



For the Scientific American.  
New Chemical Law.  
No. 2.

The following are the outlines of this chemical law given in as brief a manner as possible.

Conceive the existence of a gas, constituted of a vast number of particles either simple or compound, and each particle situated equidistant from each other. Now by this law these particles either simple or compound, constituting the gas, may under peculiar condition unite with each other, to form compound particles. Thus if the original atoms unite by pairs, then the gas or solid which these double particles constitute, will differ from the original gas. If three original atoms unite, the substance formed will differ from the two former, and in this manner, four, five, six and upward, may unite, forming different substances at each union.

Perhaps this may be still better understood, by supposing the existence of a gas, or portion of a gas, consisting for instance of 120 simple particles, like shot. Now by this law, these particles may unite with each other by pairs for instance, forming clusters or compound atoms consisting of two original atoms combined, the gas perhaps still retaining its physical properties, although with but one half the number of the original atoms. If three particles unite or aggregate, then it is evident that the substance or gas will consist of but 40 aggregated atoms, as each aggregated atom is made up by the union of three original atoms with each other. In this manner any number of atoms may unite and at each union a different substance will be the result. It makes no difference whether the original atom be either simple or compound, the result is the same. All substances formed by particles thus aggregated must possess the following properties.

1st. The specific gravities of the vapour or gases, of all substances, comprised in the same aggregated series, when taken at the same temperature, are directly proportional to their atomic weights.

2nd. The specific gravity of all substances aggregated from the same radial increase with the series.

3rd. The boiling points of all substances, aggregated from the same radial, also increase with the series.

4th. The equivalent combining volume of all substances aggregated from the same radial are equal.

5th. The power of the substances to conduct heat also increases with the series.

6th. The power of the substances to conduct electricity increase with the series.

7th. The number of atoms of Oxygen, required to acidify any substance, belonging to the same aggregate series are equal.

8th. All those substances belonging to the same aggregate science, are possessed of similar chemical properties. They are the more similar, the nearer the substances are situated to each other in the series, but grow more dissimilar as the distance between them increases. Thus the substance represented by an aggregation of two atoms, is similar to a combination of three atoms, but not as similar to a combination of four. It is in this manner, that the first substance of an aggregated series may be totally different in its chemical properties from the last.

9th. If the first of an aggregated series be a gas, then as the series increase, it will grow denser, and may become a fluid, and farther still, a solid.

10th. All substances comprised in an aggregated series, are electro-negative to all those above them.

11th. In an aggregated series, all those substances situated the highest in the list, generally have the least affinity for any particular substance.

12th. In fact whatever property a substance may possess, it is either increased or diminished by this law.

This regularity of increase and decrease, is not confined merely to an aggregated series, but extends to their compound with other substances according to the following conditions.

1st. The specific gravity of the compounds formed by any aggregated series, with any particular substance, will either increase or decrease, in a regular manner, depending upon the specific gravity of the substance uniting with the series. If the uniting substance possesses a great specific gravity, then the specific gravity of the compound, will decrease as the series increase, otherwise it will increase with the series.

2nd. The boiling points of the compounds of an aggregated series, with any particular substance, increase with the series.

The above two properties of the compound of an aggregated series, with a particular substance, are sufficient for all purposes of application, since if more were introduced, it might render it apparently complex. The same decrease or increase of all other properties, will be found to exist upon the examination. They must also possess similar chemical properties, like an aggregated series. The above conditions are sufficient to test the truth of this law. The application of course follows, and if all the results as required by the above conditions, do actually exist, then must its truth be admitted.

Bridgeport, Conn.

S. N.

#### An excellent plan for Preparing Glue.

MR. EDITOR.—I hereby send you a plan of preparing and keeping Glue in solution, which I have found to be truly good.

To any quantity of glue use common whiskey instead of water. Put both together in a bottle, cork it tight and set it past for three or four days, when it will be fit for use without the application of heat. Glue thus prepared, will keep for years and is at all times fit for use, except in very cold weather, when it should be set in warm water before using. To obviate the difficulty of the stopper getting tight by the glue drying in the mouth of the vessel, I use a tin vessel with the cover fitting tight on the outside to prevent the escape of the spirit by evaporation.

Greenville, S. C.

J. L. P.

#### Priming for Percussion Guns.

A mixture of 100 grains of oxymuriate of potasse, with 12 of sulphur is much preferable to either fulminating silver, or fulminating quicksilver, for priming. It is not so liable to accidental explosion, it leaves behind it less acid matter, and does not corrode the iron so rapidly; and, contrary to what takes place with fulminating quicksilver, its explosion is not followed by a deposition of moisture. The facility and certainty of the explosion is the same in both.

A mixture of 100 grains of chlorate of potash, with 24 of saltpetre, 36 of sulphur, and 14 of lycopodium, is not nearly so efficacious as the first; although this is chiefly a consequence of the ordinary construction of the touch-hole. The best method of filling the copper caps is, to mix up the explosive compound into a thick liquid, with any adhesive solution or tincture, and, by means of a hair pencil, to introduce a large drop of this mixture into the bottom of each cap.

Another preparation for the priming powder for percussion guns, is three drams of regulus of antimony, and one dram of oxymuriate of potasse. On account of the corrosive properties of the oxymuriate of potash, it is advisable to use the smallest possible quantity that will be certain of ignition; the above ingredient, if well compounded from a percussion powder, will fire with the greatest certainty.

One great objection to the stronger preparations for priming is the great and sudden corrosion produced after firing; so violent is this, that should the interval between firing much exceed an hour, the touch-hole is not unfrequently completely closed by a strong rust.

#### Artificial Eyes for Horses.

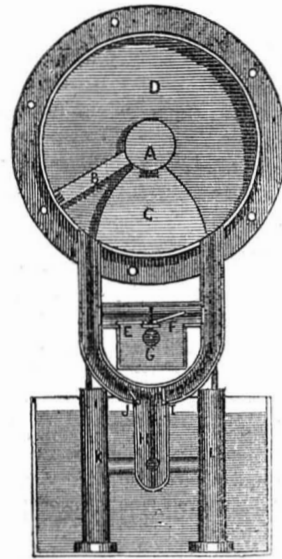
Dr. Bristol, of Lockport, Niagara Co. N. Y. advertises to make artificial eyes for horses.—He says, although not in his line, he will take orders from persons having valuable horses deformed by loss of an eye.

#### History of the Rotary Engine.

Prepared expressly for the Scientific American.

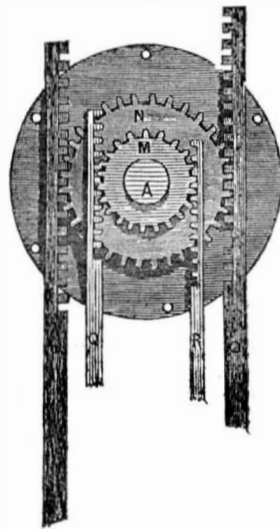
SEMI-ROTATION ENGINE.

FIG 3.



We give two views of a semi rotation engine invented by Watt, and included in his patents of 1782, and although it was never carried into execution yet it will be found by the description to be very ingenious, and must have conveyed some hints to the first builder of the vibrating kind. The same letters indicate like parts on all the figures.

FIG 4.



D, is the interior of the cylinder. It is fitted with a piston B. C is a projection of metal extending from the circumference to the axle A. Packing is introduced between this projection and the axle, so as to prevent the steam from escaping between them. E F are two valves which admit steam from the steam pipe G into the cylinder on each side of C alternately. I J are two valves acting in conjunction with E F, so as to open or shut off a communication with the condensers L K through the pipe H at a proper time. Levers are attached to the rods by which these valves are worked, from tappets on the pump rods R Q.

Steam is admitted from the boiler through the pipe G into the steam chest, and finding the valve F open, rushes up the pipe, and so into the cylinder between the piston and stop C. The piston, receding from the pressure, drives the air in the cylinder through the other pipe, and down through the valve J, into the condenser, whence it escapes by the pump L. It continues revolving until it comes in contact with the other side of C, when it is stopped; but previous to this the valves F and J have been shut by their respective levers, whilst E and I, have been opened. The steam has now access through E to the other side of the piston, and turns in the contrary direction; the steam which last performed its office escaping down through I to the condenser. The first operation is then repeated, reversing the motion of the piston as soon as, or before it comes in contact with the other side of E. N M are two toothed wheels attached to the axle A, which work (as shewn) by racks, the pump rods O P, and the smaller pump rods Q R. The former O P, are supposed to draw water

from a mine, but the smaller ones only work the condensing pumps K L.

It would hardly be an objection that the piston would strike against the stop C and thereby shake itself to pieces: for here, as an equable motion is not required like a rotary engine, the speed might (as in all pumping engines which were liable to the same objection) be gradually retarded, so that the impetus would be destroyed before it came in contact with the stop. Perhaps the most solid objection would be that of the packing requiring more care than a common workman, such as generally attends to steam engines, would be able or willing to bestow: It would have been extremely portable and cheap, would have occupied very little room and the friction would have been comparatively trifling.

#### To Weld Iron, Steel and Sheet Iron.

In an earthen vessel melt borax, and add to it 1-10th of sal-ammoniac. When these ingredients are properly fused and mixed, pour them out upon an iron plate and let them cool. There is thus obtained a glassy matter, to which is to be added an equal quantity of quick lime. The iron or steel which are to be soldered are first heated to redness; then this compound, first reduced to powder, is laid upon them—the composition melts and runs like sealing wax; the pieces are then replaced in the fire, taking care to heat them at a temperature far below that usually employed in welding; they are then withdrawn and hammered, and the surfaces will be found to be thus perfectly united. The author who is a Frenchman, asserts that this process, which may be applied to welding sheet iron tubes, never fails.

A valuable series of petrifications, purely silicious, gathered near Cairo in Egypt, have been presented by Prof. Charles E. Anthon to St. John's College, Annapolis, (Md.) The original structure of the trees is remarkably defined in these curiosities.



THE BEST  
Mechanical Paper

IN THE WORLD!  
FOURTH YEAR OF THE

#### SCIENTIFIC AMERICAN!

416 Pages of most valuable information, illustrated with upwards of

500 MECHANICAL ENGRAVINGS!

The Scientific American differs entirely from the magazines and papers which flood the country, as it is a Weekly Journal of Art, Science and Mechanics, having for its object the advancement of the INTERESTS OF MECHANICS, MANUFACTURERS and INVENTORS. Each number is illustrated with from five to TEN original ENGRAVINGS OF NEW MECHANICAL INVENTIONS, nearly all of the best inventions which are patented at Washington being illustrated in the Scientific American. It also contains a Weekly List of American Patents; notices of the progress of all Mechanical and Scientific Improvements; practical directions on the construction, management and use of all kinds of MACHINERY, TOOLS, &c.; Essays upon Mechanics, Chemistry and Architecture; accounts of Foreign Inventions; advice to Inventors; Rail Road Intelligence, together with a vast amount of other interesting, valuable and useful information. The SCIENTIFIC AMERICAN is the most popular journal of the kind ever published, and of more importance to the interests of MECHANICS and INVENTORS than any thing they could possibly obtain! To Farmers it is also particularly useful, as it will apprise them of all Agricultural Improvements, instruct them in various mechanical trades, &c. &c. It is printed with clear type on beautiful paper, and being adapted to binding, the subscriber is possessed, at the end of the year, of a large volume of 416 pages, illustrated with upwards of 500 mechanical engravings.

TERMS: Single subscription, \$2 a year in advance; \$1 for six months. Those who wish to subscribe have only to enclose the amount in a letter, directed to

MUNN & CO.,  
Publishers of the Scientific American,  
128 Fulton street, New York.

All Letters must be Post Paid.

#### INDUCEMENTS FOR CLUBBING.

|                       |        |         |
|-----------------------|--------|---------|
| 5 copies for 6 months | \$4 00 |         |
| 5 "                   | 12 "   | \$8 00  |
| 10 "                  | 6 "    | \$7 50  |
| 10 "                  | 12 "   | \$15 00 |
| 20 "                  | 6 "    | \$15 00 |
| 20 "                  | 12 "   | \$30 00 |

South and Western Money taken at par for subscriptions. Post Office Stamps taken at their full value.

#### A SPLENDID PRESENT!

To any person who will send us Three Subscribers, we will present a copy of the PATENT LAWS OF THE UNITED STATES, together with all the information relative to PATENT OFFICE BUSINESS, including full directions for taking out Patents, method of making the Specifications, Claims, Drawings, Models, buying, selling, and transferring Patent Rights, &c. This is a present of GREAT VALUE, yet may be obtained for nothing, by the reader of this prospectus, if he will take the trouble to get Three Subscribers to the Scientific American. It will be an easy matter to obtain two names besides his own.

MUNN & CO., Scientific American Office, N. Y.