SCIENCE

VOL. 88 FRIDAY, JULY 22, 1938 No. 2273

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

THE SCIENCE PRESS

New York City: Grand Central Terminal
Lancaster, Pa. Garrison, N. Y.

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.

ZOOLOGICAL SCIENCES IN THE FUTURE[1]

By Professor FRANK R. LILLIE
UNIVERSITY OF CHICAGO

I. INTRODUCTION

As far back as we can follow human records the relations of man and animals have been intimate. The Cro-Magnons in France of 50,000 or more years ago have left accurate and spirited records of animal groups, showing careful observation, that may have been born of the chase but which also displayed imaginative interest that extended beyond physical needs. Primitive man was largely dependent upon wild animal life for food and clothing. How far back the history of domestication of animals goes is still uncertain. The early use of totems and of animal names for families and clans testifies to a feeling of affinity. The satisfaction of needs, the stimulus to artistic impulse and the feeling of a kind of animal brotherhood created the first human understanding of animal life.

Aristotle, who so preeminently embodied the Greek feeling for natural law, is sometimes called the father of zoology, for he was the first great systematizer of animal lore, including not only that handed down, but also his own observations and reflections. He wrote a general "Historia Animalium," and also works on anatomy and physiology of animals, the famous "De Partibus Animalium," on the movements and locomotor organs of animals, "De Motu Animalium" and "De Incessu Animalium"; he wrote also to some extent on the behavior of animals, and all his philosophy is permeated by his zoological reasoning. Thus over 2,000 years ago the principal subdivisions, the philosophical implications and the social significance of zoology were delineated.

The evolution of zoology since may be traced in the enlargement of data, increase of accuracy in determination of facts accompanied by specialization, in the development of theories, in the application of techniques derived largely from other sciences, in economic

[1] Address before the American Association for the Advancement of Science in the conference on Science and Society, Ottawa, June 28, 1938.

With the removal of excess nitrous acid, sodium chloride does not appear to influence the determination. Hence, acetyl-sulfanilamide can be just as readily determined in trichloroacetic acid filtrates as in those obtained by the use of p-toluenesulfonic acid by the following procedure.

One volume of a 15 per cent. solution of trichloroacetic acid is used for each 4 volumes of diluted blood. The free sulfanilamide is determined in the filtrate as described above. To determine the total, 10 cc of filtrate are treated with 1 cc of 2 N hydrochloric acid, heated in a boiling water bath for one hour, cooled and the volume adjusted to 10 cc. The subsequent procedure is as above, except that in place of the 1 M phosphate buffer, a 2 M phosphate buffer containing 0.5 per cent. of ammonium sulfamate is used. The standard solution of sulfanilamide (containing 18 cc of 15 per cent. trichloroacetic acid per 100 cc) is treated as the standard used for determining free sulfanilamide.

For determination of both free or conjugated sulfanilamide in blood, we now employ a 1:20 dilution instead of a 1:10 when an ordinary type of colorimeter is used. With a photoelectric colorimeter greater dilutions of blood can be advantageously used.

Since the disturbing effect of sodium chloride is avoided by the destruction of excess nitrous acid with sulfamate, satisfactory determinations can be made in lower dilutions of urine than previously.

E. K. MARSHALL, JR.
J. T. LITCHFIELD, JR.
DEPARTMENT OF PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS,
THE JOHNS HOPKINS MEDICAL SCHOOL

INDUCING "DORMANCY" IN POTATO TUBERS WITH POTASSIUM NAPHTHALENEACETATE AND BREAKING IT WITH ETHYLENE CHLOROHYDRIN[1]

POTASSIUM naphthaleneacetate inhibits the growth of the buds of non-dormant potato tubers (*Solanum tuberosum* L.) and the pieces treated with it behave like pieces of dormant or freshly-harvested potato tubers inasmuch as they do not grow for a month or more after planting. The inhibiting action of auxin-like substances on the growth of axillary buds is well known.[2] If the potato pieces are treated with ethylene chlorohydrin after treatment with potassium naphthaleneacetate they are stimulated to grow much before similar pieces not treated with ethylene chlorohydrin. The results are like those obtained by treating dormant tubers with ethylene chlorohydrin.

[1] Herman Frasch Foundation for Research in Agricultural Chemistry, Paper No. 167.

[2] K. V. Thimann and F. Skoog, *Proc. Roy. Soc. B*, 114: 317–339, 1934.

Pieces from tubers of the Green Mountain variety were used. These had been stored all winter and untreated pieces showed emergence of sprouts about 12 days after planting. The tubers were cut into approximately cubical pieces weighing about 20 g each, with the skin at the top and one bud in the center of the upper side. They were washed, dried with cheesecloth and placed, bud up, in open petri dishes containing a solution of potassium naphthaleneacetate, 100 mg per liter, so that they were about two thirds immersed in the solution. After standing in the solution four days at 10° C., the pieces were planted in soil for eight days. They were then dug up, washed and the callus cut off in a thin layer. Some of the pieces were treated with ethylene chlorohydrin by the dip method of Denny.[3] They were dipped into a solution of 25 cc of 40 per cent. ethylene chlorohydrin per liter of water and after draining off the excess solution, were stored in a closed container for 24 hours. Control pieces were dipped in water. The pieces were then planted. Ten days later 20 out of 24 treated pieces showed sprouts above ground, while no sprouts had started on the 24 control pieces treated originally with potassium naphthaleneacetate but not subsequently treated with ethylene chlorohydrin.

JOHN D. GUTHRIE
BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH,
YONKERS, NEW YORK

[3] F. E. Denny, *Contrib. Boyce Thompson Inst.*, 1: 59–66, 1926.

BOOKS RECEIVED

DITMARS, RAYMOND L. and HELENE CARTER. *The Book of Insect Oddities.* Pp. 62. Illustrated. Lippincott. $2.00.

EAKLE, ARTHUR S. and ADOLF PABST. *Mineral Tables for the Determination of Minerals by Their Physical Properties.* Third edition. Pp. v + 73. Wiley. $1.50.

DUNNE, J. W. *The Serial Universe.* Pp. 240. 25 figures. Macmillan. $2.00.

MELLON, RALPH R., PAUL GROSS and FRANK B. COOPER. *Sulfanilamide Therapy of Bacterial Infections, with Special Reference to Diseases Caused by Hemolytic Streptococci, Pneumococci, Meningococci and Gonococci.* Pp. xiii + 398. 16 figures. Thomas. $4.00.

MITCHELL, PHILIP H. *A Text Book of General Physiology for Colleges.* Third edition. Pp. xviii + 853. 200 figures. McGraw-Hill. $6.00.

MITCHELL, PHILIP H. and IVON R. TAYLOR. *Laboratory Manual of General Physiology.* Pp. xv + 142. 29 figures. McGraw-Hill. $1.50.

QUAYLE, HENRY J. *Insects of Citrus and Other Subtropical Fruits.* Pp. ix + 583. 375 figures. Comstock. $5.00.

SMUTZ, FLOYD A. and RANDOLPH F. GINGRICH. *Descriptive Geometry; Essential Principles and Applications for Students of Engineering and Architecture.* Second edition. Pp. x + 227. 156 figures. Van Nostrand. $2.50.

WEATHERBURN, C. E. *An Introduction to Riemannian Geometry and the Tensor Calculus.* Pp. x + 191. Cambridge University Press. $3.75.