**SOME EXAMPLES OF HOW SYSTEMS AND CYBERNETICS CAN CONTRIBUTE TO TRADITIONAL DISCIPLINES**

Stuart A. Umpleby

President of the Executive Committee

International Academy for Systems and Cybernetic Sciences

Since they were founded in the mid-twentieth century the fields of systems science and cybernetics have worked to create more general theories for existing fields, to define theories of control and communication to complement theories of matter and energy, and to aid existing fields by using helpful knowledge from other fields. This paper will describe a few examples of how systems and cybernetics have in the past and are currently contributing ideas to traditional disciplines. The traditional disciplines taken as examples are management, the social sciences, and philosophy of science.

The field of management has benefited from Ashby’s theory of adaptive behavior and his Law of Requisite Variety, which provides a quantitative relationship between information and selection. Management has also benefitted from Beer’s Viable System Model, which is based on the structure of the human nervous system. Other contributions to management have been group decision-making methods such as Beer’s concept of syntegrity and Ackoff’s Interactive Planning.

The fields of psychology, economics, and political science have benefitted from Vladimir Lefebvre’s theory of reflexive control and George Soros’s theory of reflexivity. Lefebvre’s theory describes two systems of ethical cognition. The theory is helpful in making a transition from confrontation and conflict to the rule of law. George Soros’s theory of reflexivity explicitly includes the decisions and actions of observers. It places the social scientist inside the system observed and makes clear the difficulty of forecasting in social systems since they include thinking participants.

The philosophy of science has had, at least since Plato and Aristotle, more than one epistemology. Warren McCulloch suggested resolving different views of epistemology by investigating how the brain works. The strategy was to study cognition by conducting neurophysiological experiments. These ideas are embodied in the literature on second order cybernetics, which has taken up the challenge of criticing the development of science, an interest earlier practiced by the philosophy of science.