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Letters to the Editor

"Specificity" and "Generality" Concepts and Their Relation to Safety Management

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Identification is one of the main tasks of analytical chemistry. Identification refers not only to that of the species of an entity, but also to that of the state of the entity under consideration. The significance of identification concerning the latter kind has been referred to before in this Journal.[1] However, it has an additional important concern regarding one problem of human beings of the present generation: safety management. The said concern is discussed here from the viewpoints of "specificity" and "generality", which are measures of the identification of the state of an entity. The understanding of specificity and generality is a problem of basic importance in science, having various concerns regarding nature. Various examples of these concerns have been referred to with respect to the thermodynamics of solute entities in solution.[2] One idea discussed in the references (given later) is the following. Consider in general the states of any entity in nature. These states may be classified as being two kinds, depending on whether the entity can be identified as having an individual of specific character. For the convenience of further discussion, this type state will be referred to as S, where S referes to specificity; it can also be assigned to be a situation in which the entity can be taken as only one part of the whole ensemble which is formed by all entities, the state G, where G refers to general. In the case of state G, the component entities must be bound with each other. The identification of each state, S or G, has been referred to as the target of analytical chemistry.[1] It often determines the effectivity of the solid states: the added microcomponents in semiconductors, luminescence material, or a solid catalysis of synthetic chemistry. The entities of state S maintain the condition of individual. Hence, the energy of the whole system which contains the entities is assumed to be governed by the dispersion entropy of the entities. The energy of system G is assumed to be dominated by its internal energy, which is equivalent to the interaction/binding energy of the component entities, since the component entities in a G system interact with each other while forming a united G system.

The aim of the present note is to call the attention of readers to the problem of safety management. The importance of safety management investigations has already been pointed out in this Journal.[3] An investigation has been conducted by the present author on safety management in cooperation with his colleagues over the last two years. In this investigation, the definition of the term "safety management" was taken widely. Consider the safety of a system, say a chemical power or communication facility, or even another system, such as the environment or human body. Various attempts to monitor the safety of such systems can be carried out. These attempts may be referred to as the paths along which faults involving the operation of the system or anomalousness of the measurables of the system are monitored.

According to Rasmussen[4], a malfunction or error which is found in one path does not cause a safety loss of the whole system. A serious safety loss is produced when dual or multi errors occur with those paths, particularly when a correlation of those errors occurs in the system. The essential point of the statement of Rasmussen is that the purpose of safety management is to maintain all elements of safety guard as independent from each other as possible and not to make correlations with each other. Thus, a safety loss occurs at the very moment in which the states of the safety guard are transformed from state S to state G.

Thus, any problem of safety managemnet is reduced to that of correlation. A study of correlation has been carried out in great depth and width, theoretically and experimentally. Although the type correlation which is being referred to has been well studied, it can not be denied from a fundamental point of view that such a study is phenomenological and that very little or almost nothing is known concerning the real motive force or reason which produces correlation. Our knowledge regarding correlation is simply that things happen after a correlation occurs. What we need for safety management is guiding knowledge in order to avoid safety loss.

During the course of our study over the last two years on safety management, it came to the mind of the present author that any analysis of empirical expertise, such as the Japanese traditional games of "Go", "Shogi" or even "Renju", would be helpful for us to construct

knowledge base on correlation. Efforts for such an analysis are being carried out in the Research Institute for Information and Knowledge with the cooperation of several colleagues including Dr. Tsutomu Oguni and Mr. Natsuhiko Nagumo. Very recently, it has been stated that the artificial intelligence, program of SOAR adopts knowledge related to chess in order to promote program architecture.[5] Experience stands on the specificity and construction of program architecture on generality. A bridging of both ends, or transference of the content from one to another, is important in science. Results involving such an investigation will follow.

References

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