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EDUCATIONAL DARKNESS AND LUMINOUS RESEARCH[1]

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I

ALMOST any group of scholars would agree that during the past fifty to one hundred years research in the natural sciences has provided truth and principles which are capable of transforming earlier and popular views concerning nature and man. Yet, despite the surpassing fruitfulness of this era of research, it may well be that if or when later generations of man should care to form an estimate of our present generation, they will marvel less at this brilliant research than at the depths of our present educational darkness—less at the intellectual achievements of an amazing century of science that has disclosed the basic facts of man's own nature and man's place in nature, than at our present educational programs which essentially fail to give the new truth and principles to this generation. It is in the field of biology—the life-sciences—that this failure is so flagrant and conspicuous; and it is the truth and principles of this same group of sciences that could otherwise contribute so greatly to the mental and physical well-being of the present generation of mankind. These remarks will therefore deal with certain aspects of this flagrant failure of our educational program to comprehend and teach life-science.

In the course of this discussion it may become apparent that the same familiarity with life-science which is required for modern intellectual life, for good citizenship, for progressive agriculture and husbandry, for better health and for preservation against many diseases, will automatically supply that better knowledge which this audience well knows is needed also to save many thousands of lives from cancer.

II

To every one it is evident that only the primary and secondary schools of a nation have opportunity

[1] Luncheon address before the Cancer Forum, Philadelphia, November 30, 1937.

Evaporation of the preserving fluid is reduced to the minimum. The cost of a container made of this plastic is far less than an equivalent glass container. As soon as polished plates of methyl methacrylate can be secured at a low cost, it will be easy to prepare containers of rectangular form by cementing the sides and ends in the manner described above for cylindrical containers.

Hibben[4] has reported that it is possible to embed biological materials in this plastic. However, Knight[5] pointed out that the process is by no means simple. The solubility of methyl methacrylate in chloroforms suggests that it might be possible to embed rather large objects in a solution of this plastic without recourse to polymerization of the monomethyl methacrylate. However, the writer has so far been unable to secure entirely satisfactory results, due chiefly to excessive shrinkage and the inclusion of air bubbles. The addition of xylene to a chloroform solution of the plastic gives better results and offers an attractive field for further experiment.

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A SIMPLE FEEDER FOR RATS AND MICE

CONTROLLED feeding of dry foodstuffs in nutrition experiments on rats and mice presents several technical difficulties. For exact work the usual wire hopper method is useless, while pastes are subject to infection by moulds and they introduce errors from evaporation.

We have designed a feeder meeting the following demands: (1) The amount must be exactly and quickly ascertainable; (2) enough food to satisfy the appetite must be readily available; (3) soiling of food by urine and feces must be prevented; (4) introduction of extraneous matter, such as sawdust, from the cage must be minimized; (5) the fondness of the animals for eating by holding the food in the front paws should be given scope; (6) the container should be easily filled, weighed and emptied when necessary; (7) it should be cheap and easily made.

We utilized a tall cylindrical tin-can (height, 6½ inches; diameter, 3 inches) having a removable lid. Two platforms were fixed inside the can (these were made from discarded fruit tins) and a rectangular entrance-hole was made in the side. This hole was just large enough to accommodate the head and shoulders, together with the front paws, and we found it convenient to make the hole by crossed cuts so that the triangles which were formed might be turned inwards. The upper and lower ones helped to support the platforms, while the side ones prevented too much lateral movement of the head and shoulders inside.

[4] J. H. Hibben, SCIENCE, 86: 2228, 247–248, 1937.
[5] Henry G. Knight, SCIENCE, 86: 2232, 333–334, 1937.

The lower platform is perforated, with holes large enough to permit food particles to fall through to the bottom of the can, and it extends inwards to a distance about equal to the length of the animal from the tip of the snout to just behind the shoulder blades. From this innermost edge a vertical partition (unperforated) extends to the bottom of the can and is closely applied to its sides. We made the horizontal and vertical parts in one piece.

The upper platform (unperforated) was fixed above the upper edge of the entrance hole, and it extends almost completely across the can except at the back, where it has a vertical drop-piece, as in the case of the lower platform. This partition, with a "pigeon-hole" in its lower end, extends a short distance (less than the height of the "pigeon-hole") below, and behind, the vertical part of the lower section to which it is closely applied. This upper platform acts as a hopper, and its efficiency is, of course, increased by having the front edge higher than the back one.

If the entrance hole is properly made the animal has some little difficulty in withdrawing itself, so that it is obliged to drop any food it holds and use its front paws. This food falls through the perforations and is not lost.

To prevent sawdust being swept into the container we suspend it above the floor of the cage and fit a few wire rungs below the entrance hole to provide support for the hind legs and to permit the animal to squat whilst feeding.

We are at present using a dross made up according to the recipe given by Thomson in the *Journal of Hygiene*, 36: 1, 1936, and find it highly satisfactory.

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BOOKS RECEIVED

BARDÈCHE, MAURICE and ROBERT BRASILLACH. *The History of Motion Pictures.* Pp. xii + 412. Illustrated. Norton. $4.00.

MILLER, JOHN A. *Master Builders of Sixty Centuries.* Pp. xviii + 315. Illustrated. Appleton-Century. $3.00.

SMITHSONIAN INSTITUTION. *Explorations and Field Work in 1937.* Pp. 122. 123 figures. The Institution, Washington, D. C.

Stanford University. *Annual Report of the President for the Forty-sixth Academic Year Ending August 31, 1937.* Pp. ix + 550. The University.

THURSTONE, L. L. *Primary Mental Abilities. Psychometric Monographs, No. 1.* Pp. viii + 121. Illustrated. University of Chicago Press. $2.00.

TRATTNER, ERNEST R. *Architects of Ideas; Story of the Great Theories of Mankind.* Pp. 426. 15 plates. Carrick and Evans, New York. $3.75.

VON EULENBURG-WIENER, RENÉE. *Fearfully and Wonderfully Made; the Human Organism in the Light of Modern Science.* Pp. xii + 472. 18 figures. Macmillan. $3.50.