http://geology.19thcenturyscience.org/books/1906-Merz-HistEurThot/README.htm

had employed before. How little these ideas, which have now been introduced into elementary text-books as the very alphabet of physical knowledge, commended themselves in that age, except to a few intellects that had been occupied for many years trying to fix precise terms which should be capable of mathematical definition, and at the same time correspond to common-sense experience, is evident, *inter multa alia*, from the criticism by Sir John Herschel in 1866.[1] Here it is maintained that the use of the term "potential energy" "is unfortunate, inasmuch as it goes to substitute a

425. A very complete and careful historical account of the gradual invention and crystallisation of the vocabulary of the energy conception is given by Helm, 'Die Lehre von der Energie,' Leipzig, 1887, p. 36 *sqq*.

[1] The passage quoted appears in an article "On the Origin of Force," by Sir John Herschel, in the first volume of the 'Fortnightly Review,' 1865, p. 439. The article is well worth reading for those who wish to realise the enormous benefit which has been rendered to science by banishing the indefinite use of the word force and by introducing the term energy, restricting the use of force to the meaning attached to it by Newton. Sir John Herschel still speaks of the "conservation of force" (as did likewise Helmholtz, who, however, very early introduces the term *Arbeitskraft*, power to do work, thus removing all ambiguity). Rankine replied to Herschel's criticism in a paper read before the Glasgow Philosophical Society, 23rd January 1867 (reprinted in 'Miscell. Scient. Papers,' p. 229 *sqq*.) He there states that the quantity itself occurs as a mathematical symbol in Newton's 'Principia' (prop. 39), but till recently had received no appropriate name. He closes his remarks by the still more important reflection: "One of the chief objects of mathematical physics is to ascertain, by the help of experiment and observation, what physical quantities or functions are 'conserved.'" As such he enumerates mass, resultant momentum, resultant angular momentum, total energy, thermo-dynamic function. Whilst this physical problem was being defined by Rankine, Cayley, Sylvester, and Hermite were working at the corresponding problem in pure mathematics to decide what properties or quantities remain unaltered (*i.e.*, invariant), if an arrangement of several algebraical symbols is subjected to algebraical operations. It is the modern doctrine of "invariants." This doctrine has led to an enormous extension and simplification of the theory of mathematical forms or quantics. It is the key to all mathematical tactics, and prepares a useful instrument for the application of mathematics to physical problems. See Major MacMahon's Address to the Mathematical Section of the British Association, Glasgow, 1891.