

It will be obvious that this criticism is based upon a misapprehension. The new method is not an extension of the old. It is a fundamentally different process. The old method is chiefly didactic. The new is a systematic course of experiment and observation by the student himself. In the old the student rests upon the dictum of the professor and the text-book. In the new he relies upon the fundamental experiments done with his own hands. In the old his experiments follow the lecture and attempt to verify its statements. In the new the lecture follows his experiments and discusses them in relation to the work of other observers. In the old the stress is upon the didactic teaching. In the new the stress is upon observation. Under the old method, students in the Harvard Medical School used to ask, 'Who is the authority for that statement?' Under the new, they ask, 'What is the experimental evidence?' The old method insensibly teaches men to depend upon authority, but the new directs them to nature.

In the old method the experiments performed by the students are almost exclusively such as are quickly and easily done; for example, the simpler experiments in the physiology of muscle and of the circulation of the blood. They are intended to illustrate physiological experimentation rather than to disclose step by step the groundwork of the science of physiology.

In the new method, on the contrary, the fundamental experiments and observations which form the solid ground in every field of physiology are divided into sufficiently small groups and arranged in the most instructive sequence. With the fundamental experiment of each group are placed the accessory data. The meaning of this term will be clear from the following example. Consider the function of the roots of spinal nerves. The fundamental experiment here is Johannes Müller's well-known section and stimulation of the nerve-roots. The accessory data are such of the observations and opinions of his successors as are necessary to give a clear picture of the present state of knowledge of this subject. The student makes for himself the funda-

mental observation, and immediately afterward considers the accessory data provided in text-book and lecture. He proceeds systematically from the fundamental experiment and accessory data of one group to those of the next, in an ordered and logical series.

The fundamental experiment and the accessory data are taken as directly as possible from the original sources, and the reference is given in each case.

It should be observed that this new method serves for the instruction of all students, from beginners to those engaged in research. The beginner performs the fundamental experiment in each group and studies the accessory data. The advanced student performs the fundamental experiments and as many of the accessory experiments as may give him the special training he desires. The research student has before him the classical observations and the original sources of the problem he has chosen.

It should be noticed also that the new need not violently push aside the old method of instruction, but may replace it chapter by chapter as the means and the energy of the instructors shall permit.

It has been urged against the new method that there are fundamental experiments which require more time than the student can possibly give, or which are too complicated to be successfully performed by him. The number of these has certainly been much exaggerated, and is daily lessened by inventions that secure simplicity without loss of accuracy. Pending such labor-saving inventions, the experiments which consume much time may well be done by committees of students, and the results reported to the entire class, who will compare them with the account given by the original discoverers.

SCIENTIFIC NOTES AND NEWS.

THE council of the British Association for the Advancement of Science has nominated the Right Hon. Arthur James Balfour to the office of president for the Cambridge meeting in 1904. They further agreed to recommend to the association the acceptance of the invitation to South Africa for the year 1905.

PROFESSOR KOCH has been elected a foreign associate to the Paris Academy of Sciences in succession to the late Rudolf Virchow.

SIR DAVID GILL, astronomer royal at the Cape, is to direct an expedition to complete the scientific survey of Rhodesia.

DR. HUGH M. SMITH, the newly appointed deputy commissioner of fish and fisheries, has left Washington for Japan, where he will make a series of investigations into the fisheries with reference to saving the terrapin industry of the United States.

DR. L. A. BAUER returned to Washington from Porto Rico on March 16. A series of magnetic observations was successfully carried out on the Coast Survey steamer *Blake* on her trip from Baltimore to Porto Rico; a temporary magnetic observatory was put in operation on Vieques Island, to the east of Porto Rico and on the homeward trip *via* Havana, magnetic observations were obtained at two stations in Santo Domingo and at four in Cuba.

DR. A. E. ORTMANN, now of Princeton University, has accepted the position of curator of invertebrate zoology at the Carnegie Museum, Pittsburgh. He will assume the duties of his office on July 1, and asks that thereafter all correspondence be addressed accordingly.

At a meeting of the American Geographical Society in New York on March 17, the Cullum gold medal was awarded to the Duke of the Abruzzi in recognition of his services to geography by his ascent of Mount St. Elias in 1897, and his Arctic explorations in the region of Franz Josef Land in 1899-1900. The Duke of the Abruzzi is the sixth explorer to be thus honored by the society, the previous recipients of the medal having been Commander Peary, Dr. Nansen, Sir John Murray, Dr. T. C. Mendenhall and Dr. A. Donaldson Smith.

THE University of Halle has conferred a gold medal on Professor J. P. Pawlow, of St. Petersburg, for his research on digestion.

As we have reported a gold medal was presented to Professor von Esmarch, the eminent surgeon, on the occasion of his recent birth-

day. Medical journals state that it is now proposed to give a bronze replica of the medal to persons or societies that have distinguished themselves in the first aid or Samaritan movement, as it is called in Germany. The first medal was presented to Prince Henry of Prussia, February 14.

THE Medical Club of Philadelphia will give a reception to Dr. William Osler, of the Johns Hopkins Medical School, at the Hotel Belvedere on March 27.

PROFESSOR IRA N. HOLLIS, who holds the chair of engineering of Harvard University, has been elected president of the Boston Society of Civil Engineers.

PROFESSOR E. MAZELLE has been appointed director of the Astronomical-meteorological Observatory at Triest.

Nature states that Dr. J. W. Gregory, F.R.S., professor of geology in the University of Melbourne, has met with an accident, necessitating an operation under chloroform. He was conducting scientific investigations in Tasmania at the time, and considerable anxiety has been felt concerning him. The latest news is, however, reassuring.

DR. GEORGE F. BARKER, emeritus professor of physics at the University of Pennsylvania, lectured before the Chemical Club of Columbia University on March 19, his subject being 'Radium.'

SIR ROBERT BALL began a course of three lectures at the Royal Institution on March 17, his subject being 'Great Problems in Astronomy.' Friday evening discourses are announced on the 20th by Professor E. A. Schäfer on the 'Paths of Volition,' on the 27th by Professor Herdman on the 'Pearl Fisheries of Ceylon,' and on April 3 by Lord Rayleigh on 'Drops and Surface Tension.'

It is proposed in Vienna to erect a monument to the African explorer, Dr. Holub, who died last year.

A COMMITTEE representing Cambridge University and the Royal Society has been formed to secure a memorial of the late Sir George Gabriel Stokes.

THERE will be a civil service examination on May 1 for the position of systematic agrostologist in the Bureau of Plant Industry, Department of Agriculture, at a salary of \$2,000. On April 21 there will be an examination to fill a number of vacancies in the position of aid in the U. S. Coast and Geodetic Survey, at a salary of \$720 per annum. The age limit is eighteen to twenty-five years.

The collection of Diptera, especially Muscidae, made by Dr. Garry de N. Hough, of New Bedford, has lately been acquired by the University of Chicago. It is believed to contain some 20,000 specimens.

THE will of Mrs. Susan Bevier gives \$50,000 to the Rochester Athenæum and Mechanics' Institute. The income is to be devoted to the purchase of paintings and works of art, which are to be placed in the Bevier Memorial building.

THE Michigan Academy of Sciences will hold its spring meeting at Ann Arbor on March 26, 27 and 28. There will be sections in (1) agriculture, (2) botany, (3) zoology, (4) geography and geology, (5) sanitary science and (6) science teaching.

THE announcement of the Ohio State University Lake Laboratory, at Sandusky indicates increased facilities in the provision of a commodious laboratory building capable of accommodating at least one hundred students and investigators. Courses are offered in zoology, botany, entomology, ornithology and physiology, with opportunities for research work or independent investigation. The latter with no charge for use of tables and general laboratory facilities. During the last summer's session twenty-four students and investigators were enrolled, these representing fourteen different colleges and universities. A series of general lectures included the following topics: 'Physiographic Features of Sandusky Region,' by Professor E. L. Moseley; 'The Harriman Alaskan Expedition,' by Mr. Leon J. Cole, of the U. S. Fish Commission; 'The Biological Features of the Florida Keys,' by Professor E. L. Morris, of the U. S. Department of Agriculture; 'Adaptation in Ani-

mal Life,' by the director; 'Evolution of Plants in Time,' by Professor J. H. Schaffner; 'Collecting in the Philippine Islands,' by Professor E. L. Moseley. The session for 1903 opens on June 29, and lasts six weeks, while the privileges of the laboratory are open to both students and investigators for at least two weeks longer for independent work. Announcements giving details may be obtained by addressing the director, Professor Herbert Osborn, Ohio State University, Columbus, Ohio.

THE Biological Laboratory of the Brooklyn Institute of Arts and Sciences, located at Cold Spring Harbor, Long Island, will hold its next regular session for six weeks beginning Wednesday, July 1. Courses are offered in high school zoology by Dr. Davenport and Mr. Lutz, in comparative anatomy by Dr. Pratt, in invertebrate embryology by Dr. Sigerfoos, in animal bionomics and variation by Dr. Davenport, in cryptogamic botany by Dr. Johnson, in ecology by Mr. Whitford, in bacteriology by Dr. Davis, and in microscopic methods by Mrs. Davenport. Fifty students are admitted to receive instruction, the tuition fee being \$25. A limited number of rooms are offered free of rental to properly qualified investigators. Application for such rooms or for further information may be made to Professor C. B. Davenport, University of Chicago.

HARVARD UNIVERSITY offers a summer course of five weeks in geological field-work in the Rocky mountain region, beginning about the first of July. The field selected includes the higher groups of mountains in southwestern Colorado. The course will be in charge of Mr. Chas. H. White, who will send a descriptive circular on application, giving dates, outfit, expenses, etc. Mr. White's address is Rotch Building, Harvard University, Cambridge, Mass.

UNIVERSITY AND EDUCATIONAL NEWS.

PURDUE UNIVERSITY has recently been the recipient of liberal treatment at the hands of its state legislature, just adjourned. By an amendment to a previously existing law,