tains for an as yet undetermined distance into Texas. The name "mescal pit" has been applied locally to this type of structure over a period of many years, and the use of this term has spread equally with the interest incited by the recent investigations. For the two field seasons of 1930 and 1931 the writer conducted expeditions for the Laboratory of Anthropology in the Guadalupe Mountains area, and during this time a number of "pits" were excavated or trenched. It was definitely determined that they were not pits, in any sense of the word; nor were they concerned especially with the preparation of mescal for food. Instead, they were found to be specialized refuse heaps. These circular mounds contained, in addition to the more obvious small cracked rocks, accumulations of ash, charcoal, food bones and other camp debris. As the term "mescal pit" is obviously a misnomer, and as it is likely to be perpetuated by usage, the writer feels that a designation more in keeping with the character of the structures should be chosen. Therefore the name "midden circle" is proposed. Further discussion of these circles, together with other archeological information gathered during the two seasons' work, will appear in a report now in preparation.

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IS GEOLOGY EASIER FOR BOYS THAN FOR GIRLS?

IN an article which appeared in the issue of SCIENCE, dated November 11, 1932, and written by Gragg Richards, of Detroit, Michigan, evidence based on statistics was introduced to prove that geology is an easier subject for men than for women. I have examined the grades of all the students who have taken my course in physical geology for the past seven years. They come from all the classes in college, ranging from 17 to 21 years of age, the larger proportion from the freshman and sophomore classes. Instruction consists of lectures, laboratory work and field trips. A standard college text-book is used, and students are required to supplement class work by outside reading; 10 to 25 readings constituting the usual number, the smaller figure being the minimum required. The average size of the laboratory section is about 25 and there is considerable personal contact between instructor and student, especially in the laboratory and in the field. The grades for the course are on the following basis: A—excellent, B—good, C—fair, D—unsatisfactory, F—failure. No conscious effort was made to follow a distribution curve. The group consists of 647 students, 254 men and 393 women. On the basis of A = 3, B = 2, C = 1, D = 0, the men show an average of 1.255 and the women 1.407.

	Percentage				
	A	B	C	D	F
Men (254)	6.3	30.25	46.1	11.4	5.92
Women (393)	8.9	36.6	40.7	10.7	3.06
Entire group (647)	7.6	33.42	43.4	11.0	4.49

These statistics show clearly that the women are slightly better than the men, although the difference between them is so slight that one may consider them equal in ability. They also indicate that geology is as easy for women as for men. There is, in my opinion, based on eighteen years of experience teaching science, no marked difference in the ability of men and women.

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BROWN ROOTROT OF TOBACCO

A FORM of brown rootrot of tobacco is due to the insufficient intake of calcium by the tobacco plant. The condition may be brought about by lack of available calcium, an excess of magnesium over calcium or the presence of appreciable amounts of ammoniacal nitrogen in relation to nitrate nitrogen. The foregoing findings were the results of researches carried on at the Connecticut Agricultural Experiment Station at New Haven and the Tobacco Substation at Windsor, Connecticut. Soil, sand, water cultures and field tests were made.

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SCIENTIFIC BOOKS

RECENT ZOOLOGICAL TEXT-BOOKS

IN reading the text-books which have been published during the latter part of 1932 a reviewer is impressed by certain facts which are perhaps worth mentioning: (1) Writers of text-books are unprogressive. They have at last given up Batrachia, Urodela and Anura; and use Amphibia, Caudata and Salientia, instead. But they cling to such archaic names as Platyhelminthes, Nemathelminthes, Trochminthes, Molluscoidea, Pelecypoda, Polyzoa and Infusoria. Even such a conservative institution as the *Zoological Record* has progressed to Platyhelminthia, Nemathel-

minthia, Ciliophora and Bryozoa. All biology does not have to be crammed into two great receptacles, morphology and physiology. Such a subject as psychology perhaps depends as much upon knowledge of the structure of neurones, tracts and areas as upon that of behavior, reflexes and reaction times; but two recent writers assert that psychology is (in the words of Octavius Roy Cohen) "nothing else but" physiology. The scientific name of an animal consists of the genus, species *and the name of the author;* but a student in elementary zoology has no chance to find this out. (2) A glossary should be a series of carefully considered, critical definitions of technical terms, instead of a list of careless, loose and inaccurate statements, such as a freshman might produce impromptu during an oral quiz. (3) Generic names are sacred and their spelling may not be changed to suit the whims of writers. Amoeba can not become ameba. (4) High-school teachers appear to be doing better teaching than university professors. Their texts are written for students to read and use; not for professional, backward-looking zoologists. Students in high schools are expected to solve problems, think and grow—not merely verify, draw, answer, pass and get credit.

Animal Biology. By LORANDE LOSS WOODRUFF. Macmillan, New York. $3.50. xii + 513. 1932.

This text-book presents zoology from "a general biological view-point." It is the work of a scholarly man who shows his general learning by frequent, apt quotations. Good judgment is shown in the use of technical terms; there are not too many, but enough are introduced to permit a student to gain some knowledge of zoological terminology. The book is well planned; the figures are well conceived and executed. The parts of the work that relate to general biological phenomena are well presented; though frequently stated in a teleological way. Those that deal with classification and newer knowledge in fields with which the writer is apparently not familiar are often uncritical and inaccurate. For example, Chapter III, on the physical basis of life, is admirable; Chapter VII, "Survey of Invertebrates" is not so well done; the part of the appendix which deals with classification is quite unprogressive; the glossary contains many questionable statements. On page 80 it is said that, "The Guinea worm, Filaria, is sometimes six feet long, and spends its adult life under the human skin and its youth in a Water-flea." Since the time of Reichard in 1759 the guinea worm has been placed in the Genus Dracunculus and it probably never reaches a length of six feet. Other examples of objectionable statements are, "the Earthworms, or Oligochaeta. . . . The largely sedentary and nocturnal life of earthworms renders special locomotor, respiratory, and sense organs unnecessary," (p. 81); "Absorption. The passage of nutritive and other fluids into living cells. . . . Alternation of Generations.—The alternate succession of a sexual and an asexual generation in the life history" (p. 473); "Chorion.—External embryonic membrane of Mammals. . . . Cloaca.—A cavity at the posterior end of the Vertebrate body. . . . Colony.—An aggregation or intimate association of several or many similar individuals to form a superior unit" (p. 476). Evidently the writer disapproves of the modern tendency to begin even generic names with small letters, for he begins even such words as Man, Bird and Butterfly with capitals. The topics discussed in the twenty-five chapters are: The scope of biology, cells, physical basis of life, metabolism, protozoa, metazoa, invertebrates, vertebrates, nutrition, respiration, circulation, excretion, reproduction, coordination, origin of life, continuity of life, fertilization, development, inheritance, adaptation, descent with change, biology and human welfare, and the development of biology.

Manual of Animal Biology. By GEORGE ALFRED BAITSELL. Macmillan, New York. $2.50. xiii + 382. 1932.

This is a laboratory manual intended to be used with Woodruff's "Animal Biology" and other standard zoological text-books, to which references are made throughout. It consists of two parts, "descriptive" and "laboratory directions" (which are also descriptive). The first part contains brief accounts of protoplasm, amoeba, euglena, volvox, paramecium, vorticella, grantia, hydra, obelia, starfish, earthworm, crayfish, insects, clam, frog and vertebrates in general, and vertebrate development. The second part, on detachable pages, contains laboratory directions concerning equipment, microscope, cells, green plants, fungi, protoplasmic movement, amoeba, euglena, volvox, paramecium, grantia, hydra, obelia, gonionemus, starfish, earthworm, crayfish, grasshopper, honey-bee, life history of moth, clam, chordates, vertebrates, tissues (epithelial, muscular, supporting), vertebrate skeleton, viscera, buccal and respiratory organs, enteron, vascular system, urinogenital system, nervous system, histology of nerves, tissue, vertebrate eye, spermatogenesis, oogenesis, fertilization, mitosis, and embryology of frog and chick. The method employed in each exercise is the observation of such structures as are described and the making of one or more drawings. Apparently no written notes are expected and no questions are asked. Twelve figures are presented.

An Introduction to Zoology Through the Study of the Vertebrates with Special Reference to the Rat and Man. By ZENO PAYNE METCALF. Thomas: Springfield, Illinois. $3.50. xx + 426. 1932.

This book has been written for agricultural students in general zoology and is presented in "three major divisions: (1) a general introduction; (2) the study of the detailed anatomy and physiology of a mammal, the rat, with comparisons from other groups of vertebrates; (3) the broader aspects of zoology. . . . Throughout this text-book the author has attempted to write on what he believes is the level that the average college freshman can attain. . . . It has not been written for zoologists but for beginning college students." The book appears to have been thoughtfully and carefully written. The figures are clear and appropriate. Classification receives little attention; morphology, physiology and the general aspects of biology and economic zoology are emphasized. The scope of the work is indicated by chapter headings in the three sections: (1) The field of zoology and the animal kingdom; (2) with special reference to the rat and mammals—general morphology and physiology; habits, external characters, general internal structure, integument, muscles, skeleton, locomotion, enteron, respiratory system, urinary system, circulatory system, metabolism, reproductive system, embryology, heredity, endocrine system, nervous system; and (3) distributional zoology, paleontology, evolution and history of zoology.

Zoology. By F. E. CHIDESTER. Van Nostrand, New York. $3.75. xii + 581. 1932.

In the preface of this book it is said that, "this text was written as a general survey for use by college students and to serve as a reference book by biologists. . . . Important features are the logical arrangement of facts about the animals within a group, a statement of the chief characteristics at the beginning of the discussion, and a summary of the economic importance at the end of each section. The newer physiology has been introduced and a bibliography checked by experts in each field is given at the end of each chapter." To the reviewer the book seems to be poorly organized and poorly written. It contains many questionable and inaccurate statements. For example, under the title "Characteristics" the following statements are made about Protozoa (p. 21): 1. Morphologically the simplest ones are equal to isolated epithelium. 2. Physiologically they are equal to the whole group of cells making up the human body. Protozoa are complete unicellular organisms and many have a brief multicellular phase. 3. Functionally they epitomize life processes. 4. Theoretically they are generalized cells. 5. Of practical economic importance, they cause many diseases. 6. As soil organisms protozoa are of doubtful importance.

Are the points enumerated characteristics and do they all mean something? In characterizing the vertebrates (p. 14) nothing is said concerning gill slits, but invertebrates (p. 16) are said to "lack gill slits or visceral clefts." "The term 'tropism' has long been used to indicate the reaction of an animal to some sort of stimulus," (p. 24) is an example of many loose statements. Two species of amoeba are said to occur in man (p. 26); whereas eight or more so occur. *Christispira,* a spirochaete, is affirmed to be "a large flagellate" (p. 29). The glossary contains many doubtful and curiously limited statements—*e.g.: "dentine,* the inner portion of a tooth; *lipoid,* a substance found in the nervous system which is dissolved by anesthetics or narcotics; *respiration,* oxidation of protoplasm releasing energy and producing carbon dioxide; *testis,* an organ in a male animal where sperms are produced." The twenty-two chapters are devoted to Introduction, Protozoa, Porifera, Coelenterata, Platyhelminthes, Nemathelminthes, Annelida, Trochelminthes, Molluscoidea, Echinodermata, Mollusca, Arthropods, Chordata, Cyclostomata, Pisces, Amphibia, Reptilia, Aves, Natural History of Mammals, Mammalia—Physiology, Social Life of Animals, and Evolution, Heredity, and Eugenics.

The Essentials of Biology. By JAMES JOHNSTONE. Longmans, Green and Co., New York. xv + 328. 1932.

"The intention of this book is to present a balanced account of the theoretical matter of animal biology. Botanical results are only noted in so far as they bear upon general biological science." The book is a thoughtful, philosophical consideration of modern science with special reference to biology. It is not a catalogue of facts to be learned, but a logical development of thoughts and relations. The statements made are carefully considered and mean something. At times they may be a little tiresome and abstruse, but the reader gains much and feels repaid. When scanning the book one wishes that college students in the United States could have more of the attitude of mind that would be essential for its use—more thoughtful consideration of the fundamental problems of science and less concern for memorized facts and propaganda. Johnstone's book may be read with profit by any student, young or old. It is in two parts and nine chapters, which indicate the contents: (I) THE INDIVIDUAL, (1) the Organism as a Natural Thing, (2) Organic Structure, (3) Organic Functioning, (4) Animal Behavior; (II) THE RACE, (5) Reproduction and Growth, (6) Development, (7) Heredity, (8) Transformism, and (9) the Evolutionary Career.

Everyday Problems in Biology. By C. J. PIEPER, W. L. BEAUCHAMP and O. D. FRANK. Scott, Foresman and Company, Chicago. $1.60. xxxiii + 686. 1932.

This is a biological text intended for use by high-school students in the ninth and tenth grades. It is a carefully considered, well-organized book written by experienced teachers. The student is stimulated to think about things biological, especially those related to man, and his capacity is continually increased. Topics are considered under twelve "units," presented as questions, in the following order: obtaining and using food, growth, reproduction, ecology, behavior, classification, economic biology, evolution and conservation.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

IMPROVED KYMOGRAPH RECORDING

SINCE the introduction of smoked, glazed paper for kymographic recording, numerous attempts have been made to obviate many of the disadvantages of this method. Of these attempts the most recent have been the successful efforts of Wichart, Thienes and Visscher,[1] and Patterson.[2] The former group of investigators employ cellophane coated with carbon sprayed from a pressure air gun, whereas Patterson delivers ink from quill pens against white, glazed paper. The former method allows for direct reproduction in the lantern by simple insertion between two glass plates but still retains the disadvantage of requiring carbonizing before and fixing after recording. Patterson's method simplifies preparation of a record which requires no shellacking but requires photographing for reproduction in the lantern.

More recently Warren[3] reported the use of cellophane as a transparent preparation, capable of receiving impressions from carbon paper in the typewriter or by pencil pressure. He cautions, however, against handling, which removes the carbon particles from the cellophane.

We have found cellophane an excellent recipient for India ink, which dries almost immediately and resists violent finger friction. Cellophane also takes red, blue and green ink (concentrated by evaporation to one half or one third volume), and thus allows for differential tracings to be made of any type of drawing, photograph or record.

We have further utilized the ink-taking properties of cellophane in keeping permanent records of physiological activity to be kymographically registered. Curved glass capillary tubes of very fine bore deliver ink to the cellophane, which is held in position on the kymograph drum by library paste or rubber bands. To afford less chance of breakage capillary tubes can also be bent to lead ink to the inner surface of ordinary steel writing pens, which are supported on light reed or aluminum recording levers. To render the record easily discernible, the drum is first covered with permanent white facing—either enamel or paper.

This type of cellophane record requires no smoking nor fixing. The ink will not rub off unless it is moistened with water or alcohol, in which case the cellophane will retake ink at site of removal. Any part of the permanent record, as suggested by others,[1, 3] can be placed between glass plates and used directly in the projection lantern. The economy of the method, obviating smoking, shellacking and photographing parts of records, is apparent.

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[1] W. F. Wichardt, C. H. Thienes, M. B. Visscher, SCIENCE, 73: 99, Jan. 23, 1932.

[2] T. L. Patterson, Demonstration, The Federation of Amer. Societies for Exp. Biol. Philadelphia, April, 1932.

[3] K. L. Warren, SCIENCE, 76: 573, Dec. 16, 1932.

AN INEXPENSIVE PYROMETER FOR TEMPERATURES UP TO 1000° C

THE use of an electrical muffle furnace in operations such as ashing of biological materials makes the control of temperatures up to 1000° C. highly desirable. Finding most manufactured pyrometers expensive we originally fashioned a simple thermocouple of chromel-alumel and calculated the temperature from e.m.f. as measured by a student potentiometer. Subsequently we used an inexpensive microvoltmeter procured through the Weston Electrical Instrument Corporation, Newark, N. J., who were kind enough to modify one of their standard instruments (Model 301) and equip it with a scale calibrated in centigrade degrees, the entire assembly making a direct reading pyrometer with a range up to 1000° C. accurate to ± 10° C. and obtainable at nominal cost.

No. 14 gauge pieces of chromel and alumel wires each about 3 ft. long were twisted together tightly for a distance of one inch. The twisted ends were protected from corrosion by means of a small silica test-tube packed with asbestos fiber. The free ends were insulated from each other by short lengths of silica tubing sufficient to bring the wires out of the back of the oven and were held in position far enough from the oven to avoid being heated by radiation. They were then connected to copper leads, which ran to the reading instrument. Changes of ambient temperature about this junction were not compensated for, and, for the accuracy desired, could be neglected. The modified microvoltmeter was made for us by the