of exact reasoning—attempts to condense and unify knowledge were discredited. The result—especially in Germany—was that in many sciences information became buried in periodicals and in the memoirs of learned societies: text-books were chiefly written by men of secondary importance, translated from the French and English, and frequently on somewhat antiquated lines.[1] The new spirit which began to leaven scientific research in the middle of the century was confined to a few master minds, who—frequently almost unknown—marched in advance of their age. In the course of the last thirty years this has been entirely changed. The means of intercourse and communication, referred to above, make scientific isolation almost impossible; the necessity has been felt of remodelling the whole of the popular school literature on more modern lines: some of the first in-

21. Reform in school literature.

[1] The greater part of the higher German school literature in mathematics and physics was supplied by the French or modelled on French ideas—Legendre and Monge in elementary and descriptive geometry, Lacroix in the higher branches. Francœur's course of mathematics was introduced in England as well as Germany; Poisson, and later Lagrange and Duhamel, became the models in mechanics, Biot and Pouillet in experimental physics, Regnault in chemistry. The only great popular authorities which did not belong to France were Berzelius and Graham in chemistry, and Euler in mathematics. As late as 1860 hardly any text-book existed in Germany on the theoretical and mathematical portions of physics. The second volume of 'Baumgartner' was a miserable compilation. Beer's 'Höhere Optik' was the first important work of this kind. Germany had indeed not been wanting in original research, but the new ideas of Möbius, Steiner, Staudt, Plücker, and Grassmann in geometry found no adherents till, mainly through the translation of Salmon's text-books by Fiedler, a new spirit came over geometrical teaching. In the meantime Lejeune Dirichlet, and Neumann the elder, cultivated in their academical lectures the higher branches of mathematical physics, and educated a whole generation of mathematicians and physicists. Through them the original researches of Gauss and Jacobi became better known, and an independent school of German mathematical thought was established. In England the influence of French science was much more limited, and to the present day Euclid is preferred to Legendre's more elegant methods.