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EXPANDING CONSCIOUSNESS AND DEMOCRACY¹

By Professor H. W. SHIMER

THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

FROM the point of view of a student of evolution it would seem that much of the trouble in the world to-day results from the age-old conflict between two major impulses of life. These are the impulses of each individual organism to live its own life in unhampered freedom, and the impulse of each individual to seek association with its own group. Life tends to vary, to differentiate, to individualize, a tendency which is in continued conflict with the "herd instinct," the impulse of individual organisms to come together for protection and aggression.

Evolution implies that through the long history of life new types have come into existence through descent, with slight modifications, of new individuals from pre-existing individuals. Life would long ago have vanished from the earth in the face of the diffi-

¹ Address of the retiring president of the Boston Geological Society.

culties and dangers in its environment, had it not been for this overwhelming urge of each individual organism to live and to reproduce.

While, however, life was limited to one-celled and self-sufficient organisms, there could be little advance in evolution. Later single cells came together to form many-celled larger units, with their enlarged possibilities. In each of these the component cells divided the labor of preserving the larger organism, and hence the existence of each individual cell came to depend on the existence of the other cells. And it is possible that in these larger many-celled organisms may have arisen the first diffused beginnings of the impulses which are sometimes classified together as the herd instinct.

From such cooperative beginnings the evolutionist traces the long succession of increasingly compact groups up to their culmination in the swarm, the herd,

clotting or interference with the course of the experiment. Clotting has been prevented even in experiments in which agents which are known to produce intravascular clotting were used. The dye has proved very valuable in experiments conducted by students.

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EFFECTIVE CONTROL OF CULTURE MITES BY MECHANICAL EXCLUSION

INVESTIGATORS working with fungi *in vitro* are unhappily familiar with the common mycophagous mites, which invade their test-tubes and cause many inconveniences by destroying pure cultures or by contaminating them with other fungi or bacteria. Control of these pests is claimed to have been effected by the use of various volatile chemicals which purport to kill the mites and their eggs. Since plant and other materials harboring these mites are brought almost daily into most mycological laboratories reinfestations readily occur necessitating repeated use of these chemicals, most of which are detrimental to fungous growth and noxious to the person using them. The method of control which was developed and is now being used in this laboratory is based on the positive exclusion of the mites from test-tube cultures by mechanical means. The materials to be used are: (a) 10 per cent. gelatin in water to which has been added 2 per cent. CuSO_4 to prevent fungous and bacterial growth, (b) 1 book of L.L.F. cigarette papers and (c) a heavy blotter. About 25 cc of the melted gelatin is poured into a petri dish and allowed to solidify. The cigarette papers are taken from the cover, the small dab of glue that holds the sheets together is cut off, the bundle of sheets is cut in halves, placed in a small preparation dish and sterilized in the dry oven. This treatment with dry heat tends to make the papers separate more readily. The ordinary laboratory procedure now follows: The cotton plug is removed, the tube is seeded and flamed, but instead of replacing the plug the tube is inverted and the hot rim is pressed gently against the surface of the solidified gelatin, thus becoming coated with a thin film of melted gelatin. By touching the gelatin-coated rim to the cigarette papers in the preparation dish the top sheet is neatly picked up and removed and then made to adhere more firmly by pressing it against the resilient surface of the blotter. The tube is now placed upright in a rack with other tubes similarly prepared and so arranged that the corners of the projecting pieces of paper touch. By igniting at a single point, the projecting paper on all the tubes will burn off, leaving neat, circular, paper seals that effectively keep out all faunal and floral contaminants. When sub-cultures are to be made the seal is readily burned

off by flaming, and after the transfer is completed the process of sealing is repeated as before. For cultures in liquid media the gelatin is melted and painted on the rim of the tube with a small brush and the paper then placed on top by means of forceps. If so desired, the cotton plug may be retained but should of course be shoved well below the rim of the tube before sealing. We have tested several brands of cigarette papers, many other kinds of paper, several grades of Cellophane and other materials. All Cellophanes and treated papers such as waxed papers greatly depressed growth of the fungi and of all the others tested only the one brand of cigarette papers made a perfect seal and burned without leaving an undesirable black residue. The efficacy of the method was tested by placing together in the same drawer sealed cultures, unsealed, cotton-stoppered cultures and unsealed cultures heavily infested with mites. After a period of months only the sealed cultures remained free of mites. This new method of mite control has the advantage over older methods of being effective, nontoxic to fungi, inexpensive and easily applied. An illustrated account of this and other mite-control methods will be published elsewhere.

The non-technical assistance by employees of the federal Works Progress Administration is acknowledged.

H. N. HANSEN
WILLIAM C. SNYDER

UNIVERSITY OF CALIFORNIA,
BERKELEY

BOOKS RECEIVED

- American Chemical Society; Papers Presented before the Petroleum Division, Baltimore, April, 1939, Part 1.* The Society.
- BERGMANN, LUDWIG. *Ultrasonics and their Scientific and Technical Applications.* Translated from the German by H. S. HATFIELD. Pp. viii + 264. 148 figures. Wiley. \$4.00.
- BRANDES, GUSTAV. *Bufchi; Vom Orang-Säugling zum Backenwölfler.* Pp. 135. 155 figures. Quelle and Meyer, Leipzig. RM 4, 80.
- DAVIS, WILLIAM B. *The Recent Mammals of Idaho.* Pp. 400. 33 figures. Caxton Printers, Caldwell, Idaho. \$5.00.
- GATES, G. E. *On Some Species of Chinese Earthworms with Special Reference to Specimens Collected in Szechwan by Dr. D. C. Graham; Vol. 85, No. 3040, Proceedings of the U. S. National Museum, 1937.* Pp. 405-507. Smithsonian Institution, Washington.
- HUDSON, JAY W. *The Old Faiths Perish.* Pp. 302. Appleton-Century. \$2.00.
- HYLANDER, CLARENCE J. *The World of Plant Life.* Pp. xxii + 722. Illustrated. Macmillan. \$7.50.
- LYND, ROBERT S. *Knowledge for What? The Place of Social Science in American Culture.* Pp. x + 268. Princeton University Press. \$2.50.
- RORTY, JAMES. *American Medicine Mobilizes.* Pp. 358. Norton. \$3.00.
- SIMMONS, JAMES S. and others. *Malaria in Panama.* American Journal of Hygiene Monographic Series, No. 13, January, 1939. Pp. xv + 326. 32 figures. Johns Hopkins Press. \$1.10.

New MCGRAW-HILL Books

Introduction to Mechanics and Heat. *New second edition*

By NATHANIEL H. FRANK, Massachusetts Institute of Technology. 383 pages, 6 x 9. \$3.00

As in the first edition, the chief aim of this text is to develop a logical, unified treatment of the subject matter, comprising the topics of mechanics, acoustics, and heat, so that the beginning student may learn to appreciate and to utilize fundamental and general methods of attack on problems in all branches of physics. The new edition offers revisions of the material on kinematics of linear motion, static elasticity, etc.

Geology. Principles and Processes. *New second edition*

By WILLIAM H. EMMONS, GEORGE A. THIEL, CLINTON R. STAUFFER, University of Minnesota, and IRA S. ALLISON, Oregon State College. 451 pages, 6 x 9. \$3.75

This standard text gives, as before, a thorough, balanced treatment of all the essential topics covering the materials of the earth and the processes that operate at the earth's surface. The text has been carefully revised to meet more adequately the needs of the first course in physical geology.

Calculations of Quantitative Chemical Analysis

New fourth edition

By LEICESTER F. HAMILTON and STEPHEN G. SIMPSON, Massachusetts Institute of Technology. *International Chemical Series*. 298 pages, 5½ x 8. \$2.50

The revision of this standard text covering the stoichiometric principles involved in quantitative chemical analysis presents 150 new problems, in addition to a new section giving the essential steps in the more common analytical determinations.

Synthetic Projective Geometry

By R. G. SANGER, University of Chicago. 175 pages, 5½ x 8. \$2.00

Developing projective geometry by methods used in high school geometry, this important new text first treats completely the projective aspects of the various phases of the subject and then makes specializations which relate the new geometry to classical metric plane geometry.

Deserts

By GAYLE PICKWELL
San Jose State College

174 pages, 9 x 12,
64 full-page photographs. \$3.50

This book shows, in striking photographs and text, how living things may survive where water is very scarce and where high temperatures prevail. The author tells the dramatic story of the struggle for existence under these unfavorable conditions.

Birds

By GAYLE PICKWELL

252 pages, 9 x 12,
59 full-page photographs. \$3.50

Birds is not another of the familiar manuals for the identification of birds. Instead, it explores the interesting field of bird homes and home life, bird foods and feeding habits, bird travels, and bird feathers.

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New Books

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By Carleton S. Coon. Ready April 25th.
\$5.75 (probable)

This important new book is an extraordinarily well-rounded, comprehensive, and scholarly survey of the racial history of white humanity from its Pleistocene beginnings to the present. Based on a thorough study of data from many different fields of investigation, it brings scientific sanity to problems that have become today focal points of emotional controversy.

The Chemistry of Organic Compounds

By James B. Conant. Revised Edition to be ready in May. \$4.00 (probable)

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Theoretical and Applied Electrochemistry

By M. deK. Thompson. Third Edition to be ready in May. \$5.00 (probable)

A full year's course in electrochemistry for engineering students is systematically presented in this book. In the new Third Edition the whole text has been largely rewritten to cover the many great advances in this field both in theory and in industrial applications. There are also many new problems, with solutions given at the end of the book.

The Phylum Chordata

By H. H. Newman. \$3.60

This new text, by an inspiring and experienced teacher, sets the pace for a memorable course in vertebrate zoology or comparative anatomy. It spreads before the student the fascinating and amazing history of the vertebrates in such a way that he may see the broad significance of the data he observes in his laboratory work, and carry away from his study a sharpened facility for observation and an enriched understanding of the vertebrate world around him.

Biology of The Vertebrates

By H. E. Walter. Revised Edition to be ready in May. \$4.00 (probable)

The new edition of this text provides a full course of study on the vertebrates, outstanding for its effective organization of material, its interesting style of presentation, and the inclusion of a liberal amount of useful background information.

Elements of Plant Pathology

By I. E. Melhus and G. C. Kent. To be published in May. \$4.50 (probable)

The excellent choice of material, the unusually effective and interesting presentation, and the unique illustrative equipment all combine to make this new book the outstanding text on the market for introductory courses in plant pathology. Attention is focused on parasitism—on living organisms in disease processes. The individual diseases discussed are widely representative. 258 diagrams and photographs—most of them original—illustrate the book.

Macmillan, New York