Correspondence.

Rackarock Blasting Powder.

To the Editor of the Scientific American:

In your issue of the 10th inst. you state the power of rackarock to be 95 per cent of No. 1 dynamite. As a matter of fact, the average of the tests made for the Government by Gen. Abbot himself *ran nine per cent above* No. 1 dynamite.

You have taken our guarantee instead of the actual results attained. As usual, "we promised less than we performed."

RENDROCK POWDER CO.,
A. C. RAND, *Treas.*

How to Engrave Egg Shells.

To the Editor of the Scientific American:

Trace the writing or design on the shell with thin varnish or melted wax, using a common pen; then immerse the egg for a few minutes in vinegar or dilute acetic acid. A few experiments will determine the proper time, depending on the strength of the acid employed. Then wash the egg in water, and remove the tracing. Wax will rub off, and varnish will come off with alcohol. The result will be a most beautiful and delicate relief of the desired pattern. If varnish be used, a colored background can be produced by dyeing the egg before applying the alcohol. Wash tne egg before dyeing it, as the acid would injure the color.

E. L. INGRAM.

Wilmington, Del., Oct. 3, 1885.

Measuring the Height of Trees.

To the Editor of the Scientific American:

Measure off a distance from the foot of the tree which the experimenter may think is a little less than the length of the tree, and stand facing the tree with a staff of such length that it may be stuck into the ground until the top is on a level with the eyes. Then lie down on the back with the feet against the foot of the staff, the head being in a straight line away from the tree. It will be understood at once that the line of vision, passing just over the top of the staff, will strike the tree exactly the same distance from the ground that the eyes are from the foot of the tree. Of course, it is presumed that the tree is straight and that the direction selected to form the bottom of the right angle is level. It is easier to obtain these conditions by this process than by computing from shadows, as any side of the tree may be chosen.

This plan has been followed for years by woodsmen to find out before cutting whether a tree would make a stick of timber of a desired length or not.

N. L. GANO.

Fernandina, Fla., Sept. 28, 1885.

Pneumonia and Ozone.

To the Editor of the Scientific American:

In the issue of October 3 of your most valuable paper, which has been to me a constant friend and valued teacher for thirty-five years, I find an article headed "Pneumonia and Ozone."

In the interest of suffering humanity, I wish to call the attention of scientific observers to some facts that have come under my observation.

A member of my family has been suffering for more than twenty-five years from neuralgia. During the year 1865 I first observed that the malady enabled her to detect the approach of storms. The attacks always commenced before a storm reached her place of residence, and ended as soon as it rained, or gradually diminished as the storm passed by.

For the last ten years I have carefully watched the effect of storms on the invalid, and, by the government reports of the paths and extent of the movements of storm centers over the country, I find that on the approach of a storm the suffering will commence, and cease as soon as the storm center is reached. When the edge of a storm center passes over the residence of the patient, she will suffer until the whole storm center has passed by.

In the year 1871, during the prevalence of the peculiar disease that so completely prostrated the horses in Boston, the "epizooty," as it was called, the invalid suffered continually. During that year I had peculiar opportunities of observing the large excess of ozone in the atmosphere. Since then I have repeatedly tested the condition of the atmosphere in front of the storm center, and along its skirts, and always discovered an excess of ozone.

I have frequently called the attention of the medical profession to my observations, but found that all with whom I came in contact were satisfied with giving relief by the use of morphine, narceine, or chloral, rather than investigate the cause. All observers must know the fact that we are very sensibly affected by the chemical condition of the atmosphere. I hope, therefore, that you will call attention to the above facts, and request physicians in all parts of the world to which your valuable paper is carried to make such observations in connection with pneumonia as will establish or disprove its connection with ozone. If in modern science we once find the cause, we can readily find the remedy.

An old contributor,
JOSEPH A. MILLER, C.E.

KEEPING TRACK OF LOCOMOTIVES.

On a road of several divisions or of several engines, it is desirable frequently, and necessary, that the master mechanic, and sometimes the superintendent, have some means of determining at a glance the condition, size, etc., of the several engines, as well as their location and occupation. This is sometimes partially filled by a list, which, as it requires to be newly made each month, if anything like accuracy is desired, is, for the the reason of the bother of this, too frequently left undone, and the list generally is allowed to get several months and sometimes years old, when, of course, it is useless. I have seen a board arranged with clips to allow of the insertion of different colored slips of cardboard, which, having a certain feature exhibited by the color, gave the condition of the engine.

I have gotten up several boards based on this system, but which are simpler and, I think, much more complete. A board of the size to allow for the number of engines is arranged with feet, so that it may stand in any convenient position, or be hung on the wall. Where different divisions are to be represented, this is easily done by giving to each division a distinctive color, and painting each portion of the board allotted to such division that color. The board is pierced with holes, about three inches apart each way, each hole for an engine. Squares of cardboard of different colors and shades are provided, with holes through which the pins can be slipped to retain them in place on the board. The plan is that each color represents a part of the engine, while the shade of the color the condition of that part. The cards are of increasing size, so that they may all be seen.

Fig. 1.

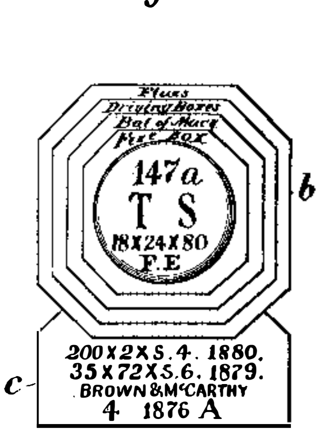
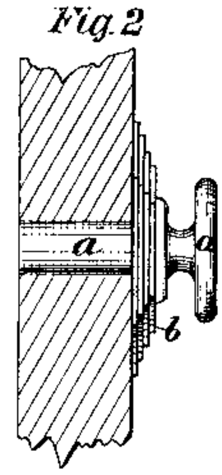


Fig. 2



Suppose it is desired to divide the engine for record into four general parts, such as the flues, driving boxes, balance of machinery, and firebox; then it would be necessary that the first card next to the board be the larger, as shown by "flues" in Fig. 1, so that it might show over those following it, the rest decreasing in size as shown. It is, therefore, necessary to establish the order in which they go on to the pins, as, say, flues front, driving boxes second, etc.

The flues may be represented by blue, driving boxes by red, balance of machinery by green, and the firebox by yellow, etc. White represents a first class condition, black that the engine is in the shop for repairs. The condition of each portion is represented, therefore, by the shade of color, while the part is represented by the color and position of card on the pin. The condition is divided into first class, represented by white; fair or needs light repairs, by a light shade of the distinctive color; needing heavy repairs, by a darker shade of the same color; and in the shop, by black.

Suppose, in Fig. 1, that the flues are in bad order; then, as blue indicates the flues, and they need heavy repairs, the first card next to the board would be a dark blue. The driving boxes need light repairs, and therefore the next card would be a light red; the balance of machinery being as supposed in fair order, or needing light repairs, the next card should be a light green; and the firebox a light or dark yellow, as answered the condition of it. Suppose the engine to be in the shop for heavy repairs or a general overhauling. This would be indicated by the first or largest card being black, and each of the following cards of dark shades. If, however, she was in for a new set of flues, with nothing else to be done—an improbable case, but supposed simply to illustrate how this might be indicated—the proper arrangement would be: put a black card to indicate the engine was in the shop, and next a dark blue to represent heavy repairs to the flues; and as it is supposed that nothing is to be done to the balance of the engine, the balance of the cards would be white. But if light repairs were to be made on the balance of the engine, light shades of red, green, and yellow cards would follow, If new flues and a new firebox, and the balance light repairs, were the conditions, the black card would come first, to show the engine was in the shop, dark blue next to indicate heavy repairs to the flues, light red next to indicate light repairs to the driving boxes, light green to represent light repairs to the balance of machinery, and a dark yellow to show heavy repairs to the firebox. An engine just out of the shop would be represented by all of the cards being white, to show first class condition; and as her parts deteriorated by service, the conditions would be shown successively until she again went into the shop.

Each month each division master-mechanic makes out a report of each engine on his division on a printed slip or sheet, on which the words flues, driving boxes, balance of machinery, firebox, service, with or without air pump, engineer, and fireman, etc., are printed, opposite to which he records the proper words in answer. This sheet being forwarded to the general master-mechanic, in whose office the board is properly supposed to be, he furnishes the boy whose duty it is to look after the board the necessary information with which to change the board to the new conditions, thus supplying at a glance all of the information generally desired to be known in a hurry about each engine.

On the end of the pin, *a*, Fig. 1, is marked the number of the engine—147; next follows the initial letters of the stations she is running between, as T for Turtletown and S for Sheboygan. 18 x 24 x 60 shows the engine 147 has 18 x 24 cylinders and 60 inch drivers. The letter F that she is in freight service, and E that she is an eight wheel or American type. In place of E, M for mogul, T for ten-wheeler, and C for consolidated would be substituted to meet the case.

If it is desired to extend the information exhibited, a card, *c*, being the first card next to the board, and having a lower extension, as shown, may be used, on which may be recorded whatever may be desired, as 200 x 2 x S. 4, 1880 would stand for 200 two inch flues, S for steel flues, and 4, 1880, that the flues were put in the fourth month of the year 1880. 35 x 72 following would indicate the size of the firebox, S that it was steel, and 6, 1879, that it was put in the sixth month of the year 1879. Brown and McCarthy are the engineer and the fireman; 4, 1876, the date when the engine was last overhauled; and A that the engine has an air pump; and as much more information as may be desired, the *position* of each line showing what it refers to. A key, explaining this and the colors, etc., is convenient, although not necessary, as the simple planning out of such a board will suffice to make the whole clear, so that a glance is sufficient to answer many questions which are ordinarily only determined after hours of hunting through books, etc.

FRANK C. SMITH.

Explosions Caused by Carbon Dust.

Mons. C. Engler has been making some experiments on the nature of explosions caused by various kinds of dust, more especially in connection with accidents which have occurred in the manufacture of lampblack. He finds that these explosions may be attributed to the inflammation of a mixture of combustible gases and air, of carbon in a finely divided state, or of a mixture of combustible gases and particles of lampblack in air. The problem which he set himself to solve was this: Is it possible for the inflammation of dust floating about in the air to take the form of an explosion, even when this dust is incapable of engendering a combustible gas under the influence of heat? It is scarcely necessary to follow the details of the experiments; but as the conditions of one series were those in which a combustible dust and an inflammable gas were brought in contact with each other—circumstances which have been found to give rise to spontaneous combustion of a more or less explosive kind—some particulars in regard to them may be given. The first materials selected were charcoal dust and ordinary illuminating gas; and it was found that air mixed with from 8 to 12·3 per cent of gas and dust exploded on ignition. When the mixture was from 3·5 to 7 volumes per cent, the whole mass rapidly took fire; but when there were only 2·4 volumes per cent, the mixture did not ignite. According to Herr Wagner, air charged with Munich gas to the extent of 6·7 volumes per cent will, on ignition, cause slight explosions; but air which contains only 6·25 per cent of gas is not susceptible of ignition. With Carlsruhe gas (with which the experiments were made), it was found to be impossible to cause the inflammation of mixtures of air containing less than 7·5 per cent of gas. It seems, therefore, that a mixture of air and lighting gas (where the latter exists in too small a quantity to allow of its inflammation) becomes capable, whenever it contains, in addition, particles of carbon in suspension, not only to quickly propagate flame, but to produce actual explosions. The experiments of M. Engler possess especial interest, inasmuch as they show that a carbon which does not develop combustible gases under the influence of a high temperature (as, for instance, charcoal) is nevertheless capable of rendering explosive a mixture of air and hydrocarbon gas when the proportion of the latter would, under any ordinary circumstances, be insufficient to engender flame,