

ξ Geminorum, and its calculated magnitude is 15.0. The observation by Dr. Wolf on March 19 showed the actual brightness to be about one magnitude fainter than the ephemeris value (*Astronomische Nachrichten*, No. 4485).

PROPER MOTIONS IN SUN-SPOT GROUPS.—Dr. W. Brunner, Zurich, has an important and interesting paper in No. 3, vol. xl., of the *Memorie di Astrofisica ed Astronomia*, in which he discusses the relations existing between the proper motions observed in spot-groups and the solar activity producing the groups. The discussion is based on the examination of Wolfer's Zurich drawings for the period 1887-1905, and the spots born on the visible hemisphere are considered separately from those which, having first broken out on the invisible hemisphere, are first seen at the eastern limb; only the proper motions in longitude are discussed, and, in general, these are in the sense which makes the various members of the group diverge *inter se*.

The general conclusions, in brief, are that this divergence is not accidental, but is connected with the phase of development of the group. In the early stages of development the diverging tendency is strongly marked, but it rapidly wanes until it disappears seven or eight days after the first outbreak, unless a recrudescence of activity takes place, when the same phenomena reappear. Taking as positive the proper motion, which is in the direction of the diurnal motion, it is found that the groups in which negative motion is dominant are more numerous at the epochs of maxima in the undecennial period. But it is found that the magnitude of the proper motion is independent of the phase of the solar activity and also of the heliographic latitude. As naturally follows from the first conclusion, those spots born on the invisible hemisphere, being several days old when first seen, exhibit the proper motions in a less marked degree than those of which the primary phases of development are observed.

THE RATIO BETWEEN THE DIAMETER OF A PHOTOGRAPHIC IMAGE AND EXPOSURE.—In the measurement of photographic magnitudes by measuring the diameter of the star images it is assumed, in the formula usually employed, that the diameter is proportional to the square of the intensity of the light. Not agreeing with the principle of this assumption, Dr. Kenneth Mees recently made some experiments, under laboratory conditions, in which he produced easily measurable images with greatly differing exposures. He finds that the diameter of the small image of a fine slit or point is proportional to the logarithm of the exposure given, and assuming that increase of exposure is effectively equivalent to increase of intensity, this would mean that the diameter of a star image should be proportional to the logarithm of the intensity of the light-source rather than to its square. Dr. Mees suggests that the astronomical equation is based upon a modification of the true law dependent on the conditions of the formation of images in telescopes (*Astrophysical Journal*, vol. xxxiii., No. 1).

PHOTOGRAPHIC MEASURES OF STELLAR TEMPERATURES AND DIAMETERS.—In No. 4483 of the *Astronomische Nachrichten* Herr Adolph Hnatek publishes an interesting paper on a photospectroscopic method of determining the effective temperatures and relative diameters of stars. The photographic intensities of various parts of the spectrum are compared, and from the resulting data a temperature scale is formed. This ranges from 4000° for η Pegasi to 11600 for Algol, eight stars being considered, and agrees fairly well with the Potsdam values where comparable. It also places the eight stars in the progressive order shown by the Kensington temperature curve. The comparison of diameters shows that α Lyræ is 6.1 greater than the sun, whilst α Aquilæ is but 1.9 times greater.

CANADIAN OBSERVER'S HANDBOOK FOR 1911.—An excellent handbook for amateur and other astronomers is issued by the Royal Astronomical Society of Canada, and edited by Mr. C. A. Chant. The first two numbers were published in 1907 and 1908, and then the experiment of publishing the information in instalments in the society's *Journal* was tried. This proved unsatisfactory, and the former custom of having a separate volume has been reverted to. The book should prove of invaluable assistance to the rapidly growing body of amateur astronomers in the Dominion, and it is hoped to publish the volume for 1912 before the beginning of the new year.

NO. 2166, VOL. 86]

THE IMPERIAL EDUCATION CONFERENCE.

THE public sessions of the first conference of delegates summoned by the British Government to represent the Overseas Dominions were held in London on four afternoons, April 25-28. The President of the Board of Education welcomed the representatives, and presided at each meeting. Administrative problems were, it is believed, discussed at the morning sessions, to which only the official delegates were invited. The proceedings at these morning meetings were private, the conference agreeing at its first meeting that, in order not to hamper discussion, no report should be made until the close of the conference; when an official summary will be issued. At the time of writing, all that can be said with certainty is that the private sessions are being prolonged into the week following the public meetings. Admission to the afternoon discussions was by tickets issued to representative administrators and teachers. The attendance of the overseas delegates in the afternoons was not large. The programme drawn up by the Board of Education included papers on the teaching of geography, history and arithmetic, manual work, the organisation of secondary education in Scotland, engineering, and vocational education. All the papers were by well-known British workers in the educational field.

Chairman's Prologue.

Mr. Runciman said that the conference originated from requests made in 1907 to the Imperial Government to summon an Imperial Conference to deal purely with educational affairs. ("The Federal Conference on Education," held in 1907, was initiated by the League of the Empire, and was unofficial and highly successful.) Since 1907 the Department of Special Inquiries and Reports had been in direct communication with the Dominions, India, and the Colonies, there had been improved circulation of reports, and memoranda had been compiled during the four years which would be issued shortly. Assistance was being given every day in the week in the selection of teachers, e.g. for Alberta, Australia, and South Africa. They had also arranged through the Department that the privileges now given to the teachers in the United Kingdom in French and German schools should be extended to teachers throughout the Empire. Assistance was continually being given to visiting officials. A library of considerable dimensions had grown up containing carefully selected and organised contributions from all over the world. The problems to be faced here and overseas were very similar. There were the difficulties of the supply and training of teachers, the problem of giving freedom of organisation while retaining control of finance. All the subjects of pedagogy were of universal interest. They had to deal with the puzzle of the classification of schools, with rural, urban, and technical problems. The United Kingdom might learn from Canada, Canada from Australia, Australia from South Africa, and so forth. They wished to bring to the common stock the intellectual forces of the whole Empire, and feed the very root of Imperial strength. The Empire was a practical working concern, not merely a sentimental vision, and they were met to discuss practical questions.

Imperial History and Geography.

Mr. H. J. Mackinder, M.P., read a paper on the teaching of geography from an imperial point of view, and the use which could and should be made of visual instruction. He asked for attention to a mode of teaching which might have peculiar value in the consolidation of the Empire, a work in which the part of the teacher must be as great as that of the statesman. The Empire existed by the free consent of the peoples, and this consent must be based on a reasonable agreement in regard to aims and sympathy in regard to difficulties. It was the part of the teacher to exorcise the devils of ignorance and local prejudice. Geography should be taught as a special mode of thought—a special form of visualisation which he would not describe otherwise than as "thinking geographically." He went on to describe the work of the Visual Instruction Committee, and concluded by urging that geography should be the chief outlook subject in our school curriculum, and should be taught by methods which demand visualisation. We should aim at educating the citizens of the many parts of the British Empire to

sympathise with one another and to understand Imperial problems by teaching geography visually, not only from the point of view of the Homeland, but also of the Empire. Among many other excellent aids to such teaching, there was now becoming available an apparatus of illustrated lectures prepared under the authority of the Visual Instruction Committee of the Colonial Office. Prof. H. E. Egerton, Beit professor of colonial history (Oxford), followed with a paper on some aspects of the teaching of imperial history. He dealt mainly with three subjects:—(1) the mercantile system; (2) the evolution of Colonial self-government; (3) the development of the Federal principle. The mercantile system assumed colonies to be plantations, *colonies d'exploitation*; what was to happen when they proved *colonies de peuplement*, settlements of men? The idea of a self-sufficing Empire postulated a general controlling Parliament; what was to happen when this Parliament represented the selfish interests of one particular portion of the Empire? Round the single principle of the mercantile system they had all the causes which led to the development and dissolution of the first English colonial empire. They would all admit that the evolution of Colonial self-government was a subject which, on a smaller scale and with simpler material, would bring out the underlying principles of the British Constitution. Referring to the Federal principle, Prof. Egerton declared that a more systematic organism must be found for the disjointed portions of the British Empire. For such an undertaking there could be no better preparation than the study of what has been done by our kinsfolk in the past.

The discussion was well maintained by well-known English teachers, but unfortunately no Colonial delegate spoke.

Arithmetic in Elementary Schools.

At the second public session Mr. Marshall Jackman read a paper on experimental work in connection with the teaching of arithmetic in elementary schools. The word "experimental" was justified by the fact that the methods employed were a departure from the Code at the time, ten years ago, when Mr. Jackman adopted the principles on which he has successfully worked ever since. These principles may be inferred from the facts that (1) the concentric method is adopted; (2) no set method of solving a problem is insisted upon; (3) the terms used in the problems are familiar to the children and the problems dealt with transactions within their grasp; (4) no problem is set which cannot be solved mentally. He claimed that, in addition to securing the teaching of arithmetic on more rational lines, the methods pursued set free more than eighty minutes a week in the three lower classes of the school; this time was devoted to reading with most beneficial results. Mr. J. V. Thompson (Fiji) said he had attempted to teach arithmetic to young Fijian chiefs in a language not their own. The Fijians delighted in exercise books, and the native master liked to set his class an enormous division sum, knowing that he would then have a most restful half-hour. He would take Mr. Jackman's scheme with him and use it.

Practical Education in Elementary Schools.

Mr. J. G. Legge, Liverpool Director of Education, read a paper on the above subject, and directed attention to the influence of the changed social conditions brought about by the industrial revolution. Of old, education was as much the work of the home as of the school. But the home side had been fading away, and despairing—perhaps too soon—of ever recovering it, we were rushing in where angels might hesitate with proposals for feeding and clothing, medically treating, and apprenticing. After the child is officially taught, officially fed, officially clothed, and officially placed in employment, there but remains the prime condition, to which eugenics is already pointing the finger, that he shall be officially begotten. As a result of a study of educational history, we discovered that manipulative exercises were not mere counter-irritants to book-work, but the right method of applying the universally accepted principles of Pestalozzi. Recently, experimental psychology has taught us that hand training *must* precede trade training if dexterity is to mature in perfection. Henceforward we may base our claim that manipulative exercises shall find a place in our elementary-school curri-

cula, for six reasons, viz.:—(1) to develop centres in the brain; (2) to develop manual dexterity at the age when it must be developed if it is to reach the pitch it should in maturer years; (3) to afford scope for self-expression; (4) to make school subjects more real to the child and to bring in the third dimension; (5) to keep the child in touch with its environment; (6) to give the child something to do which it recognises as definitely useful, and thereby to implant the germ of the idea of usefulness, the fruit of which is social service. Variety of schemes will be necessary; but in any case the limit of the manual side is the point at which it ceases to develop the all-round, intellectual as well as physical, development of the child. By manual work a boy is taught to think clearly towards an end believed by him to be useful. The child should make something for its own use or the use of its home. In a slum school a boy should learn to mend his own breeches, socks, or boots—for educational reasons.

Secondary Schools in Scotland.

Mr. J. Strong described the development of the organisation of secondary education since the passing of the Act of 1872. By control of the leaving certificate examination and virtual control of grants, the Scotch Education Department had a great hold on the secondary school. Curricula, buildings, and the qualifications of teachers were subject to the approval of the Department. A virtual register of teachers had been made, and a high standard fixed for training. To the Department was entrusted the administration of the teachers' superannuation scheme of the 1908 Act, which applies to secondary as well as elementary teachers. Mr. Strong explained the classification of schools and the system of certificates and transition to higher schools, university, or vocations in a lucid manner. Mr. Board (New South Wales) said that in New South Wales they had followed very closely on the lines of Scotland, with the important exception that they had no local control. Centralisation had some disadvantages, but on the whole the gain was greater than the loss. They would hesitate before dividing into such small areas as in Scotland.

Engineering and Technical Education.

Dr. J. A. Ewing, Director of Naval Education, said that the ideal training for the engineer was one which comprised, in addition to means of getting experience, a properly organised course of study in the relevant sciences taught with reference to their practical application. Science helped to determine everything the engineer did. After explaining some features in the organisation of leading engineering schools, he said the engineering professor ought to encourage his better senior students to undertake research, which was vital to the progress of engineering science, and was one of the duties of the college. Experience had proved that the use of tools could be so taught in a college workshop as to have solid professional value. He did not suggest that such an element in the training of engineers could entirely take the place of practical work done on a larger scale under commercial conditions, but much of what apprenticeship was designed to teach could be taught more effectively that way and in less time.

Mr. J. H. Reynolds (Manchester) read a paper on higher technical instruction. In his opinion, no reform in England was more urgent than that secondary schools should receive State recognition, be relieved from external examinations, and have their leaving certificates accepted by higher institutions as giving complete and satisfactory evidence of fitness to enter upon a further stage of advanced study. In 1869 this country was a generation behind Germany, and it was hardly less so to-day. In the United Kingdom the enrolments of students in higher institutions possibly reached 40,000; but in the German Empire the total enrolments were nearly 74,000, whilst the age of entrance and the state of preparation required was admittedly much beyond that prevailing in this country. The doom of the nation was surely set unless they rose up and provided for the people the means of the highest education, alike in their best interests as human beings and as needful for the maintenance and development of her trade and industry.

The discussion was maintained by several men of

eminence in English engineering education, but no Colonial representative took part.

Trade Schools and Continuation Schools.

Mr. R. Blair (London Education Officer) read a paper on the recent development of day schools for boys or girls following immediately on the close of the elementary-school career, the schools being so closely associated with the industry for which they are preparing their students that the preparation is a substitute for the earlier years of apprenticeship. He directed attention to the extent and peculiarities of London's needs, and his valuable remarks were supported by a large amount of useful statistics appended to his paper. He selected for detailed description the work of the Brixton School of Building. The paper is one to be read in full and kept for reference; we must content ourselves with noting that Mr. Blair attributes the success of the schools to the thoroughness of the investigation made into the conditions of a trade before establishing a school or class, and to the appointment of a consultative committee of experts. The striking success of the girls' schools was due to the high standard of devotion and enthusiasm of the staff.

Mr. Graham Balfour (Staffordshire) showed how complicated and varied were the difficulties in organising continuation schools, and the need for resourcefulness and judgment in dealing with each individual locality.

Mr. C. E. Bevan Brown (Christchurch, N.Z.) said that recently an Act had been passed in New Zealand allowing local authorities to make continuation classes compulsory.

A Criticism and a Hope.

Had the papers and discussions been the British part of proceedings to which the Overseas Dominions had contributed a similar share, we should feel that these conferences had made a good beginning. It is to be hoped that when the report of the private sessions appears it will reveal the fact of a useful interchange of experience and ideas between the delegates of the various parts of the Empire. So far as the public sessions are concerned, it cannot be said that a programme consisting solely of contributions from the United Kingdom fulfils even approximately the aspirations with which we regard an Imperial Education Conference. It has been stated in the daily Press that the Colonial Governments were not invited to make suggestions for the business of the conference. In face of the fact that the Board of Education had four years for preparation, this statement appears to us incredible, or, if credible, then discreditable. We hope that one result of the private sessions will be to evolve a method by which the various parts of the Empire can act in concert, so as to carry out in future those aims of the conference which were stated with clear insight by the President of the Board in his opening address.

G. F. D.

BIRD NOTES.

TO the April issue of *British Birds*, Messrs. Witherby and Alexander contribute an account of the visitation of crossbills to the British Isles in 1909. The birds made their appearance on Fair Isle on June 23, and before the end of that month were seen in the Shetlands, Orkneys, Outer Hebrides, Merionethshire, and Durham; while in July they were observed all over England except the extreme south-west, as well as in a number of places in Wales, and a few scattered localities in Ireland. The latest record of their being seen at sea was in the Shetlands early in August. The first nest recorded was taken on January 12, 1910, near Thetford, while the latest nests were seen respectively in Sussex and Kent on May 25, the height of the breeding season being in March and April. Nests were recorded from thirteen English counties. The dates of departure of the birds varied locally; in some districts all had gone by the end of 1909, in others there was little or no diminution in the numbers till well on in the following year, but, as a whole, the records indicate that the main departure took place either in February or in April and May. From a second paper in the same issue, it appears, however, that a few crossbills remained

NO. 2166, VOL. 86]

to breed in certain localities in the spring of the present year. A note is added in the latter paper on the thin-beaked Scots crossbill (*Loxia curvirostra scotica*), which breeds regularly over a considerable area in Scotland.

The *Irish Times* of March 31, as quoted in *The Field* of April 8, reports an enormous influx of migratory birds into Ireland, especially the south-eastern districts, during the last week of March. In New Ross on the night of March 29 the town was practically invaded by a vast swarm of starlings, while in Kilkenny on the same day the streets were strewn with the dead bodies of various species, including curlew, while much the same thing happened in Carlow on March 30. There can be little doubt that the influx and subsequent destruction were in some way connected with the abnormally cold weather prevalent at the time.

In *The Emu* for January, Mr. A. J. Cambell describes, under the name of *Erythrotriorchis rufotibia*, a new species of so-called Australasian goshawk, characterised by the rich rufous or chestnut brown of the shank of the leg. This bird inhabits north-western Australia; the other members of the genus are *E. radiatus* of eastern, northern, and central Australia, and *E. doriae* of south-eastern Papua.

To *The Selborne Magazine* for April, Mr. A. H. Macpherson contributes notes on London birds in 1910, in which reference is made to the visit of a great crested grebe to the Serpentine on January 29. To illustrate the article on account of this casual visit with a figure of a nesting grebe, is, perhaps, a little misleading.

Mr. V. Franz gives, in *Himmel und Erde* for March, an illustrated account of the bird-observing station at Rossitten, with figures of the modes of ringing birds' feet, and notes on some of the results which have been obtained by the system of bird-marking.

From a paper by Mr. Grinnell issued in vol. vii., No. 4, of the Zoological Publications of the University of California, it appears that the Californian linnnet (*Carpodacus frontalis*) was introduced into the Hawaiian Islands about forty years ago, and that the males of the race now established there differ from the normal form of their continental brethren by the replacement of the crimson head and breast colouring by yellow or orange. This pale colouring of the cock Hawaiian linnnet is paralleled sporadically by the linnnet of the mainland in a wild state, and constantly in birds kept in confinement. As the change in the Hawaiian bird does not appear to be due to differences in temperature or humidity, change of food, or a diminution in the number of foes, it appears to be connected with deep-seated factors, one of which may be insularity of habitat. "A deficiency in capacity, of the germ, for the formation of the appropriate enzyme may have been intensified through close breeding until the condition was reached where the amount of enzyme produced in the feather anlage is insufficient to carry on oxidation of tyrosin beyond the yellow, or, at farthest, the orange stage.

R. L.

OPTICALLY ACTIVE ALCOHOLS.

THE January issue of the Chemical Society's Journal contains an important paper by Dr. R. H. Pickard and Mr. J. Kenyon on the "Dependence of Rotatory Power on Chemical Constitution." Hitherto much of the work that has been done in order to find out the influence on optical rotatory power of temperature, solvent, concentration, and chemical constitution has been based upon the observations of complex compounds, such as nicotine and derivatives of various complex acids and bases. These substances have the advantage that they can be purchased as natural products in optically active forms, but the complexity of their structure has rendered it almost impossible to draw any general conclusions from the vast array of facts that have now been accumulated. In the research now described the authors have endeavoured to reduce the problem to its simplest possible form by studying the properties of the series of secondary alcohols, R.HOH.R., of which the simplest member is secondary butyl alcohol, CH₃.CHOH.CH₂.CH₃.

Up to the present no fewer than fourteen of these alcohols have been prepared, and separated into their