on a policy of increasing the exchange list and as he sees best respecting advertising in the *Journal*. Mr. Latimer J. Wilson was elected a delegate to the meeting of the American Association for the Advancement of Science at Pasadena in June, and Dr. J. T. McGill to the meeting at New Orleans in December.

The officers of the Academy for 1931 are:

President: L. R. Hesler, University of Tennessee, Knoxville.

Vice-president: H. A. Webb, George Peabody College, Nashville.

Editor: Jesse M. Shaver, George Peabody College, Nashville.

Secretary-Treasurer: John T. McGill, Vanderbilt University, Nashville.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A TRANSPARENT ELASTIC GLUE, USED IN MAKING CHAMBERS FOR INSERTION IN THE RABBIT'S EAR

IN connection with the new methods for studying the growth and reactions of living cells and tissues in the living mammal, originated and developed under the direction of Dr. E. R. Clark, it became necessary to find a satisfactory glue or cement substance which would fasten together various parts of the transparent chambers used for insertion into the rabbit's ear.

The first type of these chambers was developed by Dr. J. C. Sandison ('28)[1] and was made entirely of kodaloid, and the various parts were stuck together by parlodion. Later a number of workers in this laboratory collaborated on various improvements in the technique in order to obtain standardized chambers which would give uniform results and would be adapted to various types of observation and of experiment (Clark, Kirby-Smith, Rex and Williams, '30).[2] The thin kodaloid top proved to be unsatisfactory for such standardized chambers because of its tendency to warp and to allow the escape of moisture. Glass covers were much too fragile. Mica proved to be a satisfactory substitute as regards thinness and clearness, and the finding of a satisfactory glue to seal mica to heavy kodaloid or glass, used in the bases and supporting rings of the chamber, has obviated the chief difficulties inherent in the use of mica in the earlier chambers (Sandison, '24).[3]

A satisfactory glue for use in the construction of the chambers had to meet a number of requirements. It was necessary for it to be permanently adhesive and to be impervious to and unaffected by fluids, including the natural tissue fluids and antiseptic solutions such as phenol, hexyl-resorcinol and metaphen, and to be uninfluenced by moderate changes in temperature. In addition, it was highly desirable for it to be elastic, transparent and smoothly clear (without bubbles).

A large number of experiments were carried out before a glue which meets all these requirements was obtained. Balsams and resins of different varieties were tried with many different solvents. A number of varnishes and shellacs were also experimented with. Different commercial cements were tried. Celluloid compounds in different mixtures and combinations were used. Some of these substances, such as glyptal, passed the tests with water, but failed after the chamber was placed in one of the disinfecting solutions, or after insertion in the ear. Others (especially the cements such as Duco) were successful in sticking mica to glass, but had a tendency to warp the heavy kodaloid and to form bubbles.

The present glue forms a permanent, tenacious cement. It is smooth, transparent and waterproof, is unaffected by the moisture of the animal's tissues, by various antiseptics, or by moderate changes in temperature, and possesses the added advantage of elasticity. It will stick mica to kodaloid, to glass or to silver, kodaloid to glass or silver, and glass to glass.

The ingredients used and method of preparing the glue are as follows:

Pure gum copal (in lumps, *not* powdered)
Venice turpentine
Xylol

Select lumps of the copal which are clear and light amber in color. Heat copal in a porcelain dish until melted. While still over the flame, add a small amount of Venice turpentine and stir well. (The amount of Venice turpentine depends on the desired flexibility of the cement). Turn off the flame and continue stirring while adding xylol in small amounts. Some of the xylol evaporates, and it is therefore advisable to add a little xylol continuously while the

[1] J. C. Sandison, "The Transparent Chamber of the Rabbit's Ear, Giving a Complete Description of Improved Technic of Construction and Introduction, and General Account of Growth and Behavior of Living Cells and Tissues as Seen with the Microscope," *Am. J. Anat.*, Vol. 41, No. 3, p. 447, 1928.

[2] E. R. Clark, H. T. Kirby-Smith, R. O. Rex and R. G. Williams, "Recent Modifications in the Method of Studying Living Cells and Tissues in Transparent Chambers Inserted in the Rabbit's Ear," *Anat. Rec.*, Vol. 47, No. 2, p. 187, 1930.

[3] J. C. Sandison, "A New Method for the Microscopic Study of Living Growing Tissues by the Introduction of a Transparent Chamber in the Rabbit's Ear," *Anat. Rec.*, Vol. 28, No. 4, p. 281, 1924.

cement is still hot. On cooling, the cement may become hard. This indicates an insufficiency of xylol, and it is then necessary to reheat the mixture and add more xylol. When cool the glue should have the consistency of molasses.

In applying the glue a small camel's hair brush is used. The consistency of the glue allows plenty of time to apply it smoothly and in the exact amount required.

Copal glue thus prepared is not sufficiently tenacious to hold pieces together when strong forces are exerted which tend to separate the pieces. Consequently it can not be used for the original type of chamber described by Sandison, which was glued together before insertion into the ear. But it is tenacious enough to hold together either the tops or the bottoms of the newer types of chamber, since the forces exerted are such as to press the glued portions closer together, while the forces which act so as to separate the top from the bottom are resisted by nuts and bolts.

When parts of the transparent chambers have been cemented in the manner described recently (Clark *et al.*, '30) it is necessary for them to stand for at least 24 hours—preferably longer—before insertion in the rabbit's ear, on account of the susceptibility to irritation on the part of living tissues toward a trace of free xylol.

Although up to the present time this glue has been used only for the purpose for which it was invented, its qualities should prove useful in sealing total mounts, especially of specimens cleared in oil of wintergreen.

Thanks are due to Dr. S. E. Pond for information regarding types of glues, to Dr. O. V. Batson, who suggested the use of copal, and to Dr. E. R. Clark, at whose instigation the studies were made.

B. B. VARIAN

SCHOOL OF MEDICINE,
UNIVERSITY OF PENNSYLVANIA

CELLOPHANE COVERS FOR PETRI DISHES FOR KEEPING OUT CONTAMINATIONS AND STUDYING THE EFFECTS OF ULTRA-VIOLET LIGHT

ORDINARY petri dishes, with loosely fitting glass covers, are not altogether satisfactory for use in research on pure cultures of certain organisms, particularly fungi, because of the difficulty of preventing contaminations. By means of a simple technique covers of cellophane may be applied, making it possible to keep the cultures almost indefinitely without danger of contamination. Furthermore, they may be examined as often as desired under the low power of a microscope, without exposing them to contamination, for the flexibility of the cellophane makes it possible to bring the objective close to the organism.

In addition to maintaining the purity of cultures, cellophane offers a tremendous advantage in the investigation of the effects of ultra-violet light on various organisms in pure culture. Ordinary glass covers transmit hardly any of the ultra-violet spectrum, and the best of the special ultra-violet transmitting glasses are impenetrable to the very short wave-lengths. Cellophane, on the other hand, is nearly as transparent to the extreme ultra-violet as air, and as it is only .025 to .03 mm thick, the percentage transmission, as compared to air, must be close to 100. Cultures may thus be irradiated by any wave-length of ultra-violet, from the shortest to the longest, over any length of time and for any duration of exposure, by placing an appropriate filter on the cellophane cover, without exposing the culture to contamination. In some experiments, now almost complete, conducted on several species of fungi, some very interesting results were obtained by means of this procedure. It is a distinct improvement over former methods, in which the glass cover of the petri dish was removed in order to study the effect of the extreme ultra-violets.

The application of the cellophane covers is quite simple and not time consuming. The percentage of contaminated cultures, after a period of a month, was reduced from about 20 per cent. to 0.5 per cent. by applying cellophane covers according to the following method. Some of the cultures were carried around in the pockets of my coat for several days without subsequent contamination.

The cellophane is cut into square sheets, about 6 by 6 inches, and sterilized by placing in 60 per cent. alcohol in a flat glass dish for half an hour. The cultures are inoculated in the usual manner. It is necessary to exercise some care in transferring the cellophane onto the petri dish. Best results are obtained by placing the petri dish culture next to the dish containing the cellophane saturated with alcohol, lifting the top of the petri dish with the thumb and forefingers and then drawing a sheet of cellophane across the top of the bottom part of the petri dish with the third and fourth fingers, thus avoiding at any time exposing the culture to any bacteria or spores that might otherwise fall into it. The glass cover can now be replaced to press down the cellophane, and then removed again and a rubber band applied to hold the cellophane around the sides. If this is done carefully, no alcohol will get into the medium, and in a few minutes it will evaporate out of the cellophane, leaving it perfectly dry, transparent and tightly stretched across the top of the dish. If the culture is to be kept for any length of time,