

66 (3 February 1898) 96

Some Unrecognized Laws of Nature: An Inquiry into the Causes of Physical Phenomena, with Special Reference to Gravitation.

By Ignatius Singer and Lewis H. Berens. D. Appleton & Co. 1897. 8vo, pp. 511.

CSP, identification: Haskell, *Index to The Nation*. See also: Burks, *Bibliography*; Fisch and Haskell. *Additions to Cohen's Bibliography*.

The purpose of this work is to revolutionize physics by showing that the cause of forces is a tendency to equalization, an action of which viscosity is a familiar example. Viscosity equalizes the velocity of the different layers of a stream. Now this, as is well known, is not a *conservative* force—that is, neglecting effects of heat, it appears to violate the law of energy; so that to make an action like viscosity the fundamental cause of all forces is to set up a theory in opposition to the doctrine of the conservation of energy. The principle of equalization is represented as one of four—persistence, unequal resistance, reciprocity, and equalization—from which the whole play of nature may be deduced. This formula was first remarked by the authors as governing the growth and development of animals and plants, and is now extended to pure physics.

All this might have been maintained, one would suppose, without calling in question the majority of the great discoveries, or propositions accepted as discoveries, which during the last three centuries have been so laboriously, and, as it would seem, so successfully, elaborated by physicists. But, as the discussion is conducted in this volume, substantially the entire body of established dynamics and physics is proposed to be swept away as worthless. Comprehending these circumstances, no person of good sense will undertake to read this book, unless as a study in psychology, without being thoroughly versed, at least, in every branch of mathematical physics; and those persons who really are competent to discuss questions of this kind will soon discover that neither Mr. Singer nor Mr. Berens is among their number.

What, for instance, is to be thought of authors who calmly remark that “not sufficient notice has been taken by physicists” of the law of action and reaction? That law, as everybody knows, is insured of thorough-going application by the aid of the conception of Mass. But these authors are capable of saying, “Whether a pendulum set swinging *in vacuo* and having no friction would actually keep on swinging for ever, . . . the matter of doubt in our mind is whether the downward pull of gravitation would not have to be regarded as another retarding element, besides friction and the resistance of the air.” This betrays utter want of grasp of the principle of the pendulum, connected with a failure to distinguish between mass and weight. And, accordingly, we are informed that *mass*, in its last analysis, is nothing but *gravity*. Now this is not so. There might be so such force as gravitation, proportional to mass, and yet the action of bodies under magnetical and

electrical forces, and under impact, would still proclaim the reality of mass so long as the law of action and reaction continued to operate.

We meet with equally gross misunderstandings when we pass to thermotics. For instance, we are told (pp. 24, 93) that the doctrine of the absolute zero rests upon nothing except "on the theory that at that temperature a body would be practically annihilated"; that is, the authors suppose the air or hydrogen thermometer is its only basis. One would find it hard to invent a remark which should more manifestly betray total ignorance of the theory of heat. Yet the following beats it: "The late Professor Tyndall held that heat was 'a mode of motion.' It is not quite clear whether the phrase is to be understood," etc. A man who does not know what the kinetical theory of heat is, and supposes Tyndall the author of it because of his popular book, and who nevertheless presumes to speak of the greatest physical speculator of our time except Helmholtz thus: "Thomson's error consisted in confounding the common or industrial meaning of the term 'work' with its philosophical meaning," cannot expect to make a favorable impression upon the scientific world. The book is simply chock-full of blunders quite as bad as the above few specimens.

The work is not entirely one of ratiocination. Various experimental results are announced which are supposed to support the theory. These are, for the most part, old mare's-nests which have already been sufficiently investigated. Some of them might be worth reëxamination with all our modern appliances of precision, but none of the experiments herein described appears to have been conducted with any extraordinary refinements. A few of them are rather curious, though probably not important.

The first words of the preface are these: "At last, after years of patient plodding in dim regions where the footprints are few and the pitfalls many, the time has arrived when we are enabled to place before the world of science the first-fruits of our explorations." No doubt a great part of two men's lives has gone into this enterprise, and it is tragic to see that the result is good only to fill a page in some supplement to the 'Budget of Paradoxes.'

66 (31 March 1898) 250-251

Social and Ethical Interpretations in Mental Development.

By James Mark Baldwin. Macmillan. 1897. 8vo, pp. 574.

CSP, identification: MS 1513 (draft). See also: Fisch, *First Supplement*.

Prof. Baldwin here puts forth a sequel to his remarkable work on 'Mental Development in the Child and the Race,' which our readers will remember contained a most valuable body of observations upon two children. The aim of the present volume is "to inquire to what extent the principles of the development of the individual mind apply also to the evolution of society." But no insignificant part of the former volume was devoted to this same subject; so that the contents of the present work were largely anticipated in their outlines in the former publication. About five-sixths of this new book is occupied with the development of the indi-