"The General, Selective, and Specific Formation of Complexes by Metallic Cations" by G. Schwarzenbach. The author surveys the course of reactions when water molecules in the hydration shell of a metallic ion are replaced by other ligands "in order to point out some empirical regularities without giving more than an indication of their theoretical interpretation." In six tables are given formation constants for some well known complexes (28 pp., 70 ref.). (7) "Atmospheric Activities and Dating Procedures" by A. G. Maddock and E. H. Willis. This is an excellent review of the experimental techniques for the radiocarbon method of dating, critically examining the sources of error and the fundamental assumptions on which the method is based. The use of tritium for dating is also discussed (48 pp., 286 ref.). (8) "Polyfluoroalkyl Derivatives of Metalloids and Nonmetals" by R. E. Banks and R. N. Haszeldine. This chapter deals with the preparation, the chemical and physical properties of the known polyfluoroalkyl derivatives of mercury, boron, silicon, nitrogen, phosphorus, arsenic, antimony, oxygen, sulfur and selenium. Many of the data are presented in 20 tables (96 pp., 210 ref.)

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Microchemical Journal Symposium Series. Volume 1. Submicrogram Experimentation. Based on a Symposium Sponsored by the National Academy of Sciences and the National Research Council, Arlington, Virginia, May 15–18, 1960. Edited by NICHOLAS D. CHERONIS, Brooklyn College of the City University of New York. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1961. viii + 351 pp. 16 × 23.5 cm. Price, $12.75; $10.75 (paper).

This book contains the Proceedings of the Conference on Submicrogram Experimentation, a symposium limited to 29 participants. A total of 22 papers with discussions and a summary of the symposium are published here.

The submicrogram region is defined as that which includes masses from 10^{-6} g. to near the range of individual molecules. The methods used for study include activation analysis, emission spectrography, flame photometry, absorption spectrophotometry (ultraviolet, visible and infrared), mass spectrometry, X-ray spectroscopy and diffraction, fluorescence, density measurements, electrophoresis, magnetic susceptibility, micro- and macrobiological assay methods, enzymatic studies, paper chromatography, gas chromatography, olfactory sensing, microscopic examination (light and electron) and microcoulometry.

Diverse problems which necessitate working in this region include criminalistics, trace elements in high purity materials, marine chemistry, synthetic elements which are very limited in quantity, functions of trace substances in the growth of various organisms, carcinogenicity, serum analysis, atmospheric pollution, pesticide residues, analysis of tissue sections, and cytochemical studies.

As has been known for a long time, biological systems are very sensitive to small quantities of certain substances. Therefore, it is no surprise that much of the work in the submicrogram region has been done by investigators in the biological field. A large proportion of the papers in this book are biological in application. These studies most often involve trace quantities in large amounts of total sample, and separations are necessary before quantitative estimations are possible. Much of the effort in trace quantity studies is devoted to the separation of the desired material. Studies involving single cells and those on extremely limited quantities of sample deal with total quantities in the submicrogram region.

A few of the devices used are specially tailored for the small quantities, but many of the techniques consist of adaptations of existing equipment and instruments to handle the small quantities as may be seen from the list of the methods used.

Because of the diverse natures of the problems discussed, the book is extremely interesting. The fact that it is a compilation of individual papers given at a symposium yields a variety in styles of writing, in detailed content and completeness. The papers range from a rather thorough discussion of one phase of one technique (detector systems in gas chromatography) to more general descriptions of various techniques available. Very few of the papers contain sufficient detail to enable one to go directly into the laboratory and apply the technique. On the other hand, the book would be an excellent starting place for one interested in submicrogram analysis to find what techniques have already been devised.

In comparison to other books of this nature, the price may not be out of line, but none-the-less this reviewer feels that for the size and content this book is somewhat overpriced.

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Verfahrenstechnik in Einzeldarstellungen. Band 11. Experimentelle Vermessung von Dampf-Flüssigkeits-Phasengleichgewichten dargestellt am Beispiel des Siedeverhaltens von Fettsäuren. Von DR. R. MÜLLER, Hamburg, und DR. H. STAGE, Köln-Niehl. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany, 1961. viii + 117 pp. 15.5 × 23.5 cm. Price, DM. 21.—.

Measurements of the isobaric liquid–vapor equilibria give indications of the distillation behavior. This fact is of particular importance to the oil and fat industry. The authors have summarized in this book their work for a series of saturated even numbered, straight chain, fatty acids; these data supersede previous books describing experimental work in this field which are now out of date. The book consists of seven chapters and a total of 254 references through 1958. The authors have emphasized the newer types of apparatus which make such measurements not only much faster but also much less complex.

After an introduction and discussion of the importance of the determination of the vapor–liquid equilibria of fatty acids, the authors describe in Chapter II the operations involved in the preparation of pure fatty acids. They then discuss a number of previously used distillation columns; this leads into a detailed description of their distillation column with automatic control of distillation rate, heating temperature, distillation pressure, temperature of the cooling water, temperature registration, sample takeoff, etc. Descriptions are also given for the crystallization for the higher fatty acids from C_{14} on.

In Chapter III, the authors give the exact vapor pressure curves determined for the fatty acids from C_6 through C_{24} as well as tables of melting points. Chapter IV gives a detailed description of the authors' investigation of the temperature stability and sample analysis, in addition to phase equilibria for fatty acid mixtures of C_6–C_8, C_{10}–C_{12}, C_{14}–C_{16}, at various pressures; this is followed by tables of melting and solidification points for the same series of fatty acid mixtures. It also includes a discussion of the thermal stability of fatty acids at several temperatures with various lengths of heating time.

In Chapter V the apparatus used for the phase equilibria studies is described in detail. It is so constructed that the known source of error of previously described apparatus has been taken into consideration. This apparatus was tested by determining the equilibria for mixtures of acetone–benzene as well as 2-methylnaphthalene–decanone; the resulting values were checked by thermodynamic methods Equilibrium measurements of fatty acids included the mixtures: C_6–C_8, C_8–C_{10}, C_{10}–C_{12}, C_{12}–C_{14}, C_{14}–C_{16}. Each mixture was measured at three pressures. In order to evaluate these measurements, exact vapor pressure data were necessary. The literature values within the homologous series were checked and a formula was derived which gives vapor pressure curves for the higher fatty acids. The results of the vapor pressure measurements indicate that slight deviations from ideal behavior are found. This difference increases with falling temperatures. The association phenomena in these acids is discussed in this context.

The final two chapters include an evaluation of the reported results in terms of their thermodynamic significance as well as a discussion of further investigations which are necessary in this field.

Numerous tables for melting points, solidification points, vapor pressure curves and phase equilibria in addition to descriptions of the experimental apparatus used for these determinations should make this an important contribution to the library of oil and fat chemists.

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Interfacial Phenomena. By J. T. DAVIES, Professor of Chemical Engineering and Director of the Department, University of Birmingham, and E. K. RIDEAL, Former Professor of Colloid Science, University of Cambridge. Academic Press Inc., 111 Fifth Ave., New York 3, N. Y. 1961. xiii + 474 pp. 16 × 23.5 cm. Price, $14.00.

The interfaces treated in this book are those involving at least one liquid and particularly those involving water and aqueous solutions. The gas–solid interfaces which have been the subject of many monographs are purposely excluded. Within these limits an almost overwhelming variety of aspects and problems is explored in a series of chapters devoted successively to physics of interfaces, electrostatic phenomena, electrokinetics, adsorption, properties of monolayers, reactions at surfaces, and diffusion through interfaces. A last chapter occupying almost a quarter of the book deals with disperse systems, including foams, detergency, flotation, crystal growth, adhesion, friction and similar applications.

The authors' detailed considerations range widely from fundamentals of surface potentials and of double layer structure through experimental techniques for obtaining fully wetted or really clean surfaces to engineering problems of mass and heat transfer or of the effective application of insecticide sprays. This richness of contents is achieved within a rather compact volume by presenting throughout the authors' own point of view, with a minimum of discussion of other opinions or other approaches and with little distinction between what is well established and what is today's best guess. The authors clearly take the responsibility for their views—this is never a presentation of what somebody else has to say on the subject but of what they feel is the proper approach and treatment. Since they have contributed much to our understanding of interfaces, their presentation is not only authoritarian but also generally authoritative and enlightening. However, their style remains the same and the reader gets no warning when they are in regions where angels might fear to tread.

The treatment is concise but clear and combines skillfully theoretical principles and experimental evidence supported by almost a thousand references. It is only in the chapter on reactions at interfaces that the argument is so condensed that it seems almost to be a guide through the references. The rest of the book is, however, developed logically and consistently with a minimum of mathematical involvement and with emphasis on the facts and their physical interpretation. It can be read profitably by any chemist interested in surface chemistry. It will give much stimulation and food for thought to those more familiar with the subject while others will get a clear and coherent introduction to the field and will probably discover later anyhow that nature may sometimes be more complicated or even different. Those interested in specific aspects only will find it a good guide to specialized literature provided that they can locate the subject of their interest. It is really unfortunate that the very incomplete index will be of little help in this or in retrieving any specific point after a first reading. There are few other places, however, where so many topics are so well discussed. This reviewer was particularly impressed by the treatment of spontaneous emulsification, of surface potentials and by the constant awareness of the reciprocal effect between subsurface convection currents and local surface pressures.

Interfacial phenomena emerge from this book as the important frontier of knowledge vigorously explored on the basis of sound principles, which it is. The best evidence for this lies probably in the fact that about half the references cited are from the last decade and that the latest year included, 1960, provides by itself as many as the whole pre-1920 era.

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Physical Chemistry. Volume IX. Photochemistry of Air Pollution. By PHILIP A. LEIGHTON, Department of Chemistry, Stanford University, Stanford, California. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1961. ix + 300 pp. 16 × 23.5 cm. Price, $11.00.

The author has drawn upon his vast experience in the areas of photochemistry and air pollution to write an authoritative and readable book. This is an excellent example of the practical use of quantitative research results to explain an extremely complex "natural" system, the irradiated auto-exhaust polluted atmosphere. The book for the first time makes available to the researcher many facts and discussions of the author and others first published in the now rather inaccessible Reports of the Air Pollution Foundation. It is a thoroughly gratifying experience for the reader to follow Professor Leighton's quantitative approach to this complex problem. The book should be of great value not only to researchers in the air pollution area, but to those interested in photochemistry and free radical reactions. The near ultraviolet photochemistry of O_2, O_3, NO_2, SO_2, HNO_3, alkyl nitrates, HNO_2, alkyl nitrites, nitro compounds, aldehydes, ketones, peroxides, acyl and peroxyacyl nitrites and nitrates, are all reviewed critically. The intricate thermal interactions of oxygen atoms, organic free radicals, ozone, oxides of nitrogen, hydrocarbons and sulfur dioxide in polluted air are thoroughly discussed and evaluated.

As with any book of this type there are points with which fellow scientists will quarrel. For example, the author concludes that in the photolysis of CH_2O both at 3130 and 2537 Å. the primary formation of H_2 and CO by intramolecular rearrangement is unimportant; photolysis of CD_2O and CH_2O mixtures at 3130 Å. suggests otherwise (R. Klein and L. J. Schoen, *J. Chem. Phys.*, **24**, 1094 (1956)).

The optimism of the author in his conclusion does not reflect the many uncertainties of his earlier discussions, "Although much remains to be disclosed concerning the details of this immensely complicated process, there is no longer any doubt but that removal of the oxides of nitrogen and the olefins from polluted air, by proper control of their sources, will eliminate this unwelcome by-product of present day civilization." The removal of the oxides of nitrogen and the olefins from polluted air should improve the present Los Angeles situation, but unless the partially oxidized products of hydrocarbon combustion (*e.g.*, CH_2O, peroxides, etc.) are removed as well, a new type of polluted atmosphere of unknown properties will be created. Even if we discard completely the now offensive internal combustion engines, new sources of atmospheric pollution will appear; it is only through the continued evaluation and control of our many different urban atmospheres that we can keep up with the problems of air pollution.

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