

Since the degree of concentration of the solution greatly affects the electromotive force of the metal, and since in the act of deposition of a metal from its solution the concentration of the liquid around the cathode is reduced, owing to slowness of diffusion, it follows that in electrodeposition the counter electromotive force at the cathode will vary with the rate at which metal is being deposited, and will, therefore, vary with the current-density employed. And since, moreover, the variations in electromotive force due to differences of concentration are greater for copper than for zinc, it follows that in the deposition of brass from a mixed solution of cyanides of a medium concentration in which zinc is slightly more electropositive than copper, there will be a certain density of current with which the metals will be deposited in nearly equal quantities, whilst for weaker current-densities the less electropositive metal will be deposited in excess, and for stronger current-densities the more electropositive metal will be deposited in excess.

Hence to variations in the concentration of the electrolyte near the cathode are due the departures, observed with all currents except weak ones, from the law that out of a solution of mixed metals the least electropositive is deposited first.

XIII. "On the true Fructification of the Carboniferous Calamites." By WILLIAM CRAWFORD WILLIAMSON, LL.D., F.R.S., Professor of Botany in the Owens College and the Victoria University. Received May 17, 1887.

(Abstract.)

The true systematic position of the Carboniferous Calamites has long been a debateable subject, owing to the lack of satisfactory evidence respecting the character of their fructification. Some years ago, Mr. Carruthers and the late Mr. Binney expressed their conviction that *Calamostachys Binneyana* stood in that relationship to Calamites, a conclusion which the author was unable to accept; but in 1869 he obtained a fragment of a new Cryptogamic fruit, of which he published an account in the 'Memoirs of the Literary and Philosophical Society of Manchester.' The central axis of this Strobilus presented so many details of structure hitherto seen only in Calamites as convinced the author that it was the true fructification of these plants.

Many years elapsed before a second example of this interesting fruit was discovered, but seven or eight specimens of it recently found in a nodule from near Oldham, have come into the author's possession; these examples are in a sufficiently excellent state of

preservation to enable him to illustrate almost every detail of their structure. They not only support his previous conclusions, but they supply irresistible evidence that those conclusions are correct ones. Fortunately, at least three of the Strobili have attached to them the ends of the twigs which supported them; these peduncles are indisputably Calamites of the type to which Göppert assigned the generic name of *Arthropitus*, which genus several of the French Palæontologists have long insisted upon classing with the Gymnospermous plants.

The fruit is beyond question that of a true spore-bearing Cryptogam; a fact which determines the Equisetiform affinities of the entire Calamitean group; since if any members of that group might possibly have been regarded as Gymnosperms, it certainly was those of the Arthropitean type. But of all such *possibilities* there is now an end.

XIV. "On Fossil Remains of *Echidna Ramsayi* (Ow.). Part II."

By Sir RICHARD OWEN, K.C.B., F.R.S., &c. Received May 20, 1887.

(Abstract.)

Since the transmission of the evidence of the large extinct species of *Echidna*, the subject of the paper ('Phil. Trans.,' 1884, p. 273, Plate 14), the discoverer of the specimen, Ed. P. Ramsay, Esq., F.L.S., has prosecuted his researches in the "Wellington bone and breccia caves, New South Wales," and has added to the mutilated subject of that paper an entire humerus, a large portion of the skull, the atlas vertebra, a tibia, and fragmentary evidences of other parts of the same skeleton—adding to the knowledge of a former existence in Australia of *Echidna Ramsayi*.

The edentulous condition, proportions, and conformation of the jaws, together with other characteristic modifications of this monotrematous genus, are repeated on the same magnified scale as in the mutilated arm-bone previously described and figured.

The predatory subject of the paper on *Thylacoleo carnifex* ('Phil. Trans.,' 1887) was discovered in the same cave, and exemplifies the leonine marsupial which contributed to the extinction of the larger phytophagous and monotrematous Mammals of the Australian Continent.