

Mr. W. H. Pennington. The volume represents a large amount of industry and research on the part of associates of the Society, and it will give a stimulus to the study of science in Lancashire. Another volume just published by a provincial Society is the Annual Report and *Transactions* (vol. xxix.) of the Naturalists' Field Club and Archeological Society of North Staffordshire. This volume is, as a whole, more scientific in character than that of the Rochdale Society. Reports are given of the work of the various sections of the Society concerned with observations in different branches of science, and we notice, among the other contents, an address by Dr. W. Hind; a paper on glacial theories, past and present, and their application to Staffordshire, by Mr. C. E. De Rance, and one on the occurrence of marine fossils in the coal-measures of North Staffordshire, by Mr. John Ward. Both volumes are very creditable records of the work of provincial scientific Societies.

WE have on our table several new editions of books previously reviewed in NATURE. Among these volumes is a second edition of "Modern Microscopy" (Baillièrre, Tindall, and Cox), a handbook for beginners, comprising a section on the microscope, and instructions for its use, by Mr. M. I. Cross; and on the preparation and mounting of microscopic objects, by Mr. Martin J. Cole. We welcome a second edition of "A Manual of Physics" by Dr. W. Peddie, bearing the same publishers' names. The work is an admirable text-book, which students of physics would do well to obtain. Messrs. Longmans, Green, and Co. have published an eighth edition of Mr. John Thornton's "Elementary Physiography"; and Messrs Blackie and Son, the ninth edition of "Earth-Knowledge," by Mr. W. Jerome Harrison and H. Rowland Wakefield; both these books being intended for students in the physiography classes of the Department of Science and Art. Messrs. Blackie have issued also a fourth revised and enlarged edition of "Elementary Inorganic Chemistry," by Prof. A. Humboldt Sexton.

THE additions to the Zoological Society's Gardens during the past week include a White-backed Piping Crow (*Gymnorhina leuconota*) from Australia, presented by Mr. Percy A. Gore; a White-headed Sea-Eagle (*Haliaetus leucocephalus*) from Newfoundland, presented by Mr. Leicester Curzon Howe; a Chough (*Pyrrhocorax graculus*), British, presented by Mr. Gerald Strickland; two Blood-breasted Pigeons (*Phlogoenas cruentata*) from the Philippine Islands, presented by Captain Harvey; two Greater Sulphur-crested Cockatoos (*Cacatua galerita*), a Crimson-winged Parrakeet (*Aprosmictus erythropterus*) from Australia, presented by Mrs. Morgan; two Barbary Wild Sheep (*Ovis tragelaphus*, ♂♂) from North Africa, deposited; a Great Northern Diver (*Columbus glacialis*), twelve Snow Buntings (*Plectrophanes nivalis*), four Dunlins (*Tringa alpina*), a Golden Plover *Charadrius plumbeus*, a Grey Plover (*Squatarella helvetica*), British, a Bahama Duck (*Dafila bahamensis*) from South America, four Green-winged Doves (*Chalcophaps indica*) from India, two Bearded Vultures (*Gypatus barbatus*), European, purchased.

OUR ASTRONOMICAL COLUMN.

POSITIONS OF THE NEW COMETS.—As we go to press, the following calculated positions for the two new comets have been received from Kiel. The places are for Berlin midnight.

| | | | |
|-------------------------|----------|-----|-----------|
| <i>Perrine's Comet.</i> | | | |
| Date. | R.A. | | Decl. |
| | h. m. s. | | |
| Dec. 7 ... | 14 52 37 | ... | - 13 37'2 |
| <i>Brooks's Comet.</i> | | | |
| Date. | R.A. | | Decl. |
| | h. m. s. | | |
| Dec 8 ... | 8 11 2 | ... | + 44 28'2 |
| 10 ... | 7 45 57 | ... | + 51 36'7 |
| 12 ... | 7 16 42 | ... | + 57 23'5 |

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SWIFT'S COMET, 1895 II.—Another comet has put in a claim to be considered the long-lost comet of Lexell; and the claim is perhaps based on a better foundation than any of the other competitors can show. Le Verrier has supported the comets of Faye and De Vico; more recently Brooks' comet of 1889 found a supporter in Dr. Chandler, but the claim was routed by the calculations of Mr. Lane Poor. M. Schulhof looked favourably for a while on the merits of Finlay, but finally inclined to the belief that the two comets had a common origin rather than absolute identity. The new comet Swift has much to recommend it to the consideration of astronomers (*Astr. Nach.*, No. 3318). In the first place, Tisserand's criterion is fairly well satisfied; next, the closest approach to the orbit of Jupiter, in the case of both comets, falls very nearly in the same longitude; further, of the various orbits along which Le Verrier showed Lexell might move, after the heavy perturbations of 1779, one can be selected which agrees very closely with the orbit of Swift. Moreover, this particular selection of the various orbits suggested by Le Verrier is supported by Clausens's work on the same comet. Here is the comparison:—

| | | |
|-----------------------------|----------------|----------------|
| | Selected orbit | Orbit of Swift |
| | of Lexell. | (Schulhof). |
| Long. of perihelion ... | 330° 0 | 338° 1 |
| Long. of node ... | 169° 9 | 170° 3 |
| Inclination ... | 6° 0 | 3° 0 |
| Excentricity ... | 0.6317 | 0.6515 |
| Semi-axis major ... | 4.224 | 3.724 |
| "Tisserand's criterion" ... | 0.480 | 0.493 |
| Long. of approach to ♃ ... | 184° | 179° 5 |

It is a question if the agreement is not too good, for the comet of Swift made a close approach to Jupiter in 1886, and underwent heavy perturbations. M. Schulhof is at present considering these; but till their character and amount is known, it is premature to decide this vexed question of identity. It is possible the question will not be set at rest till 1931, for the returns previous to that date are not very favourable for observation, and the comet may pass unnoticed. But in any case observations in large telescopes should be prosecuted as long as possible, in order to determine the mean motion with accuracy, with the view of assisting the re-discovery.

A PECULIAR VARIABLE STAR.—A variable star recently discovered by Mr. Chandler presents some very remarkable features (*Astronomical Journal*, No. 358). In the singularly short period of 5h. 31.15m., the magnitude of the star varies between 8.9 and 9.7, so that three or four of the principal phases may be observed in a single night. The variations are distinctly not of the Algol type, but maxima and minima are equally and sharply marked. The light-curve is also unlike those of the other class of short-period variables, such as δ Cephei and η Aquilæ, inasmuch as the rise to maximum and fall to minimum take place in equal periods.

The newly-discovered variable is designated U Pegasi, and its position for 1900 is R.A. 23h. 52m. 53s., Decl. 15° 23' 9"; the elements of the variability are as follows:—

| | | |
|-------------------------|------------|-----------------------|
| | G.M.T. | |
| | d. h. m. | |
| Minimum, 1894 Sept. ... | 22 14 56.0 | } + 5h. 31m. 9.0s. E. |
| Maximum ... | 22 17 41.6 | |

The probable error of the period is believed to be only a moderate fraction of a second.

It appears that Dr. Chandler discovered the variability of the star more than a year ago, but erroneously inferred that it was of the Algol type with a period of 2.06 days. Mr. Yendell confirmed the variability, and concluded that the period was 0.69d., or one-third of that assigned by Dr. Chandler; but it was still supposed to be of the Algol type. A more recent discussion of the observations, however, has established that this period must again be divided by three, and that the light-curve has the character to which reference is made above.

SATURN'S RINGS.—Some remarkable observations of the rings of Saturn are reported by A. Mascari, of the Catania Observatory (*Astr. Nach.*, 3318). Observing from July 25 to August 6 of the present year, he noticed certain dark spots on the crape ring, as well as bright ones on the brighter rings. Perhaps the most curious feature of these spots is their apparent permanence of form; for this is not easy to explain if the idea that the rings are composed of separate particles be accepted, as in that case

adjacent parts of the rings would have different angular velocities. It was found, also, that the external boundary of the outer ring apparently joined the inner bright ring at a point on its northern edge, while the crape ring was almost twice as wide in the northern as in the southern part. This imperfect symmetry of the outer ring and crape ring with the inner bright ring, suggests that they do not all rotate in one plane. The different divisions of the ring would thus cast shadows upon each other, the amount of shadow depending upon the inclination.

The colour of the crape ring is described as bluish, and the shadow of the globe on the rings was curved, with the convexity towards the planet. Encke's division was very feeble and uncertain during the observations. It is pointed out that future observations of the spots may throw further light upon the rotation and constitution of the rings.

THE ANNIVERSARY MEETING OF THE ROYAL SOCIETY.

LAST Saturday being St. Andrew's Day, the Anniversary Meeting of the Royal Society was held in their apartments at Burlington House. The auditors of the Treasurer's accounts having read their report, the Secretary read the list of Fellows elected and deceased since the last Anniversary.

The qualifications of the new Fellows were given in NATURE of May 9 (vol. 52, p. 31). Since the last Anniversary Meeting, the Society has lost nineteen Fellows and seven Foreign Members, viz. :—

Bisset Hawkins, December 7, 1894, aged 98.
Pafnutij Tchebitchef, December 8, 1894, aged 73.
Arthur Cayley, January 26, 1895, aged 73.
Sir James Cockle, January 27, 1895, aged 76.
Rev. Thomas Penington Kirkman, February, 1895, aged 88.
John Whitaker Hulke, February 19, 1895, aged 64.
Henry Austin Bruce, Lord Aberdare, February 25, 1895, aged 80.
Sir William Scovell Savory, March 4, 1895, aged 69.
Sir Henry Creswicke Rawlinson, March 5, 1895, aged 84.
Albert William Beetham, March 11, 1895, aged 95.
James Dwight Dana, April 15, 1895, aged 82.
Carl Ludwig, April 24, 1895, aged 78.
Roundell Palmer, Earl of Selborne, May 4, 1895, aged 83.
Henry John Carter, May 4, 1895, aged 82.
Sir George Buchanan, May 5, 1895, aged 64.
Franz Ernst Neumann, May 23, 1895, aged 97.
Valentine Ball, June 15, 1895, aged 52.
William Crawford Williamson, June 23, 1895, aged 78.
Right Hon. Thomas Henry Huxley, June 29, 1895, aged 70.
Henri Ernest Baillon, July 19, 1895, aged 67.
Charles Cardale Babington, July 22, 1895, aged 86.
Sir John Tomes, July 29, 1895, aged 80.
John Syer Bristowe, August 20, 1895, aged 68.
Sven Ludwig Lovén, September 3, 1895, aged 86.
Louis Pasteur, September 28, 1895, aged 73.
George Edward Dobson, November 26, 1895, aged 47.

Lord Kelvin, the President, then delivered the Anniversary Address as follows :—

In Cayley we have lost one of the makers of mathematics, a poet in the true sense of the word, who made real for the world the ideas which his ever fertile imagination created for himself. He was the Senior Wrangler of my freshman's year at Cambridge, and I well remember to this day the admiration and awe with which, before the end of my first term just fifty-four years ago, I had learned to regard his mathematical powers. When a little later I attained to the honour of knowing him personally, the awe was evaporated by the sunshine of his genial kindness; the admiration has remained unabated to this day, and his friendship has been one of the valued possessions of my life. While we mourn his departure from among us we know with gratitude that he has left an imperishable monument of his life's work in the grand edition of his mathematical writings which the University Press of Cambridge gives to the world. The interesting and genuinely appreciative obituary notice of Arthur Cayley, contributed by our colleague, Prof. Forsyth, to the *Proceedings* of the Royal Society for the present year, has been reprinted as a preface to the eighth volume of his "Collected

Mathematical Papers," which was published last August, rather more than half of it having been passed through the press by the author with notes and references, and the remainder simply reprinted from the original publications. Matter for two more such volumes remains to be reprinted.

At the good old age of ninety-seven the veteran Franz Ernst Neumann has left us. He has been one of the most profound and fertile of all the workers in mathematical physics of the nineteenth century. I remember with gratitude the admirable and suggestive theorem¹ on electromagnetic induction which I learned in 1848, from a first paper on the subject which he had communicated to the Berlin Academy of Sciences, and which, translated into French, was published in the April number of that year of Liouville's *Journal des Mathématiques*. That first paper and others which followed it on the same subject, and his papers on the physical theory of light and on elasticity, are grand and permanently valuable contributions to science.

The death of Huxley, one of my predecessors in the Presidential chair of the Royal Society, takes from us a man who can ill be spared. During the fifty years since he sailed from England, as assistant-surgeon on board H.M.S. *Rattlesnake*, bound for a surveying expedition in the southern seas, he had been a resolute and untiring searcher after truth, and an enthusiastically devoted teacher of what he learned from others and what he discovered by his own work in biological science. His first contribution to science was a short note communicated, while he was still a student in the Charing Cross Hospital, to the *Medical Times and Gazette*, describing a structure in the root-sheath of hair, which has since borne the name of Huxley's layer. It was followed by papers on the blood corpuscles of the *Amphioxus lanceolatus* and on the anatomy and affinities of the family of *Medusæ*, for the British Association and the Royal Society; and several other articles on various biological subjects, all describing some of the work of the leisure left him by his medical duties during his four years' cruise on board the *Rattlesnake*, which were sent home by him to England, and published during his absence. It is to be hoped that the long series, thus so well begun, of papers describing skilful and laborious research by which knowledge was increased in every department of biology, will be given to the world in collected form as soon as possible. Even those purely scientific papers contain ample evidence that Huxley's mind did not rest with the mere recording of results discovered by observation and experiment: in them, and in the nine volumes of collected essays which he has left us, we find everywhere traces of acute and profound philosophic thought. When he introduced the word agnostic to describe his own feeling with reference to the origin and continuance of life, he confessed himself to be in the presence of mysteries on which science had not been strong enough to enlighten us; and he chose the word wisely and well. It is a word which, even though negative in character, may be helpful to all philosophers and theologians. If religion means strenuousness in doing right and trying to do right, who has earned the title of a religious man better than Huxley?

Another name literally of world-wide fame, Louis Pasteur, stands next to the end of our list of losses. Before he entered on his grand biological work, Pasteur made a discovery of first-rate importance in physics and chemistry—the formation of crystals, visibly right-handed and left-handed, from a solution of racemate of soda and ammonia; and the extraction of ordinary tartaric acid and of a kind of tartaric acid not previously known, from solutions obtained by picking out the crystals separately and redissolving: the new kind of tartaric acid having the property of producing the opposite rotatory effect on the plane of polarisation of light to that produced by ordinary tartaric acid. From 1848 to 1857 he was chiefly occupied with researches related to the subject of that great discovery, as may be seen from the titles of the first twenty-two of his papers in the Royal Society Catalogue. His work of those nine years led up from Biot's fundamental discovery of the dioptric helicoidal property of liquids and vapours, to the enrichment of chemistry by the annexation of a new province called stereochemistry, splendidly and fruitfully developed twenty years later by Le Bel and Van't Hoff. Near the end of 1857 his twenty-third paper appeared, three pages, in the *Comptes rendus*, "Sur la Fermentation appelée lactique." It shows that he had then entered on the

¹ Quoted in "Mathematical and Physical Papers" (Sir William Thomson), p. 92, vol. i.