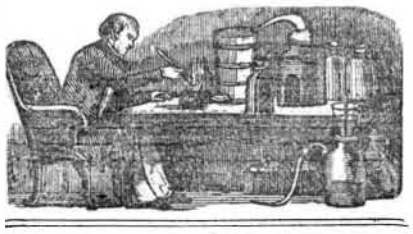


For the Scientific American.

New Chemical Law.

No. 16.

There is no doubt but that many persons will consider this new chemical law, as a speculation merely, based entirely upon mental evidence, and that it is therefore of no practical benefit to chemical science. To all such I would say that they are wrongly impressed and do not understand the subject, since it is based entirely upon certain indisputable facts, which are new to science and of the greatest importance to its advancement. It is in fact of no particular importance whether this principle of aggregation is believed or not, since it will not in the least degree influence the facts upon which it is based. In this respect it is precisely similar to the atomic theory of Dalton which is a speculation based upon the fact, that substances combine with each other in definite and multiple proportions. It matters not, therefore, whether the atomic theory of Dalton is believed or not, the facts upon which it is based are indisputable. In this essay it may be seen that I have introduced the law as developing the facts, in order that both the speculations and the facts might be the better understood, although I could have shown the facts as existing independent of any speculation. I chose rather to combine the two, so that if any one rejects the speculations they must believe the facts. I have not given the facts separate from the speculations and for this reason many may be led to ask, where are the facts? To answer such an enquiry I will introduce the following examples of isolated facts, the greater part of which I claim as new and of the utmost importance.

1st. Chlorine, bromine and iodine are nearly similar to each other in their chemical proportions.

2d. All the compounds of chlorine, bromine and iodine, which possess similar atomic constitutions, are also nearly similar to each other in their chemical properties.

3d. Chlorine, bromine and iodine, when arranged so that their atomic weights form an increasing series, will possess specific gravities also forming an increasing series.

4th. All compounds of chlorine, bromine and iodine possessing similar atomic constitutions, when arranged so that their atomic weights form an increasing series, will possess specific gravities also forming either an increasing or decreasing series depending upon the specific gravities of the substances uniting

5th. Chlorine, bromine and iodine and all their compounds possessing similar atomic constitutions when arranged so that their atomic weights form increasing series, will possess boiling points invariably forming increasing series.

The above are simply facts and involve no speculations whatever, and any person who will take the trouble to examine the above facts will find no exceptions. This is not confined to the above example, but extends also to all other classes of substances whatever, which possess similar chemical properties and similar atomic constitutions. It is to be hoped therefore that chemists will take this subject into consideration and test it thoroughly. They may reject the speculations if they choose, but they must admit the facts, which are indisputable.

By collecting the true specific gravities and boiling points of classified substances, we shall be enabled to discover their respective Laws which govern them, and shall then be enabled to correctly calculate them, without experiment. All will admit that this is desirable, yet it can be accomplished by a very few experiments, which I hope will be instituted for that purpose.

With these remarks I will close the subject feeling confident that any person who will take the trouble to examine it will be amply repaid by the truth it unfolds. S. N.

Bridgeport, Conn.

Making Colors.

We have tested these receipts and found them to be correct and good. They will only answer on wool and silk, or both combined For cashmere delaines they are the grand desideratum. A few French color makers have recently arrived in this country to execute these colors in some of our print works. They are given to our readers as peculiarly valuable for that branch of business. The stuffs will be all the better to be made a little stronger than is defined in the specification. —so we have found in testing them. $2000 was paid for the receipts about two months ago by an eminent Calico Printing Establishment near this city.

The coloring matters hitherto employed in printing textile fabrics composed of wool, of silk, and of wool and silk combined, are usually in the state of extracts which are obtained by aqueous solutions from various kinds of dyewoods, and from other substances, such as orchil, cochineal &c. and by evaporating more or less, these extracts. But it often occurs that in using boiling water to extract these coloring matters, several other soluble substances are extracted along with them, so that when an aqueous solution of any coloring matter is evaporatad, the residum retains a great deal of these extraneous substances, and therefore produces colors, less brilliant than if it were isolated and pure. All aqueous solutions, particularly highly concentrated ones, deposit in the course of time the whole of the coloring matter which is in the state of suspension, and likewise, in the majority of cases, a resinous substance, which has probably mixed up with it a portion of the coloring matter. And as the concentration or strength of the extract diminishes in proportion as the deposit increases, it follows that the liquor in any two vats must always vary more or less in strength, according as one may have stood longer than the other. Now such differences of intensity cause irregularity in the printing of goods; and there are still greater differences caused by these extracts not having equal affinities for water, and consequently some have a greater tendency than others to absorb steam, from which causes combined steam printing (*le vaporisage*), is rendered an operation extremely uncertain in its effects and very liable to accidents. This process has been known by the name of dry dyeing (*teintureseche*) which wrongfully implies that water is not necessary, which however is not the case, for all manufacturers are careful to keep their goods moist which they wish to fix with the colors, either by placing them in a humid atmosphere or by damping them during the process of steaming, by opening the steam cock a little at the commencement of the operation, so that the steam which escapes may be condensed upon the goods and thereby impart to them the proper degree of humidity. Without these precautions the colors would be feeble and spotty in appearance, unless, indeed the colors can be previously rendered equally lygrometric, which it is an extremely difficult thing to effect. If two pieces of the same printing fabric are submitted to the process of steaming, one very dry and the other very damp, the color of the first will be spotted and feeble, while the second will be bright and full bodied. All printed woolen goods, with the exception of those which are printed with colors, which like the French Blue, have a great afinity for water, require in order to fix firmly the color, to have condensed upon them the largest possible quantity of steam, either before or during the process of steaming but without the quantity being so large as to allow of running (*coulage*) and if it should happen that in the same piece, and by one and the same operation, the color runs in one part, is weak in another, or is clear and decided in a third, it must arise from the piece not having in all parts an equal affinity for water.

To remedy the various inconveniences arising fron the use of extract in steam dyeing, (*vaporisage*) it is necessary to replace those extracts by preparations in which the coloring matters are in a purer and more unalterable state and which are such that they may be fixed in the goods in an uniform manner, and at a degree of humidity as analagous as possible to that of the dyeing bath; and this is what has been effected by the following processes.

These improvements are founded on the general fact, that if to a decoction of any coloring matter, there be added a salt, such as the chloride of tin, the base of which has a great affinity for the coloring matter, an insoluble precipitate is the result, which holds very little, if an extraneous soluble matter, and contains the coloring principle in a state of much greater purity than the ordinary extracts.

Although such an extract is insoluble yet it is capable of combining perfectly with the textile fabrics aforsaid provided that the drying be performed while the goods are well damped. In consequence of the insolubility of this precipitate, the color obtained by means of it, may be fixed by steam without any previous dissication, and goods which may have been dried after printing may be again wetted without the danger of the colors running. The precipitates which may be thus obtained and applied, are numerous, but as they are all very similar in effect, it may suffice to specify only those which appear to be most susceptible of general use.

(*To be concluded*)

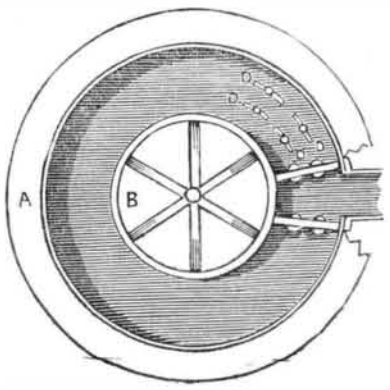
History of the Rotary Engine.

Prepared expressly for the Scientific American.

WILCOX'S ROTARY ENGINE.

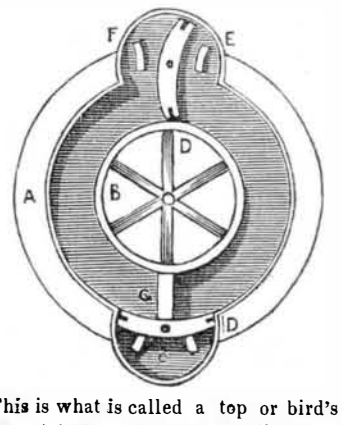
This is a rotary engine of Mr. Wilcox—the inventor of the one in our last number and as it is very different, it is worthy of a place in our history.

FIG. 29.



A is the outside fixed cylinder. B, the inner or revolving cylinder, D D, two or more pallets working through a deep stuffing box, and turned by a lever or other power from the external part of the engine alternately flat or edgewise; the pallets D D, are fixed to the revolving cylinder, E is the steam passage—the one to the condenser is not shown.

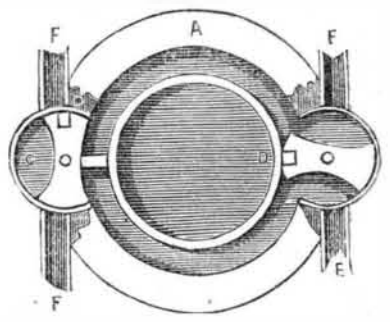
FIG. 30.



This is what is called a top or bird's eye view. A is the outer or fixed cylinder. B the inner or revolving cylinder. C C, the pallet, used as a cock, or a portion of a circle fitted accurately to the circle it describes with a spindle working through the top of the cylinder. D is a groove into or against which the part coming in contact with the revolving cylinder is secured with a piece of chilled iron in order that the constant friction of the revolving cylinder should not injure the pallet. E is the passage from the boiler, and F that to the condenser. G is the pallet secured to the working cylinder. In this figure two portions of circles and eocks are introduced to shew their situations clearly.

Fig. 31 is another top view of a rotary engine —all these being modifications of one principle, which shews the want of principles in the construction of these engines for steam *moters*. Cocks are used in this engine to regulate the steam in place of valves. A is the outer or fixed cylinder with a fixed pallet. C C, the cocks which are wrought from the out-

FIG. 31.



side of the engine, by a spindle passing through the top. D is a piece of chilled iron in the cock to resist the friction of the revolving cylinder, as explained in last figure. E is the steam passage and F the passage to the condenser.

There would certainly be a great difficulty in fitting the pallets of fig. 29 close at the joints to prevent leakage —a great difficulty in rotary engines, and the two latter modifications contain the same elementary principles of construction and operation, as the engine of Mr. Flint, in No. 14 Scientific American, and they have the very same defects.

Interesting Experiment.

A writer in the Batavia (N. Y.) Spirit of the Times, suggests that the phenomenon of the variation of the compass, may be in some way dependent upon the equally unaccounted for existence of the Aurora Borealis. On the morning of the 18th ult., he says, when the whole southern hemisphere was filled with a redish light, accompanied by the usual appearance, under similar circumstances, in the north, he placed the needle of a surveyor's compass upon the magnetic meridian, and observed that it inclined with an uneasy, restless motion, three and a half degrees towards the east. As the Aurora died away, the needle retrogaded with the same motion as before to its original position. He supposed that as the Aurora may exist without necessarily being visible, the same influence may at all times manifest itself on the magnetic needle.

This was the opinion of Oersted, and it is generally admitted to be correct by electricians.