mildewed epidermis shows no measurable anaerobic CO_2 production. From Table III it is at once apparent that the infection causes an increase of about 50 per cent. in host fermentation.

TABLE III

Tissue	Anaerobic CO_2 in c. mm			$CO_2/cm^2/hr.$
	1	2	3	Ave.
Normal wheat	1.76	1.80	1.76	1.77
Mildewed wheat ...	2.63	2.70	...	2.67
Mildewed epidermis .	±.03	0.00	±.08	...

The pathogenesis of mildew infection of wheat is correlated with an increase in fermentation and a larger increase in respiration of the host tissue. These changes in the host metabolism occur in the green cells of the mesophyll which are not in contact with, nor invaded by, the hyphae of the mildew. Preliminary measurements of the effect of the disease on photosynthesis indicate that the destruction of functional chlorophyll is subsequent to these changes in fermentation and respiration.

PAUL J. ALLEN
DAVID R. GODDARD

DEPARTMENT OF BOTANY,
UNIVERSITY OF ROCHESTER

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A PRACTICAL BELLOWS RECORDER[1]

THE Brodie bellows is regarded as one of the most satisfactory recorders of volume changes that we have. Various modifications have been suggested from time to time, but most of them are time-consuming in preparing them for use or they are too complicated to be easily practical. One of the most popular methods of preparing the Brodie bellows is with cargile membrane. This method presents several difficulties. A set of patterns is necessary to cut the membrane. The gluing constitutes the most troublesome feature of the preparation. It usually requires a skilled technician to prepare one that is effectively air-tight. After one has been used once, it requires continuous attention to insure its being available for a second use, *i.e.*, it must be covered with cotton and soaked in glycerin in order to keep it pliable. A few months' use of this instrument together with frequent failure on the part of technicians to prepare one properly led the author to study the problem with the purpose of devising an instrument that would not lose in accuracy and yet be easy to prepare.

The following device was finally arranged and has been in use for some time by the author and many other workers. It consists essentially of a base plate of brass, to which is attached an arm for mounting to an iron support. At the distal end of the mounting arm is a small removable block which is fastened to the base plate by set screws. Through the middle of the base is drilled a hole, which is countersunk from above. A threaded brass tube with a shoulder at one end passes through this hole, the shoulder fitting accurately into the countersunk depression. The bellows fold is made by using either a rubber condom or, with the smaller models, a thin finger cot. If a condom is used, it may be cut off at about one-half length, and with the removable block raised or removed, the condom is placed on the brass plate until the closed end extends a little beyond the free end of the brass plate. Note the position where the threaded tube which passes through the brass plate lies. Mark the point on the condom and cut a small hole in it at that point. Remove the brass tube and inserting its small end first into the condom, push the small end through the hole previously cut. Place a little colophonium cement in the countersunk depression. Warm it gently and then quickly thrust the tube through the hole and immediately tighten the wing nut screwed on the tube beneath the brass plate. Now place the open end of the condom under the brass block and tighten the set screws. The bottom of this block should be covered with a thin piece of soft leather or blotting paper and a similar piece should be laid on the top of the base plate lying under the block. In our laboratory, we have taken a piece of leather from a lady's kid glove and have split a thin layer from it. The object of the leather is to form a padding to grip the condom tightly when the thumb screws in the block are tightened.

All that is left to do now is to fasten the aluminum plate on the top of the condom. This is done by placing one edge of the aluminum plate in the groove in the brass block. With a spot of colophonium cement on the under side of the plate and with *very gentle* traction on the condom, heat the aluminum plate with a metal rod or small flame and push it down firmly against the rubber, holding it until the cement has set. The object of making slight traction on the condom is to insure the edge of the aluminum plate being drawn back snugly into the groove in the brass block when the condom is released. In this way a perfect hinge is formed and wobbling is prevented. On top of the aluminum plate may be fastened any type of writing point—straw, aluminum or celluloid. The length of the writing point may be suited to the needs of the experiment at hand.

[1] From the Department of Pharmacology, Boston University School of Medicine and the Evans Memorial Hospital.

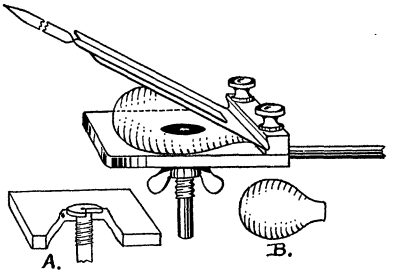

FIG. 1. Bellows recorder.

Fig. 1 is a mechanical drawing of the bellows. Recently we have adopted latex for our balloon material. With this material one can make the balloon any desired shape or size. It is especially desirable to make the balloon smaller in diameter where it passes under the block. Such a shape reduced in size is shown at B in the illustration. At A is a detail drawing of the countersunk depression in the base plate with the brass tube in position. The base plate of the recorder measures 4 cm × 5 cm and is 5 mm thick. It can be made in any shop where tools and a mechanic are available and can be made any desired size. One point indicated in the drawing which might be advantageously changed is the shoulder on the threaded tube which may be made square or, if left round, may be fitted with a tongue which would sink into a corresponding groove in the brass plate. This is to prevent the threaded tube from turning when the wing-nut is tightened, thereby skewing the rubber condom somewhat.

This apparatus has been used in several laboratories, and I have been asked many times to publish a description of it. Dr. Charles Gruber, of Jefferson Medical College, Dr. G. H. Miller, of Iowa City Medical School, and Dr. Fredrick F. Yonkman, of Boston University School of Medicine, have used the bellows and published their results. The bellows was demonstrated at the meeting of the American Society for Experimental Pharmacology and Therapeutics held in Rochester, N. Y., in 1927.

WALTER L. MENDENHALL

"PROPS" FOR COVER GLASSES

A SIMPLE method for "propping up" cover glasses in preparing total mounts of chick embryos, small insects and other specimens requiring raised cover glasses makes use of small bone "curtain rings" which are available in $\frac{1}{2}''$, $\frac{5}{8}''$, $\frac{3}{4}''$ and $\frac{7}{8}''$ diameters, corresponding to standard sizes in round cover glasses.

The bone ring is ground with sandpaper or emery wheel on top and bottom to produce flat adhering surfaces for slide and cover slip. The ground ring is then treated in the same manner as the specimen to be mounted; *i.e.*, washed in distilled water, run through the alcohols, xylol, and impregnated with thin balsam. This procedure is important, especially dehydration, in order that no air or moisture remains in the bony structure to cause "bubbles" or fogging of the balsam after mounting. The rings may be stored in the balsam for later use.

When ready for use, the rings are placed on the slide with sufficient balsam adhering to make a good seal, and then allowed to dry for 24 to 48 hours in a dust-proof cabinet or box. In mounting the specimen, the ring is filled with thick balsam, care being taken to avoid bubbles on the inner and lower periphery of the ring. After placing the specimen in the balsam, more is added until the ring is filled and "heaped" but not overflowing. The cover slip is placed directly over the ring without being pressed down, as the light tension of the cover glass will permit any small bubbles formed to work out and permit some shrinkage of the balsam in drying.

After drying for several days, the ring is "painted" with heavy balsam to form a smooth, even surface finish, and to prevent bubbles of air creeping in as the balsam continues to shrink in drying. An occasional similar application of balsam will make these mounts long-lasting and uniformly neat laboratory slides.

HERTHA M. CORDTS

NEW YORK, N. Y.

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