and the results which have been obtained in the main verify those of Mr. Huggins as to the approach and recession of stars from and towards us in the line of sight. The Astronomer Royal remarked that Mr. Huggins had in this direction had the privilege of starting a new science, and it would be their duty at the Observatory to revise it; they intended to follow up the matter still further, but there were great difficulties still to be overcome, difficulties which no one could appreciate who had not attempted delicate work of the kind. They had also at the Observatory been applying themselves to photography, and had taken negatives of the sun with considerable regularity, though there were fewer spots to be observed now than at any former period which he could remember. Sir G. B. Airy also laid before the Society a map of the stars in the neighbourhood of Mars during its next opposition in 1877, and drew attention to the great advantages which this opposition would offer for the determination of the solar parallax.—Mr. De la Rue gave an account of the preparations that are being made both in France and Austria for the cultivation of physical astronomy. At Vienna an observatory is in the course of erection outside the city, on an area of some fifteen or seventeen acres. A central dome is being erected of 42 feet in diameter, which is to hold a 27-inch refractor, by Grubb, of Dublin.—Prof. Pritchard gave an account of the new Physical Observatory at Oxford, and of the mounting of the 12¼ inch refractor by Grubb, which has recently been bought by the University.—Lord Lindsay read a note on the progress of the reduction of his observations of the transit of Venus; and Mr. Bidder exhibited at the meeting and described an observing chair of simple and inexpensive construction.

Physical Society, Nov. 13.—Prof. Gladstone, F.R.S., president, in the chair.—The President stated that since the last meeting of the Society, Prof. Everett's important work on the Centimetre-Gramme-Second System of Units had been published by the Society. The book is based on the recommendations of a committee of the British Association, and consists of a collection of physical data concisely presented on the above system, a complete account being added of the theory of units.—Dr. Stone then read a paper on Thermopiles. He has recently been engaged in some experiments with a view to ascertain the best alloy for use in thermopiles. The thermo-electric power of a metal or alloy appears to be quite unconnected with its power for conducting heat or electricity, or with its voltaic relation to other metals, neither does it appear to have any relation to specific gravities or atomic weights. The thermopiles employed were of a form slightly modified from that employed by Pouillet in his demonstration of Ohm's law. Alloys are frequently more powerful than elementary metals, thus: 2 parts antimony and 1 part zinc have a negative power represented by 22·70, while that of antimony is 6·96 or 9·43, and of zinc is 0·2. A strange exception, however, is that of bismuth and tin, for while the power of bismuth is + 35·8, when the two metals are alloyed in the proportion of 12 to 1, the power becomes − 13·67. Dr. Stone first used a couple consisting of iron and rich German silver (that is, rich in nickel). This was characterised by great steadiness, but the electromotive force produced by moderate differences of temperature was not great. He then used Marcus's negative alloy, consisting of 12 parts antimony, 5 of zinc, and 1 of bismuth, but the crystalline nature and consequent brittleness of this mixture were found to be great objections to its practical use. It occurred to Dr. Stone that the addition of arsenic might diminish the brittleness without injuring the thermo-electric power, and on trial it was found that an alloy of zinc, antimony, and arsenic, with a little tin, formed a much less brittle mass than Marcus metal, with quite as great or greater thermo-electric power. A set of twelve couples of this alloy and German silver was exhibited. The electromotive forces of this set and of a similar one of twelve iron and German silver couples were determined by Mr. W. J. Wilson, and found to be, for one alloy and German silver couple with difference of temperature of 80° C., $\frac{1}{108}$ of a Daniell's cell. The electromotive force of one couple of the iron and German silver set was $\frac{1}{848}$ of a Daniell's cell. The ordinary method of applying heat by a trough of hot water is objectionable, for the water short-circuits some of the current. This is evident from the fact that if oil heated to the same temperature be substituted, a considerably greater deflection is obtained. Another method suggested by the author, which would tend to economy, is to allow petroleum to volatilise in the neighbourhood of one face of the pile, thus chilling it, and to ignite the mixture of air and gas so produced at the other face. Clamond's pile, consisting of iron and an alloy of zinc and antimony, was employed for some time, but although good results were obtained, the iron is liable to rust at the connections.—Dr. Guthrie remarked that in researches of this nature the main object in view was to ascertain what relation, if any, existed between the direction of the current and the amount of heat-flow. He referred to the experiment with a tangle of fine platinum wire, by which it is found that if either end of the wire be heated, a current flows towards the tangle, and this takes place however well the tangle may be annealed. Dr. Guthrie suggested that the great effect which alloying one metal slightly with another has on its position in the thermo-electric series may perhaps be connected with its change in conducting power for heat.—Mr. Walenn referred to experiments which he made some years since on thermopiles when used at high temperatures. The most powerful currents were obtained with a couple in which amalgamated copper was employed, but the power was soon lost in consequence of the volatilisation of the mercury. Subsequently he employed wires of wrought iron and German silver, and although the results were not specially remarkable at moderately high temperatures, the power became great when the connections were raised to a red heat.—Prof. Foster called attention to Matthiessen's table of the electric conductivities of metals and alloys in relation to the use of the latter in thermopiles. The fact shown by Matthiessen that the conductivities of alloys are greatly influenced by changes of temperature, will probably, he considers, be found to have some connection with their thermo-electric action. He also mentioned, as a fact which should be remembered when considering the construction of thermopiles, that the presence of minute traces of impurity completely changes the electric conductivity of a metal.

Anthropological Institute, Nov. 9.—Col. A. Lane-Fox, president, in the chair.—Major T. F. Wisden was elected a member.—Mr. Francis Galton, F.R.S., read the following papers:—"Heredity in Twins." On comparing the number of twins found among the uncles and aunts of twins with those found in similar classes of society generally, it appears that twin-bearing is hereditary, in so far that there is an excess per cent. of three individuals of twin birth in the former group. It further appears that the male and female lines contribute the twin-bearing tendency in identical proportions. The families are very large in which twins are born; even those of their parents average nearly seven persons, but the twins themselves appear neither to marry so frequently nor to be so prolific as other persons. However, the common belief that both twins are in no case fertile is quite untrue.—"A Theory of Heredity." Starting with the generally admitted view that the body consists of a multitude of organic units, each of which is to a certain degree independent of the rest, and with certain postulates which that view implicitly recognises, there exists a firm basis on which to establish a theory of heredity. By these and their necessary consequences, the object of double parentage, and therefore of sex, was first explained by the likeness and dissimilarities observed between brothers and sisters, and the still more remarkable similarities and contrasts between twins of the same sex, were then accounted for. It was argued that the germs which were selected for development into the bodily structure had very small influence in an hereditary point of view, but it was those germs that were never developed but remained latent, that were the real origin of the sexual element; by this hypothesis the almost complete non-transmission of acquired modification was explained; also the occasional fact that strongly marked characteristics in the parents were sometimes barely transmissible, and again that of certain diseases skipping alternate generations. It was further supposed, in the successive segregations and segmentations of the earliest germinal matter, that the divisions were never precise, and therefore that alien germs were ultimately included in each structure; thus latent germs of all kinds became distributed over all parts of the body. This accounted for much that Mr. Darwin's theory of Pangenesis over-accounted for, and was free from objections raised against the latter. The assumed evidence that structural changes under modified conditions of life reacted on the sexual elements was then discussed, and it was pointed out that much that had the appearance of heredity was not so in fact, but was due to changes of the sexual elements collaterally with the structural ones. A modification of Pangenesis was adopted, as a subsidiary part of the main theory, to account for the occasional and limited transmission of acquired modification. The precise character of the relationship that connects the offspring with the parents was then defined.—Mr. F. W. Rudler, F.G.S., read a report on the Department of Anthropology at the Bristol meeting of the British Association.