ple, and the chromophobes are colorless to very light blue and have purple nuclei.

In using the technique it is best to follow the sections rather closely with the microscope for a while to become accustomed to their appearance at various stages. One advantage of the technique is that if at any time too much stain has been removed the sections can be restained immediately without any further treatment. When using the stains on other tissues less time is necessary in the anilin blue solution.

This method may be used successfully after fixation in a modified Bouin's fluid (using only 1 cc of acetic acid instead of 5 cc) if the sections are mordanted before staining in a 3 per cent. potassium dichromate solution for at least 15 minutes.

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ACTION OF RADIOACTIVE SUBSTANCES ON THE SPEED OF GROWTH OF PENICILLIUM NOTATUM AND THE PRODUCTION OF A POTENT PENICILLIN[1]

WE have based our experiments on the principle that the radiations of minute amounts of radon, or other radioactive substances, have an exciting action on the growth of living substances in contrast with the radiation of larger doses of these radioactive substances which have a destroying power.

Furthermore, a fluorescent substance, for instance, fluorescein, excited by the presence of radioactive substances, emits a light vibration. This light is produced internally in the suspension. The action of small amounts of this light probably has an additional exciting power on living substances.

The radioactive sources used were porcelain tubes filled with emanating radioactive substances (radium). Through the porcelain wall of the tube the radon diffuses. Our cells were prepared for a daily production of about 7 micro curies.

The medium utilized for the culture of *Penicillium notatum* was the usual medium (slightly modified Czapek-Dox medium at PH 6).

For each series of experiments we have studied and compared the growth of the same strain of *Penicillium notatum*,[2] and also the inhibitory power of the penicillin secreted under the following different conditions:

I. Normal growth of *Penicillium notatum* at 24° C.
II. Growth in presence of radon. During the period of irradiation, radon and its short-lived daughter products (Ra A, B, C, C_1, C_2) are present.
III. Growth in presence of radon and a fluorescent substance (fluorescein).

For the control of potency of the penicillin secreted, we have used Heatley's assay method, as described in *Endeavor* of January, 1944. However, we have seeded our plates according to the method described by Thomas, Levine and Vitagliano.[3]

The microorganism tested was a 21-hour culture of *Staphylococcus aureus*.

Under these conditions the Petri dishes examined 24 hours later have shown that the peak of secretion of penicillin, for the irradiated culture, was obtained at least 2 or 3 days before that of the controls.

CONCLUSION

These experiments demonstrate the possibility of substantially decreasing the time required for the growth of *Penicillium notatum* and of obtaining an active penicillin, tested *in vitro,* in the presence of radon and its deposits.

We do not believe that these radioactive substances act through their chemical properties since they are present in negligible quantities. However, it seems reasonable to assert that this action is due to the radiations emitted by these substances. These radiations are Alpha, Beta, Gamma and Delta. As a major part of the radiated energy absorbed by the medium is due to Alpha particles, it seems probable that the observed effect is mainly due to this type of radiation. Experiments are being conducted in order to determine the relative importance in the effect produced by the different types of radiations.

The addition of a fluorescent substance to the medium in which radioactive substances are present improves noticeably the effects of these radioactive elements.

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[2] Received from the Northern Regional Research Laboratory of the U. S. Department of Agriculture.

[3] A. R. Thomas, M. Levine and G. R. Vitagliano, *Proc. of the Soc. for Exp. Biol. and Med.*, 55: 4, 264, April, 1944.

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