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Improvement in Cooling Mill Stones and Flour.

Every miller knows how desirable it is to deposit the flour or meal as it comes from the stones in a perfectly cool condition, and that one of his principal annoyances is the heating of the stones. The inventor of the device herewith illustrated intended to subserve these two purposes, says that practical tests show a saving over the ordinary mode of elevating of about one pound of flour on each bushel ground.

A represents a mill stone and hoop, beneath which is a scroll, B, containing a fan blower, the blades of which, instead of forming a gradual curve, turn at right angles, this form being considered preferable. From the stone a discharge pipe, C, leads to the eye or center of the fan, conveying the flour. The spout or pipe, D, is double, or divided longitudinally by a partition shown in the space broken away. The portion, E, leads from the periphery of the fan or blower to the chamber, F, the upper portion of the tube being shortened to permit the escape of surplus air. The flour or meal is forced upward through the pipe, E, from the fan, and is discharged at G, directly into the bolt, conveyer, or hopper boy. The chamber, F, is made of any suitable size and is covered, or partially so, on its sides with gauze or muslin. From this chamber a return spout, H, leads to the fan and through it the surplus air is returned, and also many particles of flour which would otherwise be lost.

The fan being revolved rapidly receives its supply of air through the spout, C, from between the stone and hoop, drawing all the heated air away, thus keeping the stone cool and dry, and preventing the formation and accumulation of dough around the hoop. The flour, soon as discharged from the stone, falls into a current of cool air which prevents evaporation. For simply elevating grain only the fan and spout, E, are used.

This apparatus was patented May 5, 1868, by James Raney, assignor to himself, L. Raney, and B. Raney, either of whom may be addressed for rights or further information at New Castle, Pa.



RANEY'S PATENT PNEUMATIC ELEVATOR

practically inexhaustible. It has been largely and successfully tested in the casting of chilled car wheels, both in England and in this country, and in the former country by John Brown & Co., of Sheffield, for armor plates. We give an analysis of the ore.

Peroxide of iron	45.200	Soda	.541
Protoxide of iron	3.458	Sulphuric acid	.588
Alumina	5.448	Phosphoric acid	
Oxide manganese	11.381	Silica	14.126
Peroxide manganese	1.093	Carbonic acid and water	11.781
Lime	1.756		
Magnesia	3.740	Total	100.000
Potash	.688		

FOOTE'S PATENT PORCELAIN LINED ICE PITCHER.

Considerable has been said about the chemical action of different drinking waters on the metal of which the interior



wall of ice pitchers is composed, their being productive of oxides inimical to health, etc. It is well known, however, that the porcelain lining of iron kettles and the glaze on our

table ware is unaffected by ordinary acids. Acting on these facts the inventor of the pitcher shown in the engraving has succeeded in coating the inner wall of metallic ice pitchers with a liquid enamel, fused and attached to the metal by heat, in one smooth, complete coating without seam. Prof. Hayes says "it is entirely free from anything poisonous or injurious. A quart of acidulated well water was boiled in one of these pitchers without perceptible action upon the enamel, and water to which caustic alkali had been added was afterward boiled in it with a similar result. When submitted to sudden changes of temperature the enamel did not crack or separate from the iron, and sharp strokes with pieces of ice failed to make any impression upon it."

It will be readily understood that the pitcher may be made of any form desired. Its freedom from unpleasant odor, as well as its perfect cleanliness and certain safety, seems to give this improved pitcher a deserved commendation.

It was patented through the Scientific American Patent Agency June 30, 1868, and assigned to the Meriden Britannia Company, West Meriden, Conn., by whom they are manufactured, to whom all orders should be addressed, D. C. Wilcox, Secretary. The commendatory letter of Prof. Hayes may be found in full on the last page of this paper.

FUTURE PROSPECTS OF MACHINE MANUFACTURING IN RUSSIA.

If we take the map of Russia, and set one leg of a pair of compasses upon the spot occupied by the town of Kharkoff, setting the compasses to a radius of 370 miles, then this radius will reach to the extreme northern end of the the rich agricultural government (or province) of Orel, inclosing at the same time the equally rich government of Koursk.

Sweeping around to the northeast we cut off part of the government of Tula, the Russian Sheffield, as also part of Tambov, inclosing the whole of the government of Voronej, with its rich stores of corn and oil. To the northeast we cut into the borders of the government of Kaluga, inclose the whole of the government of Poltava with a great part of that of Tchernigon, and join up to the borders of the government of Kiev. In a right line south from our starting point, we, with the same radius, cut into the sandbanks in the Sea of Asoph near the port of Bardiensk (for the removal of which said sandbanks, by the way, the future factory may have to provide dredgers, so they may as well be included in the circle), while at the same time we include the government of Tausidia, along with that of Ekaterinoslav with its coal bearing strata. Sweeping to the southeast, we inclose the whole of the territory of the Cossacks of the Don, with its vast beds of anthracite and iron ore. The same radius takes us in this direction across to the opposite shore of the sea of Asoph, fronting Taganrog and Rostov. To the southwest we come again upon the greater part of the government of Tausidia, with the greater part of that of Kherson, sweeping to within twenty miles of the ancient town of Kiev.

For enterprising men with capital this is an immense field for labor; and commercial energy might easily square this circle, even by means of a circumscribed square to enlarge the area. The principal railways (not merely projected, but actually being constructed) cutting into this circle are, first, the main line direct from St. Petersburg to the Sea of Asoph, passing through two coal fields in its course, namely, the northern or Kaluga-Tula and the southern or Donetz basin. (The Donetz is a river falling into the Don after a course of about 270 or 280 British miles, and forming a sort of border to the coal field; its repeated attempts to cut into the hard strata of the coal basin induced geologists to call the coal district by its name, the Donetski Kraj). This main line of railway after leaving Moscow passes through the towns of Tula, Orel, Koursk, Kharhoff, and many towns of smaller note, and will end, after passing through the whole of the southern future mining district, at Taganrog and Rostov.

From this main line there will be numerous branches to different places, the names of which are as yet unknown to fame, but which, in consequence of their stores of mineral wealth, are capable of becoming great industrial centers. Communication with Europe, through Poland, will be secured by the line from Kiev joining into the main line at Koursk. The main line will also communicate with the Black Sea, by means of the line from Kharkoff through Poltava and other important towns, to Kiev and Odessa. In like manner, by the extension of the Riga-Dinaburg-Vitebsk railway to Orel, the south of Russia will be put into communica-

Learning to Telegraph.

According to the *Telegraph*, the institutions known as Telegraph Colleges are unmitigated humbugs. They purport to teach the art of telegraphing so that any young man or woman can become efficient in three months, obtain a good situation, large salary, &c. Fees payable in advance. Our contemporary remarks:

"We wish to impress upon the minds of those who desire to become telegraphers, that only upon telegraph lines, and in the practical daily practice of an office, can they become qualified for telegraphic positions.

Another fact is sedulously kept out of sight by the proprietors of these colleges, which is patent to every practical telegrapher, that is, that probably less than fifty per cent. of those who seek to learn telegraphy, even in the regular and proper manner, become good, reliable operators. The profession requires a quickness of perception and a certain amount of mechanical skill and facility of manipulation which is not generally possessed. Very few become good, practical telegraphers, unless they commence the study of the art before they reach their twentieth year. For those of over that age to endeavor to do so, is, in a majority of cases, pure waste of time. We do not mean to say that instances are unknown of persons more advanced becoming first-rate telegraph operators, but they are so few as not to offer encouragement to such to seek admission into the telegraphic ranks.

We have heretofore pointed out the deficiencies in scientific knowledge of a large proportion of the practical telegraphers. This we should be glad to see corrected, and we should regard any means of education in this particular afforded to telegraphers, and a disposition to avail themselves of such facilities by operators generally, with favor and gratification."

New Brunswick Hematite Iron.

We have received some specimens of white fibrous iron from hematite ore mined in New Brunswick. It is of extreme hardness, capable of scratching glass, and of remarkable purity. It is also exceedingly tough, Robert Mushet of Coleford, England, stating that he has twisted nail-rod cold, made from it, which exhibited a toughness equal to the best Llundross or Tevoitdale iron. Charles Sanderson says he is

tion with the Baltic. There is also the inland line completed as far as Vorouj from Moscow, afterwards to be extended to the anthracite mines at Grushevka, which last are already in communication with the river Volga by means of a short railway. Independently of the proposed branch lines, which from their situation may well be called mineral lines, it is proposed to lay another main line from a point about 100 miles south of Kharkoff to far-famed Sevastopol.

The imaginary circle thus drawn incloses the whole of the southern coal fields, and cuts into the border of the northern. As the northern coalfield is beyond the boundary line chosen little need be said about it, although it is far from being an unimportant one. The coal is inferior in quality to that of the southern field, while at the same time the iron found there makes very good castings. According to the report of the latest investigations published last year, the northern coalfield is 114 miles long by 80 miles wide, or about 9,120 square miles. Within this boundary there are no fewer than 113 known places favorable for mining; and four of the best known of them are estimated to contain a supply for 150 to 200 years, at the rate of 400,000 tons annually. The price at present at the pit mouth is about one dollar per ton.

The southern basin with which we have more immediately to do is more extensive, and the coal is of a better average quality. The coal seems to crop up to the surface in the government of Kharkoff so that in many places coal is turned up by the plow, and they extend to within less than 60 miles to the shores of the Sea of Asoph. The northern or Kharkoff end of this field contains coal similar to that of the Tula-Kaluga field; while in the center of the basin the best caking and steam coal is found, and at the southern extremity anthracite, containing, according to reported analysis, 98 per cent. of carbon. That part of the coalfield lying in the government of Ekaterinoslav is bounded by the rivers Dneiper, Don, and Donetz, and has a surface of over 10,000 square miles. Adjoining this in the territory of the Don Cossacks, and bordering on the Sea of Asoph, there are still 7,100 square miles under which lies the best coal and anthracite.

The now, in Russia at least, well known mines of Grushevka contain no fewer than 269 allotments, out of which, in 1866, 83, containing 93 pits or shafts, were being worked, and produced 150,152 tons of anthracite against 85,401 tons in 1865. The estimated quantity for the 42 square miles of this district alone is 24,000,000 of tons. In the 7,100 square miles of the territory of the Don Cossacks, reckoning only the upper seams and only those which are more than one asheen (2ft. 4in.) thick, the estimated quantity is 700,000,000 of tons. The seams vary from 2½ feet to 8 feet in thickness. In this black country there is much work yet to be done for both the mining and mechanical engineer. The 93 before mentioned pits are, with one or two exceptions, mere holes, and in the district generally, until within the last two years, the black diamond was left in the depths of the mine undisturbed; as soon as the water grew troublesome, another hole was struck, and the former one abandoned. At the present time, however, at Grushevka three shafts are being, or have been, sunk deeper in the water-bearing strata, and eight steam engines, from 6 to 75-horse power, are either at work or are in the course of erection. The price of the coal averages from one dollar and thirty cents to two dollars and seventy-five cents per ton at the pit mouth, according to quality.

This district is no less rich in iron ore than it is in coal. Geologists and mineralogists of different nations all agree in their statements as to the immense quantity of ore, and also to its high quality. The thickness of the layers varies in some places from 9 inches to 21 inches, and in others from 14 inches to 3 feet. The layers of ore extend in many places in an unbroken line for many miles, and are interspersed with layers of coal, limestones, and schists. The ore lies in many parts, especially in the ravines, at a depth of from only 14 feet to 28 feet from the surface, while almost the only mining as yet has been that of the aforesaid geologists. There is indeed one iron works in the district, belonging to Government; but from a mistake in the choice of a situation, caused by the wish to take advantage of water power, it is too far from the mines connected with it, and its rate of production has not as yet been very great.

The other subterranean products of this mine of wealth are in connection with iron smelting, limestone and good fire-clay, while for purposes connected with other manufactures are potter's clay, kaolin, gypsum, and the materials for good cement. There are also beds of the stone generally used here for millstones, also paving stones, and in some parts thick beds of roofing slate. Specimens of this slate were sent to the Paris Exhibition, along with specimens of the anthracite near which it was found. Limestones and sandstones for building purposes are also here, together with an inferior sort of marble. Clays of all sorts abound, suitable for brick-making, both fire and common red and yellow, and chalk enough to score up the reckonings of all the miners and puddlers in the world for centuries to come.

Lead ore, with a percentage of silver, is also to be found; while last, but not least, one of the great necessities of life, common salt, has formed a staple article of commerce for more than a century. The yearly quantity of this article supplied by this district within the past thirty years has varied from 5,000 to 16,700 tons. With the exception of this salt, this immense treasure vault has been little more than peeped into by scientific men; the full opening up has been as yet unattainable, not having had as in other countries, the assistance of the iron horse. The time of opening is however, now near at hand; the iron horse is on his way down south with the keys. The first sod of the Kharkoff-Taganrog railway was cut June 2d, 1868, although work had been commenced upon the line generally some time before.

The question now must be who will be the first to ravish this almost virgin treasure.

It must not be thought that the mineral wealth of Russia is confined within the boundaries of the imaginary circle drawn; on the contrary, the northern coalfield might, by deep mining, yield a better quality of coal, and it is supposed dip a great depth under Moscow and some of the other northern governments, as it has been found to make its appearance again in the government of Archangel. There is then the eastern or Ural system, and the still richer western or Polish, where coal seams have been found from 35 feet to 42 feet, and in one instance even 49 feet in thickness, made up of layers of different qualities of coal, divided by very thin layers of clay. Then we have in Siberia, the Tomsk field, estimated at 170 miles long and 70 broad, and coal of an inferior quality, but still usable, at the foot of the Caucasus. Among other projected railways, first on the list stands one to connect the frontiers of Siberia with the interior of Russia. Railway communication has commenced in the Caucasus with the opening of the Poti and Tiflis railway, and Kharkoff is looked upon as the future central station for direct communication with the Caucasus.

All these places may, at a future time, become seats of manufactures, but in the part of the country above described everything is favorable to enterprise; even at present, the climate is wholesome, and peace and plenty reign around. Some difficulty would be experienced at first in getting together workmen, but when once found and settled, the real Russian likes to remain in one place if he finds himself at home, and generally likes to stick to a good master. There is one thing, however, although trades unions and general strikes are unknown there, still the workmen taken singly are very independent and firm in their demands; the being thrown out of work does not seem to frighten them much—they can be led easier than they can be driven.

THE AINOS, OR HAIRY MEN OF YESSO AND SAGHALIEN.

In Notes on the Expedition against the Settlements in Eastern Siberia, published in London in 1856, is an account of a peculiar race of people, of which some specimens were seen to the north of Cape Lamanon, on the western coast of the island of Saghalien, the most northerly of the Japanese group. The author, Mr. Whittingham, who accompanied the expedition, thus describes the people and their manner of living: "As we came near the shore, four dark men with very long black hair flying in the wind, and clothed in seal-skin jackets, kilts, and boots, waved their arms and hands, warning us to another landing-place, toward which they waddled with a peculiar clumsy gait. With many demonstrations of respect they led the way to their huts of rough logs, covered and the interstices filled with birch bark and dry leaves; they were low on the ground, and could only be entered by stooping on the hands and knees. The larger huts were used as store houses for their fishing apparatus. One of the men was a magnificent savage, tall, lithe, straight, and strong, with hair, beard, and mustaches never desecrated by the touch of the scissors; with a high broad brow, dark eyes, straight nose, and oval face, he was a far nobler creature than the Red Indian who, I had always fancied, was the pride of wild men. His fellows were less manly in their bearing, and smaller; and as far as dirt, mal-odor, and want of light permitted me to see, the women were ugly and little." R. Linn, in La Pérouse's voyage, gives the following valuable measurements of the head of one of these people:—circumference, 23.80 inches; its longest diameter, 10.30; and its shortest diameter, 6.83 inches.

In a recent communication to the Boston Society of Natural History, Mr. Albert S. Bickmore, A. M., gives the results of his late investigations in regard to the origin of this peculiar race, and adds important and interesting particulars of their manners, customs, and religion.

The first of these strange people seen by Mr. Bickmore were at Mori, on Volcano Bay, at the western side of the island of Yesso. Along the shore to the north of Mori they were met with, sometimes at work with the Japanese, but more frequently in companies by themselves.

At Urope, twenty miles north of Mori, is a village of about two dozen houses only, three or four of which are Japanese, the rest belonging to the Ainos. Mr. Bickmore describes this village as follows:

"The houses were scattered irregularly near the shore over a broad belt of sand, that has been drifted back by the easterly winds. They all have the same rectangular form, and are similarly situated in respect to the shore.

"The best are composed of a house part about thirty feet long and twenty broad. To this is attached a porch about twelve feet long and eight broad, and around the whole is a straw fence. The house and porch are built of a frame work of small poles, fastened together with strips of bark and covered with millet straw. The walls are about four feet high, and slightly sloping. The roofs project a few inches at the eaves, and rise from each side to a point in the center. In the walls under the eaves, there are two or three holes a foot in diameter, which serve as windows. In entering, you pass through the straw fence into the porch, and thence through the door into the house. The house part is generally one room, and also the porch; but in a few, a kind of partition is made in the larger room by hanging up mats. Most of the houses have no floors, but instead the sand is covered with mats of coarse straw, and on one side of the room there is a platform of boards on stones or blocks of wood, where the occupants lounge and sleep. They usually sit on the mats on the sand. In the center of the room the fire is made on the sand, and over this and about three feet above it, is a kind of frame work held up by strings from the rafters, where

they place the fish they wish to smoke. It also serves for a cupboard or dresser, where the smaller iron pans and kettles may be put away. There is no chimney, and I did not even see a hole in the roof for the smoke to escape. Everything overhead is, therefore, black with smoke, and generally has a shining, oily appearance. Each house is provided with a few iron pans and kettles of Japanese manufacture, and these with two or three wooden dippers, and some large valves of the pecten, comprise their cooking utensils. They make a fire by means of a flint, steel, and tinder, which are usually kept in a bag of undressed deer skin. In several houses I saw a considerable number of lacquered dishes, which they had evidently obtained from the Japanese. Near each house there is another small one about eight feet square, perched on a platform five or six feet high, in which they store their fish, in much the same manner as the natives of Sumatra preserve their rice. In the first house we entered, the man was sitting cross-legged in one corner making spears, with a fire of charcoal and a Japanese bellows. The woman was crouched near the fire, twisting up thin strips of the inner layer of the bark of a tree into a continuous line of the size of a mackerel line. It is from such material, and in this way, that all the lines for their fishing nets are made. They had four children, all boys, the youngest two and the eldest ten. The two younger ones were without clothing, and the others had only each a long jacket, though it was quite chilly.

"In the next house we entered—the dimensions of which I have given above as a model—we found an old man, his son, and three women. The old man said he was seventy five, and his white hair and white beard made it appear probable, yet a young woman, apparently of twenty, was presented to me as his wife. She was demurely at work in one corner, making a straw mat after the Japanese style. The other young woman was weaving a piece of cloth about ten inches wide, from strings made of bark as already described. These strings, which represented the warp, were fastened at one end to a post and at the other end to a board which she kept leaning against while she changed them and pushed through the filling and pressed it down with a sharp edged board. This kind of cloth seems to be the only one they have, and it is all made in this slow and laborious manner. In front of this house, that is, on the side toward the shore, there was a kind of rack filled with sticks, each having on its top the skull of a bear. In this single place I counted twenty-nine skulls of this animal, a number that must make our old friend and his son rank high in the estimation of his Aino companions. In another house we entered, we found a man and his wife seated by the fire. The woman was sewing, but the man was doing nothing, and yet the bay was swarming with fish. He showed us the bow he used in hunting the bear, but would only sell a model of it, declaring that in their estimation it was most disgraceful for an Aino to part with the bow he was accustomed to use. However I secured a real arrow. The after part of the shaft was of reed, the fore part of solid wood to make it fly point foremost, and the barbed part of bamboo. They carry short knives, but they appear to rely on their bows and arrows when they attack a bear or kill a deer. I saw no lances, nor any implements of stone or bronze. I also purchased of this man a pair of snow shoes, each made of two strips of wood bent like an ox bow, with the straight part fastened together with deer skin. The woman sold me a short knife, with a scabbard of wood and ivory rudely chased. It was the only piece of ornamental work I saw. As I was anxious to ascertain the height, the distance round the chest, and the length of the arm, hand, and foot of an Aino woman, my interpreter bribed the husband with a small piece of silver to make the desired measurements, but the paper was unfortunately lost, and now I can only state from memory, that the peculiarity which struck me most was that the regions of the waist and chest did not appear as separate as in most women, but it remains to be seen whether this is a permanent character. The mammae were very largely developed, and gourd shaped.

"When a woman marries they tattoo her upper lip and sometimes the under one also. A favorite pattern has the ends curved up, in just the way exquisites sometimes curl up the ends of their mustaches. Several times I inquired what was the cause or origin of this strange custom, but invariably received the unsatisfactory answer—'because it is the Aino fashion,' which is, perhaps, as good a reason as could be assigned for a thousand foolish customs in the most civilized lands. At all events it gives these Aino women the appearance of trying to add to their charms by artificially making up for what they seem to consider a defect in nature's handiwork. The women also tattoo the backs of their hands in narrow transverse bands, but no other parts of the body. They never blacken their teeth or compress the feet. In each Aino village, the oldest man, or a very old man, is the chief, and he in turn is responsible to a Japanese official styled the 'Aino Interpreter.' As the chief was away fishing, we called on the Interpreter, who was also absent, but a sub-official gave me some further items in regard to the strange people under his charge. They cultivate millet and potatoes, but no rice. In one hut I saw the thick midrib of some wild plant finely chopped. When they kill a bear, they are allowed the head, but the skin belongs to the Interpreter. They are permitted however to wear deer skin, and the woman I saw first at Mori had on an outer dress of that kind. It is said that when young cubs are found they are brought home and nursed by the Aino women like their own children, but this is quite incredible.

"On my return to Hakodaki I found that eight Ainos had just arrived in a couple of junks from a place on the south coast, a short distance east of Endermo Bay. With the prospect of a small present they readily came to the residence of Colonel Rice, whose kind hospitality I was then enjoying.