neers who are familiar with the use of the stereoscopic plotting instruments for photographic mapping.

These, then, are briefly the conclusions reached by the congress of the International Federation of Surveyors regarding what were considered as the two most outstanding topics in the field of improvements in the instruments and methods of surveying.

EARL CHURCH
SYRACUSE UNIVERSITY

SCIENTIFIC APPARATUS AND LABORATORY METHODS

BUTYL ALCOHOL AND CYTOLOGICAL TECHNIQUE

SEVERAL years ago the writer[1] described the advantages of *n*-butyl alcohol in dehydration and clearing specimens for paraffin embedding. Hemenway,[2] Earl,[3] LaCour,[4] Waterman[5] and Stiles[6] among others have extended and modified the technique so that now *n*-butyl alcohol is used in preparing many different types of material for embedding, and most cytological laboratories have a supply on hand. The purpose of this note is to call attention to some minor uses that can be made of this reagent.

A fluid composed of two parts of ethyl alcohol and one of butyl can dissolve both water and xylene and keep them in solution at the same time. Thus a mixture of

water	1 part
xylene	1 "
n-butyl alcohol	1 "
ethyl alcohol	2 " s

forms a single clear liquid. This solution is useful for cleaning slides as it will soften and remove both water-soluble substances (glycerine, glucose, etc.) and those which are fat soluble (immersion oil, balsam, etc.). Dilute ammonium hydroxide can be substituted for the water and carbon-tetrachloride for the xylene. This latter combination forms a very potent cleanser.

Another and perhaps more useful application of *n*-butyl alcohol to the cytological technique occurs in the hydration and dehydration of cut sections. The usual procedure is to place the slides containing the paraffin ribbons into a Coplin jar filled with xylene. When the paraffin is dissolved, the slides are transferred to absolute ethyl alcohol and then through several successive dilutions of alcohol to water. When the sections are stained they are passed back through the series of Coplin jars and mounted in balsam. Unfortunately, some xylene adheres to the slides and is carried on them into the absolute alcohol, where it soon appears as a milky precipitate as the alcohol absorbs moisture from the air. Likewise some alcohol and water are carried into the xylene, which also becomes clouded. In the moist atmosphere of seaside laboratories it is particularly difficult to prevent water from contaminating the absolute alcohol and the xylene. A few drops of *n*-butyl alcohol, however, added to these clouded fluids will clear them immediately, as the butyl alcohol will take both water and xylene back into solution. If the original series is made up as follows, no precipitate should occur.

(1) xylene 100 per cent.
(2) xylene 95 per cent., *n*-butyl alcohol 5 per cent.
(3) absolute ethyl alcohol 90 per cent., *n*-butyl alcohol 10 per cent.
(4) absolute ethyl alcohol 100 per cent., etc.

The writer has often passed more than a hundred slides through a single series of Coplin jars without renewing any of the solutions or obtaining any precipitate.

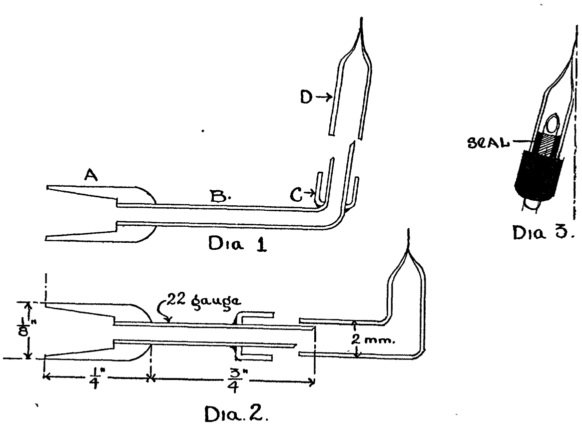
CONWAY ZIRKLE
UNIVERSITY OF PENNSYLVANIA

[1] SCIENCE, 71: 103–104, 1930.
[2] SCIENCE, 72: 251–252, 1930.
[3] SCIENCE, 72: 562, 1930.
[4] *Jour. Roy. Mic. Soc.*, 51: 119–126, 1931.
[5] *Stain Tech.*, 9: 23–31, 1934.
[6] *Stain Tech.*, 9: 97–100, 1934.

A MICROPIPETTE ADAPTER

MICROPIPETTES used for single cell isolation and dissection can be made from capillary glass tubing on a machine designed to pull them to a certain size.[1] Mechanically made pipettes require a special mounting or adapter before they can be used satisfactorily in a manipulator. Once mounted, however, they offer the advantages of being in a certain position and can be easily changed.

The adapters described herein are improvements over devices previously described.[1,2] Diagram 1



[1] J. Arthur Reyniers, *Jour. Bacteriology*, 23: 2, February, 1932, pp. 183–192.
[2] *Ibid.*, 26: 3, September, 1933, pp. 251–287.

shows the bent type of adapter used principally in single cell isolation. It consists of a base (A) made to screw or slip on a manipulator mounting; a piece of 22 gauge hypodermic needle wire (B) 1 inch long bent to less than 90 degrees ¼ inch from its end and sharpened to a bevel; a cup (C) large enough to admit a piece of capillary tubing which will fit over the needle; (D) represents a micropipette. In use the cup may be filled with wax, vaseline or some other sealing substance or it may be empty, depending on the pressure to be exerted in exhausting the pipette of fluid. The pipette is warmed before use and is slipped over the adapter end into the cup. The sealing substance in the cup makes a perfect seal.

The adapter described in Diagram 2 is essentially the same as the one described in Diagram 1 as to dimensions and construction, except that it is not bent at one end but is allowed to remain straight. This type of adapter is used in micro-injection experiments where a relatively large volume of fluid is to be handled. The pipette shank can be made to any length. The pipette must be sealed in with cement or sealing wax to prevent it from turning.

Diagram 3 shows an end view of an adapter and pipette in place. It illustrates how the pipette must be turned to allow the light to strike its tip rather than the metal adapter.

These adapters are made for me by the South Bend Watch Service, South Bend, Indiana, and have been in use for over a year.

J. A. REYNIERS

UNIVERSITY OF NOTRE DAME

SPECIAL ARTICLES

THE ENERGY REQUIREMENT OF AN ACROMEGALIC GIANT

DURING the spring of 1933, the author had the privilege of studying the gaseous exchange of a group of pituitary cases who were in Boston on a professional engagement. The results have been reported[1] and showed a marked lowering in the energy requirement of all the dwarfs. The results with the giant in the group (J. E.) were recognized and reported as unsatisfactory at the time of testing. At an earlier date, a measurement had been attempted with this subject elsewhere, using a small portable apparatus, the oxygen content of which was speedily exhausted with somewhat disturbing results. While our own approach utilized the open circuit method with large Tissot containers, a certain apprehension, residual from his previous experience, precluded the attainment of that tranquility essential for accurate measurement. His return to Boston this spring gave opportunity for a repetition of the study under the better conditions of a corrected psychology. While a fairly complete study was again carried out,[2] only the respiratory exchange will be reported here. It may be said, however, that the results of the 1934 studies showed a surprisingly precise correspondence with those of the previous year.

The open circuit method was again used, and the respiratory metabolism was measured by Dr. Thorne M. Carpenter and his associate, Mr. Robert C. Lee, to both of whom it is a pleasure to express my appreciation.

The orienting physical data are given in Table I. The height measurement implies a growth of one inch during the past year, which I am disposed to question. The subject had been spending the winter in the South and was in definitely better physical condition than when previously studied. I attribute his apparent gain probably to a more erect carriage and am supported in some degree by the fact that the span dimension remained unchanged. On the other hand, the sitting height failed to show the increment that would accord with this hypothesis; posture, however, plays a significant rôle in this measurement. The other data show a gratifying concordance.

TABLE I
DIMENSIONS

Datum	1933	1934
Standing height (cm)	228.6	231.1
Span (cm)	236.2	236.2
Sitting height (cm)	110.5	111.2
Index	0.483	0.481
Chest (cm)	124.3	123.2
Waist (cm)	107.0	106.7
Weight (kg)	163.3	162.7
Area (sq. m.)	3.125	3.236

The respiratory data are shown in Table II.

TABLE II
OXYGEN CONSUMPTION

Datum	1934		1933
Respiratory quotient	0.806 0.800	0.803	0.890
Oxygen, per minute	356.2 cc 358.7 cc	357.5 cc	419.7 cc
Energy, per 24 hours	2,466 Cal. 2,480 Cal.	2,473 Cal.	2,969 Cal.

[1] Rowe, *Jour. Nutr.*, 7 573, 1934.
[2] Rowe and Mortimer, *Endocrin.*, 18: 20, 1934.