

FROM PHILOSOPHY TO MATHEMATICS TO BIOLOGY¹

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Two months before his death, in a ceremony at the White House, Norbert Wiener was awarded the National Medal of Science. The citation by President Johnson said: "... for marvelously versatile contributions, profoundly original, ranging within pure and applied mathematics, and penetrating boldly into the engineering and biological sciences."

Our assignment here is twofold: we want to explore how Wiener came to penetrate into biology, a field into which few real mathematicians had strayed before him; we should also like to assess, no matter how incompletely, the imprint that Wiener has left upon the sciences of Life and Man.

From his early youth Wiener, the prodigy, acquired intensive experience in the manipulation of both mathematical and linguistic symbols; but his career choice seemed initially little related to these skills. Perhaps in part due to his father's acquaintance with Walter B. Cannon, Norbert seemed sufficiently interested in biology to become a graduate student in zoology at Harvard University, after he had graduated at the age of 14 from Tufts College. But, in spite of his interest in the subject matter, Norbert had neither the manual skill nor the patience to do well in the graduate courses in biology of that era. In one of his autobiographical books Wiener commented on the contrast between his quick insight into ideas and his extreme lack of manual dexterity as follows:

"This impatience was largely the result of a combination of my mental quickness and physical slowness. I would see the end to be accomplished long before I could labor through the manipulative stages that were to bring me there. When scientific work consists in meticulously careful and precise manipulation which is always to be accompanied by a neat record of progress, both written and graphical, impatience is a real handicap. How much of a handicap this syndrome of clumsiness was I could not know until I had tried. I had moved into biology, not because it corresponded with what I knew I could do, but because it corresponded with what I wanted to do.

"It was inevitable that those about me discouraged me from further work in zoology and all other sciences of experiment and ob-

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