MATHEMATICS AND THE BIOLOGICAL SCIENCES*

BY H. B. WILLIAMS

We meet this afternoon to do honor to the memory of one whose influence on the development of scientific thought and achievement has been in many ways remarkable. The auspices under which this assembly has gathered is in itself an earnest of the regard in which the name of Josiah Willard Gibbs is held by the mathematicians of America. Forty years ago he delivered the vice-presidential address before the Section of Mathematics and Astronomy of the American Association for the Advancement of Science. The topic was *Multiple Algebra*.[†] His own contributions to this subject, particularly his development of the theory of dyadics, would be sufficient to establish without question his standing as a pure mathematician, while his vector analysis with its practical and convenient notation has been of no small service to the cultivators of mixed mathematics.

The soundness of his judgment in the field of physics is attested by the fact that he was among the first to take up and extend Maxwell's electromagnetic theory of light. In his obituary of Professor Gibbs it is remarked by Professor Bumstead[‡] that these optical papers are noteworthy for the entire absence of special hypotheses regarding the connection between matter and ether. It seems to have been a characteristic trait with him to strip his problems of every unnecessary element before commencing extensive treatment of them.

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* The Fourth Josiah Willard Gibbs Lecture, read at Philadelphia, December 28, 1926, before a joint session of the American Mathematical Society and the American Association for the Advancement of Science.

† J. Willard Gibbs, *On multiple algebra*, Proceedings A. A. A. S., vol. 35 (1886), pp. 37–66. Also Gibbs, Collected Scientific Papers, vol. 2, p. 91.

‡ Bumstead, Henry A., *Josiah Willard Gibbs*, American Journal of Science, (4), vol. 16 (Sept. 1903). Also Gibbs, Scientific Papers, vol. 1.