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MOLDERS OF A BETTER DESTINY[1]

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IN fighting a war, the all-absorbing intent is to win. There is little time to analyze the rush of events or to appraise their consequences beyond the war's end. The united objective is rightly success for our arms.

Yet under the pressures of a great war there may be compressed scientific, economic and social developments that might have taken many decades to achieve under less urgent conditions. Their effects on our lives and all civilization may be more wide-reaching and lasting than any military conquest. They constitute one of the most imperative incentives to victory.

No American, least of all any scientist worthy the name, conceivably could endorse war as a justifiable means to progress. The destruction of life and property wrought by the present war far exceeds the havocs of a century's earthquakes. Most of mankind is burning itself on an altar of paganism.

Nonetheless, one fact is inescapable. Despite the recurrent malady of war, history's over-all course is forward. Mankind has the habit of rising phoenix-like from its own ashes to attain greater heights. Progress is immortal.

We emerged from the First World War with a wholly new concept of our possibilities. For the first time we began clearly to see that when the Creator conferred upon man freedom of choice and action, there were placed in man's hands the tools with which he could shape his destiny and modify his future. We learned that it was possible not only to emulate nature but even to excel her in certain fields of creation. We were shocked at how little we knew and at

[1] Address before the General Session of the American Chemical Society, Buffalo, N. Y., September 7, 1942.

saline and a carefully measured amount (1 cc/Kg) injected into the dog whose blood volume is to be measured. After allowing a variable time for mixing, a sample was removed, its radioactivity measured directly and compared with that of the sample injected. The blood volume was a simple matter of division. To determine red cell and plasma volume, the hematocrit provided the necessary relationship for the calculation.

We determined the radioactivity of the recipient dog's blood at various intervals after the injection in order to determine whether there was a curve of disappearance as there is with the dye method; we found no loss of activity for several hours which was more than long enough for thorough mixing. However, a slight but increasing loss of P_{32} from the red cells was observed thereafter, confirming previous observations of Hahn and Hevesy.[3,4] In this respect radioactive phosphorus presents a disadvantage over radioactive iron which, as already mentioned, remains for a long time within the red cell. On the other hand, for ease and simplicity, the method here described enables a determination to be made on one single sample of blood from the dog to be tested and but two direct determinations of radioactivity on the Geiger counter. Incompatibility of donor and recipient, though rare, will make the test valueless because of hemolysis. Our results confirm those of Hahn *et al.*,[2] in that the blood volume as determined in the above-described method is lower than that obtained by simultaneous determinations with the blue dye (T–1284). Additional details will be described later.

The authors are indebted to Dr. John H. Lawrence for supplying the radioactive sodium phosphate and to Dr. Carl Moore for the Geiger counter used in these experiments.

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FREEZING MYRIAPODS FOR PHOTOGRAPHING

PHOTOGRAPHING small myriapods, such as pauropods 1.5 mm in length, presents many difficulties. Distortion especially is pronounced when they are inactivated or killed. The application of anesthetics such as ether, chloroform, chloretone, etc., to immobilize them was not found satisfactory because of ensuing contraction and distortion. Specimens preserved in alcohol or formaldehyde were likewise found to be misshapen.

Slow killing in a sealed moistened cell chamber mounted on a glass slide was tried. By applying heat from a 60-watt bulb at a distance of 6 to 8 inches, the specimens became immobile in a few minutes. This procedure partially solved the problem of getting the desired relaxation but was discontinued when found to be rather erratic.

Finally, quick freezing was tried and found successful. A small glass circular cell was placed on an ordinary glass slide and the bottom covered with thick, black absorbent paper or a mixture of 3 parts plaster of Paris and 1 part powdered animal charcoal. Moisture was added, live specimens placed within, and the cell sealed with a cover slip. The specimens were then exposed to a temperature of $-12°$ C for about 25 minutes which killed them and at the same time preserved a nearly normal appearance.

A fixed focus camera used with a compound microscope was prepared ahead of time. For our set-up it was found satisfactory to use a Bausch and Lomb surface illuminator. When the specimens were ready they were taken from the freezing chamber and immediately photographed. If desirable the cover slip may be removed during exposure and replaced immediately after to prevent drying. Thus, the same specimen may be used more than once. With the light source at our disposal it was found best to keep exposure time ½ second or less, since a longer period tended to curl and dry the specimens. This freezing method should be equally applicable in photographing other small organisms.

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BOOKS RECEIVED

BAKER, EDWARD. *A First Course in Mathematics for Students of Engineering and the Physical Sciences.* Pp. xiii + 295. D. Van Nostrand Company, Inc. $3.00.

COURANT, RICHARD and HERBERT ROBBINS. *What is Mathematics?* Pp. xix + 521. Oxford University Press, New York. $5.00.

COX, JOSEPH F. and LYMAN JACKSON. *Field Crops and Land Uses.* Illustrated. Pp. xiv + 473. John Wiley and Sons, Inc. $3.75.

FREAR, DONALD E. H. *Chemistry of Insecticides and Fungicides.* Illustrated. Pp. viii + 300. D. Van Nostrand Company, Inc. $4.00.

HOSKINS, MARGARET M. and GERRIT VEVELANDER. *Outline of Histology.* Illustrated. Pp. 112. C. V. Mosby Company.

KISER, CLYDE V. *Group Differences in Urban Fertility.* Pp. xii + 284. The Williams and Wilkins Co. $2.50.

KOL, ERZSÉBET. *The Snow and Ice Algae of Alaska.* Illustrated. 6 plates. Pp. 36. Smithsonian Institution.

LANDIS, CARNEY and M. MARJORIE BOLLES. *Personality and Sexuality of the Physically Handicapped Woman.* Pp. xii + 171. Paul B. Hoeber, Inc. $3.00.

WILSON, CHARLES MORROW. *Ambassadors in White.* Illustrated. Pp. x + 372. Henry Holt and Company. $3.50.

[3] L. Hahn and G. Hevesy, *Nature*, 144: 72, 1939.