

nearer to our understanding the complicated phenomena of retarded and accelerated growth.

It seems very likely that the abnormally large amount of energy expended upon rapid growth during a short period is an unfavorable element in the individual development. A study of the phenomena of growth of various groups of the same population has shown that early development is a concomitant of economic well-being, and that a characteristic of the poor is the general retardation in early childhood, and the later rapid growth. It follows from this that there is a corresponding, although not equal, retardation in early mental development, and a crowding of developmental processes later on, that probably place a considerable burden on the body and mind of the poor, which the well fed and cared for do not bear. The general laws of growth show also that a retardation kept up for an unduly long period can not be made up in the short period of rapid growth; so that it would seem that, on the whole, excessive retardation is an unfavorable element in the growth and development of the individual. Whether there are similar disadvantages in a considerable amount of early acceleration is not so clear.

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*THE WORK DONE BY THE GERMAN SUBCOMMITTEE ON THE TEACHING OF MATHEMATICS*<sup>1</sup>

I REGRET very much, that Mr. F. Klein, Göttingen, the president of the German subcommittee of the International Commission on the teaching of mathematics, is not able to come to Cambridge. It thus happens that I have the honor, in his place, of presenting to you the following short report of the present state of the work done in Germany.

When we consider the historical development of the German empire, it is very evident that we should not expect to find a homogeneous system of schools, controlled by a central board of education, as is usually the case in

<sup>1</sup>Report presented at the meeting of the Fifth International Congress of Mathematicians, at Cambridge (England), August 23, 1912.

other countries. The various sections of the German people may be looked upon as different sources of the stream of German culture. Furthermore, the religious reformation tended to increase the variety of the German schools; for while in some parts of Germany the schools of to-day can be traced directly to the ancient cloister-schools, in other sections of the country there is not such a connection apparent. And finally the modern development of Germany from an agricultural state to an industrial one has also had a large influence on the formation of schools, so that a great difference in types must be expected and actually does exist.

A recognition of all these influences, the political, the religious and the economical, is essential to a complete understanding of German education, and they are therefore in evidence in the general plan of the German report as well as in the individual essays of which it consists.

The German report<sup>2</sup> is composed of 5 volumes, treating:

I. The secondary schools of northern Germany.

II. The secondary schools of southern and middle Germany.

III. Special problems of the secondary mathematical instruction.

IV. The mathematics at the technical schools.

V. The teaching of mathematics in elementary schools, and in the seminaries or training schools for elementary teachers.

These five volumes will comprise 36 individual reports and I have the honor to present 27 of them to the congress.

The German subcommittee has succeeded in engaging a staff of specialists in the various fields of mathematical instruction, and it has taken care to harmonize all the single reports with the general plan. The president, Mr. Klein, had the general supervision of all

<sup>2</sup>“Abhandlungen über den mathematischen Unterricht in Deutschland, veranlasst durch die Internationale Mathematische Unterrichtskommission,” Herausgegeben von F. Klein, Leipzig, B. G. Teubner.

the volumes, being assisted by Mr. Lietzmann, the secretary of the German subcommittee. Furthermore, Mr. Klein gave special attention to the volumes I., III. and V., while the second volume was due in large measure to Mr. Treutlein, one of the most prominent of our secondary teachers, whose death, three weeks before this congress, is a great loss to our country. Volume IV., which relates to the mathematics at the technical schools, is largely in the hands of Mr. Staedel.

At first sight it might be expected that the report would begin with the elementary schools, proceeding then to the secondary schools and finishing with the institutions of university rank. It is not possible, however, to give such a systematical description of the German schools. The variety is too great, the development of the different types of schools too peculiar, the mathematical instruction too varied, to make it possible to arrange our school-system in a straight line.

The points of view that have been set forth in the several papers can not be completely given in this short report. I may say, however, that in general there is given in every case a sketch of the historical development and of the organization of the special types of schools. Perhaps you will allow me to call especial attention to the fact that the reports of the German delegation not only present a fairly adequate picture of the mathematical instruction, but also of the whole German system of schools.

In order to set forth a general summary of the German reports, without entering into details, I beg to call attention to the third volume, which contains the discussion of certain general questions of the secondary mathematical instruction, and to mention in some detail the several papers.

During the last 10 or 20 years the reform of the teaching of mathematics has often been discussed not only in Germany, but in all cultivated countries. Therefore it is of interest that the first paper of the third volume is especially devoted to the development of these reform tendencies in Germany.

The second paper treats of the relation be-

tween mathematics and physics in the secondary schools, showing by numerous examples the great value of physics when founded on a high grade of modern mathematical instruction. We may assume that this paper will have a good reception in the native country and in the university of Newton.

The following three papers treat of applied mathematics, and especially of descriptive geometry, astronomy and practical arithmetic. These are followed by an essay on the history of mathematics as a means for raising the interest of the student in the subjects of the secondary school.

The last essay of the third volume that just appeared sets forth the relation between mathematics and philosophy. It shows us how the higher classes in mathematics in the secondary school receive a valuable training in philosophy as well. I am of the opinion that this paper will be found to contain much that will prove to be of value and of general interest to all readers.

Though all of the volumes of the German report treat more or less at length of the training of teachers, nevertheless it has been thought desirable to prepare a special paper on the study of mathematics at the German universities since 1870. I am sorry to say that this report is not yet printed, but it is just going to press. I need not urge the great importance of such a report, for it is evident that the education of teachers is the center of any substantial educational reform.

The reform of mathematical instruction is extending itself everywhere in Germany, and this tendency naturally leads, little by little, to a standardization of the instruction in the different parts of the country. But in spite of this tendency it must be said that, in matters of public education, Germany enjoys very great freedom. I dare say that this freedom is a notable characteristic of our country, and that there exists scarcely an analogy in any other of the leading countries of the world. I may illustrate this liberty of teachers and of the educational system by two examples: First, in Germany the teachers are merely obliged to follow certain general outlines

given by the minister of public instruction, without being slavishly bound to the textbooks that are used in their schools; and second, the problems for the "Abiturientenexamen" (our finishing examination at secondary schools) are not prescribed by a central board or by the ministry, but are set by the teachers themselves, subject only to the approval of the authorities.

The reform in mathematical teaching is only one step in the reorganization of secondary education. This reorganization aims at making the youth of our country sympathetic with labor as well as appreciative of the best that is in modern culture. From this point of view the teaching of mathematics and science assumes a position equivalent to that in history and languages. It has been felt to be an important problem to reorganize the teaching of mathematics and science, and you are doubtless aware that the "Unterrichtskommission" of the German Association for the Advancement of Science, now enlarged to the "Deutscher Ausschuss für den mathematischen und naturwissenschaftlichen Unterricht," has prepared special outlines for the teaching of mathematics and physics as well as for that of biology. In presenting the German reports of the International Commission on the teaching of mathematics, I beg to be allowed to place here upon the table the publications of the Unterrichtskommission<sup>3</sup> and of the Deutscher Ausschuss<sup>4</sup> as far as they have been published until now.

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*THE NINETEENTH INTERNATIONAL  
CONGRESS OF AMERICANISTS, 1914*

In the fall of 1911 a number of delegates to the past congresses of the Americanists met in Washington, under the auspices of the

<sup>3</sup> A. Gutzmer, "Die Tätigkeit der Unterrichtskommission der Gesellschaft Deutscher Naturforscher und Aerzte," Leipzig, 1908, B. G. Teubner.

<sup>4</sup> "Schriften des Deutschen Ausschusses für den mathematischen und naturwissenschaftlichen Unterricht," Leipzig, Heft 1-14, B. G. Teubner.

Smithsonian Institution and the Anthropological Society of Washington, for the purpose of taking preliminary steps toward extending an invitation to the congress at its London meeting, to hold its nineteenth session in 1914 at Washington. A temporary organizing committee was selected, consisting of Professor W. H. Holmes, chairman; Mr. F. W. Hodge; and Dr. A. Hrdlička, secretary. This committee entered into communication with the principal local institutions and organizations which are interested in the work of the Americanists, and by May 1, 1912, a formal invitation to the congress was agreed upon by the Smithsonian Institution, the Anthropological Society of Washington, the George Washington, Georgetown and Catholic universities, and the Washington Society of the Archeological Institute of America. A list of names of persons to form the permanent organizing committee was agreed upon and Dr. Hrdlička was instructed to present the joint invitation with the list just mentioned to the council of the London meeting of the Americanists, which was done, and both were accepted without objection. In addition an official invitation from the Bolivian government was accepted for a second session, to be held at La Paz following that in Washington.

On October 11, 1912, the permanent committee for the Washington session met in the U. S. National Museum for organization. Its membership is as follows: Messrs. Franklin Adams, Frank Baker, Chas. H. Butler, Mitchell Carroll, Charles W. Currier, A. J. Donlon, J. Walter Fewkes, Alice C. Fletcher, Gilbert H. Grosvenor, F. W. Hodge, H. L. Hodgkins, William H. Holmes, Walter Hough, Aleš Hrdlička, Gaillard Hunt, J. F. Jameson, George M. Kober, D. S. Lamb, Chas. H. McCarthy, James Mooney, J. Dudley Morgan, Clarence F. Norment, Thomas J. Shahan, H. J. Shandelle, George R. Stetson, Chas. H. Stockton, J. R. Swanton, Harry Van Dyke, Charles D. Walcott and M. I. Weller.

The elections of officers resulted, in the main, as follows:

*For Patron of the Congress:* The President of the United States.