could have confused the Paliau movement with a cargo cult. Much of the effort of the Paliau movement was devoted to ideological combat with a cargo cult which, for a time, competed with Paliau's movement for adherents. The Paliau movement is, in fact, the best documented single case of a Melanesian revitalization movement in the anthropological literature: yet it receives only 11 inaccurate lines in a 39-page chapter devoted to "messianic movements in Melanesia."

It is distressing to see the scientific significance of this subject matter diminished by the sloppiness of some of the work devoted to it. Let us hope that future comparative works in this area emulate the studies by Schwartz and Wilson, not the one by Lanternari.

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Plant Taxonomy

Biochemical Systematics. Ralph E. Alston and B. L. Turner. Prentice-Hall, Englewood Cliffs, N.J., 1963. xii + 404 pp. Illus. $13.25.

The more we learn about biology the more we find out that all creatures contain the same basic components. This is bad for biochemical systematics. However, we have also learned that there are special compounds, de luxe equipment, nonessential to the welfare of the plant, which are peculiar and unique to an individual species, a group, a genus, or a family. It is these nonubiquitous materials, these compounds produced at the plant's whim rather than for its essential well-being, that constitute the subject matter of plant biochemical systematics. Among these nonessential and nonubiquitous compounds are numerous very interesting materials: amino acid derivatives not contained in protein, the alkaloids, the cyanogenic glycosides, phenols of various kinds including the anthocyanins and anthoxanthins, quinones, terpenes, carotenoids of various kinds, tannins, isothiocyanates, and various odd organic acids. It is with these groups that Alston and Turner are primarily concerned in this pioneer volume. Overall, the reader must conclude that biochemistry is not yet a powerful tool for the systematician. It is true that biochemical diagnosis can distinguish *Pinus jeffreyi* (heptane) from *Pinus ponderosa* (pinene and limonene), a classical case of biochemical systematics which we owe to Mirov, and one can distinguish the algae, which contain no anthocyanins, from any plant which contains an anthocyanin, of which there are many. In general, however, the present volume provides an orientation, rather than a key. The authors guide the systematic botanist toward the groups of compounds and the groups of plants in which biochemical diagnoses may be useful.

The first five chapters constitute an introduction to the subject (regrettably on an elementary level), apologetics for taxonomy, the history of plant taxonomy, the history of biochemistry, some discussion of the evolution of metabolic pathways, and some discussion of the history of the application of immunochemistry to plant systematic problems. The next nine chapters are concerned sequentially with the nonprotein amino acids, fatty acids, sugars, alkaloids, cyanogenic glucosides, phenols, quinones, terpenes, and miscellaneous compounds such as carotenoids, the betacyanins, tannins, lignins, isothiocyanates, and the organic acids. Of these groups of compounds, the phenols, including the anthocyanins and anthoxanthins, the terpenes, the betacyanins (nitrogen containing cyanine-type colored compounds), and the isothiocyanates appear to have the most power for taxonomic purposes, have received the most attention in past investigation, and deserve the most future investigation. In the cases of the anthoxyanins and of the terpenes, not only can one distinguish between species by chemical analysis alone, but one can also determine whether a putative hybrid is in fact a hybrid, since the hybrid in general contains the chemical components characteristic of both parent species.

Chapter 15 includes an overall summary of Turner and Alston's work on the biochemical taxonomy of the species of *Baptisia* and their hybrids. The method adopted in this study is that of fingerprinting; a whole cytoplasmic extract is subjected to paper chromatography, two dimensional, and we determine what compounds are not common to two individuals or species. By the same method, we determine which individuals are hybrids of which parents; all of this is accomplished without any chemical identification of the compounds involved. As an interim method, in the absence of biochemical sophistication, the fingerprint technique may well prove to be a valuable tool in the service of plant taxonomy. Chapter 16, evaluation, brings out a few of the broad generalizations of biochemical genetics. For example, it would be surprising to find an anthocyanin in a member of the Chenopodiaceae. This family contains betacyanin, and betacyanin and anthocyanin appear to be mutually exclusive.

The present volume brings together in a systematic fashion the facts of the distribution in plants of nonessential metabolites, and it lays the groundwork for the application of biochemical analysis to plant taxonomy. It is not an evaluation of a finished topic. Rather, in praiseworthy fashion, it lays the groundwork for the intensive application of classic tools of chemistry in the service of plant taxonomy.

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Descriptive Astronomy

Pictorial Astronomy. Dinsmore Alter, Clarence H. Cleminshaw, and John G. Phillips. Crowell, New York, ed. 2, 1963. viii + 312 pp. Illus. $6.95.

Extensively revised since its first appearance 15 years ago, and with a new and third author, *Pictorial Astronomy* offers a brightly written and reasonably comprehensive story of the skies, a wealth of carefully selected and fresh photographs, and a glossary that leads the reader from aberration to zodiac. The book aims essentially at the interested lay reader, and it seems to me that the aim is fairly true. What is more, the book covers the field completely enough to serve as a good companion for one who is taking a first descriptive course in astronomy. There is neither extended mathematical analysis nor elaborate discussion of physical concepts, but one finds a number of tables crammed with useful numerical data.

The major subject headings are sun, earth, moon, eclipses, planets, comets and meteors, and stars and nebulae—an organization that is identical with that of the first edition. Following these