Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.
☞ "The New York News Company," 8 Spruce street.

☞ Messrs. Sampson, Low, Son & Marston, Booksellers, Crown Building, 188 Fleet street, London, are the Agents to receive European subscriptions. Orders sent to them will be promptly attended to.

☞ A. Asher & Co., 20 Unter den Linden, Berlin, are Agents for the German States.

☞ Tubner & Co., 60 Paternoster Row, London, are also Agents to receive subscriptions.

VOL. XX., No. 20...[NEW SERIES]....*Twenty-fourth Year.*

NEW YORK, SATURDAY, MAY 15, 1869.

Contents:

(Illustrated articles are marked with an asterisk.)

A REFORMATION IN THE PATENT OFFICE.

Secretary Cox enjoys the reputation of being a patriotic and incorruptible man. He has certainly given earnest proof of the possession of these sterling qualities by breaking up the villainous rings that so completely demoralized the service of the Indian Bureau.

In the selection, also, of Col. Fisher to occupy the important position of Commissioner of Patents, we are still further assured that Secretary Cox intends to put an end to imbecility and corruption in the management of the affairs of that Office. It has come to pass, somehow, that the Patent Office has fallen under suspicion. The misappropriation of the funds of the Office in barbaric decorations, Dempsey & O'Toole contracts, and other transactions of a somewhat doubtful character, served to justify Congressional interference. But worse even than these things is the current impression that the Patent Office had fallen into the hands of a corrupt clique who molded the decisions of the Office to suit their own interests. We cannot say that this suspicion was justly founded, but we do know that its general influence upon the character of the Office has been pernicious in the extreme. It is also well known that certain parties about the Patent Office have hitherto been too much in the habit of claiming a sort of paternity to the Commissioners, as if they were merely creatures of their breath. This may have been merely a vain and innocent conceit; but such things tend to degrade the character of the Commissioner of Patents and expose him to unjust suspicion.

Col. Fisher is indebted to none of these parties for the position he now holds. It is well understood that other candidates were urged by them, they knowing probably full well that should Col. Fisher get the appointment he would be fully competent to undertake all the duties of the Office without their intrusive advice, and moreover his character was a sufficient guaranty that corrupt rings could not bind his independent action. We feel encouraged, therefore, that brighter days are in store for the Patent Office, and that the new Commissioner will fully justify the confidence reposed in him.

THE SALE OF GAS BY QUALITY AS WELL AS QUANTITY.

We notice that the absurdity of selling gas by measure merely without regard to its quality, to which we called attention in an article on "Gas Measurement," nearly a year ago, has begun to attract notice both in this country and in Europe. *Engineering*, of April 9th, contains an able editorial on this subject, in which it almost reiterates the very language we used in the article referred to. It says: "There seems to be a very general opinion on the part of gas consumers that they should have some readily accessible certification of the quality of gas in regard to illuminating power and purity; and that since the supply of this lighting material is virtually a monopoly, the relations between the price paid for it and the qualities above mentioned, should be regulated in such a manner that the consumer might obtain a fair equivalent for his money, while the gas companies would be secured a reasonable interest on the capital and expenditure necessary for their operations."

It is evident that if the gas delivered to customers be of uniform chemical composition, and be delivered under uniform conditions of pressure, its illuminating power will be uniform. These conditions can be only approximated in practice, but there are certain limits beyond which no variation ought to be tolerated.

A photometric test is one which is out of the question for universal use. Beside requiring personal attention at every application, there is no unit of measurement that can be relied upon as being uniform. Candles vary widely in their illuminating power, and the oil lamp of Keates, recently invented for photometric use, seems to us far from perfect. There is also a necessity for the proper adjustment of burners to the quality of the gas in photometric tests. No test made with a single burner is reliable. Poor gas will flow far more freely through a small aperture than rich gas, and as the flow is intimately connected with the pressure, and the pressure with the illuminating power, the necessity for repeated tests with different burners becomes obvious. These considerations show that this kind of testing can never be made available to consumers at large.

We believe a specific gravity test cannot be made applicable to the obtaining of approximate results as to the illuminating power, and the determination of those gases which are detrimental to the illuminating power of the complex mixture of hydrocarbons which constitute illuminating gas.

We speak of this here because it has been proposed several times of late, by inventors not fully acquainted with the subject, to construct a meter having a register to run faster or slower, as the specific gravity of the gas might vary. We consider such a device a useless one, as the specific gravity of gas bears but a slight relation to its illuminating power.

Any method, to be of value to the consumer, must be one that can be applied at will and give the mean illuminating power for the periods of time for which bills are made out and collected.

The problem to be solved then is the invention of a means, either as an attachment to the ordinary meter or otherwise, whereby the mean illuminating power, per month or quarter, can be readily obtained by the consumer as well as the companies who supply the gas. This, with the quantity delivered and the mean pressure at which it has been delivered, would form an equitable basis for assessments. The determination of the mean pressure seems to us to be not a difficult thing to accomplish by some simple addition to the meter itself. The determination of the mean illuminating power is by far more difficult to accomplish by the use of mechanism. It does not seem impossible, however, to collect a specimen of gas by means of simple mechanism, that shall be a sample of the mean quality of the gas used during a given space of time.

But how shall this specimen be tested when obtained? There is room here for a good deal of study. It is possible that a fixed relation may be found between the illuminating power of gas and its heating power; if so, the test would be exceedingly simple, but we see reasons that lead us to suppose such a relation would be difficult to establish.

Notwithstanding the difficulties of this problem, we believe its solution is possible and that some inventor will yet realize a fortune, by giving to the public a simple, cheap, and efficient apparatus for determining the illuminating power of gas, and the pressure under which it is delivered as well as the quantity consumed.

EARTH CLOSETS.

The water closet, although a very convenient and almost indispensable appendage to a first-class residence, is open to many objections, arising from carelessness in its management, freezing of pipes, etc., which are too well known to need specification. The earth closet, improved as it has been already, and doubtless will be, is destined, if we mistake not, to prove a formidable rival to the water closet.

The general principle which gives value to the earth closet is the power of earth to deodorize decaying and decomposed organic matters. This is due partly to its absorbent power upon gaseous compounds, and partly to chemical reaction, between the substances of which earth is composed and the offensive matters. The absorbent power of earth upon effluvia has been long known. In rural districts the practice of burying clothes to rid them of smell caused by too intimate contact with that personally disagreeable, but to hop-growers exceedingly useful little animal, the skunk, is a common practice. It is well known that excrementitious matters, covered with dry earth, are not only completely deodorized, but form the most valuable of all known fertilizers.

The mechanical construction of earth closets, as they are now made, is such, that by a very simple movement, matters deposited therein are instantaneously covered with a layer of dry earth, and, thus deodorized, may be removed with as little offense or trouble as ashes.

The plan is commendable in many points of view. On shipboard its introduction would obviate the most intolerable nuisance. In hospitals it would greatly promote the health and comfort of both patients and their attendants. It is equally applicable to dwelling houses, wherever situated, and under any circumstances whatever, and is as applicable to a commode as to a room set apart for the purpose. It removes all danger of the impregnation of wells with excrementitious matters, an accident now of frequent occurrence, and the cause of frightful epidemics.

Its universal adoption would lessen the demand upon the water supply of cities to a very large extent—an important consideration. It can be made convenient in use, and lastly, but not by any means least, such a system might be made to restore to lands the large amount of valuable fertilizing matters which now flow through the sewers of seaboard towns to contaminate the water for miles around.

The value of this now wasted sewerage is enormous. It may be estimated in millions annually. Engineers have racked their brains to devise some means of utilizing this waste; it seems to us that the earth closet is the true method for its accomplishment. Not that we believe the principle has been yet wrought out to perfection, but that it is capable of being applied so as to cover all the requirements of the case.

Our attention was first called to this subject by the perfect absence of smell, and the superior cleanliness of the earth closets of the Oneida Community, an association which, whatever its errors of belief, is not open to any criticism on the score of cleanliness. These closets are daily cleaned, without inconvenience, by simply drawing away the earth and deodorized matter with the receptacle allotted to them, and replacing it by another. The compost is used on their lands, and is considered an extremely valuable manure.

We are glad to see that public attention is being directed to this matter on both sides of the Atlantic, and we trust the subject will be discussed, and the matter tested until its merits are fully established. A patent is pending at the Patent Office now on a very ingenious earth closet, the invention of an Englishman. As soon as the patent issues we shall probably illustrate the subject in these columns.

EATING CONSIDERED AS NOT A FINE ART.

A man is in one sense a machine. He has his levers, valves, pumps, and pipes. He requires fuel to run him. He is a locomotive engine on wheels, as Dr. Oliver Wendell Holmes has shown. True, his wheels are only segmentary, and each of the two segments has but one spoke; so an entire revolution of either is impossible; but each has a reverse motion, and is lifted and placed back to its proper position, relative to the entire machine, while the opposite one is propelling, so that the necessity of an entire rim and more spokes, connecting it with the hub (hip joint), is obviated. This hub is also a a wonderful contrivance; it has many axes of revolution. Instead of revolving on a single axle, it is a ball and socket joint, and may admit of motion on its vertical as well as its horizontal axis, thus enabling the locomotive to get around curves without increased friction, a desideratum long sought for the iron locomotives which man's hands have wrought. The spokes (legs) also have a movable joint in the middle, and another where they join the rim (foot), which latter is as full of joints as it can well be made, having thirty, or thereabouts, exclusive of the lateral articulations of its pieces. A pretty complicated wheel this, but it is nothing to the complication of some other parts of this wondrous machine.

It has arms and hands of still more complex structure with which it performs useful work. It has a force pump and bellows, working constantly, night and day, and a fire box, in which the fuel is placed to keep the whole apparatus in working trim, for if the fire ever goes out and the water gets cold in the boiler, that machine is done with forever; it is worth even less than the old iron of a railroad locomotive. Consequently the prime object of all men, except those unfortunates who desire death, is to supply fuel to keep up steam. The work of the machine then is, or ought to be, worth more than the fuel it consumes. Fortunately, this is the case. For the most part, the work of one of these machines will buy not only fuel for itself, but for a number of smaller ones, and a round house (or square one) in which they all may be stowed away comfortably, beside something to spare for those poor broken machines which can do no useful work but yet claim their share of fuel and cover from the storm.

Its bell and whistle are combined by a curious arrangement and placed in a singular place, *i. e.*, just inside the furnace door. The clapper of the bell is a wonderful piece of mechanism. Look at it closely and you will see that it must have been designed to do a great deal more than to warn folks off the track when the engine is coming. Scattered over its upper surface, most thickly on the posterior portions, are little protuberances, called by the learned papillæ, whose office is to determine the quality of the fuel put into the door, and if this is found to be inferior or injurious to the machine, it, together with the folding stove doors, is so arranged as to reject the fuel. At the same time the clapper most generally rings out a most discordant and angry peal.

Now, if men were machines only, the uses of this apparatus might well end with the selection of proper fuel, and the rejection of the bad or inferior; but we find that, on the summit of the machine, there is a curious apartment—the engineer's domicile, fitted up most elaborately, with two most beautiful windows in front, an apparatus for transmitting sounds upon either side, and another most remarkable arrangement just below the front windows, by which a most subtle and critical examination of fuel as well as other external objects may be made. By means of these beautiful contrivances, the engineer is able to communicate with other engineers, without leaving his apartment, which he never does until he finally abandons his machine as worthless. If we look still still more closely, we shall discover little cords running from each of the papillæ to the engineer's room, and also from each of the other pieces of mechanism which we have described. The engineer receives over these cords (each of them in itself a wonder), sensations of pain or pleasure. When bad fuel is put in the fire box, the sensation is generally painful, and *vice versa*. But there may be enjoyment in taking in fuel which has very little economical value, and hence such fuel finds market, and is useful because it keeps the engineer in good temper, and, not unfrequently, prevents disaster from the too free use of fuel which has too high a heating power to be safely used by itself. In fact, the sole end and use of the machine is to give pleasure and happiness to the engineer; for though he may, and should, often use it to give others pleasure, he only does this because he feels high pleasure himself in so doing, or corresponding pain if he leaves the duty unperformed.

To give pleasure to the fine sensibilities of the mind and body is the object of those arts which have been called the fine arts, and there is no doubt that the art of cooking may be