often obscured rather than elucidated by the sample print-outs. In trying to purify the lists by eliminating all except "operative" names, Gould is making a serious mistake. In the algae, at least, yesterday's taxonomic synonym is likely to become tomorrow's accepted name. Flowering plant taxonomy, while not as fluid, is surely not sufficiently static to guarantee a long life of usefulness for any list of accepted names. Although every name must be assigned a taxonomic position in order for retrieval to be meaningful, all names must be entered equally if the index is to serve as a universal tool. For use by specialists or regional botanists, on the other hand, the basic index may be modified and enriched by programming any amount of taxonomic opinion or other types of information desired.

A critical aspect of Gould's project is the preparation of entries for coding, as the output of a computer is only as accurate and as comprehensive as its input. Bearing in mind the enormous amount of scholarly research that has gone into the preparation of the Index Nominum Genericorum (21,000 printed cards to date) and the Index Nominum Algarum (more than 130,000 entries so far), one can see that collaboration of many taxonomists is essential if the task is to be completed. Now is the time to put our ledgers in order, once and for all, with allowance for the correction of past errors at any future time; now is also the time to establish a standardized and computerized system of bookkeeping for future additions to our vast store of taxonomic documentation. The International Bureau for Plant Taxonomy and Nomenclature at Utrecht is the logical place for centralized data processing; it must be given greater responsibility, power, and support. Gould should be commended for his self-sacrificing and persistent efforts to develop the computerized index. At the same time, it seems clear that the project would benefit greatly from constructive criticism, if such were to be offered by the community of taxonomists.

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Illinois Biological Monographs, No. 34

In preparing **A Monograph of Lemnaceae** (University of Illinois Press, Urbana, 1965. 118 pp. Paper, $3.50; cloth, $4.50), the author, E. H. Daubs, presents an excellent summary of the suspected phylogeny within the family and possible relationships with other taxa. The diverse interpretations of the vegetative "frond" of the duckweeds, especially with respect to the origin of lateral pouches and their enclosed meristems, are adequately reviewed on an anatomical basis.

The author gives no indication, even in the bibliography, that this monograph is based wholly on his Ph.D. dissertation completed in 1962. In fact, the citation of abbreviations from the 1964 edition of *Index Herbariorum* creates the impression that the systematic treatment of duckweed taxa represents an up-to-date summary. Such is hardly the case in light of the chromatographic analysis of the Lemnaceae undertaken by J. W. McClure at the University of Texas and the growth-response analysis of *Spirodela* taxa undertaken by D. E. Harrison at North Carolina State University, both of which were available in thesis form prior to 1965. Furthermore, pertinent papers, published both before and after 1962, have somehow escaped inclusion in the bibliography. Thus, the data and concepts of duckweed taxonomy developed within recent years have not been considered by the author in his delineation of duckweed genera and species. We must, therefore, consider his systematic treatment in terms of the information available prior to 1962.

In this context, Daub's delineation of duckweed taxa is admirable from a typological point of view, especially since the duckweeds are extremely difficult, if not impossible, to identify from dried specimens, and it does provide an illustrated record of gross variability within the family, along with worldwide distribution data. His frequent use of quantitative (and overlapping) terminology, in keys and descriptions, does somewhat nullify the statement that " . . . identification can generally be readily made by following the keys presented herein. . . ." The following statement adds additional doubt about the accuracy of the taxonomic treatment: "These two species [*Lemna minima* and *L. valdiviana*] do, however, intergrade in form and in flowering and fruiting characteristics. . . ." Furthermore, the statement that "No one has seriously questioned the generic status of *Spirodela* since its establishment by Schleiden [1839] . . ." is certainly in error because several botanists [for example, A. R. Clapham and others, in *Flora of the British Isles* (1962), and R. W. Butcher, in *A New Illustrated British Flora* (1961)] seriously consider the genus *Lemna* to include the taxa often segregated under the genus *Spirodela.* These are matters of subjective evaluation, however, and Daubs has presented his systematic treatment of the family in a form that is more inclusive and as realistic as any presently available.

It is unfortunate that the author chose to ignore approaches to duckweed taxonomy completed between 1962 and 1965. Had brief reference to these approaches been made, even as a postscript, the reader of the 1965 monograph would not be lulled into the typological complacency so typical of this and many other monographs. At least, the reader could take with a grain of salt one of the author's " . . . more significant findings . . . [that] . . . the validity of determining species primarily on the basis of vegetative structures is examined and accepted."

Despite obvious faults, this monograph contains sufficient information on the anatomy, phylogeny, and distribution of the duckweeds, and on the literature, to be of considerable reference value to students of duckweed taxonomy.

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Nucleic Acid Research in India

The following statement is made on the flyleaf of this book, **Nucleic Acids: Structure, Biosynthesis, and Function** (Council of Scientific and Industrial Research, New Delhi, India, 1965. 372 pp., $6), " . . . the primary objectives of the symposium were to provide an opportunity for a close and informal contact between workers on nucleic acids in India and abroad; to take stock of the work being done in this field in India in the context of the extensive investigations being carried out else-

where; and to emphasize that this field, like other important areas of research in modern biology, provides a meeting ground for many, varied disciplines."

In this context the symposium, which was held in Hyderabad in 1964, appears to have been a success. The 12 papers from laboratories in India cover DNA and RNA metabolism in plant, animal, and microbial extracts, metabolic regulation, virology, and genetic mechanisms, and the role of hormones in regulation of RNA synthesis. They provide an informative survey of India's very commendable contributions to this rapidly advancing field.

The 19 papers by guests from six countries also cover a wide range of topics. Fully half of the papers explore questions that remain unanswered 2 years after the symposium. The bold attacks on these questions illustrate that the participants were leaders in their fields. It is unfortunate that the discussions were not included in this book. The lack of an index also detracts from the book's usefulness.

The book has value as a broad collection of exploratory, speculative, and review papers that range from 3 to 24 pages in length. The reviews of codon composition (by Lengyel and others), of the molecular basis of crossing-over (by Siddiqi), and of the translation of genetic information into proteins on polysomes (by Rich), and the paper on the design of pyrimidine antimetabolites (by Heidelberger) are likely to be useful to both student and researcher for some years to come.

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Cyrtandras on Oahu, Hawaiian Islands

Cyrtandra is the largest genus of Gesneriaceae and one of the great genera of the southeast Asian–Pacific region: there are perhaps 600 species. In 1883, C. B. Clarke recognized 167 species in the entire genus; there has been no general treatment since. Regional revisions are difficult enough, and the long delayed publication of Harold St. John's important **Monograph of Cyrtandra (Gesneriaceae) on Oahu, Hawaiian Islands** (Bishop Museum Press, Honolulu, 1966. 469 pp., $12) is very welcome. On this one island he recognizes 118 species. Of these 51 were published by St. John and Storey in 1950: even so St. John now adds another 41 species. This huge increase completely upsets all figures given previously for endemism in the Hawaiian flora. For instance Symkiewicz [*Act. Bot. Soc. Polon.* **15**, 15 (1938)] gave the total endemics for Oahu as 72, and his figures included only 12 species of *Cyrtandra.*

Inevitably plant geographers and others will ask if St. John's concept of a species is not unduly narrow, though the author explicitly states that these are linnaean species, not jordanons (p. 27). Judgment in these terms seems premature when no less than 53 of the 118 species accepted are based on a single collection. Local diversity is indicated by the occurrence of between 20 and 30 species in 4 of the 18 areas recognized. If anyone studies the Hawaiian *Cyrtandra* after working on those of Malaysia, he will be less surprised by these figures than botanists concerned with better known floras. The figures are, in fact, quite comparable to those likely to be given soon for Borneo. However there is one major difference that makes a strong impression: *Cyrtandra* in Borneo embraces a far wider range of form, especially in habit and in flower-size and color, than it does on Oahu. Other lines of variation, such as those resulting in connate bracts, horned calyces, and unusually long fruits, are repeated in both areas, though without any close affinity between the plants concerned.

The cytological information (contributed by W. B. Storey) shows that the 9 species examined have 34 somatic chromosomes. This number has now been found from Hawaii and Tahiti westwards to the Malay Peninsula. In so diverse a genus this is striking uniformity, and it goes right across the sharp change in fruit structure which was pointed out by H. B. Guppy many years ago. All species west of the Solomon Islands have hard green crustaceous fruits; all those eastward have fruits that become white and softly fleshy at maturity. Is this a better criterion for two subgenera than the persistence or otherwise of the calyx (used by C. B. Clarke, who is followed by St. John)? It may be convenient to split the Hawaiian species on the calyx, but it is certainly quite misleading to suggest that *Cyrtandra* has just these two subgenera and that both occur in Hawaii. Subgenera and sections as used in this revision are each probably one taxonomic rank too high in relation to the rest of the genus.

The production of this volume is very good. The author's meticulous descriptions are reinforced by some first class illustrations by Florence Meekel and Hung Sun Lau. These do not, however, support St. John's statement (p. 9) that the stigmas "all seem similar in Hawaii" (compare Figs. 64 and 174, for instance), and one would like to have a more critical study of this feature. Great attention has also been paid to mapping the distribution of sections and species. In fact we have been given a first-rate, formal, taxonomic monograph. *Cyrtandra* may not be an ideal genus for experimental work, but research into the difficulties of propagation, culture, and cytological examination should certainly be put in hand. In these highly localized Oahu *Cyrtandra,* studies of the complete populations of many species should now be possible. Some species may prove to have been too finely drawn, but to have stimulated such research would be St. John's real reward.

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Botany

The author, William D. P. Stewart, indicates that this book, **Nitrogen Fixation in Plants** (University of London Press, London, 1966. 180 pp., 25s.), was built around a series of lectures given to undergraduate botany students. As such, it constitutes a rather short but at the same time sufficiently comprehensive review of the field for anyone except the specialist. References well into 1965 are included, but proper weight has also been given to the older references upon which current developments are based.

The story of nitrogen fixation is introduced with a brief historical account which precedes a discussion of pertinent methodology employed in research. The author then devotes three chapters to symbiotic nitrogen fixation. The process of infection of leguminous plant roots and nodule formation includes references to recent work with electron microscopy which has