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.