THE PARIS ELECTRICAL EXHIBITION.

[From Our Paris Correspondent.]

To the Editor of "SCIENCE."

This letter leaves Paris somewhat late, considering the official opening of the Electrical Exhibition took place eight days ago, and that the opening to the public followed the next day, viz., the 11th of August, but in fact the exhibition is not opened even yet, although the public is admitted during some hours of the day to look at the half-finished structures and to inspect the dust-covered instruments.

The daily newspapers and some so-called scientific papers, which give to their readers sensational articles rather than correct information, have been for about ten days crowded with descriptions of the opening and the progress of the electrical exhibition, but the real good scientific papers have hitherto only given short notes, because it has, as yet, been impossible to study the value of the different instruments in the exhibition building, where everything is still in a half-finished state and where the noise of hammers and carpenters' instruments are still heard in every corner.

Notwithstanding this, I will endeavor to give you in this letter a description of the actual state of the exhibition, which will serve your readers as an introduction to the more special articles with which I will furnish your paper weekly.

When we first enter the Palais de l'Industrie through the principal pavilion, which is situated on the side of the Champs Elysées, we observe a series of beautiful statues which serve as "candelabres" for lamps of the Werdermann system, and when we approach the entrance to the great nave our eyes are attracted with two enormous images representing a male and female lion, while we observe above our head a beautiful chandelier of iron wrought in tasteful style, furnished with Siemens lamps. This lustre will undoubtedly be very attractive if the arrangements for the light are made as carefully by the French firm of the well-known house of Siemens, as those in the German department, where some evenings ago the preliminary experiments made with the Siemens lamps attracted the general admiration of all those who had the privilege to witness them.

In the centre of the nave a light-house is erected, which is a copy of the light-houses that guard the coasts of France. It is surrounded by a small water-basin, which, although it may be called ornamental, is perfectly useless for the purpose for which it is destined, on account of its limited dimensions and the outlines of its borders, which form a star. This basin is intended as a field of exercise for the boat of M. Trouvé, called the *Telephon*, which is driven by an electric motor, in connection with a Bunsen battery, and the length of which nearly equals the radius of the circumference of the basin.

I may here say a few words about M. Trouvé's boat, on account of which a good deal of nonsense has been published in European and American papers, one of the latter mentioning not long ago that M. Trouvé's boat, with which he experimented upon the Seine, contained a battery of M. Faure, but M. Trouvé is too well acquainted with the value of scientific instruments to depreciate the merits of the Planté battery and to substitute for it Faure's modification, as long as the former is better.

Count Du Moncel, whose name is well known among all electricians, on account of his excellent work on the "Application of Electricity," which is the most complete work of its kind in existence, and also on account of his other numerous publications and inventions relating to this part of Science, presented on the 7th of July last a note to the Academy of Sciences, in which M. Trouvé describes in a very precise manner the motor used by him in propelling a little boat. This note will give to your readers exact and correct information regarding the merits and properties of the motor used in the little canoe which is now seen in the Electrical Exhibition, and I therefore quote this note verbatim:

"A motor having a weight of 5 kilogrammes and in connection with six elements of a secondary battery of Planté, which produces a labor of 7 kilogrammeters per second, was placed on the 8th of last April upon a tricycle, which latter, rider and battery included, had a weight of 160 kilogrammes, and gave to the vehicle a celerity of 12 kilometers per hour."

"The same motor, used on the 26th of May, in a boat having a length of 5.50 meters and a breadth of 1.20 meters, holding three persons, gave to this boat a celerity of 2.50 meters in descending the Seine at Pont-Royale and of 1.50 meter in moving against the current. The motor obtained its electro-motive power by means of two batteries, consisting each of 6 elements of bichromate of potash, and the propeller was furnished with a coil having 3 branches.

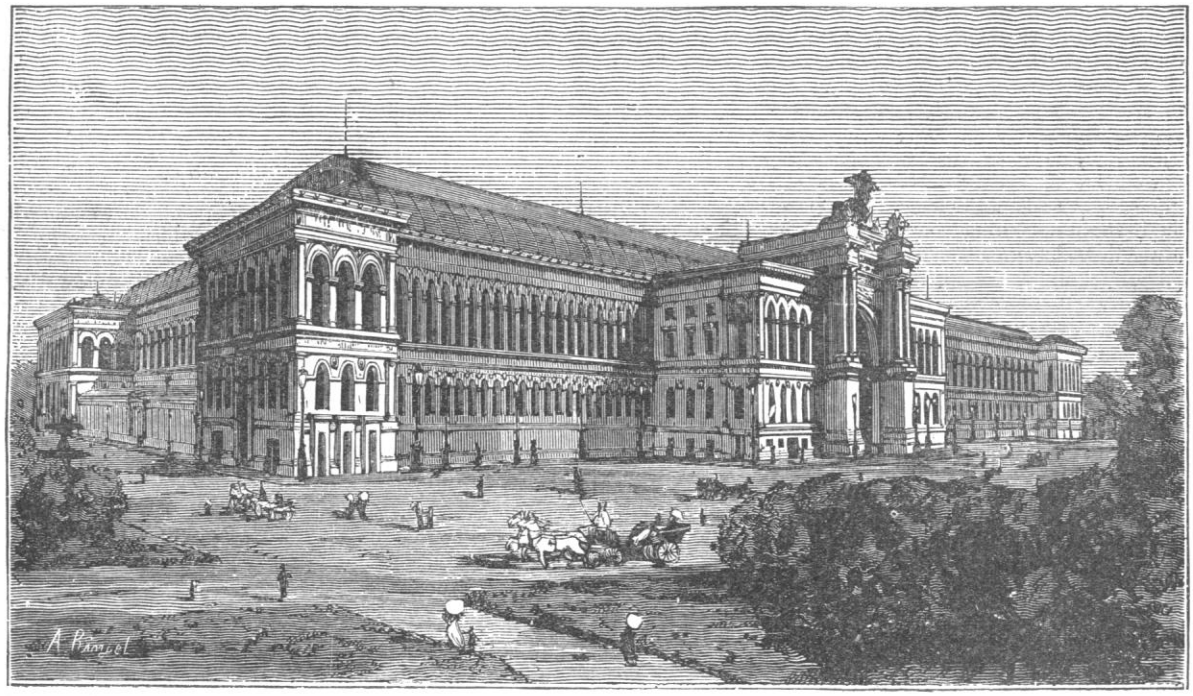
"On the 26th of June I renewed the experiment upon the quiet waters of the upper lake of the Bois de Bologne, using a coil with 4 branches having diameters of 0.28 meter and being in connection with 12 elements of Bunsen with flat plates such as are used in the Ruhmkorff battery. The liquid of these elements consisted of one part of hydrochloric-acid, one part of nitric acid, and two parts of water in the porous vessel, in order to diminish the disengagement of hypoazotic vapors.

"The celerity of the little boat, which was measured with an ordinary log, rose in the commencement to 150 meters within 48 seconds, or a little more than 3 meters per second; but after three hours of working it had diminished to 150 meters during 55 seconds. After five hours of working the electricity was still 2.30 meters per second."

So much about M. Trouvé's boat, of which a number of miniature specimens, in good working order, may be seen in the upper story of the Exposition building.

At the left-hand side of the nave, nearest to the light-house, are the exhibitions of Great Britain, Germany and the United States. The exhibition of Germany is that which has the most imposing appearance and is also that which was first completed. Two enormous "candelabres" in forged iron ornament the entrance of the department, and contain lamps of "Gebrueder Siemens" of Berlin. Near them stand two trophies crowned with the Prussian eagle, and behind them, upon a large number of tables, may be seen a collection of electrical instruments of all kinds, which we will describe in our reports hereafter. At the right-hand side of the department we see the busts of five German pioneers in the field of Electrical Science, viz.: Otto von Guericke, Ohm, Sömmering, Steinheil, and Gauss.

The historical collection of instruments in the German department is of the highest interest in a retrospective way. I will only mention an exact copy of the first machine for static electricity, constructed in the year 1670 by Otto von Guericke, consisting of a sulphur globe, which was electrified by turning it by means of an axis and using the hand as a rubber; an electrical egg, so-called, property of Prince Pless, of Germany, and constructed at the commencement of the 18th century; an electro-chemical apparatus for telegraphing, constructed by Thomas Sömmering in Munich in the year 1809—the telegraphing with this instrument is done by the decomposition of water. A magneto-electric telegraph of Gauss and Weber, constructed in 1833—this telegraph was used in 1837 in order to keep up a telegraphic communication between the physical laboratory aud the magnetical observatory in the University of Göttingen; the copy of the first telephone ever constructed, and invented in the year 1861 by Reis, and a great many other apparatus of equal interest.



EXTERIOR.

INTERIOR.

ELECTRICAL EXHIBITION.—PARIS, 1881.

Amongst the other electrical instruments in the front part of the department, especially worthy of attention, are some of the most important instruments used in the physiological institution of Berlin and mostly due to the genius of the celebrated German professor "Dubois-Reymond" of Berlin. These instruments will be used in experiments before the French Academy of Sciences and the Electric Congress, by Professor Arthur Christianï, of the Medical Faculty of the Berlin University, who has been sent for this purpose to Paris and arrived here a few days ago.

A large space in the German department is occupied by the extensive exhibitions of the firm of Siemens & Halske of Berlin, and there may be also seen the first electro-locomotive constructed by this firm in the year 1867 and the first machine of that renowned type, which was invented at nearly the same time by Mr. Wheatstone in England and Mr. Siemens in Berlin.

The exhibit of Mr. Siemens is, in my opinion, one of the most important of all the exhibits in the whole building of the Palais de l' Industrie, and the excellent instruments and apparatus manufactured by this firm, which occupy a large place in the German, French and English departments of the exhibition create general admiration. I shall endeavor, during the following week, to furnish you with an explicit description of some of the more important instruments of the Siemens exhibition and your readers will then be able to judge for themselves of their value.

The exhibition of *Great Britain* is still far from being complete, and this is very easily explained, by the fact that the English government, although after a very long hesitation, finally having taking part in the exhibition has not consented to contribute anything for the expenses, and it is marvellous that under such circumstances the English exhibitors have been able to contribute so much as they have. The only portion of the English exposition which is nearly complete is that of Siemens Brothers, who, among other things, exhibit a great number of apparatus for submarine telegraphy which are displayed on several large tables, and of which the most conspicuous is a full sized buoy ornamented with a flag. One fact which I must not forget to mention, is, that the pavilion of the British post-office is undoubtedly erected in excellent taste and is not only the most conspicuous but also the most beautiful in the exhibition (with the exception of the pavilions of the Italians). This pavilion is divided into two parts, the one containing a historical collection which is very remarkable and consists of the first instruments of telegraphy, among others that ingenious telegraph apparatus of Cook and Wheatstone, which was used with several wires and which now, after the invention of duplex, quadruplex and multiplex systems seems rather primitive, while the other part consists of a collection of all the modern instruments of telegraphy which can only be appreciated by a more minute description, and a great help to the study of these instruments is their excellent arrangement, which is due to the labors of Mr. Preece.

The exhibition of the United States is not at all what it should be, and it is greatly to be regretted that Europeans will receive a very wrong impression of the productiveness of your country if they judge by the scanty exhibits which America has sent to the Paris exhibition.

Most of the Americans to whom I have spoken seem to recognize this fact very fully, and it is generally regretted that many of the beautiful electrical inventions of the United States cannot be displayed here, where they would certainly create a sensation. But it seems that the United States Government was too interested in politics to care for a worthy representation at the electrical exhibition, and the more intelligent class of the French public know how to appreciate the difficulties with which the American exhibitors had to contend on this account, as well as on account of the great distance which separates their country from Europe.

Among the apparatus, which are already installed, may be mentioned the Bell telephone, the automatic time-register and alarm, the Dolbear telephone, of which you have already given a long description in your paper, and which is now exhibited in a neat little pavilion erected by Mr. Buck and Mr. Stetson, who, by their industry, set an example to the tardy French workmen; and the exhibition of the United States Signal Service, which contains an ingeniously constructed distance-barometer, anemoscope and anemometer, invented by Mr. Eccard. The display of the other exhibitors are not yet finished, and I reserve that of Mr. Edison's until it is more complete, as it promises to be the most interesting and valuable one in the building, and will demand a special report to do it justice.

If we continue our walk through the Exhibition towards the East Entrance, we come to the department of Belgium and Austria. That of Belgium offers a very beautiful aspect, and is displayed in two fine pavilions, which are furnished with several crystal cases ornamented by copper posts. The galvano-plastic exhibits in this department are worthy of the greatest attention, but scientifically, the most interesting exhibit is that of the meteorological station of Brussels. Austria has contributed a great many apparatus which serve for the security of railways.

The pavilion of Italy, which we next enter, is a beautiful oblong building, and attracts much attention. Until yesterday it was nearly empty, but the instruments begin now to be installed, and within a few days the visitors of the Exhibition will have the privilege of seeing the ingenious instruments that Volta, Gulvani and Nobili constructed with their own hands, and to read the original letters in which these great scientists published their first ideas regarding their new and wonderful discoveries. This Italian pavilion, in connection with the post office pavilion of England and the retrospective collection of the Germans, form together the material for the three most important chapters in the history of electricity.

The exhibition of Holland offers, so to say, an appendix to them, and the instruments for static electricity there shown, excel, perhaps not in quality, but at least in grandeur all other instruments of this kind. The enormous machine and battery of Leyden-bottles of Van Marum, of which we have all heard when we were school boys, form the most interesting part of this exhibition, and the whole, including the enormous natural magnets, makes upon the visitor an impression that he is visiting an exhibition of the Scientists of the land of the pyramids.

Passing the departments of Spain and Switzerland, and leaving at the left the exhibition of Russia and Norway, which have all contributed in an appreciable manner to the interesting show of apparatus, we arrive at the entrance station of the Siemens' electrical railway which is not yet completed on account of several modifications which his construction had to undergo. It will be running, however, within a few days.

Returning now again to the centre of the nave, and entering the western half of the building, we see before us the French portion of the exhibition.

At the left hand side viewed from the light-house, is a pavilion in very good taste filled with the shining silver and gold exhibits, and with the highly artistic galvano-plastic reproductions of the renowned firm of Christofle & Co., and on the right hand side from the light-house in a pavilion corresponding exactly in style with the former, we see the exhibits of the Jablochkoff Electric Light Company. This department contains a complete collection of all the different kinds of apparatus used by this company, and amongst others a new dynamo-electric machine of Jablochkoff, which is of excellent consttron.

The pavilion of the *City of Paris* contains instruments for the distribution of time and electrical instruments for the service of the fire companies. This pavilion is surrounded by the exhibitions of different French railroad lines, which contain an enormous amount of apparatus too complicated and too numerous to mention in this short review.

One of the most interesting parts of the French exhibition is the pavilion of the Ministry of Posts and Telegraphs, which contains a complete collection of all the modern apparatus employed in the telegraph service of France. This pavilion is bounded on its North, South and East sides by highly interesting collections of different French firms, while on its West side the great staircase leads to the upper stories. Of the exhibits in the upper story I will give only a general catalogue because the installments are as yet too unfinished to render it possible to give any detailed description of them, and the experiments with the electric lights and telephones, to which this portion of the palace is mostly dedicated, will not commence before eight days.

Hall A, immediately opposite to the grand staircase, is a beautifully furnished drawing room called the "Salon du President" and will be lighted by the Werdermann light.

Hall 1 contains a gallery of paintings but it is to be hoped that the light of the "Lampe-Soleil" which is here exhibited will be better than the pictures, which are wretchedly bad.

Hall 2 contains a stage which once figured in the, so-called, "Athenæum," in the "Rue des Martyrs." This stage will be used for showing stage effects produced by electric lights, and the light will be furnished by the Werdermann Company.

Hall 3 is a tastefully furnished dining-room, with table temptingly set, in which the Werdermann light will also be displayed.

Hall 4 is an apartment consisting of vestibule, kitchen and bathing-room, which will be lighted by incandescent lamps fed from reservoirs consisting of Faure's secondary battery and furnished by "La Société de la Force, et la Lumière."

I have made it a special object to study the value of the Faure-battery in regard to which so much has been said pro and contra, and propose to furnish your excellent paper with impartial reports on this subject as soon as any definite knowledge of it can be obtained.

Halls 5 and 6, which are united in one, will display lights of the "Systeme-Jamin" and contain a collection of Gramme-machines modified by M. Jamin.

Hall B contains a collection of smaller electrical apparatus, of electrical toys and also an exhibition of Jablochkoff candles.

Halls 7 and 8 are dedicated to telephone experiments, hall 7, being lighted by "La Société de la Force et la Lumière" while the light of hall 8, is furnished by Mr. Brush. The preliminary experiments with the telephones in these halls have been exceedingly satisfactory, the music of the Grand Opera and the words spoken in the "Théatre-Francais" (both of these buildings being connected by telephone-wires with halls) can be so plainly heard that one may really imagine himself to be one of the audience present, instead of being several kilometers distant from the places of performance. A person, who has never witnessed these telephone experiments can have no idea of the value of the microphone and telephone, and the public, before which these experiments will be made in about eight days, will be greatly astonished to see those reports verified which it has hitherto taken for exaggerated descriptions of sanguine writers.

Hall 9 contains chiefly electrical apparatus devoted to medical purposes, and will be lighted by Méritens, who also has there exhibited the most of his special apparatus.

Hall 10 is dedicated to the exhibition and the light of the firm of "Sautter et Lemonnier."

Hall 11 has Jablochkoff light and will also exhibit the apparatus used for photographing by electric light.

Hall 12 will be lighted by the Spanish society of electricity which employs Gramme's lamps.

Hall 13 serves for the display of Siemens' differential lamps and contains an excellent collection of instruments of precision and of Geissler tubes.

Hall 14 contains machines of the system Wilde and Alliance, it will be lighted by means of Wilde's candles, furnished by the Parisian Company of Wilde's light.

Hall C contains cables, telephones, and telegraph instruments and will be lighted by incandescent lamps of Maxim furnished by the United States Electric Lighting Company.

Hall 15 has, among other things, a nice collection of lightning-rods and contains Jaspar's light.

Hall 16 has lamps of M. Anatole Gérard.

Hall 17 contains electro-chemical instruments, apparatus for galvano-plastics, etc., and lamps of the Gramme system.

Hall 18 contains a highly interesting museum of historical instruments of electricity. The light is furnished by Messrs. Mignon and Rouart.

Hall 19 will be lighted by a company from Lyons, display ing the processes of Lontin, Bertin and Mersanne, and also contains the electro-pneumatic clocks of Mr. Mayrhofer, which form one of the most interesting parts of the electrical exhibition.

Hall 20 contains a retrospective museum and a library of works on electricity; the light in the former will be furnished by Mr. James Fyfe, that in the latter by Mr. Daft.

Hall 21 serves as a restaurant and is ornamented by a large chandelier containing Swan's incandescent lamps.

Hall 22 serves as a reading-room and will be lighted by the Brush system.

Hall D is the place where the Congress will meet, and halls 23 and 24 contain the exhibition of Edison, of which I shall not now speak in detail, reserving a description for a special letter, when I will attempt to do justice to this interesting exhibit. GUSTAVE GLASER, *Ph. D.*

PARIS, *August* 17, 1881.

THE AMERICAN CHEMICAL SOCIETY.

The first meeting of the American Chemical Society, after the summer vacation, was held on Friday evening, September 2, with Vice-President Leeds in the chair. The minutes of the previous meeting were duly passed on and Dr. H. Endemann elected to the position of Editor of the Journal. The first paper presented to the Society was "On the Detection of Oleomargarine," by Mr. P. Casamajor. This method is based on the differences between the density of butter and oleomargarine. A drop of the suspected fat is melted and poured into alcohol at 15°C; if it is butter, on account of its greater specific gravity, it immediately sinks to the bottom of the vessel, while if it is oleomargarine it remains on the surface.

Mr. Casamajor followed by a second paper on the "Detection of Sugar House Syrups from Starch Sugar Syrups." The author found that by dissolving the given sample (10c.c. are taken) in three times its volume of methylic alcohol, the ordinary sugar syrup will become entirely dissolved, while the starch sugar syrup becomes precipitated under the same conditions. Partially dissolving indicates, of course, a mixture of both.

"A Short Table for Testing Sugar by Inversion" was the title of the third paper. It was also by Mr. Casamajor. Assuming that D = the first deviation in a reading of a polariscope and — D′ the second, substracting them we have D + D′.

t = the temperature.

When a solution of pure sugar is 100, the sum of the two readings will equal 144. Making Δ equal to the