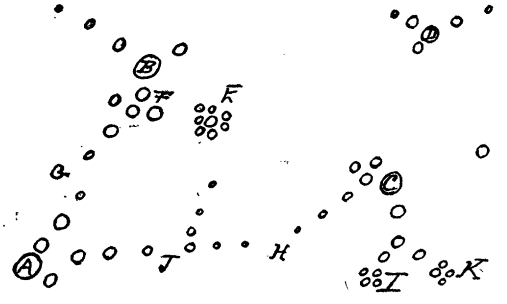
upon the more extended and critical study of plants and all their variable forms—in the field. Just as the origin of plant species does not depend solely upon hybridization, or mutation, or isolation, but upon all these agencies working together, so the salvation of botanical science does not rest in systematic botany, or in ecology, or in physiology or in morphology, but in the closer association of all these, and in more perfect cooperation between them.



The circles in this figure may be taken as representing groups of individual plants, or mountain tops, or meadows, or swamps, or islands in the sea, etc. For instance, *A*, *B* and *C* may represent well-recognized 'species' of plants where they are most at home, *i. e.*, the 'mother group.' Outlying groups in the different directions—a hundred feet or a hundred miles distant—vary from the typical form or the dominant form. At *G* two groups approach each other and hybrids may occur there, though the occurrence of these hybrids would not necessarily bring into question the utter specific distinctness of *A* and *B* unless some superficial investigator should, through lack of sufficient data, erroneously call them 'intermediate forms.' The younger group, *D*, evidently related to the others, perhaps arose by hybridization or mutation, its perpetuation perhaps due to sudden isolation. *J* may represent a descending ridge from the mountain at *A*. The groups *I* and *K* might be very different, and considered specifically distinct if judged by hurried collecting, whereas careful work up the respective cañons towards the summit or center of distribution at *C* would establish their relationship. So changed may *D* have become as to make its relations to *B* and *C*, its nearest relatives, wholly problematical, and an absence of individuals in intervening territory may prevent its reference to either except perhaps after experimental work. Evidently there may be actually in the field a thousand degrees of relationship, and in a systematic botany which shall mirror to some extent actual existing conditions, the terms 'variety' and 'race' have a scarcely intelligible place. The term 'form,' however, may well be in constant use. I do not know of any American species being charted in the above manner. Such work is rendered difficult by the superposition of hundreds of species—it will require a good eye, patience and steadfastness to a single object.

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Scientific Books.

Experimental Electrochemistry. By N. Monroe Hopkins, Ph.D., Assistant Professor of Chemistry in the George Washington University. New York, D. Van Nostrand Company. 1905.

This is an interesting book. Its author has so arranged it that it may be read previous to performing any experimental work, giving thereby an excellent picture of the historical development of electrochemistry. Any person adopting this plan will find himself in possession of many most interesting facts and helpful ideas, which are sure to prove incentives to carrying forward experimentation in this very attractive field of chemical science. Here is a thought which every student who thinks at all of electrochemistry should carefully ponder:

Electrochemical operations are essentially chemical and based upon purely chemical changes, and

it is only the man with a broad and keen insight into theoretical chemistry who can ever hope to make a successful electrochemist or electrochemical engineer.

It is in this spirit that the book is prepared and arranged. One might perhaps regret that there are not more examples for the student to carry out in the laboratory, but when it is borne in mind that a vast subject is pretty thoroughly covered and that it seems to be the aim of the author to have those who follow him in his work obtain as complete an acquaintance as possible of the whole domain of electrochemistry, the word of seeming protest or advice remains unspoken.

There are twenty chapters in the book. These occupy in all about 284 pages. In chapter I. the history and the important classic researches are considered. The theory of electrolytic dissociation is accorded two full chapters. Faraday's law is given twenty pages. There then follow chapters on the preparation of potassium chlorate, nitric acid from the atmosphere, the isolation of sodium and potassium, of aluminium and of calcium. In regard to the last the author remarks 'the electrolytic isolation of metallic calcium is far from easy.' The reviewer is disposed to differ on this point, as he has made it and had it made by students in his laboratory upon quite a large scale and with comparative ease. Further, the reviewer always encountered difficulties in attempting to cage the metal in a cylinder of platinum-wire gauze that goes over the cathode wire. The furnace used by Goodwin has proved very satisfactory and is easy to operate. For barium and strontium wholly differently constructed furnaces were found necessary.

Electric furnaces, the preparation of organic compounds, discussions on the primary cell, the secondary cell, electricity from carbon, useful pieces of apparatus and a bibliography complete the remaining chapters. The author has endeavored 'to produce a book that will prove useful both in the lecture room and in the laboratory,' and the reviewer thinks that he has succeeded.

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SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for May opens with the 'Application of de Vries's Mutation Theory to the Mollusca' by Frank C. Baker. The article deals with some fresh-water forms and the author concludes that, while the theory seems to fit in nicely in many instances, it must not be applied too hastily to animal life. W. A. Kepner presents some 'Notes on the Genus Leptophrys,' and E. A. Andrews describes in detail the 'Egg-laying of Crayfish,' the species observed being *Cambarus affinis*. Glover M. Allen notes the occurrence of 'Sowerby's Whale on the Atlantic Coast' and gives a list of the recorded occurrences of this species. The 'Fresh-water Rhizopods of Nantucket' are listed by Joseph A. Cushman. Among the 'Notes on Literature' is a large number of notes and reviews of papers on fishes.

The Museums Journal of Great Britain for April has for its leading article 'Dublin Museum. The Circulation Branch,' by the director, G. T. Plunkett. This contains a detailed account of the circulating collections in botany, zoology, industrial crafts, artistic crafts, etc., including the objects loaned, the size of the cases and methods of packing for shipment, with example of labels and explanatory leaflets. The cases are loaned for periods of seven weeks or less. From the report we learn that the collections that have a direct relation to work that may be done by students seem to be in the greatest demand. The balance of the number is occupied with reviews and notes.

The American Museum Journal for April is styled the Local-birds Number, as it contains the first instalment of 'The Birds of the Vicinity of New York City' by Frank M. Chapman, intended as a guide to the special collection of birds found within fifty miles of New York. The second instalment will appear in the July *Journal* and the whole as Guide Leaflet 22; it will be a most useful little handbook. There is a notice of 'The Twenty-fifth Anniversary of the Presidency of Mr. Jesup,' and of the publications resulting from the Jesup North Pacific Expedition, as