Willard Gibbs[1] in America. They seem to have been the first to approach the question of chemical equilibrium, the result of the action of various conflicting chemical forces, termed affinities, from a general comprehensive point of view; recognising that the theory then commonly adopted on the Continent—the thermo-chemical theory of affinity—was incorrect or incomplete. This theory, which had been principally elaborated by Julius Thomsen in Copenhagen and by Berthelot in France, was supported by the large amount of valuable experimental research for which we are indebted to these two eminent men and their numerous followers.

whilst chemists persisted in the exclusive use of atomistic conceptions, which, as Horstmann pointed out, are of no avail in problems of that nature (see Helm, 'Energetik,' p. 143).

[1] More fundamental than the labours of Horstmann were those of Gibbs, which began with the year 1874, and were for a long time buried in the 'Transactions of the Connecticut Academy.' They were known to Maxwell, but remained generally unknown, partly owing to their abstract nature, partly to the fact that the majority of Continental chemists were not prepared to appreciate the mathematical form in which his expositions were clothed. Previous to the study of questions of chemical equilibrium, Gibbs had successfully developed an idea of James Thomson's—viz., the graphical representation of the different thermodynamic quantities in three instead of merely in two dimensions. Thomson had represented the properties of a body or system by referring them to volume, pressure, and temperature. Gibbs refers them to volume, energy, and entropy, the former quantities being always definable by the latter, but not *vice versâ*. The advantages of this representation were demonstrated to English students in Maxwell's 'Theory of Heat.' In Germany it was Prof. Ostwald who, by collecting and translating the memoirs of Gibbs, first made them accessible to students ('Thermodynamische Studien,' von Willard Gibbs, Leipzig, 1892). Subsequently both Ostwald and Helm have done much to promote an understanding of Gibbs's methods. See Ostwald, 'Allg. Chemie,' vol. ii. part 2, p. 114, &c.; Helm, 'Grundzüge der mathematischen Chemie' (Leipzig, 1894), and 'Energetik,' *passim*. Subsequently Gibbs also introduced the very general and useful term "phase" to denote the different states in which a substance can exist. This term denotes not only such differences as were formerly called in German *Aggregatzustände*, but likewise conditions of dissociation, allotropic and isomeric modifications.