



## Vertebrates:

### *Their Structure and Life*

By W. B. YAPP, *University of Birmingham, England*

This textbook provides a clearly written, up-to-date introduction to comparative anatomy for undergraduate courses. The first seven chapters survey the vertebrate classes; the last fourteen chapters analyze and compare the organ systems. The author attempts throughout to relate structure to function, thus enabling the student to see the evolutionary value of the parts of the body as they change with time.

1965 544 pp. 200 illus. \$8.50

## Invertebrate Zoology

By PAUL A. MEGLITSCH, *Drake University*  
Offered in this work is a thorough, balanced coverage of invertebrate zoology and a discussion of structure, classification, phylogeny, habits, and development of various invertebrate groups. Considerable attention is given to physiology with the discussion kept at a level that will be intelligible to the general student of zoology. Line drawings with detailed captions are featured.

June 1966 650 pp. 400 illus. prob. \$10.00

## Inorganic Chemistry

### *Two Volumes*

By C. S. G. PHILLIPS, *Tutor in Chemistry*,  
and R. J. P. WILLIAMS, *Lecturer in Chemistry, Oxford University*

In the belief that inorganic chemistry should be a stimulating intellectual and experimental inquiry rather than a feat of memory, the authors have compiled a two-volume text for advanced students and research workers which gives more weight to broad general principles and the comparative chemistry of the elements than to the detailed descriptive chemistry of individual compounds. Volume I deals with fundamental principles and the chemistry of non-metals. Volume II treats the chemistry of metals.

Volume I 1965 704 pp. illus. \$8.00

Volume II  
Spring 1966 700 pp. illus. \$8.00

## The Mystery of Matter

Prepared by THE AMERICAN FOUNDATION FOR CONTINUING EDUCATION. LOUISE B. YOUNG, *editor*

For students in introductory science courses, this collection of writings by leading scientists and authors traces the development of the concepts of atomic physics and the structure of matter. The articles have been selected and arranged to provide a basis for understanding the problems and implications of the atomic age, to give an insight into scientific method, and to instill a sense of the excitement of discovery that comes with a new understanding of nature.

1965 704 pp. 117 line drawings

51 halftones text edition \$7.50

**Oxford University Press**

417 Fifth Avenue  
New York, N.Y. 10016

graph paper. In acoustics, electronics, chemistry, and other fields, logarithmic scales have proved to be invaluable—the decibel scale, for example, or pH. Some years ago I presented many unanswerable arguments for using a logarithmic scale [*J. Opt. Soc. Am.* **32**, 229 (1942)]. With the equipment described in that paper, many millions of spectral curves have been plotted—with logarithm-of-frequency used as abscissa—and have had a variety of applications.

WILLIAM A. SHURCLIFF  
*Cambridge Electron Accelerator,  
Harvard University,  
Cambridge, Massachusetts*

### Toward Innovation

In his editorial "Barriers to innovation" (15 Oct., p. 295), Wolfe points out that "In new and undeveloped areas such as space exploration, only cost, ingenuity, and technological feasibility place limits on innovation. But innovation in civilian industry encounters a number of other barriers." There is no question that innovation is primarily controlled by political considerations—economic, social, managerial, fiscal, regulatory. Technological knowledge is an impotent force unless political consensus creates a climate conducive to its application. Such consensus requires fresh attitudes by those who control the resources for innovation—government, industry, labor, and the professions. The problem is how best to gain such new attitudes.

I suggest that we would do well to experiment with new institutional relations between these power groups in order to make them aware of the mutuality of enlightened self-interest in innovation. Such awareness can lead to progressive attitudes and to actions that are complementary instead of antagonistic. The School Construction Systems Development project in California (set up by Educational Facilities Laboratories, 477 Madison Avenue, New York 10022) is one example of a successful experiment where new institutional relations helped create an improved climate for innovation—in this case, in building technology. Plans are now being considered by other groups to conduct similar experiments in other parts of the country on other functional needs of society, for example, transportation and education. . . .

My recent experiences in govern-

ment and in industry make me as hopeful as Wolfe that increasing attention is being paid to the nontechnical barriers to innovation. As yet, however, we are for the most part still talking singly. Let us experiment together.

MICHAEL MICHAELIS  
1735 Eye Street, NW,  
Washington, D.C. 20006

### How the Spider Got into the Psalm

In 40 years of Old Testament study I have never come across a spider in the Psalms. Frank Allen (Letters, 29 Oct., p. 554) claims he sees one in Psalm 90:9—

*Ki kal yomenu panu b'ebascha,  
Kilinu shanenu k'mo hegeh,*

the second line of which he translates, "We spend our years like a spider," adding "—spinning our webs of life."

Beautiful poetic imagery, but not a translation of the Hebrew text.

Psalm 90 was written about 550 to 450 B.C. It was incorporated into the final edition of the Psalter circa 100 B.C. The whole of the Hebrew Bible (Law, Prophets, and Hagiographa) was canonized at Jamnia, Palestine, in 93 Christian Era. Then came the translations: Western Aramaic (Targum), Greek (Septuagint), Latin (Vulgate), Arabic (Saadya Gaon), German (Luther), and English (Coverdale, 1535; King James, 1611; Protestant American Standard Version, 1901; Jewish Publication Society, 1917; New American Catholic Edition, 1952; Protestant Revised Standard, 1952). Not one hints of a spider in Psalm 90.

In the University of Chicago's *An American Translation* (1931), J. M. Powis Smith renders Psalm 90:9—

For all our years vanish in Thy wrath,  
We come to an end; our years are  
like a cobweb wiped away.

I find no more textual basis for Smith's cobweb than for Allen's spider. The literal translation, the English for every Hebrew word, is:

For all our days we have faced Thy  
wrath,  
We end our years as in a sigh.

The Psalms are Hebrew poems. Biblical Hebrew poetry is characterized by parallelism; the words or clauses of the alpha half of a verse parallel those of the beta half. Thus *yomenu* ("our days")

in Psalm 90:9 alpha parallels *shanenu* ("our years") in beta. *Kal . . . panu* ("all . . . we have faced") parallels *kilinu* ("we end") in beta. This leaves us *b'abrascha* ("thy wrath") demanding a matching term. *K'mo hegeh* ("as in a sigh") is given.

The spider appears but twice in the Hebrew Bible: Job 8:14—"And the web of the spider is his trust," and Isaiah 59:5—"And they shall weave a spider's web." The Hebrew for spider is *akkabis*; for web, *kur*.

How did Smith and his disciple Allen get entangled in spinneret silk? Whence the "cobweb?" They somehow extract it from the phrase *k'mo hegeh* ("as in a sigh"). Some translators render the two words, "as a tale that is told." The noun *hegeh* derives from the verb *hagah*, meaning to point, to pierce, to reason, argue, pronounce, recite, spell, murmur a charm. *Hegeh*, the noun, is found three times in the Old Testament: our Psalm 90:9; Job 37:2—"And the sound that goeth out of His mouth"; and Ezekiel 2:10—"And there was written therein lamentations, and *moaning*, and woe." There is neither spider nor web associated with *hegeh* in these verses.

Smith knew post-Biblical Hebrew literature (Talmud and Midrash), where in the spider symbolizes bad luck. In the Babylonian Talmud, for example, we find, "The evil inclination is at first like the thread of a spider. . . ." The evil inclination is the fuel kindling God's wrath. Thus Smith rounds out the parallelism in concept, forging a gossamer link between *hegeh* and "cobweb." Allen must have reasoned: where there is a web there must be a spider.

ELY E. PILCHIK

Congregation B'nai Jeshurun,  
457 South Centre Street,  
South Orange, New Jersey 07079

## Erratum: Wrong Man

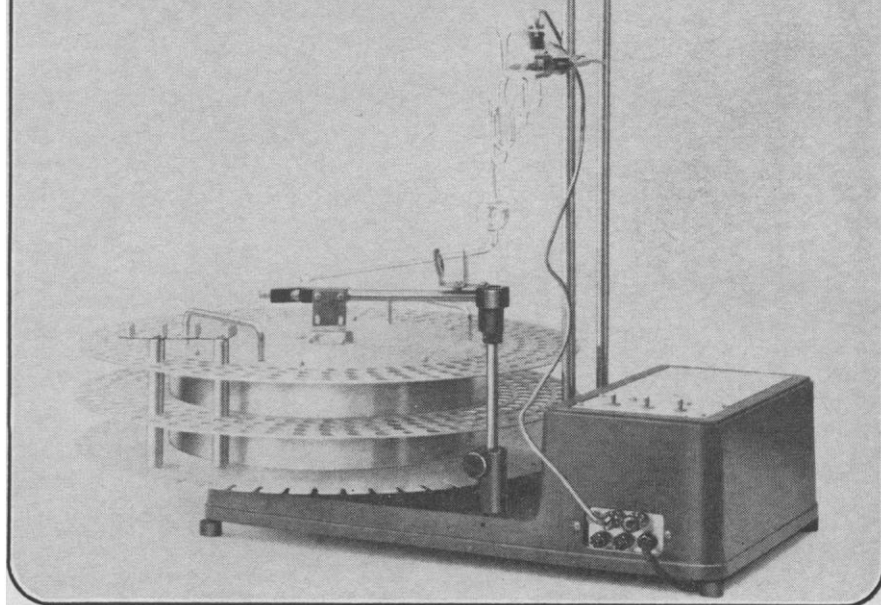
In my letter in the issue of 24 December ("Looking ahead," p. 1667), I erroneously made Klement Gottwald, instead of Walter Ulbricht, the protagonist of "a story popular in Germany (East and West) during the 1950's." I am indebted to Károly Balogh for reminding me that Gottwald was Ulbricht's Czech counterpart.

F. C. DYER

4459 Cumberland Avenue,  
Chevy Chase, Maryland

28 JANUARY 1966

# Old Reliable

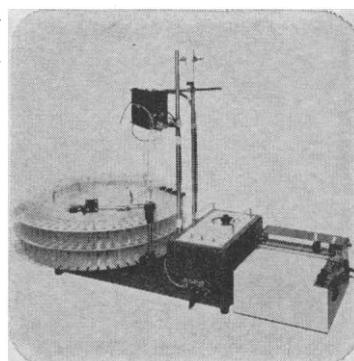


**T**he newest, most versatile version of this famous fraction collector, currently serving scientists in more than a thousand laboratories all over the world, is now available for immediate delivery **direct** to you from Canalco's plant in Rockville, Maryland.

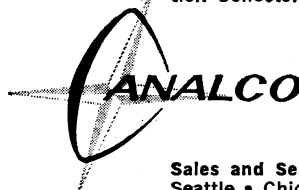
**W**ith the Canalco 1205 Fraction Collector, you can have accurate volumetric siphoning (2, 5, 10 or 20 ml fractions), timed flow (18 seconds to 2 hours) and drop counting (1 to 400 drops). Interchangeable turntables hold either 150 or 240 test tubes to collect fractions up to either 5 or 20 ml.

**C**analco's own factory-trained technical representatives stand ready to assist in installation and guide you in operation at no extra cost. Canalco thus gives you double assurance of the same dependable, trouble-free performance on which this collector has built its unsurpassed reputation for quality and reliability. A two-year warranty provides added protection.

**F**or sample collection plus flow analysis, the Canalco 1205 makes an integrated system with Canalco's Wide-Track 85 Ultraviolet Flow Monitor. Available in three models—all with true ratio recorders whose charts are as wide as this full three-column page—the Wide-Tracks give **more sensitive detection** of both proteins and nucleotides, and **cost less**, than any other flow analyzers. Options include **automatic scale expansion**, **automatic baseline compensation**, extension cables for cold-room use and choice of cuvette pathlengths. When ordered together, the Canalco 1205 and Wide-Track come with interconnecting cable for the Wide-Track's event marker pen.



Contact Canalco direct for full details on the Canalco 1205 Fraction Collector and Wide-Track Flow Monitor. Write or telephone:



## CANAL INDUSTRIAL CORPORATION

5635 Fisher Lane, Dept. E-1  
Rockville, Maryland 20852 / (301) 427-1515

Sales and Service Offices in • Boston • Houston • New York • Seattle • Chicago • Los Angeles • Pittsburgh • Washington, D.C. Cincinnati • Memphis • Cleveland • Minneapolis • San Francisco