

as the result of the crystallisation of igneous magmas of exceptional composition. In many cases, if not in all, the presence of these minerals in igneous rocks is the result of the solution of argillaceous material. It seems fair to conclude, from their general absence from masses of granite and other igneous rocks, that the absorption of argillaceous sediments has not taken place on any large scale. But in drawing this inference caution is necessary because, under plutonic conditions, the presence of water may lead to the formation of micas instead of them. Fused biotite gives rise to spinelle, and fused muscovite to sillimanite and corundum.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Dr. G. Sims Woodhead has been appointed professor of pathology in succession to the late Prof. Kanthack.

The Balfour studentship, of the annual value of 200*l.*, for original research in biology, especially animal morphology, has been awarded to Mr. J. Stanley Gardiner, Fellow of Gonville and Caius College, for three years from March 25, 1899. Grants from the Balfour fund of 50*l.* each have been made to Mr. J. S. Budgett, of Trinity College, in aid of his researches on the development of polypteris, and to Mr. L. A. Borradaile, of Selwyn Hostel, in aid of the expenses of his proposed journey in company with Mr. Gardiner, the Balfour student.

DR. H. E. ANNETT has been appointed demonstrator of tropical pathology in the newly-founded school of tropical diseases in Liverpool.

WE are asked to state that the offices of the National Association for the Promotion of Technical and Secondary Education have been removed from 14 Dean's Yard to 10 Queen Anne's Gate, Westminster, S. W.

AT the annual meeting of the shareholders of the Patent Nut and Bolt Company (Limited), held on Monday at Birmingham, it was resolved that the company should contribute 5000*l.* to the fund which is being raised for the establishment of a University in Birmingham.

THE London School Board have strongly protested against the application of the London County Council to the Science and Art Department to be recognised as the organisation responsible for science and art instruction in the County of London. A memorial has been drawn up and presented to the Lord President of the Council, asking him not to assent to the application of the County Council, and giving reasons why the Board should be largely represented upon whatever authority was given control over science and art instruction in London.

A COPY of the address delivered at the recent annual meeting of the Association of Technical Institutions, by Earl Spencer, has been received. In the address, the importance attached to a thorough system of technical instruction in America and Germany is pointed out, and the intimate and necessary relations which exist between technical and secondary education are mentioned. Just as it is difficult to give technical instruction without a foundation of good secondary education, so secondary education is retarded and often completely stopped by the poor education of pupils who come from the primary schools to seek it. Earl Spencer made special reference to this lack of system in educational efforts, and remarked that in order to secure sound and good technical education for the population as a whole, many defects of primary education will need to be remedied.

THE Calendar of the Department of Science and Art has been issued. As in former years, the volume contains a history and general description of the Department, with a summary of the rules, and a list of the science and art schools and classes. The total number of individual students who presented themselves for examination in science subjects of the Department in 1898 was 157,306. The six subjects in which the most students were examined are—mathematics (stages 1, 2, 3), 35,945; physiology, 24,877; inorganic chemistry, 23,966; practical plane and solid geometry, 20,238; machine construction and drawing, 18,073; building construction, 13,653. Of the subjects in which practical examinations were held, the first four are—inorganic chemistry, 15,012; magnetism and electricity, 2550; organic chemistry, 1195; sound, light and heat, 1141.

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SOCIETIES AND ACADEMIES

LONDON.

Royal Society, January 26.—“On the Structure and Affinities of Fossil Plants from the Palæozoic Rocks. III. On *Medullosa anglica*, a new Representative of the Cycadofilices.” By D. H. Scott, M.A., Ph.D., F.R.S., Hon. Keeper of the Jodrell Laboratory, Royal Gardens, Kew.

The existence of a group of fossil plants, combining in their organisation certain characters of the Ferns and the Cycads, has been recognised, of late years, by several paleobotanists. The convenient name, Cycadofilices, has recently been proposed to designate the group in question, which now includes several, somewhat heterogeneous, genera, among which *Lyginodendron*, *Heterangium*, and *Medullosa* may be mentioned.

No stem of a *Medullosa* has hitherto been recorded from this country, though specimens of *Myeloxylon*, now known to have been the petioles of *Medullosa*, are frequent in the calcareous nodules of the Lower Coal-measures.

The author has recently had the opportunity of investigating several excellent specimens of a new species of *Medullosa* from the Ganister Beds of Lancashire. These fossils are of special interest on several grounds; they are considerably more ancient than any members of the genus previously described, they are the first English specimens recorded, they are preserved in a more complete and perfect form than any others at present known, and lastly, the greater simplicity of their structure causes the essential characters of the genus to stand out with greater clearness than in the more complex species. The specimens were discovered by Mr. G. Wild and Mr. J. Lomax, in material from the Hough Hill Colliery, Stalybridge.

The species, which is very distinct from any form previously described, will be known as *Medullosa anglica*.

The most complete specimen of the stem has a mean diameter of rather more than 7 cm., including the adherent leaf-bases, which, to judge from the most perfect specimens, almost completely clothed the surface of the stem. The arrangement of the leaves was a spiral one, and in the only case where the phyllotaxis could be determined, the divergence proved to be 2/5.

In two of the specimens the external characters of the fossil are well shown. The habit of the stem, clothed with the long, almost vertical, overlapping leaf-bases, may have been not unlike that of some of the tree-ferns, such as *Alsophila procera*.

The vascular system of the stem consists of three (or locally four) steles, anastomosing and dividing at long intervals.

Each stele of *Medullosa anglica* is surrounded by a zone of secondary wood and bast, and shows the closest agreement in structure with the single stele of a *Heterangium*, so that the stem of this *Medullosa* might well be concisely described as a poly-stelic *Heterangium*.

The course of the leaf-trace bundles was followed very completely in consecutive series of transverse, and in longitudinal, sections. On becoming free the trace is a large concentric bundle; as it passes obliquely upwards through the cortex, the trace loses its secondary tissues, and undergoes repeated division into a number of smaller bundles, each of which has collateral structure. These collateral strands have in all respects the same arrangement of their elements as the well-known bundles of *Myeloxylon*.

The base of the leaf received a large number of bundles, consisting of the ultimate branches derived from the subdivision of several of the original leaf-traces. This distribution of the bundles is peculiar and unlike that in any known plants of Cycadean affinities.

The petioles branched repeatedly, the finest ramifications of the rachis having a diameter of about 1 mm. only, but retaining in essentials the “*Myeloxylon*” structure. The leaf was thus a highly compound one; the structure of the leaflets associated with the rachis, agrees well with that of the *Alethopteris* leaflets, figured by M. Renault.

The roots, never previously observed in any species of *Medullosa*, were of triarch structure, with abundant formation of secondary wood, bast, and periderm. The author is indebted to Mr. J. Butterworth and Mr. G. Wild, for specimens which have thrown important light on the connection between root and stem.

While *Medullosa* combines, in a striking manner, the characters of Ferns and Cycads, the author is not disposed to regard it as having lain very near the direct line of descent of the latter group. It is more probable, as Count Solms-