

Trips to the strip coal mines, deep mines and a coal washer near Pittsburg, Kansas, were arranged for members and visitors. Progress in reclaiming former strip coal land was pointed out.

Committee progress was indicated in reports at the business meeting. The committee on natural areas prepared a descriptive illustrated pamphlet on "Rock City," an area of most unusual rock formations near Minneapolis, Kansas, which the committee hopes to preserve for posterity by means of a state or national monument. The pamphlet was widely distributed, and the rock city project has attracted attention in other states. The committee on science teaching in the secondary schools, with Dr. O. W. Alm, Kansas State College, chairman, made a survey of the subject in 235 high schools in cities of first, second and third classes and prepared an extended report of their findings for publication. The membership committee reported 180 new members during the year, with 740 on the membership roll. The committee on research awards, with Dr. L. D. Wooster, chairman, made the following awards for the ensuing year: To Dr. Edwina A. Cowan, director of the Child Research Laboratory, Friends University, Wichita, \$40 from the American Association for the Advancement of Science and academy funds, for the purchase of a chronoscope to assist in her studies on constitutional types of children; to Dr. Frank C. Gates, Kansas State College, Manhattan, \$42.50 from the academy treasury for assistance in the study of the distribution of flowering plants and ferns of the state; to Dr. John Breukelman, Kansas State Teachers College, Emporia, \$32.50, which is award No. 2 of the Albert B. Reagan endowment fund for aid in his studies on the distribution of Kansas fishes; to Professor H. R. Bryson, assistant professor of entomology, Kansas State College, \$25 from the A. A. A. S. fund to pay for drawings of Elateridae of Kansas; to Dr. Mary T. Harman, professor of zoology, Kansas State College, \$42.50 from the academy fund to aid in her studies of the development of pigment in the hair and skin of guinea pigs; and to Dr. Roger C. Smith, professor of entomology, Kansas State College, \$25 from the A. A. A. S. fund to pay for photographs of grasshopper eggs. The \$75 from the A. A. A. S. was augmented by \$100 from the academy treasury, providing a total of \$207.50 for research funds for the coming year.

Dr. H. A. Zinszer, the treasurer, was designated representative to the Academy Conference at the Richmond meeting.

Possibly the outstanding accomplishment of the year was made by the Junior Academy of Science committee, which consisted of Dr. J. Ralph Wells, Kansas State Teachers College, Pittsburg, *chairman*, Miss Edith Beach, Lawrence, and J. A. Brownlee, Wichita.

They reported a total of 17 affiliated Junior Academy groups, 11 of which were organized since the last meeting. The junior academy meeting consisted of the induction of the 11 new clubs and a full afternoon of individual and group demonstrations. The Lawrence, Jr. High School group was awarded first place and will be given temporary custody of the loving cup to be bought for this recognition.

The American Association of University Professors held two sessions. Dean C. M. Correll, of Kansas State College, was chairman of the morning session at ten o'clock. Dr. C. M. Street presided at the luncheon meeting at twelve thirty. An important action written by the association was the establishment of a committee to bring about closer cooperation between the local chapters within the State of Kansas. The committee is to consist of one member from each chapter. Robert W. Conover, of Kansas State College, was appointed chairman.

The Kansas Academy inaugurated the plan last year of selecting the president a year in advance, thus giving him a preparatory year to think about his plans, aims and committees. Dr. W. H. Schoewe, professor of geology at the University of Kansas, was made president-elect last year and came to the meetings this year with a well-prepared organization plan and a list of carefully selected committee members. He initiated his term as president for the coming year at the business meeting on Saturday. Dr. H. H. Hall, Kansas State Teachers College, Pittsburg, Kansas, was selected as the president for 1939 with the title of president-elect. Other officers elected were as follows: *Vice-president*, Dean E. O. Deere, Bethany College, Lindsborg; *Secretary*, Roger C. Smith, Manhattan; *Treasurer*, H. A. Zinszer, Hays; *Members of the Executive Council*, Geo. A. Dean, Manhattan, Lawrence Oneley, Winfield, and R. H. Wheeler, Lawrence; *Editor*, Frank C. Gates, Manhattan; *Associate Editors*, R. E. Mohler, McPherson, and Robert Taft, Lawrence.

A total of 236 members registered for the meeting. The next annual meeting will be held in Lawrence at the University of Kansas about April 1, 1939.

ROGER C. SMITH,  
*Secretary*

#### JOINT MEETING OF COLLEGE PHYSICS TEACHERS AT URBANA, ILLINOIS

THE physics teachers of the area outside of Chicago held an organization meeting at the University of Illinois on November 6, 1937. A general committee on arrangements was appointed at the time, consisting of Professor L. I. Bocksthaler, of Northwestern University; Professor R. Ronald Palmer, of James Millikin University, and Professor R. F. Paton, of the University of Illinois.

In the Chicago area such an organization has been in operation for some time. At the suggestion of the down state committee a joint meeting was arranged. This met in the Laboratory of Physics of the University of Illinois on Saturday, April 23, 1938.

A program of ten papers was presented, dealing with the present-day problems of the physics teacher, by representatives from the University of Chicago; Western State Teachers College, Macomb; Eastern State Teachers College, Charleston; the University of Illinois; Woodrow Wilson Junior College, Chicago; and Bradley Institute.

Active interest was expressed throughout, and discussions followed each paper. Among the important recommendations discussed and passed were: (1) Full

cooperation with the state committee in its endeavor to raise the teaching standard of physics in the state. (2) The joint session favors that a minimum of 16 hours of college physics be required of prospective high-school teachers of physics; however, that this recommendation should not be immediately applied to teachers already in service.

The attendance was thirty-two. Twenty-one of the leading educational institutions of the state were represented at the meeting. The down state club continued the general committee—Bocksthaler, Palmer, Paton—with instructions to arrange for the next meeting.

CHAS. T. KNIPP,  
Secretary

UNIVERSITY OF ILLINOIS

## SPECIAL ARTICLES

### SOLUTIONS OF CHLOROPHYLL-PROTEIN COMPOUNDS (PHYLLOCHLORINS) EXTRACTED FROM SPINACH

THE differences in solubility, fluorescence and absorption spectrum between the green pigments in the leaf and the chlorophylls extracted in solvents such as alcohol have been ascribed either to dispersion of the green pigments in the leaf, or to adsorption or combination of the chlorophyll with lipid or protein.<sup>1</sup> We have prepared aqueous solutions of the green pigments which show characteristic protein properties and which resemble the pigments in the leaf. To distinguish them from the chlorophylls we have adopted the name *phyllochlorin* for these chromoproteins, as suggested by Mestre.

Our extracts have been prepared using dilute aqueous digitalin, a solvent currently used for the photosensitive retinal pigments.<sup>2</sup> Ordinary leaf press juice or distilled water extracts show the green pigments not in true solution,<sup>3</sup> but in a fine suspension whose particles are visible under the microscope and can be retained on a fine filter.

About 100 gm of fresh spinach is thoroughly ground with fine sand, water is added to make 100 ml, and the suspension filtered through a coarse fluted filter. The moist cake is reground and again extracted. To the combined extracts is added 5 gm of Filter-Cel.<sup>4</sup> per 100 cc, and the whole is filtered through a thin layer

of Filter-Cel. on a Buchner funnel. The deep yellow-brown filtrate is discarded. The cake is washed in distilled water several times until the filtrate shows no trace of yellow color. It is then extracted with 25 ml of 1 or 2 per cent. aqueous digitalin;<sup>5</sup> the result is a dark green solution which shows no trace of suspended material under an oil immersion lens. Similar preparations can be made with 4 per cent. purified bile salts. More dilute extracts are obtained in concentrated (40–50 per cent.) urea solutions. Digitalin solutions of the phyllochlorin kept for some weeks in the cold room (5° C.) show a little precipitated pigment which does not redissolve.

The absorption bands of the phyllochlorin (Fig. 1),

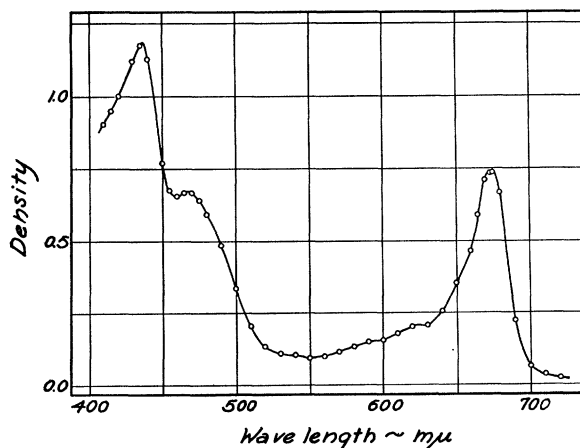


FIG. 1. The absorption spectrum of a phyllochlorin solution prepared with 2 per cent. digitalin and diluted 1 to 10 with distilled water. The density values are for a 5 mm depth of solution.

measured with Shlaer's spectrophotometer,<sup>6</sup> are like those of the leaf and are shifted towards the longer

<sup>5</sup> Crystalline digitalin, Eimer and Amend, New York.

<sup>6</sup> S. Shlaer, *Jour. Opt. Soc. America*, 28: 18, 1938.

<sup>1</sup> Reviewed by H. Mestre in "The Investigation of the Pigments of the Living Photosynthetic Cell," in *Contributions to Marine Biology*, Stanford University Press, 1930.

<sup>2</sup> e.g., K. Tansley, *Jour. Physiol.*, 71: 442, 1931; A. M. Chase and C. Haig, *Jour. Gen. Physiol.*, 21: 111, 1938; G. Wald, *Nature*, 140: 545, 1937.

<sup>3</sup> T. B. Osborne and A. J. Wakeman, *Jour. Biol. Chem.*, 42: 1, 1920. Such suspensions have also been studied by V. Lubimenko, *Rev. Gen. de Bot.*, 39: 547, 1927; and B. Hubert, *Rec. trav. bot. néerl.*, 32: 324, 1935.

<sup>4</sup> Filter-Cel., Johns-Manville, New York.