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CENTENNIAL OF THE UNDULATORY THEORY OF LIGHT¹

A HUNDRED years ago physical science received one of the greatest contributions ever made by a single man. This achievement was the establishment of the undulatory theory of light by the Frenchman, Augustin Fresnel. The work of this extraordinary man put the theory of optics on an entirely new foundation and inaugurated a steady evolution of this discipline which continues up to the present time. Beyond this, it had a stimulating and inspiring influence on other branches of physics having no apparent connection with the theory of light. It would be an interesting problem to look back on a century of scientific work and to analyze what concepts are due to Fresnel and how these concepts have stood the test of a hundred years. However, our present intention is a different one. A retrospective glance at the time of Augustin Fresnel and the scientific atmosphere in which he lived has still another purely human interest. It gives us an opportunity to trace step by step the resistance which a new and revolutionary idea finds in its way and to see how this resistance is gradually overcome. The fate of new concepts defying tradition is always the same: In the beginning they meet with a strong opposition rejecting them sometimes with cold disdain, sometimes with passionate irritability. Slowly and gradually the new theory obtains a reluctant acceptance. The contemporaries raised in different views finally resign themselves to it and only the following generation is in a position to admire and praise it without inhibitions.

The history of the undulatory theory is a classical example of this process. A hundred years ago the scientific public opinion was not such a complicated and widely ramified structure as to-day. Essentially it was represented by the opinion of five or six specialists associated with the Academy of Sciences of Paris. A discovery was accepted when its author had succeeded in convincing this handful of men. There are still numerous documents extant which give us all the necessary information about the attitude of the leading savants towards Fresnel's new theory. Science outside of France is almost of no avail for our problem. In Germany the experimental and theoretical study of nature was taken up a generation later and the conditions were similar in this country. In England there were several natural

¹Read in a public session of the Astronomy and Physics Club of Pasadena, California.

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