organisms which contribute largely to form some palæozoic limestones. He has likewise contributed largely to our knowledge of the structure and fossils of the palæozoic rocks of the Lake District of the North of England by his "Essay on the Geology of Cumberland and Westmoreland," 1868; "On the Strata and their Fossil Contents between the Borrowdale Series and the Coniston Flags" (*Quart. Journ. Geol. Soc.*, 1867), jointly with Prof. Harkness; "Additional Observations on the Geology of the Lake District" (*ibid.*, 1866); "Relations between the Skiddaw Slates and the Green Slates and Porphyries of the Lake District" (*Geol. Mag.*, 1869); "On the Lower Portion of the Green Slates and Porphyries of the Lake District" (*Quart. Journ. Geol. Soc.*, 1871); "On the Occurrence of a New Fossiliferous Horizon in the Ordovician Rocks of the Lake District" (*Geol. Mag.*, 1888, conjointly with J. E. Marr); "On the Stockdale Series of the Lake District" (*Quart. Journ. Geol. Soc.*, 1888, conjointly with J. E. Marr); "On the Cross Fell Inlier" (*ibid.*, 1891, jointly with J. E. Marr). Prof. Nicholson was awarded the Lyell Medal by the Council of the Geological Society in 1888, "as a mark of appreciation of his valuable researches among the older palæozoic rocks, both in the Old and the New World, and of his continued and patient investigations into the organisation of some of those obscure forms of life which abounded at the period of the deposition of those rocks" . . . "his researches have given him a high place among Palæontologists," whilst as a teacher and lecturer he is most successful.

JOHN MILLAR THOMSON,

F.R.S.E., F.I.C. Secretary of the Chemical Society. Professor of Chemistry and Lecturer on Photography, King's College. Professor of Chemistry, Queen's College, London. Author of the following original papers:—"The Composition and Properties of Ancient Glass from Tombs in Cyprus" (*Proc. Phil. Soc.*, Glasgow, 1870); "The Composition of certain Double Salts of Nickel and Cobalt in their relation to Dichroism" (*Brit. Assoc. Rept.*, 1877); "Action of Isomorphous Salts on Supersaturated Solutions of other Salts" (*Journ. Chem. Soc.* 1879); "Action of Constituent Salts on Supersaturated Solutions of Double Salts and Mixtures" (*ibid.*, 1882). Author of the following published lectures and papers:—"The Position of Chemistry in a Technical Education" (*Journ. Soc. of Arts*, 1878); "Solution and Crystallisation" (Glasgow Science Lecture Association, 1879); "The Composition and Properties of certain Pigments" (Cantor Lectures, *Journ. Soc. of Arts*, 1885); "Suspended Crystallisation" (*Proc. Roy. Inst.*, 1886); "The Chemistry of Putrefaction and Antiseptics" (Cantor Lectures, *Journ. Soc. of Arts*, 1887). Distinguished as a lecturer and teacher in Chemistry.

FREDERICK THOMAS TROUTON,

Sc.D. (Dubl.), M.A. Assistant to Erasmus Smith's Professor of Natural Philosophy in the University of Dublin. Teacher of Experimental Physics. Discovered the law connecting the latent heat of vaporisation and molecular weights of bodies known as "Trouton's law" and experimentally determined the directions of vibration of electric and magnetic force in plane polarised light. He has made other important observations on the phase of secondary waves and on the influence of the size of the reflector in Hertz's experiment. Author of:—"On Molecular Latent Heat" (*Phil. Mag.*, vol. xviii.); "Repetition of Hertz's Experiments and Determination of the Direction of the Vibrations of Light" (NATURE, vol. xxxix.); "Experiments on Electromagnetic Radiation, including some on the Phase of Secondary Waves" (NATURE, vol. xl.); "Multiple Resonance obtained with Hertz's vibrations" (NATURE, vol. xli.); "On the Acceleration of Secondary Electromagnetic Waves" (*Phil. Mag.*, vol. xxix.); "The Influence of the Size of Reflector in Hertz's Experiment" (*Phil. Mag.*, vol. xxxii.); "Some Experiments to Determine Wave Velocity in certain Dielectrics" (*Rept. Brit. Assoc.*, 1890); "On Thermo-Electric Currents in Single Conductors" (*Proc. Roy. Dubl. Soc.*, 1886); "On Temporary Thermo-currents in Iron" (*Rept. Brit. Assoc.*, 1889); "On the Motion under Gravity of Fluid Bubbles through Vertical Columns of Liquid of a Different Density" (*Proc. Roy. Soc.*, vol. liv.); "On the Motion of a Body near Points of Unstable Equilibrium and on the same when capable of Internal Vibration" (*Proc. Roy. Dubl. Soc.*, 1888); "On a convenient Method of obtaining any required Electrical Potential for Use in Laboratory Teaching" (*ibid.*); "On the Control Supply Pipes have on Reeds" (*ibid.*); "A Coefficient of Abrasion as an Absolute Standard of Hardness" (*Rept. Brit. Assoc.*, 1880); "On the Use of a Permanently Magnetised Core in a Telephone" (*Phil. Mag.*, vol. xxxiv.); "On Ohm's Law in Electrolytes" (*Rept. Brit. Assoc.*, 1887–88), jointly with Prof. Fitzgerald; "A Method of Determining the Specific Induction Capacity of Dielectrics" (*Phil. Mag.*, vol. xxxiii.), jointly with Mr. W. E. Lilly.

HERBERT HALL TURNER,

M.A., B.Sc. Formerly Fellow of Trinity College, Cambridge. Savilian Professor of Astronomy, Oxford. Secretary to the Royal Astronomical Society. Late Chief Assistant at the Royal Observatory, Greenwich, 1884–94. Author of various papers, among which may be mentioned: "On the Correction of the Equilibrium Theory of Tides for the Continents" (with Prof. G. H. Darwin) (*Proc. Roy. Soc.*, vol. l.); "Report of Observations of the Total Solar Eclipse of August 29, 1886" (*Phil. Trans.*); "On Mr. Edgeworth's Method of Reducing Observations relating to Several Quantities (*Phil. Mag.*, vol. xxiv.); "On Mr. Marth's Intersects" (*Monthly Notices*, vol. xlvi.); "Observations for Coincidence of Collimator at Royal Observatory, Greenwich" (*ibid.*, vols. xlvi. and liii.); "On the Variations of Level and Azimuth of the Transit Circle at Royal Observatory, Greenwich" (*ibid.*, vol. xlvii.); "On the Longitude of Paris" (*ibid.*, vol. li.); "On Stellar Photography" (*ibid.*, vols. xlix. and lix.); "On the R.-D. Discordance" (*ibid.*, vols. liii., liv., and *Memoirs Roy. Astron. Soc.*, vol. li.); "On New Forms of Levels" (*Monthly Notices*, vol. lii.); "Comparison of the Cape (1880) and Greenwich (1880) Star Catalogues" (*Memoirs Roy. Astron. Soc.*, vol. li.); "On the Reduction of Measures of Photographic Plates" (*Monthly Notices*, vol. liv.).

EDWARD JAMES STONE, F.R.S.

THE distinguished astronomer, whose name stands at the head of this notice, and whose loss will be regretted in many scientific circles, played a very prominent part in the history of astronomy during the last forty years. Although he took an active, and often a foremost, place in all the astronomical problems that have aroused attention during this period, he was more conspicuously attached to the astronomy of position, and it was by his devotion to meridian observations that his reputation was mainly won. The early training which he received under Airy, at Greenwich, whither he went on leaving Cambridge in 1860, contributed to this choice. At that time the results obtainable by photography and spectroscopy were quite undeveloped, and the lines on which the Greenwich Observatory then worked were such as to ensure a devotion to accuracy, and the appreciation of the value of star catalogues. All who have since had occasion to use the star places which Mr. Stone published, whether from the Cape, or from the Radcliffe Observatory, have reason to be grateful for that training, which, resulting in his adherence to the methods that he early acquired, led to the production of such admirable work.

In connection with his meridian observations, Mr. Stone had, from time to time, published memoirs on the value of the constants of nutation and refraction, which, though they have not displaced the values assigned by other astronomers, have yet testified to his industry and illustrated his power of conducting a searching discussion into large masses of observations, possessing varying degrees of accuracy. He also largely identified himself with inquiries into the proper motions of stars, the systematic differences between stellar catalogues, the motion of the solar system in space—all questions which demand long numerical calculations, and the values of whose final results depend upon the maintenance of rigorous accuracy in the computations.

In striving to estimate the loss to science caused by the death of the Radcliffe Observer, we give prominence to his meridian work. We recognise the fact that the old

school of astronomy has lost an exponent whom it is not easy to replace. But it would be an injustice to his memory to forget that he showed at times considerable power of originality. His work on such questions as that of the Solar Parallax is deservedly well appreciated. Thirty years ago the problem of the sun's distance occupied a very different position to what it does now. Encke's value, obtained from the discussion of the Transits of Venus of 1761 and 1769, long used without question or hesitation, was beginning to lose its authority before the tests of more rigorous analysis, and the adoption of methods better suited for the determination of this fundamental constant. Stone, by his investigation of the observation of Mars in the opposition of 1862, contributed in no small measure to increase the suspicion which was hovering around the old value of 8″·58. With his attention drawn to this subject, he next reviewed the evidence on which this value was based. With better knowledge of the longitudes of the observing stations, and with possibly a more judicious interpretation of the observer's remarks, he was able to give not only greater accordance to the various observations, but to obtain a result more nearly equal to that derived from other sources of information. For this work he was awarded the gold medal of the Royal Astronomical Society, the President contending that Mr. Stone had shown, beyond all doubt, "that the method pursued by his illustrious countryman Halley, when fairly treated, is capable of furnishing a value of the Solar Parallax commensurate in precision with the expectations formed of it." The history of subsequent transits has, perhaps, not borne out this favourable view, expressed in 1869; but Stone's loyal and persistent efforts to deduce from the transits all that they were capable of giving are shown, by the part he took, both in 1874 and 1882. In the former year he was Her Majesty's astronomer at the Cape of Good Hope, and contributed much to the organisation of the various expeditions to the Southern Hemisphere. By the time of the second transit in 1882, he had succeeded to the direction of the Radcliffe Observatory on the death of the Rev. Robert Main, and there he trained the selected observers in methods suggested by the experience gained in 1874. After the transit, the whole of the observations were reduced under his immediate superintendence, with results too well known to need further mention.

It is needless to say that Mr. Stone's direction of the Radcliffe Observatory during the last twenty years was characterised with vigour and general success. Two important star catalogues were issued under his superintendence. The meteorological department received considerable attention, and Mr. Stone, in addition, accepted a seat at the Board of the Meteorological Council. In another matter, which one naturally wishes to pass over very briefly, his researches were not so successful, but have shown him the victim of a strange paradox. The comparatively large discrepancies which exist between the observed longitudes of the moon and those computed from Hansen's tables, he sought to explain by attributing their origin to the substitution of Le Verrier's tables of the sun for those of Carlini. This slight breach of continuity in the record of mean solar time, produced by the introduction of the newer tables into the Nautical Almanac was, he urged, the cause of the gradual increase in the error of Hansen's tables; and though many eminent authorities, including Profs. Adams and Newcomb, endeavoured to convince him of his error, he supported his views to the last, and regularly published the errors of the lunar tables, as derived from the Radcliffe observations, after applying to the mean time of observation a correction based upon his theory.

On two occasions Mr. Stone observed a total eclipse of the sun; the first at Klipfontein in Namaqualand, and last summer he accompanied Sir George Baden Powell to Nova Zemlya, where he was again successful in watching the phenomenon. But to the physical side of astronomy he gave little attention; nor is the Radcliffe Observatory equipped in a manner to make such observations possible.

Mr. Stone received many acknowledgments of the value of his work. Besides being a Fellow of the Royal Society, he had been President of the Royal Astronomical, and held other offices in connection with the same Society. He received a Doctor's degree from the University of Padua, and besides the Astronomical Society's medal, to which allusion has been made, the French Academy bestowed upon him the Lalande medal, as a testimony to the value of his Southern Catalogue of 12,500 stars. He died on Sunday, May 9, at his Oxford residence, aged sixty-six. W. E. P.

NOTES.

THE first of the two annual conversaziones of the Royal Society was held yesterday evening, as we went to press.

THE University of Toronto has decided to confer the degree of LL.D. upon Lord Lister, Lord Kelvin, Lord Rayleigh, and Sir John Evans.

THE fifteen candidates selected on Thursday last by the Council of the Royal Society to be recommended for election into the Society are:—Dr. R. Bell, Sir W. H. Broadbent, Bart., Dr. C. Chree, Mr. H. J. Elwes, Dr. J. S. Haldane, Prof. W. A. Haswell, Prof. G. B. Howes, Dr. F. S. Kipping, Prof. G. B. Mathews, Mr. G. R. Milne Murray, Mr. F. H. Neville, Dr. H. A. Nicholson, Prof. J. M. Thomson, Dr. F. T. Trouton, and Prof. H. H. Turner. Following our usual custom, we print in another part of this issue the certificates of the candidates selected.

DR. C. LE NEVE FOSTER has given men of science cause to be proud that he is one of them. On Saturday morning last he was at the Snaefell lead mine, Isle of Man, in his capacity of Her Majesty's Inspector of Mines. An explosion had occurred there on the preceding Monday, and Dr. Foster's object was to ascertain whether it was possible to recover the body of a miner remaining in the workings. Lighted candles sent down to test the atmosphere burnt brightly at 115 fathoms, but were extinguished at 130 fathoms. From these indications it was considered safe to go down a certain distance; so a party, consisting of Dr. Foster, Mr. G. J. Williams (Assistant Inspector of Mines), Captain Reddicliffe, Captain Kewley, and eight others descended the shaft. The air below was tested, and found to be poisonous; but as the party was only a few feet above the body of the miner, Captain Kewley went two or three steps down a ladder, and attempted to catch the man's clothing with grappling-irons. The commotion caused by his swinging to and fro appears to have disturbed the gas, for Captain Kewley was at once overcome, and had to be hauled back to the landing. He was put into the box, and the box was going up to the surface, when it became jammed, and for over an hour could not be moved. Meanwhile, Dr. Foster and those of his companions who could not climb to the surface were below suffering from the influence of the poisonous gas—apparently carbon monoxide. During this time, when death seemed to be very near, Dr. Foster made copious notes of his sensations. He commenced writing at 2 p.m., and continued until 3.30, when he was brought to the surface, he being the last to go up. Some of the men were unconscious when brought to the surface, and others arrived in an excited and hysterical condition. The record obtained by Dr. Foster will be a most valuable physiological document,