

THE CHEMICAL LITERATURE AS A BASIS FOR CREATIVITY*

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The articles which make up this symposium will discuss several aspects of creativity based on the chemical literature. Some comments on the nature of creativity may help to set the stage for the papers which follow. Many definitions have been proposed. One of the simplest is that creativity involves new combinations of facts and ideas leading to new concepts.

Usually a definition of creativity is supplemented by mentioning some of its operational characteristics—no doubt because the elusive nature of the subject requires illustration for its appreciation. The attribute most frequently mentioned is that creativity requires stimulation, usually by means of the statement, "Ideas do not come in a vacuum." Indeed, some would say that an irritant is needed. Another frequently noted characteristic is that recognition that something new is at hand often comes suddenly. This is sometimes referred to as the "flash of genius." Less frequently mentioned is the pleasure of the inventor in contemplating his idea. To him, at least for the moment, his creation is beautiful. There is the further pleasure of following the idea's ramifications. Modifying and polishing the original conception defines it and may make it effective. Another requisite of creativity appears to be that the inventor must be looking for something. His mind must be open. As a consequence, the conception that arises is not necessarily the one originally sought. Probably as important as any other requirement for scientific creativity is the possession of the necessary technical background, together with habit of inquiry.

Let us return to the matter of the stimulus. What are the sources of stimuli? The inventor may put together combinations of ideas and facts from within his own mind without an obvious external stimulus. I suspect that there is always a stimulus even if it is not specifically recognized. Often, however, the stimulus is recently gained factual

or conceptual information, which is combined with previous knowledge to elicit a new idea. Among the sources of such stimuli are direct experimental observation, and information gained in discussion. A form of the latter is the so-called "brainstorming" procedure. And, finally, there is the literature. What more inexhaustible source of stimulation is there? The chemical literature, both past and current, is a vast reservoir of facts and ideas simply waiting to be shuffled together to attain new combinations. It is there for the taking. The generation of ideas from exposure to chemical journals and reference works may be deliberately planned or may follow an unscheduled course incident to the normal professional reading of the literature; with either procedure, the creative chemist owes a debt to the chemical literature.

It is certainly a matter of common knowledge that one form of literature, namely, patents, has contributed to invention. The existence of patents blocking a desired line of approach often has served as a stimulus for finding alternate ways of achieving a desired result. Likewise, the journal literature, reference books, compendia, *etc.*, can spark new ideas whether for intellectual curiosity, commercial gain, or both. It has been suggested that one way to find new ideas for research is to randomly select a volume of Beilstein from the shelf and let it fall open to whatever page it may. Inspection by a competent chemist with an inquiring attitude surely will lead to new concepts.

In the present symposium the matter of literature-based creativity is taken up from several points of view. First, sources of ideas generally are considered. Next the function of authors of articles and editors of publications in stimulating future creativity is discussed. After this background, the use of literature as stimuli to creative function is examined with respect to inorganic, physical, and organic chemistry. Consideration of the use of the literature in industrial chemistry for generating of new concepts concludes the symposium.

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