*Principes*, 33(2), 1989, pp. 79–87

# The Dilemma of a Dwindling Resource: Rattan in Kerinci, Sumatra

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In 1972, John Dransfield (1974) observed that "rotan manau" (*Calamus manan*) was "extraordinarily abundant" in the hill dipterocarp forests of the Batang Merangin in Jambi, Sumatra and that "the hill-slopes and ridges (in the nearby Bukit Barisan) carried an almost overwhelming variety of rattans." In 1987, all that remained of the Batang Merangin forests were huge burnt stumps and where previously "manau" had flourished there are now thousands of hectares of coffee, cinnamon, and pepper farms. In similar fashion, the forests of the Bukit Barisan are pockmarked by small farms whose numbers seem to be growing at exponential rates.

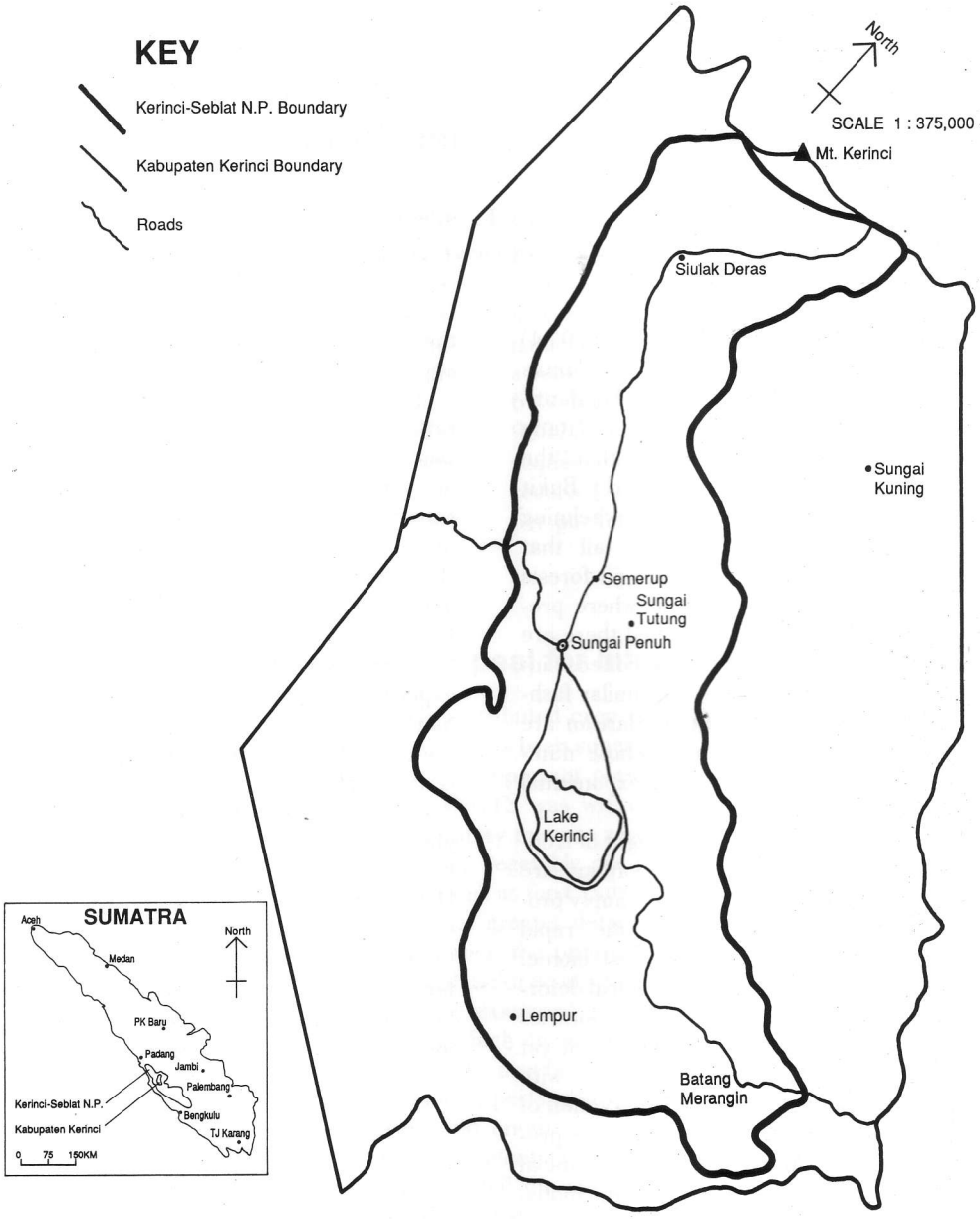
To those familiar with the plight of tropical rain forests, these observations are neither new nor profound; they simply provide additional evidence of the rapid destruction of the world's richest biome. While the rate and extent of tropical deforestation is grim, particularly in countries such as Indonesia, the situation is not yet hopeless. As Mares (1986) notes with respect to South America, conservation of tropical flora and fauna is still possible provided there is a Marshall Plan-like financial and institutional commitment by the industrialized West and major reforms in tropical countries themselves.

Increased financial support and improved institutional capacities alone will not control deforestation. Effective tropical forest conservation will also require improved understanding of the underlying causes and rationale of deforestation and the identification and development of appropriate remedial measures.

This article examines deforestation and rattan exploitation in the Kerinci region of west-central Sumatra, Indonesia. Following a discussion of forest conversion and rattan use, the cultivation and management of the rattan, *Calamus pilosellus* Becc., is examined as a potential economic development and forest conservation tool. Random sample plot analyses of wild rattans, seedling propagation trials, on-farm experiments, and interviews with rattan handicraft producers were used to gather the data. The basic premise of the article is that the popular preservationist plea, "conservation for development" is misplaced and that emphasis should actually be "development for conservation." Deforestation in Kerinci will likely be controlled only to the extent that alternatives to forest conversion, expecially forest farming, are found. Enterprises that simultaneously encourage economic growth and forest conservation are desperately needed.

## Kerinci

Kerinci is an administrative unit (Kabupaten) in Jambi, Sumatra (Fig. 1). It has been inhabited for centuries by an indigenous ethnic group, the Kerincinese, who developed an extensive rice culture in the 10 by 80 km long valley. Kerinci also refers to a 1.5 million hectare national park, Kerinci-Seblat, that completely encircles the valley and to Mt. Kerinci,




1. Kerinci, Sumatra.

which at 3,800 m, is one of the highest peaks in the Malay Archipelago.

Kerinci-Seblat N.P. contains a diverse assemblage of flora and fauna, including the entire range of lowland dipterocarp to alpine heath communities and critical wildlife habitat for such rare and endangered species as the Sumatran tiger, serow, Sumatran rhino and elephant. In short, it is a preserve of global conservation sig-

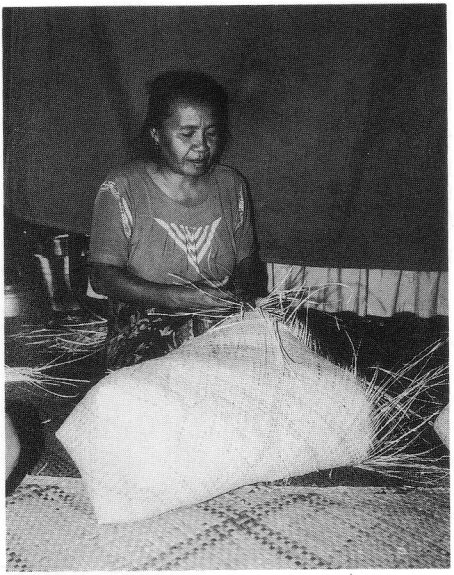
nificance. Management of Kerinci-Seblat N.P. is seriously complicated by the Kabupaten Kerinci enclave. At present, approximately 275,000 people live in the Kerinci enclave and the population is increasing at about 2.2% annually. Agriculture remains the economic base of the region with irrigated rice and perennial cash crops (i.e., cinnamon and coffee) the major products. Kerincinese utilize forest resources, which means the national park, for a variety of purposes, especially rattan and timber gathering and for acquiring new farm land.

## The Use and Abuse of Rattan in Kerinci

Rattan has been widely used in binding, weaving, and basketry for many generations in Kerinci. In fact, a tradition of rattan basket weaving developed in the village of Sungai Tutung to the extent that this single village now provides the entire valley with its rattan basket needs (Fig. 2).

At present, local rattan use is largely confined to two species: *Calamus manan*, whose large, strong canes are used to make basket frames, and *C. pilosellus* whose small, white canes are split and used in basket weaving and general binding. Other rattans, such as *Calamus* sp. and *Korthalsia rigida*, may be occasionally used, but because of inferior color, strength, and workability, they are much less desired than *C. manan* and *C. pilosellus*.

The history of commercial rattan gathering in Kerinci dates from the Dutch colonial period. Dutch records reveal, for example, that as early as 1913 16,361 kg of "rotan sego" (probably *Calamus caesius*) worth 3,009 Dutch guilders was exported from Kerinci (Anom., 1915). The extent of this early rattan trade and its impact on the abundance and diversity of wild rattan is difficult to determine. However, based on Dransfield's observations (1974) and the recollections of collectors, rattan in Kerinci appears to have been an abundant and largely undisturbed resource prior to the mid-1970s.



2. Sungai Tutung artisans weave rattan baskets (*janke*) using split *Calamus pilosellus* canes.

In the mid-1970s two events would begin to shake the foundation of the Sungai Tutung rattan business and ultimately threaten the forest resources of the entire region: the illegal and nearly complete extermination of *C. manan* for export furniture manufacturing and a rapid increase in the rate and extent of forest conversion to farms.

The collection of rattan and all other plant and animal products from Kerinci forests is prohibited. In reality, observance of this regulation is far from complete. Beginning in the mid-1970s and continuing until the early 1980s, *C. manan* harvesting was big business in Kerinci. Reconstructing details of this trade is difficult due to its illegal nature. However, conversations with former "manau" collectors revealed that, at its peak, hundreds of men, working in teams of 6 to 8 cruised the National Park forests up to 40 km from the valley. Harvested canes were carried to the roadside where they were stored in

warehouse-like buildings and then shipped by truck to Padang for export.

One wonders how an illegal business of this size and longevity could prosper without official knowledge. The answer is simple, it was "official." KODIM, the local military unit, in cooperation with a Javanese businessman reportedly operated the business. Such blatant disregard for forestry regulations is unfortunately not unusual in Indonesia where, as Robison (1985) cogently argues, state (military) exploitation of natural resources for its own benefit is the norm.

Commercial rattan exploitation in Kerinci has now ceased, not because Indonesian institutions have changed, although there is increased concern about forest conservation, but rather because all export-quality canes have already been collected. The commercial rattan operation gathered only *C. manan* and thus did not affect other rattans. However, the impact on *C. manan* was profound; hundreds of tons were extracted and the species was almost exterminated. Rattan gatherers report that *C. manan* are now found only as immature plants in isolated sites and that fruiting plants have not been observed since the early 1970s. The fact that *C. manan* does not reproduce vegetatively and that collection of immature canes (i.e., before fruiting) continues for Sungai Tutung basket making casts serious doubt about the potential survival of this species.

Conservation of *C. manan* will require the complete cessation of all harvesting in the hope that remaining immature plants will mature and set fruit. If *C. manan* harvesting is to stop, however, alternative basket framing material will have to be developed. Some Sungai Tutung artisans have already begun making portions of their basket frames out of wood (*Toona sureni*), while others substitute the crude but serviceable canes of another rattan (*Korthalsia rigida*). Undoubtedly, a substitute will be found, for as one artisan put it, "for us rattan is like 'sambal' (the fiery chili-pepper sauce that is a staple at every Kerincinese meal); we prefer fish 'sambal,' but if the fish is gone we'll settle for vegetable 'sambal' or as a last resort, just plain 'sambal,' but we have to have 'sambal.' "

Whether or not *C. manan*, *C. piloselllus*, or any other rattans survive over the long-term will ultimately depend on the extent to which deforestation is controlled. Habitat destruction, particularly the conversion of forests to perennial cash crops, is widespread and completely uncontrolled throughout Kerinci-Seblat N.P. (Fig. 3). The current rate and extent of forest degradation is unknown and in the absence of remote sensing data, is probably impossible to determine. However, informal ground surveys in the eastern and central sectors of the park indicate complete or imminent forest conversion in most flat to gently sloping areas (Fig. 4). The favorable soil and topographic conditions of these sites are probably also productive for many rattan species as well.

Control of forest conversion will require identifying the farmers involved and understanding the rationale for their activities. Deforestation in the eastern and central sectors of Kerinci-Seblat is largely the work of young, resource-poor households from three villages in the central valley (Semerup, Siulak Deras and Sungai Tutung). Discussions with forest farmers from these villages reveal that land degradation (i.e., soil infertility and erosion) has made hillside farming unproductive or unprofitable in their home regions, that population pressure and resultant land scarcity deprive many young families of access to farming altogether (either on the slopes or in the rice fields), and that there are no alternative income sources available. In other words, from the forest farmer's point of view, forest conversion is a logical response to resource scarcity in the absence of economic alternatives.

Understanding the logic of deforestation is invaluable because it can steer resource managers towards potentially viable alter-

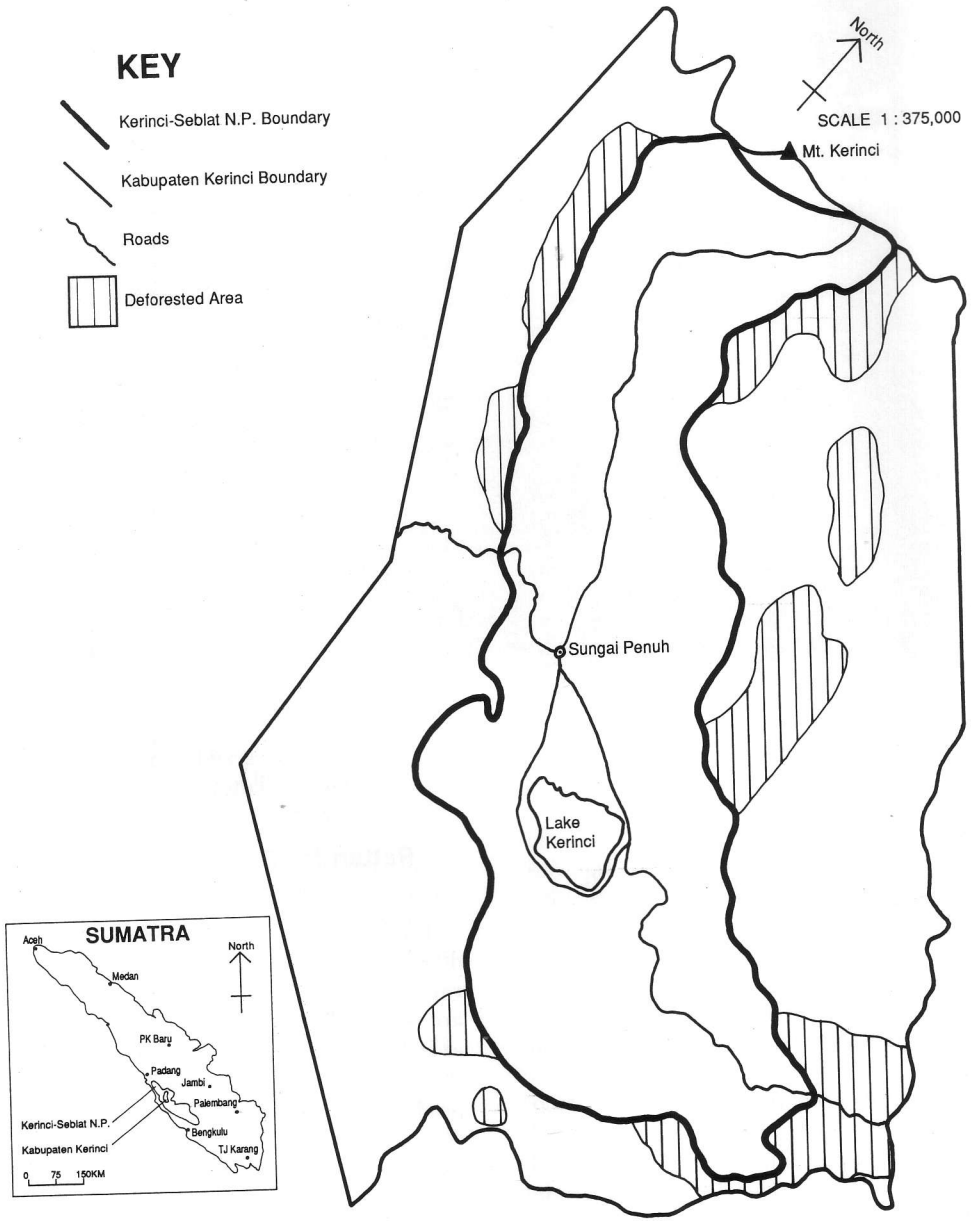
3. View of Sungai Kuning forest conversion, 25 km inside Kerinci-Seblat National Park.

natives and away from strategies that are likely to fail. For example, given economic necessity, coercive measures and simple prohibitions alone are unlikely to stop deforestation. In fact, years of vigorous policing and now an extremely costly program of forced eviction and relocation support this point; deforestation has not even slowed.

The realization that economic need is the driving force behind deforestation implies that its control will require developing real economic alternatives. That young households who lack access to land or other opportunities are the principal forest farmers, suggests that this group should be targeted for assistance programs and that initial efforts should focus on the three villages noted above. Lastly, a detailed understanding of local conditions suggests at least one potential remedial measure worthy of further consideration: the cultivation and management of *C. pilosellus* in conjunction with rattan handicraft manufacturing and marketing in the village of Sungai Tutung.

## Rattan for Development and Conservation

Environmental and socioeconomic conditions in Sungai Tutung are poor by Kerinci standards; the slopes above the village are severely degraded and now largely abandoned to *Imperata cylindrica* grass, there is no room to expand irrigated rice production and many households lack access to land altogether, traditional rattan basket and handicraft making is constrained by shortages of canes and capital, and economic alternatives to forest farming are unavailable to the bulk of the population. The predictable result is that hundreds of Sungai Tutung residents migrate to the forest to cultivate coffee, cinnamon, and other cash crops. In cruel irony, Sungai Tutung rattan artisans are flocking primarily to the Batang Merangin




4. Forest conversion in the Kerinci region of Kerinci-Seblat National Park.

where Dransfield marveled at the abundance of "manau" just 15 years ago. Discussions with these migrants reveal that: most would prefer to live and work in Sungai Tutung given the choice and most remain interested in producing rattan products. What then are the prospects for developing viable household rattan businesses in Sungai Tutung?

A sustainable and productive rattan

industry requires assured supplies, efficient production, and adequate markets. The availability of rattan, in terms of quantity, quality, and desired species, probably represents the greatest constraint to expanded rattan handicraft production. As previously noted, current rattan harvesting in Kerinci occurs primarily in the National Park and is thus illegal. Before rattan businesses can be expanded a sustainable and legal source of cane must be identified.

High quality rattan handicraft production will require an abundant supply of *C. pilosellus* and small amounts of *C. manan* or a suitable substitute. For conservation purposes the prohibition against *C. manan* collection should be maintained and an alternative found for its use in basket frames. As noted above, wood or secondary rattan species appear to be viable substitutes. The prohibition against *C. pilosellus*, on the other hand, needs to be reevaluated.

*C. pilosellus*, unlike *C. manan*, is a clustering rattan, capable of profuse vegetative propagation (Siebert, unpubl. data) and, according to collectors, is not adversely affected by repeated harvesting (i.e., it sprouts new canes). In addition, it is found in a wide variety of forest types throughout Kerinci and appears to be extremely abundant (Siebert, unpubl. data).

Basic abundance and age class distribution data of *C. pilosellus* populations were estimated in undisturbed and previously collected primary forests in the two principal rattan collecting regions of Kerinci (Sungai Kuning and Lempur, Fig. 1). Twenty-five sample plots, each 10 × 20 m or 1/50 ha, were established at regular intervals along random transects in four locations (one undisturbed and one disturbed site in both areas) and the number and size of *C. pilosellus* plants noted in each plot. The results indicate that there is an average of 122 (±164) and 320 (±452) *C. pilosellus* plants per hectare in the Sungai Kuning and Lempur regions, respectively. The wide standard deviation in *C. pilosellus* populations appears to result from microtopographic features, particularly soil drainage characteristics and the density of the forest canopy (Siebert, unpubl. data). Disturbed and undisturbed sites did not differ significantly with respect to the proportion of mature plants (i.e., those producing canes), which supports collectors' observations that *C. pilosellus* can be repeatedly harvested.

Based on the apparent abundance, vegetative reproductive characteristics, and ability to be repeatedly harvested, National Park personnel should consider allowing managed collection of *C. pilosellus* for use in local basketry and handicraft businesses. Sections of the park could be opened for limited rattan gathering based upon estimates of supply and demand while periodic monitoring could insure sustained yield management.

National Park personnel will have to be convinced of the conservation value of managed forest product trade and encouraged to assist the program. At present, the only alternative to forest farming provided by park planners is eviction and relocation. This program will move approximately 150 forest farmers from Kerinci to lowland Jambi where they are to become rubber tappers. The viability of this "transmigration" program is dubious due to the high cost (thousands of dollars per household), thousands of households involved and high failure rate; the majority of those relocated in an earlier program have reportedly already given up rubber tapping and returned to Kerinci.

In addition to managed harvesting of wild *C. pilosellus*, the cultivation of this economically important species should be examined. Cinnamon and coffee are the most important cash crops in Kerinci; collectively they occupy about 60,000 ha. Cinnamon is typically cultivated on fertile or recently cleared forest land with seedlings planted at about 3 m intervals. The trees grow rapidly and are usually harvested between 10 and 18 years of age.

Following harvest, the trees coppice and the cycle is repeated. The partial shade, moist fertile soils, and lengthy rotation period in cinnamon cultivation may be conducive to intercropping *C. pilosellus* beneath trees that already provide partial shade (i.e., at year 3 or 4). The same opportunity may exist beneath coffee as well, although the thorns of *C. pilosellus* could make coffee harvesting very unpleasant.

To explore the possibility of intercropping *C. pilosellus* in hillside farms, 20 cuttings (each comprised of root stock and an aboveground shoot) were collected and transplanted beneath perennial crops (cinnamon, coffee, and rubber) in four hillside farms. Dozens of farmers expressed interest in the trials, thus if successful, extension of the program to other Sungai Tutung farmers could proceed rapidly. Results of the trial will not be available for several years; however, two months after transplanting, seedling survivorship appeared high in all sites.

Expanding household rattan businesses will also require improvements in processing, production, and marketing. A survey of rattan artisans in Sungai Tutung revealed that lack of capital (to purchase raw materials) and need for labor saving devices (especially machinery to clean and split canes) are major constraints to increased productivity. The Department of Industry, which has been an advocate of local rattan businesses, has assisted Sungai Tutung artisans with production and marketing problems in the past and is aware of these problems. In fact, the Department conducted a study in 1986–87 and concluded that while the industry would benefit from cane processing equipment, the volume of production was too small to warrant investing in it.

Finally, if rattan businesses are to provide a viable livelihood, it will be necessary to expand present markets and increase net income. The vast majority of current Sungai Tutung production is sold in the local Kerinci market. Not surprisingly, the demand for rattan products in Kerinci is limited. However, several artisans produce handicrafts (e.g., lamps, vases, cassette holders, etc.) for other Indonesian markets. The demand for Sungai Tutung handicrafts is strong and, according to the producers, is constrained only by the supply of cane, lack of capital, and absence of cane processing equipment. The Department of Industry should expand capital and marketing assistance and, given adequate rattan supplies and markets, assist in the acquisition of cane processing equipment.

## Conclusion

The cultivation and management of *C. pilosellus*, in conjunction with rattan marketing and processing assistance, represents a potentially productive and sustainable livelihood activity for Sungai Tutung households who lack alternative income sources. A vigorous household rattan industry could not only provide poor households with a much needed source of income, but would offer an economic alternative to forest farming and thereby reduce deforestation pressures in Kerinci-Seblat National Park. Intercropping *C. pilosellus* beneath perennial crops would also intensify hillside farming and raise farm household incomes.

Obviously, rattan cultivation and management alone will not solve the forest conservation problems in Kerinci or anywhere else. However, development efforts that build upon existing livelihood activities, utilize local resources, generate a viable means of subsistence, and provide incentives to maintain forest cover, such as household rattan businesses, represent perhaps the only way tropical rain forests in Kerinci and in many other regions of the tropics can be preserved.

## Acknowledgments

Special thanks are due to John Dransfield for determining the identity of *C. pilo-*

*sellus* and to Natalie W. Uhl for editorial assistance. Research funding was provided by grants from The Garden Club of America and the Harold E. Moore Jr. Endowment Fund.

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*Principes*, 33(2), 1989, pp. 87, 90