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Contents:

(Illustrations are indicated by an Asterisk.)

PAPER FROM CORN HUSKS.

For many years the Austrian Government have encouraged a series of experiments made to test the value of Indian-corn husks for making paper, and from the manufactured samples we have seen it appears that so far as the practicability is concerned the scheme has been successful.

It is apparent that some substitute for rags is very much required, for the supplies are yearly becoming scarcer; more particularly since the war, when the cotton market has been so scantily filled. Certain kinds of the softer woods are now used to a great extent in the manufacture of paper, and the peculiar machines and processes necessary to work this substance have been brought to great perfection; and wood-paper may, in time, supply a portion of the demand for the ordinary purposes of business at a cheap rate.

Paper, it is well known, can be made from a variety of substances; but the cost of manipulation is in many cases too great to make them available. It is one objection urged against the use of corn husks for paper that the stock commands at this time a very high price, seven or eight cents per pound, simply for use in mattresses, and that if brought forward as a substitute for rags, the demand would run the price up immediately. Be this as it may the Austrian Government now makes paper of a superior quality from corn husks alone and puts it into the market against rag-paper. The Government has an advantage which paper-makers in this country have not, and that is in being able to purchase rags at first hands, so to speak; the great ports from which they are sent to this country are chiefly in Austria or the immediate vicinity. There are, moreover, other points in the manufacture of paper from corn husks which render an investigation into its value important. The process of reducing the pulp or fiber from which the paper is made, leaves the stouter fibers or skeleton of the husk uninjured, and these are easily woven into strong stout cloth, or a fabric resembling crash toweling. Still another resultant, besides the paper stock and fiber is obtained. This is the starch contained in the husk, which is all saved, pressed into square cakes. and afterward ground into flour from which bread has been made. If not desirable for this use here, it is certainly valuable for feeding animals. It is therefore clear that the corn husk is capable of a variety of uses, and it is important that it should receive serious attention. It is not reasonable to suppose that the Austrian Government are spending time and money in the pursuit of a chimera, and if it can be made an article of commerce in that country, there is no reason why we too should not reflect upon this subject.

If we sleep upon mattresses made of husks, it is plain that by intelligent management we could turn the material to much better advantage and use the fibers for bags; we may extract the life-supporting principle, and set free the paper stock to go abroad to our countrymen in the shape of weekly journals, and yet have mattresses from some other and cheaper material.

These are not schemes which we have briefly alluded to, but only an incomplete record of the uses to which the maize plant is now put in Austria. Rolls upon rolls of the cloth are manufactured annually, and it is both stout and strong; a sample can be seen at this office. The great question to be looked at is simply—Will it pay? The obvious inference is that if the Austrian Government finds it advantageous to foster establishments for using corn husks in this manner, manufacturers in this country may at least examine into it with profit. If it shall be found (and we are sanguine it will) that corn husks can be put to better uses than feeding cattle or stuffing mattresses, a very great field is open for the development of a new source of individual and national wealth.

THE HECKER AND WATERMAN EXPERIMENTS.

For the benefit of our new subscribers we will briefly state that this is an elaborate series of experiments being conducted at 239 Cherry street, in this city, by Henry Waterman, at the expense of George V. Hecker, to ascertain the actual advantage of working steam expansively, in a cylinder both with and without a jacket of steam. The cylinder is made of steel plate 1-10th of an inch in thickness, and is surrounded by a similar plate, the space between being 3-8ths of an inch thick. The whole is then secured in an ordinary cast-iron cylinder. The experimental engine has a cylinder 10 inches in diameter with 2 feet stroke. Experiments are tried with the space between the two cylinders filled with steam, and then under the same conditions without steam in this space. The engine is also worked as a condenser and as a non-condenser. For each experiment the engine is run constantly 30 hours, observations being recorded every hour. To give a full idea of the character of these observations we publish the headings of one of the 30-hour sheets, with a few of the hourly records, and the observations and computations which are made on each sheet:—

MARCH 18, 1864. STEAM IN HEATERS.

Hour.	Counter. Number.	Counter. Rev'n per min.	Steam in Boiler.	Thermometer. Room.	Thermometer. Feed tank.	Thermometer. Hot well.	Feed tank steam chest.	Water from steam chest.	Water from heaters.	Vacuum.	Coal.	Barometer.
5 P. M.	966200	60·63	38	68	80	97	h.m. 41	lbs. 12½	27¼		lbs. 360	29·65
6 "	966838	60·96	37	69	88	90		13½	27¼			29·65
7 "	160	61·20	36	69	87	90	8-15	13	27¼			29·65
8 "	4132	61·96	36	70	89	88	lbs.	14	27¼			29·65
9 "	7782	60·83	36	69	89	90	5	13¼	27¼			29·65
10 "	11500	61·96	36	69	87	91	5	13¼	27¼			29·65
11 "	15214	61·90	36	70	89	90	9-45	13	27¼			29·65
12 "	18916	61·70	37	70	89	90	11-15	12½	27¼			29·65

The observations are recorded in the same way for the 30 hours, when the ashes are weighed and deducted from the weight of the coal used. The figures in the columns are then added, the means calculated, and the pounds of water evaporated per pound of coal and per pound of combustible are computed and recorded.

IN the month of May three locomotive boiler explosions occurred on English railways. It is reported that in every instance the dome has been the seat of failure.

METAL-WORKING.

The perfection to which metal-working has attained is one of the miracles of modern times. Tools cut iron and brass at speeds which, fifteen years ago, would have been pronounced unattainable with economy. In gun and pistol factories and in sewing machine shops the various pieces are turned, milled, sawed, planed, or ground in such quantities and with such unfailing accuracy as to command the admiration of the observer Not only have the tools been greatly improved in their character, but the material worked upon has also undergone important modifications ; by this we mean the processes to which it is subjected before it is worked by cutters. Steel is annealed so thoroughly that its character as a tough, tenacious, and stubborn metal is wholly destroyed, and it becomes as tractable, so to speak, as the softest iron. Its virtue is not destroyed by this operation, but changed, and the temper is restored again at will.

It is important to remember that these improvements in working metals were not reached by conjecture, or by a single bound; but by successive steps and careful experiment. Whatever advantages we enjoy over other nations as skillful workmen is due wholly to the skill and intelligence of our artisans, and it is no hyperbole to say that they are indeed the bulwarks of the nation.

THE GOVERNMENT STEAM EXPERIMENTS.

The Commission is moving steadily forward in the prosecution of these experiments. On starting the engine it was found that the arms of the fans which furnish the resistance were not quite strong enough, and they are being made stronger. Mr. Allen, the head of the Commission, is satisfied that the fans are going to prove a very perfect resistance for the purpose of experiment; being adjustable to any amount of resistance desired, offering a resistance which is perfectly uniform, and which can be measured with accuracy in foot-pounds. It is the intention to try the effect of cutting off steam at different points in the same cylinder, the effect of different areas of ports, of different leads, and of all other matters connected with the working of the steam engine which it is desirable to know, and which can be ascertained by means of the extraordinary facilities placed by the Government in the hands of this Commission.

CHARLES WYE WILLIAMS ON HEAT AND STEAM.

There are two classes of writers—clear-headed men and muddy-heads. The first embraces all of the great minds, and numerous others who, with fewer ideas, yet understand distinctly everything that they think they understand. When this class of men attempt to convey their ideas they generally use short, simple words ; and they always use words whether short or long, with a perfect understanding of their exact signification. One of the charms of Macaulay's matchless style is the manifest fullness of his appreciation of the precise meaning of every word and phrase which he employs. The same is observable in the writings of Sir John Herschel, of Dr. Lardner, of Faraday, of all the great masters of science.

The muddy-heads are not all by any means destitute of intellect. Some of them have a great many ideas, but their ideas are always vague, undefined, and without distinctness. When men of this class attempt to speak or write, the meanings which they attach to their words and phrases are generally as vague as their ideas. The most perfect specimen of this class is Charles Wye Williams. He has written a book of 278 pages on Heat, Water, and Steam, which has been republished by the great industrial publisher, Henry Carey Baird, of Philadelphia.

The vague way in which Williams uses language is forcibly shown in a paragraph on page 32 of his book. There are three phrases which he has occasion to use very frequently in his discussions—these are *latent heat*, *atoms of water*, *and units of heat.* Now each of these has a definite meaning which has been perfectly established by general use.

Latent heat is the heat which disappears when a body changes from the solid to the liquid state, or from the liquid to the gaseous state. To talk about the latent heat in ice, or in any solid, is nonsense.

An *atom of water* or of ice is formed by the com-