shown the dry weights obtained by varying both the iron and the manganese concentration in a series of 42 solution cultures of bean plants (*2*), while Fig. 2 is made up of photographs of the same plants. Extreme toxicity of manganese in the absence of insufficient iron and the antidoting effect of iron are clearly shown.

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Penicillin as an Agent for Sterilization of Protozoan Cultures

GERALD R. SEAMAN[1]

Biological Laboratory, Fordham University

Cleveland (*1*) attempted to obtain sterile cultures of *Trichomonas* using bactericidal agents. He states that the search for efficient chemical agents for the sterilization of protozoan cultures "appears to be almost a hopeless undertaking" (p. 256). However, various chemicals have been used successfully upon protozoan cysts. Morgan's (*3*) success in obtaining sterile cultures of *Trichomonas* with the use of penicillin and streptomycin suggested the possibility of using these antibiotics as agents for the sterilization of free-living protozoa.

In the present investigation *Colpidium campylum* was used. Organisms from a wild culture were concentrated by centrifugation and were washed three times with sterile Hahnert's solution (*2*). A few drops of the washed concentrate were then added to a solution of sterile 3 per cent Difco proteose-peptone containing 5,000 units of penicillin[2]/cc. After being in the penicillin solution for 12 hours, the organisms were transferred through three successive washes of 3 per cent proteose-peptone. A drop containing organisms and culture fluid from the third wash was plated on nutrient agar. No bacterial growth was observed on any of the agar slants used in the 8 tests conducted. The colpidia were apparently uninjured by exposure for 12 hours to solutions containing 5,000 units of penicillin/cc.

It appears that this method may be used with success in obtaining sterile cultures of most protozoa. However, with each different species used, preliminary tests must be made to ascertain the length of time the organism will survive in a given concentration of penicillin. If the survival time is extremely short, lower concentrations should be used. Preliminary observations indicate that *Paramecium nucleatum* is killed in 12 hours in solutions containing 5,000 units of penicillin/cc., but remains in a vigorous condition for 5 hours in the same concentration.

The process described above does not require constant attention of the investigator, large numbers of organisms are recovered after the final wash, and the number of transfers is reduced to a minimum, thus reducing the possibility of contamination.

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[2] The penicillin used was supplied by Merck & Co., Inc.

A Monitoring Probe for Radiochemistry Laboratories[1]

CLAUDE R. SCHWOB and RAYMOND NETHER

Department of Chemistry and *Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh, Pennsylvania*

In order to detect contamination of equipment and to protect the health of workers in laboratories handling radioactive materials, it is necessary to have instruments capable of indicating small amounts of radiation at the working space and on the person and clothing of workers. Several excellent portable radiation meters are now on the market, but only the most recent ones are effective in detecting weak radiation, the older ones generally being designed for monitoring X-rays.

As Libby (*1*) points out, the isotopes emitting the least energetic radiation are among the most useful. By substituting a more sensitive GM tube for the one ordinarily furnished, older instruments easily may be changed to permit them to detect a fraction of these weak radiations large enough so that they may be of service in monitoring laboratories. Moreover, the housing for the GM tube described here permits using the tube at some distance from the meter, allowing more flexibility in monitoring and incidentally permitting any scaler to be used as a detector of contamination.

A thin-walled, silvered, self-quenching tube is mounted in a stainless-steel housing, provided with mesh-covered windows over the sensitive area of the tube. The use of stainless steel permits ready decontamination of the probe itself in case of contamination, a nitric acid wash being sufficient in most cases. Fig. 1 shows some of the constructional details of the

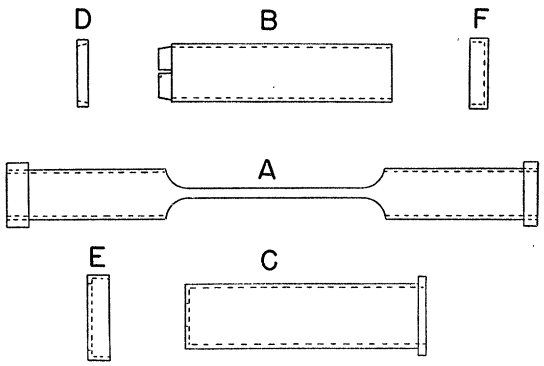

FIG. 1

probes used in this Laboratory. A, the body of the probe, is tubing, 10 inches long and 1 inch in diameter, which is attached to handle C by means of collar E. Tube B slides over A and can be secured in a position over the windows by tapered collar D. When not required in this position to protect the GM tube or to distinguish gamma from beta radiation, it is pushed back toward handle C. By making slide B $\frac{1}{16}$ inch thick, the original calibration (in R's/8-hour day) of a Herbach and Rademan Model GLR-200 Radiation Meter is sensibly unchanged when B covers the windows. With the slide open, the sensitivity of this meter is increased more than 10-fold for energetic radia-

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