

ordinates fixing its orientation in the universe in 24 hours, whereas in 24 hours its translational motion has changed its relative position in the universe by something of the order of  $10^{-12}$ , taking the diameter of the stellar universe as 300,000 light years.

It appears very natural therefore to expect that any translational effects are so small compared with any rotational effects that they are far beyond the reach of present observation, but in principle we recognize that such effects may well exist, and therefore the special principle of relativity may very probably be only a close approximation.

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### CONCERNING EXCEPTIONAL HAILSTONES

THE note in a recent number of this Journal (58: 443, 30 Nov. 1923) describing peculiar hail observed by Professor Bevan recalls that I made very similar observations some years ago during a hailstorm on the coast of California at Carmel. The conditions permitted a fairly close study of the structure of the hailstones which fell, and I was able to make a number of sketches showing their form, size and structure. An account of my observations was published in the transactions of the Royal Society of Canada, Vol. X., Series III, pages 47-50, 1916.

It seems probable that the meteorological conditions along the Pacific coast are not infrequently such as to produce the particular kind of hail described by Professor Bevan and by myself.

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### SCIENTIFIC BOOKS

#### DEAN'S BIBLIOGRAPHY OF FISHES<sup>1</sup>

THE monumental "Bibliography of Fishes," begun by Professor Bashford Dean in 1890, and continued with help of Charles R. Eastman, Eugene W. Gudger, Arthur W. Henn and many others, has been brought to completion by the issue of the third volume. To call this work monumental is only the beginning of defining adjectives. It is majestic, commanding, and, above all, insistently useful. No one in the future can attempt research in ichthyology without having these volumes at his elbow. The sciences which rest on observation, the study of structure, habits, distri-

<sup>1</sup>"A Bibliography of Fishes." By Bashford Dean. Enlarged and edited by Charles R. Eastman. Vol. I (A. to K.); Vol. II (L. to Z.).

"A Bibliography of Fishes." By Bashford Dean. Extended and Edited by Eugene Willis Gudger, with the cooperation of Arthur Wilbur Henn. Vol. III (Indices, etc.). American Museum of Natural History, New York.

bution, classification and evolution of living organisms, have gone so far and through so many hands that they are likely to be swamped in the thickets by themselves created. A system of clearing-house is vitally necessary. This is true in every field of natural history, not least in the fishes, the monstrous, ancient and varied group from which all the higher classes of vertebrates are offshoots.

In brief, Dean and his associates have tried to furnish a clue to everything of any permanence which has been written about fishes. They have listed every book or paper which has added to knowledge, and some which unwittingly have turned science backward. In the first two volumes the authors catalogue, with occasional comments, about 35,000 titles of books and memoirs since 1758, the date of the tenth volume of Linnæus's "Systema Naturae," with which scientific classification of animals began. The third volume, now before us, contains everything that the worker could desire which the other volumes omit. The title page asserts that it includes "indices, general bibliographies, periodicals relating to fishes, early works, voyages and expeditions, addenda and errata of Vol. I and II."

This modest enumeration will bear analysis. We find first a list of anonymous papers of varying importance, but worthy of record. These relate largely to fishing interests. Next comes, as "Addenda," papers overlooked in the first and second volumes. For never yet was a voluminous record absolutely complete. This fact was noted by Aristotle, who is quoted as saying (in substance): "It is pedantry to expect a degree of accuracy which the subject does not permit." Next follow titles of publications before Linnæus, though these are not considered in modern taxonomy, for a system of naming must have its beginning somewhere, yet knowledge owes much to some of these early authors. Clear minds and keen eyes came into civilization long before the printing press or the steam engine made diffusion of opinion easy. Among these ancient worthies we may name Aristotle, of course; Ælian, inventor of fly-fishing; Aldrovandi; Ausonius, who sang the trout and grayling of the Moselle; Artdi, who taught Linnæus most that he knew of fishes; Gesner; Gronovius; Ray, Rondelet and Willughby. Among these stands Izaak Walton, in a class by himself. Next follows a long list of early anonymous writers, and a record of bibliographies, large or small, the work of preceding compilers. The fifth chapter records voyages and expeditions in which fishes and fish information have been secured. Among these, our own "Albatross" holds an honorable place. Next comes the long list of periodicals devoted to fish culture. Then follow the errata and corrigenda of the first two volumes, these largely relating to initials of foreign writers and to duplications in reprints.

Of most importance to workers in ichthyology, and involving a prodigious amount of reading and research, is Part VIII, termed the "Subject index." Here every feature of fish structure and fish life has its special bibliography. In each case the student is assisted by an analysis and history of the problems concerned, and the most important papers, Bædeker-fashion, are indicated by a star (\*). For example, the first topic, "Abdominal pores of fishes," is given a page and a half of elucidation. "General morphology" receives three and a half pages, "Angling" two pages, and "The evolution of fishes" four pages. The unsolved problem of the origin of the pectoral limb is intelligibly presented, and the three or more conflicting theories are made clear.

The subject of geographical distribution, vital to any serious grasp of the facts of evolution, receives six pages, devoted to results of faunal studies all over the globe. Paleontology, equally important, as an index of results of evolution of fishes throughout the ages, has thirteen more.

The last section (VIII) consists of a systematic subject index covering all the papers which treat somewhat fully of the taxonomy and presumable evolution of the different families and higher groups. Individual genera are sometimes mentioned, but a complete analysis of the 8,000 genera, real or nominal, would demand another large volume. It is the less needed, because the *Zoological Record* of London attempts each year to do this work, a matter of the greatest importance to every systematic worker in any field. The rumored danger that the *Zoological Record* might suspend publication for want of support has given a shock to every worker on the details of classification, for without it taxonomists would sail an uncharted sea. This would be far more precarious now than in the years between 1845 to 1864 (Agassiz to Günther), when no continuous records of genera or species were kept anywhere. The number of workers and of centers of publication have enormously increased in these sixty years, and to abandon the regular annual record of discoveries would be one of the most disastrous of the many damages inflicted on science by war.

Finally, a finding index refers to all important topics, not persons, mentioned throughout the book.

In conclusion, the reviewer may again voice the profound indebtedness of every student of fishes in whatever field, an indebtedness which will endure so long as investigators busy themselves with knowledge of fishes. It is indeed, as Izaak Walton once pertinently observed, "good luck to any man to be on the good side of the man that knows fish."

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## PROGRESS IN THE CERTIFICATION OF BIOLOGICAL STAINS

In a recent article<sup>1</sup> in this journal announcement was made of the certification of methylen blue that had been undertaken by the Commission on Standardization of Biological Stains. This present notice is published to call attention to the fact that haematoxylin has now been put upon this same basis, and that samples of three other stains, namely, basic fuchsin, safranin and eosin, are now in the hands of the commission for the testing preliminary to such certification. Samples of these stains prepared from batches that have been found satisfactory by members of the commission will soon be available.

In the article just mentioned reference was made to cuts representing the labels to be used on these certified stains. No cuts accompanied the article, however, because it was found that they were not suitable to reproduction on the paper used in this journal. The inability to use these cuts was discovered too late to make the necessary correction in the proof. There are two of these labels issued by the commission. One of them is intended for use by those companies who want to employ it in addition to their regular label, the other is to be used by the companies who want to have the commission label the main label on the bottle bearing the name of the stain. The statement on the first of these labels is as follows:

Found satisfactory by Commission on Standardization of Biological Stains for purposes mentioned on main label. Use for other purposes not contra-indicated unless specifically so stated on said label.

Will users please report unsatisfactory results to the chairman, H. J. Conn, Geneva, N. Y.

The statement on the second label is the same except for minor verbal differences to indicate the fact that it is itself the main label on the bottle.

In the article above mentioned on "Certified Methylen Blue," the names of six concerns were given whose products have been certified. It was not mentioned at this time that such products could be obtained from regular dealers handling laboratory supplies. Attention is called to the fact, now, however. There is no need of ordering these stains directly from the companies mentioned. Any one desiring them can obtain them from his regular dealer by specifying one of the companies listed or by merely indicating that the stain bearing the certification of this commission is desired.

COMMISSION ON STANDARDIZATION OF STAINS

H. J. CONN, *Chairman*

GENEVA, N. Y.,

DECEMBER 1, 1923

<sup>1</sup> SCIENCE, 58, p. 41. July 20, 1923.