von Neumann, John


This very interesting, but prolix, letter from von Neumann to Norbert Wiener is a good example of Wittgenstein’s aphorism: “What can be said can be said simply”. In essence von Neumann suggests: (1) That attempts to understand thought processes by examining the behaviour of synthetic neural nets with a few thousand (or even a million) neurons are doomed to failure. (2) That intelligence is exhibited by simple biological systems such as bacteria. (3) That protein structure may hold the key to intelligent activity. (4) That the then emerging sciences of X-ray crystallography and of electron microscopy might provide the necessary clues. There are also speculations regarding the complexity of self-replicating systems.

The paper is of great interest in the light of current work on neural nets and, of course, in molecular biology. von Neumann mentions to Wiener that he would consult with Langmuir and Dorothy Wrinch regarding the possibility of using the new electronic computers to determine protein structure via X-ray crystallographic analysis. This meeting took place in Schenectady on Wednesday 16th April 1947 with von Neumann, Irving Langmuir, Dorothy Wrinch and the reviewer present. The general conclusion was that the computer was unlikely to provide an immediate solution because of the central problem of determining phases. This proved to be a valid prediction as the problem has not yet been completely solved.

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