synthesis, glyceride breakdown, and glycogen breakdown in adipose tissue: Mechanisms and regulation" by Martha Vaughan and Daniel Steinberg; "Comparative physiology of adipose tissue in different sites and different species" by Eleazar Shafrir and Ernst Wertheimer; "Triglyceride metabolism" by B. Shapiro, and "Pathological anatomy of adipose tissue" (27 pages) by C. G. Tedeschi.

Perhaps it is misleading to note a few strong chapters, because most of the volume is authoritative, well written, and critical, with excellent, though not exhaustive coverage of subject matter and references. Many of the papers are well illustrated. "The physiological role of brown adipose tissue" by Cliffe D. Joel has an illustration in color.

As might be expected, some chapters are not strong. An example is "Fat metabolism in fish." An area under active investigation over the past few years, the origin of the polyunsaturated fatty acids in marine fish, is not touched on, and only 30-year-old work on the relation between diet and body fat is referred to. The authors do not refer to their own work. As far as I know they have not published on the subject. A few other chapters were written by persons who have made relatively little contribution to the specific subject that they reviewed. While, theoretically, it may be argued that some scholars may be better able to discuss a subject than persons engaged in advancing knowledge, certainly those with both qualifications can be found.

Very few of the authors limited themselves to purely objective reporting of past work. Thus, in the chapter "Comparative anatomy of adipose tissue," Jean Vagne and Robert Fenasse propose eight groups of factors responsible for the development and distribution of fat within human adipose tissue. In the chapter "Fatty acid patterns in human adipose tissue" Jules Hirsch devotes considerable space to sources of error in gas liquid chromatography of the fatty acids in adipose tissue.

A large number of the chapters contain original data—"Adipose tissue in migratory birds" by Eugene P. Odum, "The physiological role of brown adipose tissue" by Cliffe D. Joel, and "Enzymes in carbohydrate metabolism" by G. Weber, H. J. Hird, N. B. Stamm, and D. S. Wagle. But shouldn't original data be deposited in the technical journals?

The references are all collected alphabetically (senior author) at the end of the volume; they include titles. They are followed by a "Code of subject index to bibliography" which classifies the subjects covered. The next section repeats this index, listing the numbers of the references under each. Finally, there is a list of all authors quoted, with reference numbers. The last three parts of this complex cross-index are not all useful, whereas there is no way to trace a listed reference back to the paper in which it is quoted.

This is a well printed book, though some may find 10-point print small. It is printed on 10-pound coated paper, bringing its weight to almost 6 pounds.

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Chromatography Series

"Advances in . . . " are appearing thick and fast, and one wonders who buys them and what purpose they serve. The purpose, it seems, is to provide review articles more extensive than those appearing annually or biennially in technical journals, but briefer and more up-to-date than book-length monographs. The specialist will buy the standard books on his subject and keep them within easy reach. He will buy *"Advances in . . ."* for his own use only if there are articles of special value to which he will refer again and again.

The initial volume of **Advances in Chromatography**, edited by J. Calvin Giddings and Roy A. Keller (Dekker, New York, 1965. 408 pp. Illus. $14.50) contains at least half a dozen chapters that make it worth buying [the ten chapter titles were listed in *Science* **152**, 1498 (10 June 1966)]. "Teaching chromatography and electrophoresis on paper and thin layers," by Ivor Smith, is of value to the educator and especially to the teacher of biochemistry. It also gives a quick idea of what can be done with paper chromatography and electrophoresis and what equipment is used.

"The techniques of laminar chromatography," by E. V. Trutter, is a fine supplement to Randerath's book on thin-layer chromatography and is self-contained in its own right. "The stationary phase in paper chromatography," by G. H. Stewart, shows what can be done with a very complex system by combining chemical and mathematical insights. "Capillary columns: trials, tribulations and triumphs," by D. H. Desty, is an exceptionally lively and well-written essay reflecting the personal experiences of one of the most active workers in the field. The concluding paragraph recounts the investigation of coffee essence by A. I. M. Keuelmans, and is so delightful that it will be quoted many times. "Inorganic gas chromatography," by R. S. Juvet and F. Zado, has 406 references, nearly all later than 1959, and is a most valuable review of a burgeoning field.

More than half the book deals with gas chromatography, the remainder with liquid chromatography. The first chapter, by F. Helfferich, with 377 references, reviews recent advances in ion-exchange chromatography. It summarizes a lot of information, with useful periodic-table charts of distribution data, and has some general observations on elution and displacement and on concentration profiles. Helfferich has made perceptive and original theoretical contributions to this field, and I look forward to their publication.

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Techniques for Chemistry

One of the contributors to **Applied Infrared Spectroscopy** (Reinhold, New York, 1966. 576 pp. Illus. $23) quotes R. B. Woodward to the effect that "no single tool has had a more dramatic impact upon organic chemistry than infrared measurements." Few people would dispute this sweeping statement, or similar ones which have been made about the importance of infrared spectroscopy to other branches of chemistry. The infrared spectrum probably provides the greatest variety of information, on the largest number of chemical compounds, which can be obtained from a single relatively simple instrument.

Applied Infrared Spectroscopy, edited by David N. Kendall, is a collection of articles, written mostly by industrial spectroscopists, which discuss the application of infrared methods to a variety of chemical problems. As the title indicates, the emphasis is on practical industrial problems, ranging from the differentiation between East Indian and West Indian oil of nutmeg to the

detection of adulteration of horseradish with parsnip roots. Several chapters are devoted to background information on infrared instrumentation, theory of molecular vibrations, and rather general aspects of the interpretation of infrared spectra. There is extensive discussion of characteristic group frequencies and recipes for the identification of unknown compounds. Other chapters deal with applications in particular areas such as research on pharmaceuticals, polymers, essential oils and cosmetics, and coal. There is also an interesting chapter on the use of infrared spectroscopy by governmental regulatory agencies. Finally, there are a number of chapters covering specialized experimental techniques. These include microsampling techniques, attenuated total reflection, infrared plant stream analyzers, and the use of computers in spectroscopy.

The chapters on particular applications and specialized techniques are generally well written and often quite enlightening. They provide concise but comprehensive surveys and include extensive bibliographies which should be quite helpful to anyone contemplating the use of infrared techniques in these areas. Unfortunately, the chapters on background material leave much to be desired. There is considerable repetition by different authors, and even by the same author in different chapters. The organization is generally poor, and some sweeping generalizations and simplifications are made which could be quite misleading to a person attempting to learn the theory of vibrational spectra. The discussion of such a basic point as the Beer-Lambert law is thoroughly muddled, and units are incorrectly handled in several cases. The discussion of selection rules is rather confusing, particularly in that no clear distinction is made between symmetry-selection rules and harmonic-oscillator rules. There are a number of misleading statements, such as the generalization on page 7 that ionic compounds such as NaCl do not absorb infrared radiation.

This book should prove useful to many chemists in industry and government who have specialized problems which may be amenable to infrared techniques. However, it cannot be recommended as an introduction to the field of vibrational spectroscopy.

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Early Papers on Chemotaxonomy

It is a pleasure to review James B. McNair's recently published book, even though there is nothing new in it. **Studies in Plant Chemistry, Including Chemical Taxonomy, Ontogeny, Phylogeny, Etc.** (the author, 818 South Ardmore Avenue, Los Angeles, Calif., 1965. 399 pp. Illus. $12) is a reprinting of 26 papers, the first of which appeared in 1916—when I was a schoolboy—and the last of which appeared in 1945—the year in which I wrote my first paper on chemotaxonomy.

I have read most of these papers with close attention, especially those dealing with the history of chemotaxonomy, for McNair is a pioneer. He was using masses of chemical data and applying them to taxonomic problems when few botanists were showing any interest in this field. He tried to show, for example, that tropical plants differ from temperate ones in the natures of their oils, fats, and waxes (paper 3); that the types of alkaloids produced are dependent upon climate and taxonomic relationships (paper 14); and that molecular weights and the numbers of fatty acids from seeds increase with advance in evolutionary position (paper 18).

To illustrate the scale upon which McNair worked we may refer briefly to paper 9, "Some properties of plant waxes in relation to climate of habitat" (1931). For this brief paper he assembled data on on fewer than 232 waxes. He concluded, among other things, that "wax hydrocarbons, acids, and alcohols from the tropics have lower melting points, greater molecular weights, and larger empirical formulae than those of the temperate zone." Nearly 30 years later I was told by Barber (then of Tasmania) of the importance of the melting points of their leaf-waxes to the survival of *Eucalyptus* species in that southern island.

In many cases McNair tried to do the impossible: to reach major conclusions from the then inadequate data. How different would have been his task today. We may not agree with his conclusions, but we must read his papers if we are to know the history of chemotaxonomy, and it has been difficult to get hold of them conveniently. McNair has done a great service by having them reprinted in a single handy volume—a book that should be in every botanical library. One bit of criticism: there is no index.

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Civilization in the Diyala Plains

The increasing use of extra-archeological evidence, techniques, and viewpoints is an indicator of the maturing and refining of traditional archeological research. **Land Behind Baghdad** (University of Chicago Press, Chicago, 1965. 231 pp. Illus. $8.50), by Robert McC. Adams, is a superb example of what imaginative cooperation between dirt archeologists, natural scientists, and historians can produce.

With its origins going back to a routine archeological reconnaissance by Thorkild Jacobsen in 1936–37, the Diyala Basin Archeological Project of 1957–58 completed the survey of over 867 sites in the Diyala region of east central Iraq. The coordinating of data from archeological field reconnaissances, ancient textual records, aerial photographs, and geomorphological studies provides the base on which Adams traces "successive phases of advance and decline over six millennia of man's slowly changing relation to the land." The little-used technique of viewing the overall developments of a complex ancient civilization through a multidisciplinary study of one particular region within the sphere of influence of the civilization is given encouraging support by this study.

The book opens with a detailed description of the contemporary setting with its major natural variables—climate, flora and fauna, water resources—and a study of recent human settlement patterns. The second part of the book outlines the changing patterns of ancient occupation, from the formation of walled towns (4000–2100 B.C.) through the period of Islamic revival and decline (A.D. 637–1900). Probable causes for the changing configurations in settlement patterns and irrigation systems are then analyzed.

Three appendices provide the data upon which the studies are based. Appendix A describes the methods of "topographic archeology" employed. Appendix B describes the ceramic-dating criteria used for determining the