stated that, so far as these additional experiments have been carried, the first results have been borne out in regard to the advantage of using a suitable mixture, and in showing the importance of making an accurate analysis of the exhaust gases.

The discussion which took place on the presentation of the report did not add materially to information on the subject. Some of the criticisms were very wide of the mark, more especially in regard to one point, upon which much stress was laid, viz. the leakage of gas through the indicator. This was supposed by some speakers to be sufficient to vitiate the value of the experiments, but, according to Prof. Burstall's tests, made in order to elucidate this point, the consumption of gas by the indicator was so minute as to be imperceptible. It was stated during the discussion by Mr. Burstall, a brother of the author, that, according to calculation, if diagrams were taken every five minutes, when running at 200 revolutions, and if the whole of the gas escaped on the stroke, the loss would be one-fiftieth of 1 per cent.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—A combined examination of non-resident candidates for open scholarships, exhibitions, &c., will be held at Trinity College, Clare College and Trinity Hall, beginning on November 1. At Trinity College there will be offered for competition about ten scholarships, about ten exhibitions, and about three sizarships. Scholarships include (1) major scholarships, of the value of 80*l.* a year, (2) minor scholarships, of the value of 75*l.* a year or of 50*l.* a year. Exhibitions are generally of the value of 40*l.* a year. Scholarships and exhibitions are tenable for two years from the commencement of residence. Sizarships are of the value [of about 100*l.* a year (namely, a payment in money of 80*l.*, and a remission of College fees and dues to the extent of about 20*l.*). They are tenable until the expiration of nine terms from the commencement of residence, unless the holder is previously elected to a major scholarship. Candidates for sizarships must send satisfactory evidence to one of the Tutors that they are in need of the assistance given to sizars. The subjects of examination will be classics, mathematics, natural sciences, moral sciences, and history. A candidate may take any one of these subjects, or any combination of subjects so far as the arrangement of the papers in the examination permits. At Clare College about eight scholarships of values varying from 80*l.* to 40*l.*, and at Trinity Hall six scholarships at least, ranging between the same values, will be awarded. These scholarships are offered for proficiency in classics, or mathematics, or natural science, or history. Deserving candidates who do not [attain the standard for these scholarships may be awarded exhibitions of the annual value of 30*l.* Forms of application for admission to the examination may be obtained from any of the Tutors of the Colleges named.

IN the House of Commons on Thursday, in reply to a question whether it was the intention of the Government to take the second reading of the London University Commission Bill before Whitsuntide, Mr. Balfour said he could not give any definite promise in view of the present state of public business, but he would not discourage the hope that they might have a chance of reaching the Bill as early as some time before Whitsuntide.

A PARLIAMENTARY paper issued by the Science and Art Department states that the total amount expended on technical education during the year 1895-96 in the United Kingdom was 787,467*l.*, and that the estimated total expenditure for the year 1896-97 was 847,620*l.*, exclusive of the sums allocated to technical education under the Welsh Intermediate Education Act, 1889. The total amount of the residue received under the Local Taxation Act by counties and county boroughs in England in 1895-96 was 775,944*l.*, of which 616,607*l.* was appropriated to educational purposes, and 159,336*l.* to relief of rates, the latter sum including 121,558*l.* devoted by the London County Council to that purpose. In Wales the whole of the residue grant of 37,236*l.* paid to thirteen counties and three county boroughs is devoted to intermediate and technical education. The amount of residue received by Scottish authorities was 38,262*l.*, of which 28,999*l.* was apportioned to technical education, and 9158*l.* to relief of rates. In Ireland the residue is not applicable to technical education, but eleven local authorities are making grants out of the rates for that purpose.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. xx. No. 2.—On the focal surfaces of the congruences of tangents to a given surface, by A. Pell. This paper is based upon two theorems given by Darboux ("Théorie générale des Surfaces," vol. iii. p. 121) and Kœnigs ("Sur les propriétés infinitésimal de l'espace réglé"), viz.: the locus of the centres of geodesic curvature of lines of curvature of any surface is the edge of regression of the developable surface, generated by the tangent planes of the surface at all points of the lines of curvature, and the edges of regression of the developable surfaces of a congruence form two families of curves on the focal surfaces (say S_A and S_B corresponding to the focal surfaces A and B), the osculating planes of which are tangent to the surfaces B and A respectively, and the points of contact describe on these surfaces two families of conjugate lines S_A and S_B. Other theorems discussed are due to T. Caronnet (*Comptes rendus*, 1892), E. Cosserat (*C.R.*, 1894) and A. Demoulin (*C.R.*, 1894).—Displacements depending on one, two and three parameters in a space of four dimensions, by T. Craig. This is a concise generalisation to a space of four dimensions of the kinematical methods developed by Darboux in the first two volumes of his "Théorie générale des Surfaces." The author employs Poincaré's nomenclature (*cf.* "Sur les résidus des intégrales doubles," *Acta Math.*, t. 9, p. 385).—Further researches in the theory of quintic equations, by Emory McClintock. The paper contains four parts. The first part is a preliminary classification of quintics into reducible and irreducible, and again into resolvable and unresolvable quintics. The second is a simplified restatement of the author's earlier discoveries. The third contains a presentation of the necessary form of the coefficients of the general resolvable quintic; and the last part is occupied with the development of a theorem according to which any given resolvable quintic engenders another for which the author's sextic resolvent has the same rational value. The memoir was read at the Toronto meeting of the American Mathematical Society in August last.

Symons's Monthly Meteorological Magazine, April.—The climate of Paris, by M. J. Jaubert. This is an account of an interesting and useful book by the meteorologist of the Montsouris Observatory, compiled from all available sources in the Paris district. The mean temperature at the National Observatory is $51°·3$, but in the suburbs it is less, *e.g.*, Parc St. Maur, $50°·0$. The lowest temperature recorded in the neighbourhood was $-17°·5$, in December 1871, and the highest was $101°·1$ in 1874 and 1881. Fogs are rather frequent, about forty in a year, but a foggy day is defined as one on which objects at a distance of a mile cannot be distinguished. The mean rainfall is about 22 inches, but the amount varies in different parts of the city. About thirty thunderstorms occur in a year, mostly in summer. Very little hail falls, and the stones are seldom more than ⅜ of an inch in diameter. The yearly average amount of cloud is $6·0$.—Results of meteorological observations at Camden Square for forty years, 1858-97. The average rainfall was $1·71$ inches; the amount last March was $1·46$ inches. The mean of all the highest shade temperatures was $61°·9$, and the mean of all the lowest minimum temperatures was $25°·3$. In March last the absolute extremes were $59°·1$ and $25°$ 1, while the temperature on the grass fell below freezing point on twenty-four nights.

Bollettino della Società Sismologica Italiana, vol. iii. No. 7. —Some modifications of the doubly sensitive electric seismoscope, and instructions for its installation and working, by G. Agamennone.—The seismic recorder with increased velocity on the occasion of the earthquake of September 21, 1897, by P. Tacchini.—Diurnal movement of the obelisk of Washington, by E. Oddone.—Notices of earthquakes recorded in Italy (May 14-23, 1897), the most important being an elaborate account of the earthquake of the Tyrrhenian Sea on May 15.

SOCIETIES AND ACADEMIES.
LONDON.

Royal Society, March 10.—"On the Rotation of Plane of Polarisation of Electric Waves by a Twisted Structure." By Jagadis Chunder Bose, M.A., D.Sc., Professor of Physical Science, Presidency College, Calcutta. Communicated by Lord Rayleigh, F.R.S.

"On the Production of a 'Dark Cross' in the field of Electromagnetic Radiation." By Jagadis Chunder Bose, M.A., D.Sc., Professor of Physical Science, Presidency College, Calcutta. Communicated by Lord Rayleigh, F.R.S.