year 1934 were given by Dr. Donald D. Van Slyke, of the Rockefeller Institute for Medical Research, at the Johns Hopkins Medical School on April 26, 27 and 28. The titles of the lectures were "Physiology of the Amino Acids" and "Factors Controlling Urea Excretion."

DR. CHARLES R. STOCKARD, head of the department of anatomy at Cornell University Medical College, delivered on May 2 the principal address at the fifteenth annual banquet of the Beta Lambda Sigma Chapter of New York University. He spoke on "The Rôle of Internal Secretions and Inheritance in the Problem of Body Growth and Form."

DR. DEAN D. LEWIS, professor of surgery at the Johns Hopkins University and president of the American Medical Association, delivered the April lecture on the Smith-Reed-Russell series at the School of Medicine, George Washington University, on April 24, his subject being: "The Hypophysis and Its Relation to Other Glands."

DR. GEORGE B. CRESSEY, chairman of the department of geology and geography at Syracuse University, delivered the Schiff lecture at Cornell University on April 30 on "The Geographical Regions of China and their Inhabitants." In the afternoon he spoke before a geological seminar on "The Distribution and Source of Chinese Loess."

THE annual luncheon meeting of the National Parks Association will be held at the Cosmos Club, Washington, D. C., on May 14. Dr. Cloyd Heck Marvin, president of the George Washington University and president of the association, will preside. Speeches at the luncheon have been arranged as follows: "National Parks as Factors Contributing to National Ideals," Dr. John Huston Finley, editor of *The New York Times;* "New Responsibilities," Arno B. Cammerer, director of the National Park Service; "The Primitive," Dr. John C. Merriam, president of the Carnegie Institution of Washington; "The Reorganization of the National Park Service with Special Emphasis upon the Place of the National Parks in that Scheme," Albert Atwood, writer for the *Saturday Evening Post;* "The Everglades and Ouachita," Robert Sterling Yard, editor of the National Parks Association Publications, and "Future National Park Sites," Dr. Henry B. Ward, permanent secretary of the American Association for the Advancement of Science. The luncheon will be followed after an intermission by the annual meeting of the association.

RECENT speakers before the department of geology and geography at Northwestern University have included: Dr. Joe W. Peoples on "The Geology of the Anthracite Districts, Pennsylvania"; Dr. G. F. Loughlin, geologist in charge of Metals Section, U. S. Geological Survey, on "Recent Developments at Cripple Creek"; Dr. Thos. L. Gledhill, consulting geologist, on "The Gold Belt of Ontario"; Professor Alfred S. Romer, of the University of Chicago, on "Fossil Collecting in the Karoo Desert"; Professor Carey Croneis, of the University of Chicago, on "Micropaleontology"; Dr. Gilbert H. Cady, senior geologist of the Illinois Geological Survey, on "Fundamental Research on Coal"; Dr. M. M. Leighton, chief of the Illinois Geological Survey, on "The Industrial Significance of the State Geological Survey," and Professor D. Jerome Fisher, of the University of Chicago, on "The Origin of Petroleum."

THE pressing of a gold telegraph key, connected by direct wire to the Crosley Transmitter Plant at Mason, O., by President Roosevelt on May 2 inaugurated a six-hour program dedicating WLW, the new 500,000-watt transmitter of the Crosley Radio Corporation, which will be on the air continuously from now on with the most powerful carrier wave ever transmitted through the ether. President Roosevelt, in a message to Powel Crosley, Jr., said: "I have just pressed the key to formally open Station WLW. It has been a pleasure to do this. And may I take this opportunity to congratulate you and your staff upon the inauguration of this new radio service. I feel certain that WLW will give the people of our country and those of our neighbor nations a service managed and conducted for the greater good of us all." Congratulations, including messages from Professor Albert Einstein and Guglielmo Marconi, were received from all over the United States and from abroad.

DISCUSSION

THE EXPANSION AND CONTRACTION OF CHROMATOPHORES

THE inexactness of the expressions "expansion" and "contraction" as applied to chromatophores has long been recognized and has been clearly emphasized by Sumner and Mast in a recent discussion of reasonable substitutes for these terms.[1]

What happens in an active melanophore, to take a specific example, is that at one extreme its melanin particles are spread throughout its body and its processes and at the other they are massed near its center. The method by which this translocation is accomplished is by no means clear. It is probably due in large part to the passive transportation of the pigment particles by streaming protoplasm or as a result of pressure readjustments in the semi-fluid contents of spaces with contractile walls. But it may also be due

[1] SCIENCE, Nos. 2022, 2028, 2036, 2046.

in part to the movement of the particles themselves, though this general view is not so much in favor at present. Nevertheless, it is certain that these particles exhibit Brownian movement and, were they electrically charged, more or less of their motion might in this sense be ascribed to them directly. Because of the uncertainty of this whole question it seems best to designate the various states of chromatophore pigment in as non-committal terms as possible.

Sumner's suggestion of a chromatosome, melanosome, etc., seems to me artificial, for there is really no such single body of pigment particles as these terms imply. In many melanophores, after most of the melanin particles have been drawn toward the center of the cell, groups of particles may often be seen stranded in the cell processes, showing that no such unity as is suggested in the idea of the chromatosome really exists. I am therefore not inclined to use this term and to speak of the chromatosome as expanding and contracting. I am more in favor of describing the several states of the pigment-cell in terms of its colored particles as one of dispersion of these particles or of concentration of them. In this respect I come nearer in agreement with Mast, who has suggested distribution and aggregation for the corresponding conditions. According to what I have suggested, a chromatophore might then be described as having dispersed or concentrated pigment. If, as seems probable, certain vertebrate chromatophores are provided with double innervation, the two sets of nerve-fibers may be designated as dispersing fibers and concentrating fibers. Neurohumors, if present, may be similarly designated. No writer can dictate a phraseology for another. The terms I suggest are to all intents synonyms of those proposed by Mast, but as every one knows synonyms are often very useful and if they are at the same time a means of avoiding an old difficulty, they may be doubly worth while.

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FOLIAR DETERMINATION IN ANGIOSPERMS

THE diversity of foliar structures formed during the development of the shoot in angiosperms represents a problem which has attracted considerable interest from both morphologists and physiologists in the past. The morphological view-point is well illustrated by Potonié,[1] who maintains that such vegetative organs as cotyledons, foliage leaves, cataphylls and bracts are leaf types which have all evolved from a common ancestral assimilatory leaf or "Trophophylle." The floral organs, according to this author, have developed more or less independently from a primitive type of "Sporophylle." In contrast, the physiological view-point, as typified by Klebs,[2] Pfeffer,[3] Jost[4] and Goebel[5] is primarily concerned with the influence of external and internal factors on the differentiation of the foliar anlagen of the shoot. This "causal" outlook has resulted in considerable speculation as to the inherent potentialities of foliar initials. Pfeffer (*l.c.*, p. 143), for example, holds that all foliar primordia are equipotential. Klebs (*l.c.*, pp. 4–6) likewise assumes that leaf primordia are characterized by a wide range of developmental potentialities. Klebs believes that during the development of a primordium many potentialities remain latent in favor of the realization of a dominant or "prospective" potentiality. Often, however, several potentialities may be expressed in varying degrees, resulting in organs which are intermediate in character. Goebel (*l.c.*, pp. 1603–1616), however, attempts to reconcile the morphological and physiological view-points by assuming that the plant forms but one type of leaf initial, *viz.*, the foliage-leaf primordium. Such organs as cataphylls, bracts and the floral structures result, in his view, from the transformation (*Umbildung*) of morphologically identical anlagen.

In the writer's opinion, the problem of foliar determination, as outlined above, raises many fundamental questions which warrant careful examination in the light of modern botanical technique and theory. More exact information is particularly needed as to the cytological and histogenetic processes which accompany the early stages of foliar specialization. In an effort to secure such data, a detailed study has been made of the comparative histogenesis of cataphyll and foliage leaf in *Carya Buckleyi var. arkansana,* Sarg., a species which the writer has already found suitable for morphogenetic analysis.[6] Some of the general results of this investigation seem of sufficient importance to justify a preliminary statement at this time. A detailed report will be published *in extenso* in the near future.

Clear evidence of a profoundly divergent histogenesis between cataphyll and foliage leaf appears when their respective primordia are 90–100 microns in height. This is shown in the cataphyll initial (1) by the rapid vacuolation of many cells in its median

[1] H. Potonié, "Grundlinien der Pflanzen-Morphologie," Jena, 1912.

[2] G. Klebs, *Abhandl. d. Naturforsch. Gesell. Halle,* 25: 1–162, 1903.

[3] W. Pfeffer, "The Physiology of Plants," Vol. 2. Ed. and transl. by A. J. Ewart. Oxford, 1903.

[4] L. Jost, "Pflanzenphysiologie," Bd. 2, Jena, 1923.

[5] K. Goebel, "Organographie der Pflanzen," 3 Teil, Samenpflanzen, Jena, 1932.

[6] A. S. Foster, *Am. Jour. Bot.,* 18: 864–887, 1931; *ibid.,* 19: 75–99, 1932; *ibid.,* 19: 710–728, 1932.