

investigation; the apparent inconstancy of the amount of asymmetry contrary to theory, also the apparent asymmetric intensities observed in the components of various lines. Careful measurements of the width of the lines show that the mean value is about 0.07 Ångström unit, and that the asymmetry amounts to about half this amount.

SIR WILLIAM RAMSAY contributes to the May number of *Cassell's Magazine* a popular article under the title "How Discoveries are made," in which he refers, among other matters, to the work of Priestley, Scheele, and Cavendish on air and combustion; Crookes, Lenard, and Röntgen on cathode rays; and Soddy and himself on radium emanation and its decomposition into helium, leading up to a short statement as to β rays and the corpuscular theory of electricity. The article provides general readers with a glimpse of scientific work, and is a welcome feature in a popular magazine.

THE Institute of Chemistry has published a second edition of the "List of Official Chemical Appointments." It has been compiled by direction of the council of the institute, and under the supervision of the proceedings committee, by Mr. Richard B. Pilcher, registrar and secretary of the institute. The scheme adopted in the first edition has been adhered to, the information has been corrected carefully, and numerous additions, including an index of names, have been made. The list is arranged in two main divisions; the first contains appointments in the British Isles, and the second in India, Canada, Australia, British colonies and protectorates, Egypt, and the Sudan provinces. The appointments dealt with include those under State departments, local authorities, and public institutions, in addition to teaching posts at universities, colleges, and schools. An appendix gives concise information as to societies for the advancement of chemical science and of professional chemical interests. The publication, the price of which is 2s. net, should prove of great service to all who are interested in the applications of chemistry to State purposes and in the teaching of the science at its various stages.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN MAY:—

- May 1. 8h. 46m. to 12h. 28m. Transit of Jupiter's Sat. III. (Ganymede).
 3. 21h. 59m. Venus in conjunction with the Moon. Venus $4^{\circ} 15' N$.
 4. 8h. 48m. to 9h. 46m. Moon occults μ Geminorum (mag. 3.2).
 5. 0h. 51m. Neptune in conjunction with the Moon. Neptune $1^{\circ} 20' S$.
 6. 22h. 41m. Jupiter in conjunction with the Moon. Jupiter $1^{\circ} 47' S$.
 7. 10h. 56m. Minimum of Algol (β Persei).
 15. Venus. Illuminated portion of disc = 0.388.
 ,, 8h. 42m. to 13h. 31m. Transit of Jupiter's Sat. IV. (Callisto).
 16. 11h. 15m. to 12h. 22m. Moon occults ψ Ophiuchi (mag. 4.6).
 19. 8h. 34m. Uranus in conjunction with the Moon. Uranus $0^{\circ} 35' N$.
 24. 23h. 47m. Saturn in conjunction with the Moon. Saturn $3^{\circ} 15' N$.
 29. Venus at maximum brilliancy.
 30. 9h. 25m. Minimum of Algol (β Persei).
 31. 13h. 52m. Mercury in conjunction with the Moon. Mercury $2^{\circ} 19' N$.

A NEW STAR-FINDER.—The "Metron" star-finder submitted to our examination by the maker, Mr. C. Baker, 244 High Holborn, is an ingeniously designed instrument

which will enable beginners in astronomy to become practically acquainted with the constellations and the brighter stars, and also with the more important problems usually placed under the heading: "The Use of the Globes." It consists of a 4-inch celestial globe mounted on a tripod and stand so that it may be erected for any latitude. A date circle and a loose hour circle round the south pole enable the user to set the globe for any day and hour of the year. There is also a wire grip carrying a circle, with a pointer at its centre, and a pair of telescopic sights. Having set the globe for latitude, oriented it north and south by the fixed compass, and levelled the stand by means of the two bubbles set in it, the user sets the hour circle according to the directions, and places the pointer over the star, on the globe, which he wishes to locate and recognise; the real star may then be seen in the centre of the telescope field. In this way a number of constellations and important stars, of which the names are given on the globe, may be recognised. Conversely, knowing the date and the position of the star, the approximate time may be determined; special sights are supplied for work on the sun. To facilitate the reading of the globe and circles when working at night, a small electric lamp—and dry cell—is fitted to the stand.

The whole apparatus is nicely finished in nickel plate, and should prove useful in demonstrating problems in astronomy to beginners. For anything like accurate work, the apparatus in its present form and size is, we believe, on too small a scale; a very small error in the setting produces great confusion when magnified on the celestial vault, and the unaided beginner would probably find that his knowledge of the constellations was not considerably enlarged; when he began to be familiar with the instrument and the stars he would find in the combination a source of many hours of interesting work and problem-solving. Spare globes, covered with blank paper, may be obtained for the purpose of plotting the apparent paths of planets, &c.; on the present globe we notice one or two misspellings, e.g. Sygnus, Delphin, as the names of constellations. The price of the instrument, complete in box, is 2l. 12s. 6d.

SATURN'S RINGS.—In No. 4243 of the *Astronomische Nachrichten*, pp. 289 to 313 are devoted to records and discussions of observations of Saturn made by various observers during the end of 1907 and the beginning of the present year. Prof. Lowell and Mr. Lampland give the details of the Flagstaff observations, and the former discusses the appearance of the edge of the ring system and of the condensations remarked by Prof. Barnard, themselves, and other observers. When observing the shadow of the rings on the ball of the planet, all the Flagstaff observers noticed that it was traversed by a medial core the blackness of which was far more intense than that of the boundaries. This core was first observed on June 19, 1907, and was plainly visible on subsequent occasions; on November 5 the shadow generally was of a faint cherry-red tinge, and the black medial line was slightly undulatory, showing irregularities of outline. Drawing conclusions from the discussion of his results, Prof. Lowell finds that the rings approach more nearly to the body of the planet than hitherto measured, and that the middle and inner members of the ring systems are not flat rings, but tori; this would account for the condensations observed, and for the medial core of the shadow.

THE SYSTEMATIC MOTIONS OF THE STARS.—From the analytical study of the motions of 1100 stars having proper motions of between $20''$ to $80''$ per century, and distributed over both hemispheres, Prof. Dyson has obtained results which confirm those previously obtained by Kapteyn and Eddington, viz. that the stars are moving in two streams.

The positions found for the apices of the two streams as found by the different observers are shown below:—

	Stream I.	Stream II.
Kapteyn ...	R.A. 85° , Dec. -11° ...	R.A. 260° , Dec. -48°
Eddington ...	" 90° , " -19° ...	" 292° , " -58°
Dyson ...	" 94° , " -7° ...	" 240° , " -74°

The quick-moving stars considered in the latest discussion show the two distinct drifts very pronouncedly, particularly in the case of Stream II. For Stream I. the

three determinations agree within 7° of the position R.A.=90°, dec.=−12°, and for Stream II. within 14° of the position R.A.=263°, dec.=−60° (Proc. Roy. Soc. Edinburgh, vol. xxviii., part iii., No. 13, p. 231, February).

DETERMINATION OF THE ERRORS OF THE PARIS OBSERVATORY RÉSEAUX.—In a paper communicated to the Paris Academy of Sciences, M. Jules Baillaud describes a novel method whereby he has determined the errors of the réseaux used in connection with the *Carte du Ciel* plates at the Paris Observatory. By this method the influences of variations of temperature and of deformation of the gelatin film during development are eliminated, and M. Baillaud finds that the errors attain the value 3 μ, the variations between measures on several plates not exceeding 0.5 μ. This is of the same order of size as the grain of the plate used, and it would probably be possible to reduce the apparent discordance by using plates of a finer grain (*Comptes rendus*, No. 12, March 23, p. 616).

THE HERSCHEL'S NEBULÆ.—No. 4, vol. ii., of the *Rivista di Astronomia* (Turin, April, p. 82) contains an article of especial interest and value by Madame Dorothea Isaac-Roberts, who discusses the nebulae discovered by the Herschels as photographed by the late Dr. Isaac Roberts. The author first gives a brief review of the history of nebulae observations from the time that Galileo discovered the first true nebula in 1610; then follows an explanation of the classification of nebulae made by Sir William Herschel, and of the code used by Sir John Herschel in his descriptions of nebulae. A brief description of the plates shown in the latter's memoir of 1833 is followed by a discussion of the groups of nebulous bodies as classified by Dr. Roberts. The paper concludes with a brief sketch of the lines which the author's discussion of Dr. Roberts's plates will follow, and is to be continued in the following number of the review.

HORIZON AND PRIME-VERTICAL CURVES FOR LATITUDES +30° TO +60°.—In these columns for January 30 (*NATURE*, No. 1996, p. 302) we described briefly a useful sun and planet chart submitted for our inspection by Messrs. Carl Zeiss. The same firm has now sent us a transparent celluloid scale, devised by Herr H. H. Kritzing, which, when used in conjunction with the charts, enables one to see at a glance the relative positions of the local horizon and prime vertical for any place between latitudes 30° and 60° north. This allows the approximate sidereal time of rising and setting of the stars, and of their transit through the prime vertical, to be found at once, and with no trouble beyond that involved in superposing two sets of lines. Messrs. Zeiss will be pleased to send copies of this new scale on receiving applications.

EDUCATIONAL LEAKAGE.

THE success of any system of technical instruction or higher education depends ultimately upon the preparatory education of the students in our technical schools and other institutions of higher education. The results hitherto obtained from the work of colleges and technical schools in this country have been discounted seriously by the inadequacy in the nature and supply of the education for boys of school age. Mr. V. A. Mundella, in an address delivered last year to the Association of Teachers in Technical Institutions, directed attention to the subject, and also by means of curves illustrating recent statistics demonstrated the serious leakage of children at twelve and thirteen years of age, who afterwards receive no education whatever.

The accompanying diagram shows the number of children at stated ages, and the grade of education, if any, they are receiving. Mr. Mundella states that there are in England and Wales, between the ages of eleven and twelve years, 718,000 children, of whom 620,000 are in elementary schools, and at the outside 40,000 in public and private secondary schools. The curve T shows the total number of children at each year of age up to twenty-one years, and the curve A the total number of these children in

elementary schools. The form of A shows strikingly the rapid decrease in school attendance between the thirteenth and fifteenth years. The curve *t* exhibits the number of children surviving, at each year of age, who have attended an elementary school, and a comparison of this curve with those marked B, C, X, shows how little has been accomplished in the direction of continuing the education of the nation's children after the elementary school has been left. Curve B illustrates the total number of children in science and art classes, C in evening continuation schools, X in secondary schools, and U—a continuation of X—in universities and university colleges. The curve X is based upon statistics published in 1898, no later statistics being available. The curve D represents the number of surviving

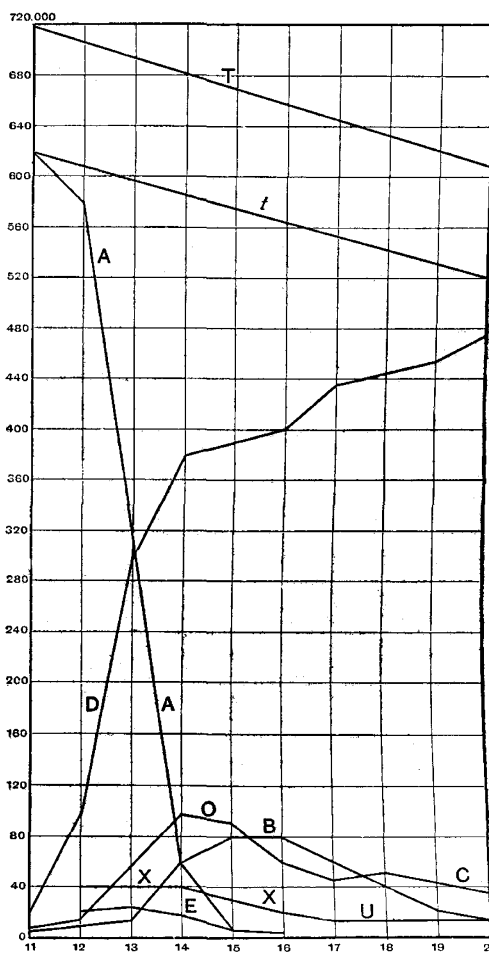


Diagram showing the number of young people in England and Wales between the ages of 11 and 21, and the number receiving education in schools and colleges of various types.

children who have attended elementary schools, but are receiving no further organised education, and E shows the total number of children at each age taking approved courses of instruction in State-aided secondary schools.

The facts embodied in this diagram demonstrate very clearly the need for strenuous national effort to insist upon children attending primary schools until they are fourteen years of age and abolish the present system of half-timers and other exemptions, to provide for continuation schools at which attendance shall be compulsory, and to establish secondary schools which are really schools of a high educational type. Schools in which 80 per cent. of the pupils leave at fifteen years of age or under are better described as higher elementary schools than as secondary schools, under which title they are at present classified.