Pacific Science (1990), vol. 44, no. 3: 265–276

Identity of *Aralia bastardiana* Decaisne[1]

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ABSTRACT: *Aralia bastardiana* Decne., since its written description in 1864 [as *Panax bastardianus* (Decne.) Decne.] thought to be from Tahiti but never recollected there, is considered almost certainly to have been collected in the Marquesas. It is identical to *Cheirodendron marquesense* F. Brown, the name by which the Marquesan *pimata*, the only species of the genus outside the Hawaiian Islands, is usually known. A new combination, *Cheirodendron bastardianum*, is therefore made. Spirally arranged leaves, seemingly exceptional in *Cheirodendron* but depicted on the main shoot in Decaisne's illustration of *Aralia bastardiana*, also occur in juvenile plants and on reversion shoots of Hawaiian species, at least in *C. trigynum* subsp. *helleri* and *C. platyphyllum* subsp. *kauaiense*. A list of localities and specimens seen of *C. bastardianum* is given.

A WORLDWIDE STUDY of *Schefflera* (Araliaceae), which I have had in progress since the late 1960s, has amongst other problems involved a reconsideration of the limits of the genus (Frodin 1975), related genera, and re-identification of much wrongly named material. I have also taken the opportunity to examine other, less closely related taxa of Harms' tribe Schefflereae (properly named Plerandreae Benth., prior by 27 years) with palmately or digitately compound leaves, including the Pacific Basin genera *Pseudopanax* and *Cheirodendron*.

Pseudopanax was last reviewed by Philipson (1965), but revisions of *Cheirodendron* (Sherff 1954, Herat 1981, Lowry 1986) have concentrated on the Hawaiian species with, usually, only passing reference to the single known extra-Hawaiian member, *C. marquesense* F. Brown. In this paper I shall examine *Cheirodendron* outside the Hawaiian Islands, giving special attention to the enigmatic, allegedly Tahitian *Aralia bastardiana* Decaisne, and introduce some observations on phyllotaxis in *Cheirodendron* that I believe can aid in interpretation of this plant as well as the genus as a whole.

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Cheirodendron OUTSIDE THE HAWAIIAN ISLANDS

Aralia bastardiana (Panax bastardianus): *Its Identity*

The taxonomy of Pacific Araliaceae has been noteworthy for a goodly number of seemingly imperfectly known species. Many of these were based on juvenile plants, which in the region often differ markedly in foliage from adults and whose distinctive features, including variegated stems and foliage, won them great popularity in the second half of the nineteenth century (Hadfield 1969:314–342). Attempts have been made to identify them (Viguier and Guillaumin 1912, Lowry et al. 1989).

Some of the enigmas, however, remain. The most outstanding is surely *Aralia bastardiana*, to which (as *Panax bastardianus* Decne.) Philipson (1965) drew attention. He did not, though, go beyond giving 1846 [correctly 1864, when the description, to which Philipson actually refers, was published] as its date of publication and saying "[it] appears ... to belong to *Pseudopanax*, but I have been unable to locate any specimen of it."

Decaisne's description of *Panax bastardianus* (Decaisne 1864) appeared, however, at least nine years after its illustration (pl. 18; reproduced here as Figure 1) in the botanical

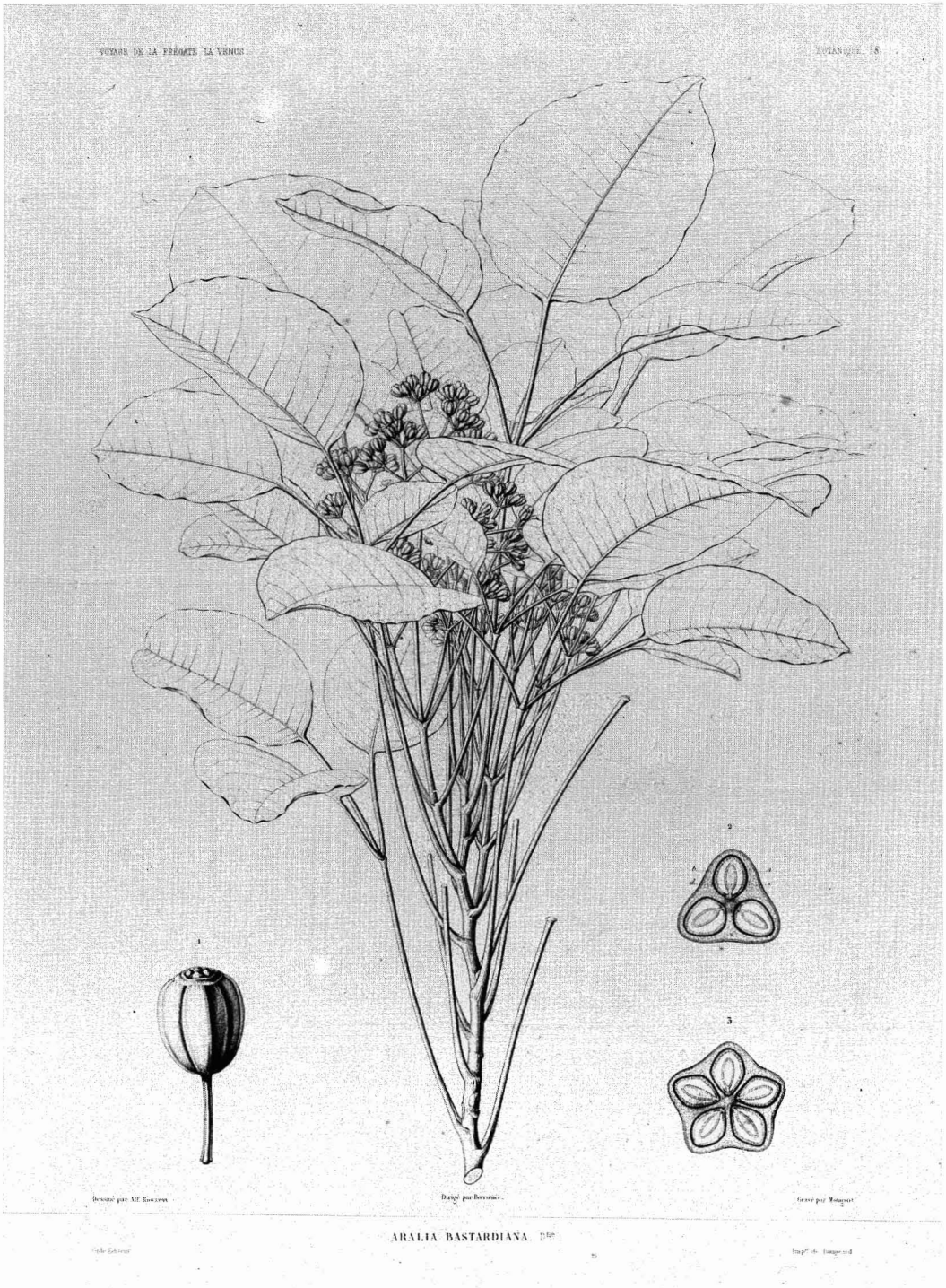

FIGURE 1. *Aralia bastardiana* Decne. Illustration from Voyage de *La Vénus*, Botanique: Atlas.

atlas of the voyage of *La Vénus* (Decaisne 1846 [1855]). The plate, bearing the name *Aralia bastardiana*, includes analyses of the fruit along with a fertile spray. Under current and recent editions of the Botanical Code (cf. Greuter et al. 1988) it is validly published and the name thus has priority over *Panax bastardianum* (sic) as used in the 1864 protologue and by Drake del Castillo (1890, 1893). Priority may indeed date to 1846, but this in fact is based on a not wholly substantiated belief that the plate appeared in that year; the more usually accepted date has been 1855 (Sherborn and Woodward 1901, Stafleu and Cowan 1976). In any case, it is clear from the plate alone that *Aralia bastardiana* (= *Panax bastardianus*) is a species of *Cheirodendron*—a genus not otherwise reported from Tahiti.

The Whereabouts of Aralia bastardiana

In his 1864 protologue, Decaisne acknowledged no collections but claimed the species to be from the mountains of Tahiti, with the local name of "pimata." Only late in the nineteenth century did Drake del Castillo (1890:181; 1893) formally credit this species (as *Panax bastardianum*) with two collections, one as "Lépine" and the other as "du Petit-Thouars 62." Like Decaisne, Drake considered this species as Tahitian. Both these collections had to have been made before 1850; Abel Aubert du Petit-Thouars first visited southeastern Polynesia, including both the Marquesas and Tahiti, in 1838 during his 1836–1839 world voyage as commander of *La Vénus* (Aubert du Petit-Thouars 1840–1843) and again in 1842 as head of a 13-ship annexation squadron (Danielsson 1957), and Jules Lépine was in Tahiti in 1847. The species was named after Le Bâtard, who visited the islands in 1844. No other collections from Tahiti were, however, recorded during the remainder of the nineteenth century, nor have I found any references in the literature apart from those of Drake. Not even Nadéaud (1873), who otherwise accounted fully for the known Tahitian araliads, including observations from sites as high as 1000 m where *Cheirodendron* might resonably be expected, mentions *Aralia bastardiana*.

Even in the present century *Aralia bastardiana* did not turn up in the Society Islands, despite much collecting activity since 1920. F. Raymond Fosberg (in litt., 10 March 1976) noted that it had not been seen in Tahiti by such botanists as M. L. Grant, H. St. John, L. H. McDaniels or himself; and in his florula Setchell (1926) makes no reference to it either. Papy (1951–1954:317-318) listed it merely as part of a biogeographic review of the flora. Because trees of at least some species of *Cheirodendron*, including *C. marquesense* F. H. Brown, are fairly conspicuous by virtue of their aspen- or poplarlike leaflets (Figure 2), I conclude that it is not, and was never in recorded history, present in Tahiti. Where, then, is it from?

Cheirodendron *in the Marquesas*

In 1935 Forrest Brown, as part of his flora of southeastern Polynesia, described as new *Cheirodendron marquesense* from the Marquesas Islands, in the northern part of present-day French Polynesia (Brown 1935:207). He, as some (cf. Gillett 1972) have since, considered it allied to *C. platyphyllum* (Hook. & Arn.) Seem., the *lapalapa* of O'ahu and Kaua'i in the Hawaiian Islands. Gillett also claimed that its presence in the Marquesas was the result of a dispersal event or events from Hawaii. The collections on which it is based were made in the early 1920s during the first major American biological surveys in the Marquesas (Sachet 1975). Further collections were made later in the 1920s and again after 1970, as indicated in the list of exsiccatae given below. It occurs as a small tree or shrub scattered at altitudes of some 700 to 1200 m on the six larger, higher islands. All plant parts exude a strong odor when broken. Francis Hallé (1978:343) briefly mentioned its role as a constituent of Marquesan montane forest vegetation, and Gillett (1972) gave its main associates.

The Collections of Aralia bastardiana

The work of Forrest Brown (and his wife, Elizabeth) on the Marquesan flora was based almost entirely on resources available at the

FIGURE 2. *Cheirodendron platyphyllum* (Hook. & Arnott) Seem, subsp. *kauaiense* (Krajina) Lowry; near Pihea, Kaua'i.

Bernice P. Bishop Museum in Honolulu (Sachet 1975:2–3) and coincided with a period of virtually total neglect of the region by French botanists (Papy 1951–1954). A renewal of French interest in Polynesian floristics, however, developed during the 1960s, and in connection with this Nicholas Hallé undertook a general reorganization of the Oceanic herbaria in the Laboratoire de Phanérogamie at the Muséum National d'Histoire Naturelle in Paris. This enabled me in 1973 to locate therein the original materials used by Decaisne and Drake.

The two collections proved to be labeled as follows:

> (a) "(Tahiti-Lépine)?" This sheet had been in Drake del Castillo's herbarium.
> (b) "62 pii mata" (in heavy ink); and, on a separate slip in a different hand, "No. 62. pii-mata. Arbriseaux très odorant croissant sur les hautes montagnes." There is no locality or collector given, but of the several sheets still extant the fruiting one clearly presents itself as the basis for the published atlas plate. The sheet was identified by Decaisne as *Aralia bastardiana*.

If the first of these is attributable to Lépine, then the second must be that attributed by Drake to du Petit-Thouars. As already noted, Aubert du Petit-Thouars actually was in the Marquesas twice, in 1838 and 1842, and thus could have gathered the latter collection. This would more likely have been in 1842, for on his first visit, in *La Vénus*, he made land contact for only five days (on Tahuata) and there is no evidence that any interior exploration was made. Le Bâtard, after whom the species was named, visited the archipelago in 1844, including Nuku Hiva, where *Cheirodendron marquesense* was found in 1922 on the Whitney expedition, and did indeed collect (cf. Sachet 1975:6). I am still unsure, however, who *really* obtained the specimen. I have not undertaken a survey of handwritings across a representative range of contemporary southeastern Polynesian collections, and very few, if any, guidelines were ever published by the late Marie-Hélène Sachet. In any case, there is no doubt in my mind that the fruiting element of "No. 62" served as the basis for Decaisne's plate, and I hereby designate it the lectotype.

The collection attributed to Lépine was in Drake del Castillo's private herbarium at the time he prepared and published his regional floras. This large herbarium was acquired by the Muséum National d'Histoire Naturelle only in 1913 (Stafleu 1967:113). Drake's herbarium in turn incorporated several earlier private herbaria, including that of the Caen botanist Sébastien-René Lenormand, who had an interest in the Pacific flora and actively corresponded with collectors in New Caledonia, French Polynesia, and elsewhere. Among these was surely Jules Lépine, who as already noted visited Tahiti in 1847. He did *not*, however, visit the Marquesas and, if the specimen was really his, he must therefore have acquired it from someone else.

I have also seen one further nineteenth-century specimen of *Cheirodendron* attributed to Tahiti. Never documented in the literature, this collection is by N. J. Andersson, a member of the Swedish exploring expedition on board the frigate *Eugénie* (cf. Skogman 1854–1855, 1856), and dates from 1852 (in herb. S). The localities are, however, reputedly not trustworthy (Steenis-Kruseman 1950:16). Although the expedition did visit Tahiti, this was after a nonstop voyage from Honolulu in Hawaii. As the specimen represents *C. platyphyllum*, I supect its origin was misconstrued.

The Identity of Aralia bastardiana *and* Cheirodendron marquesense: *The Evidence*

A morphological comparsion of available material of *Aralia bastardiana*, particularly "Du Petit-Thouars 62," and of collections of *Cheirodendron marquesense* shows no substantive differences, certainly not in leaflet characters or in the fruit. The venation depicted in the plate of *Aralia bastardiana* and in the available specimens of Brown's species match, as do inflorescene and fruit characters.

Further evidence for the identity of *Aralia bastardiana* and *Cheirodendron marquesense* is supplied not only by their respective recorded habitats and smells but also by their

vernacular names: "pii-mata" on the original collection, "pimata" in Drake (1893:80), and "pimata" in Brown (1935:207), who added that this name is used "throughout the Marquesas" by the local people to whom the plant is well known.

Other differences between Decaisne's and Brown's taxa are not apparent, and I therefore consider *Aralia bastardiana* and *Cheirodendron marquesense* synonymous. The necessary new combination is presented below. One seeming anomaly, however, remains: the spiral phyllotaxis in the main axis of *Aralia bastardiana*. I deal with this below.

PHYLLOTAXIS IN *Cheirodendron*

In seeming contrast to other *Cheirodendron* species as presently documented, including *C. marquesense*, the main axis of the lectotype of *Aralia bastardiana* has spiral phyllotaxis. Only the short fertile axillary shoots exhibit decussately opposite leaves. In contrast, descriptions of *Cheirodendron* species, and those at generic level (e.g., Harms 1894–1897, Hutchinson 1967), refer exclusively to opposite leaves.

Cheirodendron in the Marquesas has been little studied in the field, save for indications by collectors as well as observations (Warren L. Wagner, pers. comm.) that the leaves in more mature plants may have three to five leaflets. On a visit in May 1988 to Kaua'i, Hawaii, the main center of diversity in the genus, I was, fortunately, able to make some observations that cast some light on the problem of phyllotaxy. In both *C. trigynum* (Gaud.) A. Heller ssp. *helleri* (Sherff) Lowry and *C. platyphyllum* (Hook. & Arnott) Seem. spp. *kauaiense* (Krajina) Lowry [taxonomy follows Lowry (1986)]—trees of frequent occurrence along the ridge beyond Pu'u o Kila towards Pihea at around 1250 m—the main stems had, in early stages of growth, spirally arranged leaves. The spiral, or helical, arrangement is present during the juvenile phase (Figures 3, 4) and, in *C. platyphyllum* at least, reversion shoots (Figure 5). Indeed, the spatial disposition of axis and lateral shoots in the meter-high sapling of *C. trigynum* illustrated in Figure 3 is strikingly like that shown in the plate of *Aralia bastardiana*. Transition to the adult state takes place relatively quickly, as shown in Figure 4.

No information is, however, available regarding such a change in the Marquesan species, or whether it occurs at all. As in the plants observed near Pihea, the leaves in flowering shoots in available herbarium material of *C. marquesense* (along with the type of *Aralia bastardiana*, *Anonymous 62*) are opposite. The latter specimen, and apparently also *PES 43* from Hiva Oa cited below, may have been made from compact bushy plants that flowered for the first time precociously, causing the transition to be preserved and, for *Aralia bastardiana*, figured. More study in the Marquesas is needed. In any case, from the evidence presented I conclude that *Cheirodendron* species in the juvenile state exhibit the spiral (helical) phyllotaxis common to other Araliaceae, but rather early in their life history, or in the continuing growth of early axes or reversion shoots, the leaves become opposite. On lateral and succeeding shoots they are always so, save in trunk and branch suckers. This transition appears not previously to have been described; neither Rock (1913) nor Herat (1981) mentions it.

SYSTEMATIC TREATMENT

Cheirodendron bastardianum (Decaisne) Frodin, comb. nov.

Aralia bastardiana Decaisne, 1846 (1855). Voy. Vénus, Bot.: Atlas, pl. 18. Type: *Anonymous 62* (attributed by Drake del Castillo to Aubert du Petit-Thouars), without place or date (P; the fruiting sheet is the lectotype, here designated). Cheek (1989) has argued that, in a departure from past practice, the 1988 *Code* provides for acceptance as holotypes of plates unaccompanied by text in the absence of a definitive designation of a specimen by the author of a name, even where the link between plate and specimen cannot be established. If this argument is followed, then the published plate of

FIGURE 3. *Cheirodendron trigynum* (Gaud.) A. Heller ssp. *helleri* (Sherff) Lowry; juvenile plant, by Pu'u o Kila, Kaua'i.

FIGURE 4. *Cheirodendron platyphyllum* (Hook. & Arnott) Seem. subsp. *kauaiense* (Krajina) Lowry; juvenile plant, near Pihea, Kaua'i.

FIGURE 5. *Cheirodendron platyphyllum* (Hook. & Arnott) Seem. subsp. *kauaiense* (Krajina) Lowry; reversion shoots, tree on Pihea, Kaua'i.

Aralia bastardiana becomes the holotype; designation of a specimen as lectotype is superfluous.

Panax bastardianus (Decaisne) Decaisne, 1864. Voy. Vénus, Bot. 5(2): 24 ("bastardianum"). Based on *Aralia bastardiana* Decaisne.

Cheirodendron marquesense F. Brown, 1935. Bull. Bernice P. Bishop Mus. 130: 207. Type: *F. Brown 878,* Hivaoa, 1921 (BISH, lectotype here designated; one of two syntypes cited by Brown [1935]).

ADDITIONAL SPECIMENS EXAMINED: I thank Warren L. Wagner, Smithsonian Institution, for communicating information about the records from Tahuata. I have seen all others listed here. Herbarium acronyms are as defined in *Index Herbariorum* (Holmgren et al. 1981).

Fatu Hiva: Omoa, about 950 m, 11 January 1922, *F. Brown 892* (BISH; cited by Brown 1935); base of Mt. Natahu, on leeward side of ridge, 797 m, 3 August 1977, *S.L. Montgomery in B. Gagné 1270* (BISH); Punapai-Tekou Summit, ±1000–1100 m, 25 July 1988, *Montgomery in Wagner 6194* (W. L. Wagner, pers. comm.).

Tahuata: région du sommet [Mt. Pahio, c. 950 m], 17 March 1973, *F. Hallé 2180* (US); au dessus de Hamatea, sur la crête centrale de U'ua'o, 850 m, 31 May 1975, *J.-C. Thibault 85* (MO).

Hiva Oa: Feani, about 1000 m, 25 December 1921, *F. Brown 878* (BISH; cited by Brown 1935); Mt. Ootua, 2775 ft., 1922, *Quayle 1334* (BISH); above Atuona, 700 m, 1929, fr., *PES 43* (BISH); north side of Mt. Temetiu, about 1100 m, 23 March 1929, *PES 137* (BISH); Mt. Ootua, 920 m, 10 May 1929, *Adamson & Mumford PES 385* (BISH); ibid., about 920 m, 9 October 1930, fr., *Le Bronnec PES 385[bis]* (BISH); Mt. Feani, trail from Atuona to Hanamenu, 1200 m, 11 February 1975, fl., *Oliver & Schaefer 3115* (US); montagnes NW du Temetiu, crête au SE du campement, N de la haute vallée de Hanamenu, 22 October 1975, *Schaefer 5903* (US); Mt. Ootua, summit, 900 m, 29 July 1977, *B. Gagné 1212* (BISH).

Ua Pou: without precise locality, 1000 m, 9 September 1922, *Quayle 1147* (BISH; cited by Brown 1935).

Ua Huka: without precise locality or indication of altitude, 9 November 1922, *Quayle 1786* (BISH).

Nuku Hiva: without precise locality, about 900 m, 20 September 1922, *Quayle 1200* (BISH; cited by Brown 1935 as *Quayle 1334*); Hakaui side, 3500–3750 ft., 1922, *Quayle 1260* (BISH); without precise locality, 20 September 1922, *Quayle 1281* (BISH); Tovii [To'ovi'i] Valley, 900 m, 3 July 1970, *Gillett 2151* (BISH; stated as being similar to *Cheirodendron platyphyllum* of Hawaii); spur of Mt. Ooumu, Tovii [To'ovi'i] Plateau, above 795 m, July 1977, *B. Gagne 1044* (BISH); same locality, above 900 m, July 1977, *B. Gagné 1068* (BISH); eastern part of To'ovi'i Valley, 1000 m., 16 July 1988, *Wagner 6091* (W. L. Wagner, pers. comm.).

Island not indicated: "arbriseaux tres odorant croissant sur les hautes montagnes," without date [1840s], *Anonymous* ("du Petit-Thouars") 62 (P); "Tahiti," without date, *?Lépine s.n.* (P).

DISTRIBUTION AND HABITAT: Fatu Hiva, Hiva Oa, Tahuata, Ua Pou, Ua Huka, and Nuku Hiva in the Marquesas Islands. On high slopes, ridges and plateaus at altitudes of 700–1200 m or perhaps more. Reportedly occasional to very frequent or in groves in wet scrub; a constituent of the "forêt montagnarde" (Hallé 1978).

ACKNOWLEDGMENTS

I thank Drs. P. van Royen and S. H. Sohmer for providing facilities for the examination of *Cheirodendron* and other Araliaceae during visits to the Bernice P. Bishop Museum in Honolulu, as well as the Department of Botany, Smithsonian Institution, and the Laboratoire de Phanérogamie, Muséum National d'Histoire Naturelle, Paris, for access to relevant material. Dr. David Lorence of the Pacific Tropical Botanical Garden in Kaua'i, as my host there in May 1988, organized my trip to Koke'e and Pihea. Drs. F. R. Fosberg and W. L. Wagner kindly provided additional information. Completion of the study was made possible with the facilities

and the aid of staff of the Academy of Natural Sciences of Philadelphia, particularly Dr. B. C. Stone of the Department of Botany and Ms. Carol Spawn in the Library. The illustration of the plate of *Aralia bastardiana* was made available through Ms. Spawn, and Ms. Jan Schmitz arranged for making the rest of the illustrations from my color slides. I also thank the two reviewers for constructive criticism and suggestions for changes.

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