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.