(For the Scientific American.)

Heating Factories with Steam—Its Economy.

MESSRS. EDITORS—I have been a constant reader of the SCIENTIFIC AMERICAN since the commencement of the second volume; and I have no doubt that I have received back in dollars and cents, indirectly, ten times the amount the paper has cost me; not to speak of mental advantages.

I like the old-fashioned plan of telling one's experience, not only in spiritual, but temporal matters also. If you think mine will be of any benefit to your 25,000 subscribers, they can have it free of charge.

I have the supervision of an establishment that was erected last summer for manufacturing purposes, requiring a small steam engine as a motive power. We occupy two rooms, forty by sixty feet, which were fitted with pipes to heat by steam direct from the boiler. We found it to save at least forty per cent. of the fuel required to heat by stoves in the usual manner, besides making a much more pleasant and agreeable atmosphere. The room on the first floor has four 3-4 inch pipes on three sides of it. The room above it has three pipes of the same size, and nearly of the same longitudinal extent. The engine is of about four horse power. The boiler is of the locomotive kind, ten feet long, two feet in diameter, with twenty-four 1¾ inch tubes, 7 feet long; with a fire box 22 by 30 inches. The draft returns under the shell. Some two months ago, we connected the exhaust pipe of the engine with the main heating pipe; supposing that in mild weather the heat of the exhaust steam might be sufficient. We opened a communication with the atmosphere by connecting a pipe with the condense water pipe, and extending it outside the building, and in that pipe put a common screw valve. The first mild day after making the above arrangement, I let on steam direct from the boiler until the rooms were sufficiently warm, and then shut off the steam from the boiler, and turned the exhaust steam into the heating pipes. After running a few minutes, I shut the valve in the pipe connecting the condense water pipe with the atmosphere, and the engine continued to work as freely as when it was open. Finding the exhaust steam insufficient for cold weather, it heating the rooms to only about 50°, by way of experiment, I let a little direct steam from the boiler into the pipes in which the engine was exhausting, with no apparent diminution in the speed or power of the engine, though, of course, there must have been some. Since that time, the engine has exhausted into the heating pipes without any communication with the atmosphere whatever. When the weather is so cold that the exhaust will not heat up sufficiently, I increase the temperature by letting in direct steam in connection with the exhaust, thereby saving all the heat of the exhaust, and using but little direct steam in comparison to what would be required to heat the rooms entirely by it.

When using only the exhaust steam, I frequently find quite a strong vacuum in the further extremities of the heating pipes.—When we heated with direct steam alone, we burned 400 lbs. per day of anthracite coal, chesnut size, at $6 per tun. Since we have used the exhaust with the direct steam in connection, we have burned but 250 lbs., which would be insufficient to heat the rooms with stoves. Another important advantage obtained by this arrangement is this: all the steam generated in the boiler is condensed in the pipes, and returned to the cistern at about 100° of heat, and pumped from that, through the heater, into the boiler, at almost the boiling point, where it is again evaporated into steam, and used over again and again, being entirely free from extraneous matter, consequently, causing no incrustations. We frequently use no additional water for three days in succession, so that, in reality, two barrels of water would be an abundant supply for a week. Another advantage is, the steam is condensed and returns to the cistern just fast enough to supply the boiler, and is consequently self-regulating. E. LEACH.

Norwich, Conn., March 26, 1855.

American and English Flour.

In the SCIENTIFIC AMERICAN of the 10th March, there is an extract from Dr. Muspratt's work on chemistry applied to the arts. The doctor is greatly at fault in most of his statements, as is often the case when a person writes upon a subject with which he is practically unacquainted. English millers do not damp their grain prior to grinding; their climate is humid enough at all times for the grain to absorb moisture, and oftentimes in wet harvests, when the grain becomes much sprouted, it has to be kiln-dried, when foreign grain cannot be obtained to mix with it. English flour is best adapted for exportation because their millers bolt their meal cold, and much of the moisture liberated by grinding is allowed to evaporate. We manufacture a whiter article of flour because our consumers require it. I do not think we excel the British in our bolting apparatus, but our people will let the world know they are somebody, and therefore we make whiter flour. I have seen large quantities of inferior western flour manufactured in the east of England, and sold for "Prime English Household." Much American flour shipped to Europe is the *fag-end* of our own—that which we do not want. I presume Dr. Muspratt must have bought a barrel of flour manufactured at the mills where I worked, as I recollect my employer telling me of having shipped some flour to Glasgow, if so, I do not wonder he speaks so highly of American flour.

In England, stationary wire cylinders with revolving brushes are principally used for bolting, excepting for choice qualities, in which case a seamless cloth drawn on a circular reel, is used. The Dutch bolting cloth is principally used here—the number of meshes being according to the quality of flour required. I do not think the English wheat excels the American. The best white English wheat is raised in the chalk districts in the south, especially near Uxbridge. Soil has more to do with the quality of wheat than climate. The heavy clay lands of England grow a strong red wheat, something like our Indiana red. The fen lands of Lincoln and Cambridgeshire, raise a quality like that of Illinois spring wheat. There is a great difference in what is called "prime Genesee wheat" with ourselves. Most of it is whole Michigan. Oftentimes, indeed, the quality of wheat raised in a district indicates the character of the flour made in it; but millers in many cities can avail themselves of different varieties to produce any quality desired by customers.

I have never seen wheat moistened before grinding (perhaps some eccentric genius has tried it;) we should be sorry to use the watering pot in this State. One cause of American flour souring—more especially that made from western wheat—is owing to its being warm, and immediately packed too hard in the barrels. There are various kinds of driers, but if millers have their stones in proper face, and good bolting apparatus they require no more to make good flour of every quality. I have ground English, Poland, Odessa, Spanish, and French wheat, also every variety of American wheat, except southern, and can say from experience that good flour can be made from them all—some whiter, and others drier, of course. The English millers do not obtain a larger bulk of flour than the American millers, neither do the latter make a better quality, but as it is demanded of them, and contrary to what Dr. Muspratt has said, our bran here will not soil a black coat. * * *

Jackson, Michigan, March 29th, 1855.

(For the Scientific American.)

Proving of the Gravitation Theory.

The moon is 240,000 miles distant from the earth, and 95,000,000 miles distant from the sun. Each has an attractive influence over her proportional to the squares of their distances, and to their relative masses. As the square of 95,000,000 miles is to the square of 240,000 miles, so is the mass of the sun at his distance to the mass required to balance his attraction at the earth's distance, making the latter about one one hundred and sixty thousandths of the former. The mass of the earth is about one three hundred and fifty thousandth that of the sun—not half so large a one as is necessary.

Then the sun's gravitating influence over the moon is double that of the earth over the same. Suppose the moon to be leaving that point in her orbit where she has the earth between her and the sun. She cannot but obey that double attraction, and therefore will, instead of curving downward and backward behind the earth, go forward, taking an orbit of her own round the sun, just as if there were no earth. This orbit will be as far outside of that of the earth, as the moon is distant from the earth, namely, 240,000 miles, making its circumference 598,000,000 miles, 1,000,000 miles more than the circumference of the earth's orbit. To the velocity which the moon has with the earth in their united course round the sun—1,632,000 miles per day—she adds that of her passage round the earth—53,000 miles per day—so that her period of revolution in her new (annual) orbit will be 355 days, 10 days shorter than the earth's period.

Will the gravitationists attempt to falsify my deduction from their premises? Let them attempt. G. W. EVELETH.

Iodine.

Iodine derives its name from *iodos*, a Greek word signifying "violet-colored;" but the transcendant beauty of the color of its vapor requires further elucidation than simply saying that it has a "violet hue." If a little iodine be placed on a hot tile, it rises into a magnificent dense vapor, fit for the last scene of a theatrical representation. This remarkable substance was discovered by accident about forty years ago. At that period chemical philosophy was in great repute, owing principally to the brilliant discoveries of Sir Humphrey Davy. So singular a substance as iodine was to Davy a source of infinite pleasure. He studied its nature and properties with the fondness and zeal of a child at a puzzle map. His great aim was to prove its compound nature; but in this he failed; and to this day it is believed to be one of the primitive "elements," of the world we live in. Iodine is found in almost every natural substance with which we are acquainted, although in very minute portions. The sea furnishes an almost inexhaustible supply of iodine. All the fish, the shells, the sponges, and weeds of the ocean yield it in passing through the chemical sieve. Whatever be the food of sea-weeds, it is certain that iodine forms a portion of their daily banquet; and to these beautiful plants we turn when iodine is to be manufactured for commercial purposes. The weeds cast up by the boiling surf upon the desolate shores of the sea islands would at first sight appear among the most useless things in the world, but they are not; their mission is fulfilled; they have drawn the iodine from the briny wave, and are ready to yield it up for the benefit and happiness of man. The inhabitants of the Tyrol are subject to a very painful disease, called goitre or cretinism; for this malady iodine is a perfect cure. Go, and have your portrait painted "as you are." Photography tells the whole truth without flattery; and the colors used in the process are only silver and iodine.

SEPTIMUS PIESSE.

London.

About Mosquitoes.

MESSRS. EDITORS—You are doubtless well aware that the mosquito proceeds from the animalculæ commonly termed the "wiggle-tail." I took a bowl of clean water and set it in the sun; in a few days some half dozen "wiggle-tails" were visible, these continued to increase in size, till they were about 3-16 of an inch in length. As they approached their maturity they remained longer at the surface, seeming to live in the two mediums air and water; finally, they assumed a chrysalis form, and by an increased specific gravity, sank to the bottom of the bowl. Here, in a few hours, I perceived short black furze or hair growing out on every side of each until it assumed the form of a minute caterpillar. And thus its specific gravity being counteracted, or lightened, it readily floated to the surface, and the slightest breath of air wafted it against the side of the bowl. In a very brief space of time afterwards, the warm atmosphere hatched out the fly, and it escaped, leaving its tiny house upon the water. How beautiful, yet how simple!

After the water had gone through this process, I found it perfectly free from animalculæ. I therefore came to the conclusion that this "wiggle-tail" is a species of the shark, who, having devoured whole tribes of nameless animalculæ, takes to himself wings and escapes into a different medium, to torture mankind, and deposit eggs upon the waters to produce other "wiggle-tails," who in turn produce other mosquitoes. PACIFIC.

San Francisco, Cal., Feb. 25, 1855.

A Bad Habit.

MESSRS. EDITORS:—Permit me, through the columns of your widely circulated paper, to address mechanics on a practice which is often the source of great annoyance, and sometimes productive of great injury to that much injured class—inventors. The habit to which I refer is, that when an inventor goes to a mechanic to get something connected with his invention constructed, he is often plied with questions, such as "what is this for," &c. These are often rendered very disagreeable, by the pertinacity with which they are urged.

Such questions, if prompted by a laudable curiosity and desire for information, would not be objectionable, but information obtained in this way is soon spread abroad, and everybody soon knows as much about the invention as the inventor himself. CATO.

Salem, Mass., March 23, 1855.

An Excellent Paste for Envelopes.

Mix in equal quantities gum (substitute dextraie) and water in a phial, place it near a stove or on a furnace register, and stir or shake it well, it will soon dissolve, and is then fit for use. A little alcohol added after it is well mixed, will prevent its becoming sour, and keep it for any length of time. This is better and much cheaper than any of the gums used for labels or envelopes, and does not crack. T. J. W.

Ambrotypes.

The Worcester, (Mass.,) *Transcript*, thus describes photographic pictures on glass, taken in that city, by Messrs. Hathaway:—

"The picture is taken upon a piece of fine plate glass. Of course the very finest is used, which is free from all imperfection or blemish. Two of these plates sealed together, constitute the picture, although the impression is taken upon but one. In preparing the plate for the camera, it is covered with collodium (gun cotton dissolved in sulphuric ether) and then immersed in a bath of nitrate of silver. By the latter process, the plate is completely silvered. When it comes from the camera, it is exposed to the action of another chemical preparation, and to a bath of sulphuret of iron. Then it is washed with water, and with a preparation of hyposulphite of soda, which, as it were, fixes the picture, and gives it a fast color. After this, it is gilded, which darkens the picture, and it then is the perfect, life-like portrait. There is not about the ambrotype the glare of the daguerreotype, and it has a greater softness and finish.

"The inventor of the ambrotype is James A. Cutting, of Boston, an indefatigable and patient experimenter. We believe he has already sold the exclusive right to make the ambrotype in Springfield, Hartford, New Haven, Chicago, Nantucket, &c., &c. The Messrs. Hathaway have the right for Worcester, Springfield, Edgartown, and Nantucket."

[Our readers will perceive that this is the same process as that described in the SCIENTIFIC AMERICAN, two weeks ago, page 210, when it was stated to be the discovery of a Mr. Archer, in London, in 1851, and this was proven at the trial of law there recorded. If Mr. Cutting, of Boston, is the original inventor, Mr. Archer, of London, cannot be so at the same time, and *vice versa*.

The Mormons are about to build a steamboat for Salt Lake.