New Text Received with Wide Acclaim

GENERAL ZOOLOGY

By TRACY I. STORER
Professor of Zoology, University of California at Davis

McGraw-Hill Publications in the Zoological Sciences

798 pages, 6 x 9, 551 figures, 5 colored plates. $3.75

This immediately successful text has won enthusiastic response from teachers everywhere, who have acclaimed it as one of the most important contributions to the field of zoology that has appeared in recent years.

The following comments are representative:

"I have made a careful examination of this book and sincerely believe that it is the best textbook in general zoology that I have ever seen. I have decided to use it as the text in my course in medical biology, beginning next semester."

Professor H. W. CURRIE
Queen's University

"I have explored its pages carefully and can say unhesitatingly that no zoology text of recent years has caught my eye to the extent that it has. It is a worthy addition to the McGraw-Hill Publications in the Zoological Sciences and I predict for it a very high place among the outstanding American textbooks in zoology."

Professor HALBERT M. HARRIS
Iowa State College

"I have very carefully gone over this book and am very much impressed with the contents. . . . The arrangement is splendid and the great number of concise tables for each group of animals is not excelled."

Professor C. R. JONES
Colorado State College

"Professor Storer should be congratulated on his success in setting forth the principles underlying animal biology, treating clearly modern phases of the subject, and yet including a comprehensive systematic survey of the animal kingdom within the confines of a single volume. Among the specific features that will prove valuable to the student as well as the teacher are: (1) a sane allotment of space to the various fields in which the subject matter of a general course must be divided; (2) the logical sequence in which the subject matter is discussed; (3) the new text figures and clear diagrams included; (4) the ease with which reference can be made to such figures, by chapter; (5) concise tables, summarizing various topics; (6) the printing of important words and anatomical terms in bold face Italic; (7) an adequate index, and glossary; and (8) the explicit colored figures.

"I am counting on adopting it for the work of the future."

Professor B. P. YOUNG
Cornell University

"It was a red-letter event when I received Storer's General Zoology. Without hesitation I pronounce it by far the best of all the recent zoology texts. I am amazed at the amount of valuable text material that has been crowded into its pages. What pleases me most of all is not only the evidence of sound scholarship but of the author's ability to write well and in language the student can readily understand. . . . Storer's General Zoology is my text of choice the coming year."

Professor EDMUND JAGER
Riverside Junior College

"It is a very fine book, in the production of which both the author and publisher may well be proud of their achievement."

Professor HAROLD KIRBY
University of California

"I like the book and feel it is a real contribution toward bridging the gap between the principles and type course. The figures, the bibliographies, and the occasional change in size of type make it a very attractive text. It will serve the general student as a permanent work of reference long after his interest in it as a text has ceased."

Professor MELVILLE H. HATCH
University of Washington

"General Zoology seems to me to be the finest general zoology text yet. The order of treatment of the various aspects of the subject is very effective, the method of treatment excellent, and the illustrations are superb."

Professor THOMAS H. MONTON
Niagara University

"I have examined it carefully and have passed it on to the other members of this Department for their opinion. The consensus is that it is without doubt the best text on general zoology that has been published, I hardly see how we can afford—not to adopt it, and we plan to do so in the fall term. I predict that this text will become extremely popular."

Professor ROSS E. HUTCHINS
Mississippi State College

Send for a copy on approval

McGRAW-HILL BOOK COMPANY, INC.

330 West 42nd Street, New York, N. Y.  Aldwych House, London, W.C.2
SPIRAL NEBULAE

The arms of spiral nebulae, those gigantic pinwheels of the universe, have been discovered to be trailing their central region by Dr. Edwin Hubble, of the Mt. Wilson Observatory. His investigation, reported in the Astrophysical Journal, is of importance in the study of the origin and development of nebulae, the most familiar of which is the Milky Way.

Spiral nebulae, comparable in size to our stellar system, are millions of light-years away. Billions of stars, luminous gaseous matter, and dark clouds obscuring portions of the brilliant center form this whirlpool of light.

Dr. Hubble slips the missing piece of the puzzle into place by developing a criterion for determining the direction in which these whirling masses are inclined. We see them as images projected against space and whether they are tilted toward us or away would decide, in light of their spiral pattern, if the arms are trailing or leading.

It has been believed for some time that the dark lanes visible only on the slightly tilted nebulae are the key, but dispute arose as to whether they marked the far or near side. Working with the entire collection of Mt. Wilson photographs, including those made with the aid of the famous 100-inch telescope, Dr. Hubble eventually found a spiral nebula which showed both the dark lanes and the spiral pattern. The dark lines were silhouetted against the central or nuclear bulge, showing that the dark bands unmistakably denote the nearer side. Other nebulae studied support his assumption that the arms were trailing.

From the slant of the spectral lines it is known that all spiral nebulae are traveling in the same direction. Having once determined that direction, Dr. Hubble concluded that the arms of the nebulae are trailing in all spirals.

NEW COSMIC RAY THEORY

Cosmic rays are due to protons which plunge into the earth’s atmosphere from outer space, and the proton splits into ten mesotrons. This is the latest theory which Dr. W. F. G. Swann, director of the Bartol Research Foundation of the Franklin Institute, proposes in The Physical Review.

Dr. Swann has long contended, in company with many other distinguished physicists, that the incoming particles responsible for the rays are protons. Others have contended that they were high-speed electrons. He now adds a further detail to the theory, that the proton splits into ten mesotrons. This theory, he believes, is the only one that satisfactorily accounts for the variation of cosmic ray intensity with the latitude and altitude.

The proton is the positively charged particle found in the central sun or nucleus of an atom. It has about the weight of the hydrogen atom, the nucleus of which is composed of a single proton, around which revolves a single negatively charged electron. The electron has only 1/1800 the weight of a proton.

The mesotron is the elusive and exceedingly short-lived middleweight particle, with a weight about 1/10 that of the proton. Its life span is only one to two millionths of a second. Consequently many are found high up in the atmosphere, but much fewer lower down. Not many live to reach the earth’s surface. During its brief flight, the mesotron parts with most of its energy and degenerates to an electron.

COLOR CHANGES IN ANIMALS

When a chameleon flashes from brown to green in a few seconds, or an eel more sluggishly takes several hours to shift from dark to pallid in skin hue, don’t seek the cause for this difference in rates in the nerves of the one animal or the gland secretions of the other. Professor G. H. Parker, of Harvard University, spoke on this subject before the Philadelphia meeting of the American Philosophical Society.

Quickness of color change in some animals, slowness in others is determined primarily by the skin’s pigment-containing cells themselves. This is contrary to the zoological doctrine most widely held at present, which states that the quick-changing animals do the trick by means of nerve impulses, while the ones that alter their colors slowly depend on hormones or gland secretions.

This opinion, Dr. Parker said, was based on the examination of only a few animals, and falls down when a score or more species, a wide range of color-changing speeds, are examined. As a matter of fact, the quick-changing chameleon depends on hormones, the slow-changing eel on nerves.

Slowness of response by color cells to either hormone or nerve stimulus has an analogy in a similar slowness in muscle cells. A small’s muscles simply can not move otherwise than very deliberately, while a flea’s muscles always contract with a lightning-like snap.—FRANK THONE.

ISLANDS IN THE PACIFIC

Truk, in the mid-Pacific, is a doomed island. Unless geologic processes now going on in the earth’s crust beneath that part of the ocean are stopped or reversed, it will eventually be drowned. The only trouble is that this won’t happen in 1943 or 1944—geologic processes are slow.

That Truk is sinking, while other islands that are now enemy strongholds are slowly rising, was pointed out in an address by Professor Frank Herbert Hobbs, of the University of Michigan, before the meeting of the American Philosophical Society. Professor Hobbs has seen Truk and the other Japanese-mandated islands since they passed under the flag of the Rising Sun. He visited there in 1921, when Japan had just taken over and when our relations with that country were on a much more cordial basis than they have been recently. He was shown many courtesies by the officials in charge, who helped him in the geological studies he was making of the basic geology of the Pacific area.

For geologists interested in the story of mountain-building, most unique opportunities for study are offered by the several curving island chains in the Pacific, from
the Bonins through the Philippines and Indies and far on to the South Pacific archipelagoes and New Zealand. Elsewhere on the earth, whenever a mountain chain has started to grow, it has immediately been attacked by erosion, which cuts it down even as it rises above the general crustal level. These are-like strings of islands, however, are only the tips of mountain chains now forming as vast upthrust wrinkles from the ocean floor. Erosion therefore plays no part on their long, submerged flanks.

Only on the emersed tips which are the islands have the waves and the weather any chance to do any carving; and this is even a help rather than a hindrance to the geologist. For when an earthquake cycle has boosted the island out of the water another few feet, the waves obligingly carve a notch all around its shores, marking the new level. And if it should sink again, a coral reef forms, indicating the amount of submergence. The island thus serves as a natural measuring-stick for the geological progress of the submarine mountain system of which it is the apex.—FRANK THONE.

INVISIBLE FILM REPELLING WATER

One of the most difficult problems faced by radio engineers has been water getting into the porcelain insulators. When that happens, they don't insulate any more, and the set weakens—even stops working altogether. Usual practice has been to treat the insulators with wax; but that is rather impermanent.

Dr. Winton I. Patnode, research chemist of the General Electric Company, has developed a new treatment for these insulators that is said to be about nine times more effective than waxing them, and with permanent results that defy heat, chemical solvents like gasoline, naphtha and carbon tetrachloride, and long exposure to ordinary weather. Objects treated with it simply won't let water wet them. If moisture precipitates on them, it remains rounded up as round droplets, and the wide dry spaces between continue to defy the electricity to pass.

The process is quite simple, but as yet not at all well understood. The objects to be made water-repellent are simply placed in a closed cabinet, and the vapors of one of a group of substances known chemically as the methyl chlor silanes are flooded on them. An after-treatment with ammonia vapor is sometimes desirable, to neutralize corrosive acids that may collect during the moisture-proofing.

Dr. Patnode has been unable to demonstrate the presence of a tangible film on his treated insulators, either with chemical reagents or examination with a high-power microscope. Yet their behavior shows that they are wearing "invisible raincoats."

Numerous other uses are proposed for the new water-refusing films, most of which must remain undisclosed for the present. One such use, however, promises to make life in the laboratory a lot happier. Everybody has noticed how water rises in a slight curve where the edges of its surface come into contact with the tube or vessel containing it. This curve, called the meniscus, makes it hard to read guages, glass measuring flasks and other laboratory vessels that require highest possible accuracy.

If the inside of the glass is given this water-repelling film, the meniscus does not form and the surface is perfectly flat, making readings far easier to take.

ITEMS

Observations on the star-like nucleus of Comet Whipple 2, which was recently visible near the Big Dipper, has led to the discovery of a gaseous compound hitherto unidentified in comets. It is the fragmentary molecule NH2 produced when hydrogen or methane burns in the flame with nitrous oxide. Although luminous bands of NH2 have been previously observed in the spectra of other comets, it was their extraordinary strength in Comet Whipple 2 that led to their identification. The observations were made by Dr. R. Minkowski, with the 60-inch reflecting telescope of the Mt. Wilson Observatory. The only other bands in the comet's spectrum besides those of NH2 that could be identified with certainty were those of the carbon molecule, CN, which were first described by Swan in the spectrum of the candle flame in 1857. The carbon bands, however, have long been known in comets. Many other bands in Comet Whipple 2 were observed which could not be identified with known gaseous compounds, which serves to emphasize the peculiar conditions that must prevail in the nuclei of comets.

A new comet has been discovered by Miss L. Oterma, astronomer of the Turku Observatory, Finland, who is credited with discovering two comets last year. The comet was first seen on April 8 in the constellation of Virgo, which is now easily visible in our evening sky. It is of the fifteenth magnitude and therefore far too faint to be seen without telescopic aid. The new comet is near the celestial equator and moving slowly westward. Harvard Observatory received word of the discovery by way of Denmark and Sweden. On April 8 at 5 P.M., Eastern War Time, the comet's right ascension was 12 hours, 19 minutes, and its declination plus 1 degree, 12 minutes. As comets are named after their discoverer, this will be known as the third Oterma comet.

A study of the little group of stars known as the Pleiades or Seven Sisters has revealed new facts about the nature of the obscuring clouds of interstellar gas throughout our galactic system. The study was carried out by Dr. Walter S. Adams with the 100-inch reflector of the Mt. Wilson Observatory. Nine stars of the Pleiades were selected for observation because their high temperature gave a background against which to detect the dark interstellar clouds. Dr. Adams found that seven of the nine stars show obscuration by both ionized calcium and hydrocarbon gas; whereas two, Austerope and Merope, show obscuration by ionized hydrocarbon only. This is the first case found in which lines of one interstellar gas occur without the presence of ionized calcium. Another interesting point is that neutral hydrocarbon which is prominent in many stars is completely missing from the Pleiades. Dr. Adams concludes that, "The fact that such different interstellar lines are observed in neighboring stars of this small cluster indicates the diversity in the physical conditions of the interstellar clouds and perhaps the limited dimensions which these clouds must have."
Two important books by

JAMES T. CULBERTSON

MEDICAL PARASITOLOGY

Dr. Culbertson's concise but comprehensive resume of medical parasitology fills a definite need, as a textbook for medical students and a handbook for medical practitioners. It contains 21 full-page plates and many figures and tables.

"... especially interesting now that so many American doctors will be serving with the Army in tropical regions where the parasites of malaria, sleeping sickness and the like are prevalent."—Science News Letter. $4.25

IMMUNITY AGAINST ANIMAL PARASITES

A textbook which will acquaint those beginning the study of immunity to the parasitic forms with the fundamental principles of the subject, and will also give the more experienced a thorough orientation and collation of recent literature on the subject.

"The style of writing and the general makeup of the book are conducive to pleasant reading... an authoritative source for reference."—Journal of the American Medical Association. $3.50

Columbia University Press
Morningside Heights New York

Bacto-Agar

Bacto-Agar is a purified Agar prepared from domestic material. In the manufacture of Bacto-Agar extraneous matter, pigmented portions, and salts are reduced to a minimum, so that the finished product in the form of fine granules will dissolve rapidly, giving clear solutions.

Bacto-Agar is distributed only for use in bacteriological culture media upon proper certification by the purchaser.

Bacto-Asparagine

Bacto-Asparagine is a purified amino acid widely used in synthetic culture media and in the preparation of tuberculin.

Specify "DIFCO"

THE TRADE NAME OF THE PIONEERS
In the Research and Development of Bacto-Peptone and Dehydrated Culture Media.

DIFCO LABORATORIES INCORPORATED
DETOIT, MICHIGAN

THE VERTEBRATE EYE AND ITS ADAPTIVE RADIATION

By Gordon Lynn Walls

"It should certainly be read by all biologists including medical men, interested in visual problems."—Nature

"It is a 'must' book for every biologist, whatever his specialty."—Journal of Mammalogy.

"Never before has so much light been shed at one time on an animal organ... a tremendously interesting and valuable book."—American Naturalist

Published 1942. 785 pages, 197 figures, $6.50

Orders sent postpaid within the continental United States upon receipt of remittance.

CRANBROOK INSTITUTE OF SCIENCE
Bloomfield Hills, Michigan

ERIC SOBOTKA

FOR IMMEDIATE DELIVERY

RESEARCH MICROSCOPES
MICROSCOPE LAMPS

17 EAST 40TH STREET
NEW YORK, N. Y.
For Research...Analysis...Education

Purity and uniformity, indispensable qualities in chemicals intended for use in these exacting fields, are the basis of the rigid specifications for Eastman Organic Chemicals. Control of these essential properties is attained by laboratory production and actual testing of each individual batch before it is accepted for stock.

Eastman Organic Chemicals, which now total more than 3400, comprise the world’s largest group of organic compounds for research, analysis, and education. All of the items are supplied in the quantities most convenient and economical for their particular applications. . . . Eastman Kodak Company, Chemical Sales Division, Rochester, N. Y.

There are more than 3400
EASTMAN ORGANIC CHEMICALS

THE AUTOTECHNICON

THE TECHNICON CO.
NEW YORK, N. Y.
Oil for Today's Strategy

Modern warfare depends upon lubricants for every phase of transportation and combat. Aircraft operating low over scorching deserts or in below-zero temperatures of the sub-stratosphere; ships at sea under forced draft; tanks, trucks and armored cars carrying heavy loads at high speeds; all these require specialized lubricants and fuels developed for their varying needs.

Research Laboratories in the Petroleum Industry are at work constantly, producing new and better lubricants and fuels to serve the United Nations—using the finest optical instruments to insure the highest quality.

Spencer LENS COMPANY
BUFFALO, NEW YORK
SCIENTIFIC INSTRUMENT DIVISION OF
AMERICAN OPTICAL COMPANY