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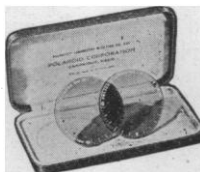
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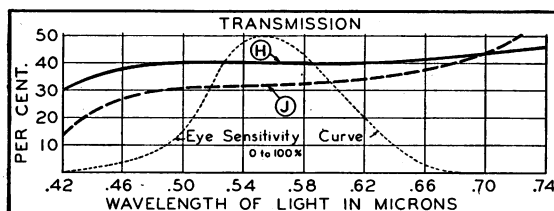
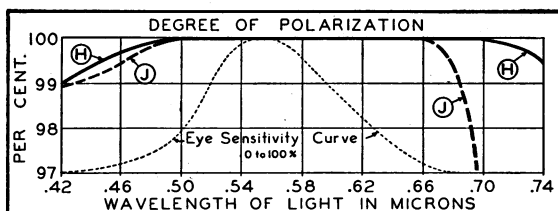
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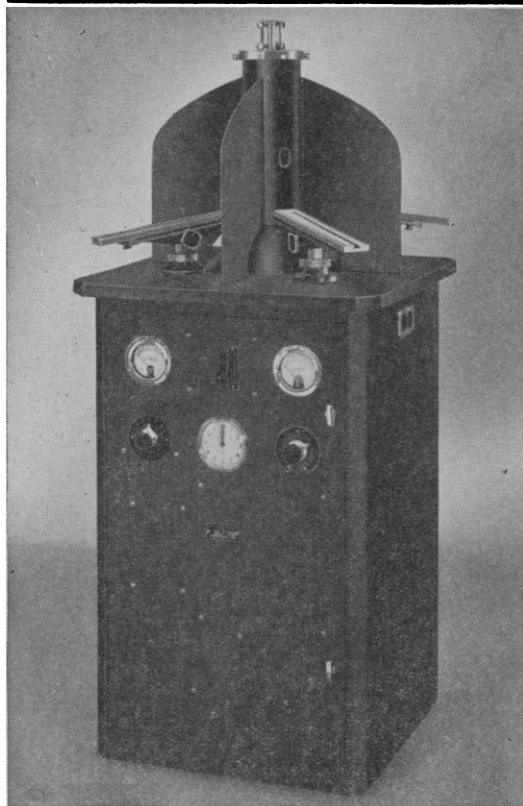
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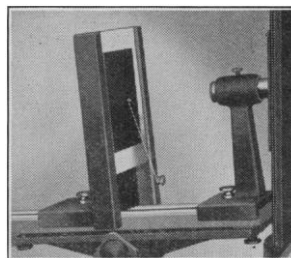


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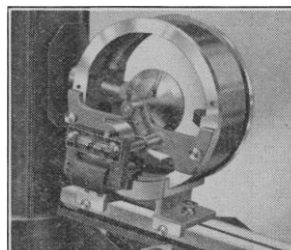
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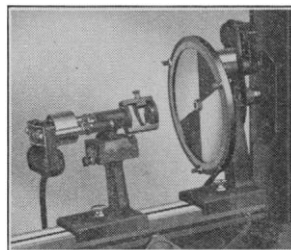
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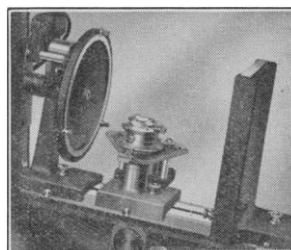
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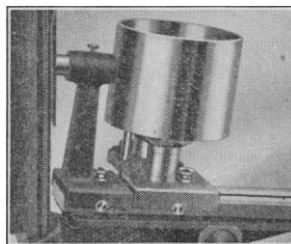
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“But I don’t find myself thinking of it as a business, even in my day-to-day contacts. Rather, my attention is on the voice that says, ‘Number, please.’ I find myself wondering if that voice is feeling as well as it always seems to, or if it feels just as hot and weary as I do, and would say so if it wasn’t the kind of voice it is.

“The first time the business angle really struck home was when I read that my friend Carl had completed thirty years with the company.

“Now it happens that I know something of the details of those thirty years with the company, and I believe they are a credit both to Carl and to the big business for which he works.

“In 1907 Carl was a high school boy confronted with the need for earning money in his spare time. He happened to get a job as Saturday night operator in the telephone exchange. He worked at this job for three years and then entered the university.

“After graduation, he was hired full time by the telephone company, not in an ‘executive’ position which some folks think

goes with a college diploma, but as a lineman.

“Within a year he was made wire chief of the district, a job which he held for the next ten years. He was then transferred to a larger city as manager of the office — then promoted to sales manager of the division.

“A year later he was sent to another State, as district manager. In less than a year, he was made manager for the entire State.

“I don’t know much about the telephone company as a business; I can only judge it by the people who work for it. Just where the dividing line is between a business and the people who work for it, I don’t know. I don’t think there is any line.”

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1. ANSBACHER, S.: *Proc. Soc. Exp. Biol. & Med.*, 46:421:1941.
2. ANSBACHER, S., and LANDY, M. (In Press).

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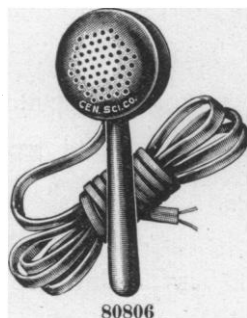
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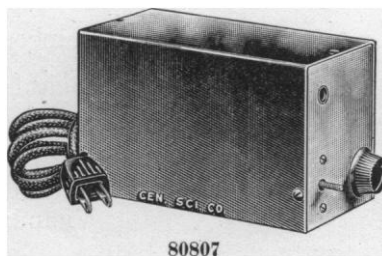
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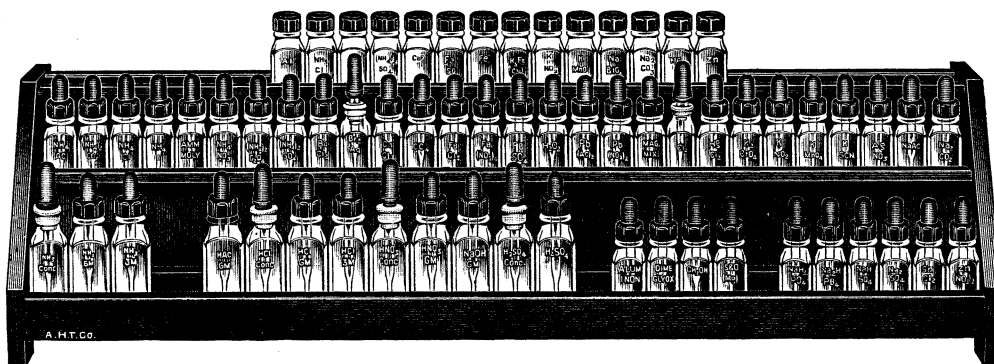
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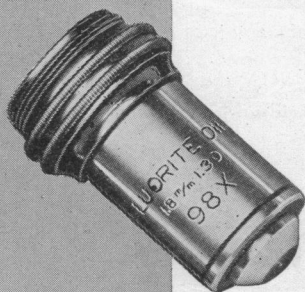
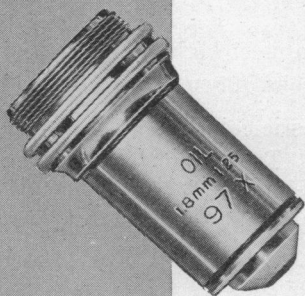
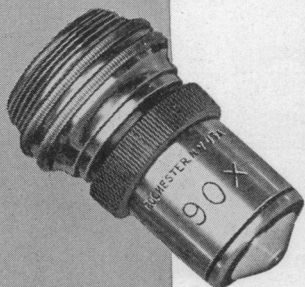
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THE RELATION OF MICROTECHNIQUE TO THE MORPHOLOGY OF SOME PROTOZOAN PARASITES¹

By Professor D. H. WENRICH

UNIVERSITY OF PENNSYLVANIA

To a considerable extent the diagnosis of parasitic protozoa, and certainly the study of their detailed morphology, is dependent upon the application of technical processes of fixing and staining and the necessary accessory procedures. The taxonomy of many protozoan parasites is based upon morphological characters determined by a study of fixed and stained specimens. The diagnosis of intestinal protozoa is greatly aided by resorting to properly prepared fixed and stained slides, and in the experience of my asso-

ciates and myself in making protozoological surveys, both the number of positives and the accuracy of their recognition are greatly enhanced by the study of permanent slides. The tendency to conduct surveys without the use of such preparations is to be deplored.

The following presentation will be largely concerned with intestinal protozoa, to which I have devoted considerable attention for more than twenty years. More especially the intestinal amoebae of man will be considered. During these years several thousand slides have been made and examined; over 130 different chemical substances or different dilutions or combinations of them have been tried out as fixing agents; but not so much has been attempted with different

¹ Condensed with slight revision from the presidential address delivered before the American Society of Parasitologists, December 31, 1940. The complete article with illustrations is published in the *Journal of Parasitology*, 27: 1, February, 1941.

lizes, the carbon dioxide exhaled is absorbed and at the same time the levels of exhalation and inhalation of the spirometer (C) fall. When the level of inspiration falls below a fixed level set by a cam, attached to one of the lips of the pulley-wheel (G), a roller leaf micro-switch² (H) is actuated, causing a solenoid valve³ (I) to open and allowing oxygen to flow from a second spirometer (J) acting as supply into the respiration circuit. A water pressure of 5 to 10 mm in (J) is sufficient to accomplish this. Thus, the oxygen consumed is continuously and automatically replaced during breathing. The supply spirometer (J) may be an old or second-hand (5 liter) clinical machine with flutter valves left in position. The outgoing connection acts as the supply line to the respiration system. At arbitrary fixed time intervals (1, 2, 3 or 6 minutes) a master clock sends an impulse shorting signal closing a double-pole-double-throw relay⁴ which, in turn, opens the solenoid valve⁵ (K) and refills the spirometer through its in-going connection from a high pressure cylinder (L) with reducing valve (M). The level of refilling is set by a cam on pulley-wheel (N), actuating another roller leaf micro-switch⁶ (O), which opens the relay and thus closes the supply valve (K). One sees from the electrical circuit in Figure 1 that valve (I) is always closed when valve (K) is open.

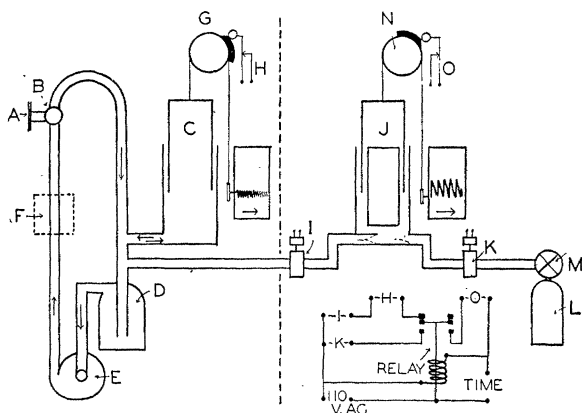


FIG. 1. Apparatus for the continuous measurement of the rate of oxygen consumption.

The motion of the respiration spirometer may describe the type of breathing. The Warren E. Collins,

² Manufactured by the Micro-Switch Corp., Freeport, Illinois; Catalogue No. YZ-RL2 (normally open), \$1.69 list.

³ Manufactured by General Controls, New York, N. Y., Type K-3B, 5/16" port, 110 v. 60 cye., \$6.40 list.

⁴ Manufactured by Struthers, Dunn, Inc., Philadelphia, Pa., Catalogue No. CBTX1, 110 v. 60 cye., \$4.25 list.

⁵ See Footnote 3. Type K-20, 1/4" port, 110 v. 60 cye., \$6.40 list.

⁶ See Footnote 2. Catalogue No. WZ-RL2 (normally closed), \$1.69 list.

Inc., of Boston, supplies a pulley head for (G) which both integrates the respiration volume and closes a contact for operating an electric counter measuring respiration rates. A second record, that of the motion of the supply spirometer, shows a series of refill lines, the height of each representing the oxygen consumed in the chosen time interval. A very accurate estimation of the rate of oxygen consumption may be had by integrating over several of the refill lines.

The method described has been used at this Laboratory for the measurement of the rate of oxygen consumption during work on a bicycle ergometer. Frequent estimation and even continuous records of this measurement were necessary. At the same time, it was desirable to avoid the space-filling handicap always present when using Douglas bags or large collecting spirometers with the usual gas analysis techniques.

In concluding it may be pointed out that there are several features of the above method that are useful under odd and unusual circumstances:

(a) The apparatus to the left of the dotted line in the figure, being portable, and the size of the usual clinical machine, may be placed compactly and conveniently in the experimental room.

(b) The supply spirometer may be permanently located in another room.

(c) The temperature conditions in these two rooms, provided they are constant relative to each other, may be quite different.

(d) For those interested in metabolism in low pressure chambers, where large volumes of oxygen are used at normal basal rates, the part of the apparatus to the left may be used in the low pressure chamber, while the supply unit giving the record of consumption may remain outside the chamber. For this purpose a needle valve in the supply line would be necessary to adjust the flow from the supply spirometer.

A. P. GAGGE

JOHN B. PIERCE FOUNDATION,
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BOOKS RECEIVED

- FENN, WALLACE O., Editor. Fifteen Contributions in a Symposium on *Muscle*; Vol. III, *Biological Symposia*. Pp. ix + 370. Illustrated. Jaques Cattell Press, Lancaster, Pa. \$3.50.
- JONES, CLARENCE F. *Economic Geography*. Pp. xxii + 629. 400 figures. Macmillan. \$4.25.
- MAVOR, JAMES W. *General Biology*. Revised edition. Pp. xxx + 897. 490 figures. Macmillan. \$4.00.
- SHERMAN, HENRY C. *Chemistry of Food and Nutrition*. Sixth edition. Pp. x + 611. 32 figures. Macmillan. \$3.25.
- University of Pennsylvania, Bicentennial Conference: SPEISER, E. A., and others. *Studies in the History of Science*. Pp. 123. \$1.50. ZON, RAPHAEL, and others. *Conservation of Renewable Natural Resources*. Pp. vi + 200. 5 figures. \$2.50. University of Pennsylvania Press.



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Part I—Effective Living for the Individual—Planning for Effective Living. Activity and Health. Care of the Skin. Good Teeth. How We Behave as Human Beings. Food for the Body. The Health of the Vital Organs.

Part II—Effective Living in the Family—Living in the Family. Becoming Good Ancestors. Health in the Family. Healthful Living Conditions in the Home.

Part III—Effective Living in the Community—Man Learns to Plan for Community Health. Lowering the Death Rate. Sanitation. Health Agencies and Health Programs. General Sources for Reference. Appendix A—Control of Communicable Diseases. Appendix B—A Plan for Effective Coordination. Glossary.

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