

SCIENCE RECORD FOR 1872.

We have in press, to be issued January 1st, a new and valuable book of 350 pages octavo, entitled as above, which, we think, will be read everywhere with interest. It will be a compendium of scientific progress of the present year, and is to be profusely illustrated with steel plate and wood engravings.

The following is a partial outline of the general contents of the *Science Record*:

Notices and descriptions of the leading discoveries and improvements invented or introduced during the present year, pertaining to Engineering, Mechanics, Chemistry, Philosophy, Natural History, Agriculture, Architecture, Domestic Economy, and the various Arts and Sciences, with many engravings.

Biographical notices of prominent men of science, with portraits.

Descriptions of the most important public works, began or completed during the year, with illustrations.

Notes of the progress and extension of railways, telegraphs, and other means of communication.

Descriptions of the new applications of steam, electricity, and other motive powers, with engravings.

Almanac for the year, and a chronological table of notable scientific events and phenomena.

Reports of Patent Office proceedings. Classification of inventions at the Patent Office, with the names of all examiners, officials and employees.

Portrait and biographical sketch of the Hon. M. D. Leggett, Commissioner of Patents.

Description of that great engineering work, the Mount Cenis Tunnel through the Alps, with engravings of the tunneling machinery, portraits of the chief engineers of the work, and other illustrations.

Description of the great Government works at Hell Gate, New York, with many illustrations, showing the wonderful galleries now being cut in the rocks under the bed of the East River, preparatory to removal of these obstructions by explosion, the drilling machinery, the electric apparatus, and other interesting objects.

Description of the great Suspension Bridge between New York and Brooklyn, now in process of erection, with interesting engravings.

Steel plate engravings of the celebrated Gatling Gun or Mitrailleur, showing its construction and use in various forms, upon wheels, horseback, camels, boats, etc.

Illustrations of recent improvements in cannon, fire arms, etc.

Recent applications of science to the construction of steam and sailing vessels, with illustrations.

Reports of the important law trials, and decisions pertaining to inventions and scientific matters.

Proceedings of scientific bodies, with notes of interesting papers.

Illustrations of late improvements in all the leading departments of mechanics and science.

Useful tables and practical recipes pertaining to the principal branches of industry.

The whole forming a convenient and popular SCIENCE RECORD of the present year, of permanent value and importance necessary for reference and interesting to everybody. It should have a place in every library.

350 pages octavo. Handsomely bound. Price \$1.50. Extra binding, half calf, \$2. Sent post free on receipt of the price. Published by Munn & Co., 37 Park Row, N. Y. Office of the SCIENTIFIC AMERICAN.

One copy of the SCIENTIFIC AMERICAN for one year and a copy of the Science Record, \$4.

University of the City of New York---Free Lectures.

We have received the prospectus of a course of lectures, to be delivered in the University Chapel, Washington Square, New York city. The admission to the lectures is free, and the reputation of the distinguished lecturers should attract a full attendance. The following gentlemen will lecture as follows.

December 14th. Professor John W. Draper, M.D., LL.D., on Spectrum Analysis.

December 21st. Professor George W. Coakley, LL.D., on The Physical Constitution of the Sun.

January 4th., 1872. Professor Benjamin N. Martin, D.D., L. H.D., on The Natural Theology of the Doctrine of the Forces.

January 11th. Professor Henry Draper, M.D., on Respiration.

January 18th. Professor Henry Draper, M.D., on Respiration. (Continued.)

February 1st. Professor George W. Coakley, LL.D., on Comets.

February 8th. Professor E. H. Gillett, D.D., on The Future of Society.

February 15th. Professor Henry M. Baird, Ph. D., on Homer and his English Translators.

February 29th. Professor Charles Carroll, A.M., on Robert Browning.

March 7th. Professor E. A. Johnson, LL. D., on The Industries of the Romans.

March 14th. Professor F. D. Weisse, M.D., on Sensation and Thought, (illustrated.)

March 21st. Professor John J. Stevenson, Ph. D., on American Geology.

March 28th. Professor T. Addison Richards, N.A., on The History and Criticism of Art.

April 4th. Whitelaw Reid, Esq., on Journalism.

THE British Museum has an anvil which, it is said, belonged to one of the Pharaohs.

SCIENTIFIC INTELLIGENCE.

DETECTING OZONE.

A Russian chemist has devised a simple method for detecting ozone. He inverts a Hoffmann eudiometer, and, after connecting the platinum wires with an induction apparatus, passes oxygen gas slowly through the tube, and afterwards through Liebig's potassa bulbs, in which is a solution of iodide of potassium and starch. The presence of ozone will presently be shown by the liberation of the iodine and the consequent blueing of the starch.

BROMIDE OF SULPHUR AND AMMONIA.

If bromine be left for some time in contact with an excess of flowers of sulphur in a well stoppered bottle, and afterwards filtered through asbestos, a liquid is obtained which is composed of 83.33 per cent of bromine and 16.77 per cent sulphur. When this compound is brought into contact with aqua ammonia, the action is so energetic that the liquid begins to boil; and presently the liberated gases burst into flame. Chlorine and sulphur afford similar reactions, and it is a question whether this phenomenon could not be used for the production of explosive mixtures and also for signals. If the action could be moderated, as is the case with chlorine, it is possible that use, in medicine and in bleaching, could be made of the compound. At any rate, it affords a beautiful lecture room experiment, if performed with due caution.

OXIDATION OF CARBON AND ARTIFICIAL PRODUCTION OF ANILINE.

At the meeting of the chemical section of the German Association for the Advancement of Science, at Rostock, on the 18th of September, 1871, the President, Professor Schulze, read a paper, on the direct oxidation of carbon by means of permanganate of potash in an alkaline solution, which excited lively debate, and was justly regarded as one of the most important chemical discoveries of the year. In addition to copious quantities of oxalic acid and of other products not yet determined, the author obtained an acid to which he has given the name of anthraconic, and which he found to closely resemble mellitic acid in its properties. The experiment was repeated with charcoal purified in a stream of chlorine gas, also by calcining cream of tartar, by the reduction of carbonic acid with phosphorus, and from graphite. All of these varieties of carbon yielded analogous results. So great was the interest manifested in the announcement, that the leading chemists adjourned to the Professor's laboratory, there to repeat the tests and to examine into the nature of the incidental products. They soon came to the conclusion that the new body was identical with mellitic acid. By treating the anthraconic acid with caustic soda, benzole was produced, which was converted into nitrobenzole in the usual manner, and from this product aniline was manufactured. We have in this way the artificial production of aniline from charcoal, and are brought nearer to an explanation, of the chemical properties of carbon and of important practical applications likely to grow out of such knowledge. It is another step in the distinguishing characteristic of modern research, namely, the synthetical method, or the building up of compounds from their constituent elements. It is easy to rend asunder and destroy, but to rebuild requires the application of the highest genius. The discovery of Professor Schulze is likely to prove of great importance, as soon as it is thoroughly understood and applied.

TO GROW LARGE CRYSTALS.

In order to grow large crystals of such substances as sugar, borax, alum, and the like, Professor Schulze recommends the use of gelatinous solutions, such as pectin and gelatin. The crystals separate, suspended in the mass, and go on growing uniformly on all sides. In this way, irregularities and distortions are avoided. The determination of the amount of gelatinous matter to be added must be the result of experiment. The chief advantage appears to be to make the liquid of such a specific gravity as will hold the crystals in suspension.

CONSUMPTION OF GAS IN LONDON, 1870.

According to official reports of the thirteen gas companies of London for the year 1870, the following were the

RECEIPTS.	
For gas.	£2,045,313 0 6
Rent of meters.	31,558 2 4
Sale of old materials.	5,766 5 4
Products.	424,952 5 11
Miscellaneous.	11,649 15 11
Total.	£2,519,239 10 0
EXPENSES.	
Coal.	£1,004,300 9 7
Purifying materials.	22,235 16 7
Wages of workmen.	224,432 3 10
Repairs.	185,431 6 7
Taxes.	63 172 2 1
Salaries.	24,808 3 0
Commission of collectors.	27,035 18 9
Office expenses.	17,608 19 10
Directors.	22,565 14 9
Auditors.	1,314 10 0
Gas pipes.	127,249 8 1
Gas meters.	32,874 15 11
Lawyers' fees.	3,643 16 9
Miscellaneous.	29,736 11 2
Total.	£1,786,409 16 9

Excess of receipts over expenditures, £722,829-13-3. The active capital and loan of the thirteen companies is £8,272,816; the receipts therefore exhibit an interest of 8.86 per cent on the capital stock. The private consumption of gas was 9,122,113,853 cubic feet: for the street lamps it was 1,500,000,000 cubic feet; the total consumption of gas in Lon-

don for 1870 was therefore 10,622,000,000 cubic feet, which is double the consumption of Paris. Total quantity of coal used in making gas 1,225,839 tons, and the average cost, including cannel, was 16s. 4½d. per ton. In New York the annual consumption of coal by three gas companies is 200,000 tons.

PREPARATION OF SULPHUROUS ACID.

In order to prepare sulphurous acid from sulphuric acid and charcoal, it is better to employ an acid of 74 per cent, or 1.825 specific gravity. If we take a stronger acid, a part of it is entirely deoxidized to sulphur, and if weaker acid be employed, sulphuretted hydrogen is evolved. To obtain absolutely pure sulphurous acid, it is well to put sulphite of lead and coarse charcoal in the wash bottle. With these precautions, it is possible to obtain pure sulphurous acid from sulphuric acid and charcoal.

REPERTORY OF TECHNICAL LITERATURE.

Many of our readers may not be aware that a continuation of Schubarth's famous repertory of technical literature is now going through the press in Leipsic, under the editorial management of Professor Bruno Kerl. The first volume of 696 octavo pages, from A to K, is now complete, bringing down the literature to 1868. By reference to Schubarth's and Kerl's *repertorium*, it is possible to obtain a complete history of the leading papers and researches, published upon any given subject, in the technological journals of the world since 1823. The work is a dictionary of reference, and is the richest mine of information to be found in any language; and it is only possible to get up such a book in a country where the compiler has access to complete series of journals in all languages. For an inventor who wishes to make an exhaustive examination of what others have done before him, such a book of reference is indispensable; and it also follows that our libraries ought to contain all of the journals, in which the original publications first make their appearance, to which reference is made in this work.

TO CITY SUBSCRIBERS.

The SCIENTIFIC AMERICAN will hereafter be served to our city subscribers, either at their residences or places of business, at \$3.50 a year, through the post office by mail carriers. The newsdealers throughout this city, Brooklyn, Jersey City, and Hoboken keep the SCIENTIFIC AMERICAN on sale, and supply subscribers regularly. Many prefer to receive their papers of dealers in their neighborhood. We recommend persons to patronize the local dealers if they wish the SCIENTIFIC AMERICAN or any other paper or magazine.

TIMELY SUGGESTIONS.

Every Employer should present his workmen and apprentices with a subscription to the SCIENTIFIC AMERICAN for the coming year.

Every Mechanic and Artisan whose employer does not take the SCIENTIFIC AMERICAN should solicit him to subscribe for 1872.

Now is the Time for old subscribers, whose subscriptions expire with the year, to renew.

Now is the Time for new subscribers to send \$3 and commence with the new year.

Now is the Time for forming clubs for the new year.

It will pay any one to invest \$3 for himself, his sons, or his workmen, for one year's subscription to the SCIENTIFIC AMERICAN.

It is easy for any one to get ten subscribers at \$2.50 each, and for his trouble obtain the splendid large steel plate engraving, worth \$10.

It is easy for any old subscriber to get a new one to join in taking the paper. Those who do will receive a bound volume of the "Science Record" for 1872. See description of this work on page 353, SCIENTIFIC AMERICAN, issue of December 2d.

It is no more trouble to remit \$6 for two subscribers than \$3 for one.

If any mechanic whom you ask to subscribe says he cannot afford it, tell him he cannot afford not to.

If any one wishes specimens of the paper to examine before subscribing, tell him to write to the publishers and they will cheerfully mail them.

If any one wishes an illuminated Calendar for 1872, to hang in his office or shop, he can have it sent free on sending a request to this office.

If handsome illustrated posters and prospectuses are wanted to assist in obtaining subscribers, send to the publishers of this paper.

It is the intention of the publishers of the SCIENTIFIC AMERICAN to make the paper next year better and handsomer than any previous year during the last quarter century it has been published.

It is the intention of the publishers to illustrate, by superb engravings, all new and practical inventions and discoveries that may be developed during the year.

For Prospectus and terms to Clubs see last page.