

energy as principles and state that mechanics can not be based upon the principles of the conservation of energy and of momentum alone?

What about the law itself? The first part of the law is clear. "To every action there is an equal and opposite reaction" is nothing but Newton's third law of motion. The word "or" leads us to think that the second part means the same thing as the first part.

Had Professor Rettger examined my book with greater care he would have noticed that I have used the term "reaction" in a slightly different sense and that with this difference the "first part" is not at all Newton's third law but has the same meaning as the "second part," and that the two "parts" are only two different forms of the statics principle. Further he would have seen that the first form is not made use of, the entire work being based upon the second form alone, and would not have charged me of having assumed Newton's third law in addition to the one I have introduced. The first form is left out entirely in the papers which I published on the subject.¹ In one of these papers I have even shown that Newton's third law is a direct consequence of the second form.

I have postulated the following principle, which I have called the *action-principle*:

The sum of all the actions to which a body or a part of a body is subject at any instant vanishes:

$$\Sigma A = 0.$$

Then I have classified and defined the different forms of action. On this principle I have based my treatment of mechanics, and claim that I have given it a degree of unity and logical continuity which is not common to treatments of elementary mechanics. This is made possible by the simplicity and flexibility of the action-principle, which is easily grasped by the beginner, yet conveys a depth

¹ "On a Progressive Development of the Principles of Mechanics," *Physical Review*, May, 1913; "On a Progressive Development of Mechanics Based Upon a New Form of the Fundamental Principle of the Science," *American Journal of Science*, February, 1914.

of meaning and breadth of application commensurate with the knowledge and ability of the student.

Besides this pedagogical advantage my treatment involves a point of view which is in harmony with our present ideas of dynamical phenomena, as it is shown in my recent paper on the subject.²

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A NEW METHOD OF COOPERATION AMONG UNIVERSITIES

In April, 1910, was formed at Kansas City, Missouri, the Missouri Valley Conference of Heads and Governing Boards of Universities. The Conference embraced, however, only the institutions up to that time belonging to the Missouri Valley Conference for athletic purposes. There have been many conferences and associations of professors of universities and presidents of universities, or both, and there have been conferences of school boards representing the public schools in various cities, but this is probably the first attempt on the part of university governing boards to accomplish a general understanding and cooperation in regard to matters affecting institutions similarly situated. The conference arose over the matter of intercollegiate football, the question so fruitful of controversy and discussion. The reason for the conference was as follows: There had been introduced into the board of regents of the University of Kansas a resolution abolishing intercollegiate football. The vote was a tie and the motion was lost. The question was brought up again and after thorough discussion it was agreed by the board of regents of the University of Kansas that it was unwise to attempt to settle that question in one university alone and that all of the universities of the then existing Missouri Valley Conference, through their heads and governing boards, should be asked to meet in a general conference at Kansas City in April, 1910. It was at the time of large and pointed discussion and criticism of intercollegiate football and after the matter had been clearly laid before the institutions most interested all of them accepted the invi-

² *Loc. cit.*

tation and all sent delegates except the University of Iowa. The institutions represented were the University of Missouri, the University of Nebraska, Washington University, Drake University, the Iowa State College, and the University of Kansas. Of these the universities of Nebraska, Missouri and Kansas were represented by members of the board of regents or curators and the presidents of the institutions. Drake University was represented by its president, Iowa State College of Agriculture and Washington University by professors sent by the governing boards of the institutions to represent them. The meeting resulted in a general conference upon athletics as affecting institutions in the Missouri Valley and rules were passed by the Conference and afterwards reenacted by the individual boards of regents, largely affecting the status of intercollegiate football. Among these was the rule abolishing the game on Thanksgiving Day, abolishing the short-term professional coach, and requiring that all college games be played on college grounds.

The second conference was held at Des Moines, January 6, 1911, at which various questions left over from the Kansas City meeting were discussed and acted upon. At that conference the University of Iowa was also represented by its president and board of regents. Washington University was not represented. The discussion at this conference widened out to include other things than athletics. A general discussion of the fraternity question was ordered for the next meeting and committees on uniform financial accounting and uniform pedagogical accounting were authorized. It was plain from the discussions at the second conference, and indeed by formal action, that it was intended to make the conference a permanent one to take into consideration any question touching the common life of universities that might need consideration and uniform action.

The third meeting of the Conference was held in Lincoln, Nebraska, January 19, 1914. The University of Iowa had in the meantime withdrawn from the Missouri Valley Conference and the State Agricultural College of

Kansas had been added. All of the institutions in the Conference were represented. Most of the attention of this conference was given up to matters other than athletic and it was more evident than before that the Conference was developing into a general conference on the welfare of the universities having so much in common. The fraternity question received much attention, as did the question of competency in teaching. It is probable that in succeeding meetings such questions as the following may be taken up and discussed, if not formally acted upon: the ethics to be observed in calling teachers from one institution to another; substantially uniform salaries for the same grade of instructors; cooperation in giving advanced and little called for courses; interchange of students and instructors; cost of education. It seems possible, therefore, that this Conference is a beginning of a new type of cooperation, having especial significance and authority because of the fact that the Conference is made up of presidents and governing boards where the primary power lies.

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SCIENTIFIC BOOKS

From the Letter Files of S. W. Johnson.

Edited by his daughter, ELIZABETH H. OSBORNE. Yale University Press. 1913. Pp. 292.

A notable feature of the applications of science to the arts and industries which characterized the second half of the nineteenth century was the phenomenal evolution of agencies for scientific investigation in the interest of agriculture and the rise of a system of public research institutions extending over every country of the civilized world. The life story of the subject of this biography is essentially the story of the birth of this system in the United States and its growth from a few modest analytical laboratories to an imposing group of national and state institutions actively engaged in agricultural research, in the teaching of agricultural science,