CHAPTER VIII

EPILOGUE

8.0 *Introduction*

In this concluding chapter, the kernel of the theory is summarized and the basic equations restated. In addition, thoughts are presented on the possible application and utility of the theory.

8.1 *Essence of the Theory of Knowledge*

The theory of knowledge which has been presented herein provides a basis for obtaining a quantitative measure of the knowledge of all substances. That is, it provides a measure of knowledge. The theory is essentially embodied in the statement;

> An individual's knowledge is directly proportional to its capacity to direct energy

This basic statement can be expressed more precisely as:

> An individual's knowledge (k) is directly proportional to the amount of energy (e_d) it can direct, this directed energy having a lower boundary of zero and an upper boundary of e_T, where e_T is the total energy in a system consisting of the individual and its environment, i.e.,

$$k = Se_d \qquad 0 \leq e_d \leq e_T$$

The theory provides for the determination of the total knowl-

edge of an individual, i.e., the total energy directing capacity, and for the knowledge used for a given set of cricumstances, i.e., the energy directed by an individual under a given set of circumstances.

To express knowledge quantitatively, a unit of measure is required. The unit of measure selected is the knowledge unit which is defined as follows:

> One unit of knowledge results when a substance directs one Joule of energy. For this unit of measure, the constant (S) in the knowledge equaiton is set equal to one. The fundamental knowledge equation becomes;
>
> $k = e_d$ knowledge units $\qquad 0 \leqq e_d \leqq e_T$

When e_d is expressed in Joules, the constant S has a unit of $(\text{Joules})^{-1}$ in this unit system for knowledge. Other units of knowledge could have been selected based on larger or smaller energy units, however the unit based on the Joule will probably have the most all around utility.

8.2 *Basic Relations for Substances*

It has been shown in this book that the theory of knowledge measure applies to all substances, i.e., animal, plant, and mineral. Equations have been developed which relate directed energy, hence knowledge, to the characteristics of the substance. The development proceeded from the most simple mineral individual to the most sophisticated animal individual. The directed energy of a substance can be considered as the sum of the directed energy internal to the substance, the energy flow between the substance and the environment which is directed by the substance, and the energy in the environment that is directed by the substance. The energy directed by a sophisticated animal can be expressed by the generalized equation:

$$e_d = m \int_{T_1}^{T_h} C\, dT + \sum_j M_j + \sum_k e_{fk} m_{ok} + F m_{Fs} +$$

$$\int (\sigma T^4 + KA \frac{dT}{dl} + \dot{\beta} \gamma_h e_F)\, dt +$$

$$\int \dot{\beta} \gamma_w e_F\, dt + \int [\dot{e}_{\alpha r} + f(\dot{e}_e)\, \dot{e}_{ww}]\, dt$$

The directed energy of a less sophisticated substance can be obtained by deleting the proper terms from this general equation.

The energy directed by a plant can be expressed by the generalized equation:

$$e_d = m \int_{T_1}^{T_h} C\, dT + \sum_j M_j + \sum_k e_{fk} m_{ok} + F m_{Fs} +$$

$$\int (\sigma T^4 + KA \frac{dT}{dl} + \dot{\beta} \gamma_h e_F)\, dt + \int e_{\alpha r}\, dt$$

The directed energy of a mineral individual, i.e. a molecule, is given by the equation:

$$e_d = m \int_{T_1}^{T_h} C\, dT + \int (\sigma T^4 + KA \frac{dT}{dl})\, dt + \int e_{\alpha r}\, dt.$$

8.3 *Semantic Problem*

The concept that a mineral can direct energy and therefore has knowledge seems to present a semantic problem for some people. The difficulty is caused by the notion that to direct, control, or operate upon something implies a willed phenomenon to many people. Directing energy is not necessarily a willed phenomenon; e.g., the sun directs energy toward the earth and this directed energy is not willed by man or by a willing process of the sun. When the energy from the sun strikes the earth it is redirected, but not by a willed process. Man also directs energy that is not willed by him, e.g. certain environ-

mental energy impinges on man, such as heat and solar energy, which is redirected by man; man can will to his heart's content but not change his body's capability to redirect this energy.

When it is recognized that directed energy is not necessarily willed, the concept of knowledge and directed energy is easily seen to apply to all substances in the universe. It is rather gratifying to see from the examples that a man has many orders of magnitude more knowledge than a mineral individual. It is also rather satisfying to the ego to observe that a man has organizational, i.e. internal, knowledge and exchange knowledge that is exceeded only by a few animals, and that man in advanced societies has more environmental knowledge than all other animals.

8.4 *Utility of Knowledge Theory*

To be meaningful, a theory which allows the measurement of knowledge should have some utility. Some of the possible uses of the theory of knowledge developed in this book are discussed in the following paragraphs.

Classification

The theory of knowledge provides a method of classifying all substances in the universe. It was shown in the development of knowledge theory that all substances have knowledge. Indeed, it was stated that when energy takes form, it assumes the attribute of knowledge. Therefore, all substances can be categorized by the amount of knowledge they possess. Substances can be classified further by type of knowledge, i. e., organizational, exchange, and environmental. As science starts with classification, the classification of substances by their knowledge forms the foundation of any science based on the attribute of knowledge.

Adaptation

The measure of a substance's knowledge provides an indication of its ability to fit into or adjust to its environment. The knowledge capacity of a substante allows the prediction of the ability of a substance to cope with or adapt to a changing environment.

Social Science

The social sciences have a common basis in the knowledge of man. All are dependent to some degree on the capacity of man to direct the energy in his environment or to direct his own energy. Even a social theorem as basic as the Malthusian theorem on population, i. e., the population increases in a geometric progression while the food supply increases in an arithemetic progression, is modified by knowledge. As a matter of fact, one of the major reasons for the current controversy on the theorem is that it fails to account for knowledge. If man's knowledge was injected into the Malthus theorem, it is seen that the increase in population would be modified by controlling the number of people and hence the total organizational knowledge of groups of people. In addition, as man increases his ability to obtain food, the rate of increasing food changes from an arithmetic progression.

I feel that the greatest potential for a theory of knowledge measure lies in the field of the behavioral and social sciences.

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