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PREVENTIVE MEDICINE: AN ATTEMPT AT A DEFINITION[1]

By GEDDES SMITH and LESTER J. EVANS, M.D.

THE COMMONWEALTH FUND

THE relief of pain is an important function of medicine. It is often the physician's first duty to "make the patient comfortable." As soon as clinical medicine gets beyond this palliative stage, however, it becomes preventive medicine. The major function of the physician is to hold disease in check lest disability or death result from it; in other words, to prevent the graver consequences of dysfunction. While it is possible to distinguish between preventive and palliative medicine, it is difficult and generally unprofitable to draw a line between preventive and curative medicine. To cure disease is to cut it short—to prevent its continuance—and so to prevent the consequences of its continuance. Preventive medicine might logically be defined as *all* medicine that seeks to alter the course of disease or to better the patient's physiological status.

For practical purposes, however, the term has commonly been restricted to mean the intervention of the physician or his technical allies in a limited range of situations in which specific diseases can be warded off or specific deterioration of the patient's condition can be forestalled. Such service is possible (at the present stage of medical science) at three different levels which will be considered in turn.

The most conspicuous field for the operation of preventive medicine is communicable disease. All disease is the result of a chain of causes, but in infectious diseases a uniformly essential link in this chain is found outside the body and, in varying degree, is accessible to attack. The external cause can be neutralized by destroying the infective agent outside the body (*e.g.*, killing typhoid bacilli in water) or by specifically increasing the body's resistance to a particular invader (as by immunization against diphtheria). If more were known about the internal fac-

[1] A memorandum prepared in connection with the activities of The Commonwealth Fund.

study, using a ration in which 6 per cent. liver extract (1:20 paste) was included, rats fed butterfat made better, but insignificantly better (Fisher's "t" test)[6] gains over those fed corn oil. The average results of both these studies for the male rats are summarized in Table 2. The results on the females were quite similar in significance.

These studies indicate that, apart from differences in vitamin content, corn oil and butterfat are essentially equal in growth-promoting value for the rat.

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[6] F. E. Croxton and D. J. Cowden, "Applied General Statistics." New York: Prentice-Hall, Inc. 1941.

[1] J. B. Gatenby and J. D. Smyth, *Quart. Jour. Micr. Sci.*, 81, 1940.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A TECHNIQUE FOR MOUNTING FREE-LIVING PROTOZOA

THE mounting of free-living protozoa on to microscope slides has always been a source of trouble to the protozoologist. The method of centrifuging after each stage in the processes of staining, dehydration, etc., suffers from several disadvantages. Firstly, the control of differentiation is difficult; for if over- or under-staining occurs, all the specimens in the tube are affected, and the whole must be re-treated. Secondly, since the organisms have to be centrifuged a considerable number of times in their passage through alcohols, stains, etc., it means that the cells are frequently distorted and true cytological pictures are not obtained. This is especially the case in dividing protozoa, where the protoplasm is less viscid than usual.[1]

Several methods of fixing protozoa to slides have been suggested,[2] but are unsatisfactory for one reason or another. The following method, recently developed by the writer, fixes the protozoa very securely to the slide and is simple and effective to use in practice.

The organisms are fixed in Schaudinn, and brought through 70 per cent. and 90 per cent. into absolute alcohol by gentle centrifuging. A small drop of albumen is placed on a clean slide, and a very thin film produced by smearing it with the edge of another slide —exactly as in the preparation of a blood film. A drop of the concentrated organisms is allowed to fall on to the film of albumen from a fine pipette held about an inch above the slide. The combined action of the dropping force and the rapid coagulation of the albumen by the alcohol, immediately causes the organisms to be fixed securely to the slide. These slides are then placed in absolute alcohol, and treated as ordinary sections.

This method avoids the difficulties mentioned above; the small amount of centrifuging necessary in the preliminary concentrating never being sufficient to damage the cells. The film of albumen, too, is so thin that it causes no interference with the staining reactions of the protozoa.

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ON QUIETING PARAMECIUM WITH METHYL CELLULOSE

MARSLAND[1] has suggested an excellent method of quieting Paramecia for study by the elementary student, using Dow "Methocel," or methyl cellulose in 10 per cent. aqueous solution.

We have found in our laboratory a slight modification of Marsland's method to be even more satisfactory for our purposes. Since 10 per cent. was a little too viscous, we tried 5 per cent., and we suggest this procedure: Make a small ring of 5 per cent. Methocel, slightly smaller than the cover glass to be used. Into the center of the ring place a small drop of medium containing Paramecia. Add a cover glass. Practice teaches one how much of each to use, but less than a full drop of each is often satisfactory with small cover glasses.

This enables the student to observe normal movement for a few minutes before diffusion of the methyl cellulose has slowed him down, and then progressively increasing viscosity gradually slows him to a completely stationary position. At this point he may be placed under an oil immersion objective, and ciliary motion studied in detail. Eventually even this slows down until the cilia appear to beat with great effort.

The Dow Company was very generous in furnishing us with the methyl cellulose.

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[2] J. B. Gatenby and T. S. Painter, "Microtomist's Vade Mecum," London, 1937.

[1] Douglas A. Marsland, SCIENCE, 98: 2549, 414, November 5, 1943.

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OSBORNE, STAFFORD L. and HOLMQUEST, HAROLD J. *Technic of Electrotherapy.* Pp. xix + 780. Charles C Thomas, Publisher. $7.50.

RIEGEL, EMIL RAYMOND. *Chemical Machinery.* Pp. ix + 583. Reinhold Publishing Corporation. $5.00.

WEIMER, BERNAL R. and CORE, EARL L. *A New Manual for the Biology Laboratory.* Pp. vii + 213. John Wiley and Sons, Inc. $2.00.