Table 1. Comparison of available stereotaxic atlases of the rat.

Atlas	Apparatus	Horizontal zero plane*	Micrographs	Accuracy
Krieg, 1946	Rat	Parallel	Drawings only	Approximately ±0.5 mm, all planes
DeGroot, 1959	Rat	10° below	Drawings only	Not stated
Massopust, 1961	Rat	10° below	Fiber	Not stated
König and Klippel, 1963	Rat	5° above	Cell and fiber	Not stated
Albe-Fessard *et al.*, 1966	Modified standard	Parallel	Cell	Anterior-posterior, ±200 μ; vertical, ±500 μ

* Plane is given as relationship in degrees to interaural-incisor bar line, with interaural line used as locus of rotation.

oratories that hitherto have worked with larger animals and would now like to work with the rat. The atlas can also be used with more specific rat apparatuses as long as the plane between the interaural line and upper rostral edge of the superior incisor bar is used as the horizontal zero.

The nuclear detail provided by the photomicrographs of Nissl preparations is excellent, and clearer than that provided by previous atlases. A corresponding myelin preparation would have complemented the atlas by more clearly portraying tracts which are inadequately seen in Nissl preparations.

A precision of diencephalic lesion and probe localization of ±200 microns in the anterior-posterior plane and ±500 microns in the vertical plane is possible if rats of the specified 200- to 300-gram weight are used.

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Plants: Chemistry and Systematics

Comparative Phytochemistry. T. SWAIN, Ed. Academic Press, New York, 1966. 374 pp., illus. $14.75.

The efflorescence of chemical approaches to plant systematics may be looked upon (botanically) as "the blossoming forth" of a new subdiscipline or (pathologically) as "a cutaneous rash" (*Funk and Wagnalls New Standard Dictionary*, 1945 edition). If the latter, the infection is apparently getting worse, for we have in the volume under review the fifth major text to appear on this subject in as many years. Interestingly enough, natural-product chemists have been mainly responsible for the continuing emphasis in this discipline. Not that taxonomists are uninterested; rather, the current practitioners are already hopelessly tied down with their own paraphernalia, data, and associated problems. A new breed of systematist is needed to cope with the array of new specialties necessary for the more meaningful chemosystematic investigations. Thus it is not surprising to find only a single systematist (V. H. Heywood) contributing to the 18 papers which comprise this volume, a compilation of the papers presented before the Phytochemical Society of England in April 1965.

Actually the book may be viewed as a somewhat thinner, second edition of *Chemical Plant Taxonomy* (Academic Press, 1963), also superbly edited by T. Swain, for about one-third of the authors are the same (Bate-Smith, Eglinton, Harborne, Hegnauer, Kjaer), and for the most part each has treated the same group of compounds he treated in the 1963 text. Consequently the editor describes the more recent contribution "as a necessary up-to-date report showing the . . . progress made in the field in the last year or so." The progress referred to (as discerned from the reports submitted by those who have contributed to both texts) has been more in the accumulation of new data than in the acquisition of new taxonomic insights derived from these data. This has been recognized by the authors themselves, and their rewrites are mostly concise (for example, Hegnauer's account of the comparative chemistry of alkaloids is remarkable for its extensive "tabular-reference list" documentation).

New contributions of considerable interest to plant systematists include those of E. A. Bell (free amino acids, mostly relating to the Leguminosae); T. J. Mabry (betacyanins and betaxanthins, relating to the Centrospermae—the data make possible a most incisive phyletic treatment); H. W. L. Ruijgrok (ranunculin and cyanogenetic compounds, relating to the Magnoliales, in particular to the Ranunculaceae); E. C. Bate-Smith and T. Swain (asperulosides and acubins, mostly relating to the Gamopetalae); and C. Mathis (hydroquinones in both animal and plant kingdoms).

Some of the papers have little or no systematic relevance, as indicated by T. W. Goodwin's account of the carotenoids ("a study of carotenoid distribution in fruit cannot have profound taxonomic significance") and H. Wagner's account of the flavonoid *C*-glycosides, in which taxonomic relevancies are not even mentioned (rightly so, for there appear to be none). One of the papers—A. H. Williams' on dihydrochalcones—is written in the vein of plant taxonomists of an earlier generation, for Williams seems preoccupied with sorting trivia, or else engrossed with raising needless questions as to a compound's presence or absence in natural populations (for example, why should "two specimens of a single species of plant [contain] two completely different phenolic compounds which have no close chemical relationships"?).

Other authors include C. Mentzer (biogenetic classification of plant constituents), J. D. Bu'Lock (biogenesis of natural acetylenes), G. Weissmann (distribution of terpenoids), and E. Percival (distribution of polysaccharides). R. E. Alston's paper, "Chemotaxonomy or biochemical systematics?", bridges the gap between Heywood's purely taxonomic purview and the more technical accounts noted above. Alston says what he has to say very well indeed; mortar of this sort is needed if chemosystematics is to become something more than lists of compounds and chromatographic spots.

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For Mathematicians et al.

Excursions in Number Theory. C. STANLEY OGILVY and JOHN T. ANDERSON. Oxford University Press, New York, 1966. 176 pp., illus. $5.

Ogilvy and Anderson aim to make the excursions they provide here "educational and entertaining . . . for the general reader who has had no more

than high school mathematics, as well as for the more advanced mathematician." It is claimed that the book "can be read once lightly for enjoyment, and a second time more seriously as an exciting mental stimulant." I did read the book once lightly for enjoyment and found it an entertaining excursion. Beginning with about page 60, I began to find things I had not known before.

There are spots which could be improved. On page 22 the authors seem to confuse a statement with its converse. In dealing with certain arithmetic progressions they lapse into the teaching role and prove results by mathematical induction which could be much more easily obtained by other means. The "monkey and the coconuts" problem can be solved with less algebra. On page 80, line 2, a multiplication sign appears instead of an addition sign. But these are minor flaws.

The important fact is that this book could be understood and read with enjoyment by the high school student having some acquaintance with algebra. The "amateur mathematician" would be fascinated by it (as a matter of fact, I know one to whom I want to lend my copy). Also there is at times the turn of phrase, the fresh approach, the new relationship which gives the mathematician pleasure even when the facts are not new. The book does not claim to be all things to all people but it is many things to many.

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Metallurgy

Alloy Phase Equilibria. A. PRINCE. Elsevier, New York, 1966. 305 pp., illus. $30.

This is an extremely well-done book. Although it is written for metallurgists, we would recommend it also to other scientists and engineers in related fields. The author's style is very readable, and the book is well illustrated.

The first two chapters outline in an unusually lucid manner almost all the most essential thermodynamic principles used in phase equilibrium and phase transformation. The author then applies those principles extensively to the construction and interpretation of phase diagrams. Many derivations of the phase diagrams from free energy curves are given. Colored space diagrams greatly help the reader to visualize ternary and other multicomponent phase diagrams.

Chapter 14 introduces the essential part of L. S. Palatnik and A. I. Landau's recent work on application of topo-analytical methods to the study of phase diagrams. This may stimulate the reader to read Palatnik and Landau's *Phase Equilibria in Multicomponent Systems* (J. Joffe, Transl. Holt, Rinehart and Winston, 1964).

The book deals only with metal systems. If the author had included discussions of some of the phase diagrams in *Phase Diagrams for Ceramists* by E. M. Levin, C. R. Robbins, and H. F. McMurdie (American Ceramic Society, 1964), it would have had even more value to nonmetallurgists.

The book discusses binary and ternary systems quite thoroughly. The higher-component systems are discussed selectively. No exercise problems are given. A discussion of recent research work on spinoidal decomposition would have improved the book.

Although its price is high, this excellent book could be used as a textbook for senior and graduate students of material science, or by professional scientists and engineers.

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Light, Reactions, and Techniques

Photochemistry. JACK G. CALVERT and JAMES N. PITTS, JR. Wiley, New York, 1966. 917 pp., illus. $19.50.

During the last 15 years photochemistry has grown explosively and has also become highly diversified and compartmentalized. Photochemists who study the reactions of simple molecules using vacuum ultraviolet light have few interests in common with those who investigate the reactions of polyatomic molecules produced by visible or near ultraviolet light. Neither group has much enthusiasm for the work of organic chemists who use photochemical techniques as a method of organic synthesis. The author of a work on photochemistry must decide whom he wishes to address. He must also decide whether his book is to be a text for beginners, an introductory monograph for physical or for organic chemists, an advanced monograph for specialists, or an encyclopedia of published results.

The present volume appears to be the result of an attempt to embrace most of these diverse and partially incompatible aims. The book includes, in chapter 1, an introduction to the "wave and particle properties of light"; in chapters 2 and 3, discussions of the spectroscopic properties of atoms and diatomic molecules; and in chapter 6, outlines of the collision and transition-state theories of reaction rates. This material is clearly and well written, but is all readily available in standard textbooks. It occupies 180 pages—nearly a quarter of the entire volume.

Chapter 4, entitled "The primary photophysical processes of polyatomic molecules," contains an excellent account of that rapidly developing subject. Much of this information has not previously been brought together in any one place.

More than 100 pages of chapter 5 are devoted to an encyclopedic listing of published studies of decompositions of aldehydes, ketones, esters, amines, and other compounds. For many of these reactions, the mechanisms postulated by the original authors are briefly stated. Usually, no convincing evidence is cited in support of them, but they are followed by statements such as "most investigators agree," "by analogy with," or occasionally by "again it is difficult to differentiate between. . . ." The chapter is followed by a list of 759 references.

In chapter 6 it is correctly stated that detailed, systematic measurements of the quantum yield as a function of the concentrations, temperature, wavelength, and intensity are essential for the determination of reaction mechanisms. Unfortunately, the order of presentation and the amount of space devoted to the several topics is likely to leave the young-man-in-a-hurry with his opinion unchanged that analogy, prejudice, and one critical experiment are enough to "prove" any mechanism.

The chapter on experimental methods should be required reading for all beginners in the field. It contains some new unpublished material which is of value to the expert as well as the neophyte.