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COMMENT ON "REPRESENTATIONAL SYSTEMS THEORY" BY BETZ AND MITROFF

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The initial development in Betz and Mitroff's paper [1] provides inadequate clarification regarding their use of the term "object." This development also contains a number of overstatements. These deficiencies are deemed serious because systems theory is an area where one should very carefully lay out the conceptual foundations. The approach adopted by Betz and Mitroff may lead to unnecessary confusion.

Regarding their inadequate clarification of a reference for the term object, many readers could be left with the idea that the reference is any physical object. While this is true, in the sense of casual systems theory usage, it is important to note that in systems theory, physical entities are merely a collection of relevant attributes possessing some cohesiveness. As stated by Zadeh and Desoer [2, p. 9] "—an object is essentially an abstract entity associated with a set of attributes—which is characterized by the relations between these attributes."

While I do believe that Betz and Mitroff are using the term properly, I do not believe that they adequately introduced the term. In systems theory one should continue to reinforce two central concepts. One, an object is merely an *abstraction* that is related to an attribute cluster (possible abstractions also). And the other, the attribute cluster or object is defined in terms of *relevant* attributes. Since these concepts exist at the very foundation of systems theory, they should not be taken as granted. Systems theory is very pervasive and is, most decidedly, not a narrow academic specialty where one can assume that all interested parties are familiar with the references for the given terminology. The reader should be warned that casual use is not implied.

Along the same line it might be useful to reinforce another concept—the relevant attributes provide the basis for the systems designer to define and make reference to the so-called object. The system designer then uses the set of relevant attributes until they prove to be unsatisfactory because either new perceptions or new criteria for relevance have evolved. When that happens, the systems designer then evolves a more useful set of attributes.

As an illustration of this point we note that the physical sciences encountered this problem of an attribute cluster versus a physical entity analogue when at one time they characterized an electron in terms of a particle and subsequently characterized it in terms of a cloud. A similar situation exists now in terms of light where we have the unresolved views of wave theory and particle theory. The point being, in adopting the view that an object, entity, or element of interest is a cluster of attributes, we set the stage for transitions to new concepts when our perception of those attributes is altered by a revision of our measuring processes or our level of relevant concern. A given object name should simply be recognized as a convenient reference for a given attribute cluster.

Aside from this inadequate clarification, the article also contains a number of overstatements. They state, "A single observer is not enough to complete the observational phase—. A community of observers is required for the understanding of behavior." I would note the following counter example to this statement: A community

of observers is not necessary for *one* person to acquire an understanding of behavior. More properly, a community of observers is required for a community of understanding.

In this same paragraph they state, "Language, of course, presupposes communication between at least two minds." I note the following counter example: Information, in the form of a language, may be stored only for use by the person storing it. He may choose any language that is convenient to him without regard to communication with others. In fact people often use a formal language to code information so as to preclude communication with people other than themselves.

While these overstatements do not have any substantive bearing on the subsequent development, they do cast a shadow. This shadow is an unnecessary distraction that might have been avoided.

References

1. BETZ, FREDERICK AND MITROFF, IAN, "Representational Systems Theory," *Management Science*, Vol. 20, No. 9, (May 1974) pp. 1242-1252.
2. ZADEH, LOFTI AND DESOER, CHARLES, *Linear Systems Theory*, McGraw-Hill, 1963.

BETZ AND MITROFF RESPOND TO BERHOLD

IAN I. MITROFF* AND FREDERICK BETZ†

Mr. Berhold takes us to task for committing essentially two kinds of errors (deficiencies): (1) making a number of overstatements, and (2) taking certain concepts for granted. Taking the second deficiency first, it was precisely because we did *not* take certain concepts for granted and that we believe that "these concepts exist at the very foundation of systems theory" that we were at such pains to focus our whole article on what he thinks we neglected—namely *concepts*. Mr. Berhold faults us for doing what he wanted us to do.

It is because we are so concerned with laying out the conceptual foundations of systems theory that we felt it was important to go beyond such innocuous statements as "physical entities are merely a collection of relevant attributes possessing some cohesiveness." The statement is not only contentious and problematic but a gross begging of the question. For example, what *are* the "relevant attributes" of an object, how *are* they determined and just who and what does the determining of what's relevant versus irrelevant? The point is that whatever physical entities really "are," they are also collections of enumerable "irrelevant" attributes, and the "relevant" is often only extracted from the "irrelevant" with great difficulty. Even more to the point, the "irrelevant" may be more important to our understanding than the seemingly relevant. It is because we were so bothered by such questions and concerns that we felt it necessary to spell them out on page 1245 [1] of our article. In a word, we felt that to be truly systemic is to realize that the determination of relevancy, plus the relevancy criteria themselves, are not only parts of the system under scrutiny, but indeed, two of the most important parts of the system. In other words, the systems analyst is not separable from the objects he studies and delineates in so far as his social psychology greatly affects his characterization of the "object world."

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