changed acid as it occurs in the cells of the thymus gland and of fish sperm (in combination with histone in the former and with protamine in the latter); according to investigations with various methods[2] (filtration and ultracentrifugation) its molecular weight is approximately 1,000,000. It may therefore be referred to as the "native" desoxyribonucleic acid.

Thus far the molecular weight has been determined definitely for the "native" nucleic acid only. Complete depolymerization of the acid to a single tetranucleotide has not yet been accomplished by chemical means.

On the other hand, by a specific enzyme obtained for the pancreas gland, Feulgen[3] succeeded in transforming the "native" nucleic acid to a tetranucleotide which differs from the "native" nucleic acid in certain physical properties and which is referred to in the literature as "b" nucleic acid.

In collaboration with Dr. E. G. Pickels,[4] we compared the behavior of "native" and "b" nucleic acid in the ultracentrifugal field with the result that the "b" form did not sediment at all, whereas the "a" form (prepared according to Neumann) settled down in a cleared boundary indicating particles of molecular weights between 200,000 and 1,000,000. These results represent the exact proof for Feulgen's assumption, that the enzymic transformation from "native" nucleic acid into the "b" form is a depolymerization.

Even though the molecular weight of "b" nucleic acid has not yet been determined, still it is not improbable that it represents a single tetranucleotide, for the reason that its behavior towards nucleophosphatase[5] is entirely different from the nucleic acids of higher molecular weight. We now find that the so-called "b" nucleic acid is the only one entirely dephosphorylated by the phosphatase, whereas the "native" desoxyribonucleic acid is not affected by this nuclease at all. Only when contaminated with the depolymerase does phosphatase affect nucleic acids of the high molecular weight.

This find, then, is of significance not only because it brings out an additional step in the process of biological catabolism of nucleic acids, but also because it furnishes a means of testing the purity of "native" nucleic acid, on one hand, and of testing the purity of a nucleophosphatase by means of the native nucleic acid, on the other.

It will be of significance also in connection with other questions bearing on the structure of nucleoproteins.

The method of preparation of nucleophosphatase free from depolymerase will be given in detail elsewhere.

GERHARD SCHMIDT
P. A. LEVENE

THE ROCKEFELLER INSTITUTE
FOR MEDICAL RESEARCH,
NEW YORK, N. Y.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE RECORDER FOR PHYSIOLOGICAL VOLUME CHANGES

As a sensitive recorder of small changes in volume, the bellows recorder devised by Brodie in 1902[1] has no equal. Its usefulness is limited, however, by the fact that it is tedious to build satisfactorily, especially since the membranes used in its construction are perishable and must be replaced frequently.

We have used in this laboratory for the past year a volume recorder which retains the principle of the Brodie apparatus, yet which can be made air-tight without difficulty, and in which the perishable membrane can be replaced in a few moments. The apparatus has found so many uses in both the student and the research laboratories that it seems to merit a brief description.

The construction of the recorder is shown in the accompanying sketch. The membrane *a* is a light, inelastic balloon, made by tying a commercially prepared sheep's cecum to the lead tube *b*. The sheep's

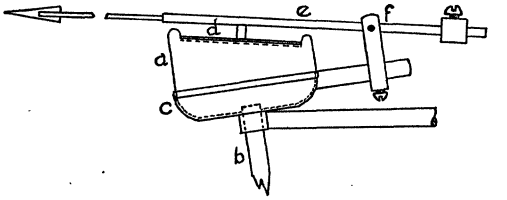

FIG. 1

cecum is sold as a contraceptive sheath. It is softened by soaking in 50 per cent. glycerol solution for a few minutes before tying. The lead tube passes through the center of a metal base, *c*, made concave to conform to the shape of the balloon. The lead tube is of rubber,

[2] R. Signer, T. Caspersson and E. Hammarsten, *Nature*, 146: 122, 1938; W. T. Astbury and F. Bell, *Nature*, 146: 747, 1938.

[3] R. Feulgen, *Zeits. physiol. Chem.*, 237: 261, 1935.

[4] We wish to acknowledge our appreciation to Dr. Pickels for his kind cooperation in this work.

[5] Nucleophosphatase probably consists of two components, one splitting the tetranucleotides into mononucleotides, and one dephosphorylating the latter. In the interest of shortness, we use in this note the term nucleophosphatase for this whole enzyme system.

[1] T. G. Brodie, *Jour. Physiol.*, 27: 473, 1902.

made rigid where it passes through the base by inserting a short segment of glass tubing. It fits the opening in the base snugly, but can easily be drawn up for tying the balloon. The light brass disc, of slightly smaller diameter than the balloon, is firmly attached to the lever *e*, whose fulcrum, at *f*, is adjustable on a rod soldered to the base. The lever is lightly counterpoised beyond the fulcrum. When the balloon has been fitted to its receptacle, it is cemented both to the receptacle and to the brass disc with rubber cement.

In order to smooth out irregularities in the shape of the balloon it has been found desirable to have the lever enough out of balance to raise pressure in the balloon about 5 mm H_2O. If this precaution is taken, there is an almost linear relation between volume change and angular movement of the lever. The range of the recorder is, of course, determined by the volume of the balloon used. Balloons with a volume of about 20 cc have been found satisfactory for most work.

HAMPDEN LAWSON

UNIVERSITY OF LOUISVILLE
SCHOOL OF MEDICINE

AN AQUEOUS MEDIUM FOR MOUNTING SMALL OBJECTS[1]

IN the course of investigating a group of small marine copepods the writer has searched for a rapid method of preparing mounts of the parts. Dissecting in glycerin has proved to be very satisfactory, but it was desirable to find a more satisfactory mounting medium than glycerin jelly for the very small parts. Articles recently published in SCIENCE[2,3] called attention to the possible usefulness of corn syrup (dextrose) and mixtures containing it. In following these suggestions, white Karo syrup alone was tried, but it was found to be very difficult to arrange the parts in position in the syrup, even when a very small drop was used; shifting invariably occurred after the cover-glass was added. With this medium it is also difficult to make the mount thin enough for the use of an oil immersion objective.

Dr. Zirkle's note on mounting media for the Belling acetone-carmine technique suggested a modification which has proved to be very satisfactory. The medium used is essentially Zirkle's mixture without the aceto-carmine:

White Karo syrup	5 cc
Certo (fruit pectin)	5 cc
Water	3 cc

A gram of powdered fruit pectin, dissolved in about 10 cc of water by boiling, may be used instead of Certo. A crystal of thymol is added as a preservative.

In making mounts with this mixture a very small drop is taken up with a fine needle and spread out upon a clean slide. The desired parts are immediately transferred to it and arranged as desired; if the drop is spread out rather thin the smallest parts (*e.g.*, copepod mouth parts) may be quite easily arranged. The mixture begins to "set" in about two minutes, and holds the parts firmly in position. If it should set before all the parts are in position, the excess may be scraped away and a fresh drop added. (The rapidity of setting can be controlled by varying the amount of water used in the mixture). When all parts have been arranged, the mount is dried to hardness over heat. If the cover-glass is put in place with another drop of the mixture a slight shifting of the mounted parts takes place, but this difficulty was overcome by adding the cover-glass with a drop of euparal, which does not dissolve the syrup-pectin mixture. The cover-glass can now be pressed down quite firmly without in the least disturbing the parts. An additional advantage of using euparal is that it can be dissolved off with 95 per cent. alcohol, if necessary, and the cover-glass removed without disturbing the parts. The syrup-pectin mount may then be softened by the addition of a fresh drop of the mixture and the objects rearranged, and the cover-glass added as before. It is not necessary to ring the cover-glass. The refractive properties of the syrup-pectin-euparal combination appear to be satisfactory, although the edges of the drop of syrup-pectin mixture appear as very faint lines.

Various small organisms have been mounted in this medium, both with and without euparal, with results quite as good as for the copepod appendages. If the cover-glass is mounted with the syrup-pectin, sufficient mixture must be used to prevent the formation of air pockets under the cover as the medium dries. Mounts made by the above methods have proved to be very satisfactory for study, and are apparently standing up very well, although none are more than ten months old. The rapidity and effectiveness of the method suggest that it may prove valuable to other workers.

CECIL R. MONK

SCRIPPS INSTITUTION OF OCEANOGRAPHY,
LA JOLLA, CALIF.

1 Contributions from the Scripps Institution of Oceanography, New Series, No. 26.

2 Ruth Patrick, SCIENCE, 83: 85.

3 Conway Zirkle, SCIENCE, 85: 528.

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