does not develop in the boys. The finding that the greatest growth for both boys and girls occurs in April and the least in October seems real but it is not well explained. This is in direct opposition to the findings in various weight studies, which show the greatest increase in the second half of the year.

The generalizations of the author as to educational implications are dominated by the belief that strength is almost wholly inherited and little credit is given to developmental or environmental influences. The author seems to have some prejudice against intensively competitive games and athletics in general, which is unsupported by data. The positive aspects of guidance are relatively undeveloped, although opinions and inferences abound in the final chapter which go beyond the meaning of the data, since no methods for developing strength have been tested.

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Fieldbook of natural history. E. Laurence Palmer. New York: McGraw-Hill, 1949. Pp. x + 664. (Illustrated.) $5.00.

"Professor Palmer's *Fieldbook* is an extraordinarily comprehensive guide to natural history. Simply presented, and profusely illustrated, it embraces more than two thousand items—birds, fish, plants, rocks and minerals, the stars, mollusks, reptiles, and mammals. Each item is illustrated with a detailed drawing or photograph for quick and correct identification, and for each there is a descriptive paragraph, followed by data on range and location, life history, ecology, and economic importance. An unusual feature of the book is its inclusion of many domesticated and economically important species not usually found in books of this kind."

This quotation from an advance notice released by the publisher of the *Fieldbook* proves to be an accurate description. Here is encyclopedic information about a wide variety of subjects. It bids fair to become one of the most frequently used books on the desks of teachers, high school and college students, naturalists, game managers, game protectors, gardeners, nature lovers, sportsmen, and citizens generally who want to know something about their surroundings. The book should give a real impetus to efforts toward conservation education.

One doesn't have to be a specialist to use this book. Technical terms have been avoided. But the information is exact and can be referred to in its place in the taxonomic scale.

Most useful will be the drawings. While this book lacks conventional keys (which ordinarily cannot be used except by specialists anyway) there are hundreds of distinctive line drawings so that identification of plants, birds, or insects should be a comparatively simple matter. It is true that some of the outlines do not look just right, but this applies to few, and is by no means strange in view of the comprehensive coverage of the work. If colors could have been used the illustrations would have been somewhat more useful.

This reviewer has often wondered why, in our books on mammals and other species, we should not include the domesticated varieties, including man (although perhaps it is stretching a point to call man domesticated!). The *Fieldbook* does this, with excellent results.

Unfortunately, the author follows the American Ornithologists' Union Check-List in the use of the possessive, as "Gambel's quail" instead of the Gambel quail—as strained a usage as it would be to say "Vancouver's Island" or "Rainier's Mountain." The author cannot be too much blamed, however, since probably the majority of usage in ornithology, at least, follows this cumbersome practice.

In a work covering so large a field in natural history, it is inevitable that omissions should occur. Among these we note the absence of bicolor lespedeza and multiflora rose among plants. Since so many gardeners and game managers all over the country are concerning themselves with these species, with a zeal that smacks of a full-fledged fad in wildlife management, there are sure to be information-seekers who will be disappointed not to find them in this volume. But in general the material has been well selected and one would be captious indeed to press this comment.

The book is typographically attractive and accurate. Furthermore, it is equipped with a complete index which will greatly facilitate its use.

Another virtue of this book is that it is authoritative—experts have checked the facts. This is unlike some other recent works whose authors appear not to have taken the trouble to check their information with specialists.

The *Fieldbook of natural history* represents another major contribution from the splendid Cornell group of scientific leaders among whom the Comstocks, Needham, Bailey, the Wrights, Allen, and Hamilton are included. The volume is a great credit, both to the author and to the publishers. Furthermore, the reviewer cannot forbear to mention the price. Five dollars for this book of 664 pages is not only astonishing, but gratifying. The job is a public service which ought to be appreciated by all and will be by many.

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Theory of oscillations. A. A. Andronow and C. E. Chaikin. (Solomon Lefschetz, ed.) Princeton, N. J.: Princeton Univ. Press, 1949. Pp. ix + 358. (Illustrated.) $6.00.

The original version of this book was published in Russian in 1937, and parts of it were included in Minorsky's *Introduction to non-linear mechanics*, first published in the David Taylor Model Basin Reports during the war. It is concerned with oscillations in autonomous systems, in particular systems representable by equations of the form

$$\dot{x} = P(x, y), \quad \dot{y} = Q(x, y), \tag{1}$$

including the second order equation $\ddot{x} + x = \mu f(x, \dot{x})$, which is reduced to (1) by putting $\dot{x} = y$. These equations are treated mainly by considering the path of the representative point in the x, y or *phase* plane, using the Poin-

caré-Bendiron theory of singular points and limit cycles; some graphical methods and the van der Pol and Poincaré methods of approximation are also included. The first chapter introduces some of the main ideas by means of linear oscillations, but the rest of the book is devoted to the nonlinear theory. There are many examples taken from electrical and mechanical systems.

The authors here, and even more in the original, seem to be interested primarily in obtaining geometrical configurations, secondarily in the stability of electric circuits and mechanical systems, and comparatively little in accurate quantitative estimates for periods and amplitudes. We must be grateful to the editor for condensing the mathematical machinery, which goes much beyond possible applications. So far as I can see, from a very brief glance at the original, considerable sections have been rewritten, and the notation has been clarified in many places. The supplement with the oscillographs shown in Minorsky has been omitted, the introduction has been drastically cut and also the list of references, although it contains some new ones. Appendices B and C contain material from other sources, but the proof in B does not cover such a long time interval as the one it replaces.

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Venins de serpents et antivenins. (Collection de l'Institut Pasteur.) P. Bocquet. Paris: Flammarion, 1948. 157 pp.

This book offers the reviewer a fine opportunity to make philosophical observations about biological phenomena, and biological observations about philosophical phenomena. Reading the first chapter, which briefly reviews facts that are common knowledge, one wonders how the snake came to be both dreaded and worshiped. It had fundamental significance in mythology and religion, it has been linked with death and immortality, and it was made the symbol of the eternal striving of mankind to explain itself. On the other hand, one wonders about what sort of vagaries and intricacies in the evolutionary process joined in the salivary secretions of snakes substances endowed with such powerful physiological and pathological effects—effects studied by specialists in fields ranging from neurophysiology to acute, invasive infection.

The obvious truth that a thorough analysis of any biological phenomenon must of necessity take a student from his own specialized field into broader and more fundamental spheres seems to find its clearest example in snake venoms, which are a challenge to limitation, and an invitation to universality in biological thought. This is, no doubt, the reason why such illustrious names as Claude Bernard, Delezenne, Weir Mitchell, Calmette, and Arthus are associated with the history of research on snake venoms, and this is why in our days venoms are assiduously studied by penetrating minds. It looks, indeed, as if the amazing properties of snake venoms had the same fascinating effect on the mind of the modern biologist as they had on the mind of the primitive man.

There was an urgent need for a book such as the one written by P. Bocquet, because those published in the past by Calmette and Physalix in France, Noguchi in the United States, Belfanti and Fracassini in Italy, Picado in Costa Rica, and still others, valuable as they are, are now dated. The book, which can be read in a few hours, is divided into 14 chapters. The first chapter offers pertinent historical data; the next four chapters deal with the toxic secretions in the animal scale, anatomy and function of the poison glands, and the natural and experimental poisoning. The sixth chapter, which is the longest, reviews first the effects of venoms on the nervous, muscular, and circulatory system, on the blood, and on cells and tissues. Then it analyzes the varied enzymatic content in the poisonous secretions, and finally it studies the action of different venoms on microorganisms, vegetal cells, and enzymes. The three following chapters consider the effects of physical and chemical agents on venoms, the chemical constitution of venoms, and variations in their toxicity, as depending on geographical and seasonal factors. The tenth chapter deals with the classification of the venoms. The last four chapters are concerned with problems of natural and acquired immunity, and the preparation of antipoisonous sera; with treatment of snake bite; and finally, with the therapeutic applications of snake venoms. The many subjects approached are treated in an authoritative manner and with characteristic French clarity. The author discusses the effects of snake venoms on the nervous, circulatory, digestive or respiratory system with perfect mastery of the sciences of physiology and pharmacology, and his classification of venoms in relation to other toxins, enzymes, and poisons shows an excellent knowledge of toxicology and bacteriology. Also, his analysis of the phenomena of natural and acquired immunity reveals a solid background in immunology, as do the precise directions for the preparation of efficient antivenimous sera.

To understand how the author, still a young man, could have accomplished his task as successfully as he did, one must remember that he has lived all his life in the atmosphere of the Pasteur Institute of Paris. Paul Bocquet is the son of an illustrious Pasteurian, Alfred Bocquet, to whom the book is dedicated and who, in turn, was the closest collaboratory of A. Calmette, the head of the brilliant School of Tuberculosis of the Pasteur Institute, and the discoverer, more than forty years ago, of the antiophidean serum-therapy. The author is himself the present head of this department at the Pasteur Institute. Bordet, still another brilliant member of Pasteur's school, reminds the reader of all these circumstances in the foreword he has written for the book.

This book, therefore, besides being the expression of an individual effort, is an exponent of continuity of one of the most brilliant schools in biological thought of the last seventy years. Bocquet's name is to be ranged with the names of so many other workers of the present Pasteur Institute who indefatigably persevere along a great tradition despite almost overwhelming financial odds and political events too recent to need recounting.

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