

societies and publications. The list contains nearly one hundred papers as the record of activity during the College year 1900-1901, and it is a better testimony to the work carried on than many successes at examinations. A similar statement of investigations made in the laboratories of the Royal College of Science and the Solar Physics Observatory during the session 1899-1900 will be found in the recently-published report of the Board of Education, vol. iii.

### SCIENTIFIC SERIAL.

*American Journal of Science*, November.—On the effect of temperature and moisture on the emanation of phosphorus, and on a distinction in the behaviour of nuclei and of ions, by C. Barus.—On the determination of the heat of dissociation and combustion of acetylene, ethylene and methane, by W. G. Mixer. Acetylene was exploded alone and with oxygen and the amount of heat evolved measured. If acetylene is exploded without oxygen in presence of a small quantity of ethylene, the latter is completely decomposed, and in this way the heat of dissociation can be more accurately determined than by the usual combustion method.—The geological relations and the age of the St. Joseph and Potosi limestones of St. Francois County, Missouri, by F. S. Nason.—Note on the Cambrian fossils of the Francois County, Missouri, by C. E. Beecher. From the fossils found an extensive area and thickness of sedimentary rocks are definitely placed in the Cambrian. Palæontological evidence as to the nature of these rocks had hitherto been largely wanting.—Discovery of Eurypterid remains in the Cambrian of Missouri, by C. E. Beecher. Description and drawing of *Strabops Thacheri*.—The determination of persulphates, by C. A. Peters and S. E. Moody. An experimental examination of the methods proposed by Mondolpo, Namias, Le Blanc and Eckhardt, Grutzner and the author. The process of Le Blanc and Eckhardt, the oxidation of ammonio-ferrous sulphate in sulphuric acid solution, is recommended as being simple, rapid and convenient.—Studies of Eocene mammalia in the Marsh collection, Peabody Museum, by J. L. Wortman. A continuation of previous papers on the same subject.—The Carboniferous and Permian age of the red beds of Eastern Oklahoma from stratigraphic evidence, by G. I. Adam.

### SOCIETIES AND ACADEMIES.

#### LONDON.

**Physical Society**, November 22.—Prof. S. P. Thompson, president, in the chair.—Prof. W. Cassie read a paper on multiple transmission fixed arm spectroscopes. The simplest form of spectroscope shown consisted of two half prisms silvered on the back, between which a beam of light goes backwards and forwards with a slight upward inclination. The result in dispersing and resolving power is equivalent to direct transmission through a long train of prisms. The collimator and observing telescope are fixed and adjustment is made by a double tangent screw which moves both the prisms. Two other types constructed on a similar principle were described, of which one had one prism and two speculum mirrors, and the other had two refracting prisms and a reflecting right-angled prism. The adjustments of these instruments are simple and their power great. By a small movement of an adjusting screw the observer can produce great changes of dispersion by passing from one to another of the series of spectra which are produced. The author in reply to questions said that with an ordinary Bunsen burner sodium flame a series of about five spectra is easily observed with dispersion equivalent to direct transmission through ten full-sized prisms. The loss of light at the reflections limits the number of transmissions that can be used; but he believed that no other spectroscope with only two prisms would give dispersing power and resolving power in any way approaching the instrument described.—Prof. W. Cassie then read a paper on the measurement of Young's modulus. The apparatus described consisted of a horizontal needle (a bar of large moment of inertia) supported by a bifilar suspension made of the wire of which the stretch modulus is to be measured. The periods of the pitching, rolling and bifilar oscillations of this system are observed, and an expression for the stretch modulus is obtained which involves no measurements except the

weight of the needle and the periods of oscillations. The necessary adjustments, and the means of eliminating residual errors of adjustment, were described for two forms of the apparatus. One form also affords a simple means of statical measurement by hanging a small weight on the needle at measured distances from the centre, calculating the difference of tension produced in the wires, and observing with a mirror and scale the consequent dip of the needle.—A paper entitled "Notes on Gas-Thermometry, Part ii," by Dr. P. Chappuis, was read by Dr. Harker. Messrs. Holborn and Day have published recently in a research on the air thermometer the results of a new determination of the expansion of Berlin porcelain between 0° and 1000°. The author has already drawn attention in a former note to the fact that part of the divergence found between the results of Callendar and Griffiths and of Harker and himself for the boiling-point of sulphur may be attributed to the uncertainty in the values assumed for the expansion of porcelain. In the present paper the author examines the way in which their results would be modified by the introduction of the dilatation deduced from the experiments of Messrs. Holborn and Day. It follows from the introduction of the new values that the boiling-point of sulphur deduced from experiments with a porcelain reservoir thermometer would be lowered from 445°·2 to 444°·7, a number very close to that obtained by Callendar and Griffiths. In a second part of the paper Dr. Chappuis has recalculated the divergences between the uncorrected nitrogen scale and the theoretical scale, and finds that the difference between these values and those given previously is too small to be of any practical importance. Prof. H. L. Callendar said that he was highly gratified to see that the application of the correction for the expansion of the bulb of Dr. Chappuis' gas-thermometer, deduced from Holborn and Day's results, gave a value, 444°·7, for the boiling-point of sulphur in such close agreement with the value 444°·5 deduced by Mr. Griffiths and himself in 1890. The agreement was really much closer than appeared at first sight, because the remaining difference of two-tenths of a degree in the results was almost exactly accounted for by the scale difference of the constant pressure and constant volume thermometers according to the theory of Joule and Thomson. It was also interesting to remark that the corrected result found by Dr. Chappuis was in very close agreement with that deduced from their own observations by Messrs. Holborn and Day. Dr. Chappuis had not referred in the present note to the work of Bedford on the expansion of Bayeux porcelain, which he had criticised in a previous paper. A comparison of results would show that Bedford's results agreed very fairly, allowing for the difference of material, with Holborn and Day's from 200° to 600° C.; and that both differed from those of Dr. Chappuis between 0° and 80°, when extrapolated, in a precisely similar manner. It was quite possible, as he (Prof. Callendar) had previously suggested, that the expansion of porcelain between 0° and 100° was anomalous. It appeared certain that some anomaly in the expansion at 800° was indicated both in the experiments of Bedford and also in those of Holborn and Day. It was also clear that Dr. Chappuis' results for Bayeux porcelain when extrapolated would agree with Bedford's at a temperature a little above 100° C., or very nearly at the same point at which his results for Berlin porcelain agreed with those of Holborn and Day.

**Mathematical Society**, November 14.—Dr. Hobson, F.R.S., president, in the chair.—After the ballot had been taken the president announced that the gentlemen whose names were published in NATURE (October 17) were duly elected for the current session. Dr. J. Larmor, F.R.S., propounded a query regarding the recent behaviour of Nova Persei which gave rise to remarks by the president, Dr. Glaisher, F.R.S., and Messrs. Hargreaves, Hough and Lieut.-Colonel Cunningham, R.E.—Prof. Love, F.R.S., communicated two papers by Mr. J. H. Michell, (1) on the inversion of plane stress, and (2) on the theory of Hele-Shaw's experiments on fluid motion, dwelling specially on the latter paper, which also evoked some discussion.—Mr. E. T. Whittaker read a paper on the solution of dynamical problems in terms of trigonometrical series. The president spoke at some length upon the subject and other members joined in a discussion.—The following papers were communicated by the reading of their titles:—Linear groups in an infinite field, Dr. L. E. Dickson; note on the algebraic properties of Pfaffians, Mr. J. Brill; on Burmann's theorem, Prof. A. C. Dixon; the Puiseux diagram and differential equations, Mr. R. W. H. T.