rays, the arrangements being made to imitate the earth with the sun as kathode. The experiments, of which numerous photographs are given, are exceedingly beautiful, and present distinct analogies with the deductions from the magnetic storms. At the same time, the analogies are by no means conclusive, and may in some cases be very misleading.

The work of analysing each storm independently must have been tremendous, but the results amply justify the work.

It is impossible to enter into details in such a brief review, but we think no serious student of terrestrial magnetism will read this book without feeling that a very distinct step has been made towards the solution of the refractory problem of terrestrial magnetism.

G. W. W.

ROCK-ENGRAVINGS IN SOUTH AFRICA.

MR. L. PÉRINGUEY, in the eighteenth volume of the Transactions of the South African Philosophical Society, continues his report on rock-engravings of animals and the human figure. The examples now described are superior in finish and artistic merit to those hitherto known. We have no longer mere lines or outlines produced by rough pointing or punching; the technique is more elaborate, and the figures are drawn in relief. Thus, in the illustration (Fig. 1) of an elephant fleeing before a hunter armed with a bow and arrow, the lines in relief represent the skin corrugation; and the position of the ears, the hanging lower lip, the curves of the back and legs, are all strikingly artistic, and suggest keen observation on the part of the sculptor. Equally artistic is the representation of the buffalo (Fig. 2), the figure of which is fully hollowed out, the attitude of the animal and the twitching of its tail being full of life.

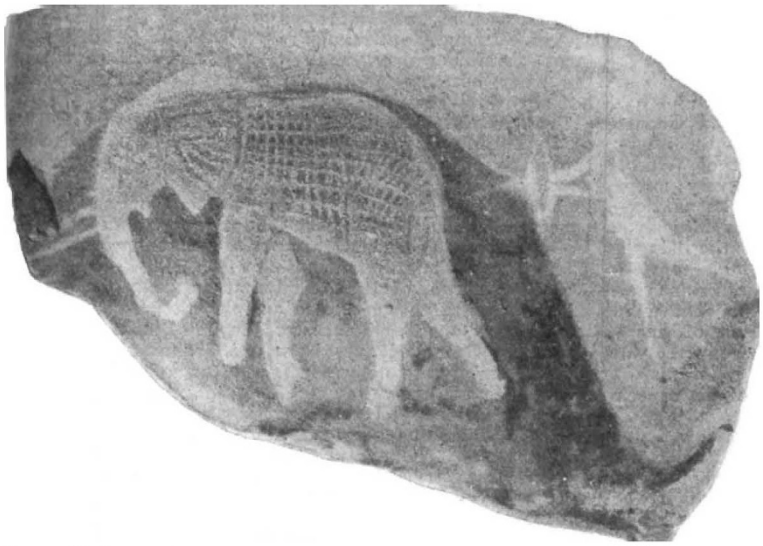

FIG. 1.—Rock-engraving of an elephant and hunter armed with bow and arrow. Size 60×39 cm.

FIG. 2.—Rock-engraving of a buffalo. Size 60×40 cm.

The age of these sculptures is still uncertain. Mr. Péringuey, comparing them with similar rock-engravings in Algeria and the Sudan, and remarking the patination of the rock surfaces, the presence of Palæolithic implements in the neighbourhood, and the absence of scenes representing domesticated animals, believes them to be anterior to the Hottentot immigration. As in Mauretania, the most highly finished sculptures, as well as paintings, are the most ancient, and a decadence of artistic skill seems to have set in with the arrival of the newer immigrants. There is no evidence that these engravings were the work of the Bushmen, and it is equally difficult to attribute them to the Strand Looper Hottentots, whom Dr. Shrubsall has recently identified on the southern seaboard. On the whole, they suggest intercourse between North and South Africa, a view corroborated by the analogies between the engravings in Mauretania and those of South Africa, the identity of type in the stone implements in both these regions, and other considerations generally accepted by modern ethnologists.

CENTENARY OF THE PHYSICO-MEDICAL SOCIETY OF ERLANGEN.[1]

THE Physico-medical Society of Erlangen, founded by Joh. Christian Friedrich Harles in 1808, reached its one hundredth birthday on March 20, 1908, and celebrated the occasion on June 27 by an anniversary meeting and a dinner. The first of the two publications cited below contains (*a*) a history of the society, by Prof. M. Noelther, of the University of Erlangen, covering eighty-three pages, and illustrated by portraits of Harles, Henke, Leupoldt, Korn, Wagner, Canstatt, Gerlach, Gorup, Zenker, and Beetz; (*b*) an address, by J. Rosenthal, "Ueber die Beziehungen der Physik und Chemie zu den medizinischen Wissenschaften"; and (*c*) a report of the anniversary celebrations, by Oskar Schulz.

Honorary doctorships in medicine were conferred on Prof. Becquerel, Prof. Curtius, and Prof. Nernst; doctorships in philosophy were conferred on Sir Victor Horsley, Prof. von Leube, and Prof. von Kries. Honorary membership of the society was conferred, on general grounds, on Queen Margherita, Count Zeppelin, and Dr. Oskar von Miller; of the special sciences, chemistry was honoured by including in the list the names of Bechmann and Buchner; physics was represented by Blaserna, zoology by Dohrn, mineralogy by Zirkel, botany by de Vries, mathematics by Poincaré, geography by Günther, physiology by Pflüger, anatomy by Roux, and the medical sciences by Erb, Ehrlich, Kocher, and Kraepelin. Amongst the new corresponding members we notice the names of Prof. Rutherford, of Manchester, and Prof. Sherrington, of Liverpool.

The *Sitzungsberichte* for 1907, sent out with the report of the centenary, is a bulky volume containing seventeen scientific communications. Nearly half the volume is devoted to a memorial notice of Henri Moissan, written by Gutbier, and extending over 260 pages; a complete list of Moissan's papers is given, and his work on fluorine, boron, silicon, ammonium, calcium, diamond, the

[1] (1) Festschrift der Physikalisch-medizinischen Societät zu Erlangen, zur Feier ihres 100 jährigen Bestehens am 27 Juni, 1908. Pp. ix+124. (Erlangen: Kommissionsverlag von Max Mencke, 1908.)

(2) Sitzungsberichte der Physikalisch-medizinischen Societät in Erlangen. Redigiert von Oskar Schulz, 39 Band, 1907. Pp. xxiv+562. (Erlangen: Kommissionsverlag von Max Menche, 1908.)

metallic carbides and hydrides, and the electric furnace is fully described. Three *Beiträge zur Geschichte der Naturwissenschaften*, numbered xi., xii., and xiii., are contributed by Prof. Eilhard Wiedermann, and a paper on the emission-spectra of cadmium and zinc vapours jointly with A. Pospielow. Papers on the atomic weights of rhodium and of palladium are contributed by A. Hüttlinger and by P. Haas, and papers on electrolysis by Gutbier and by Herzog; papers dealing with medical subjects are contributed by de la Camp, by Grünbaum, and by Jamin, and a mathematical paper appears under the name of Noether.

At the end of 1907 the society included fifty-one ordinary, fifty-four honorary, and seventy-eight corresponding members; nine meetings had been held, and sixteen papers had been read and discussed. The "yield" of scientific work will bear comparison with that of many societies claiming a wider range of membership, but in view of the large variety of topics discussed and the small number of papers dealing with any one branch of science, it is at least doubtful whether the publicity attained can be sufficient to compensate for the heavy cost of setting up and printing; as a general rule, the disadvantages of local publication are so serious as to outweigh the advantages which arise from stimulating the local centres of research.

THE INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY.

THE seventh International Congress of Applied Chemistry was opened on Thursday, May 27, in the afternoon, at the Royal Albert Hall by the Prince of Wales, who was accompanied by the Princess. A very large gathering was present, and the Prince, who spoke as vice-patron, the King being patron, offered in His Majesty's name a most hearty welcome, and expressed the King's pleasure that the foreign delegates would be able to visit Windsor Castle. It is only recently that the Prince, as president of the Board of Trade Committee to deal with exhibitions, directed attention to the importance of scientific progress, and at the opening of the congress he accentuated the value of scientific progress in words of such importance that we reproduce a portion of his speech verbatim.

"The main object which you all have in view is, I assume, to discuss in your numerous sections the many topics of interest and importance that are continually arising owing to the marvellous discoveries which the science of chemistry, both pure and applied, is making from day to day. Those interested in some special branch meet in the different sections their *confreres* from other lands to their mutual benefit. . . . These conferences, whether of a scientific or of a more intimate character, between men living in distant lands, all working for the same object, although under different conditions, cannot but be favourable to the progress of science and of the industries to which many of you have devoted your lives, as well as to the general peace of the world. I fully appreciate the important part which chemistry plays in almost every branch of our modern industry. We all recognise that without a scientific foundation no permanent superstructure can be raised. Does not experience warn us that the rule of thumb is dead, and that the rule of science has taken its place—that to-day we cannot be satisfied with the crude methods which were sufficient for our forefathers, and that those great industries which do not keep abreast of the advance of science must surely and rapidly decline? On behalf of the Princess of Wales and for myself, I offer our cordial greetings to the members of the congress, and I earnestly trust that great results may accrue from your deliberations. I now have much pleasure in declaring the seventh International Congress of Applied Chemistry open."

Sir William Ramsay, in the course of his opening address, said it is impossible to draw a hard-and-fast line between scientific and technical chemistry. Above all, chemistry is a practical science, although in recent years it has more and more tended to become a branch of applied mathematics. The chief difference between pure and applied science consists in a satisfactory answer to the question—all-important to the technical chemist—"Will it pay?" This, however, is irrelevant to the man of science. On the answer to this question the success of a process depends; but in its essence applied and industrial chemistry are one. This has hardly been realised in a practical way on this side of the Channel or even on the other side of the Atlantic. Our Continental friends have realised it and acted upon it under the conviction that the industrial prosperity of a nation can best be advanced by an alliance between the technical and practical workers, that is to say, between the university and the factory. Such congresses as the present can teach much, and if this lesson be learnt, then a valuable national asset will have been gained. It is often said that science knows no country, and the existence of this congress accentuates the proof of the saying. All the nations of the civilised world are represented, and have met together to discuss how best to develop the special branches of chemistry to which the members have devoted their lives.

Prof. Wiley, of America, said there is no more apt illustration of the utility of chemistry than to say that if its principles were unknown and unapplied, teeming millions of the globe would be at this moment unclad and unfed. Sanitation is a chemical problem; pure food, pure air, pure water, which ensure activity of mind and body and cure disease, are also problems for the chemist.

Prof. Armand Gautier, of France, said that in the development of industrial science England and France are not the only, but the great leading nations—never enemies, but always rivals.

Prof. O. N. Witt, replying for Germany, said the field of applied chemistry extends in two directions. It includes the analysis scientifically and the control of commercial raw products, and also of finished products. It further includes the advance of the chemical industries which are concerned with them. The congresses promote friendly feeling and noble rivalry, and as a consequence obtain the patronage of the rulers of nations.

Prof. Paterno, of Italy, said that naturally the members responded with enthusiasm to an invitation from the country which was the birthplace of Boyle, Black, Cavendish, Priestley, Dalton, Davy, Faraday, Graham, and Woollaston. Even in the noisy rush and turmoil of London life scientific men know how to find the necessary tranquility to carry out their scientific investigations.

Prof. Arrhenius, in replying for other delegates of foreign lands, spoke of England as the classical world of applied chemistry. In this country, particularly in London, successful efforts have been made to improve hygiene by the employment of chemical methods, with the result that among the large cities of the world London has the lowest death-rate.

Later in the afternoon sectional meetings were held to arrange the work for the succeeding days of the congress. The organisation of the sectional work was a matter of considerable difficulty owing to the large number of papers sent in. This was notably the case in the sections for organic chemistry, analytical chemistry, and electrochemistry, in each case the number considerably exceeding one hundred, while the actual time available for work only amounted to 18½ hours.

In several cases, where the subject was of interest to more than one section, joint meetings were held. A special case of this was a joint meeting of five sections to discuss the fixation of atmospheric nitrogen, when Hofrath Prof. Bernthsen, Prof. Birkeland, and Dr. N. Caro presented the subject from different points of view. This particular discussion attracted great attention, not only because of its enormous importance, but also because Prof. Bernthsen's address was experimentally illustrated.

The process of Birkeland and Eyde, in which the arc is drawn out into a thin disc by the means of powerful magnets, is well known, but that of the Badische Anilin- und Soda-Fabrik had not been previously described in this country. An iron tube contains an insulated electrode at one end and itself acts as second electrode. At its formation the arc springs from the insulated electrode to an adjacent part of the iron tube which is only a few millimetres away. Air is, however, blown tangentially or with a rotary motion through the tube. This carries the end of the arc along the wall of the tube, so that it ends at a