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. Lowman[1] 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. Meunier[3] 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 mμ) 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, $C_6H_5(CH=CH)_4 \cdot C_6H_5$, 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.

Seifriz[1] 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

[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.
[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.

former occurs in the absence of oxygen and in the latter oxygen is involved. Hence, the term does not differentiate the intimate role of oxygen.

Goddard,[2] on the other hand, believes we would do well to retain the word fermentation for reactions involving the degradation of an organic molecule into two or more simpler molecules by an oxidation and reduction occurring within the original molecule or its products. He points out that, if the term anaerobic respiration is used according to its usual meaning (*i.e.,* in the absence of oxygen), in many types of tissues, *e.g.,* some tumors, contracting muscles, certain yeasts and some seeds, carbohydrate degradation occurs without the intervention of oxygen, even though oxygen may be present.

Hence, the word anaerobic respiration, like the word fermentation, in itself does not give an accurate picture of the actual type of respiration prevailing. Therefore, these two words which seem to be competing in scientific usage both fail because of the same ills.

In my opinion, the opposing views can be resolved into satisfactory agreement which will banish confusion in the minds of students of biochemistry and others, and we can still retain the word anaerobic respiration in popular usage as it is at present. We need simply to qualify the term to mean the state of respiration or the release of energy from a substrate in the cell, in which oxygen is *not one of the reactants,* whether or not it is present. Therefore, anaerobic respiration may prevail either in the presence or absence of oxygen, but in either case oxygen is not the hydrogen acceptor.

Aerobic respiration on the other hand refers to the active participation of oxygen in the energy-yielding process.

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PLEA FOR PUBLICATIONS

WE, in Belgium, have been deprived of American publications since the beginning of the war; accordingly, we have not been able to refer to published works in which we should be particularly interested. At the suggestion of my friend and former coworker at this institute, Major R. Roseman, Sn.C., of the American Army, I am addressing an earnest plea to the readers of SCIENCE for any available reprints on the following subjects: proteins, bilirubin, clinical and experimental studies on burns and penicillin. Any information whatever furnished along these lines would be greatly appreciated.

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SCIENTIFIC BOOKS

COMMERCIAL ANALYSIS

Commercial Methods of Analysis. By FOSTER DEE SNELL and FRANK M. BIFFEN. vii + 753 pp. Illustrated. 13.5 × 21 cm. New York: McGraw-Hill Book Company, Inc. 1944. $6.00.

THE authors state in the preface that this book is for the student who has already become familiar with the tools of quantitative analysis and the routine methods, and who desires further training in this field by a study of commercial methods and may serve as a manual to the industrial analyst. The first eighty pages are devoted to elementary subject-matter such as a description of the tools of the analyst; beakers, flasks, burettes and filter paper, and a discussion of such general operations as drying, weighing and extraction. Thirty pages deal with inorganic qualitative micro analysis.

The balance of the text is given over to procedures for the quantitative analysis of many industrial materials, including minerals, water, cement, ferrous, aluminum, and copper-base alloys, fats, soap, greases, solvents, paint, rubber, coal, gas, paper, sugar and some others. Little theory is presented; hence, the book, if it has any pedagogical value, will be more useful in the training of chemical analysts than in the education of analytical chemists. Standard methods are drawn from those published by the American Society for Testing Materials, the Association of Official Agricultural Chemists and others. Frequent deviation from official and recommended procedures are given, but seldom are these departures indicated as such.

The value of this book as a reference work is greatly lessened by the almost complete absence of literature citations. The reviewer could locate no more than eighteen specific citations in footnotes together with a few general references within the text of the book.

In spite of these faults, this book will properly find its place on the shelves of technical libraries and on the desks of many chemical analysts. It will serve as a point of departure when the latter are called upon to perform analyses which fall outside the routine of their day-by-day experience.

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[2] David R. Goddard, SCIENCE, 101: 352–353, 1945.