



PERSPECTIVE...

Science and Humanism

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THE "INTEGRATION" AND "SYNTHESIS" of knowledge called for by educators has no more striking instances than those achieved in modern genetics, thermodynamics, quantum theory, and the relationships between atomic structure and physiochemical behavior. These and others are among the finest products of the mind, comparable to great works of art and literature. Surely they are part of humanism. . . .

No curriculum should be filled to the brim with required courses all from one area. Curricula in sciences and engineering are in this often the worst offenders. Those who construct them hate the thought that a student may graduate with gaps in his education. But the best and ever-growing body of knowledge makes this inevitable; hence, the pretense should be abandoned in favor of a kind of education designed to produce men with the impulse and equipment to go on growing. No one whose education ceased at age 25 is an educated person at age 50. The test is not what the institution pours into the student but what it succeeds in planting to continue to grow. This in my view, is what can make an education liberal.

It is ideas that enable us not only to find our way among the myriad facts of any one area but even, now and then, to take excursions into neighboring territory. In any branch of science it is the conceptual framework which, like the steel frame of a building determines its form and structure. Isolated facts are as far from constituting a science as piles of building materials are from being a building. The dictionary definition of science as "classified knowledge"

is far less than the truth. It corresponds only to an orderly arrangement on the ground of the various building materials. It applies to a science only in its early stages. The materials must be put together according to a design appropriate to their nature and to the function intended for the structure. Thus the biological sciences, beginning with natural history and taxonomy, gathered scientific significance by advancing to ecology, physiology, and genetics. Chemistry has progressed far beyond the mere description of substances and their properties and now incorporates the comprehensive ideas of kinetics, thermodynamics, inter- and intramolecular forces, and the relationship of atomic and molecular structure to physical and chemical behavior. It is ideas such as these that save us from being overwhelmed by the mere description of the half-million known chemical compounds and make of chemistry a manageable and predictive subject. They indeed "synthesize" and "integrate." . . .

The sciences should not play two distinct roles: one for the technicians, the other to give a smattering of scientific facts to future "philosopher-kings" who are supposed to guide society. The scientist should not be a "mere technician," he must be a wise member of society; nor can society be well guided by men who are ignorant of those criteria for reaching sound conclusions that are the essence of science. There is no more important task ahead for scientists than to teach the science to both groups, not merely as information, but as science.

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