

**Scientific Politicians.**

Says *Nature*, Marat, the notorious hero of the first French Revolution, the same who met his death at the hands of Charlotte Corday, was the author of several important works on electricity. This fact, which is not generally known, was recently brought to notice by M. A. J. Frost, who is editing the catalogue of the Ronalds Library. Most of Marat's works were written between 1779 and 1785, and several of them were translated into German. Marat was not the only one of the prominent figures of the time who worked in physical science. Arago, though his fame does not rest upon his political achievements, once enacted a chief part in the crowning of the statue of Liberty. "Citizen" Charles was as famous among the revolutionists as for his scientific attainments. Robespierre wrote an article on the lightning conductor for the *Journal des Savants*; and last, but not least, Napoleon Bonaparte on many occasions dabbled in scientific lore, and was the liberal patron of men of science.

**ELECTRIC LAMP TESTS.**

The Annual Report of the United States Lighthouse Board for the year ending June 30, 1879, contains an appendix that will prove valuable to all that are interested in the study of the electric light, the different methods by which it is generated, and their relative merits and disadvantages. It contains a very full list of the appliances devised in recent times, with concise descriptions of the apparatus and principles involved, illustrated by excellent cuts, some of which have appeared in the columns of the *SCIENTIFIC AMERICAN*, and others taken from Dr. H. Schellen's recent work. Its compact form renders it very convenient for reference. This portion of the report had its origin in a suggestion made last fall by the chairman of the Lighthouse Board to President Henry Morton of the Stevens Institute to test the various machines and lamps in use with the view of determining their relative efficiency.

It was found that there are three ways of producing electric illumination: 1. By means of the electric arc; 2. By ignited conductors; and 3. By incandescent gases, the latter of which is hardly of practical utility.

To overcome the difficulties connected with the use of the electric arc, which consist in its unsteadiness, in the wearing away and the combustion of the carbon electrodes, etc., numerous regulators have been devised. "The difficulty with all these," we are told, "is, that however well they may regulate everything else, they cannot regulate the minute accidental variations in the structure of the carbon poles during their consumption." The effect of this is to wear away the poles unequally and to cause the arc to shift its position, so that in the space of a few minutes, the intensity of the light measured in a given direction fluctuated between 400 and 2,000 candle power. Nevertheless, since the great improvements recently made in the homogeneity of the carbon poles and in the regulating machinery, and since the introduction of reflectors, the electric arc is no longer too unsteady to use for practical purposes.

In the production of the electric light by ignited conductors, the difficulties are that there is a great wastefulness of energy and consequent costliness, and that the conductors are rapidly disintegrated. A current that would furnish an electric arc of 1,000 to 2,000 candle power would not generate a light of more than 50 to 100 candles when used to ignite a platinum wire, and the platinum so used would soon become brittle and break up.

Higher temperatures were obtained with small rods of carbon placed in exhausted tubes, but they were soon vaporized and disintegrated. At this time Edison had not yet given up platinum. The report concludes that none of the lamps so constructed have proved practically useful as yet, and then goes on to give an historical account of the different inventions of this class for future reference. To show the loss of energy resulting from the division of the current several experiments are described. In one of them a given current produced a light of 65 burners when concentrated on a single lamp; when divided between two lamps, it was reduced to  $7\frac{1}{2}$  burners each; among three lamps to  $1\frac{1}{8}$  burners each, among four to  $\frac{3}{4}$ ; and among five to  $\frac{1}{2}$  burner.

The subject of electromotors, or instruments for producing electric currents, is treated next. To show that the galvanic battery is not economical, the following calculation is made. Weight for weight coal has almost six times the available energy of zinc, and the price of zinc is about 25 times that of coal. Hence to make gas from coal and burn it will be cheaper than to obtain electricity from zinc and turn it into light, unless the loss in the former case is 150 times greater than in the latter.

It follows from this that electric lighting did not become a practical problem until 1831, when Faraday discovered the fact that electricity could be produced from magnetism. Since then numerous magneto-electric machines have been invented, seventeen of which are described and their principles explained. Of these the following were tested in the Physical Laboratory of the Stevens Institute: the Siemens, the Wallace-Farmer, the Brush, the Arnoux-Hochhausen, the Weston, and the Maxim.

The Wallace-Farmer and the Arnoux-Hochhausen machines having been withdrawn after preliminary trials, the remainder were thoroughly tested to find out which was best adapted for use in the Lighthouse Department.

To measure the intensity of the light, Sugg's photometer

was used in a dark room temporarily fitted up in the Physical Laboratory. At the same time the power employed to drive the machine was measured by means of a transmitting dynamometer designed by Mr. William Kent, a graduate of the Stevens Institute.

In the following table will be found a résumé of the results obtained. The first column contains the name of the magneto-electric machine used in each series of experiments; the second contains the kind of self-regulating lamp employed, the word "hand lamp" indicating that the distance between the carbons was regulated by hand; the third column shows the amount of illumination; thus in the first line the figure number 3,297 means 3,297 times the light obtained from one standard candle burning two grains of stearine a minute; the fourth column indicates the horse power actually used; and the last column, found by dividing the third by the fourth, shows the number of candles obtained per horse power:

Machine.	Lamp.	Average candle power.	Average horse power.	Average candle power per horse power.
Maxim (ordinary type)...	Maxim .....	3,297	5.483	729
Maxim .....	Hand lamp .....	3,930	5.585	704
Siemens .....	Siemens .....	4,651	4.863	956
Siemens .....	Siemens .....	4,548	4.742	959
Weston .....	Hand lamp .....	8,585	4.769	1,800
Weston .....	Maxim .....	7,787	4.683	1,663
Weston .....	Siemens .....	7,262	5.056	1,436
Weston .....	Weston .....	6,063	4.552	1,332
Maxim (with magnets of low resistance)...	Maxim .....	7,524	7.400	1,017
Brush .....	Brush .....	4,365	2.8467	1,533
Brush .....	Siemens .....	3,532	3.9573	1,194

The report concludes with the following words: "In conclusion, your committee would report that they find several of the machines and lamps, with which they have experimented, sufficiently efficient and reliable to warrant further experiment in the nature of a practical test in one of the coast lighthouses."

C. F. K.

**The Melbourne Exhibition of 1880.**

Mr. Thos. R. Pickering, United States Government Agent for the Melbourne Exhibition, publishes the following general regulations of the Royal Colonial Commission:

1. The Exhibition will be opened on the 1st day of October, 1880, and closed on the 31st day of March, 1881. It will be open evenings.

2. There are no differential duties, and all exhibits will be admitted free of duty for the purpose of exhibition. Facilities will be given for the sale of exhibits, delivery to be made after the close of the Exhibition.

3. The protection of inventions capable of being patented, and of designs, is secured by the patent laws of Victoria.

4. If exhibits are not intended for competition it should be so stated by exhibitors, that they may be excluded from examination by the International Jury.

5. The general reception of articles in the Exhibition buildings will commence on June 1, and no articles will be received after August 31st. Arrangements will be made for transporting goods from the port of Melbourne, or the several railway stations, to the Exhibition grounds, at a fixed rate of charges.

6. All expenses of freight, marine insurance, etc., should be prepaid by the exhibitor, but if that be inconvenient, the Victorian General Commission, through its agents in New York and Boston, will, if desired, undertake the transportation, custom house formalities, unpacking and arranging the products for exhibition, the expense incident upon such work to be regarded as a first charge upon the exhibits, to be deducted from the net proceeds in the event of their being sold. Should such exhibits, however, not be sold, but be claimed by the exhibitor or his authorized agent at the close of the Exhibition, then such sums as may have been disbursed by the Commission or any of its agents must be paid before such goods are delivered.

7. No work of art nor any article whatever exhibited in the buildings, parks, or gardens, may be drawn, copied, or reproduced in any manner whatsoever without the permission of the exhibitor. The Commission reserves the right of authorizing the production of general views.

8. By the introduction of steam power, which will be supplied gratuitously, it is proposed to afford facilities for presenting not only the machinery for any given manufactures, but the manufactures themselves; and it is further intended that space shall be afforded for the production in the Exhibition of interesting objects by manual labor.

9. The Victorian General Commission is prepared, if required, to make arrangements for the construction of show-cases by contract at a price per cubic foot, the cost to be borne by the exhibitor using the same.

10. The Commission will take precautions for the safe preservation of all articles in the Exhibition, but will be in no way responsible for damage or loss of any kind, or accidents by fire or otherwise, however caused; facilities will be afforded exhibitors for insuring their goods.

11. The awards shall be based upon written reports adopted by the jurors.

Reports and awards shall be based upon inherent and comparative merit, the elements of merit being held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy, and cost.

Awards shall consist of gold, silver, and bronze medals, and a certificate of honorable mention, together with a special report of the jurors on the subject of the award.

Each exhibitor shall have the right to produce and publish

the report awarded to him, but the Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and to embody and distribute the reports as records of the Exhibition.

No commissioner who is an exhibitor or a member of a firm exhibiting shall take any part in the selection or appointment of jurors in those classes in which he exhibits.

No person interested either as a partner or *employé* in a house exhibiting shall be a juror in the classes in which such house or person exhibits.

The size of the medals (for prizes) will be two inches and a half, the design having been adopted.

12. Exhibitors are particularly requested to mark the trade price of the articles exhibited, so as to facilitate the judgment of the jury, as well as for the information of visitors.

13. Exhibitors will not have to pay rent for space occupied by them in the Exhibition.

**REGULATIONS FOR THE UNITED STATES SECTION.**

Congress having made no appropriation for the payment of freight upon goods sent to the Australian Exhibitions, and having assigned no government vessels to the duty of transportation, the United States Commission will assume no direction whatever of the movement of goods either to or from Australia.

Upon the delivery of the goods within the Exhibition buildings at Melbourne, and the payment of all charges by the exhibitors, the United States Commission will see that they are properly assigned to the space allotted the United States, and that they are catalogued.

The expense of installation must be borne by the exhibitors, and the United States Commission will not be responsible for expense of any kind in connection with the handling, storage, or the loss or injury of exhibits.

An agent with written authority duly filed, and whose qualifications are satisfactory to the Secretary of the United States Commission, will be the acknowledged representative of an exhibitor, but when goods are exhibited in the name of an agent—awards, though recommended by jurors, are not allowed by International Commissions; it would be well, therefore, for those who intend exhibiting for competition to make application in their own name.

**The Buenos Ayres Exhibition.**

The following are the principal regulations affecting exhibitors at the forthcoming South American Industrial Exhibition, to be held in Buenos Ayres in 1880:

1. The Exhibition will be opened on September 15 and closed on December 15, 1880. 2. Foreign exhibitors of industrial, agricultural, and all other machinery, suitable for the requirements of this country, admitted in accordance with the regulations of the Exhibition. 3. Applications for space required must be made on or before the 1st of May, 1880, addressed Al Presidente de la Comision Esposicion, Secretaria de Club Industrial, Buenos Aires. 4. The charge to foreign exhibitors will be 5 dols. (12 sterling) per square meter. 5. Articles intended for exhibition will be admitted from the 15th of June to the 15th of August, 1880. 6. No articles presented for exhibition can be removed until the close of the Exhibition. 7. All articles exhibited must figure under the name of the parties soliciting their admission, and any prizes awarded will be given in the same name. 8. Exhibitors may inscribe the names of the manufacturers or agents on the goods exhibited as well as their own. 9. All goods intended for the Exhibition will be admitted by the Customs free of duty, but must come expressly for the Exhibition, and as a guarantee that such is the case, each lot of goods must come accompanied by a certificate from the Argentine Consul at port of shipment. 10. All goods not reshipped after the close of the Exhibition must pay the customary duties.

We learn from the Argentine Consul General, No. 60 Wall St., New York, that foreigners can only compete in respect to exhibits of improved machinery.

**Scientific Societies.**

At recent meetings of scientific and professional societies in this city, officers for the ensuing year have been elected as follows:

*New York Academy of Sciences*: President, John S. Newberry; First Vice-President, Thomas Eggleston; Second Vice-President, B. N. Martin; Corresponding Secretary, A. R. Leeds; Recording Secretary, O. P. Hubbard; Treasurer, J. H. Hinton; Council, D. S. Martin, G. N. Lawrence, A. A. Julien, A. C. Post, W. P. Trowbridge, Louis Elsberg; Curators, B. G. Amend, C. F. Cox, B. B. Chamberlin, Charles A. Seeley, W. H. Leggett; Finance Committee, T. B. Coddington, Philip Schuyler, Thomas Bland.

*American Ethnological Society*: President, Alexander J. Cotheal; Vice-Presidents, Charles E. West, LL.D., and Charles C. Jones, Jr.; Corresponding Secretary, Charles Rau; Recording Secretary, T. Stafford Drowne, D.D.; Treasurer, Alexander J. Cotheal; Librarian, Henry T. Drowne; and Executive Committee, George H. Moore, LL.D., Asa Bird Gardner, LL.D., and Henry T. Drowne.

*American Institute of Mining Engineers*: President, Wm. P. Shinn, of St. Louis, Mo.; Vice-Presidents (in place of those whose term expires this month), James A. Burden, of New York; Dr. Charles B. Dudley, of Altoona, Penn.; and Persifer Frazer, Jr., of Philadelphia. Managers (in place of those retiring this month), James C. Bayles, of New York; W. S. Keyes, of San Francisco; and Percival Roberts, Jr., of Philadelphia. Treasurer, Theodore D. Rand, of Philadelphia; Secretary, Dr. Thos. M. Drown, of Easton, Pa.