

century produced in Germany men of great scientific importance; but their position was irregular and uncertain, and they undoubtedly do not wholly or exclusively belong to the history of the university system. Leibniz, Euler, Haller, Werner, Markgraf, Tobias Mayer, Lambert, and Humboldt are all intimately connected with the growth of modern science: their position and sphere of action were in each case different.¹ Leibniz was a courtier, Euler an

for the solution of the problem, have a definite sense; each of them possesses a certain charm which dispels fatigue, and if the question is really answered, then they know the ways and means of attaining similar ends. I know many who are now at the head of soda-, vitriol-, sugar-factories, of colour-works and other establishments. Without ever having had anything to do with them beforehand, they were in the first half-hour acquainted with the processes, the second already brought a number of appropriate improvements, &c., &c." Similarly Helmholtz in 1862 ('Reden,' vol. i. p. 142): "He who in the cultivation of the sciences aims at immediate practical usefulness, may be pretty sure that he will miss his aim. Science [*Wissenschaft*] can aspire only to a perfect knowledge and a complete understanding of the sway of physical and mental forces. The individual worker must find his reward in the joy over new discoveries, as new victories of mind over matter, in the æsthetic beauty which an orderly display of knowledge affords, &c., &c." How little do our modern colleges of science correspond with this view of *Wissenschaft*!

¹ On Leibniz (1646-1716), see p. 158; Werner (1750-1817), p. 118; and Tobias Mayer (1723-62), p. 158. A. von Humboldt (1769-1859) is well known to English readers.

Leonhard Euler (1707-83), a native of Basel, passed the greater part of his life at St Petersburg as a member of the Academy, a portion of it (1741-66) as an Academician at Berlin. He has been termed the father of pure mathematics, inasmuch as he freed mathematical analysis from geometrical conceptions, established the notion of function or mathematical dependence, and did much to make the theory of numbers an independent branch of science. His memoirs are said to number nearly a thousand; his works, if all printed, would fill 60 to 80 quartos (see Hankel, 'Die Entwicklung der Mathematik,' Tübingen, 1884, p. 12). Andreas Sigismund Markgraf (1709-82) was born and lived at Berlin, a member of the Academy. On his various chemical researches see Kopp, 'Geschichte der Chemie,' vol. i. p. 208. Albrecht von Haller (1708-77) was a native of Bern. He was, next to Leibniz, perhaps the most encyclopædic mind of modern times, equally celebrated as botanist, physiologist, and poet. He has been termed the father of physiology. Brought up under the celebrated Boerhaave, he accepted a chair at the newly founded University of Göttingen in 1736, and taught there for seventeen years anatomy, botany, medicine, and surgery.