

Woodward, Robert Simpson I

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(*b.* Rochester, Michigan 21 July 1849; *d.* Washington, D.C., 29 June 1924)

applied mathematics, geophysics.

Woodward was part of the tradition of mathematical physics that saw the earth as the great object of study. In 1904 he asserted, "The earth is thus at once the grandest of laboratories and the grandest of museums available to man." To this laboratory and museum Woodward brought a great skill in mathematics and an insistence on obtaining data of the highest precision in a form suitable for computation. The last point greatly influenced the young John Hayford, who worked with Woodward at the Coast and Geodetic Survey.

After receiving a degree in [civil engineering](#) in 1872 from the [University of Michigan](#), Woodward worked for the years with the Lake Survey of the U.S. Corps of Engineers. From 1882 to 1884 he was an astronomer with the U.S. Transit of Venus Commission. Woodward next served for six years with the U.S. Geological Survey, successively occupying the posts of astronomer, geographer, and chief geographer.

His most notable scientific contributions occurred during this period. For G. K. Gilbert he calculated the effects on shore lines of the removal of superficial masses by means of potential theory. In this work and his passing consideration of isostasy, Woodward considered thermal effects, clearly related to the concern with how heat influenced base bars and other instruments of precision. In a series of papers in 1887–1888, Woodward explored the cooling of homogeneous spheres and the diffusion of heat in rectangular masses. The findings were applied to Kelvin's work on the age of the earth. By 1889 Woodward criticized Kelvin for the "unverified assumption of an initial uniform temperature and a constant diffusivity." As the data for Kelvin's calculations were derived from observations of continental areas, Woodward felt the probabilities were against obtaining satisfactory numerical results for the entire earth. His position strengthened the opposition of many geologists, at least in America, to Kelvin's constriction of geological time.

From 1890 to 1893 Woodward was with the U.S. Coast and Geodetic Survey. In 1893 he became professor of mechanics and mathematical physics at [Columbia University](#); and in 1895 he was named dean of the College of Pure Science. From 1904 through 1920 Woodward was president of the Carnegie Institution of Washington, succeeding D.C. Gilman. As chairman of two advisory committees, he had previously played a role in the development of the policies of the Institution. He was a strong administrator and largely responsible for the direction taken by the Carnegie Institution.

BIBLIOGRAPHY

F. E. Wright's memoir in *Biographical Memoirs, National Academy of Sciences*, **19** (1938), 1–24, has a good bibliography. The archives of the Carnegie Institution of Washington and the papers of many of his contemporaries contain manuscripts by or about Woodward. The correspondence of J. McK. Cattell in the [Library of Congress](#) and T. W. Richards in the [Harvard University Archives](#) are valuable for his views on the policies of the Carnegie Institution. The correspondence of Presidences Low and Butler in the Office of the Secretary, [Columbia University](#), contains a small number of interesting items.

Nathan Reingold