vertex involve the solution of a right-angled triangle for two of its parts.

Since it seems to be almost certain that a proposed great circle track will in reality be sailed as a series of rhumb lines each terminating in or near the great circle, the methods of Mercator sailing will still be found useful. By aid of a set of meridional scales, problems in Mercator sailing can be worked with great facility. For, the board, the uniformly divided scales, and the T-square constitute an ordinary traverse table, and the departure is readily converted into difference of longitude through the equation

$$\text{Diff. long.} = \frac{\text{merid. diff. lat.}}{\text{true diff. lat.}} \times \text{departure.}$$

To do this, suppose the meridional difference of latitude to be laid off upon a uniform scale rotating about the pin or pivot. Let the true difference be laid off along, or parallel to, the initial line. Rotate the former scale until the T-square indicates that the point representing meridional difference is directly above that representing true difference. Now slide the T-square along until a point in the initial line is reached which denotes the value of the departure. The reading of the rotated scale directly above this point is the difference of longitude.

In conclusion, it should be said that the aim has been to use the drawing board proper merely as a surface upon which to locate points or lines temporarily, the accuracy of the work depending upon the fact that the scales and border of the board are not subject to any considerable atmospheric or temperature changes. R. A. Harris.

SCIENTIFIC BOOKS.

Zoology: Descriptive and Practical. By Buel P. Colton, A.M. Boston, D. C. Heath & Co. 1903. Part I., Descriptive, pp. x + 375. Part II., Practical, pp. xvii + 204.

Colton's 'Practical Zoology,' which was published seventeen years ago, did excellent pioneer work as a laboratory guide for secondary schools. This useful hand-book, revised and amplified, now appears in connection with an excellent descriptive zoology.

In the latter the author introduces each of the larger groups of animals by a description of a typical example, treating of its morphological and physiological characteristics and paying especial attention to its habitat, movements, senses, capture of prey, taking of food and manner of self defense.

Naturally, Arthropods, and particularly Insects, have a prominent place at the beginning, followed by a brief account of the Annulata, a somewhat longer description of the Mollusca and an extended discussion of the Chordata. Thereupon the Protozoa, Porifera, Cœlenterata, Echinodermata, Platyhelminthes, Trochelminthes and Molluscoidea are taken up in the order given. This is an excellent practical arrangement on the whole, though it might have been still better to have placed the Annulata and Echinodermata last and thus have preserved the ascending order throughout each of the two sections, for the sake of avoiding those misconceptions which are wont to arise in the mind of the beginner, to whom position in a text-book has a profound significance.

The strongest feature of the book is its broad treatment of animal life, in other words, its natural history. The author has a keen sense of what is interesting. His style is simple and direct, and the book is thoroughly readable.

The author did not cease to do pioneer work when he published his 'Practical Zoology' seventeen years ago. In the present book he makes free use of 'tho,' 'thru,' 'thoro' and their various compounds, while 'celom,' 'cecum,' 'hemal' and a few other words have been stripped of superfluous letters. He does not attempt to set right names like Amœba, which are apparently protected by their Latin form, but one is surprised that 'cœlenterates,' 'diaphragm' and a few other terms should not have been pruned. Spelling reform has much in its favor, and it must be introduced

by such gradual changes that a conservative public may not be offended. In the present instance the author's zeal does not seem to have led him to the point of giving offense, even though he may have laid himself open to the charge of inconsistency.

The book is comparatively free from minor errors or infelicities. On page 90, the skin of the earthworm is said to consist of three layers, the cuticle and epidermis, no mention being made of the derma. The cœlomic epithelium is omitted in the enumeration of the coats of the body wall. The description of the papulæ of the starfish as 'holes thru the aboral wall from which extend slender projections of the thin, soft lining membrane of the body cavity' needs considerable revision. The term 'digestive tube' is used when the cavity of the digestive tube, not its walls, is meant. The statement that in the echinoderms the digestive tube is 'distinct from the body cavity' is not very illuminating as it stands.

The illustrations are mostly well chosen, and about forty of them are original. It is unfortunate that greater care was not given to matters of detail in some of the original diagrams; thus the oviducts in the snake and the oviduct in the pigeon are each incorrectly represented as opening in front directly into the cavity of the ovary.

The capital press work of the descriptive part contributes in no small degree to the general excellence of the book.

Part II., on 'Practical Zoology,' is a great improvement over the original laboratory guide with which teachers in secondary schools are familiar. Full directions are given for the observation of living animals in the field and in captivity.

This part, however, might be made much stronger in respect to its teaching of morphology, without greatly increasing its size. For example, the attention of the student is not called to the cœlom of the earthworm either in connection with the dissection or in the study of the cross-section; and the term body-cavity is used loosely to apply to the enteric cavity in Hydra and to the cœlom in vertebrates. The directions for the study of the brain, particularly that of the rabbit, are exceedingly inadequate. We are told that the optic nerves 'directly enter the cerebrum'; and both diencephalon and midbrain are ignored. While this is in line with the popular notion that the brain consists of only two parts, it is not the sort of teaching that ought to find place even in a very elementary text-book. This part is remarkably free, however, from positive errors, and can be heartily recommended as a laboratory guide for secondary schools; the descriptive part is an elementary text-book of unusual merit.

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DISCUSSION AND CORRESPONDENCE.

METEOROLOGICAL OBSERVATIONS WITH KITES AT SEA.

TO THE EDITOR OF SCIENCE: Under the titles 'A New Field for Kites in Meteorology' and the above there were described in Vol. XIV. of SCIENCE experiments by the writer and his assistants of flying kites in calm weather from a tug-boat and from a transatlantic steamship. The demonstration that meteorological observations might be obtained at high altitudes, independently of the natural wind, over the greater portion of the globe and where no observations had been possible before, attracted the immediate attention of European meteorologists. The following brief accounts show that their application of this new method of meteorological research has been both extensive and successful.

The first to repeat the pioneer experiments of the late Mr. Sweetland and the writer during their voyage across the North Atlantic in 1901 were Messrs. Berson and Elias, of the Prussian Meteorological Institute, who, last August, made a voyage from Germany to Spitzbergen and back, achieving satisfactory results with their kites. Meanwhile Professor Köppen, of the Deutsche Seewarte, carried out analogous experiments on the Baltic Sea. About the same time, Mr. Dines, aided by grants from the Royal Meteorological Society and the British Association, employed