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A Friendly Countercomment to Holton

Arthur Iberall

I and my colleague Wilkinson, are very appreciative for Holton's help in getting the paper "On A Characteristic 500-Year Process-Time in Culture-Civilizations" published in the Spring 1995 issue of CCR, and for his critique of our theoretic. It is useful to the society and the subject to pursue his remarks.

1. He says that we set no limits on the usefulness of the theories of physics. That is true. That is why I have spent the past 35 years in expanding physics into the subject areas it has not yet fully reached, e.g., biophysics, social physics, evolutionary physics. Our recent book, Iberall, Wilkinson, White, Foundations for Social and Biological Evolution, 1993, illustrates such extension. It is not a request for faith we require, but it is a matter of direct theoretical and experimental proof using only one common set of principles. Not as a matter of direct application to the particular problem here, of language and information flow, but as a matter of the current status of physical theory in general, I would call attention to an article in a recent issue of Science, Sept. 15, 1995, p. 1511, which asserts that "A Theory of Everything Takes Shape". The specific subject reference there is to one of the current remaining problems in physics — how to unify a theory of gravity with quantum theory. This is not an attempt to pull superior scientific rank, but to indicate how physics continues persistently in its now remaining task of unification. I am one of its few peasants that toils in the field of application of physics to human social theory.

2. Holton says that our theoretical framework is biased away from the symbolic, the linguistic. It is true that I have not mentioned our contributions in that subject area in ISCSC circles, but to suggest that perhaps the subject never crossed our mind (in 35 years?) is a mite casual. I apologize for the oversight, and offer a small bibliography.

3. Actually, we had been invited to write a piece on language for the 1993 Scranton meeting, an invitation which we accepted, and we had provided the requestor with a document. However it was inadvertently omitted from the program, so we never tried to crowd it in. It would seem appropriate to offer it here now for publication. That piece follows.

Coda: Other missing pieces?. Before we are additionally challenged by some assertions of other missing themes in our specifically focused presentation that Holton comments on, it seems appropriate that we name a few other foundational subject fields in which we have also done some homework. Our contributions in biomedical engineering and biophysics, in psycho- and neuro-physics, for psychologists, psychiatrists, ethologists, and anthropologists, we
believe, are also pertinent. The line we offer is a summary of problems leading up to command-control in living organisms.

Our work started at the National Bureau of Standards, in a Mechanics Division, using a National Institute of Health Section on Biophysics as a consultant for physiological background in the development of high altitude safety equipment for military aviation, and bridging to aviation medicine. This work, in the 1940's, included the development of space suits. In the 1950's, we started on a study of metabolic and heat processes in the human for clothing, for human performance at high altitude, and for other military support for human physiological operation. This included proof that the human organism and other mammals operated in accordance with the Second Law of Thermodynamics, thereby qualifying their systems' physiological description fully within the bounds of physical-chemical theory (Iberall, 1960). From presentation to a particular Gordon Research Conference on measurement, instrumentation, and control, on our dynamic (one of the Conference's founders in the 1940's) we were encouraged to broaden our program. A proposal to NASA just prior to 1960 to its life sciences section at Headquarters received considerable recommendation for support to the President's Science Advisory Committee and resulted in our being permitted to start a very general study program in the dynamic physiology of the mammal - particularly the human system, as an extension of our 1960 work. A first widespread publication was on a generalized characterization of command-control in the living organism (Iberall, Cardon, 1964). The limited scope of the then ongoing group study in the Engineering in Medicine and Biology community led to Iberall's suggestion to the engineering societies in America (particularly their control divisions), later on in the world, to start a study committee in the domain of biocontrol systems. Permission was forthcoming in the American Automatic Control Conferences (AACC), a group effort sponsored by the control system groups in the major American engineering societies, and then in the International Federation of Automatic Control (IFAC). Both of those biocontrol committees were headed by Iberall. A first gem-like program was organized for an ASME (Am. Soc. Mech. Eng.) annual meeting in 1969 to demonstrate the general capability of the newly organized effort. It included our key Iberall, McCulloch paper (See Iberall, McCulloch, 1968, 1969; Iberall, 1968). Iberall was invited to an international meeting organized by the geneticist, Waddington, under the auspices of the International Union of Biological Science, held at Lake Como. These meetings have become very famous in attempting to start the development of a theoretical biology. (See Waddington, 1969). The Iberall, McCulloch paper came out just in time to introduce it to the Lake Como audience, just when Thom's topological modeling for biological and social system's stability was presented to a world audience. A year or two later, interest arose in the engineering societies at their president's level to get broadly into the biomedical engineering field, e.g., with the American Medical Association. When that did not work, Iberall offered
to form a connection between the engineering societies, among their biocontrol committees (in AACC) and the American and international community in physiology. Because of Iberall's work and its connections, it was possible to get an international conference sponsored by both AACC and IFAC, a number of specific supporting engineering societies, the American Physiological Society, and the International Union of Physiological Science, with the enthusiastic support of major biological figures. That 1972 conference (Iberall, Guyton, 1973) was a huge success. It showed that the two communities could produce common engineering and physiological foundations by that time. Many other more detailed study pieces are not being mentioned, just enough to trace the big picture line (for example, we were asked to organize the American contribution to an IFAC conference on technical and biological problems in control in Yerevan (see Iberall, Reswick, 1970). That meeting was devoted to both biological and social modeling, particularly from the USSR official outlook on such social modeling.

It was the composite of all of those experiences that put both social and biological evolution on our agenda. It was soon clear that the homeokinetic group, so called from about 1965 within our NASA program, would soon become involved in such interdisciplinary programs without limit. Iberall was attracted to the organizing of ISCSC in 1972. At the same time, with colleagues, we sought to organize another international meeting to follow up on what Waddington had started in biocontrol. Our contribution as a conference in Dubrovnik appeared (See Yates, 1986, particularly the conglomerate of pieces written by Iberall and colleague Soodak - the conference proceedings were unnecessarily held up from a 1979 date). By that time a number of our pieces in the social sciences had also appeared. Here we are up to the work that we have contributed to ISCSC and to the anthropology community. (See A. Moore, and his mentor C. Arensberg, and our writing with colleague Wilkinson starting in 1986). As a contribution to systems psychology, particularly as practiced by the ecological psychology school, one can find pieces recognized professionally in the neurophysiological and biophysical communities that number perhaps a dozen. Examples, beyond out first paper with McCulloch are Iberall, 1964, 1972, 1973, 1974, 1976; Llinas, Iberall, 1977; Iberall, 1978, 1991, 1992, 1995, in review, forthcoming 1997).

A portion of a language and information bibliography follows: We do not complete that bibliography with a detailing, second list of references of our biophysical and psychophysical contributions.

A Chronology of Contributions

Springfield, VA. Report AD No. 635-809.


