

26. 5h. 57m. Venus in conjunction with the Moon (Venus $5^{\circ} 13' N.$).
 28. 12h. 32m. Jupiter in conjunction with the Moon (Jupiter $3^{\circ} 46' N.$).
 29. 9h. 45m. Uranus in conjunction with the Moon (Uranus $2^{\circ} 53' N.$).

A NEW HILL ASTRONOMICAL OBSERVATORY.—M. H. Perrotin, writing in the *Revue Générale des Sciences* (November 15, No. 21), records the foundation of a new hill observatory on Mont Salève, at an elevation of 1250 metres. This new observatory owes its origin to the fact that M. Schaer, of the Geneva Observatory, having completed the construction of a Cassegrain telescope of 100 cm. in diameter, looked for a suitable spot in the canton of Geneva where an observatory could be built in order to make the best use of this telescope. The plain of Geneva, bounded by the Jura, the Salève, and the lake, was always found to be invaded by the mist during the fine season and by fog in winter. Such bad observing conditions are nearly always associated with low-lying stations, and hence the general tendency of either moving old or creating new observatories on elevated sites removed from large rivers, lakes, and towns. M. Schaer's work has always been encouraged by M. Honegger, and it is due to the latter that this high site can be utilised. The observatory will be used both for astronomy and meteorology, and the chief astrophysical work will be the study of the spectra of the stars of the second and third magnitude with very great dispersion. An astrophysical laboratory will be attached, and an electric current of 500 volts will be available; spectroheliographic work will also be done. M. Schaer invites French astronomers or meteorologists to make use of the site either by using the observatory's instruments or any instruments they may like to bring with them.

MEASUREMENT OF RADIAL VELOCITIES BY OBJECTIVE GRATING SPECTROGRAPH.—The determination of the velocities in the line of sight of the fainter stars is becoming an urgent necessity in astrophysics, and consequently efforts are being made to replace the slit spectrograph by other arrangements capable of utilising a greater proportion of the light available. To this end M. Maurice Hamy explains in a note in No. 17, *Comptes rendus*, a method by which an objective grating spectrograph may be employed for this purpose. The grating, preferably one giving under normal incidence only two symmetrical spectra, must be mounted so that these spectra may be photographed in two separate cameras. A collimator fixed to the same base is used to furnish comparison spectra from a terrestrial light-source. To eliminate the effects of variations of the angle of incidence the exposures on the star and comparison have to be intermittent and alternate. The reduction is based on a rigorous relation between directions of incident and diffracted beams, wave-length, constant of the grating, and order used. Two methods are given for the measurement of the plates.

SUN-SPOT AREAS FOR 1912.—Dr. Dyson communicates the usual annual summary relating to the areas and positions of sun-spots for the past year to the *Monthly Notices of the Royal Astronomical Society* (vol. lxxiii., No. 9), and its chief interest lies in the fact that that year and the present one includes the epoch of a minimum. In 1912 the mean daily spotted area was only thirty-seven millionths of the sun's visible hemisphere, while the values for 1910 and 1911 were respectively 264 and 64 millionths. Comparison is made between the years of minimum of the three preceding cycles; the values for 1878 gave an area of twenty-two, for 1889 an area of seventy-

eight, and for 1901 an area of twenty-nine, so that the low value in the last-mentioned year is not quite attained in 1912.

Attention is directed to the fact that, up to September 12 of the current year, a "much feebler condition of sun-spot activity even than 1912" has been experienced, so that the sun-spot minimum now in progress is probably going to turn out an unusually low and prolonged one. Minima of this character have generally been followed by a slow rise to a low maximum. The fact that some small spots have been observed in high latitudes suggests the commencement of a new period of activity. It is interesting to note that since 1905, and including that year, the number of days on which photographs of the sun were taken have been either 364 or 365.

CURRICULA OF SECONDARY SCHOOLS.¹

THE recently issued memorandum on the curricula of secondary schools displays with remarkable clearness the attitude of the Board towards educational problems. It is to be hoped that it will be widely read outside as well as inside the scholastic profession. Inevitably the influence of the Board on the work of the schools gets greater year by year, and it is vital to national progress that this influence should be exercised in a broad and enlightened spirit. We may state at once that we have never read an official document which gave us more reason to hope that the dangers of bureaucratic control will be avoided, while the opportunities for removing inefficiency and for coordinating and economising our educational resources will be watchfully grasped.

In the introduction we read:—"The present memorandum . . . is not intended to contain any dogmatic exposition of educational doctrine . . . the problems of education have to be re-stated for each generation . . . the Board could do no greater disservice than by attempting to check the spirit of exploration, experiment, and inquiry which should exist in every school. . . . Organisation alone cannot make a good school. The real success of the work depends on the harmonious activity of a well-equipped staff, and also—a fact not always sufficiently taken into account—on the cooperation of the parents."

Turning from these expressions of opinion, which, however excellent, are platitudes unless translated into practice, we find that the Board regards as cardinal and essential subjects "English language and literature, at least one language other than English, geography, history, mathematics, science, and drawing." Provision must be made for training in singing and manual work, and for promoting the physical development of the pupils. The memorandum lays emphasis on the fact that it is impossible for boys and girls to profit adequately if the duration of school-life be curtailed. The suggestion is put forward that some of the work hitherto restricted to technical schools may wisely be attempted in connection with the general education of the older boys and girls in the secondary school. The report truly states that, at present, time is often wasted in the middle and higher forms through the inefficiency of earlier teaching, through the absence of coordination (e.g. in the syllabuses for mathematics and science or for science and geography), and through the inclusion in the syllabuses of much that is trivial and unessential, to the neglect of what is of capital importance.

The question of insistence on Latin is left in a curious position. If only one foreign language be offered, the school is free to propose any language which is suited to the needs of the pupils and for

¹ Board of Education Circular 826. Price 2d.

which the instruction is efficient. If two languages are taken (other than English), one of the two must be Latin unless "the Board are satisfied that the omission of Latin is for the educational advantage of the school." This regulation has done injury to the study of German, and the British Science Guild and several teachers' organisations have objected. The Board now state that Latin will not be demanded if instruction therein is available in other accessible schools. The Board fear that the prospects of the pupils will be prejudiced if Latin is omitted, as they may be debarred from entry into professions and from university work in literary subjects. To the present writer it appears prejudicial to national progress that the education of thousands of boys and girls should be made less efficient because certain chartered corporations hold antiquated views regarding school curricula (on which subject they are seldom qualified to advise), or because those corporations may regard the exclusion of the un-Latined as a convenient social precaution.

The memorandum contains many useful suggestions with reference to the work of the more advanced pupils, and, so far as science is concerned, the recommendations will be approved by most of those who have had practical experience. Modified specialisation is the keynote—thus pupils specialising in science and mathematics should take English literature and composition and one foreign language, "which for those who have already spent some years in the study of French should by preference be German." Specialisation in art, economics, and domestic courses are also contemplated by the Board as permissible in selected schools, but with provision for the continuance of general education. As regards the main portion of the school, the study of science (including practical work) should extend continuously over four years. "This will be required in all schools unless special reasons to the contrary can be given." Boys who are working in preparation for an advanced course in classics may have a science course for three years (instead of four) between the ages of twelve and sixteen, if this course be supplemented by the inclusion of science among the subsidiary subjects taken at the specialising stage. This and similar statements in the memorandum should strengthen the resistance of enlightened headmasters to the injuriously narrow specialisation which still appears requisite for winning a scholarship at the older universities.

G. F. DANIELL.

THE SPREAD OF THE METRIC SYSTEM.

IN a circular letter, dealing with the world-wide spread of the metric system, the Decimal Association points out that the time is soon coming when metric usage, instead of being regarded as a hindrance to British trade with the Far East, will have to be adopted as a necessity in our dealings with China, Japan, and Siam, which have each taken definite steps to establish that system. Already the Advisory Council of China has passed the first reading of a law to that effect, and two Chinese gentlemen are now in Paris studying the technical details of the subject. Japan has for the present four legal systems of weight and measure, but the Government has declared its preference for the metric system by making it obligatory for the services of the customs excepting a few articles. The metric system is taught in all the public schools of Japan, and is prescribed for the army, for medicine, and for electrical work. Siam has employed the system with success on its railways and public works for some years, and last year joined the International Convention of the Metre, from

which it has received the apparatus needed for a Central Bureau of Standards at Bangkok. Siam proposes not to make metric reform compulsory at one and the same time in all parts of the kingdom, but to deal with each province separately at convenient times. Russia also has adopted the metric system for several purposes, and has announced to the Decimal Association that the metric system is favoured, but has to await the necessary arrangement of control and inspection throughout the Russian Empire. This conversion of Russia is notable as completing the solidarity of all Continental Europe in metric reform. All South and Central America are either metric or tending to be so. The Australasian Dominions of Great Britain have urgently pressed the question; and last, but most important of all, are the United States of America, which have gone far in preparing for reform, and will act with vigour when the time comes.

ZOOLOGY AT THE BRITISH ASSOCIATION.

SECTION D presented a full programme, the large number of communications rendering necessary morning and afternoon sessions. Interest in the proceedings was well maintained, good audiences being present throughout the meetings. A striking feature of this year's programme was the large number of papers dealing with vertebrate anatomy and morphology.

Some Aspects of the Sleeping Sickness Problem.

A lecture on this subject was delivered by Prof. E. A. Minchin. He referred briefly to the chief signs and symptoms of sleeping sickness, and described the main features of trypanosomes, remarking that the tendency of natural evolution appeared to be for the pathogenic species to adapt themselves to certain species of hosts, to which they become quite harmless. *Trypanosoma brucei*, *gambiense*, and *rhodesiense*, however deadly to domestic cattle and man, are harmless to the wild game, which appear to be their natural hosts. There is evidence that *T. rhodesiense* is a newly arisen strain of *T. brucei*, which has recently acquired the power of living in human blood, and, as a "new" parasite of man, is extremely virulent. Prof. Minchin pointed out the principal characters of tsetse-flies (*Glossina*), and the part played by certain species in transmitting the trypanosomes of sleeping sickness. In about 5 per cent. of the flies fed on infected blood, the trypanosomes ingested go through a complicated developmental cycle, multiplying in the fly's digestive tract, and, after a time, migrating forwards and passing into the salivary glands, where they establish themselves, multiplying constantly so long as the fly lives. It has been proposed to exterminate the wild game on a large scale in order to remove this "reservoir" of the disease, but Prof. Minchin considered it to be doubtful whether this would bring about the desired effect. Destruction of the game would remove only a portion of the reservoir, for ruminants generally, including domestic stock, can harbour the trypanosomes in question, and, further, such destruction, by removing the natural food of the flies, might cause the flies to move closer to human habitations, and hence increase the transmission of the disease among human beings and domestic stock. He hoped, therefore, that if game is to be destroyed, this will be done in limited areas only, until more accurate knowledge of the results has been acquired. He suggested that reduction of tsetse-flies might be effected, (1) by protecting the wild gallinaceous birds, by introducing species