

Our Astronomical Column.

OCCULTATION OF A STAR BY SATURN.—Mr. A. Burnet has pointed out that the star Lalande 20654 (mag. 7.3) will be occulted by Saturn on the evening of March 14. Mr. L. J. Comrie gives some further details and a diagram in the *Journal of the British Astronomical Association* for January. At Greenwich the star disappears at 7h. 5m. in position angle 281° , just to the north of the ring, reappearing at 8h. 40m. in angle 121° . The star will pass very close to Titan about 12h. 15m., and an occultation by that satellite will probably occur somewhere on the earth; hence it is important to observe the conjunction with care, and, if an occultation occurs, to take the times of disappearance and reappearance, as a useful determination of Titan's diameter might be made from such observations. A central occultation would last about five minutes.

THE NAUTICAL ALMANAC FOR 1922.—This volume has lately been issued, and is of interest as being the last almanac in which the places of the moon are based on Hansen's tables; these were first used in the 1862 almanac, but, starting with 1883, Newcomb's corrections have been applied to them. For ten years after this the errors of the almanac places of the moon were very small, then they began to mount up, and now reach nearly 1 sec. in R.A. The introduction of Brown's tables in the 1923 volume will greatly reduce this error, but will not remove it entirely, since Dr. Brown has preferred not to introduce a term of some sixty years' period which is indicated by the observations.

CALENDAR REFORM.—This question, which was suspended during the war, is again coming to the front. The majority of the reformers agree on the following points:—(1) That each quarter should have ninety-one days (thirteen weeks), there being two months with thirty days and one with thirty-one, these lengths repeating themselves in the same order in each quarter; (2) that one day in each year, and a second day in leap year, should stand outside the week, so that the week-days repeat themselves alike in every year; and (3) that the leap day should come at the end of the year, its position in the second month being extremely inconvenient. Mr. Alexr. Philip proposes to begin the year with March, thus restoring the meaning of the names September, etc. He further suggests that the day outside the week should be Whit-Sunday, which is put at the end of the first quarter (May 31); it is immediately followed by an ordinary Sunday, taking advantage of the fact that the day following Whit-Sunday is already a general holiday. Easter Sunday on this plan would always be on April 12. The leap day would come as now, at the end of February, but this would then be the last month of the year. He further suggests that, if it be desired to keep the months as nearly as possible at their present lengths, his scheme would involve no greater change than that August should give one day to February.

M. Flammarion's scheme, reprinted in the *Annuaire Astronomique* for 1920, is similar, but more revolutionary. He would begin the year at the vernal equinox, giving new names to all the months. Their lengths in each quarter would be 30, 30, and 31 days. Easter would be the 21st of the first month (corresponding with April 10). The extra-week day and the leap day would both come at the end of the year.

It would seem desirable that all reformers should agree to adopt one of the many schemes that have been proposed, as unanimity is required to give sufficient driving power to carry any reform. The fact that the present most illogical calendar has survived so long is a forcible illustration of the strong conservatism of mankind.

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The Association of Technical Institutions.

THE twenty-seventh annual general meeting of the Association of Technical Institutions was held in the Cordwainers' Hall, E.C., on Friday and Saturday last, February 27 and 28. The meeting was opened by the retiring president, Lord Sydenham. The Marquess of Crewe, K.G., was elected president for the year 1920, and delivered his inaugural address, in which he dealt at length with the working of the Education Act of 1918, especially in its relation to continuation schools, and went on to plead strongly for better education and training in the science and methods of agriculture, certainly our oldest, and possibly our largest and most vital, industry. No industry demands for its successful prosecution a sounder knowledge of the various sciences, including chemistry, botany, geology, bacteriology, entomology, meteorology, and engineering. Modern agriculture is a complex business, and measures should be taken for the due training of all concerned, whether engaged in it on a small or a large scale, and especially in the scientific study and practice of forestry. One of the fruits of the great war was seen in the newly awakened interest of employers in the applications of science to industry, and in their greater readiness to find appointments and opportunities for students who, on the foundation of a good general education, had specialised in scientific subjects and showed themselves willing and able to undertake important research. In this regard we could learn valuable lessons from American practice. It was gratifying to observe also the keenness displayed by the general class of workers, who, under the auspices of the Workers' Educational Association, are now, with shorter traditions and scantier leisure than other social classes, interesting themselves in liberal studies relating to literature and history, and in social and political economy. It is all to the good in the building up of an educated nation.

The report for the year 1919 was submitted, showing that the membership of the association now comprised 108 institutions, the highest in its history, being an increase of ten over that of 1914. Steps have been taken to bring before the Board of Education the necessity for providing not only facilities, either in full-time or vacation courses, for persons desiring to become teachers in the new continuation schools set forth in the Education Act of 1918, but also opportunities for present continuation-school teachers who need further training in this special form of educational work. It was suggested by the council that full-time courses might be of one year's duration or not shorter than six months and that in the event of approved teachers so devoting themselves the Board might consider favourably the question of granting a maintenance allowance for such teachers. The council was assured of the sympathy of the Board in this matter, especially in the case of demobilised officers, and that a maintenance allowance would be made.

The question of pensions for teachers in technical institutions had also been considered and information thereon sought from the Board, which states that, with the approval given by the Treasury, the following will be accepted as counting for *qualifying* service, namely, in private schools (prior to April 1, 1919), provided they are conducted on the same standards of efficiency as schools under public management; as inspectors of schools under any Government Department in England, Scotland, or Ireland; as officials of the Board of Education or of the Scotch or Irish Education Department; as officials of a local education authority whose salaries are paid out of the education rate; as officials of any school or educational institution (not conducted for private profit), including a university, if the institution is one, teaching service

in which would be regarded as recognised and qualifying service; in the case of trade or commercial instructors, five years of practical experience or not more than seven years in special cases; in any university or university college; in any school receiving grants provided by a Government Department; as a supplementary teacher in a public elementary school; in any school in any British Colony or Dependency or in India, aided or under regular inspection by the Government; in any foreign country where there exists an arrangement for the interchange of teachers made by the Board of Education.

The question of salaries for teachers of various grades in technical institutions had been carefully considered, and the following scale was submitted to, and approved by, the meeting, and ordered to be forwarded to local education authorities and the governing bodies of technical institutes for their consideration, namely: Principals in four grades of schools ranging from 125*l.* down to 50*l.*, and rising by annual increments during five years to 150*l.* and 75*l.*; heads of departments in three grades ranging from 60*l.* down to 40*l.*, and rising by annual increments during ten years to 90*l.* and 60*l.*; heads of junior technical and commercial schools to be classed as heads of departments; lecturers in three grades ranging from 40*l.* down to 25*l.*, and rising by annual increments during three years to 60*l.* and 40*l.* respectively.

In a paper by Mr. A. Mansbridge on "Technical Schools and their Part in Adult Education," it was urged that a great crusade against the unworthy use of leisure is a pressing need of the time. There can be no better way for the worker to tread in his off-hours than that which leads to the development of his interests or his skill. Technical training can, however, never flourish in a community which does not regard the matters with which it deals as of fundamental importance to the whole health of man. A nation which merely regards it as a means of outstripping others must always be content with superficial achievement. The education of a man lies deeper than the pursuit of knowledge or training. Some turn to the influencing or contemplation of the ideas and movements of men, others to the creation of material things, and each alike serves his generation if the direction be true. Mr. Mansbridge pleaded that the technical institutes should make provision for adult men and women to study in their leisure time the matters, technical or non-technical, in which they are interested, or rather for which they possess the necessary aptitude. He asked that serious attention should be given to the notable Report of the Committee on Adult Education issued in July last.

A paper was read on "Day Continuation Schools" by Mr. H. J. Taylor, of Dewsbury, in which he urged that a hearty response should be given to the invitation of Mr. Fisher to local education authorities to establish these schools voluntarily on the lines laid down by the Board of Education in its recent circular, namely, that such schools must give as great a measure of liberal education, both physical and mental, as opportunity and time afford. Mr. Taylor contended that the most effective way in which the conditions could be met was by arranging for a complete day each week for groups of boys and girls, and cited the efforts of the Dewsbury Education Committee and of the employers of the town (without reducing the wages of their employees) to establish such a school as illustrating its possibility.

A further paper was read by Dr. R. S. Clay, of the Northern Polytechnic, London, in which he advocated an ampler provision of scholarships throughout the whole sphere of education by the institution to each ten thousand of the population of six junior scholar-

ships from elementary to secondary schools, six industrial scholarships, three intermediate scholarships to enable the recipients to continue their education at the secondary school until the age of eighteen or nineteen, one senior scholarship to the university or the technical institute, and one post-graduate or research exhibition tenable at the close of the graduate course.

Resolutions were adopted dealing with lengthened vacations, so that teachers of special subjects should have facilities for keeping in touch with industrial developments; maximum teaching hours for ordinary lecturers and heads of departments; the appointment of a consultative committee comprised of representatives of industry, and including representatives of universities and technical institutions, to advise the university and technological branches of the Board of Education on all matters affecting the relationship of university and higher technical education to industry; and, finally, the provision that should be made in the preparation of schemes required by the Education Act of 1918 for the continuation of study on the part of science teachers by means of suitable tutorial courses of science lectures and practical work, together with facilities to attend meetings of scientific and technical societies and to visit special educational centres and industrial works.

The Einstein Deflection of Light.

THE idea of detecting the Einstein deflection by measures of two neighbouring stars has occurred to many people, and Prof. C. V. Raman writes to suggest that the apparent distance of the two components of a binary star may be influenced by the effect. It seems, therefore, worth while to examine the conditions, and to try to discover whether any sensible effects are to be expected.

First, it is easy to show that where the linear distance between the two stars is small compared with their distance from the sun, then the angular shift of the further star, due to the Einstein effect, is diminished as seen from the sun in the approximate ratio: Distance between the stars/their distance from the sun. That is, it becomes absolutely evanescent, and the effect suggested by Prof. Raman is non-existent.

Secondly, let the two stars be at different distances from the sun; for simplicity, take the distance of the



FIG. 1.—To illustrate the production of an image of a distant star by the gravitational bending of its light by a nearer one.

nearer star as half that of the further; let their angular diameters be 0.002" and 0.001" respectively, and let the angular distance between them be 1". Then the light from the further star passes the nearer star at a distance of 1000 of its radii. If the bending of a grazing ray be 2", the bending in the actual case is 0.002", and the apparent shift as seen from the sun 0.001". It appears that in no case where the two star-discs are sufficiently far apart to be easily separable is the Einstein shift appreciable.

A second Einstein effect has been imagined, viz. the formation of an image of the distant star on the reverse side of the nearer one. From C, the centre of the latter, draw tangents CA, CB, and produce them backward to DE. Then DE is one-millionth of a second. Now it is only along the arc DE that the Einstein image is produced, and the radial diameter