stated and solved by G. Pólya. A new impetus to the problem was given by the work of Paley and Wiener. The first part of the present book (Chapters I–IV) continues the work of Paley and Wiener, and extends it to a final form, in a certain sense. The method of Paley and Wiener, based on the consideration of Fourier Transforms in the complex domain, is successfully used by the author in treating various other problems of the theory of functions of complex variables. Such are problems connected with vanishing of Fourier Transforms, distribution of zeros and singularities of analytic functions, and the rate of growth of analytic functions (Chapters V–VII). In Chapters VIII and IX the author extends the work of Pólya concerning entire functions of zero order and shows that his results are in a certain sense the best possible. Finally in the last part of the book (Chapters X–XII) the author gives a considerable extension of a remarkable theorem of Hardy and Littlewood, where the convergence of a series is derived from its summability by a certain method, without any additional conditions on the terms of the series. Due to its technical character, the reading of the book is not very easy; however, the exposition is very clear and precise, and the reader who will stick to his job will feel greatly rewarded at the end.

Fourier Series and Boundary Value Problems. By RUEL V. CHURCHILL. ix + 206 pages. New York: McGraw-Hill Book Company. 1941. $2.50.

THE literature in English on the subject of partial differential equations of mathematical physics is rather restricted. Expositions of introductory but not entirely formal nature are practically non-existent, and the present book represents a welcome contribution in this direction. In the first two chapters the author discusses the notion of a boundary value problem for linear differential equations and derives some simplest differential equations of mathematical physics. In the next three chapters the author introduces the notion of orthogonal sets of functions, discusses properties of being closed and complete, and applies the general principles to the special case of trigonometric Fourier series. Simple fundamental facts concerning convergence of Fourier series and operations with Fourier series are discussed here, and the notion of Fourier integral is introduced. Chapters VI and VII give applications to solution of simplest boundary value problems of the theory of heat conduction and potential theory. Much attention is given to the question of uniqueness of solutions. Finally, in chapters VIII and IX the author introduces Bessel functions and Legendre polynomials and considers some applications to boundary value problems. Exposition is clear and "rigorous" as far as possible in a book of elementary character. The notion of Laplace transform is omitted although it seems quite desirable and worth mentioning. The author promises, however, another volume of a more advanced nature where further methods of solving boundary value problems will be treated.

J. D. TAMARKIN

BROWN UNIVERSITY

SOCIETIES AND MEETINGS

THE KANSAS ACADEMY OF SCIENCE

THE seventy-third annual meeting of the Kansas Academy of Science was held at Manhattan, Kansas, on April 3, 4 and 5, 1941, with Dean E. O. Deere, Bethany College, Lindsborg, Kansas, presiding. The Kansas Entomological Society, which is affiliated with the academy, held its seventeenth annual meeting on April 5. The following other state societies held their meetings in cooperation with the academy: The Kansas Association of Teachers of Mathematics, the Kansas chapter of the Mathematical Association of America, and the Kansas chapter of the American Association of University Professors. The Weather Crops Seminar, another affiliated society, held its meeting last November.

The academy program opened with a Thursday evening lecture under the joint auspices of the Kansas State College chapter of Gamma Sigma Delta and the academy by President W. M. Jardine, of the University of Wichita, who spoke on "Egyptian Agriculture."

After sectional meetings on Friday morning for Botany, Zoology, Psychology and Geology from 9 to 11 A.M., a general academy business meeting was held. Recipients of the six research awards for 1940 reported briefly on the results of their work.

More definite plans were made for the celebration of the seventy-fifth anniversary of the academy in 1943 at the Lawrence meeting. This "Diamond Jubilee Committee" is planning to prepare an extended report on the chief contributions to science by the various institutions of the state during the seventy-five years of academy activity.

Sectional meetings for Botany, Chemistry, Physics, Psychology, Zoology and a Geological field trip were held on Friday afternoon.

At the annual banquet on Friday evening, Dr. S. A. Nock, vice-president of Kansas State College of Agriculture and Applied Science, spoke appropriate words of greeting and gave a challenge of the times to science and scientists. Dr. J. T. Willard spoke on per-

sonal "Reminiscences" of some of the founders and earlier members of the academy.

The banquet was followed by the annual public meeting, which this year was a joint symposium sponsored by the Mathematical Societies and the academy. Dr. L. C. Heckert, head of the department of physical science at Kansas State Teachers College at Pittsburg, spoke on "Kansas Resources and National Preparedness." Dr. William L. Hart, professor of mathematics at the University of Minnesota, representing the Mathematical Societies, spoke on "Mathematics and National Preparedness."

The next business meeting was held on Saturday morning. President Deere gave his presidential address on "Crowding and its Effect on Organisms." Dr. J. R. Wells reported the decisions of the judges and the names of the winners of the awards of the junior academy meeting. Robert Beck of Manhattan, and Frances Chubb of Lawrence, were nominated for the honorary junior memberships in the A.A.A.S. for the coming year.

Mrs. Otilla Reagan, donor of the Albert B. Reagan memorial fund, attended the meeting and spoke briefly of some pamphlets on the life and work of Dr. Reagan which she has for distribution.

insects at various altitudes by airplane; a $40.00 Kansas Academy of Science award to Lawrence Oncley and William B. Plum, both of Southwestern College, for research on the vitamin content of the beans of the Kentucky coffee tree. It was decided that, beginning with the awards for 1941, the recipients will not be given their awards in cash but that a credit be established to the amount of each award and that statements or bills be presented by the recipients for apparatus, labor, travel expense or other expense in carrying on the research projects.

Dr. Roy Rankin reported on the death of Dr. W. R. B. Robertson, the only known death in the academy ranks during the year. Dr. W. H. Mikesell, of the University of Wichita, chairman of the committee on educational trends, gave the report of an extended study of the psychology course as given in the high schools of the state.

Total academy registration was 488. In addition, the junior academy had a registration of approximately 200; the Kansas Entomological Society 55; the Mathematical Societies 135; the University Professors 45.

The reports from the section chairmen on their sections is presented herewith in tabular form.

SECTION RECORD, WITH PAST AND FUTURE OFFICERS, MANHATTAN MEETING

Name of section	Chairman of section for the meeting	No. papers on program	No. persons attending	Chairman for 1942
Biology Teachers	H. H. Hall	7	43	R. L. Tweedy
Botany	F. W. Albertson	26	60	Stuart Pady
Chemistry	K. S. Bergstresser	12	90	Leonard C. Kreider
College Students	M. W. Allen	14	120	M. W. Allen
Entomology	R. L. Parker	23	55	Don B. Whelan
Geology	Carl Barnhart	22	55	Geo. M. Robertson
Junior Academy	Don Marchbanks	{ Class A Schools } 200		John Michner
Committee Chairman	J. R. Wells	{ Class B Schools }		L. D. Wooster
Physics	S. Winston Cram	18	60	K. V. Manning
Psychology	Geo. A. Kelly	18	70	H. E. Schrammel
Physical Science	Lawrence Oncley			
Weather Crops	W. A. Cochel	Meeting in November		R. H. Wheeler
Zoology	R. E. Bugbee	38	100	E. H. Herrick
Kans. Assoc. Teachers Mathematics	Mrs. Adelle Davis	5	50	Miss Kathleen O'Donnell
Math. Assoc. of America, Kansas Chapter	G. Baley Price	9	85	C. V. Bertsch
A. A. University Professors	R. W. Conover	7	50	A. B. Sageser

Three new life members, Dr. Edwina A. Cowan, Marion I. Campbell and Dr. J. E. Ackert were added to the roll of life members.

The following research awards for 1941 were announced by P. S. Albright, Southwestern College, chairman of the research committee: The $32.50 Reagan award No. 5 was given to Travis Brooks, Kansas State College, for research on the Myxomycetes of Kansas; a $40.00 American Association for the Advancement of Science award was made to Leslie L. Eisenbrandt, University of Kansas City, whose research work at Kansas State College is a study of the intestinal mucosa for an inhibitory growth factor for nematodes; a $35.00 A.A.A.S. award to Leonard H. Moulden, Kansas State College, for aid in collecting

A sectional program for college students was an innovation this year and proved to be so successful that it was made a permanent feature. The section will be managed by an academy committee to insure continuity.

The next annual meeting of the academy and the same cooperating societies for 1942 will be held at Hays, Kansas; the meeting for 1943 will be held at Lawrence and the invitation from Pittsburg, Kansas, was accepted for 1944.

The following officers were elected for the next year and meeting: *President,* F. C. Gates, Kansas State College; *President-elect,* R. H. Wheeler, University of Kansas; *Vice-president,* H. A. Zinszer, Fort Hays Kansas State College; *Secretary,* John C. Frazier,

Kansas State College; *Treasurer,* F. W. Albertson, Fort Hays Kansas State College.

Executive council members are L. D. Bushnell, Kansas State College, E. O. Deere, of Bethany College, and H. H. Hall, Pittsburg. Two associate editors, chosen for three years, are J. A. Trent, Pittsburg State Teachers College; and W. H. Schoewe, of the University of Kansas. Dr. Robert Taft, of the University of Kansas, is the new editor of the "Transactions." The writer will serve the second year of his three-year appointment as representative to the academy conference at Dallas with President Gates as alternate.

ROGER C. SMITH

MANHATTAN, KANSAS

REPORTS

ADDITIONAL COOPERATIVE STUDIES OF THE RELATION BETWEEN MOSQUITO CONTROL AND WILDLIFE CONSERVATION[1]

A PREVIOUS report of the Technical Committee[2] outlined the mechanism for the conduct of investigations for the coordination of programs of malaria control and wildlife conservation in the impounded waters of the Tennessee Valley Authority. This report briefly outlined the studies conducted during the season of 1939. The work of this committee has continued through the summer of 1940 and it is desired at this time to make a brief progress report.

It is recognized that the production of *Anopheles quadrimaculatus* is closely associated with aquatic vegetation. It is also known that certain species of aquatic plants are objectionable, both because they favor the production of mosquito larvae and because they have no value as food for wildlife. This has led to an intensive investigation of the relative importance of various species of aquatic vegetation in the production of *A. quadrimaculatus.*

Quantitative studies were undertaken to determine the relative importance of individual aquatic species in the production of this mosquito. Twenty species of aquatic plants were studied, but emphasis was placed upon nine of these. Plots five yards square were adopted as the unit of study and usually four or more such plots were sampled for each plant species in a given area. Ten square-foot samples were collected from each plot by means of a screen dipper and strainer pan. All anopheline larvae were classified according to their instars, and species determinations were made of most fourth instar larvae. Estimates were made of the vegetative cover and the amount of flotage in each square-foot sampling station. Altogether, 3,000 individual samples were taken during the summer. The results of these studies indicate that, with the possible exception of watershield (*Brasenia schreberi*), which may inhibit larval production, factors other than the individual species of vegetation are of primary importance in determining the extent of anopheline production in a given area. It was apparent that structure and growth characteristics of the plants and the way they interact with a combination of external factors such as flotage, water-level, wind action, the amount of vegetation edge-line at the water surface, etc., were more significant in anopheline production than were mere species differences. Because of water-level fluctuations for malarial control and variations brought about by floods, navigation, and power uses, the marginal vegetation in the reservoirs of the Tennessee Valley Authority presents problems widely different from those found under more stable conditions. At high-water levels emergent vegetation was important in anopheline production, while at low-water levels submerged species became important. Floating-leaved species were important at both high- and low-water levels. In general, there was a positive correlation between the density of anopheline larvae and the abundance of flotage and frequently with the amount of vegetative cover.

Experimental studies have been conducted on the control of vegetation objectionable to malaria control and wildlife interests. Experimental applications of powdered sodium arsenite were made by airplane at monthly intervals at the rate of approximately eight pounds per acre. With the exception of lotus, the control of the various species obtained by four applications was encouraging. Coppice was particularly susceptible to sodium arsenite. While complete control can not be anticipated at present, it is felt that such applications might reduce the vegetative cover sufficiently to make the application of larvicides more effective and even reduce the need for these. A wide variety of liquid herbicides has been tested on alligator grass (*Achyranthes philoxeroides*), but no definite conclusions have been reached at this time. The utilization of an underwater weed cutter in the control of lotus (*Nelumbo lutea*) and cowlily (*Nymphaea advena*) has given very encouraging results.

Experimental plantings of sixteen species of vegetation important to wildlife have been made in the Wheeler refuge. These plantings indicate that three species suitable for waterfowl, namely, four-angled

[1] Report of the Technical Committee for 1940 by E. Harold Hinman (*chairman*), John Steenis, W. V. King, J. L. Robertson, Jr., A. H. Wiebe, Clarence Tarzwell and A. D. Hess.

[2] E. L. Bishop, SCIENCE, 92: 201–202, 1940.