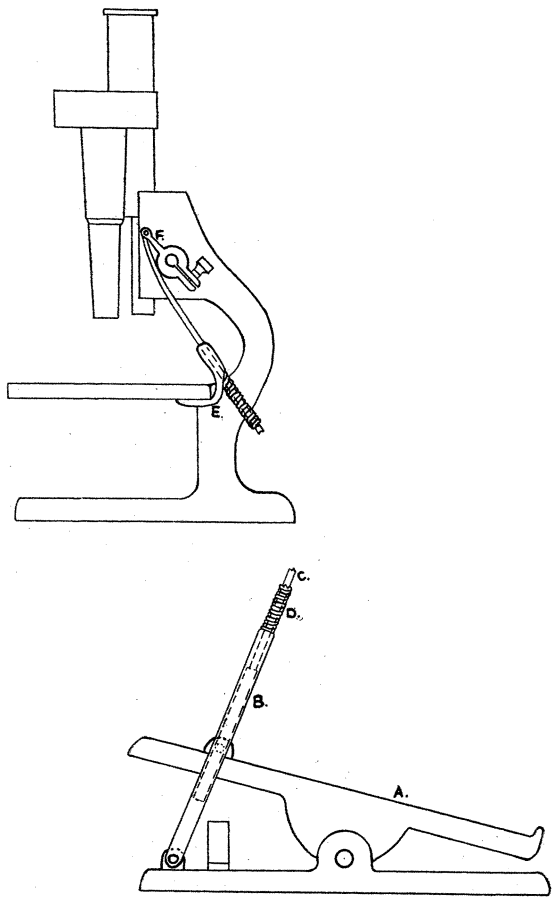

FIG. 1

different thickness, without necessitating any change of the set-up.

It has been suggested that this instrument would be of value in such work as making tissue transplantation in zoological research. It has been of value to the authors in the study of small flower parts in plant taxonomy. It would seem to be a great time-saver in any sort of work where much time is spent in using a dissecting microscope.

It has also been suggested that this device would be of value attached to the fine adjustment of an ordinary microscope for such purposes as making blood counts, or in following the movements of motile organisms, such as protozoa or bacteria.

The investigators in the various fields of research who have felt the need of such a device will be interested to know that the attachment described here, somewhat modified to allow for adjustment to the standard makes of dissecting microscopes, will be put on the market in the near future by the Spencer Lens Company, of Buffalo, N. Y.

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A SIMPLE AND INEXPENSIVE RESPIRATOR FOR SMALL ANIMALS

IN experiments involving opening the thoracic cavity of white rats, collapse of the lungs frequently resulted in death from asphyxiation. Viability depended partly on the point of entrance to the cavity. The animal recovered more frequently after a dorsal than after a ventral incision. Because of the nature of the operation, it was impossible to use the principle of the Drinker respirator, so positive pressure through the trachea was employed to keep the lungs distended.

The respirator is an inexpensive device consisting of a small respirator chamber (capacity 70 ml) attached to a double-acting pump (Fig. 1). The chamber, preferably made of glass, is tapped at five points; one end is covered by a sheet of thin rubber in which a hole is made to admit the muzzle of the animal; a safety valve serves two purposes, easing the suction on the lungs and drawing in fresh air from the outside at each stroke. A mercury manometer is valuable in detecting leakage in the system. The amount of air being pushed into the lungs at one stroke may be regulated by fastening the handle of the pump to the desired radius on the drive-wheel.

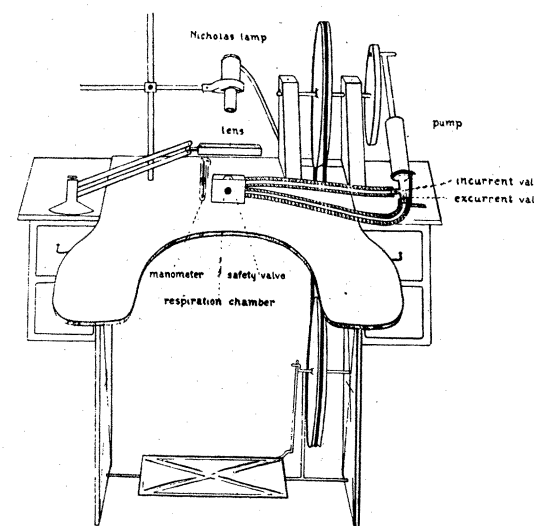

FIG. 1

The whole apparatus is conveniently supported on top of a sewing machine frame by two wooden standards, through the top of which the shaft rotates. The fly-wheel is connected with the treadle wheel by leather belting. It is a simple matter to keep the strokes synchronized with the breathing rhythm of the animal. Slight inflation of the stomach usually occurs, but in only a few cases does it become extreme enough to actually harm the animal.

A specially designed top upon which operations can be performed is superimposed on the sewing machine frame. This gives the proper angle to work the treadle with ease and affords ample surface space for the animal, the lamp, the microscope and the other instruments.

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SPECIAL ARTICLES

THE EFFECT OF HEAVY WATER OF LOW CONCENTRATION ON EUGLENA

EXPERIMENTS[1] in May, 1933, demonstrated that a very low concentration of deuterium oxide (1 part in 2,000) slightly higher than that occurring in ordinary water (1 part in 5,000)[2] has a pronounced effect in increasing the length of life of *Spirogyra* filaments. It was also shown[3] that *Oscillatoria* spread more extensively in this dilute heavy water and that the enzymes, amylase and zymin were less active after incubation in this isotope water. Richards[4] and also Meyer[5] have confirmed the dilute heavy water effect, since they find that it increases the dry weight of yeast and *Aspergillus*.

Increased cell division was observed in *Spirogyra* in the isotope water[6] (possibly due to the greater longevity), so it was decided to try a form like *Euglena* in which cell counts can be made easily. Moreover, it had been shown previously that Euglena grows more rapidly in recently melted ice water than in recently condensed water.[7] Taylor, Swingle, *et al.*,[8] observed cessation of movement in *Euglena* in 92 per cent. heavy water and "no effect" after 6 days in 30 per cent. heavy water, but the cells were not counted at the end of the experiments, which were designed to detect a toxic action of deuterium rather than its rôle in normal physiological processes for which study the concentrated heavy water is obviously not suitable.

Dr. Theo. L. Jahn kindly supplied *Euglena gracilis* from a two weeks' old peptone culture (bacteria free). The solution was washed off by centrifuging five times at low speed with distilled water. Eight Pyrex test tubes, each containing 10 cc of water (four with isotope water of density 1.000061 and four with ordinary glass distilled water) were inoculated with 1 cc of a suspension of *Euglena*, making the average concentration at the beginning of the experiment 31,750 cells per cc (February 10, 1934). The tubes were exposed to northern light (Temp. 17–20° C.) and counts were made after forty-five days (March 28, 1934). It was found that more cells were present in the isotope water, the average population being 59,087 cells as compared to 51,112 cells in ordinary water (Table I). Moreover, there were more active forms in the isotope water as indicated by an average of 4,400 moving individuals per cc as compared to an average of 1,900 moving individuals in the ordinary water cultures. The results are of interest in connection with the greater longevity and increased cell division in *Spirogyra*[9] in the dilute heavy water, and it is possible that a small proportion of deuterium is a necessary constituent of living systems. It will be recalled that Washburn and Smith[10] found that a preferential selection of the heavy H isotope occurs in the process of synthesis of organic compounds by a growing willow tree. In *Spirogyra* and *Euglena* in hypotonic solutions the reduced enzymic hydrolysis[11] may enable the cells to live longer, and consequently there is more opportunity for cell division. Further experiments on a similar longevity effect in *Planaria* are in progress.

TABLE I

MULTIPLICATION OF EUGLENA GRACILIS IN ORDINARY DISTILLED WATER AND IN HEAVY WATER OF LOW CONCENTRATION. AVERAGE POPULATION AT BEGINNING 31,750 PER CC.

Tube No.	Kind of water	Final population (average)
1	ordinary distilled	51,750 per cc.
2	ordinary distilled	50,800 per cc.
3	ordinary distilled	50,400 per cc.
4	ordinary distilled	51,500 per cc.
5	isotope	56,750 per cc.
6	isotope	59,650 per cc.
7	isotope	62,000 per cc.
8	isotope	57,950 per cc.

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INFRA-RED ABSORPTION OF WATER FRESHLY PREPARED FROM ICE AND FROM STEAM

A SERIES of papers,[1] published during the last two years in other than biological journals, dealing with differences in the physiological effects of water freshly prepared from ice and from steam, have come to our

1 Barnes, *Jour. Am. Chem. Soc.*, 55: 4332, 1933.
2 Bleakney and Gould, *Phys. Rev.*, 44: 265, 1933.
3 Barnes and Larson, *Jour. Am. Chem. Soc.*, 55: 5059, 1933.
4 Richards, *Am. Jour. Bot.*, 20: 679, 1933.
5 Meyer, SCIENCE, 79: 210, 1934.
6 Barnes and Larson, *ibid.*
7 Barnes and Jahn, *Proc. Nat. Acad. Sci.*, 19: 638, 1933.
8 Taylor, Swingle, Eyring and Frost, *Jour. Cell. and Comp. Phys.*, 4: 1, 1933.
9 Barnes and Larson, *ibid.*
10 Washburn and Smith, SCIENCE, 79: 188, 1934.
11 Barnes and Larson, *ibid.*
1 H. T. Barnes and T. C. Barnes, *Nature*, 129: 691, 1932; T. C. Barnes, *Proc. Nat. Acad. Sci.*, 18: 136, 1932; F. E. Lloyd and T. C. Barnes, *Proc. Nat. Acad. Sci.*, 18: 422, 1932; T. C. Barnes and T. L. Jahn, *Proc. Nat. Acad. Sci.*, 19: 638, 1933; T. C. Barnes and E. J. Larson, *Jour. Amer. Chem. Soc.*, 55: 5059, 1933.