

# ETHNOBOTANICAL VALUE AND CONSERVATION OF SACRED GROVES OF THE KPAA MENDE IN SIERRA LEONE<sup>1</sup>

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**Lebbie, Aiah R.** (*Department of Biological Sciences, Njala University College, PMB Freetown, Sierra Leone*), and **Raymond P. Guries** (*Department of Forestry, 1630 Linden Drive, University of Wisconsin-Madison, Madison, WI 53706, USA*). ETHNOBOTANICAL VALUE AND CONSERVATION OF SACRED GROVES OF THE KPAA MENDE IN SIERRA LEONE. *Economic Botany* 49(3): 297-308. 1995. Sacred groves in the Moyamba District of Sierra Leone were assessed for their value to local herbalists and traditional folk medicine practitioners of the Kpaa Mende people. Herbalists (*tufablaa*) collecting in 23 sacred groves were interviewed regarding their general knowledge of medicinal plants, and their perceptions regarding changes in the occurrence of medicinal plants. Over 75 medicinal plant remedies are currently in use among the Kpaa Mende, with some plants reported here for the first time in terms of their medicinal uses in Sierra Leone. A significant feature of Kpaa Mende ethnobotany is the employment of 2 or more kinds of plants in combination as a remedy for particular afflictions. The discovery of rare and uncommon plants in the groves and their medicinal uses are discussed in terms of the role of the sacred groves in medicinal plant conservation.

Valeur Ethnobotanique et Conservation des Bosquets Sacrés du Peuple Kpaa Mende, Sierra Leone. Des bosquets sacrés du district de Moyamba, Sierra Leone, furent évalués quant à leur utilité aux herboristes locaux et aux praticiens de médecine populaire du peuple Kpaa Mende. Des herboristes (*tufablaa*) récoltant dans 23 bosquets sacrés furent interrogés sur leur connaissance générale des plantes médicinales et sur leurs impressions concernant les changements survenus à la flore médicinale. Plus de soixante-quinze remèdes d'origine végétale sont actuellement utilisés par les Kpaa Mende, quelques unes de ces plantes sont ici reconnues pour la première fois, pour leur valeur médicinale au Sierra Leone. Un aspect significatif de l'ethnobotanique des Kpaa Mende est l'utilisation combinée de deux ou plusieurs types de plantes pour guérir certains maux. La découverte de plantes rares ou peu fréquentes dans les bosquets, ainsi que leur utilité médicinale, amènent à discuter le rôle des bosquets sacrés dans la conservation des plantes médicinales.

**Key Words:** sacred groves; secret societies; medicinal plants; folk medicine; plant conservation.

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In most rural communities throughout Africa, traditional folk medicine remains a primary source of health care as most modern medical services are inaccessible (Bichmann 1984; Hamann 1991; Pifferling 1975). Many individuals simply cannot afford the high cost of antibiotics, pharmaceuticals, and specialized health care. The inexpensive substitute provided by traditional herbalists has strengthened local dependence on traditional folk medicine in Sierra Leone. This reliance stems from its efficacy in meeting the 'biopsychosocial' health needs of the individual (Ataudo 1985). Many developing countries have

integrated traditional folk medicine into modern medical practices (WHO 1978; Xiao 1991), but such a merger has yet to occur in most of Sierra Leone.

Sierra Leone's diverse cultural heritage, coupled with a rich forest flora, provide the basis for an extensive ethnobotanical knowledge. Such knowledge is a central feature of the cultural life of various ethnic groups in the country, where it is informally passed on to succeeding generations through apprenticeship and cultural interactions with other tribal groups. Although the literature is replete with general references to ethnobotany for the country as a whole, efforts to document specific details of this knowledge have been limited (Ayensu 1978; Barnish and Samai 1992; Burkill 1985; Dalziel 1937; FAO 1986; Macfroy

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<sup>1</sup> Received 3 January 1995; accepted 21 April 1995.

and Sama 1983; Oliver-Bever 1983; Savill and Fox 1967).

Ethnobotanical knowledge in Sierra Leone often resides with specific individuals or families, frequently women, many of whom acquire this knowledge by virtue of their membership in specialized social groups. These groups are formalized as 'secret societies' (Little 1949) in which gender is one credential for membership. The two largest societies in Sierra Leone are the *poro* and the *sande*; the *poro* society is almost exclusively male while the *sande* society is exclusively female. Other societies such as the *njaye* include both male and female members, many of whom also are herbalists in Sierra Leone. In addition to providing various social and educational services, almost all secret societies play a role in providing biopsychosocial health care in Sierra Leone. Different health care needs are met by different secret societies, and some specialization is evident. For example, the *njaye* society specializes in the treatment of insanity and mental complaints, while the *sande* society specializes in the use of herbs for abortion, birthing and still births. The *sande* forms the nucleus for traditional midwives services (birth attendants) in most communities. Individuals may be members of several secret societies, and different societies have overlapping spheres of health care interests such that the social organization of traditional folk medicine does not reduce to simple division by gender.

Most secret societies in Sierra Leone maintain "sacred groves," mostly small fragments of a formerly extensive forest now embedded in an agropastoral landscape. These groves serve as sites for initiation ceremonies, spiritual rites, female circumcision, adolescent education, training grounds for herbalists, sources of medicinal plants, and as a "traditional hospital" where the sick can be taken for specialized treatment. These groves are protected against encroachment and access to them is accorded only to members of the respective secret society. Both the flora and fauna of these sacred groves are protected under sanctions and taboos which provide limits to overexploitation (Lebbie and Freudenberger n.d.). The current wave of deforestation in Sierra Leone makes sacred groves particularly important for the conservation of many useful medicinal plants. However, the lack of information for sacred groves with respect to their biological and ethnobotanical resources makes conservation ef-

forts difficult. In addition, ethnobotanical knowledge of traditional healers associated with these groves is critical to scientific research as well as the maintenance of traditional folk medicine in Sierra Leone.

As part of a larger project to assess the biological resources, conservation value, and present plight of these forest fragments, ethnobotanical data was collected for a set of sacred groves in the Moyamba District of Sierra Leone. We summarize here information obtained from traditional herbalists associated with these sacred groves in terms of their past and current plant collection activities, and their use of herbal preparations for specific remedies.

## METHODS

### STUDY AREA

The present study was conducted in Moyamba District, southwestern Sierra Leone, during early 1994. This district is divided into 14 chiefdoms, each being independently administered by Paramount Chiefs, section chiefs and numerous local chiefs. The entire region is dominated by a tribe referred to as the Kpaa Mende. Many communities in this region are still rather remote, are comprised primarily of subsistence farmers, and maintain traditional lifestyles including a reliance on wild plants for food, construction materials and medicines.

The chiefdoms surveyed included Kori, Dasse and Kowa, which include 23 sacred groves. A total of 51 herbalists were interviewed, mostly elderly persons between the ages of 52–89. Interviews were conducted in Mende, the language spoken by the Kpaa Mende. Women formed the larger portion of those interviewed (83%), as men were reluctant to be interviewed and/or demanded money for any information provided. One boy, aged 15 (also a secret society member), was interviewed on the use of two medicinal plants he claimed to use in healing. While few youths actually participate in folk medicine, it is not unusual in Sierra Leonean villages for boys this young to possess such knowledge. One of us (ARL) was initiated into the *poro* society at the age of 10, and the acquisition of knowledge in traditional folk medicine was a central feature of training in the sacred grove.

Rainfall in this region of Sierra Leone averages between 2000–2250 mm per year, a level capable of supporting high forest (Davies 1987). A con-

tinued dependence on swidden agriculture, and a decline in length of fallow periods, have led to extensive forest clearing and development of secondary "farm bush" vegetation. In addition, large areas are subject to frequent annual fires with most secondary forests eventually being transformed into degraded forests dominated by grasses, especially *Imperata cylindrica*.

#### ETHNOBOTANICAL SURVEY

The enumeration of medicinal plants in sacred groves by herbalists was approached in two ways. During a floristic inventory of the *poro* forests, herbalists were asked to provide the medicinal uses of trees, vines and shrubs occurring in research areas being studied as part of a larger survey. For the *sande* forests, because of access restrictions excluding men, female herbalists were asked to collect medicinal plants and bring them for identification. In both cases, herbalists were asked to provide local names of plants, afflictions for which they were used, parts of the plants used, methods of preparation and administration, and whether the plants were used singly or in combination with other plants. Most information was provided by herbalists with the understanding that any knowledge provided would not be used to treat local people thereby providing unwanted 'competition.' In such a case, especially for some female herbalists, plants were identified and discussed out of public view, at the rear of their houses or at a nearby coffee plantation.

Over 75 recipes derived from plants belonging to 43 families and 82 species are used in the preparation of traditional folk medicines for treatment of common ailments. Most plants were identified in the field using the "Vernacular Botanical Vocabulary for Sierra Leone" (Deighton 1957), and the "Trees of Sierra Leone" (Savill and Fox 1967). Herbarium specimens were collected, identified, assigned a collector's identification letter and number, and deposited in the National Herbarium (NH) of Sierra Leone at Njala University College, Sierra Leone.

#### ENUMERATION OF MEDICINAL PLANTS

Plants and their medicinal use are organized in two ways. Plants are arranged in alphabetical order by family and species. Remedies based upon a single plant are presented in more or less the following order: botanical name/ collector's number/ vernacular names (in bold face)/ plant

parts used/ general description of medicinal uses/ reported uses/ reported constituents and pharmacological actions or effects. For remedies based upon multiple-species combinations, only the first named plant is arranged in alphabetical order. Where plants have been reported for the same or similar use in other regions of West Africa, the source of the report is noted.

#### ACANTHACEAE

*Acanthus montanus* T. Anders./ *Lebbie 110 NH/ Kpete pela/* leaves are boiled and the decoction drunk as a remedy for urine retention.

*Crossandra buntingii* S. Moore/ *Lebbie 39 NH/ Komafali/* leaves are macerated and the liquid used to wash the eyes as a remedy for conjunctivitis. A poultice of the leaves is also rubbed on developing boils to arrest further development.

#### AGAVACEAE

*Dracaena arborea* (Willd.)/ *Lebbie 129 NH/ ningei/* sun-dried leaves are burnt to ashes and mixed with palm (*Elaeis guineensis*) nut oil and rubbed on the chest to relieve heart pains.

#### ANNONACEAE

*Enantia polycarpa* Engl. & Diels./ *Lebbie 120 NH/ gbelo wuli/* infusion or decoction of the stem bark is drunk as a remedy for malaria and jaundice. This plant is reported as a remedy for jaundice and ulcers (Dalziel 1937; Savill and Fox 1967); or is used together with another plant for jaundice (Barnish and Samai 1992).

*Xylopiya aethiopica* (Dunal) A. Rich./ *Lebbie 94 NH/ hewe/* sun-dried seeds are cooked and the soup drunk as a remedy for severe stomach aches.

#### APOCYNACEAE

*Catharanthus roseus* (Linn.) G. Don/ *Lebbie 101 NH/ flawah/* whole plant is sun-dried and the decoction is drunk over several weeks as a remedy for tuberculosis. This plant is reported to be in use for diabetes (Burkill 1985). Reported alkaloids include vinblastine, vincristine, vinleurosine and vinoxidine (Burkill 1985).

*Funtumia africana* Stapf/ *Lebbie 109 NH/ boboi/* stem bark infusion is drunk as a remedy for jaundice. Reported use of stem bark for jaundice (Barnish and Samai 1992).

*Rauvolfia vomitoria* Afz./ *Lebbie 90 NH/ Kowoga/* leaf poultice mixed with clay is rubbed on the skin as a cure for scabies; an infusion of

pounded roots is drunk to induce or increase male virility, or alternatively, an infusion of the inner bark is drunk. A leaf poultice with clay is reported for scabies (Barnish and Samai 1992); leaf infusion for constipation or indigestion (Dalziel 1937); leaf infusion mixed with spice is used for jaundice, or a decoction of leaves is used for ascites, or a decoction of leaves with other plants is used to induce labor and treat smallpox (FAO 1986). Plant is used as a source of reserpine and ajmaline (Farnsworth and Soejarto 1991; Husain 1991).

#### ASTERACEAE (COMPOSITAE)

*Ageratum conyzoides* Linn./ *Lebbie* 93 NH/ **ngu-gbe**/ leaf poultice is rubbed on the skin as a remedy for scabies and rash; leaf infusion is drunk to stop vomiting. Leaves of this plant are reported to be in use for wounds, while leaves and stem bark together with another plant are used for jaundice (Macfoy and Sama 1983); juice from crushed leaves are used as a cure for wounds (Macfoy and Sama 1983); roots are used for abdominal pains, while leaves are used for pneumonia and as an emetic (Ayensu 1978).

*Crassocephalum rubens* (Jacq.) S. Moore/ *Lebbie* 7 NH/ **kikpoi**/ roots are pounded with clay and the nest of a wasp, and the paste is used as a remedy for humpback.

*Tridax procumbens* Linn./ *Lebbie* 103 NH/ sun-dried shoots are boiled and the decoction drunk as a remedy for diarrhea. Burkill (1985) reports a decoction of the roots being used for infantile diarrhea.

#### CAESALPINACEAE

*Amphimas pterocarpoides* Harms/ *Lebbie* 102 NH/ **njumbo wuli**/ sun-dried stem bark is mixed with water and the infusion drunk to alleviate shortness of breath. A resin from the bark is reported to be used as a remedy for dysentery (Dalziel 1937).

*Anthonotha macrophylla* P. Beauv./ *Lebbie* 113 NH/ **mbombi**/ leaves are macerated and the infusion drunk as a remedy for jaundice; a poultice of the leaves with salt and a wasp is rubbed on boils to ease pain and induce pus formation. Leaves are reported to be used for jaundice (Macfoy and Sama 1983); leaves are used for dysentery, boils, and snake bites (Savill and Fox 1967); bark is used for jaundice; a decoction of leaves is used for toothache (Barnish and Samai 1992).

*Cassia alata* Linn./ *Lebbie* 64 NH/ **njepa**/

leaves are pounded with clay and the poultice is rubbed on boils to promote pus development. A root decoction is reported to be in use as a laxative (Macfoy and Sama 1983); leaves are used for measles, constipation and ringworms (Barnish and Samai 1992).

#### COMBRETACEAE

*Combretum smeathmanii* G. Don/ *Lebbie* 51 NH/ **hapka nyamui**/ leaves are chewed and liquid swallowed as a remedy for diarrhea. Leaves are reported to be in use for jaundice (Barnish and Samai 1992).

#### COMMELINACEAE

*Palisota hirsuta* K. Schum./ *Lebbie* 2 NH/ **ndu-mui**/ inner bark is removed and put in the pants of an individual suffering from piles (hemorrhoids). A leaf infusion is reported to be in use for piles (Burkill 1985); leaves are used as a sedative for coughing (Ainslie 1937).

#### CYPERACEAE

*Scleria barteri* C.B. Cl./ *Lebbie* 26 NH/ **njawæ**/ apical leaves are macerated, a hot charcoal is dropped in the leaf infusion, and the infusion is drunk during the last month of pregnancy to hasten child delivery. Macerated leaves are reported to be in use to hasten or ease childbirth (Walker and Sillans 1961); leaves are eaten with cola nuts for coughing (Barnish and Samai 1992).

#### DILLENIACEAE

*Tetracera alnifolia* Willd./ *Lebbie* 31 NH/ **ndopanénéh**/ leaves are boiled and the decoction held in the mouth as a remedy for toothache; an infusion of the leaves with salt and palm (*Elaeis guineensis*) oil is drunk to remove a bone stuck in the throat. Exudates from stem and leaves are reported to be in use for thorn pricks, while leaves used together with another plant cures dysentery (Macfoy and Sama 1983); leaves are used for diarrhea or cholera, or together with another plant for relief from dysentery; juice from stems is used for eye trouble and puncture wounds (Barnish and Samai 1992).

#### EBENACEAE

*Diospyros thomasii* Hutch. & Dalz./ *Lebbie* 28 NH/ **ndoku wuli**/ inner bark is removed, placed in a bottle with water to stand for a while, after which the infusion is drunk as a cure for hemorrhoids or piles. An infusion of inner bark or

leaves is reported for diarrhea, and a decoction of the leaves is used for dysentery (Barnish and Samai 1992).

#### EUPHORBIACEAE

*Alchornea cordifolia* (Schum. & Thonn.) Muell. Arg./ *Lebbie 91* NH/ *njækoi*/ while arms are folded at back, leaves are taken in the mouth, chewed and the liquid swallowed as a remedy for diarrhea; a decoction of the leaves is drunk as a remedy for dysentery; liquid from poultice of the leaves is squeezed into a wound to help in healing. Juice from leaves is reported to cure diarrhea (Macfoy and Sama 1983); heartwood of young stem is used for coughing, dry leaves are used for toothache, leaves warmed over fire with other plants are used for scabies, while juice from mature stems is used for eye trouble, leaves together with other plants are used for gonorrhoea (Barnish and Samai 1992); a poultice of the roots and leaves in combination with other plants is used as an enema to stop abortion, while a decoction of leafy twigs is used as a remedy for chills and rheumatic pains; the fruit and leaf juices are used for ringworm (Dalziel 1937).

*Bridelia micrantha* (Hochst.) Baill./ *Lebbie 122* NH/ *kui*/ stem bark is boiled and the decoction used to wash wounds to aid in healing.

*Hymenocardia lyrata* Tul./ *Lebbie 32* NH/ *fag-banjoi*/ roots are boiled and the decoction is drunk to relieve stomach pain. The decoction is also drunk by pregnant women to help hasten child delivery.

*Phyllanthus discoideus* (Baill.) Muell. Arg./ *Lebbie 128* NH/ *tijoe*/ a decoction of the stem bark is drunk to induce menstruation and abortion.

*Ricinus communis* Linn./ *Lebbie 130* NH/ *kasta weh* or *ngele bondoi*/ leaves are boiled and the decoction drunk by children as a vermifuge.

*Tragia tenuifolia* Benth./ *Lebbie 33* NH/ *mor-linyényé*/ leaves are pounded with clay and the poultice rubbed on the abdomen of a pregnant mother to induce foetal movement; an infusion of the leaves is also drunk to help maintain pregnancy.

#### GRAMINEAE

*Eleusine indica* Gaertn./ *Lebbie 56* NH/ *ngetae wuli*/ leaves are macerated and the infusion drunk as a remedy for urine retention.

#### IXONANTHACEAE

*Ochthocosmus africanus* Hook. f./ *Lebbie 119* NH/ *twanyé*/ stem bark is sun-dried, boiled and the decoction drunk as a remedy for severe stomach aches.

#### MALVACEAE

*Sida stipulata* Cav./ *Lebbie 114* NH/ *helui*/ inner stem bark is peeled off and made into a twine together with a black thread, tied into 3–4 knots and hung around the neck of a child as a remedy for convulsions; a poultice of the leaves with clay is rubbed on a boil to induce pus formation. Poultice of leaves is reported to heal inflammation (Macfoy and Sama 1983); poultice of leaves with mud is used for boils, and with ash for splitting head (Barnish and Samai 1992).

#### MELIACEAE

*Trichilia heudelotii* Planch. ex Oliv./ *Lebbie 99* NH/ *njawæ*/ stem bark is boiled and the decoction drunk as a laxative. Bark is reported to cure cough (Macfoy and Sama 1983).

#### MENISPERMACEAE

*Triclisia patens* Oliv./ *Lebbie 89* NH/ *fok-lobæ*/ leaves are boiled and the decoction is drunk as a remedy for discharge during early pregnancy.

#### MIMOSACEAE

*Acacia pennata* (Linn.) Willd./ *Lebbie 108* NH/ *tanyé*/ leaves are pounded with goat fat and a tiny amount is put in a tooth if there is a hole in it. If it is just ordinary toothache, a decoction of the leaves is held in the mouth and then spewed out.

*Dichrostachys glomerata* (Forsk.) Chiov./ *Lebbie 3* NH/ *ndandæ*/ stem bark poultice is placed in the pants of an individual with hemorrhoids or piles. Alternatively, stem bark is boiled and anus is steam bathed with it. The bark is reported to be in use for roundworms, while leaves are used for sores, burns and scalds (Barnish and Samai 1992); young leaves are used in conjunction with another plant for piles (Macfoy and Sama 1983).

#### MUSACEAE

*Musa cavendishii* Lambert/ *Lebbie 71* NH/ *manawa*/ leaves are macerated in water, salt added, and the infusion drunk to help maintain pregnancy.

## NYMPHAEACEAE

*Nymphaea* sp./ *Lebbie* 15 NH/ **pupendæ**/ leaves are sun-dried and burnt to ashes, and the ash is put in the horn of a duiker and sealed with goat fat. A hole is bored through the tip of the horn, a thread is passed through and hung around the neck of a child as a remedy for convulsion. Rhizomes of *Nymphaea alba* are reported to be used to counteract convulsions (Delphaut and Balansard 1943); leaves together with other plants are used to stop vomiting (Barnish and Samai 1992); Reported alkaloids include nymphaeine, nymphaline and nupharine (Oliver-Bever 1983).

## OLACACEAE

*Ongokea gore* (Hua) Pierre/ *Lebbie* 36 NH/ **gbui**/ seed is pierced at one end and a thread is passed through the hole and tied to the wrist of a suckling child to suck on as a remedy for constipation.

## PAPILIONACEAE

*Desmodium adscendens* (Sw.) DC./ *Lebbie* 35 NH/ **ndogbo niki**/ leaf poultice is mixed with goat fat and rubbed around the hips as analgesic, or some of the poultice is put in a cowrie shell and tied around the waist; an infusion of the leaves is drunk to relieve early labor pain in pregnant women, and bark of the inner stem is also removed and made into a twine and tied around the waist of the pregnant woman. Leaves together with other plants are reported to be in use for scabies, while an infusion of the leaves with other plants is used for asthma (Macfoy and Sama 1983).

*Milletia rhodantha* Baill./ *Lebbie* 69 NH/ **torlu gbélé**/ inner bark is removed and chewed as a remedy for coughing.

## PASSIFLORACEAE

*Adenia lobata* (Jacq.) Engl./ *Lebbie* 34 NH/ **mawoni**/ leaves and stem are sun-dried and burnt to ashes, the ash is mixed with hot palm (*Elaeis guineensis*) oil and rubbed as a remedy for eruptive skin diseases.

*Smeathmannia pubescens* Soland. ex R. Br./ *Lebbie* 24 NH/ **ndovotæ**/ stems are cut into tiny bits, sun-dried, boiled, and the decoction is drunk by pregnant women to help induce womb enlargement. An infusion or decoction of roots with other plants is reported to be in use as a laxative (Macfoy and Sama 1983); an infusion of roots is

drunk for jaundice, while juice of pounded stem bark is drunk for dysentery (Barnish and Samai 1992).

## RHAMNACEAE

*Gouania longipetala* Hemsl./ *Lebbie* 46 NH/ **sawa wai**/ leaves are macerated in water and the infusion drunk during the last months of pregnancy to hasten child delivery. A leaf infusion is reported to be in use to promote foetal development (Macfoy and Sama 1983); leaves and bark are used as a cough remedy, while bark is used for sores, and leaves for burns and boils (Barnish and Samai 1992).

## RHIZOPHORACEAE

*Anisophyllea laurina* R. Br. ex Sabine/ *Lebbie* 9 NH/ **Kandi**/ dried stem bark is pounded, sieved and mixed with rice flour. Water is added to the mixture and then given as a remedy for dysentery; a poultice of the leaves is rubbed around a snake bite after removing any fangs; the inner bark is scraped and put in a leaf funnel at the base of which is cotton wool, and water is added and set aside for some time. The liquid is squeezed into eyes to remove cataracts. A decoction of the leaves is reported as a remedy for toothache (Savill and Fox 1967).

## ROSACEAE

*Acioa scabrifolia* Hua/ *Lebbie* 131 NH/ **nyé-galæ**/ stem bark poultice is rubbed on the joints of children to make them strong.

## RUBIACEAE

*Craterispermum laurinum* Benth./ *Lebbie* 21 NH/ **nyéla**/ stem bark is pounded and mixed with palm wine, and the infusion drunk as a remedy for both jaundice and malaria. A decoction of the inner stem bark is reported to be used for malaria and jaundice, a decoction of the dried leaves or stem barks with other plants is used for jaundice; a decoction of the stem bark is used to treat eye trouble (Barnish and Samai 1992); the leaves are used in conjunction with another plant to cure jaundice (Macfoy and Sama 1983).

*Morinda morindiodes* (Bak.) Milne-Redhead/ *Lebbie* 30 NH/ **kojo logbo**/ leaf decoction is drunk as a taenifuge. A decoction of the leaves is reported to be used for malaria (Barnish and Samai 1992).

*Nauclea latifolia* Smith/ *Lebbie* 17 NH/ **yumbuyambæ**/ young leaves are boiled and the de-

coction held in the mouth as a remedy for tooth-ache.

*Tricalysia deightonii* Brenan/ *Lebbie* 62 NH/ **kpoli wuli**/ sun-dried inner stem bark is boiled and the decoction is drunk as a vermifuge.

#### RUTACEAE

*Fagara macrophylla* Engl./ *Lebbie* 78 NH/ **fui**/ stem bark poultice is rubbed on the skin to relieve bodily pain. The bark is reported to be in use for aching joints, as an aphrodisiac, for stomach aches and as a vermifuge; bark is used with another plant as a remedy or preventative for smallpox (Savill and Fox 1967); bark is used for stomach trouble (Barnish and Samai 1992).

#### SCROPHULARIACEAE

*Scoparia dulcis* Linn./ *Lebbie* 49 NH/ **pondo livali**/ leaf poultice is rubbed on broken limbs or arms and tied for 3–4 days. After removing bandages, a poultice of the leaves is mixed with clay and rubbed on the affected part daily as a remedy for fractures.

#### SELAGINELLACEAE

*Selaginella myosurus* (Sw.) Alston/ *Lebbie* 106 NH/ **ndimoimoi**/ whole plant is boiled and the decoction used to bathe individuals with eczema; a poultice of the plant is rubbed on the skin; the entire plant is pounded with rice flour and rolled into smaller balls, sun-dried and eaten as a remedy for dysentery. A poultice of the entire plant is reported to cure tinea; in combination with other plants, a poultice is used as cure for eruptive skin disease (Macfoy and Sama 1983); an infusion of the plant is drunk as a remedy for asthma (Barnish and Samai 1992).

#### SOLANACEAE

*Solanum duplosinuatatum* Klotzsch/ *Lebbie* 73 NH/ **kwao-gbolo**/ fresh leaves are cooked and the sauce is given to women as a remedy for distended stomachs; a leaf infusion is drunk by pregnant women to hasten child delivery; while a leaf infusion together with salt is used to stop bleeding during early pregnancy.

#### STERCULIACEAE

*Cola nitida* (Vent.) Schott & Endl./ *Lebbie* 116 NH/ **Toloi**/ leaves are macerated together with salt and the infusion is drunk for diarrhea and asthma. Leaves together with cola nuts are reported to be used for diarrhea, while leaves or

bark are used for eye trouble; seeds with other plants are used for piles (Barnish and Samai 1992).

#### VERBENACEAE

*Clerodendron scandens* Beauv./ *Lebbie* 29 NH/ **hona wuli**/ leaves are boiled or macerated and the infusion or decoction is drunk to induce abortion.

#### ZINGIBERACEAE

*Costus afer* Ker./ *Lebbie* 95 NH/ **howæ**/ an inflorescence is heated over fire for a few minutes and the liquid used to treat ear infection, and wounds caused by thorns or spines; young leaves are pounded with clay and rolled into smaller balls, sun-dried and eaten as a remedy for foul discharge in women. Stem infusion together with lime is reported to cure gonorrhoea (Macfoy and Sama 1983); or stem infusion with pepper is used to cure malaria; stem is used for coughing; or stem together with rice flour is used for jaundice; while an infusion of the pounded stem is used as a remedy for dysentery; roots are used to treat gonorrhoea; a stem decoction together with other plants is used as a remedy for gonorrhoea; pounded stem together with lime is used for schistosomiasis (Barnish and Samai 1992).

#### MULTIPLE SPECIES PREPARATIONS

1. *Adenia lobata* (Jacq.) Engl./ *Lebbie* 34 NH/ **mawoni**/ Passifloraceae/ stem is cut into tiny bits, sun-dried, cooked with palm oil and three fruits of *Capsicum annuum* Linn./ *Lebbie* 81 NH/ **pujæ**/ Solanaceae/ and the soup drunk as a remedy for stomach ache.

2. *Albizia adianthifolia* (Schumach.) W. F. Wight/ *Lebbie* 66 NH/ **kpakpa gbogboi**/ Mimosaceae/ stem bark is boiled with the fruit of *Citrus aurantifolia* (Christm.) Swingle/ *Lebbie* 105 NH/ **lumbé-nyényé**/ Rutaceae/ and the decoction drunk as a remedy for gonorrhoea.

3. *Alchornea hirtella* Benth./ *Lebbie* 5 NH/ **tokenge**/ Euphorbiaceae/ sun-dried leaves are pounded with those of *Trichilia heudelotii* Planch. ex Oliv./ *Lebbie* 99 NH/ **njawæ**/ Meliaceae/, *Harungana madagascarensis* Lam./ *Lebbie* 100 NH/ **mbeli mumui**/ Hypericaceae/ and *Alternanthera sessilis* R. Br. ex Schult./ *Lebbie* 27 NH/ **ndata wuli**/ Amaranthaceae/, and sieved. The powder is mixed with roasted and pounded seeds of *Sesamum indicum* Linn./ *Lebbie* 25 NH/ **mandæ**/ Pedaliaceae/ and salt. One teaspoon is put in a

cup of tea or palm wine and drunk to induce or increase male virility (erection).

4. *Bridelia micrantha* (Hochst.) Baill./ *Lebbie* 122 NH/ **kui**/ Euphorbiaceae/ stem bark is boiled with that of *Mangifera indica* Linn./ *Lebbie* 96 NH/ **mangoi**/ Anacardiaceae/ and an individual with syphilis asked to sit in the decoction for some time. *Anisophyllea laurina* R. Br. ex Sabine/ *Lebbie* 9 NH/ **kandi**/ Rhizophoraceae/ leaves are heated over fire and the liquid squeezed onto the sores, and a poultice of the leaves rubbed on the genitals.

5. *Canthium glabriflorum* (K. Schum.) Hiern/ *Lebbie* 37 NH/ **mbeli wawa**/ Rubiaceae/ fresh leaves are boiled together with those of *Cassia sieberiana* DC./ *Lebbie* 22 NH/ **gbangbay**/ Caesalpinaceae/ and *Ocimum viride* Willd./ *Lebbie* 38 NH/ **kumuli**/ Labiatae/, and the decoction drunk as a remedy for both malaria and jaundice. The use of *C. glabriflorum* leaves together with another plant is reported as a blood tonic, while a decoction of leaves is used to control persistent menstruation (Macfoy and Sama 1983).

6. *Crassocephalum rubens* (Jacq.) S. Moore/ *Lebbie* 7 NH/ **kikpoi**/ Compositae/ roots together with those of *Spondias mombin* Linn./ *Lebbie* 23 NH/ **gboji**/ Anacardiaceae/ are boiled and the decoction drunk as a remedy for womb pain.

7. *Craterispermum laurinum* Benth./ *Lebbie* 21 NH/ **nyélæ**/ Rubiaceae/ stem bark is pounded with that of *Costus afer* Ker./ *Lebbie* 95 NH/ **howæ**/ Zingiberaceae/ and lime, and then mixed with water. The infusion is then filtered and drunk as a remedy for jaundice and malaria.

8. *Crossandra buntingii* S. Moore/ *Lebbie* 39 NH/ **Komafali**/ Acanthaceae/ leaves are pounded with those of *Scoparia dulcis* Linn./ *Lebbie* 49 NH/ **pondo livali**/ Scrophulariaceae/ and the poultice placed inside a duiker horn or cowrie shell, covered with goat fat, and tied around neck of a child as a remedy for convulsion.

9. *Dioscorea minutiflora* Engl./ *Lebbie* 72 NH/ **didí**/ Dioscoreaceae/ underground tuber is cooked with *Capsicum annun* Linn./ *Lebbie* 81 NH/ **pujæ**/ Solanaceae/ and salt, and the soup is drunk as a remedy for pain experienced in the womb after child birth.

10. *Dryopteris striata* (Schum.) C. Chr./ *Lebbie* 44 NH/ **koyé**/ Filicales/ roots are cut, sundried and boiled with stems of *Marsdenia latifolia* (Benth.) K. Schum./ *Lebbie* 92 NH/ **tawa-beimbe**/ Asclepiadaceae/ and leaves of *Scleria barteri* C. B. Cl./ *Lebbie* 26 NH/ **njæwæ**/ Cyper-

aceae/, then mixed with those of *Palisota hirsuta* K. Schum./ *Lebbie* 2 NH/ **ndumui**/ Commelinaceae/ and seeds of *Xylopia aethiopica* (Dunal) A. Rich./ *Lebbie* 94 NH/ **Hewe**/ Annonaceae/; the decoction is drunk to induce foetal movement during pregnancy; the use of *X. aethiopica* as a treatment for fertility has been reported (FAO 1986).

11. *Harungana madagascarensis* Lam./ *Lebbie* 100 NH/ **mbeli mumui**/ Hypericaceae/ leaves are boiled and drunk; in addition, a poultice of *Scoparia dulcis* Linn./ *Lebbie* 49 NH/ **pondo livali**/ Scrophulariaceae/ leaves mixed with clay is rubbed on skin as a remedy for itch and rashes.

12. *Ipomoea involucreta* P. Beauv./ *Lebbie* 47 NH/ **ndondokoi**/ Convolvulaceae/ leaves are pounded with fruits of *Citrus aurantifolia* (Christm.) Swingle/ *Lebbie* 105 NH/ **lumbe nyényé**/ Rutaceae/ and the filtrate kept in sun for some hours and drunk as a remedy for malaria.

13. *Jatropha curcas* Linn./ *Lebbie* 53 NH/ **kata wuli**/ stem bark is pounded with the juice of *Citrus aurantifolia* (Christm.) Swingle/ *Lebbie* 105 NH/ **lumbe-nyényé**/ Rutaceae/ and water added to it. The liquid is filtered and kept in the sun for some hours before being drunk as a remedy for jaundice. The leaves of *J. curcas* are reported to be in use for convulsions, while wood fibers mixed with other plants are used for malaria (Barnish and Samai 1992).

14. *Mangifera indica* Linn./ *Lebbie* 96 NH/ **mangoi**/ Anacardiaceae/ stem bark is mixed with that of *Craterispermum laurinum* Benth./ *Lebbie* 21 NH/ **nyélæ**/ Rubiaceae/, stems of *Costus afer* Ker./ *Lebbie* 95 NH/ **howæ**/ Zingiberaceae/, and fruits of *Citrus aurantifolia* (Christm.) Swingle/ *Lebbie* 105 NH/ **lumbe-nyényé**/ Rutaceae/ and pounded in a mortar. The pulp is mixed with water and the infusion is drunk for a week as a remedy for gonorrhoea. *M. indica* sap is reported to be in use to treat syphilis (Singha 1965); stems of *Costus afer* and *Craterispermum laurinum* have also been reported as a cure for gonorrhoea, while *C. aurantifolia* mixed with other plants is used for gonorrhoea (Barnish and Samai 1992).

15. *Microdesmis puberula* Hook. f. ex Planch./ *Lebbie* 19 NH/ **Nikii**/ leaves are chewed with the nuts of *Cola nitida* (Vent.) Schott & Endl./ *Lebbie* 116 NH/ **toloi**/ Sterculiaceae/ and the paste used to massage joints and head for rheumatic pains and headaches; leaves are also ground with clay and rubbed on aching parts after the massage. A poultice of the leaves *M. puberula* mixed



with clay is reported to cure scabies (Macfoy and Sama 1983). Leaves cooked with another plant are used for dysentery; when compounded with other plants it is used to mend fractures and joint pains; macerated leaves are used for eye trouble; leaves with another plant used to expel pus from boils (Barnish and Samai 1992); Dalziel (1937) reports the fruits being used as a laxative and to acquire immunity from boils, and the bark and leaves are used as an enema.

16. *Microdesmis puberula* Hook. f. ex Planch./ *Lebbie* 19 NH/ **Niki**/ Euphorbiaceae/ leaf infusion together with those of *Manihot esculenta* Crantz/ *Lebbie* 98 NH/ **tangæ**/ Euphorbiaceae/ is rubbed on the head and given orally to victims of snake bite. The leaves of the two species are ground with clay and the poultice rubbed around the bite site. The raw tuber of *M. esculenta* is reported to be used for diarrhea; the juice of pounded leaves is used for snake bites; an infusion of leaves is used for toothaches; leaves together with other plants stops vomiting; leaves are used as eye drops; and mature leaves as a remedy for schistosomiasis (Barnish and Samai 1992).

17. *Morinda geminata* DC./ *Lebbie* 20 NH/ **njasui**/ Rubiaceae/ leaves are boiled together with those of *Craterispermum laurinum* Benth./ *Lebbie* 21 NH/ **nyélæ**/ Rubiaceae/ and *Nauclea latifolia* Smith/ *Lebbie* 17 NH/ **yumbuyambæ**/ Rubiaceae/ and the decoction used to steam bath individuals with malaria and yellow fever. The decoction is also given to individuals to drink. *M. geminata* roots and leaves are used for malaria and leaves for constipation (Barnish and Samai 1992). *C. laurinum* inner bark is used for malaria, while the inner bark and dried leaves are used for jaundice, the stem bark for gonorrhea, and young leaves for eye troubles (Barnish and Samai 1992).

18. *Napoleona heudelotii* A. Juss./ *Lebbie* 132 NH/ **ngolo haemi**/ Lecythidaceae/ roots are sun-dried with those of *Nauclea latifolia* Smith/ *Lebbie* 17 NH/ **yumbuyambæ**/ Rubiaceae/ and *Morinda geminata* DC./ *Lebbie* 20 NH/ **njasui**/ Rubiaceae/, and with leaves of *Gouania longipetala* Hemsl./ *Lebbie* 46 NH/ **sawa wai**/ Rhamnaceae/ and stem bark of *Alstonia boonei* De Wild./ *Lebbie* 133 NH/ **kalui**/ Apocynaceae/, and the decoction drunk as a remedy for malaria.

19. *Nauclea latifolia* Smith/ *Lebbie* 17 NH/ **yumbuyambæ**/ Rubiaceae/ roots and sun-dried leaves are boiled together with those of *Cassia*

*sieberiana* DC./ *Lebbie* 22 NH/ **gbangbay**/ Caesalpiniaceae/ and the decoction drunk for constipation and as a vermifuge. Leaves of *N. latifolia* are reported to be in use for constipation, roots and stems for sores, leaves for scabies, inner bark for coughing; roots for flu and measles; stem juice for eye troubles (Barnish and Samai 1992); dry fruits are used for piles and dysentery (Oliver-Bever 1983). Indolo-quinolizidine alkaloids and glyco-alkaloids have been identified from root bark (Dimitrienko, Murray, and McLean 1974; Hotellier, Delaveau, and Pousset 1975), while an antipyretic effect also has been reported (Oliver-Bever 1983).

20. *Ongokea gore* (Hua) Pierre/ *Lebbie* 36 NH/ **gbui**/ Olacaceae/ leaves are pounded with the fruit of *Citrus aurantifolia* (Christm.) Swingle/ *Lebbie* 105 NH/ **lumbe-nyényé**/ Rutaceae/, water added to it, and the filtrate set aside in the sun for a few hours before being drunk as a remedy for rheumatism.

21. *Palisota hirsuta* K. Schum./ *Lebbie* 2 NH/ **ndumui**/ Commelinaceae/ terminal buds are pounded with those of *Cercestis afzelii* Schott./ *Lebbie* 1 NH/ **mbembei**/ Araceae/, and *Microdesmis puberula* Hook. f. ex Planch./ *Lebbie* 19 NH/ **Nikii**/ Euphorbiaceae/, and the poultice mixed with clay and rubbed on aching joints to relieve rheumatic pains. Leaves of *C. afzelii* are reported to reduce abdominal pains and swollen stomach (Macfoy and Sama 1983).

22. *Premna hispida* Benth./ *Lebbie* 117 NH/ **kamajovondo**/ Verbenaceae/ leaves are ground with those of *Capsicum annun* Linn./ *Lebbie* 81 NH/ **pujæ**/ Solanaceae/, mixed with clay, and the poultice rubbed as a remedy for arthritis.

23. *Tetracera alnifolia* Willd./ *Lebbie* 31 NH/ **ndopanénéh**/ Dilleniaceae/ leaves with those of *Eleusine indica* Gaertn./ *Lebbie* 56 NH/ **ngetae wui**/ Gramineae/ are pounded and the poultice rubbed on skin as a remedy for skin eruptions and scabies.

24. *Zingiber officinale* Roscoe/ *Lebbie* 80 NH/ **kijæ**/ Zingiberaceae/ tubers are pounded with a single fruit of *Capsicum annun* Linn./ *Lebbie* 81 NH/ **pujæ**/ Solanaceae/ and the poultice rubbed as a remedy for cold and fever in children.

## DISCUSSION

A significant feature of Kpaa Mende ethnobotany is the employment of 2 or more plants in combination as a remedy for particular afflictions. For example, a concoction of the following

five plants is used as a remedy for malaria, *Napoleona heudelotii*, *Nauclea latifolia*, *Morinda geminata*, *Gouania longipetala*, and *Alstonia boonei*. Other reports indicate that four of these plants are often employed individually as remedies for malaria (Barnish and Samai 1992; Macfoy and Sama 1983; Oliver-Bever 1986; Savill and Fox 1967). Some plants have a single use while a few are used extensively for a multiplicity of afflictions. For example, *Costus afer* is used either singly or in combination with other plants as a remedy for malaria, gonorrhoea, ear infection, puncture wounds, and yellow fever. On the other hand, *Ochthocosmus africanus*, is only used as a remedy for stomach aches. The possibility that other medicinal uses are being ascribed to this plant in other parts of the country, or elsewhere in West Africa, cannot be overlooked, as local variations exist in the use of most plants.

This is the first documented case of medicinal use of the following 15 plant species by practicing herbalists in Sierra Leone: *Ongokea gore*, *Dioscorea minutiflora*, *Crossandra butingii*, *Ochthocosmus africanus*, *Dracaena arborea*, *Ipomoea digitata*, *Solanum duplosinuatum*, *Catharanthus roseus*, *Hymenocardia lyrata*, *Tragia tenuifolia*, *Scoparia dulcis*, *Acanthus montanus*, *Musa cavendishii*, *Tricalysia deightonii* and *Clerodendron scandens*. Each of these plants is associated with one or two afflictions, and 50% are employed in childbirth and pregnancy related problems. In addition to the plants listed above, most of the remedies documented in this study relate to childbirth and pregnancy. This is not surprising, as the herbalists were dominated by women of the sande society who play a central role in traditional midwives services as well as other social services. Additional field work with male herbalists would be useful in this regard, to help determine the extent to which gender differences in the use of medicinal plants relate to childbirth and pregnancy.

Most plants discussed here continue to be found throughout Sierra Leone, while a few have a more localized distribution. With increasing deforestation in Sierra Leone, some of the once common plants are now becoming less common in the habitats where they once were abundant. Our informants confided that certain medicinal plants abundant as recently as a decade ago are currently difficult to find and several reported that some plants are now found exclusively in sacred groves. Medicinal plants reported here, including

*Ongokea gore*, *Homalium letestui*, *Craterispermum laurinum*, *Microdesmis puberula*, and *Alstonia boonei*, are still found in mature forests, but are uncommon or absent in young bush fallows. For example, *Enantia polycarpa*, was reported by herbalists to be locally rare or absent in fallows, due largely to declining fallow periods and overexploitation for medicinal use. Preferred by herbalists for treating malaria and jaundice, we found *E. polycarpa* in only 3 of 23 sacred groves. Herbalists also prefer older stems of *Craterispermum laurinum* over young saplings for herbal preparations, but loss of forests to rice cultivation is high, such that mature stems of *C. laurinum* are rare in young fallows and even mature forests.

*Enantia polycarpa* and *Craterispermum laurinum* are among several rare medicinal plants whose survival depends on the protection of existing forests in Sierra Leone. Most forests in Sierra Leone are threatened, but our lack of information on the abundance and distribution of plants militates against conservation efforts specifically for medicinal plants. Sacred groves could offer one possibility for the conservation of plants of medicinal significance in Sierra Leone as they are among the most vigorously protected forests in the country. The numerous sacred groves in the Moyamba District represent a variety of habitats which include many plant species, especially forest trees, some of which have localized as well as widespread distribution (Lebbie and Guries, in preparation). Most sacred groves in Sierra Leone are small in size, seldom exceeding 10 ha., and with increasing modification of surrounding habitat, as well as isolation of the sacred groves, possibilities for local plant extinction appear high. Most studies on forest fragmentation have focused on birds and larger mammals, but the implications of such studies are also applicable to plants occurring in sacred groves of varying size and degree of isolation (Leck 1979; Lovejoy et al. 1986). Small isolated sacred groves are likely to lose a large complement of plants (if this is not already the case) than are small and less isolated groves. Though no empirical data exist for sacred groves, observations by herbalists that some plants are now becoming rare in their surroundings suggests that local extirpation is already taking place. For the more isolated and smaller sacred groves, efforts should be directed toward increasing their size to minimize possibilities of localized extinction.

Most medicinal plants discussed here are native to Sierra Leone, although a few are exotics, including *Tridax procumbens*, *Catharanthus roseus*, *Mangifera indica* and *Jatropha curcusa*. The persistence of exotic species in some sacred groves is almost certainly due to continued agricultural disturbance and human dispersal and limited expansion of sacred groves into agricultural areas. Exotic species may have little conservation value but still represent important plant resources to local herbalists. The use of introduced species by practicing herbalists demonstrates the dynamic nature of ethnobotanical knowledge as new plant resources are incorporated into traditional folk medicine. For example, the use of *C. roseus* in traditional folk medicine in West Africa is reported here for the first time despite its widespread use for diabetes in other regions (Burkill 1985; Oliver-Bever 1986).

Local community knowledge in the use of plant resources is also very important for conservation efforts directed at protecting medicinal plants. Folk medicine practitioners tend to have extensive knowledge of the ecology and use of the local flora. However, as many local cultures are increasingly threatened, the need to document their knowledge of plants for medicinal and other uses becomes more urgent. In recent times, sacred groves in the Moyamba District have come under threat from commercial exploitation of mineral resources. Since very little is known about species composition and medicinal uses of plants within sacred groves, it is important that such information be collected and measures be taken to provide a framework for the conservation of plants of medicinal value in these sacred groves.

#### ACKNOWLEDGMENTS

The authors wish to thank the NYZS/The Wildlife Conservation Society, and the Conservation Biology and Sustainable Development program at the University of Wisconsin-Madison for research grants to conduct field work in Sierra Leone. We also acknowledge the efforts of the traditional leaders in the Moyamba District of Sierra Leone for allowing the field work to be conducted. We are indebted to all the herbalists for their patience and willingness to share their ethnobotanical knowledge, and we are particularly grateful to Mama Jenneh, Jilo Sam-King, Boi, Mama Tommy, Mama Kadie, Mama Kinee, Tamba, Mama Fatu, Mama Simbo, Nyamea, Sowie Ngajah, Mariama Gbani, Secna Lamboi, Samuel Saidu, Simeon Alpha, Abibu Johnson, Marie Lavalie, Lavai Sengeh, Sowie Sudie and Marie Allieu. Three of our field assistants, Abibu Johnson, Daniel Momoh and Alfred Mbayo provided invaluable assistance. We also thank J. L. Borboh of the National Herbarium of Sierra Leone for helping with plant identifications.

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## BOOK REVIEW

**Natural Products: Their Chemistry and Biological Significance.** J. R. Mann, S. Davidson, J. B. Hobbs, D. V. Banthorpe, and J. B. Harborne. 1994. Copublished by Longmans Scientific & Technical and John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158. ix + 455 pp. (paperback). \$44.95. ISBN 0-582-06009-5.

*Natural Products: Their Chemistry and Biological Significance* is a much needed addition to the various organic chemistry text books on the market. This is one of the few natural products books which has been specifically written as a text. The book should be useful for advanced undergraduates or beginning graduate students. The text covers the major classes of primary and secondary metabolites, including carbohydrates, nucleosides and nucleotides, amino acids and peptides, fatty acids and their derivatives, terpenoids, phenolics and alkaloids. Surprisingly, polyketides are not covered. In each chapter, information is presented on structural variation, structure elucidation, synthesis, biosynthesis and biological significance. The seven chapters are written by different authors and thus the emphasis varies somewhat. For instance, the emphasis in the carbohydrates chapter is on synthesis while that in the terpenoids chapter is on structural types.

The "Introduction" will be appreciated by students without a biochemistry background as it bridges the "gap" between a knowledge of laboratory chemistry

and an understanding of biochemical pathways. Analogies are drawn between the conversion of an alcohol to its tosylate to make it into a better leaving group, with the biochemical phosphorylation of an alcohol by ATP. Also, the section on enzymes and cofactors will permit students without any formal biochemistry background to appreciate the biosynthetic discussions. Unfortunately, this section is only five pages in length and students may well have benefited from a slightly more extensive introduction to biological chemistry.

Each chapter is well referenced, with the references presented in the form of "Further Reading." They are divided into "General references" which refers the reader to such sources as "Dictionary of Alkaloids," and "Research references" which indicate appropriate items in the primary literature. This format seems particularly suitable for students.

The text is not a comprehensive account of natural products chemistry—such would be unmanageable, and inappropriate for students. Rather, it will provide a very usable text to introduce students with a sound background in organic chemistry to the field of natural products.

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