

1801. The function of n represented by $\phi(n)$ is, however, generally called Euler's function, since Euler had studied some of its fundamental properties before the appearance of Gauss's "Disquisitiones."

It is a well-known fact that it is easy to find errors in nearly every book and the few errors noted above would be of very little interest if they did not occur in such an excellent work. As they were met incidentally, it is not implied that they include the most important mathematical errors in the work under consideration. They may perhaps serve to emphasize the great importance of a thorough study of the question on hand before expressing a definite conclusion, and also the large amount of labor involved in such a study. There is a vast amount of error afloat even in the best literature of the present time, and this calls for a larger army of workers who investigate questions *ab initio* and who are fearless in resisting the tendency towards the further spreading of these weeds on the intellectual earth.

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MORE WASHINGTON SCIENCE

TO THE EDITOR OF SCIENCE: I have been reading with much interest the recent communications on Washington science. No one will deny credit to the scientists who are giving the government department their best energies. Still, these same men are occasionally lacking in—I am almost tempted to say a system of professional ethics. I have been quite near the inside of Washington methods and herewith present the case.

In the event of choosing a scientific assistant for a vacancy, I have known in several cases that the matter of minimum salary the applicant would accept was of paramount importance while the ability and training of the applicant seemed to be an insignificant matter. I know cases where men with practically no college or scientific training of any sort were preferred to college graduates with experience, because the former could be obtained for five dollars a week less. I know a case in one

division where \$100 per year represents the difference between the beginning salary of an untrained man and that of a post-graduate of a large eastern university. I do not refer to men appointed under the civil service competitive examination, but rather to those who come under the general heading of agents and experts, who are appointed merely at the recommendation of a division chief. Many of us know of cases wherein good men were discouraged, by this state of affairs, to the extent of entering other lines of endeavor. It is now in order for some one to sign an earnest communication containing the phrases "love of science," "mercenary," etc. To one interested in this subject I would suggest looking up the records of resignations of very good men from the government bureaus as a result of the order of Secretary Wilson (1909) that no promotions were to be made for the next fiscal year. Is there not a system of ethics in these matters?

For obvious reasons, I emulate my predecessors and sign myself

A FORMER WASHINGTONIAN

COLUMBIA AND BERLIN

A STATEMENT has recently appeared in a number of newspapers to the effect that Columbia University having passed the University of Berlin in attendance is now the largest university in the world. As a matter of fact it will probably be several years before the attendance at Columbia exceeds that of Berlin. The error in calculation has arisen primarily from the fact that the Columbia figures include not only the fall attendance but also the enrollment of the summer session of 1911, proper allowance, of course, being made under duplication for the summer session students who returned for work this fall. The figures of the University of Berlin, with which a comparison has been made, include, however, only the attendance during the winter semester, the summer semester enrollment not being considered. Inasmuch as registration at the University of Berlin for the winter semester of 1911-12 is not yet completed, it is simpler to make a comparison between

the attendance at Columbia University during the academic year of 1910-11 and the attendance at Berlin during the winter semester of the same year, leaving the summer session students out of consideration in both cases.

There were matriculated at the University of Berlin last winter, 9,686 students, distributed as follows: Protestant theology, 406; law, agriculture and forestry, 2,429; medicine, pharmacy and dentistry, 1,864; philosophy, pure science, etc., 4,987. In addition 778 men and 256 women were enrolled as auditors, so that the total attendance amounted to 10,720, this being exclusive of 4,664 auditors registered at other Berlin schools of university rank. Leaving the auditors out of consideration, the University of Berlin had an attendance last winter of 9,686 students, as against Columbia's 5,893, the latter being distributed as follows: undergraduates, 1,349; theology, —; law, 376; medicine, 329; pharmacy, 275; applied science, 724; architecture and music, 182; political science, philosophy and pure science, 1,367; Teachers College, 1,571 (280 duplicates). Of the 1,349 undergraduates, 839 were enrolled in the freshman and sophomore classes, and these students in Germany would correspond to the two last years of the secondary schools—*i. e.*, they would not be of university grade in Germany. Omitting these students, the total would be reduced to 5,054. Then if we subtract the enrollment of Teachers College, the faculty of applied science and the faculty of fine arts, we would have compared with the 9,280 students enrolled at Berlin in the various faculties, exclusive of theology, only 2,857 students at Columbia. The number of students in agriculture, forestry and dentistry at Berlin—departments not represented at Columbia—is not large enough appreciably to affect the result. The law and medical schools at the University of Berlin are each about five times as large as the corresponding schools at Columbia, and the Berlin non-professional graduate students are more than three times as numerous as they are at Columbia. It must also be borne in mind that in general the requirements for admission to the professional schools, with the

exception of law and medicine, are—with few exceptions—higher at Berlin and other German universities than they are at Columbia and elsewhere in the United States.

In the same year the University of Munich had an enrollment of 6,905 students, exclusive of auditors, and Leipsic had an enrollment of 4,900 students, so that the former at least may be regarded as being larger than Columbia, no matter from which standpoint the matter may be viewed, and from certain viewpoints Leipsic is larger. The latter university, in addition to its 4,900 matriculated students, had 904 auditors, and it might thus also be considered as outranking Columbia in size. If the summer semesters for Berlin, Munich and Leipsic were added, the numerical superiority of these institutions over Columbia would become even greater, for as against Columbia's 2,632 summer session students in 1910 and 2,970 students in 1911, there were registered at the University of Berlin in the summer semester of 1910, 7,383 matriculated students and 651 auditors; at Munich there were 6,890 matriculated students and 474 auditors; and at Leipsic 4,592 students and 784 auditors. These figures are all based on reliable statistics compiled annually for the "Deutscher Universitäts-Kalender."

I might also add that compared with the 724 students enrolled at Columbia in the faculty of applied science during the academic year 1910-11, there were 2,168 students registered at the Berlin School of Technology in the winter semester of 1909-10, these students of course not being included in the enrollment of the University of Berlin.

It is also well to remember that Berlin is not the largest university in the world, this distinction belonging to the University of Paris, at which there were enrolled during the winter semester of 1909-10 no fewer than 17,512 students. At the University of Cairo there were over 10,000, at Moscow over 9,000 matriculated students, at St. Petersburg almost 9,000; at Vienna there were 6,833 matriculated students in the summer semester of 1910, at Budapest (Hungary) there were 6,683 matriculated students in the winter semester

of 1909-10; at Naples there are almost 7,000 students, and at Tokyo over 5,500.

It will probably be some time before Columbia University—in point of student enrollment the largest American university—or any other American university attains to the distinction of attracting the largest student body in the world to its halls; and in the meantime it is well to bear in mind that, after all, greatness and not bigness is the most important factor in the development of our higher institutions of learning, and that the Columbia authorities lose no opportunity to emphasize the value of quality in contradistinction to quantity.

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SCIENTIFIC BOOKS

The Doctrine of Evolution: its Basis and its Scope. By HENRY EDWARD CRAMPTON, Ph.D., Professor of Zoology, Columbia University. New York, Columbia University Press. 1911. 12mo, pp. ix + 311. \$1.50 net.

The difficulties of presenting scientific conceptions and results in wholly untechnical language are abundantly evidenced; they are appreciated by every one, most keenly by those who have attempted the task. Failure to achieve such a purpose seems to follow more often from falling away from the strictly scientific method and spirit, than from an inability to make facts passably intelligible.

To Professor Crampton, however, must be granted a large, if not a complete, measure of success in his attempt thus to set forth the essentials of the evolution idea. For the lucidity of his untechnical statements of facts makes his work thoroughly intelligible, while his method and the scientific spirit which pervades the work make it convincing.

This volume consists of the Columbia University Hewitt Lectures for 1907. As such they were prepared for an audience "of mature persons of cultivated minds, . . . quite unfamiliar with the technical facts of natural history." All consideration of the work must obviously be made with the nature of its adaptedness constantly in mind: it is in-

tended as "a simple message to the unscientific."

The introductory chapter provides a setting for the evolution doctrine and includes a brief discussion of certain fundamental principles of science in general, and in particular of biology. There are the necessary descriptions of the biological sciences, of the nature of the organism, and of life processes, throughout which the wisdom of the author is evidenced by his discreet avoidance of the word "vitalism" in any of its present meanings. The second and third chapters are given to setting forth the evidences of evolution as afforded by the structure, the development, the fossil history and the geographical distribution of organisms. Factors in the process of evolution are reviewed in the fourth chapter. This concludes what might have been termed Part I. of the work, dealing with general evolution.

In the remaining chapters the author takes up various phases of human evolution for especial emphasis and more detailed treatment. Presentation of the facts regarding the "physical" evolution of the human species is followed by an account of the evidences for the evolution of the human races. This leads to an account of man's mental evolution, which is discussed from the standpoints of comparative psychology, both descriptive and genetic, of "comparative anthropology," and of the "paleontology of mind."

It is at this corresponding point that many somewhat similar accounts of evolution terminate. Professor Crampton, however, does not fail to discuss those aspects of the evolutionary doctrine which the general reader to-day regards as of the most importance, and concerning which there is the greatest need for simple, sane, scientific treatment. For there follow two chapters entitled "Social Evolution as a Biological Process" and "Evolution and the Higher Human Life." Many will find these the most valuable parts of the book, for here are reviewed, in simple terms, the fundamental evolutionary aspects of social relations, and of ethics, religion and philosophy.

In its general plan this work is not unlike