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## **Norbert Wiener and voices from the past**

Circumstances led me recently to re-read parts of Norbert Wiener's autobiography (Wiener 1956), shortly after writing a brief account of theories of information for a forthcoming book (Bawden and Robinson 2012). What caught my attention was how the lives and work of the proponents of what has been come to be known as information theory were inter-meshed during the late 1930s and 1940s. Wiener teaches a young Claude Shannon at MIT, but has relatively little contact with him at that stage. He works with Vannevar Bush on the early development of computing, though Bush still favours analogue approaches while Wiener espouses digital computing. He is assigned to work for Warren Weaver on a wartime project, and consults with John von Neumann about it.

Although it has always been clear that the mathematical formulations of information theory, or communication theory as Shannon originally termed it, were about a meaning-free conception of information, it is interesting to see just how much this is so. Wiener tells the story as essentially one about two forms of electrical engineering: power engineering and communications engineering. The theory of the latter, also termed the theory of strong currents, led to the formulation of a quantitative measure of information. But this was in way associated with information in the sense used by the sciences of the human record, until Warren Weaver speculated that Shannon's theory might have much wider applicability. Until then, it was a matter of the study of the quality of transmission across noisy channels, the representation of formal logic in electrical circuitry, and the use of feedback circuits for the control of complex machinery.

Wiener seems to have resented the way which information theory was, even at the time he wrote, beginning to be termed Shannon theory, or Shannon-Weaver theory. He terms it 'Shannon-Wiener' theory, and insists that "it belongs to both of us equally". That is not how history recalls it. Nor is there much explicit recognition, apart from a few comments in passing, of the difference made by a minus sign in the otherwise identical formulations of Shannon and Wiener. For Shannon, information is randomness, variety, disorganisation; for Wiener it is order and pattern; what later authors would call 'negentropy'.

Perhaps this is of no consequence at this distance in time. But perhaps, when debates can still rage about the validity and relevance of an objective view of information, it may be worth reminding ourselves what the original protagonists thought.

Wiener also has a provocative thought for those who wish to assess all academic work by its short-term results. Institutions such as universities, he writes "cannot and do not ask for an immediate translation of their hopes and ideals into the small change of the present day. They exist on faith, the faith that the development of knowledge is a good thing and must ultimately conspire in the good of all men". Too

liberal, perhaps, for the impact-focused evaluation of research which are so in vogue at present, but something else worth pondering across the years.

**David Bawden**

***References***

Bawden, D. and Robinson, L. (2012), *Introduction to information science*, London: Facet Publishing

Wiener, N. (1956), *I am a mathematician*, London: Victor Gollancz