conjunction with the society, held its sessions on Monday afternoon and Tuesday morning.

The principal feature of the meetings was the seventeenth of the series of colloquium lectures delivered under the auspices of the society. The lectures were delivered by Professor Norbert Wiener, of the Massachusetts Institute of Technology, on the subject "Fourier Transforms in the Complex Domain." Professor Wiener delivered four lectures of an hour and a quarter each, one on Tuesday afternoon and the others on Wednesday, Thursday and Friday mornings. The first lecture was devoted to Fourier transforms in strips and half planes, the second to quasi-analytic functions, the third to closure properties of trigonometric functions, while in the fourth the lecturer discussed the harmonic analysis of random functions. The material of these lectures was the outgrowth of a fundamental and far-reaching series of investigations carried on by Professor Wiener and Dr. R. E. A. C. Paley, of Cambridge University, while the latter was spending a year at the Massachusetts Institute of Technology. Dr. Paley was killed in an unfortunate skiing accident while on a brief vacation in the Canadian Rockies in April, 1933.

On Thursday afternoon, by invitation of the program committee, Professor J. A. Shohat, of the University of Pennsylvania, gave an address entitled "On the Expansion of Functions in Series of Orthogonal Polynomials."

Of the shorter papers read before the society at its various sessions, twenty were devoted to analysis, four to geometry and analysis situs, seven to algebra and two to mathematical logic. In addition, twenty-six papers were read by title, eleven in algebra and number theory, nine in geometry and analysis situs and six in analysis.

The local committee arranged a delightful program for the visiting mathematicians and their friends. Wednesday afternoon was featured by an automobile trip over the Taconic Trail to Bennington Battlefield and the new Bennington College for Women. On Wednesday evening a very fine organ and song recital was given by Dr. and Mrs. Charles Louis Safford. Dr. Safford is the director of music at Williams College. On Thursday evening the banquet of the mathematical organizations was held at the Hotel Greylock. Professor E. V. Huntington acted as toastmaster. The speakers were: Dr. Tyler Dennett, the new president of Williams College; Professor Arnold Dresden, representing the Mathematical Association, and Professor E. R. Hedrick, representing the society.

J. R. KLINE,
Associate Secretary

DENTAL CONFERENCE AT YALE UNIVERSITY

A GROUP of fifty dental surgeons from various parts of the country met at the Yale University School of Medicine on October 24 and 25 for a discussion of scientific subjects relating to dentistry. Dr. A. Leroy Johnson, of New York City, presented a paper on studies of the teeth and jaws of dogs from the Cornell Experimental Morphology Farm. He described tooth defects found in certain cross-breedings in dogs fed adequate diets and showed the similarity to defects which have been shown to be associated with dietary deficiencies. The importance of genetic factors in research on the teeth was further emphasized in the discussion of the paper.

A clinical study of restorative work on the teeth from the point of view of the effect on the health of the individual in subsequent years was described by Dr. Yngve Hildebrand, of the Royal Institute of Stockholm, Sweden. Advantages and disadvantages of restorations as evidenced in a number of individuals over a period of eight to ten years were analyzed. Stresses upon the teeth, bone and other supporting tissues, and the results of these stresses were noted in detail. Dr. Hildebrand illustrated his discussion with clinical and statistical material derived from his study of the subject for the past twelve years.

A report on a study at Yale on nutrition and dental changes was presented by Professor Arthur H. Smith, Miss Aline U. Orten, Dr. Casper C. Burn and Dr. Sumter S. Arnim. One aspect of the study had to do specifically with the influence upon the teeth and related structures in rats of a diet deficient in inorganic salts. The investigation showed in general that the skeletal bone and the tooth structure respond in different ways and in different degrees to the same dietary factors. A presentation was also made of a series of patients to show medical-dental relationships in diagnosis and treatment. Cases from Yale were presented by Dr. B. G. Anderson, director of clinical work in dentistry, and Dr. David Weisberger, with the collaboration of staff physicians. Case reports were made also by Dr. J. C. Healy, of Tufts Dental School. A demonstration and discussion of laboratory work being carried on by the dental group at Yale was conducted by Professor Smith and Dr. Burn with the assistance of Dr. Lester Burket, Dr. Frank Kanthek and Dr. Harold Genvert.

The purposes of the dental program at Yale were described as: (1) To place the study of the natural history of the teeth in health and disease on a sound scientific basis; (2) to investigate the causes of diseases of the teeth and associated structures in relation both to specific agents of local morbidity and to the general health of the individual; (3) to create a

liaison between dental and medical personnel by developing a group of men for the interpretation of diseases of the teeth and their relationship to the functioning of the human organism as a whole.

Dr. M. C. Winternitz, dean of the Yale University School of Medicine, spoke on the dental project at a dinner meeting of the group. Subjects relating to dental education were further discussed by Dr. George R. Moore, of Ann Arbor, and Dr. Frank S. Cartwright and Dr. Stanley A. Mackenzie, of Detroit.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

LITHOTYPING IN MINIATURE AS A MEANS OF SCIENTIFIC PUBLICATION

THIS is a further note on a method of inexpensively publishing research reports, which Dr. Seidell and Dr. Visscher discussed in earlier numbers of SCIENCE (July 20 and September 14, 1934).

During the past three years we have developed in the School of Education at the Pennsylvania State College a scheme of lithotyping in miniature doctors' dissertations and abstracts of theses. We have so far issued three numbers of such publications and shall issue three more this year. In the case of a doctor's dissertation we prepare an abstract eight or ten pages in length giving a summary of the procedures and findings, lithotyping this in a size of type that can be easily read without a magnifying glass. Then we lithotype in miniature the whole dissertation, including unabridged tables, graphs, etc. The miniatured pages are 1.9 by 2.4 inches, and eight of then fit into a five- by eight-inch book page. It is the intention to have this miniatured material read by the aid of a magnifying glass, although it is feasible to read it without such aid. Two very suitable reading glasses for this purpose are available: one is a binocular reading glass developed by the author from a stereoscope, the cost of which is only $3; the other is the "electrolens," manufactured by the American Optical Company, containing a small electric light for illuminating the page, and selling at wholesale for $5.

A doctor's dissertation, consisting originally of 120 typed pages, put up in this form made a booklet of 24 lithotyped pages—a nine-page large-type abstract, twelve pages of miniatured material, and one inside and one outside cover page blank. The cost of lithotyping, assembling and stitching these was $42 for an edition of 500. The booklets could be sent through the mail at one-cent postage.

Our abstracts of masters' and doctors' theses are put up in the following manner: each abstract occupies the front and the back surfaces of a single sheet, five by eight inches in size; on the front face a brief abstract of the whole thesis is given in type large enough to be read by the unaided eye; on the back surface occur eight miniatured pages for which a reading glass should be used. Thus each abstract contains the equivalent of an eight- or nine-page journal article, although it occupies but a single sheet five by eight inches. Each abstract carries a filing number according to the system of the *Loyola Educational Digest*. For libraries we have these sheets bound into booklets with a spiral wire coil. Those not to be used on library shelves are left unbound and are trimmed to fit into a standard filing system so that they may be kept classified by topic.

An edition of seven hundred copies of these abstracts containing eighty pages costs us about $127 for the lithotyping and in addition $50 or $75 for overhead.

Not only is this an inexpensive way to publish research reports, but there is the further advantage that the miniatured material occupies only a small amount of shelf space in libraries, as compared with ordinary print. This is an important factor if we are to come to the policy of publishing large numbers of research reports. And, when a suitable glass is used, miniatured print can be read approximately as easily as regular type.

CHARLES C. PETERS

ATTACHING REFRACTORY PARAFFINE SECTIONS TO THE GLASS SLIP

IT often happens that a protective, permeable covering for sectioned tissue on the slip is needed to prevent possible transposition of certain structures, the loss of refractory sections, or to permit drastic manipulations, such as blotting sections or passing them from aqueous stains to 95 per cent. alcohol. By following the suggestion of Barron[1] that amyl acetate is a practical solvent of both paraffine and celloidin, a protective membrane meeting the above requirements has been devised. By this method fine cytological, as well as very difficult material, such as cross-sectioned rabbit fur and vibrissae, may be securely fastened to the slip, successfully stained and covered.

Two solutions are made as follows:

(A) To equal parts of absolute alcohol and ether add enough liquid collodion (U. S. P., Baker) to make a solution so thin that when a glass slip is flooded and the solution permitted to coagulate, the mark of a sharp needle is scarcely visible to the unaided eye. (Thicker solutions may be used on thick sections or on those not intended for study under oil immersion.)

(B) Add one volume of amyl acetate ("purified," Baker) to four of solution A. (In practice the propor-

[1] D. H. Barron, *Anat. Rec.*, 59: 1–3, 1934.