

GENERAL THERMODYNAMICS.

Thermodynamics: An Introductory Treatise Dealing Mainly with First Principles and their Direct Applications. By G. H. BRYAN. Teubner's Sammlung, Band XXI. Leipzig, 1907. xiv + 204 pp.

The books on thermodynamics are legion. In purpose and content they run the whole gamut from Maxwell's inimitable little work on heat and the many no more advanced though greatly inferior treatments of the subject to the large treatises like Weinstein's *Thermodynamik und Kinetik der Körper* in three sizable and highly mathematical volumes of which the last is not yet finished. Some are chiefly concerned with engineering problems, others with physics, and lately many with physical chemistry. One might therefore well ask what was left for a new work on thermodynamics except repetition. Anybody who has undertaken to teach a comprehensive course on thermodynamics, beginning essentially at the foundations and covering as well as may be the various applications up to and even including those in physical chemistry, will have no hesitation in answering that there is no short treatise which he could use as a guide — as a *précis* — for his whole course, nothing that at once was comprehensive and compact, as deductive as might be and yet thoroughly physical, and furthermore well balanced between the distracting needs of the different dependent fields of science. Better might it be said that such would have been the answer a few months ago. Now it would no longer be true; for Bryan's little book furnishes precisely this desideratum.

It should be noted that there is no necessity of banishing the physical side of a science in giving a deductive presentation of its theory. The history of most branches of mathematical physics is about this: First some fundamental experiments combined with a very crude theory which is frequently almost as much wrong as right; then after an increasing accumulation of facts there appears some master mind to formulate a comprehensive and essentially correct theory based upon a few crucial experiments; finally the deductive stage arrives in which the start is made from certain mathematical statements and physical experiment no longer plays any considerable rôle. This