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The present issue of the SCIENTIFIC AMERICAN closes the first volume of 1871.

Subscribers who commenced with the volume, and paid for half a year, are reminded that the time for which they prepaid will expire with this number. We hope every one of these six month subscribers will renew before the 1st of July.

The safest way to remit is by draft on New York, postal order, or check on some bank, although money is seldom lost when secured in letter and properly directed. Address MUNN & CO., Box 773, New York.

## CLOSE OF ANOTHER VOLUME.

The present number completes the Twenty-fourth Volume of the New Series of the SCIENTIFIC AMERICAN.

As we write, our subscription list is larger than at any other period in the history of our popular journal, and it is still growing steadily and healthfully, without any special exertion on our part, except that always made to render our paper the best popular scientific publication in the world.

By comparing the index of the present volume with those of preceding volumes, it will be seen that a considerably greater variety of subjects has been discussed than in any other volume. We have labored earnestly to please and instruct our readers in the selection of topics as well as in their treatment, and we have every reason to believe we have succeeded.

The hearty friendship to our enterprise, evidenced in the warm praises received from our numerous correspondents, encourages us again to appeal to our readers for their cooperation in extending the usefulness of the SCIENTIFIC AMERICAN, by inducing others to subscribe for it. While our paper is, we believe, the best of its class, we know it to be the cheapest; and no man can invest money more profitably than in securing such a fund of practical and useful information as we annually furnish.

The departments of "Queries," and "Answers to Correspondents," is, under the present plan of conducting it, eliciting a large amount of practical information upon the whole range of industrial arts. We hope our correspondents will continue their favors and aid us in ultimately making this one of the most valuable features of our paper.

With these remarks we pass on to the next volume, pledging that our efforts shall be put forth unremittingly to maintain and increase the value of the SCIENTIFIC AMERICAN and to sustain its reputation.

## THE LAST SIX MONTHS OF CHEMISTRY.

In turning over the leaves of our last volume, to see what has been done in the line of chemistry, we do not come across the record of any startling discoveries, but we find a very satisfactory condition of things in the various laboratories of the world, and there is abundant proof of unusual industry among scientific men. It is pleasant to see that the ranks of scientific laborers have not been so largely thinned by death as they were a year ago. Very few men of distinction have been summoned away during the last six months, and the biographical sketches of these few have found suitable place in our columns. Conspicuous among those who have closed their labors may be mentioned Professor Wetherill, William von Haidinger, and Professor Staedeler.

The efforts of chemists have been chiefly directed towards increasing our knowledge of the properties of substances previously discovered. This is in accordance with the humanitarian spirit of the age. The tendency now always is to make practical use of everything—in other words, to turn it to good account—and in this pursuit the chemists have been unusually successful since the commencement of the year. We can not occupy the time of our readers with a repetition of the accounts already given of the leading investigations, but it may be worth while to recall to mind a few improvements that have been made, in order to encourage original workers to make renewed exertions to round up and complete certain desired inventions.

A cheap method of making hydrogen was suggested by Du Motay, the same chemist who has enriched our knowledge of the manufacture of oxygen, which consists in heating slaked lime with some carbonaceous material. It looks like a cheap and easy way of procuring a gas that would have extensive application in the arts, if it were available in unlimited quantity. When we have hydrogen in abundance, we can easily carburet it, and it would be a singular thing indeed if some day our illuminating gas were to be made out of water combined with slaked lime, and the distillation of coal were to be confined to the production of tar derivatives and aniline colors.

Our knowledge of hydrate of chloral has been much extended. A good deal of contradictory testimony exists in reference to it, and we are now going through the doubtful stage, in which the skeptical refuse to believe, and the credulous are much disturbed in mind. We have taken pains to give both sides a fair hearing, and the summing up of the evidence lead us to think that as a hypnotic the hydrate of chloral is one of our most useful remedies; but it ought never to be applied without the knowledge and consent of the best medical authority. The employment of chloral as a reducing agent, in many chemical processes, is novel, and bids fair to become a very important one. The incidental products growing out of its manufacture on a large scale, have also found an use in the dye vat, so that our knowledge of this subject has decidedly increased during the past six months.

The increasing demand for albumen has occasioned more than the usual activity in the search for new sources of supply. While merchantmen look to far off islands, frequented by wild birds, the chemist examines home products, and finds in the blood a supply of albumen, that ought to be better economized and more largely used than it has hitherto been. Blood albumen is becoming a large article of manufacture, and some specimens we have seen are but little inferior to the best product of the egg. The sugar refiner, the photographer, the calico and aniline printer, consume large quantities, hence the attention bestowed upon this branch of industrial chemistry.

Beet sugar and grape sugar, two industries of the first importance, have received extraordinary attention of late, and they are likely to develop into sources of wealth to those who enter upon them with adequate knowledge and proper caution. In a country where corn is grown in such enormous quantity as on the prairies of the West, grape sugar made from starch ought to become an article of export. Its uses in the arts have increased wonderfully, and the demand for it is likely to advance just in proportion as a popular knowledge of its value is further disseminated. Beet sugar is undergoing experimental examination, as we have shown, and bids fair to assume importance in this country as well as in Europe.

The artificial production of cold by chemical means has been considerably studied, and we have published all that has been made known on the subject. The most successful agent thus far appears to be ammonia, and it is peculiarly fortunate that this chemical product can now be obtained very cheaply and in large quantities. Ammonia, as a motive power and as a refrigerating agent can justly claim the attention of all experts. It is only a few years since the first organic compound was made by artificial means. The announcement of the discovery was everywhere greeted with profound attention, as the thought was near that at some future time we should be able by synthesis to make such rare and valuable medicines as quinine, morphine, codeine, and narcotine. Within a few months we have been able to give an account of the artificial production of coniine, one of the alkaloids, and this discovery offers encouragement that we are making progress towards the grand result indicated above.

The use of chlorine gas in metallurgical operations, although suggested some years since, has recently been brought more prominently before the public in connection with the toughening and refining of gold. As the production of chlorine gas can now be economically accomplished on a large scale, more particularly by Deacon's process, the attention of chemists is more than ever directed towards it, and there appears to be little doubt that it will obtain extensive use in the separation of many metals. The rare elements, silicon and aluminum, are more readily obtained from chlorine compounds than in any other way, and it is probable that gold will hereafter be refined by the use of this gas.

The applications of glycerin have gone on increasing, and especially for nitro-glycerin and dynamite we note for it an unusual demand. The chemical nature of glycerin, its boiling point, its solvent properties, and the temperature of its distillation, have been made the special subjects of inquiry during the present year, and much progress has been made.

Another chemical product, called carbolic acid, has been subjected to numerous experiments until it has become an important article of commerce.

From this hasty summary, it will be apparent that chemists have not been idle, but have contributed a fair share of our general stock of useful knowledge.

## PAINE'S ELECTRO-MOTOR.

We recently published a series of engravings illustrative of the above improvement, together with such information as had reached us concerning its actual and anticipated performances. We were a little fearful that our estimates, although derived from good sources, might be considered by the parties in interest as somewhat overdrawn. But it appears from a letter from Mr. Paine, which we elsewhere publish, that instead of over-estimating we have greatly under rated the capacity and merits of his alleged discovery.

He states that the electric engine now running at Newark, N. J., has been in constant operation for eight months, running nine hours a day, doing a duty of 67,000 foot-pounds (a little over two horse-power) with a consumption of only three ounces of zinc per day—a cost of less than two cents.

In previous articles in our columns bearing upon the subject of electro-motors, calculations have been given, showing that the mechanical equivalent for twenty-two pounds of zinc, or the consumption of that quantity of zinc in such a manner that its total mechanical effect could be realized, would be a duty of two horse-power maintained for nine hours. Between these calculations and Mr. Paine's statements, there is, consequently, a very wide difference.

Mr. Paine further tells us that he expects to realize from his new engines a force of sixty-seven millions of foot-pounds, or two thousand horse-power, at a cost of three grains of zinc; and that he will be able to drive the largest ship afloat (the *Great Eastern*, we suppose) by means of a single Bunsen quart cell, with a velocity only limited by the strength of the vessel. One hundred and fifty miles an hour will be a moderate velocity, according to Mr. Paine's science, for the future speed of the great ship.

With these wild dreams for a basis, it would seem like a difficult undertaking for the Paine Electro-Magnetic Engine Company to find purchasers for their scrip. But Mr. Paine assures us that he has secured a chosen band of adherents, composed of "men that you and I cannot mislead." We conclude that every bubble, like the dog, must have its day.

We have not space to discuss Mr. Paine's turpentine light which he gives us to understand still flickers, although, as a sensation, it long ago burned out.

## THE INAUGURATION OF THE MORSE STATUE.

We do not believe there was a single right feeling individual in the entire civilized world who did not feel a glow of pleasure when it was announced that the telegraph operators of this country intended to erect a statue in Central Park, in honor of the venerable Professor Morse.

They gave their dollars, and procured the statue, and the inauguration took place last week, too late for notice in our last issue.

The ceremonies were of great interest. Speeches—of which that of the venerable Professor himself, which we give in another column, was the best of all—together with poetry and music, crowned the occasion, and thousands gathered together to show their appreciation of the event, and of him in whose honor the statue was erected.

The following was the order of exercises in the Park:

1. Music by the U. S. Band, of Fort Columbus.
2. Introductory address by Gov. Hoffman.
3. Unveiling the statue by His Excellency, Gov. Claflin, of Massachusetts, and Hon. William Orton.
4. Music.
5. Inaugural address: William Cullen Bryant.
6. Reception of the statue by Hon. A. Oakey Hall, Mayor of the City of New York.
7. Music.
8. Prayer by Rev. Stephen H. Tyng, D.D., rector of St. George's, N. Y.
9. Doxology, by band and people.

In the evening, the Academy of Music was crowded by interested citizens. Hon. Wm. Orton presided. Professor Morse sat at the right of the stage, the observed of all observers. After speeches by Messrs. Orton and Dr. George B. Loring, of Boston, the following telegram was dispatched to the telegraphic fraternity throughout the world:

"*Prof. Morse sends greeting to those of the telegraphic fraternity throughout the world. 'Glory to God in the highest, peace on earth and good will to men.'*"

Miss S. E. Cornwell, who transmitted the first message ever sent by the Morse system also transmitted this message, and Prof. Morse telegraphed his own signature, as the closing act of his telegraphic career. The utmost enthusiasm prevailed, and a more fitting tribute of a grateful people to a public benefactor never took place in this city.

## FLYING MACHINE.

The famous old Novelty Works, in this city, once a scene of constant activity, now present an aspect of desolation. The machinery is all removed, and the entire floor of the principal building is empty, save that in the center stands a flying machine.

We know not who is the inventor of this machine. The watchman of the premises told us it had been left to its own devices for six weeks or more, and, strange to say, that it had proved a failure. A watchman's judgment, however, is not generally very reliable on such matters, and as our questioning failed to elicit any knowledge of the principles of the device, we examined it minutely ourselves. As many of our readers are interested in the subject of aerial navigation, we place before them a description of the mechanism.

It is designed to be driven by steam. A two-horse power vertical boiler is supported in a light frame at the bottom of the machine. At one side of the top of this frame is placed one of Root's rotary engines. On the shaft of this engine is a miter gear, which meshes into two others, one at the top and another at the bottom of the gear on the engine shaft. The two driven gears are respectively keyed to a solid shaft and a hollow shaft, the former rising vertically