state." "Very little is known concerning the mechanism by which [vitamin K] . . . promotes the formation of prothrombin." "An extensive field, still largely unexplored, exists in which the biochemical reactions catalyzed by those coenzymes [containing niacin] must be integrated into the normal physiology and biochemistry of the intact animal." "The biological role of the [essential fatty acids] has not yet been elucidated. . ."

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Superfluids. Macroscopic Theory of Superfluid Helium. Volume II. By the Late FRITZ LONDON, Duke University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1954. xv + 217 pp. 15.5 × 23.5 cm. Price, $8.00.

In this excellent monograph the late Fritz London has given a clear and lucid exposition of the theoretical concepts, for which he himself was principally responsible, which provide an explanation for the anomalous properties of superfluid liquid helium. He has accomplished this task with a minimum of mathematical complexity, and he has critically reviewed the existing body of experimental facts within the framework of his theory. As one of the few examples of the direct manifestation of quantum mechanics in the macroscopic properties of matter in bulk, superfluid liquid helium is one of the most fascinating objects of study of modern chemical physics. Although many details remain to be worked out and many features of the theory will doubtless be modified in the future, there seems to be little doubt that the essential features of London's theory, the Bose–Einstein condensation and the establishment of order in momentum space, are correct. It is therefore most fortunate both for experimental low temperature physicists and for chemical physicists interested in the theoretical aspects of the problem to have London's summary of the essential experimental and theoretical material available to them in the form of this monograph.

After a brief review of the phenomenology of liquid helium I and II, a description of the essential superfluid properties of helium II and the lambda point transition, the author passes to the evolution of the two fluid concepts of the properties of helium II. He discusses the equilibrium properties of liquid helium from the standpoint of the Bose-Einstein condensation and points out what modifications will eventually be necessary in the ideal theory. He then passes on to a review of the transport properties in liquid helium with a review of the essential experiments relating to superfluidity and second sound. There follows a chapter on the hydrodynamical quasi-continuum with the introduction of the concepts of rotons and phonons and their relationship to second sound. The quantization of hydrodynamics is discussed and the transformation theory of the phonon field is presented. Subsequently, the detailed theory of two fluid thermohydrodynamics is developed in some detail and the application of the equations of this theory to a quantitative description of transport phenomena in helium II is given. In a final chapter, the properties of the liquid phase of the helium isotope He^3 are investigated and the properties of mixtures of He^3 and He^4 are treated by means of a simplified model, which leads to a qualitative explanation of both the equilibrium thermodynamic properties and the transport of such mixtures.

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Technique of Organic Chemistry. Volume VI. Micro and Semimicro Methods. By NICHOLAS D. CHERONIS, Professor of Chemistry, Brooklyn College. Edited by Arnold Weissberger. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. xxiii + 628 pp. 16 × 23.5 cm. Price, $12.00.

The phenomenal growth of microchemistry in the short span of our own scientific generation and its broad outreach into so many fields calls for a good book on the subject from time to time. It is good for specialists in other fields of science to be made aware of the ingenious techniques that often exist for carrying out familiar chemical operations on a small scale since these are being constantly used to advantage by the microchemists themselves. For in microchemistry as with anything else there is always a right way to do something and, if one can find it, he may be able to save himself much hardship and grief.

The present work is broad in scope. Perhaps the authors in their ambition to do a good job have tried to cover too much ground in their volume. Nevertheless, on the whole, their offering may be termed "substantial" because it contains much valuable information along several different lines.

The book starts out with a brief introduction that presents among other things one significant thought that the reader may or may not be willing to accept: *i.e.*, the idea of shifting his concepts of micro, semimicro and macro according to whether it is an analytical or preparative operation that he has in mind. For although the authors are willing to go along with the traditional 10, 10–25, and 100-mg. sample weight limits to define the three ranges in analysis, they advocate limits of 50 mg. and 100–2000 mg. for synthetic work. The reviewer finds it difficult from force of habit to think of 50 mg. as micro or 2 g. as semimicro. On the other hand, he must admit some justification for the innovation because from a practical view of synthesis it is indeed true that what really matters is how much material the worker has left at the end of his project rather than how much he was compelled to start with. Nevertheless, the reader should understand at the outset that the preparative experiments in subsequent chapters will be labeled "micro" or "semi-micro" on this rather arbitrary basis.

The body of the book is divided into three parts: "General Methods," "Preparative Reactions" and "Analytical Procedures and Reactions." The last deals mainly with qualitative analysis, although Dr. T. S. Ma has assisted with a 6-page chapter on the quantitative estimation of functional groups. This last chapter, as one would expect from its brevity, is of a general nature only. It takes up two problems that arise in developing a quantitative method for a functional group: (a) the suppression of interfering side reactions, and (b) the difficulty of devising a universal method for a given functional group whenever its functional activity will shift with changing substitution. The first problem is illustrated by the authors in a discussion of the multifarious acetyl determination; the second, is the problem of estimating the primary amino group. The chapter closes with a useful table summarizing the present status of quantitative microprocedures for functional group analysis. It should be pointed out here, however, that the author has omitted from the list in the table the important Karl Fischer determination of water. Yet this method is extremely useful and it plays an important role in functional group analysis. It can be applied in almost any reaction of a functional group where water is liberated or consumed, and the list of such possibilities is long.

Beginning with Part I, "General Methods," as we examine the book more closely, we find many interesting ideas along with much that is quite obvious to the specialist in organic chemistry. For instance, the idea of adding a "chaser" to reduce hold-up in a small scale distillation, the description of the "Chemical Warefare" microstill of Gould, Holzman and Niemann, the suggestion of polysiloxanes for melting point bath liquids, the good discussion on thermometer calibration, the thorough treatment of the Kofler micro hot stage, and the description of the modified Menzies-Wright ebulliometer stand out in this reviewer's memory as some of the high lights in Part I. On the other hand, the incomplete description of the "Universal Microapparatus" illustrated on pages 135 and 136 was disappointing and forced the reviewer to repair to the library for an understandable description. It should also be noted that in the discussion of the osmometric determination of molecular weight the author does not mention the method of Baldes. Yet as modified by Taylor and Hall[1] this delicate osmometric method is perhaps the best. It should have been included. Another unfortunate omission in this area was the important improvement by White and Morris[2] in the Signer procedure. It is their refinement that makes this method practicable.

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(1) G. B. Taylor and M. B. Hall, *Anal. Chem.*, **23**, 947 (1951).

(2) L. M. White and R. T. Morris, *ibid.*, **24**, 1063 (1952).