



What is Information Theory?

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INFORMATION THEORY has been identified in the public mind to denote the theory of information by bits, as developed by Claude E. Shannon and myself. This notion is certainly important and has proved profitable as a standpoint at least, although as Dr. Shannon suggests in his editorial, "The Bandwagon," the concept as taken from this point of view is beginning to suffer from the indiscriminate way in which it has been taken as a solution of all informational problems, a sort of magic key. I am pleading in this editorial that Information Theory go back of its slogans and return to the point of view from which it originated: that of the general statistical concept of communication. A message is to be conceived as a sequence of occurrences distributed in time to be considered not exclusively by itself, but as one of an ensemble of similar sequences. As such it comes under the theory of time series which is an important branch of statistical theory with a rapidly developing technique and set of concepts of its own. This theory is closely allied to the ideas of Willard Gibbs in statistical mechanics. What I am urging is a return to the concepts of this theory in its entirety rather than the exaltation of one particular concept of this group, the concept of the measure of information into the single dominant idea of all.

I am pleading for this more particularly because the Gibbsian point of view is showing an applicability and fertility in many branches of science other than

communication theory and in my opinion in all branches of science whatever. It is generally recognized that the quantum theory which now dominates the whole of physics is at root a statistical theory; although it is perhaps not yet as generally recognized as it should be, the quantum theory is strictly a branch of the theory of time series. Professor Armand Siegel and I are among those now working in this field.

What I am here entreating is that communication theory be studied as one item in an entire context of related theories of a statistical nature, and that it should not lose its integrity by becoming a special vested interest attached to a certain set of slogans and clichés. I hope that these TRANSACTIONS may encourage this integrated view of communication theory by extending its hospitality to papers which, while they bear on communication theory, cross its boundaries, and have a scope covering the related statistical theories. In my opinion we are in a dangerous age of overspecialization. To me the danger of this period is not primarily that we are studying very special problems that the development of science has forced us to go into, but rather that we are in great danger of finding our outlook so limited that we may fail to see the bearing of important ideas because they have been formulated in what our organization of science has decreed to be alien territory. I hope that these TRANSACTIONS may steadily set their face against this comminution of the intellect.

