

siasm, when he condemns, as a support for fascism, "the thesis that man's biology decides his social behavior." In his view, the laws and behavior of higher level systems are *by their nature* unpredictable from those of their lower level constituent systems, and presumably the reverse; in our view, they are not of necessity unpredictable. Emergent attributes are difficult to predict, to be sure, because man yet knows little; but every significant scientific experiment is an act of faith or confidence in the ultimate understandability and predictability of nature. And this is not atomism, for it works both ways—the brain could never be fully understood without knowing mind, nor the mind without knowing brain. Where Novikoff would say that man's affairs are sharply separable into the sociological or the biological and that blurring the distinction is dangerous, we say they are part of each and that blurring the similarity is also dangerous. We recall that Darwin's clue for the concept of biological evolution came from sociological considerations and that his concept was, in turn, the stimulus to fruitful sociological thought.

Fortunately for our main theme, whether the particular mechanisms of evolution are alike or different at cellular, organismic or societal levels, comparable qualities repeatedly emerge. It remains true that the fact of evolution applies to all the universe we know—inanimate, living, thinking—and that its overall trend is consistently towards greater differentiation by specialization of units combined with greater integration (interaction or cooperation) of units in the whole.

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THE COLORATION GIVEN BY VITAMIN A AND OTHER POLYENES ON ACID EARTHS

IN one of the recent issues of *SCIENCE*, A. Lowman¹ reported on the blue coloration which appears if vitamin A, which is dissolved in a non-polar solvent, is brought into contact with the commercial adsorbent, Super Filtrol. His observations were confirmed by H. R. Kreider.²

Evidently because of the prevailing difficulties in obtaining foreign literature, neither of the authors mentioned seems to be aware of the fact that this interesting reaction has been observed and interpreted by P. Meunier³ three years ago. According to Meunier's explanation, some acid earths which possess incomplete electronic octets are able to give rise to an intensely blue color when they are in contact with vitamin A which is dissolved in a non-polar solvent;

by donating unshared electrons to such adsorbents, the vitamin molecule undergoes polarization and forms positively charged, strongly resonating structures. A few very debatable points in Meunier's interpretations shall not be discussed here; for example, the alleged restriction of the resonating system to twice four double bonds in the β -carotene molecule.

The Carr-Price reaction and some color tests given by sterols have also been treated by Meunier and his collaborators.⁴

Of course, the coloration on acid earths can not be expected to be specific for vitamin A. In fact, carotenoids were mentioned by Meunier and the reaction was observed by Lowman to be given by carotene.

A similar coloration is also shown by a new polyene, now under investigation, which is widespread in plants, shows intense fluorescence in ultraviolet light and was recently reported in collaboration with A. Polgár.⁵ We find that if a highly purified, colorless petroleum ether solution of e.g. 0.01 mg of this compound is placed in contact with filtrols, the solid phase turns azure blue. The formation of this color is irreversible in the sense that an alcohol or acetone eluate, after transfer into petroleum ether, does not show the typical extinction maxima of the starting material (331, 348, 367 m μ) as represented in a published curve.⁵

A deep coloration on acid earths, e.g., on purified Super Filtrol can also be obtained with a benzene solution of diphenyloctatetraene, $C_8H_5(CH=CH)_4 \cdot C_8H_5$, under suitable conditions.

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ANAEROBIC RESPIRATION VS. FERMENTATION

THE terms fermentation and anaerobic respiration have justifiably been put under the microscope in two recent discussions in *SCIENCE*.

Seifriz¹ objects to the use of the term fermentation for anaerobic respiration when the reactions involved are substitutes for energy-yielding anaerobic processes necessary for life.

The criticism seems a valid one, for the word fermentation as used historically by Pasteur *et al.* and, as used currently, does not denote the part which oxygen may or may not play in the reactions. In the literature, reference is repeatedly made to "alcoholic fermentation" and "acetic acid fermentation." The

⁴ P. Meunier, R. Dulou and A. Vinet, *Compt. rend.*, 216: 907, 1943; P. Meunier, R. Dulou and A. Vinet, *Bull. soc. chim. biol.*, 25: 371, 1943; P. Meunier and Y. Raoul, *ibid.*, 25: 173, 1943.

⁵ L. Zechmeister and A. Polgár, *SCIENCE*, 100: 317, 1944.

¹ William Seifriz, *SCIENCE*, 101: 88-89, 1945.

¹ A. Lowman, *SCIENCE*, 101: 183, 1945.

² H. R. Kreider, *ibid.*, 101: 377, 1945.

³ P. Meunier, *Comptes rendus de l'Acad. Franç.*, 215: 470, 1942.