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

true deviation, we have from the above constants $\Delta = D + D' \times \frac{100}{144-t}$.

In the table given by Mr. Casamajor the quantities which t was equal to was given, so that by a simple calculation it became readily possible to determine the value of the true deviation. The table was based on the much larger one of Clergets.

The fourth paper of the evening was by Mr. A. H. Elliot and it consisted of a description of "A New Form of Apparatus for the Analyses of Gases." It was very severely criticised by Dr. Endeman as being decidedly inferior to the more complicated forms devised by Professor Hempel. M. B.

THE SUCCESSFUL ADMINISTRATION OF NITROUS OXIDE AS AN ANÆSTHETIC FOR DENTAL AND SURGICAL OPERATIONS.*

DR. E. P. HOWLAND, Washington, D. C.

The successful administration of nitrous oxide consists in administering it to patients in such a manner that during operations they will not suffer pain, and that they will be in such a condition that the dentist and surgeon can successfully perform the operation and afterwards that the patients are found not to be injured by its administration. The first requisite for success is that the nitrous oxide should not have more than one per cent of pure oxygen or three per cent of atmospheric air, and that it should be perfectly free from all other gases or vapors. Nitrous oxide with two per cent or more of pure oxygen or five per cent or more of atmospheric air, will not produce perfect anæsthesia and the patient will feel the pain of the operation and pronounce the gas a failure. The adding of one per cent of pure oxygen to nitrous oxide has the benefit of partially oxygenating the blood and in a measure preventing the spasmodic action of the muscles and at the same time produce satisfactory anæsthesia. According to experiments made in France by P. Bert, ten per cent of oxygen or fifty per cent of atmospheric air can be added to nitrous oxide to oxygenate the blood, and at the same time produce perfect anæsthesia if it is breathed in a chamber under a pressure of two atmospheres. A certain amount of nitrous oxide taken into the lungs is necessary to produce insensibility, and it can be diluted with any innocuous gas and still produce anæsthesia, provided this amount is inhaled in the given time. Under pressure in a chamber more gas is breathed in a given time, as the nitrous oxide is condensed the same as the air in the chamber and under a pressure of two atmospheres, two volumes of nitrous oxide would be condensed into one volume, so that the nitrous oxide could be diluted with equal measures of atmospheric air and still the quantity of nitrous oxide inhaled would be the same as if breathed ordinarily and the quantity of oxygen breathed sufficient to arterialize the blood. Rapid breathing of nitrous oxide produces quick anæsthesia, but nothing is gained by it in practice. It is very difficult to produce anæsthesia with nitrous oxide at high elevations above the ocean, because the low pressure of the atmosphere allows the gas to expand so that a less quantity is taken into the lungs in a given time than is required to produce insensibility. Valve inhalers have generally proved a failure, because they admit atmospheric air with the gas in sufficient quantity to to prevent perfect anæsthesia. As near as I can ascertain, more than one-half of all the dentists of the United States who have used nitrous oxide have abandoned its use on account of want of success in producing satisfactory insensibility and thereby injuring instead of benefiting their practice. One cause of failure is the unskillful administration of the gas in allowing air to be inhaled with it, by not having the lips closed tight around the inhaler, and other causes; not using the nose as a valve for expiration exactly at the right time; not stopping the administration at the point of greatest anæsthesia and not having sufficient self-possession under all circumstances and emergencies to know just what to do and when to do it. But the greatest cause is the failure of producing perfect anæsthesia from the mixture of atmospheric air in the nitrous oxide that has been kept in a gasometer over water for a few days. The gas becomes mixed with air through the medium of the water and defective gasometers and cocks. The trouble and cost of making fresh gas every few days has caused the great abandonment of its use. Skillful administrators, who have a large practice and make fresh gas before deteriorated by air, are making nitrous oxide a success. Other dentists can make gas a success by obtaining it condensed in cylinders, when the gas will keep unadulterated and unchanged for years. The only drawback to a paying success is the present great cost of the condensed gas, which in the small cylinders amounts to about thirty-five cents for each administration, when the gas can be made in the dentists' laboratory for about three and a half cents for each administration. An apparatus can now be obtained that enables each dentist to make and condense his own gas and keep it for any length of time. Physicians and surgeons do not use nitrous oxide on account of the trouble and cost of making and keeping it, and the greater amount of practice and skill required in its successful administration than with the more dangerous ether and chloroform. Nitrous oxide requires a costly apparatus to manufacture it, and bulky receptacles to hold and administer it from, and the gas is for sale in but two places in the United States, while ether and chloroform can be carried in a bottle in the pocket and purchased at every drug store in the land. Nitrous oxide can be administered with almost absolute safety, while ether and chloroform can point to their victims in every city and hospital. Money, labor and skill can make nitrous oxide successful with both dentist and surgeon, and taking into account the value of human life, nitrous oxide should stand at the head of all anæsthetics, and its practical use be encouraged instead of ether and chloroform.

I have administered nitrous oxide in over thirty thousand cases for dental and surgical operations, and have had uniform success. I have never had a case of injury from lung or heart disease, but in many cases of throat and lung diseases a marked and permanent improvement. I have kept a large number of patients perfectly anæsthetic for surgical operations from five to thirty-five minutes, and the pulse during these operations has been nearly uniform and full. The success of prolonged operations consists in first producing perfect anæsthesia and then breathing air to arterialize the blood and before consciousness returns again breathing nitrous oxide, the necessary intervals varying in different patients from one-fourth to one-half minute. The average length of time occupied in dental operations from the first commencement of breathing the gas till return of consciousness has been two minutes. To encourage and make nitrous oxide a greater success in the future, the dental and medical colleges should employ successful operators to lecture and instruct graduates so that the particular knowledge and skill acquired by them in practice can be learned by others.

* Read before the A. A. A. S., Cincinnati, 1881.

ON October 17 next, fifty years will have elapsed since Prof. Bunsen, the eminent chemist, received his doctor's diploma from Göttingen University. He, however, intends to absent himself from Heidelberg on the day in question, in order to avoid all congratulations and speech-making.

MR. W. H. M. CHRISTIE, F. R. S., First Assistant at Greenwich Observatory, has been appointed Astronomer Royal, in succession to Sir George Airy, who retires after holding the office for nearly half-a-century.