wide bevel causes it to be somewhat too flexible for hard objects imbedded in paraffin. There are a number of stropping devices on the market which will prepare any of the blades mentioned above for sectioning. Twin-plex stroppers are very satisfactory and models are available for all types of blades. The Spiro stropper, made by John Watts, Sheffield, England, is very well constructed and convenient to use, although the claim made for it that the stroke is diagonal is not justified. Watts manufactures blades for use in Auto-strop razors which are perforated so that they can be sharpened with the Spiro stropper.

ROBERT A. NESBIT
U. S. BUREAU OF FISHERIES

ESTIMATION OF THE COLLOIDAL MATERIAL IN SOILS

IN conducting investigations to devise methods for determining the content of colloidal material in soils, one of the methods that has been tried and has proved most successful is the hydrometer method. By means of this method, the colloidal content of a soil can be estimated quite accurately in only fifteen minutes. The general procedure consists of dispersing in a mortar by means of a pestle 50 grams of soil, placing it in a high cylinder, adding a total volume of water equal to 1,050 cc, shaking the mixture vigorously for about two minutes and then placing a hydrometer in the mixture and measuring the density or grams per liter. It has been found that the percentage of the material, based on the original sample taken, that stays in suspension at the end of fifteen minutes is equal to the percentage of the colloids as found by the heat of wetting method. This remarkable relationship is almost incredible, but it has been actually found to hold true in all kinds of soils, ranging from sandy loams to very heavy clays and even when different proportions of soil samples are used. The only places where the relationship between the percentage of material staying in suspension at end of fifteen minutes in a liter of water and the percentage of colloids as determined by the heat of wetting method does not hold very close is in abnormal soils which refuse to stay dispersed and in soils whose organic matter is not completely decomposed. Out of thirty-one soils used, however, only three refused to give a very close relationship. In the other soils the relationship is identical in many cases, and in the others it is only about 3 per cent. apart.

From the work thus far done it appears that the hydrometer method can be used confidently to estimate the colloidal content of soils quite close. In some unusual soils the estimated amount may be about 10 per cent. off of the true amount or the amount shown by the heat of wetting method, but when it is considered that by our present methods it takes almost one week to determine the colloidal content of a soil, any method that can give in fifteen minutes the colloidal content of soil should be considered very valuable, even though in some cases the results may be about 10 per cent. off.

The hydrometer method is able not only to estimate the colloidal content of soils, but also to measure the rate of settling, from which a distribution curve of the soil particles of various sizes may be worked out.

The hydrometer employed is of a lactodensimeter type, which has a large volume and weight, both of which make it very sensitive. It was calibrated to read directly in grams of material per liter of water.

A detailed report of these investigations is being published elsewhere.

GEORGE JOHN BOUYOUCOS
MICHIGAN AGRICULTURAL EXPERIMENT STATION

PERMANENT CULTURES

VERY frequently instructors are required to keep Protozoan cultures over long periods of time. The following method has been used with great success for such cultures as paramecia, the smaller forms of amoeba and certain forms of flagellates.

A large number of hay infusions are started in ordinary drinking tumblers, using pond water from different localities. They are then placed in various positions about the room and examined from time to time until the proper culture has been found. When a desired culture is found it should be fed five or six scrapings of dried whole wheat bread. These scrapings are made by simply taking a scalpel and scraping a crust of bread, care being taken so as to feed only what the culture will utilize. The glasses are then covered and the process repeated every two weeks or so. Whole wheat bread is far superior to ordinary wheat bread.

Using the above method I have kept ordinary classroom cultures alive for a period of a year.

It is also excellent for maintaining such cultures as rotifers and the small crustaceans.

FREDERICK BAUER
RHODE ISLAND STATE COLLEGE

SPECIAL ARTICLES

THE FILTERABLE CELL OF THE ROUS CHICKEN SARCOMA AND THE QUESTION OF THE CAUSATIVE AGENT

IN a previous note[1] I reported that desiccated or glycerinated tissues of the Rous chicken sarcoma No. 1 often contain many viable cells. The bearing of this observation on the question of the so-called causative agent which has long been supposed to exist in this

[1] Nakahara, W., SCIENCE, 1926, LXIII, 549.