

tumuli which in all probability represent more recent additions to the original scheme of observation, as we have found at Stenness; and show that Trowlesworthy was for long one of the chief centres of worship on Dartmoor. Their azimuths are S. 64° E. and S. 49° W., dealing, therefore, with the May year sunrises in November and February and the solstitial sunset in December. It is probable that, as at the Hurlers, tumuli were used instead of stones not earlier than 1900 B.C.

Stalldon Moor (lat. 50° 27' 45") I have already incidentally referred to. The azimuth of the stone row as it leaves the circle, *not* from its centre as I read the 6-inch map, is N. 3° E.; as the azimuth gradually increases for a time, we may be dealing with Arcturus, but local observation is necessary.

The differences between the Cornish and Dartmoor monuments give much food for thought, and it is to be hoped that they will be carefully studied by future students of orientation, as so many questions are suggested. I will refer to some of them.

(1) Are the avenues, chiefly consisting of two rows of stones, a reflection of the sphinx avenues of Egypt? and, if so, how can the intensification of them on Dartmoor be explained?

(2) Was there a double worship going on in the avenues and the circles at the same time? if not, why were the former not aligned on the circles? On a dead level, of course, if the avenues were aligned on the centre of the circle towards the rising or setting of the sun or a star, the procession in the *via sacra* would block the view of those in the circle. We have the avenue at Stonehenge undoubtedly aligned on the centre of the circle, but there the naos was on an eminence, so that the procession in the avenue was always below the level of the horizon, and so did not block the view.

(3) Do all the cairns and cists in the avenues represent later additions, so late, indeed, that they may have been added after the avenues had ceased to be used for ceremonial purposes? The cairn at nearly the central point of the S. avenue at Merrivale was certainly not there as a part of the structure when the avenue was first used as a *via sacra* for observing the rising of the Pleiades. I have always held that these ancient temples, and even their attendant long and chambered barrows, were for the living and not for the dead, and this view has been strengthened by what I have observed on Dartmoor.

There was good reason for burials after the sacred nature of the spot had been established, and they may have taken place at any time since; the most probable time being after 1000 B.C. up to a date as recent as archaeologists may consider probable.

Mr. Worth, whose long labours on the Dartmoor avenues give such importance to his opinions, objects to the astronomical use of those avenues because there are so many of them; he informs me that he knows of 50; I think this objection may be considered less valid if the avenues show that they were dedicated to different sacred uses at different times of the year. For instance, Challacombe is not a duplicate of Merrivale; one is solstitial, the other deals with the May year, and a complete examination of them—I have only worked on the fringe—may show other differences having the same bearing.

In favour of the astronomical view it must be borne in mind that the results obtained in Devon and Cornwall are remarkably similar, and the dates are roughly the same. Among the whole host of heaven from which objectors urge it is free for me to select any star I choose, at present only six stars have been considered, two of which were certainly used afterwards at Athens; and these six stars are shown by

nothing more recondite than an inspection of a precessional globe to have been precisely the stars, the "morning stars," wanted by the priest-astronomers who wished to be prepared for the instant of sunrise at the critical points of the May or solstitial year.

NORMAN LOCKYER.

THE BOTANICAL CONGRESS AT VIENNA.

THE International Botanical Congress, held at Vienna on June 11-18, was an impressive demonstration of the activity of botany as a science, and of the enthusiasm of its adherents. Vienna is not the most central town for a meeting-place, but, nevertheless, more than six hundred botanists, men and women, representing nearly all the important, and many of the less important, botanical institutions of the world, met together there. As might have been expected, the central European element predominated, but there were a goodly number of Americans representing the southern and far western as well as the eastern States, while from the Far East came a deputation of two Chinese.

On the first day of the Congress, members were invited to be present at the opening of the Botanical Exhibition, which was held in the orangery of the historic Palace of Schönbrunn, just outside the town. The exhibition was an interesting one, and gave a good idea of the present position of botany from a teaching as well as from a more general point of view. There were fine series of diagrams, and coloured photographic lantern-slides of microscopic preparations, flowers, plant associations, and other objects; living cultures of Algæ; apparatus of all kinds; and some beautiful photographs of tropical vegetation in Brazil, Malaya, and elsewhere. A remarkable feature was the unique specimen of *Fockea capensis*, a member of the family Asclepiadaceæ, which, originally brought from the Cape, still remains the only known specimen. The plant has a hard, woody rhizome, as big as a child's head, from which in the rainy season numerous shoots are developed. It was figured and described by Jacquin in his "Fragmenta" at the beginning of the last century.

The Botanic Garden of Schönbrunn brings to mind, at any rate for the systematic botanist, the name of Jacquin, and some of his manuscript and original drawings were an important feature of the exhibition, and a subject of envious admiration of certain American botanists; we in London are proud to possess some of Jacquin's work, in the form of botanical letters to Sir Joseph Banks's librarian, Dryander, copiously illustrated with exquisitely delicate drawings. His herbarium, consisting largely of plants cultivated in the Vienna and Schönbrunn gardens, was bought by Banks, and is now in the general collection at the Natural History Museum. Nicolas Joseph Jacquin was professor of chemistry and botany at Vienna from 1768-96; later in the week of the congress a bust was unveiled in his honour in the Fest-Saale of the university. To quote from Prof. Wiesner's appreciation at the ceremony:—"His broad horizon and great powers of organisation were shown in the fact that, in the second half of the eighteenth century, no scientific, and especially no natural scientific, undertaking was started in which Jacquin did not take an important part. He embodied the ideal of the academic teacher." On the same occasion was also unveiled the bust of Jan Ingenhousz (1730-99), a Netherlander by birth, who spent the greater part of his working life in Vienna. Physician to the Empress Maria Theresa and the Emperor Joseph II., botanists know him best as one of the earliest workers in the sphere of plant

physiology; to quote the inscription beneath the bust, "Qua ratione plantae aluntur, primus conspexit."

On the evening of June 11, the members met in the Hall of the "Kaufmännischer Verein," when Prof. Julius Wiesner, the well-known head of the Institute of Plant Physiology, welcomed the botanists of the world to the home of Clusius, Jacquin and Unger; and the botanists renewed old friendships or made new ones over the Abendskarte and the inevitable *Bier*. At the official opening, in the great festal hall of the university, on Monday morning, greetings were given by the famous geologist and president of the Academy of Sciences, Prof. Eduard Suess, Prof. Wiesner, and others.

The general programme included lectures or papers by well-known men on topics with which their names have become associated. Thus Prof. Goebel discussed the subject of "Regeneration," and Dr. D. H. Scott gave an account of the present state of our knowledge of the Pteridosperms—the fern-like seed-plants of the Carboniferous flora—the illustration of which, by actual specimens, in the form of lantern-slides, was especially appreciated.

The development of the European flora since Tertiary times formed the subject of a group of papers. Prof. Engler, in stating the general problems, referred to the part played by man and his works, especially during the last century. He pleaded for the preservation of such plant-formations and plant-societies as throw a light on the past history of the European flora, citing as an example the National Park in the United States of North America. In the same connection Dr. Lauterbonn asked the help of the congress towards securing the preservation of part of the primitive forests of Bosnia, which, he stated, were in imminent danger of destruction. An interesting paper on the history of the development of the flora of the North German "Tief-land" was read by Prof. Weber. Covered by the sea since Oligocene times, this area became dry land during later Pliocene times, and the earliest vegetation of this period is remarkable for the occurrence of the vine, which is now generally regarded as an introduced plant in Central Europe. The plant-life of this area was, during the diluvial period, repeatedly crushed out of existence by land-ice, the intervening periods of vegetation being remarkable for the appearance of plants indicating a milder climate than do those composing the existing flora. Another subject, taken up by Dr. Molisch and Prof. Hueppe, of Prague, was the present state of our knowledge of CO₂-assimilation. Mention should also be made of a very fine series of photographic slides with which Dr. Hochreutiner, who has just returned from a prolonged stay in Buitenzorg, illustrated his account of a botanical institute in the tropics.

But for many of the members the most important work came in the afternoon, a time devoted by the majority to relaxation, which often took the form of excursions to places of botanical interest within easy reach of the town. Meanwhile the conference on botanical nomenclature sat in the lecture hall of the Botanic Gardens. At the entrance to the gardens is the former residence of the director, and we passed the window of the room in which Kerner wrote most of the well-known "Pflanzenleben." Kerner's successor, Prof. von Wettstein, is lodged in the new Botanical Institute—a large and well-arranged building. The arrangement of the gardens is mainly a geographical one—in one bed a collection of Himalayan plants, in another plants from the Cape, and so on. The result, though doubtless helpful to the student, illustrates the limitations to which such an arrangement is subject in any one climate. The work of the conference was to discuss the recommendations of the

commission on nomenclature appointed by the International Congress of Paris in 1900. These were embodied in the *Texte synoptique*, a formidable quarto volume in which the *rapporteur général*, Dr. Briquet, had collated the numerous emendations and modifications of the original code of De Candolle, which during the last five years have been submitted by various societies, institutions, groups of botanists, and individuals. The numerous suggestions had previously been voted on seriatim by the members of the commission, and from the results of the voting certain recommendations were drawn up by Dr. Briquet for the consideration of the members of the conference, about a hundred and fifty of whom were present. The new American school was strongly represented by Dr. Britton, Mr. Coville, and others, while Dr. Robinson, of Harvard, represented the more moderate school which has worked on lines similar to those adopted in England. The Berlin school was present in force, and most of the Continental botanical societies and institutions were represented. As the president, Prof. Flahault, remarked, in answer to Dr. Otto Kuntze's protest against an "incompetent congress," it would be difficult to bring together a body of botanists more competent to discuss botanical nomenclature, and, one may add, more seemingly anxious to arrive at some solution of the various problems, and some agreement on the points at issue. From three to seven or eight o'clock each afternoon the members steadily worked through the *Texte*.

It was decided at the start to refer the question of cellular cryptogams and fossils to separate commissions, which should report to the next congress. The present conference, therefore, dealt only with flowering plants and vascular cryptogams. The results will in due course be arranged and published in English, French, and German. Brief reference may be made to the more important. The code of laws approved by the conference is based on that of De Candolle, and will consist of rules and recommendations, the difference between the two sets being expressed thus:—"A name contrary to a rule cannot be kept up; a name contrary to a recommendation is not a model for imitation but cannot be rejected." The most important result was the passing by an overwhelming majority of a list of generic names, which from long established usage are to be retained, though on the principle of priority they should be rejected. There was considerable discussion on the question as to the trivial name to be adopted when a plant is transferred from one genus to another, or from subspecific or varietal to specific rank. English, and a minority of American, botanists have followed the so-called "Kew rule" of adopting the first correct binomial, while the majority of American and most Continental botanists, in common with zoologists, adopt the earliest trivial name. On this point a compromise was effected as follows:—When a change of systematic position without change of rank occurs (such as the transference of a species from one genus to another), the earliest epithet is to be used; when the rank changes (as in the elevation of a variety to specific rank), the original epithet is not insisted on. The conference was also strongly opposed to any change in a name once given, though for various reasons it might be considered inappropriate or even misleading. A name is a name, and must stand.

An account of the congress would be incomplete without some reference to the nightly meetings for social intercourse which were arranged by the organising committee on typical Continental lines. Members will carry away very pleasant memories of the Rathaus-Keller, the Prater, and the Brauerei garden out at Hutteldorf. For, after all, the great object of a

Congress is the meeting together and getting to know one's fellow-workers; and an expression of thanks is due to the organising committee under the joint presidentship of Profs. Wiesner and von Wettstein, with Dr. Zahlbruckner as the energetic secretary, to Prof. Flahault, the firm and genial president of the conference on nomenclature, and finally to Dr. Briquet, whose name must always be associated with the latest attempt to solve the vexed question of plant-nomenclature.

At the final meeting, in response to an invitation from the Belgian Government voiced by Prof. Errera, Brussels was selected as the place of meeting for the third congress, which will be held in 1910.

A. B. RENDLE.

ENTRANCE EXAMINATION TO THE INDIAN FOREST SERVICE.

ON May 11 the Secretary of State for India issued the regulations for the forthcoming entrance examinations for the Indian Forest Service. Amongst the features of these regulations two are of considerable importance.

The age limit is raised to twenty-one years on January 1 preceding the examination, so that the average B.A. who graduates usually between twenty-one and twenty-two may compete. The second point of interest is the schedule of the subjects in which he is to be examined.

According to the regulations given in the East India (Forest Service) Blue-book, Cd. 2523, the subjects in which the candidates are to be tested are four—chemistry, physics, botany, and zoology—and the schedules imply that the knowledge which the candidate is expected to exhibit is of a very limited description. Speaking roughly, the examination will be harder than the preliminary scientific examination which every candidate for a medical degree is obliged to take, but not much harder. Medical students generally pass their preliminary scientific examination during their first year, though there are cases in which they pass it while still at school. The Indian forestry students may pass their entrance examination in their third or fourth year. The Blue-book stated that each candidate must qualify in all four subjects, but for some reason or another—and probably because the entry under the new regulations is small—the Secretary of State for India has now still further lightened a very elementary examination, and is now advertising in our columns that zoology is optional. Thus men, who may be graduates, will be admitted into a great public service on an examination which comprises but three out of the ordinary four subjects which candidates for medical degrees normally pass in their first year, and judging by the schedules the amount in each subject to be “got up” is little more than in the preliminary examination for an M.B. degree.

When we remember that in the Indian Civil Service examination the standard of the subjects is that of an honours examination, and that a candidate takes not three subjects, but eight, nine, ten, or more, it is obvious that the Secretary of State is trying to recruit the forest officers from men of a markedly inferior intellectual range, and the strictures which were passed by Sir George King on the Indian foresters at the Dover meeting of the British Association will probably need repeating a few years hence.

The schedules are well adapted for an elementary pass or plough examination, but are ill adapted for a competitive examination. It will be very difficult, if not impossible, to select the best candidates competing in an examination carried on on these lines.

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NOTES.

AN important step in the direction of the adoption by this country of a decimal system of weights and measures has been taken by the Board of Trade. In reply to a resolution sent to the Board of Trade by the secretary of the Association of Chambers of Commerce, in which the Board was asked to authorise weights of 20 lb., 10 lb., and 5 lb. as aliquot parts of the cental, Lord Salisbury has written:—“With reference to your letter of March 14 last, in which you suggest that new denominations of weights of 20 lb., 10 lb., and 5 lb. should be legalised for use in trade, the Board of Trade have given careful consideration to the representations which have been made, and they are prepared to assent to the application. Steps will, therefore, be taken for the preparation of standards of the same octagonal form as the present 50 lb. weight.” The chambers consider that this concession will save time, labour, and expense, as the 50 lb. weight has done already.

COMMANDER PEARY sailed on Sunday last to make a further attempt to reach the North Pole. Before leaving, he communicated various particulars respecting his expedition to Reuter's Agency. His plan is based upon the Smith Sound, or “American” route to the Pole, and his object is to force his ship to a base within 500 miles of the Pole itself, and then to sledge across the Polar pack. The Arctic ship *Roosevelt*, which has been specially built for this expedition, has been constructed so as to withstand the heavy ice pressure, and is so shaped that the pressure of the ice pack will have the effect of raising the vessel out of the water. The ship will carry a wireless telegraphic outfit, which, with one or two relay stations in Greenland, will keep her in communication with the permanent telegraph station at Chateau Bay, Labrador, and thence by existing lines with New York. By the same means communication with the expedition will be possible, at least for a portion of the distance, when in February next the sledge party leaves the *Roosevelt* for the northern dash. The ship will carry two years' supplies. With regard to the route to be followed, it is intended to establish a permanent sub-base at Cape Sabine, on the west coast of Smith's Sound, and, after securing the services of the necessary Eskimos, to force the vessel through Kane Basin and Kennedy and Robeson Channels to the northern coast of Grant Land or of Greenland, if the conditions should compel it, and there winter within 500 miles of the Pole. From these winter quarters a start north over the Polar pack will be made in February. The explorers will have available a probable period of five months in which to traverse the distance between their vessel and the Pole. In the event of the failure of the *Roosevelt* to force Kennedy and Robeson Channels during the first summer the dash for the Pole will have to be postponed until February, 1907.

THE seventy-third annual meeting of the British Medical Association will take place at Leicester from July 24 to 28. Addresses in medicine and surgery will be delivered respectively by Dr. H. Maudsley and Mr. C. J. Bond, and, following the precedent of last year, a popular lecture will be given (on July 28) by Prof. Wm. Stirling, who will take as his subject the phenomena of fatigue and repose.

THE Geologists' Association announces an excursion to Central Wales extending from July 24 to 29. The headquarters are to be at Llandrindod Wells.

THE first International Congress of Physiotherapy will be held at Liège from August 12 to 15 next. The questions proposed for discussion are, says the *British Medical*