of the temperature of the point of maximum density of water caused by the addition of a solute is directly proportional to the concentration of the latter. Mr. Wright further shows that the lowering of the temperature of the maximum density of water produced by a highly ionised binary electrolyte is composed of two separate independent effects, one due to the acid and the other to the basic radicle, and can therefore be calculated by the addition of two moduli to the lowering produced by a molecular solution of a chosen standard substance. The standard substance chosen was normal hydrochloric acid. The acid salts of the dibasic acids behave normally, but the neutral salts and the salts of bivalent metals do not conform to any simple rule in their effect on the temperature of maximum density. The feebly ionised organic acids show abnormal effects, but their highly ionised salts behave in the normal manner.

CONSIDERABLE interest is attached to the comparatively rare alkaloid hyoscine or scopolamine, owing to its use in the treatment popularly known as "twilight sleep." The hyoscine of commerce, extracted from solanaceous plants, is lævorotatory, but an optically inactive form produced by the action of dilute alkali on the naturally occurring alkaloid is known. At a meeting of the Chemical Society on April 3 Mr. Harold King, of the Wellcome Chemical Research Laboratories, described the resolution of this optically inactive hyoscine into the well-known lævo- form and the hitherto unknown dextro- form. On hydrolysis *l*-hyoscine yields *l*-tropic acid and an optically inactive amino-alcohol, oscine. Mr. King has also resolved the latter into its optically active components. Since, therefore, tropic acid and oscine each contain an asymmetric carbon atom, and are each capable of existing in three forms, two active and one inactive, the possible combinations of these various forms may give rise to ten, or possibly eleven, isomeric hyoscines. It becomes of interest to ascertain which of these forms are represented by the two optically active hyoscines already known. This question is still under investigation, but Mr. King pointed out that as benzoyl *d*-oscine gives optically pure *d*-oscine on hydrolysis, it seems probable that the known hyoscines contain inactive oscine, the optical activity being due to the lævo- and dextro-tropyl radicles respectively.

ON taking over the duties of the chair of metallurgy in the Royal Technical College, Glasgow, last September, Prof. Cecil Desch devoted his introductory lecture to a review of the aims of a Glasgow School of Metallurgy. In this address Prof. Desch laid emphasis upon a change in the methods of industry which has recently been taking place. He quoted from Prof. Patrick Geddes, who has proposed to divide the industrial age into two periods, which he has called the "palæotechnic" and the "neotechnic." In the earlier of these the aim of industry was merely the accumulation of material wealth. Natural resources were squandered recklessly, the one consideration being their rapid conversion into marketable products. Human life was disregarded, the cheapest labour being utilised without reference to the standard of life. In England this was essentially the age of coal. Fuel was cheap and abundant; no care was exercised in its use, and our scenery was disfigured by smoke as the manufacturing districts spread over the country. Housing conditions were such as to accommodate the largest number of persons on a given area at the lowest possible cost, and the results are to be seen in the squalid industrial regions of Manchester, Sheffield, the Black Country of the Midlands, and Glasgow. It is, however, being slowly realised, both by the employers of industry and the workers themselves, that all natural resources must be used with the utmost economy, unnecessary destruction avoided, health and comfort considered in the devising and planning of works, and the erection of squalid dwellings crowded into a minimum of space must give place to town-planning on a scientific and sound basis. The symbol of the palæotechnic age was the furnace fired with raw coal; that of the neotechnic age is the electrical power-house with its clean atmosphere and white-tiled walls. Prof. Desch is to be commended on having laid such emphasis on a matter of vital importance to the future of the country.

COPIES have reached us of Nos. 2 and 3 of the *Children's Newspaper*, a weekly periodical edited by Mr. Arthur Mee, and published by the Amalgamated Press, Ltd. Mr. Mee was editor of the "Children's Encyclopædia" and "Harmsworth's Popular Science," both of which are among the best works of their class. The new periodical shows the same interest in scientific matters and originality in presenting them to juvenile readers. Its aim is to give "the story of the world to-day for the men and women of to-morrow," and we are glad to see that the world includes Nature as well as man. We should like to think that when the boys and girls who now derive pleasure and profit from the newspaper published especially for them become adults they will expect like fare to be provided in the public Press. The *Children's Newspaper* will be a valuable aid in this direction, and we cordially welcome it.

Messrs. A. and C. Black, Ltd., will publish shortly a book on "Cerebro-spinal Fever," by Drs. C. Worster-Drought and A. M. Kennedy. The authors were responsible for the treatment of the disease among the troops in the Woolwich military district. The following works have been arranged for appearance in the University of Chicago Science Series (*Chicago: The University of Chicago Press; London: The Cambridge University Press*):—"Black Body Radiation," Prof. C. E. Mendenhall; "Mechanics of Delayed Germination in Seeds," W. Crocker; "The Rigidity of the Earth and of Materials," Prof. A. A. Michelson; and "Linear Integral Equations in General Analysis," E. H. Moore. The new list of *Messrs. Longmans and Co.* includes "The Design of Propellers for Aircraft," H. C. Watts; "The Design of Aero Engines," Major A. T. Evans and Capt. Adams; "Engineering Machine Tools and Processes," A. G. Robson; "The Principles and Practice of Electrical Testing," R. G. Allen; and "Garden First in Land Development," W. Webb. *Mr. H. Milford* announces "The Place of the University in National Life," the Right Hon. H. A. L. Fisher (No. 4 of "Barnet House Papers").

THE latest catalogue (No. 387) of Mr. F. Edwards, 83 High Street, Marylebone, W.1, appears at an opportune moment, seeing that it deals with books relating to Europe. It is historical and descriptive, and conveniently arranged according to the various countries of the Continent. Doubtless it will be of interest to many readers of NATURE at the present time. Copies are obtainable upon application.

OUR ASTRONOMICAL COLUMN.

THE APRIL METEORIC DISPLAY.—The shower of Lyrid meteors in April dates from antiquity, and some of the early displays appear to have been of an exceptional and striking character. In 1803 a brilliant exhibition was witnessed in America, and in 1851 it was repeated in Indian skies. In 1863 its visitation as viewed from England was conspicuous, if it lacked the grandeur of old-time spectacles. It is evidently not a phenomenon with attractive features which we can await with confidence every year as in the case

of the August Perseids. It is rather an event with possibilities which cannot be definitely predicted because it is affected by irregularities not fully understood. Usually it must be confessed that the shower provides few meteors and disappointment. However, meteoric astronomers anticipate its brilliant revival at any time, and watch the spring skies with a keenness which merits success.

The meteors are due on the night of April 21, when the moon will be at her last quarter, and does not rise until nearly an hour after midnight. But it will be advisable to watch on the preceding night also, and the hours after midnight are likely to be the most productive, the radiant point at 271°+33° being at a much greater altitude than in the evening hours. The really active stage of the shower is limited to a few hours, but the whole duration is much longer, and certainly extends from April 18, when radiation is from 266°+33°, to April 26, when it has advanced to 278°+33°.

UNIFICATION OF THE ASTRONOMICAL AND CIVIL DAY.—The Lords Commissioners of the Admiralty have given instructions to the Superintendent of H.M. Nautical Almanac Office that in the Almanac for 1925 the day shall be considered as beginning at midnight, to make the astronomical agree with the civil day. This change has been resolved on after consultation with the Royal Astronomical Society, which issued a circular to the superintendents of the ephemerides of other nations and to the representatives of other bodies asking for opinions and suggestions. It appears that the change is to be made chiefly in the interests of seamen, who will find it more convenient to have the same time system in use for purposes of navigation and for ordinary life on board ship. It may be remembered that a vigorous attempt to secure this unification of the civil and astronomical day was made about the year 1885.

THE EVOLUTION OF BINARY SYSTEMS.—Mr. J. H. Jeans, in the Monthly Notices of the Royal Astronomical Society for December, 1918, examines some of the problems of double-star orbits. While in the solar system the angular momentum is too small for the system to have broken up through rotation, in the majority of binary systems it is too large for this to have happened. Tidal action cannot increase the latus rectum by more than some 60 per cent. in the case of equal masses (Russell). Large alterations of latus rectum, and hence of period, cannot, therefore, arise from the mutual action of the stars. Either the periods have retained approximately their present values throughout the star's career (this hypothesis is rejected), or there must have been sensible disturbances from other stars. This leads Mr. Jeans to the interesting conclusion that the stellar system was initially of about 1/1000 of its present volume. He suggests that the outward movement may still be in progress, and notes the observed excess of positive radial velocities as evidence of this. In its earlier compressed condition mutual encounters of stars would have been frequent. Incidentally, he finds 0·637 as a mean value of eccentricity of orbits as produced by encounters. This accords well with observed facts.

It is advisable to direct attention to one sentence of the summary. Mr. Jeans says:—"The dwarf M stars have velocities which show no preference for particular directions in space, and there seems to be no correlation between the magnitude of their velocities and the parts of the universe they occupy." But, in fact, we are acquainted only with those dwarf M stars that are in close proximity to the sun; for such stars are intrinsically so faint that they do not appear in our catalogues at all if they are distant.

AERIAL PHOTOGRAPHY.

PHOTOGRAPHY from the air reached a wonderful degree of excellence during the war, as is demonstrated by the pictures that have been published and shown at various exhibitions; but for obvious reasons the instruments used for this work have only quite recently been made public. The experts who have compared the various lenses suitable assure us that those made by English opticians were found to be not only equal to those of Zeiss and Goerz, but markedly superior to them. With regard to cameras, the editor of the *British Journal of Photography* has had an opportunity of seeing the whole range of cameras used by the Royal Air Force, and describes them in an article in his journal of March 21. Within a few months of the beginning of the war the value of aerial photographs began to be recognised, and specially made cameras were first used early in 1915. The first camera was of a very primitive type, and fitted with a Mackenzie-Wishart adapter for 5×4 plates. Early in 1916 a magazine-changing arrangement was used with the plates in metal sheaths, the foremost—that is, the lowest—plate being pushed sideways after exposure into the receiver by a horizontally moving metal plate. So far the cameras were of wood, but in 1917 a metal camera was introduced, and the changing done by pulling a cord instead of pushing a metal plate.

The next improvement (early in 1917) was to provide a mechanical method of changing, the motive power being produced by a small propeller, which was brought into action by simply releasing a Bowden lever, the shutter being automatically actuated at the same time and by the same means. In 1918 this camera was further improved in several ways. The shutter was made replaceable by another, if necessary, as on account of derangement, and lenses of focal lengths from 4 in. to 20 in. might be used on the same camera. Among other patterns was one, first used in 1916, which would take a continuous series of photographs, up to 120, on a roll of film. The exposures were made automatically at intervals corresponding with a certain number of revolutions of the propeller, and by means of a small supplementary lens each negative had recorded on it the height of the machine and its compass bearings. Major C. W. Gamble, of the R.A.F., in a lecture before the Optical Society on March 13, after describing the various cameras used, said that, although the most rapid plates were desirable so that exposures might be made late in the day and when the light was poor, it was found that the density-giving capacity of the plate was of at least equal importance. As time progressed the tendency was to use panchromatic rather than orthochromatic plates, and, finally, three-fourths or more of the plates used were panchromatic, a suitable light-filter being employed.

NEW KNOWLEDGE OF A PUZZLING GROUP OF GYMNOSPERMS.

THE abundance of large fronds in Rhætic, Jurassic, and Wealden rocks, closely resembling in habit those of some recent Cycads, and the occurrence of hundreds of petrified trunks in Jurassic and Neocomian strata in North America and, in smaller numbers, in many other parts of the world, have led palæobotanists to speak of these periods as the "age of Cycads." It is, however, a remarkable fact that the reproductive shoots of these Cycad-like plants differ very widely from the corresponding organs in the true Cycads; had we possessed no knowledge of the vegetative organs, the reproductive shoots would