

mining engineers in South Africa. The courses of instruction are intended to prepare students for a diploma of mining engineer, or for the degrees of B.Sc. or M.Sc. in mining engineering. Theoretical and practical instruction is given, under the direction of the principal, Mr. James G. Lawn, in mining, mechanical and electrical engineering, metallurgy, assaying, surveying and other subjects. Practical work is carried on in the mines and workshops of the De Beers Company, and also in various mines at Johannesburg. The time spent at Johannesburg is devoted to a special study of the cyanide process in all its developments, of the electrical machines and appliances at the mine where the student is working, of the methods of assaying and surveying and of the economics of mining on the Rand. A thorough training for mining engineers is thus provided in connection with the school, the course of work described in the prospectus being of a very satisfactory character.

THE London Technical Education Board have arranged several advanced evening science courses in connection with King's and University Colleges, to commence next month. The courses of instruction will afford an opportunity to students who can study only in the evenings to obtain instruction in well-equipped University laboratories, and will make available to evening students the same advantages as are enjoyed by University day students, but they are only intended for those who are practically engaged during the day in some trade, business or occupation.—A course of twenty lectures on civil engineering will be given by Prof. Robinson, at King's College, on Mondays, from 7 to 9, commencing on Monday, October 9. Part of the time will be spent in working out engineering calculations by graphical methods.—A course of about twenty demonstrations will be given by Prof. Capper and Mr. H. M. Waynford, at King's College, on Thursday evenings, 7 to 9, upon "Steam and Gas Engines and General Laboratory Work," commencing October 12. The latter portion of each evening will be devoted to experimental and practical work in the engineering laboratory in illustration of the lectures.—A course of about twenty lectures on mechanical engineering will be given by Prof. Hudson Beare, at University College, on Friday evenings from 7.30–9.30, commencing Friday, October 13.—A special course of lectures on alternating currents will be given by Prof. Wilson, at King's College, on Monday evenings, at 6.30 p.m., beginning October 9.—The following courses have been arranged to be held under the direction of Prof. Ramsay, at University College. In both of these courses the work will be *original*. (a) A course of twelve lectures on sewage and its purification, by Dr. Samuel Rideal, on Mondays, at 5.30 p.m., commencing November 6. (b) A course of lectures on spectroscopy and spectrography will be delivered by Mr. E. C. C. Baly.

SCIENTIFIC SERIAL.

Wiedemann's Annalen der Physik und Chemie, No. 8.—Limits of the solid state, by G. Tammann. Experiments on a number of organic bodies show that even when the heat of fusion is very nearly or accurately zero, the difference between the specific volumes of the liquid and the crystals is considerable.—Magnetic properties of hematite, by A. Abt. The maximum magnetic moments of three equal prisms, of pyrrhotite, hematite and magnetite respectively, were found to be in the ratio of 1 to 2.356 to 3.237. Pyrrhotite shows the smallest magnetisation in comparison with its percentage of metallic iron.—The blue steam-jet, by A. Bock. A sky-blue colour is imparted to a steam-jet by sending through it a current of air saturated with hydrochloric acid. The jet, as regards colour, polarisation and diffraction, shows a close analogy with the atmosphere.—Resistance of alloys, by R. H. Weber. To measure the resistance of brittle alloys, like those of zinc and copper in which the zinc preponderates, the author employs the alloy in the form of thick plates or cylinders. A magnetic needle is made to vibrate over the plate, and its logarithmic decrement is directly proportional to the conductivity of the alloy. The method has the further advantage that the substance need not be exposed to much mechanical working, such as is involved in wire-drawing.—Work consumed in a spark gap, by E. Riecke. In a 40-plate Toepler machine, the work consumed with a gap of 2 cm. is 1.64 watts per turn, and with a gap of 6 cm. it is 3.27 watts. A further increase of the width of gap diminishes the work of the spark.—Pressure in the spark, by

E. Haschek and H. Mache. By noting the increase of pressure in a vacuum tube on sparking, and the volume of the spark itself, the authors arrive at an estimate of the pressure within the spark. It is of the order of fifty atmospheres.—Potential gradient at the anode, by C. A. Skinner. The drop of potential from the anode to the adjoining gas during a low discharge is about 20 volts. This increases to about 40 volts within a distance of a few millimetres from the anode; but there is no potential gradient within the thin luminous layer immediately adjoining the anode. The greater the drop of potential at the anode, the less is the potential gradient in the anode light.—A radio-active substance, by E. de Haën. By extraction from a large quantity of uranium ore, the author has obtained substances which possess the properties ascribed to "radium" in an extraordinary degree. One preparation exhibits all the properties of Becquerel radiation, and, in addition, possesses the property of being strongly luminous. This luminosity is rapidly impaired by moisture, and can only be restored by melting the substance in the oxyhydrogen blow-pipe.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 18.—M. Maurice Lévy in the chair.—Variations of volume in Portland cement resulting from setting and hygrometric state, by M. Considère. The expansions of cement prisms immersed in water were studied for a period of over two months, comparisons being made between loaded and unloaded prisms. The expansions increased very regularly, and were much less with a mixture of cement and sand than with pure cement. Owing to this gradual expansion, metal plates holding cement under water may be submitted to much greater stresses than has been hitherto supposed.—On the development of a holomorphic function at the interior of a contour in a series of polynomials, by M. Renaux.—On some experiments designed to confirm Ampère's hypothesis relating to the direction of the elementary electromagnetic action, by M. W. de Nikolaiève.—On Egyptian pottery, by M. H. Le Chatelier. Analyses of five different specimens of Egyptian pottery are given, together with a reproduction of the microscopic appearance of two of them.

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