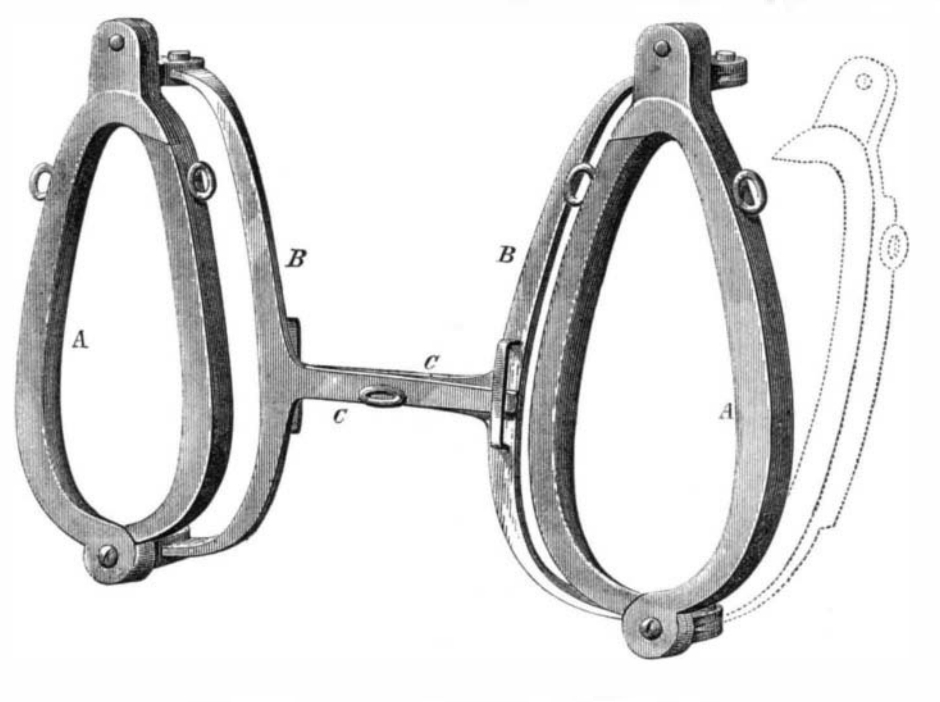
### IMPROVED HORSE YOKE.

The horse yoke illustrated in the annexed engraving is intended to enable horses to be attached to plows and other implements without using traces or whiffletrees, enabling the horse to perform his labor with ease, especially among trees and in other situations where the whiffletrees obstruct the work. The hames, A, are placed on the horse collar, as usual, and are made in two parts, hinged together on a pivot at the bottom, and fastened at the top by a screw. B B are the two sections or the yoke, which are joined by the horizontal bars, C. The hames, A, are made with projecting ears, which are slotted horizontally to receive the ends of the yoke, which are jointed by pins or screws in the top and bottom of the hames. The bars, C, are joined by the draft pin, shown in the engraving, and can play up and down to accommodate the position of the horses. It will be seen that the yoke is self-adjusting, the hames turning freely on the pins by which they are jointed to the yoke. Breeching and cruppers may be used when considered necessary, but harness in general can be dispensed with by using this arrangement.

Patented April 13, 1875, through the Scientific American Patent Agency, to Rufus Stratton and George Olmsted. For further particulars address the inventors at Hazardville, Conn.




STRATTON AND OLMSTED'S HORSE YOKE.

### A NEW PYROMETER.

M. J. Salleron is the inventor of a novel form of pyrometer, an engraving of which, herewith given, we extract from *La Nature*. The instrument consists of a cylindrical vessel, C, Fig. 2, of copper contained in an outer brass jacket, E. *d* is a disk of wood supporting the inner vessel, the radiation and conduction of heat from which is farther diminished by the air space intervening between it and the enveloping cylinder.

The vase, C, is first filled with about half a pint of water measured in the flask, V, and the initial temperature of the liquid, *t*, is noted from the thermometer, T. A cylinder of copper, M, weighing 1,530 grains, is then placed in the furnace, the temperature of which it is desired to measure, and is held in a recess in the end of an iron tube, L. As soon as the cylinder is heated to the same degree as that of the furnace it is quickly removed, and, by reversing the tube, L, dropped upon a stand inside the vessel, C, which stand is then agitated by means of the rod, *a*. The mercury in the thermometer will rise rapidly, and finally remain standing before beginning to descend. While stationary its indication, *t'*, is noted. The temperature can then be calculated by the formula: Temperature $= 50\,(t'-t) + t'$. For example: Suppose before the immersion of the copper the temperature of the water is 15° C $= t$; after the experiment it is 25° C $= t'$; then the temperature of the locality measured, $T = 50\,(25-15) + 25 = 525°$ C.

Copper cannot be employed for determining temperatures exceeding 1,832° Fah. = 1,000° C, since its point of fusion is too nearly approached. In such case a platinum cylinder, M, weighing 2,355 grains may be used, and the coefficient 50 in the above formula is replaced by 100.

It will be seen that this plan offers a simple instrument for determining high temperatures, which any mechanic can easily make, or which, in case of necessity, may be extemporized with always available materials.

Fig. 1.

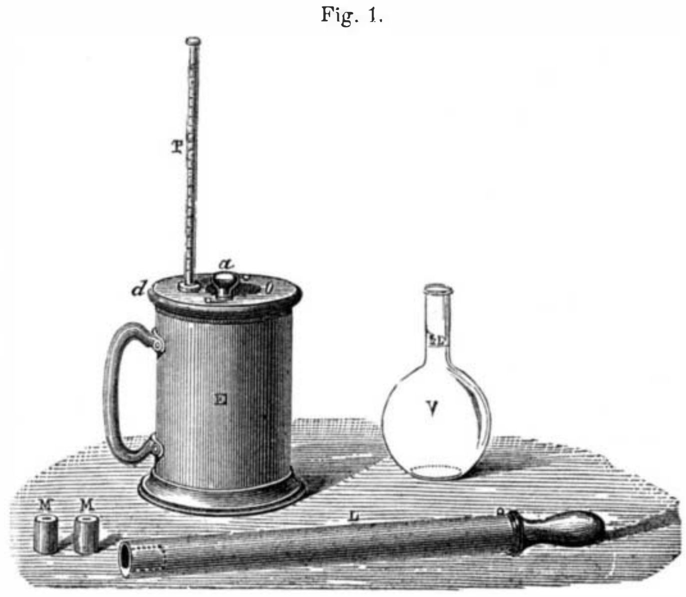
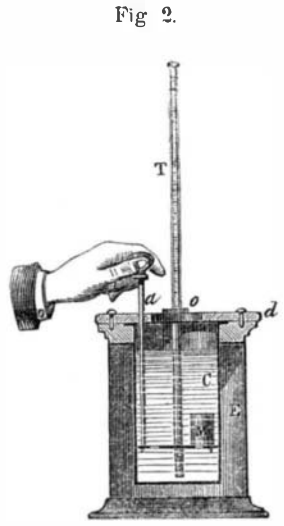



Fig 2.




SALLERON'S PYROMETER.

### Reducing Force.

It is the practice of many manufacturers, on the approach of the dull business season, usually beginning about the present time, to seek to economize by discharging a number of their workmen, giving the latter to understand that they will again be employed when trade becomes brisk in the fall. This course, naturally the first to suggest itself under the circumstances, does not appear to us to be the wisest that can be adopted. It certainly does not enure to the benefit of the discharged workmen, who find themselves out of a situation at the very time when work is hardest to get, nor are the employers likely to gain much in the long run, when they sever their connection with hands thoroughly familiar with all details of their particular business, and run the risk of having to instruct a new gang in the fall, should the old workmen prefer to remain in places obtained during the summer. We have always advocated the view that, if both employers and employed would treat each other more as men and manifest a reciprocal interest in each other's welfare, there would be less feeling on the part of one class that workmen are but machines to exact the greatest amount of labor from at the least cost, and less of the efforts on the part of the workmen to extort the greater amount of wages from their employers in return for the least and poorest labor.

The *Carriage Monthly* takes a very sensible view of this custom of reducing force in the summer time, and suggests a method whereby the same may be avoided, which, at the same time, is just as economical and much better calculated to meet the favor of the workmen. "If it became necessary to reduce our force, were we engaged in manufacturing," says the editor, "we would assemble the whole number and address them in this wise:

"Gentlemen, the present standing of trade will not permit our continuing a full force. Neither do we wish to, nor will we, discharge any competent employee. Such work as we have we will give you. So many will work each week in each department, and alternate, so that the amount will be equally distributed. This will allow all engaged in our employ to earn at least part if not full wages. If there are any who may feel aggrieved, and prefer accepting other situations, we shall place no obstructions in their way, and shall gladly receive them into our employ on a full resumption of business."

To those who have never tried this method, we would suggest that they give it a fair trial, and compare notes of this plan with notes of the old one of a wholesale discharge. Unless it be most needy operatives, there is hardly a man in the whole force but would gladly accept a few weeks' recreation after many months of arduous toiling.

### Snow-White Salicylic Acid.

It is well known that the salicylic acid prepared by Kolbe's process does not possess a pure white color, but is more or less yellow. The salicylic acid manufactured and furnished to the trade by Dr. F. von Heyden in Dresden, according to the above patent, is a whitish powder with a strongly yellow hue, from which by recrystalization tolerably colored crystals are obtained. Kolbe himself says that, in order to obtain snow-white salicylic acid, the crude acid should be converted into an ether by the usual method, and this again decomposed by caustic soda, and so on. However, the boiling point of the ethylic as well as the methylic ether is so high that at this temperature a portion of the salicylic acid begins to decompose. For my part, I have never succeeded in obtaining in this way more than one fourth, of the quantity of salicylic acid originally employed, in the form of a chemically pure product.

As the use of salicylic acid for medicinal and surgical purposes is continually increasing, a method of purification, whereby the yield is much larger and almost the entire quantity of salicylic acid present can be separated from its colored impurities with little trouble and at a small expense, will be welcome. Salicylic acid, we know, cannot be sublimed without decomposition. It splits up into carbonic and carbolic acids. On the other hand, salicylic acid volatilizes in a space filled with any gas or vapor at a temperature far below its boiling point and even far below its melting point. If the vapor from a boiling aqueous solution of salicylic acid be condensed, it readily gives the reaction of this acid; and if salicylic acid is exposed to a current of air heated to 212° Fah., it rapidly loses weight.

I made use of this phenomenon in the process here described for the preparation of pure salicylic acid, and found, after many unsuccessful experiments, that superheated steam was best adapted to the distillation of salicylic acid. For this purpose I had made a little double-walled copper boiler, by placing two copper tubes of unequal diameter one within the other, and closing the ends with plates of copper soldered with hard solder. The space between the two tubes was filled through a suitable opening with melted paraffin, and in this opening was placed a thermometer so that I could continually observe the temperature. The interior of this double boiler held the crude salicylic acid, and to the highest part was attached two tubes. One tube served to introduce the superheated steam; through the other the boiler was filled with crude salicylic acid, and it afterwards served as exit for the steam laden with acid. This tube should have a diameter of at least 0·6 inch, because otherwise it is easily stopped up by the escaping salicylic acid. The double walled boiler used in my experiments was so large that I could operate on about as much as 2 lbs. of crude acid at one time. To the last mentioned tube of at least 0 6 inch diameter, is attached a straight tin tube of the same width, passing through a Liebig's condenser and kept always cold. On the upper end of the tin tube, where it is connected with the copper boiler, a small lead tube with a funnel is soldered on; and through this, cold distilled water is allowed to drop continually during the distillation.

When the apparatus is all arranged, the boiler is heated until the thermometer in the paraffin marks 338° Fah. Superheated steam at 338° Fah. is allowed to enter the interior space through the narrower tube. This steam is generated in a glass flask of 3⅞ pints capacity, and is superheated by passing it through a long thin lead pipe coiled in an iron pot containing paraffin, which is heated to 338° Fah. As soon as the crude salicylic acid has acquired the temperature of the surrounding paraffin, which always takes some time, its distillation begins, the acid passing off with the accompanying steam so rapidly that the tin tube would be stopped up very soon, in spite of the continually dropping water, unless the pipe is continually cleared by means of a glass tube, or, better still, a split stick of well boiled pine wood, which reaches all the way to the boiler. The salicylic acid appears at the lower end of the tin cooling pipe as a thick magma of snow-white color, and is caught in a beaker glass placed under it. At the close of the operation the temperature of both paraffin baths is raised to 365° Fah. In about 2 hours, the operation is finished. Only a slight black resinous residue remains in the boiler. The salicylic acid which goes over has only a slight odor of carbolic acid. By pressing out the crystalline mass, boiling it in distilled water, and recrystallizing, it is easily freed from the carbolic acid. By recrystallization from distilled water (well water, or a filter which has not been washed with hydrochloric acid, contains enough iron to impart to it a reddish color), it can be obtained in beautiful, absolutely white crystals. One must not neglect to carefully clean the tin tube with ether before beginning the operation, to remove the grease that always accompanies the manufacture.

In the manufacture on a large scale, high pressure steam could be substituted for the paraffin baths. In high pressure steam itself, employed directly, the salicylic acid scarcely distils at all. I tried, among other things, to distil the acid by the direct action of steam at a pressure of 5 atmospheres, at which pressure the temperature is 320° Fah., but did not succeed; the steam scarcely carried a trace of acid with it. Evidently the boiling point of the acid was correspondingly raised by the increased pressure. I conjecture that the distillation of salicylic acid under diminished pressure, say half an atmosphere, would take place still more readily.

I would farther recommend a stirrer for the salicylic acid boiler, so as to give it more opportunity for contact with the vapor passing through it.—*Dr. Aug. Rautert, in Polytechnisches Notizblatt.*

A LONDON architect has submitted to the municipal authorities of that city a plan for a gigantic pyramidal necropolis, which is to cover five acres of ground, and yet be capable of holding in its vaults 625,000 corpses.

TO EBONIZE wood, collect lamp black from a lamp or candle on a piece of slate. Scrape off the deposit, mix with French polish, and apply to the object in the ordinary way