RICE—HOW IT IS PREPARED FOR MARKET.

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When the rice is ready for the harvest, it is cut by hand about 12 inches from the ground, and laid across the stubble for two days to cure. It is then tied into sheaves and put into small cocks in the field to more thoroughly dry. After a few days it will be ready to be carried to the barnyard, where usually the thresher is situated, and put into stacks, where it remains until the owner is ready to thresh it out. In some localities it is only removed from the fields daily in sufficient quantities to supply the thresher, which is almost always a frame building, one and a half stories, with high shingle roof, filled with the necessary machinery for separating the rice from the straw. The usual motive power is steam, the boiler and furnace of which should be placed outside the main building and encased in brick. The smoke-stack is frequently of brick, at least forty feet high, and placed at least fifty feet from the building, with an underground flue running to the furnace. This is the best and safest construction; but sometimes it is not practicable, and then an iron smoke-stack is substituted, and when that is the case the main building and boiler house should both be covered with metal, and the exhaust steam not allowed to be vented into the smoke-stack, as it causes to be thrown out a volume of sparks, not only endangering buildings, but also any stacks of rice that may be in the yard or on flats near by. This evil is supposed to be obviated by placing a spark arrester in the smoke-stack; but the experience of practical machinists is that they cannot be recommended as safe, and therefore should be avoided. The speed of the different portions of the machinery is not great; the smallest sized beater, which is the thresher that takes the grain from the straw, revolves not exceeding 600 per minute, and the largest 250, and of course sizes between these at proportionate rates. The speed of the fans varies from 100 to 300 per minute; therefore, if ordinary attention is paid to oiling the machinery, there should be no fear of fire from friction.

As threshing should only be done by daylight, and no artificial light allowed in the building at any time, there will be very little danger of fire; but, as the whole is of an inflammable character, if fire once gets under way the loss will most probably be total. Therefore, as fast as the rice passes through the thresher it should be removed to a storage barn, at a sufficient distance to make it comparatively safe in case of a fire occurring in the thresher, and should be kept there no longer than is necessary to accumulate a vessel load, when it should be sent to market to be sold at once as rough rice, or stored in mill until the owner desires to have it pounded and sold as clean rice. The straw, which is separated from the grain in the thresher, is by machinery delivered outside the rear of the building, and should be removed as fast as it accumulates to a safe distance from the thresher.

This rice straw is a good forage for animals, and valuable as a fertilizer for high land crops; but where it is not wanted for such purposes, it is much used for fuel in the furnace, and in the vicinity of Savannah, Ga., a considerable amount is used in a paper factory, as it is found to be valuable in the manufacture of that article, which is then frequently turned into "genuine Havana cigars." When it cannot be utilized by some of the above methods, it is burnt on the plantation, and the ashes applied as a fertilizer to the land.

Rice pounding mills are of two classes as to fire hazard. First, the mills on plantations, which are nearly all two story frame, shingle roof buildings, and next, the mills in cities, which are usually three and sometimes four story brick, with slate or metal roofs, but all run by steam, with furnace and boilers bricked up outside of building, and containing the same kind of machinery.

The city mills generally have warehouses adjacent to them, as the storage capacity of the mill itself is rarely sufficient for its wants. These mills are always located on some navigable stream, so as to be easy of access to vessels for the delivery to them of the rough, and the receipt from them of the clean rice. When rough rice is sent to mill to be at once pounded, elevators are lowered into the hold of the vessel, and the rice taken out and carried into the mill by horizontal screws, and at once elevated to the highest floor, and run through screws which take out all rubbish, such as bits of stick or straw, and sand. It then passes slowly into large millstones, six feet in diameter, revolving 120 per minute, and set so as not to break the grain of rice, but to cause the hull to split off. From the stones it passes through a fan, which blows the hull or chaff into an apartment, from which it discharges itself by a spout to the outside of the building, and is at once removed. The rice is carried from the fans to bins over the mortars. These mortars hold about four bushels each, and are made of wood, egg-shaped, large end down, lined with Russia iron. The pestles are pieces of timber 8 x 12 inches, ten feet long, shod with a heavy iron boot, and are lifted by arms from the pestle shaft in rear, and dropped about thirty inches into the rice in the mortars. This pounding continues from one to two hours, according to quality of grain, which reduces to flour a skin or coating that was left on it by the stones. It is then emptied out of the mortars, and carried by elevators to the upper part of the mill, and passed through screws, which take nearly all the flour off. It is again elevated to upper floor to screws which separate it into three qualities—whole, middling, and small—and then passes to the brushes. The brushes are cylindrical wooden drums, varying from two to three feet in diameter, and in length from six to ten feet. They are placed on end, the spindles running through an iron bar, and long enough to pass the floor, so as to be easy of access for oiling; as, before this plan was adopted, the spindles could not be got at while working, and have been the cause of fires. This drum is covered lengthwise with strips of sheepskin, wool side in, about six inches wide and eighteen inches long, backed on one side only to the drum, each slip lapping a little the one adjacent to it. The cylinder is then enclosed by a wire screen firmly screwed in position. The rice from the fans passes between the wire screen and the skins. The brushes when working revolve, the largest 300, and the smallest 450 per minute. This motion causes the loose edges of the skin to fly off and rub the grain against the wire screen, driving any flour onit through the screen, and polishing the rice. As it is brushed according to its grade of whole, middling, or small, as previously separated by the screens, it so passes by spouts to tierces prepared for its reception, standing each on a platform to itself, so arranged on a shaft underneath as to give them a slight jerk up and down, which packs the grain as it falls into the tierce. As soon as it is full, it is removed, the head put in, branded, and rolled into the shipping shed, ready to be sent to market. This completes the process of milling. The speed of the different parts of the machinery is, with slight variations, as follows: Pestle shaft, 12 revolutions per minute; millstones, 120; brushes, from 300 to 400, according to size; fans, from 100 to 300, according to size; elevators, 40. It is therefore evident that there should be no danger from friction, if ordinary attention is paid to lubricating. The rough rice, and nothing that comes from it during the process of pounding, is at all inflammable, but, on the contrary, is slow of combustion; but as these mills work at night, carelessness in the system of illumination should be avoided. All lights should, as far as practicable, be fixed, and no hand lamps allowed, except lanterns fully protected under glass; and where coal gas is not used, lard or whale oil should be. In case of a partial loss, the greatest damage would be from water, as fresh water softens the grain so much that, if saved from heating and sprouting, it never recovers its original firmness, and is therefore very seriously deteriorated in value; and if with salt water, it soon becomes as offensive as decayed flesh, and is valueless.

These mills are costly, and generally pay well, and every precaution is used by those in charge to protect them from accidents; but still they are classed as extra hazardous, and some companies, particularly the English, write only very small lines on them, or decline them altogether. This I can only attribute to a want of knowledge of the risk. The writer has been familiar with the rice interest of South Carolina for over thirty-five years, and can remember the burning of only three pounding mills in that time, and therefore cannot regard them as extra hazardous.

The particulars as to speed of machinery, and much other valuable information, have been kindly furnished me by two of the most experienced practical millers in the State.

THE KEELY MOTOR DECEPTION.

The Keely Motor lunatics are still at work, according to the Philadelphia *Times*. The "directors" it is said, held a meeting, August 8, to witness Keely's experiments with a "new" machine. The following description of it as given by the reporter of the above paper is as clear as mud:

"The machine is made of wrought iron and cast steel. It consists of spheres, basins, standing tubes and small reservoirs, with a wilderness of connecting rods, valves and tiny copper tubes. A globe of cast steel, four feet in diameter on the outside, holds only twelve gallons. The center cavity is in a shell of nine inches thickness. The perpendicular tubes that reach from floor to ceiling, at the other end of the machine, have a central chamber of three inches diameter, the surrounding metal being three inches thick, and outside of it, one above the other, are huge rings of wrought iron shrunk upon the pipe. The copper tubes appear to be one fourth and one half inch in diameter, but the aperture in their center is not large enough to admit a pin head."

Mr. Keely made nine tests, and with $\frac{5}{10}$ suspension of the water column and 10 lbs. air he produced 11,000 lbs. pressure to the inch, and had to shut off the pressure because the gauge would not stand more. The condensing apparatus into which the vapor is discharged is a cylinder that holds three gallons of water, and so strongly bolted and barred that it looks as if made for the discharge of a twenty inch projectile. Its design is to reduce the vapor, the force of which has just been used, to water, for use over and over again in the working of the machine. The *Times* representative had an opportunity to test the quality of the water introduced into the machine from the hydrant and that in the condenser after its power had been used. He drank a pretty good quantity from each cylinder and found it cold, and free from any foreign taste, such as would probably be caused by explosive powders. He had a chance to breathe the mysterious vapor while the wonderful pressure was upon the tubes. It was discharged into his hands, his eyes, and mouth. It was perfectly cold and dry. Within a month, when he has made all his experiments with his now completed machine, Mr. Keely will endeavor to show the extent of its power.

In his talk with the *Times* representative Mr. Keely said: "This is a new substance; a new force, altogether unknown to science; I don't pretend to be the inventor; I discovered it by accident. I could work this machine up to ten thousand horse power if the metal would hold. I shall certainly work it upon a two hundred horse power engine soon. The little machine you saw in the office, up stairs (it is only nine feet long, two feet wide and three feet high in its highest part), is the most powerful machine ever constructed. It was built for us by Mr. Willard of Bordentown, who was drowned a few days ago. It is a quart machine—that is to say, it uses only a quart of water. With the condenser that I have now nearly complete I will make that quart of water produce a thousand horse power motion of sufficient duration to run a steamship across the ocean."

One of the directors said: "We have been laughed at and called cheats and impostors, but out of the original company who joined in raising the $120,000 already expended upon this invention only three or four have withdrawn. We are the original crowd, and we don't think of weakening. In a month or two now all Mr. Keely's tests will be finished, and we will show the world whether he is the greatest inventor or the greatest humbug of this age. Scientists, machinists, and learned societies are invited to come and make every test they can think of."

The purport and substance of all the foregoing bosh is, we suppose, that the Keelyites are short of funds and are about to make a new effort to shove off upon the unwary, another batch of their worthless stock.

EBURINE.

M. Latry has recently exhibited to the French Society for the Encouragement of the National Industry a new compound, to which the above name is given, and which is composed of ivory or bone pulverized, and in some cases mingled with agglutinative material. The latter is not, however, uniformly necessary, as by M. Latry's process the dust can be caused to agglomerate by simple pressure and heat. The operation is rather a difficult one, as too high a temperature produces disaggregation; but by experiment M. Latry has succeeded in so regulating the heat applied to the moulds by observing the behavior of wafers of fusible metal, that instead of a porous and almost friable mass the resulting product is extremely hard and resistant. It is believed that the natural organic material in the bone or ivory dust becomes partially melted, and so serves as a cement.

The color of the eburine is a grayish-white; and to make it pure white, suitable pigment is added. This, however, necessitates the further addition of a little albumen or other agglutinative material, as already noted. The material may be colored any hue, and is best utilized in combination with the so-called "*bois durci*," or wood concrete, which is made of sawdust and beef's blood pressed also in moulds under heat. The eburine serves for the raised portion of ornamentation of furniture, etc., and when moulded with the "*bois durci*," adheres to it with great firmness. It does not crack, and when not rendered too hard may be worked with ordinary wood tools. The grain of the hard variety is so fine that by suitable coloring it is easily made to imitate certain stones, such as jasper, malachite, and lapis lazuli, or by painting beautiful and accurate imitations of cameos and mosaics may be produced upon it. The invention appears to be of considerable industrial importance, as it opens a new mode of utilizing waste products, for which hitherto there has been comparatively little employment.

ENGINE "SPURTS."

There are numerous instances of collisions and other marine casualties on record, from which it would appear that the danger might have been avoided had there been some means on board the injured vessels for developing a sudden and great increase of power in the engines for a brief length of time. A long and heavily laden steamer, for example, is not easily manœuvred even under full steam power, and when moving at high speed it is a matter of considerable difficulty to check her way. Similarly a heavy war vessel, in order to avoid torpedoes, may find a means of suddenly swerving, backing, or shooting ahead a potent safeguard against suddenly discovered obstacles.

M. Bertin proposes a simple means of effecting this object, which merely involves providing each vessel with a blower, by which strong jets of air can at a moment's notice be forced in at the base of the smokestacks in order to increase the draft. This has recently been tested in France on board the frigate *Resolue*. Combustion was found to be nearly doubled in activity under the transitory action of the jets of compressed air. The motive power developed was equal to 1·8 times the primitive power of the engines; and the increase of consumption of fuel was 20 per cent. This last is of no importance, however, in view of the necessities of the case and the brief period over which the augmented power would in most instances be excited.

Colored Borax Varnishes.

It is well known that an aqueous solution of borax is able to dissolve shellac, forming a kind of varnish, to which any desired color can be imparted by mixing with pigments. Major Dr. Kahl of Dresden has communicated to the Dresden branch of the Saxon Society of Engineers the results of a large series of experiments made with these varnishes. He reports that they are very cheap and dry very quickly, but they scale off from wood too easily. When this varnish is colored black with india ink and applied to paper, it possesses a fine gloss, but other colors, especially carmine, when mixed with this solution acquire an impure shade, and many pigments cement together in this solution, forming a hard and totally useless mass. The black shoe polish sold for ladies' boots is often made by adding some black pigment to this shellac solution. For bronze boots, rosanilin may be dissolved in any alcohol varnish.