

An additional endowment of about \$50,000 has been collected during the past year for this excellent school, which in its provisions for scientific, in connection with academical education, is second to none in the possession of the English race.

One most important feature of the Sheffield School is that it combines all that is valuable in a science degree with the special training of a practical science course. Students who have the necessary literary acquirements may thus obtain the degrees of Bachelor and Doctor of Philosophy along with their special scientific training as civil or mining engineers, assayers, &c., while others can secure the practical advantages without the degree. In a recent article in the *Yale College Courant*, Prof. Dana explains the details of this system and its advantages and economies. He maintains that "the modification in American colleges, which is demanded by the vast development of the sciences of nature within the past century, and also by the contemporary progress of linguistic and other sciences, is accomplished by the Yale scheme through a method which does not sacrifice in any degree classical education, and which at the same time combines thorough literary culture with the widest range and highest development of scientific education."

#### GERMANY AND SWITZERLAND.

But though much is being done in England and the United States, science and technical education are carried to a still higher point in Germany and in Switzerland, which perhaps excel all other countries in this respect. In the former country, while every one is educated, general education is made to lead to technical education in a great variety of schools, suited to persons in all conditions of life, and culminating in the great technical Universities, a kind of institution as yet unknown in the English-speaking world, unless Cornell University can be regarded as a step in this direction. In Germany there are now no less than six technical Universities, and a large number of technical colleges or higher schools to train students for these Universities, or for directly entering into employments in arts and manufactures.

#### TECHNICAL UNIVERSITIES.

Mr. Scott Russell, in his work on Technical Education, takes the Polytechnicon, or Technical University of Switzerland, as an example of the most perfect organization of this kind; and I may abridge from his notes the following facts as to its scope and organization.

Its courses of study are arranged under 145 subjects, divided among 31 professors, 10 assistant professors, and 16 private teachers and lecturers. They consist entirely of science, applications of science to the arts, and modern languages, literature and history. Among the few subjects not included under these heads are the Swiss federal constitution and rights, and the Biblical History of Creation, a subject scarcely thought of in the English world, even in the education of theological students. The students are either regular or "free," the latter taking selected courses; but of 762 students only 173 are free or occasional. In the regular programme of study the 145 subjects above referred to are divided into eight groups: (1) Preparatory subjects necessary for those who come imperfectly prepared; (2) subjects relating to architecture and building; (3) civil engineering; (4) mechanical engineering; (5) practical chemistry; (6) agriculture and forestry; (7) subjects necessary for scientific workers, professors and teachers; (8) a general course of philosophy, statesmanship, literature, art, and political economy. In aid of these courses of study the University possesses an astronomical observatory, arranged for teaching observers; a chemical and mechanical laboratory, for experiments in new inventions, &c.; a chemical laboratory, for ordinary practical teaching, which Mr. Scott Russell calls a palace of science in comparison with similar places in England; collections of drawings, models and machines; a collection of architectural models and sculpture; collections in zoology, geology, and antiquities; and a botanical garden. To the foundation of the University the Federal Government of Switzerland contributed £20,000, and the canton of Zurich £136,000. Its annual expense is very moderate, being only £13,459 sterling. From such institutions in Germany and Switzerland annually proceed numbers of educated young men who are prepared to advance every branch of art by the applications of science, who are distancing England in so many manufactures, and who are now contributing so largely to the wonderful success of the German armies. It is well for us to remember that the Technical University of Zurich ministers to the wants of a population of only two millions and a half, or considerably less than that of Canada, and that even the little state of Wurtemberg, with a population of less than two millions, has its Technical University at Stuttgart, with no fewer than 57 professors and teachers. It is further to