SCIENCE

VOL. 97 FRIDAY, FEBRUARY 12, 1943 No. 2511

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SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

Lancaster, Pennsylvania

Annual Subscription, $6.00 Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary in the Smithsonian Institution Building, Washington, D. C.

SCIENCE, AND ITS CHANGING SOCIAL ENVIRONMENT[1]

By Professor P. W. BRIDGMAN

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THE first part of this address dealt with recent work of the author in extending the pressure range attainable in the laboratory. The subject has been similarly treated in the third volume of Science in Progress, published by the Society of Sigma Xi.

And now I will turn from these technical matters, with which I have been personally concerned, to matters of more immediate and vital interest to all of us. In the present world struggle physics has come to occupy a position in the very front line. A large part of the body of physicists has been asked to divert its activities from accustomed channels, and all of us who have been able have rejoiced that the opportunity has been offered and that we can be of service. Because of the obvious importance of the service that physics is rendering, many physicists are anticipating, after the war, a permanent increase of the appreciation of the public for physics, and a great increase in the attractiveness of physics as a profession for our abler young men.

There are, however, other aspects of this rosy future to which I wish to direct your attention. Because of the heavy social impact of the products and techniques resulting from scientific investigation, there is a growing tendency in many quarters to maintain that science, and this of course includes physics, is the servant of society and that all scientific activities should be under complete supervision and control by society or the state. This point of view is finding advocates among scientists themselves. It seems to be growing in favor in some quarters in this country,

[1] Part of the retiring presidential address to the American Physical Society, given at Columbia University, January 23, 1943.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

PRODUCTION OF PANTOTHENIC ACID DEFICIENCY IN MICE WITH PANTOYL-TAURINE

MUCH evidence is accumulating to show that compounds with highly similar chemical configurations may interfere with each other with respect to their effects on living cells. The initial observations on the competitive relationships between sulfonamides and p-aminobenzoic acid in their effect on growth of microorganisms have been abundantly confirmed and extended by such reports as that of McIlwain,[1] who showed that pyridine-3-sulfonic acid and its amide interfere with nicotinic acid metabolism in microorganisms; and of Snell,[2] who showed that the physiologically inactive sulfonic acid N-(α, γ-dihydroxy-β, β-dimethylbutyryl)-turine (pantoyl-taurine[3]) interfered with the metabolism of pantothenic acid by lactic acid bacteria and yeast, apparently by blocking the essential pantothenic acid away from its site of action. No adverse effect of pantoyl-taurine on growth was observed if excess pantothenic acid were added simultaneously to the culture. McIlwain[3] has secured similar results with this substance on pathogenic bacteria. No data have been published concerning the effect of this substance on animals.

Pantoyl-taurine is relatively inactive on single oral or intraperitoneal administration to small mammals. No effects are noted from single doses as high as two grams per kilo of body weight in mice and rats. However, on long continued daily oral administration of pantoyl-taurine at a dose level of two hundred milligrams per kilo of body weight, evidence of pantothenic acid deficiency may be noted. After three to four weeks of such daily administration, growth in standard strains of laboratory mice ceased, the hair became roughened and porphyrin deposits appeared on the whiskers. There were also characteristic behavior symptoms similar to those observed in direct pantothenic acid deficiency.[4] These results were secured on a diet of Purina Fox Chow. This ration contains adequate pantothenic acid for mice in the absence of pantoyl-taurine. It thus appears probable that pantoyl-taurine interferes specifically with the metabolism of pantothenic acid in animals, as it does with microorganisms.

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[1] H. McIlwain, *Brit. Jour. Exp. Path.*, 21: 136, 1940; *Nature*, 146: 653, 1940.
[2] E. E. Snell, *Jour. Biol. Chem.*, 141: 121, 1941.
[3] H. McIlwain, *Brit. Jour. Exp. Path.*, 23: 95, 1942.
[4] J. G. Sandza and L. R. Cerecedo, *Jour. Nutrition*, 21: 609, 1941.

A NEW FIXATIVE FOR ANIMAL TISSUES

A NEW general fixative, superior to any other so far tested, has been developed in connection with the routine toxicological work carried on in this laboratory. This solution not only fixes the tissues well, but it permits brilliant subsequent hematoxylin-eosin staining. It has the additional advantage of dehydrating the tissues as it fixes them.

Fixative:

Picric acid	5 parts
Isopropanol	55 "
Acetone	30 "
Acetic (glacial)	5 "
Formaldehyde (40 per cent. by vol. C.P.)	5 "

The length of fixation depends, as with other fixatives, on the size and nature of the tissues involved. From two hours to four days is recommended. Tissues have been left in this fixative for several days without apparent harm.

The tissues that are not imbedded in paraffin are stored in 70 per cent. isopropanol.

Since this solution fixes and dehydrates at the same time, it permits a direct transfer from the fixative to isopropanol. In general practice, tissues are trimmed and placed in the labeled cheesecloth "tea" bags in which they are transferred from one solution to another and through the paraffins until imbedded.

After fixation the tissues are washed in two changes of isopropanol (nearly absolute), one to two hours in each change. Then they are passed through three changes of dioxane, one to two hours in each change. The tissues are usually left overnight in the third change of dioxane. Infiltration is begun with two hours in a $\frac{1}{3}$ dioxane-$\frac{2}{3}$ paraffin mixture and completed in three changes of pure paraffin, one half to one hour for each, in a vacuum oven.

Tissues are sectioned from 4 to 7 microns thick. The picric acid is removed from the mounted sections with a 1.5 per cent. solution of ammonia hydroxide in 95 per cent. ethanol prior to staining.

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BOOKS RECEIVED

ANDREWS, ALBERT H. *Manual of Oxygen Therapy Techniques.* Pp. 191. The Year Book Publishers, Inc. $1.75.

BOWEN, E. J. *The Chemical Aspects of Light.* Illustrated. Pp. vi + 191. Oxford University Press. $4.00.

Carnegie Endowment for International Peace. Year Book, 1942. Pp. x + 152. Carnegie Endowment.

MABEE, CARLETON. *The American Leonardo, The Life of Samuel F. B. Morse.* Illustrated. Pp. xix + 420. Alfred A. Knopf, Inc. $5.00.

SCHUCHERT, CHARLES. *Stratigraphy of the Eastern and Central United States.* Illustrated. Pp. xvii + 1013. John Wiley. $15.00.

WEISS, EDWARD and O. SPURGEON ENGLISH. *Psychosomatic Medicine.* Pp. xxiii + 687. W. B. Saunders Company. $8.00.