THE first building of the Army Medical School, located at the Walter Reed General Hospital, in Washington, is completed and is nearly ready for occupancy. The cost of the unit was $450,000. It contains laboratories for the various sections, operating rooms and a roentgen-ray unit. All typhoid vaccine for the army and U. S. Public Health Service will be made in one of the laboratories.

J. HARRISON BELKNAP, formerly assistant professor of electrical engineering at the Oregon State Agricultural College, has joined the control engineering division of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

UNIVERSITY AND EDUCATIONAL NOTES

AT the December meeting of the Rockefeller Foundation a total sum of $2,725,000 was appropriated in fulfillment of various pledges given previously by the foundation. In addition it was voted to continue certain fellowships in United States educational institutions. Of these appropriations, $1,000,000 will go to the medical school of the University of Chicago, $1,000,000 to the medical school of the University of Toronto, and $225,000 to the medical school of the University of Iowa. The remaining $500,000 is for the endowment of the medical school of the University of Alberta. The fellowships to be continued are in physics, chemistry, medicine and the biological sciences under the auspices of the National Research Council.

ST. STEPHEN'S COLLEGE, at Annandale on Hudson, N. Y., has received $125,000 from the estate of the late John R. Hegeman, of New York.

DR. JAMES ARTHUR HARRIS, of the Cold Spring Harbor Biological Laboratory, with which he has been associated since 1907, has been elected professor of botany and head of the department of botany of the University of Minnesota. He will take up his new work in September, 1924.

DR. JAMES H. MEANS, formerly assistant professor of medicine, has been appointed Jackson professor of clinical medicine, in the Harvard Medical School, to succeed Dr. David L. Edsall, the dean of the Medical School. Dr. Means is chief of the medical service at the Massachusetts General Hospital, Boston, in which capacity also he succeeds Dr. Edsall.

R. T. HASLAM has been promoted to a full professorship in the School of Chemical Engineering Practice, Massachusetts Institute of Technology.

PROFESSOR O. W. ALBERT, of Grinnell College, has been appointed head of the department of mathematics at the University of Redlands.

DISCUSSION AND CORRESPONDENCE

A SUGGESTION AS TO THE APPROXIMATE CHARACTER OF THE PRINCIPLE OF RELATIVITY

THE special principle of Relativity may be formulated partially somewhat as follows: In all systems moving with uniform velocity with respect to the fixed stars (called inertial systems by definition) the "laws of nature" take an especially simple form, and are the same for all the inertial systems.

Something equivalent to this seems to be an essential part of any rigorous formulation of the special principle. Now such a formulation demands an examination of what we mean by "laws of nature." Obviously we can not include among our laws of nature a statement that the stellar system has a certain apparent velocity, for this velocity is different for different inertial systems. We evidently mean that the laws of nature are the laws governing the happenings which take place solely in any one of the inertial systems, supposed isolated from the rest of the universe.

These considerations allow us incidentally to make an alternative formulation of the principle of relativity as follows: "It is actually impossible to detect uniform motion with respect to the fixed stars except by looking at them."

The necessity of supposing our inertial system isolated from the rest of the universe must arouse considerable misgiving, for it is not at all certain that it is physically possible to isolate a part of the universe from the rest. On the contrary, in such experiments as the gyroscopic compass and Foucault's pendulum, we have important evidence that happenings in our own system are essentially connected with all the rest of the universe, for the only significance which can be attached to an invariable direction, which these experiments show to exist, is a direction invariable with respect to the stellar universe. (Perhaps one reason that this connection is not more often prominent in our minds is that we are still very far indeed from being able to give that mechanistic account of the connection that our minds so insistently demand.) Admitting then the fact of such a connection, we find the ignoring of it by the principle of relativity logically difficult to justify. But we may physically justify the neglect of it if we can see any reason to expect that the effect of a translation may be very much smaller than that of a rotation. Such a difference is at once found in the enormous difference of actual velocities of translation and rotation when measured in cosmic units. In dealing with phenomena of connection with the entire universe, we naturally expect to employ coordinates relative to the entire universe. Now the earth in rotating about its axis runs through the entire possible range of co-

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[1]

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, distribution, 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; Artedi, 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.

[1] "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.