"Further Evidence of Sex Variations in Utilization of Iron by Anemic Rats," and states that the findings of the authors, Drs. Louise Otis and Margaret Cammack Smith, "were previously established by Dr. Helen Hubbell and reported in the *Journal of Nutrition* in January, 1938, Vol. 15, pp. 91–102." In this connection we would like to point out that in the course of an investigation using hundreds of rats, begun in 1935 in our Arizona laboratories on the hematopoietic value of foodstuffs, a marked difference in the response of male and female rats was consistently noted. At that time it was current practice in other laboratories to use male and female rats interchangeably, which gave conflicting results. Our findings were reported in a paper by Smith and Otis entitled "Sex Variations in the Utilization of Iron by Anemic Rats," which appeared in SCIENCE in January, 1937, Vol. 85, pp. 125–6, which was almost a year before the paper by Rose and Hubbell appeared. Also, a paper by Smith and Otis entitled "Hemoglobin Regeneration in Anemic Rats in Relation to Iron Intake," which included a discussion of their findings concerning sex difference, was published in the *Journal of Nutrition,* Vol. 13, pp. 557–82, in June, 1937.

We regret that in our third paper, entitled *"Further Evidence* of Sex Variation in Utilization of Iron by Anemic Rats," which is the paper to which Dr. Rose refers, no mention was made of the excellent paper of Rose and Hubbell. It would, of course, have been included in any complete review of the literature on the subject, but a review of any length is not permitted in SCIENCE. A more complete description of our iron studies is soon to appear elsewhere.

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SUGGESTIONS REGARDING A PROPOSED STANDARDIZATION OF OSMOTIC PRESSURE AS A TERM

THE proposal to standardize osmotic pressure as a term made recently in these columns[1] should meet with sincere approval. We believe, however, that such a standardization should, if possible, transcend the limits of one field of science. This is particularly necessary from a pedagogical standpoint.

As pertinent to this suggestion we would call attention to the desirability of considering osmotic pressure as the pressure that must be exerted on the solution in order to make the escaping tendency of the solvent from the solution equal to the escaping tendency of the pure solvent at the same temperature. One needs further to point out that (*a*) the addition of a solute to a solvent in general lowers the escaping tendency of the solvent molecules and (*b*) the application of an external pressure in general increases the escaping tendency of the solvent. This treatment of osmotic pressure is quite generally found in the better elementary text-books of chemistry, in the physical chemistry texts and in advanced texts.[2]

It will be observed that the suggested standardization includes the two generalizations regarding the influence of solute concentration and pressure. We propose (1) that the definite relation between these generalizations and the osmotic pressure be pointed out and (2) that reference be made to some generalized term such as "escaping tendency."

We suggest that such an amplification would improve the treatment of the term by increasing the range of applicability and by relating the phenomenon under consideration to others, such as vapor pressure effects, etc.

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SCIENTIFIC BOOKS

LIFE ON OTHER WORLDS

Life on Other Worlds. By H. SPENCER JONES. New York: The Macmillan Company. 1940.

FOR centuries man has wondered and speculated about the possibility of life on other worlds. Nowadays probably no question is put more frequently to the astronomer by the layman than "Are there men on Mars?" Percival Lowell at the close of the past century thought he had evidence for the existence of intelligent life on Mars. Alas, the modern astronomer can not concede Lowell's point. H. Spencer Jones, Astronomer Royal of England, in his recent book, "Life on Other Worlds," brings a timely and authoritative account of many aspects of the problem of the existence of life elsewhere in the universe.

Regardless of whether or not life does exist on the other planets, life can be directly observed only on the Earth. Life as we know it must therefore furnish a working definition of what shall constitute life. Complex molecules containing carbon have been found to form the basis of the structure of all living organisms on Earth. From the prevalence of the same physical

[1] H. C. Eyster, SCIENCE, 92: 171–2, 1940.

[2] The following list includes an example from each of the classes mentioned: Herman T. Briscoe: "An Introduction to College Chemistry," p. 257. Houghton Mifflin Company. W. H. Rodebush and E. K. Rodebush: "An Introductory Course in Physical Chemistry," p. 188. D. Van Nostrand Company. G. N. Lewis and Merle Randall: "Thermodynamics and the Free Energy of Chemical Substances," p. 213. McGraw-Hill Book Company.

and chemical laws throughout the universe, Dr. Spencer Jones consequently infers that the formation of similar large molecules with chainlike structure and of feebly stable molecular groups must be possible wherever living matter is to exist, although the living matter need not necessarily be of a type familiar on Earth. A study of the physical, meteorological and geological conditions and their evolution on the Earth make it evident that the requisites for the existence of life (especially regarding atmospheric composition and temperature) are rather narrowly defined. Spencer Jones, discussing at length all the planets and the principal satellites of the solar system, finds evidence for vegetation on Mars, but no evidence anywhere for animal life. With the possible exception of Mars, the Earth is, he contends, the only planet on which animal life can have developed.

Speculatively the author also takes us beyond the solar system. Considering the nicety of conditions required for the existence of life, may we egotistically assume that we are the only men in the universe, or must we modestly admit that our Earth is but one among innumerable similar satellites to other suns? That, according to the Astronomer Royal, depends very much on how the solar system originated. Many theories have been proposed, but all, on careful examination, have been found wanting. The most promising theory requires such specialized accidental circumstances that our egotism is encouraged. On the other hand, he points out, the immensity of the number of galaxies of stars and the theory of an expanding universe combine to suggest that ours is not a unique world.

"Life on Other Worlds" gives a fairly complete survey of the present state of knowledge on the subject. It is fluently and clearly written. In general, the treatise is not only instructive but entertaining (notably where the fates of would-be rocket exploring-expeditions to the Moon are commented upon) and it is definitely provocative of thought. The reader is left impressed with the quantity of research in numerous fields of science that has been accomplished in an approach to the solution of the problem of life elsewhere in the universe. "Life on Other Worlds" is sincerely recommended to all astronomically and philosophically minded laymen. For the astronomer it will provide an enjoyable "busman's holiday."

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MEDICINE IN AVIATION

Grundriss der Luftfahrtmedizin. By SIEGFRIED RUFF and HUBERTUS STRUGHOLD. viii + 191 pp., 103 figs. Leipzig: Johann Ambrosius Barth, Verlag. 1939.

THE preface to this book is written by Dr. E. Hippke, "Chef des Sanitätswesens der deutschen Luftfahrt." Chapter I reviews the problems which meet the aviator and alpinist as higher and higher altitudes are reached. Chapter II contains an analysis of different factors affecting the organism in high altitude: the low pressure of oxygen, the low temperature, the ultra-violet radiation, etc. A short review of the general physiological and physical background necessary for understanding the special physiology of high altitude is given in the first part of the chapter; later follow descriptions of the effects on organs and functions and of ways for investigating and combating the impairing forces. Problems of practical importance, as acclimatization to high altitude, high altitude tolerance, oxygen administration, etc., are given special consideration. Chapter III deals with acceleration. In this field, new as it is, the Germans are specialists in research and in the application of research. Centrifugal force has been studied both "artificially" by means of great centrifuges and "naturally" in various kinds of diving, "pull-outs," "looping," etc. Air-sickness is considered in this chapter. Chapter IV covers the psychophysiology of aviation, especially sensory physiology. In Chapter V the reasons for accidents in flying are analyzed and devices apt to diminish them described, and in Chapter VI is given a short but inclusive review of the comparative physiology of flying.

The book is offered as a supplementary text for students of medicine and as a source of orientation and information for practical men—aviators, military men, physicians and people interested in the problems of the man in the air force. Most figures, tables, curves, etc., are taken from German sources. An English translation might properly include a supplementary chapter or appendix containing data from American and other sources. A revision of the bibliography along the same lines also would seem advisable.

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CHEMISTRY IN WARFARE

Chemistry in Warfare. By F. A. and M. S. HESSEL and WELLFORD MARTIN. With a foreword by Colonel Crosby Field and a Technical Appendix. New York: Hastings House, 135 Front St. 164 pages; numerous illustrations and diagrams; price, $2.00. 1940.

THIS popular treatment of the subject is clearly and interestingly written. Its purpose is to give the layman a concise and reasonably comprehensive review of the manifold ways in which modern warfare is dependent upon chemistry and the chemist, with such illustrations, diagrams and collateral information as will enable any one to see for himself the significance of chemistry's rôle and the indispensability