelphia, or in parts of Montgomery and Chester counties, nor portions of Camden county, N. J. It is, however, to be met with in many parts of our State. It does not appear in Prof. Verrill's catalogue of the batrachia of Maine, and Prof. Allen says it is not common in Massachusetts. Dr. De Kay calls it the "blue-spotted salamander," and includes it in the fauna of New York State.

Ralph W. Seiss furnishes me with the following remarks: The *glutinosus* is rightly named, for unlike other urodelans of my acquaintance, it is covered with a glutinous slime, which, when brought in contact with the hand in capturing the animal, leaves an adhesive, albuminous substance upon the fingers, which is somewhat difficult to wash off. While in Hunterdon county, N. J., this summer, I collected six individuals. They were all, with one exception, captured under rotten logs, one being found in the center of a log which was sufficiently decayed to be readily broken to pieces. These specimens were very lethargic and inactive, much more so than even the red-backed salamander, allowing themselves to be captured without making any effort to escape or to bite. When placed in the water, this species, like the *P. erythronotus* (red-backed), becomes very lively, doing his best to escape from the seemingly unwelcome element. I, however, obtained two of my specimens within a yard of the water. I captured several of this species, the red-backed and the gray variety of the red-backed (*P. cinereus*), in the immediate neighborhood of each other. In one instance, I found a glutinous and red-backed salamander under the same log. I know nothing in regard to its breeding habits. Prof. Cope, however, says it probably never enters the water, but its eggs are hatched in damp places on land.

I have placed beside the salamander a cloak-bearing longicorn beetle (*Desmocerus cyaneus*, Fabr.). It is a handsome species, being of a deep blue color, with purple reflections, and the anterior portion of the wing covers (*elytra*) orange-yellow. It is found in June and July upon the common elder (*Sambucus canadensis*, Lin.), and its young bore into and feed upon the stems. I have never known it to be injurious to other plants.

A New Leaf-Cutting Ant.

BY REV. G. K. MORRIS, VINELAND, N. J.

At Island Heights, a new summer resort on Barnegat Bay, N. J., I have found a new leaf-cutting ant. That it belongs to the *Attidæ* is the opinion of both Dr. McCook and Mrs. Treat. It has the rugosity on the head which characterizes Dr. McCook's Texas cutting-ant, and resembles it in so many other particulars as to leave no doubt of their relationship generically. This, however, is much smaller, being not much more than an eighth of an inch in length. Like other leaf-cutters it carries its burden on the top of its head and along the back. A row of them marching in single file, each carrying a piece of the fine needle-like leaf of tender pine seedlings, suggests a file of soldiers armed with rifles. It is an amusing sight, and provokes a smile. Sometimes the leaf carried is twice as long as the ant. I have seen them gathering only one other leaf besides the young pine leaf, namely, from cow wheat (*Melampyrum americanum*). Of this plant they gather also the petals. They make relatively very large cells, of the general shape of a coffee cup, and from two to four inches in diameter. The nests examined were in fine white sand, but the cell walls were made very firm and smooth. In several instances the walls were lined with what may be called a curtain of sand, of different color, the particles of which are held together mysteriously, and the whole suspended against the walls of the cell. This curtain is readily removed, leaving the hard, smooth wall with its original finish, showing clearly that after the formation of the chamber and the completion of the walls, the yellow sand had been brought up from a lower stratum, from two to three feet down, and worked into a loose drapery of hitherto unheard of texture. Dr. McCook assures me that after the pupa state, ants cannot make web. It may be in a sense true, but certainly these ants use a fine white filament, for which I know no other name than web.

The leaf cuttings are manufactured into a porous, spongy material, which becomes crisp when exposed to the air, and in which the young ants are reared. I have usually found this material either on the bottom of the cell or chamber, or else filling the same loosely from top to bottom. I was not prepared, therefore, for what met my eyes in the last chamber examined. Cutting away the side cautiously, I gained a view that surprised me beyond expression. I could have doubted my own eyes, if such a thing were possible. The material described above, made of leaves and other matter, was suspended from the roof of a cell three and a half inches high and wide, extending nearly to the pebble-covered floor. The arrangement was like that of the comb in a beehive. There were three combs, or layers, each shorter than that by its side. These were full of small, irregular