

THE ROLE OF MEDICAL ETHNOBOTANY IN ETHNOMEDICINE: A NEW GUINEA EXAMPLE

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ABSTRACT.—Medicinal plants are known all over the world. They are indispensable as ingredients of many important modern drugs and are sources for the imitation of natural molecular structures by synthesizing even more powerful analogues in laboratories. Of the 300 million prescriptions written during 1963 in the United States, 47% contained a drug of natural origin and the yearly world market for medicinal plants has been established at \$300,000,000 (Logan 1978:181). Some people maintain that medicinal plants are efficacious; others are skeptical of the plants' curative powers. Despite this it has been estimated that from 25 to 50 percent of the non-Western pharmacopoeia are empirically effective (Hughes 1978:154).

In the present paper I am mostly concerned with the Meiwa tribe of the Northern Melpa people, and Sau Enga, Kombolo, and some Hagahai groups (Pinai, Mamusi and Luyaluya).² The area where these people live lies at the border of three provinces: Western Highlands, Madang, and Enga in the Highlands of Papua New Guinea. During my field research I was able to observe different healing practices in this remote area. Extensive bibliographies on traditional healing in Papua New Guinea not discussed in my paper are those by Hill (1985) on medicinal plants and Jilek (1985) on ethnomedicine.

THE HISTORY OF MEDICAL ETHNOBOTANY IN THE SOUTH PACIFIC

Some say that pre-literate tribal societies would hardly have continued to use drugs for centuries if they possessed no curative properties, a faith, as Evans-Pritchard says, which is unhappily contradicted by the history of European medicine and by the history of magic everywhere (1972:494). On the basis of my experience in the upper Yuat area of Papua New Guinea, I question whether these traditional tribal people have used medicinal plants through the centuries. If we compare three neighboring groups of people: the Northern Melpa, who have extensive contacts with other groups and the outside world, the Pinai with fewer such contacts, and the Kombolo and those Hagahai groups who are virtually without them, knowledge about medicinal plants is found to decrease in the same order.

People tend to be curious about any kind of knowledge if it is closely connected with their own way of life, and if they discover an interesting plant that does not grow in their home area, they will take it home. We often carried seeds, or even whole plants attached to my backpack, from one hamlet to another and from one group to another, and transplanted them. This applied equally to plants of decorative, food, and medical value. It is obvious that people with more contacts with other groups and the outside world will have developed a richer repertoire of herbal medicine and related knowledge through their wider experiences. According to Romanucci-Ross:

Folk culture is . . . a more open system of beliefs and behaviors than societies we call primitive, which are characterized by transmission of beliefs and behaviors in a closed system lacking the opportunities found in a situation of culture contact (1982:5).

For the Melpa living in Hagahai (Pinai) territory, the leap from primitive to folk medicine, which occurred after contact with other groups (especially Enga), resulted in an extension of medical beliefs and practices, and also had a significant outcome for their knowledge of medicinal plants.

If one asks people about the history of their medicinal plants they will say that they inherited their knowledge from their ancestors and that they have used plants as medicine for centuries. How is it then, that the majority of the Hagahai and Kombolo people, who were considered 'lost tribes' until 1983, know so little about *marasin bilong bus* (Pidgin term for bush medicine) (see also the scanty reports on medicinal plants by Miklouho-Maclay 1886). If we survey healing practices in other parts of the South Pacific, we find parallels in the history of the development of use of medicinal plants. Rivers (1927:65) wrote that the medical art of Indonesia presents more variety than that of Melanesia or Polynesia. He attributed this to the influences to which Indonesia has been historically exposed (Hindu and Chinese in particular). Rivers argued that Polynesian medicine (in the sense of plants) could hardly be said to exist, and that little use was made of herbs or other internal remedies. Even where definite therapeutic remedies were employed in Polynesia, including New Zealand, these were of recent introduction (Rivers 1927:63,64). He stressed that herbal medicine was much more elaborate in Melanesia than in Polynesia (Rivers 1927:93). When Rivers wrote his book nothing was known about the New Guinea Highlands. The area was thought to be uninhabited. In Samoa, for example, where medicinal knowledge had evolved to a state where an expanded range of causal agencies was acknowledged, Macpherson found:

. . . [a] greatly increased range of plants and plant compounds used in the management of illness. Contemporary Samoan medical practice depends heavily on a wide range of indigenous and exotic plant species. This appears to be a post contact development, a conclusion supported by examination of the record of Samoan plant usages over time. An analysis of early editions of Pratt's much-praised dictionary yields very few plant usages connected with medicine despite a large number of non-medicinal plant usages (1985:14).

If we look at what Stair noted in 1897, we can see that there were few Samoan remedies, and these did not include many medicinal plants or herbs of much value (MacPherson 1985:8). Early missionary accounts make little mention of the use of plant medicines in Futuna, while today they play an important role in traditional healing (Biggs 1985:121). In Nanumea, Tuvalu, herbal medicines are a recent introduction and Kennedy reported during his research in the mid 1920s (Chambers 1985:34) that traditional therapies using plants were not known before import from Fiji (for Fijian medicinal plants see Cambie 1986). After quoting Martin (1817) who reported that in Tonga few medicinal plants were used around 1800, and that the first plant infusions were taken from the people of Fiji, Weiner (1971:424) asks himself:

Why is there no record present or past of the employment of hallucinogenic or narcotic plants by the Tongan in his medical or religious rites? Has there been less need for these agents than in many areas of South America and Asia? Have these Pacific islanders been less inquisitive about their flora?

We can ask these very same questions of the medical knowledge of the New Guinea Highlands. While among the Northern Melpa, herbal medicine has reached that stage where plants play a role in everyday treatment (but not much more), medical ethnobotany among the Hagahai and Kombolo is still in an initial process of development, and shows no historical presence. In the upper Yuat area of the Hagahai and Kombolo, we witness the phenomenon of a dual system: knowledge about medical ethnobotany is appearing and disappearing at the same time. But when considering the value of plant collection I agree with Parsons (1985:213):

. . . whatever the truth about the history and the extent of herbal remedies being used they do exist today. Indeed, the interest in locating and documenting such plants is increasing.

RESEARCHERS AND MEDICINAL PLANTS IN THE NEW GUINEA HIGHLANDS

It is interesting that medical anthropologists such as Glick (1963, 1967) and Lewis (1975, 1979, 1986), who have worked for long periods in Papua New Guinea, became very skeptical about the extent of use and efficaciousness of medicinal plants. Johannes (1976) says that very few medicinal plants are known to Nekematigi non-curers in the Eastern Highlands Province, though curers know a great variety of them. Johannes (1975, 1976) is one of the few anthropologists who insists: 'that the clinical attributes of specific plants are important factors in the healing equation in New Guinea and presumably elsewhere' (Brown 1987:6). Welsch (1982a:76, 94) tells us that only nettles and a few other substances in the traditional Ningerum repertoire are likely to have specifically positive effects. Short-term researchers (ethnobotanists usually) without knowledge of local people's medical beliefs and magico-religious worldview, came back full of enthusiasm, with collections of plants that people had told them about. On the basis of such reports, an untrained observer can easily be misled concerning the number of effective drugs in use in the Papua New Guinea Highlands. Our duty is to place medicinal plants in the context of people's cultural (medical) worldview, to examine their professional and non-professional use, and to recognize any other medical practices which occur. The medicinal plants I have documented (Table 1) must be considered as part of the whole body of beliefs and practices. Once we understand that most serious illnesses are attributed to spirits, sorcery, or the breaking of taboos, and are thus principally socio-psychological in nature, then we also understand why divination and counter-magic are considered as appropriate treatments. The Northern Melpa, Sau Enga, Hagahai, and Kombolo do not have a social category for herbalists, witch-doctors, or shamans. Their traditional healers are ritual specialists who know spells for exorcizing malevolent forces. Plants used in such performances have no direct pharmacological effect (but are part of psychosomatically effective ritual); and even if they did have some active compounds, these would hardly be absorbed through the skin into the body when used externally. I call them healing plants in contrast to plants that cure.³ A professionalized, indigenous medical system, using medicinal (curing) plants, simply does not exist. That is why it is comparatively easy to collect basic data about plants that cure, but more difficult to record plants used in counter-magic. Curing plants could be classed in the 'Popular sector of Health Care' as defined by Kleinman:

It can be thought of as a matrix containing several levels: individuals, family, social network, and community beliefs and activities. It is the lay, non-professional, non-specialist, popular culture arena (1980:50).

Evans-Pritchard (1972:482) says that an individual Zande will not know more than three hundred plants used for medical purposes. Frake (1961:131) tells us that among the Subanum of Mindanao, responses to illness depend on the selection of botanically-derived remedies from 724 recorded plants. From a close review of the medical, anthropological, and botanical literature, and judging by my own experience, it appears that Highlanders in general are poor herbalists. The small number of plants employed medicinally could be explained partly by their perception of the cosmos, including medical beliefs, and their lack of anatomical and physiological knowledge.

One could say that quality is much more important than quantity and that it is better to have a small number of highly effective drugs than a large number of ineffective ones. Let us note first how Evans-Pritchard doubts the effectiveness of plants used by the Azande:

The enormous number of drugs which Azande employ and the variety of herbal products they bring to bear on a single disease at once demonstrate their lack of therapeutic value when we reflect what scientific pharmacology really implies (1972:494).

I found, however, that medicinal plants among the Northern Melpa at least deserve the term, and serve people in everyday life, particularly in the event of external injury. These medicines cannot compete with Western medicines and usually do not show any potency in the modern pharmaceutical sense. In cases of serious illness, a person usually receives no relief (if he does not employ a ritual specialist, or does not go to an aid post or hospital) and waits for the self-limiting system of the organism to win or lose. But with the combination of traditional and Western knowledge individuals can enjoy a reasonably good state of health.

Readers of reports often complain about poorly recorded information on the preparation and dosage of medicines (Croom 1983:15, 21); but for the whole area around the Yuat and Lai rivers, there are no real recipes or prescriptions for self-treatment by individuals. They never prepare complicated mixtures or extractions; nor do they make tinctures, solutions, suspensions or emulsions; they do not prepare teas or infusions either (Panoff 1970:76 for Maenge). They never cook mixed herbs to prepare a special medicine. They merely chew leaves and spit them (or heat and squeeze them) on the injured area, or they simply eat them. Knowledge about medicinal plants is poor and no individual could really be called a specialist. Everyone knows how to use stinging nettles and ginger and perhaps a further five to ten more useful medicinal plants. In his discussion of Gimi plant use in the Eastern Highlands Glick (1963:153; 1967:44-5) states that 'most plants are used simply because they are there, and we will not go far trying to explain their use by noting their qualities or peculiarities.' Furthermore, I sometimes heard the same name given for different species and I had to ask several people before I could collect the correct one (Weiner 1971:426 for Tonga). It was often the case that those who went collecting with me in the bush knew the particular plant only from descriptions given to them the previous day by somebody else. An informant, in a single sentence, will state how and why a plant is used. A curious observer will ask to be shown the whole process, and during his stay with the people he will often attend curing sessions. But throughout these performances he will learn little more. It is unusual for the size of the dose to be mentioned, but doses do vary from time to time, according to the age of the patient, the stages of illness, as a result of individual differences between practitioners, and because today is different from yesterday.

People will often tell a researcher about plants used for treatments which, in

reality, they do not use. In fact, he will be surprised to find that people do not use plants once they are injured, however enthusiastic they might have seemed about the power of plants just a couple of days before. When I arrived in the field and asked people if they used plants as medicine, the answer was: 'A lot, even more than a lot.' The picture changed towards the end of my fieldwork and I came to agree with Lewis, who said that among the Gnau only nettle leaves are commonly used in serious illness, and that they use no specific herbs in the sense of plants whose medicinal use depends on the clinical signs observed (Lewis 1975:144). Murdock (1980:6-7) argued that infectious diseases in isolated small-scale societies could spread only with difficulty and tended therefore to be localized in particular areas. He went on to say that human beings develop a relative immunity through a process of natural selection, while the disease micro-organisms undergo an opposite evolutionary development; the more lethal strains kill their carriers and thus tend to be eliminated. This dual process would help to explain why medicine men in pre-literate societies have more often been specialists in magical therapy than herbalists or bone setters. On the other hand, once we accept that curing plants are part of lay treatment, we can see that people use them as medicine from time to time, after the physical aspects of illness are recognized. Unfortunately for ethnopharmacologists searching for new powerful drugs, however, in the majority of cases these are lesser maladies. From my own observation, and my own use, I can say that these medicinal plants are not very effective, or are not even consistently used by people. Such is the case, for example, with *Kui bono* (Melpa) (*Buchnera tomentosa*) which was claimed to be used as a contraceptive; but when at the end of my stay I repeatedly asked about it, people (especially women) admitted that it does not really work.⁴ Likewise, external injuries, if they do not fester (and many times even if they do), will usually remain untreated. The only powerful plant is stinging nettle which is somewhat surprising for a region with a rich flora. I must agree once again with Lewis, when he states:

If we look at treatment in tribal societies, hoping to learn from it, it is in their skill at meeting expectations and at providing social and psychological support and care during illness that the primary interest lies, I think, rather than in the possibility that we may find useful healing plants or drugs that we do not know (1979:237).

PLANTS THAT CURE

Among the most popular curing plants are those which are used in everyday life (these are not mentioned in Table 1). Sore and cuts are covered with the oily juice of *Pandanus*, smeared with latex of breadfruit. People moisten tobacco leaves with saliva, or heat them over the fire and press them on lesions. Quite often, after chewing *Areca* nut, they spit the red juice over the sores. People give little attention to this treatment, it does not require continuity of practice, and it is simply part of everyday life. Sores and cuts usually fester, before or after the treatment. Leaves of *tanget* (Pidgin) (*Cordyline* sp.) or banana are stuck into the lower part of bark belts to reduce the pain caused by scabies. When abscesses are in the ripening stage and at their most painful, people use fresh leaves of tobacco (*Nicotiana tabacum*), leaves of *daka* (Pidgin) (*Piper betle*) and sweet potato (*Ipomoea batatas*), and leaves for rolling up cigarettes (*Acalypha insulana*). These leaves are heated over the fire, moistened with saliva and stuck over the abscess. The reason for this is to accelerate ripening. The common green vegetable *aibika* (Pidgin) (*Hibiscus manihot*) is eaten for general

TABLE 1.—Plants Used in the Treatment of Illness Collected between August 1986 and March 1987 in the Territory of Lai and Yaut Rivers, Papua New Guinea.

Ser. No.	Coll. No.	Plant name	Family	Native name	Part used	Application
1	65	<i>Acalypha insulana</i> Muell. & Arg.	Euphorbiaceae	<i>isedeway</i> (<i>tecuwa</i>) P	leaves	sores, wounds
2	33	<i>Acorus calamus</i> L.	Araceae	<i>manana</i> or <i>kopan</i> P	leaves	serious illness
3	53	<i>Alphitonia ferruginea</i> Merr. & Perry	Rhamnaceae	<i>pokta</i> M <i>poger</i> E	bark, leaves	counter magic, toothache
4	85	<i>Alsomitra macrocarpa</i> (Bl.) M. Roem.	Cucurbitaceae	<i>damdam</i> M	fruit	poison
5	42	<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae	(<i>koguli</i>) P	sap	sores, wounds
6	74	<i>Amonum aculeatum</i> Roxb.	Zingiberaceae	<i>pu</i> P	pith	in mixture for hair oil
7	76	<i>Amorphophallus campanulatus</i> (Roxb.) Bl. ex Decne	Araceae	<i>gongon</i> M	whole plant	poison
8	47	<i>Angiopteris</i> sp.	Angiopteridaceae	<i>pombukma</i> M	leaves	counter magic
9	28	<i>Anisomeles malabarica</i> (L.) R.Br.	Labiataeae	<i>kond</i> M	leaves, whole plant	earache
10	2	<i>Ardisia</i> cf. <i>subanceps</i> Laut. & K. Schum.	Myrsinaceae	<i>kupang</i> M	whole plant	hunting (protective) magic
11	81	<i>Arenga microcarpa</i> Becc.	Palmae	<i>tim</i> M	pith	cough
12	88	<i>Asplenium nidus</i> L.	Aspleniaceae	<i>I'gou</i> M	leaves	contraceptive (pigs)
13	69	<i>Baccaurea papuana</i> F.M. Bail.	Euphorbiaceae	<i>aka</i> P	fruits	stomachache
14	60	<i>Bambusa macrolemma</i> Holtum	Gramineae	<i>hotu</i> P	leaves, pith	diarrhoea
15	78	<i>Begonia serratifoliosa</i> Imscher	Begoniaceae	<i>kurtuninga</i> M	leaves	for pigs to get pregnant
16	12	<i>Bixa orellana</i> L.	Bixaceae	<i>kelye</i> M	fruits	decoration
17	106	<i>Blumea riparia</i> (Bl.) DC.	Compositae	<i>mingulya</i> M	leaves, stem	toothache
18	97	<i>Breynia cernua</i> M.A.	Euphorbiaceae	<i>poimbek</i> M	leaves	counter magic
19	95	<i>Buchnera tomentosa</i> Bl.	Scrophulariaceae	<i>kui bono</i> M	whole plant	contraceptive

TABLE 1.—Plants Used in the Treatment of Illness Collected between August 1986 and March 1987 in the Territory of Lai and Yuat Rivers, Papua New Guinea. (continued)

Ser. No.	Coll. No.	Plant name	Family	Native name	Part used	Application
20	39	<i>Calamus vestitus</i> Becc.	Palmae	balsa P p(u)ruk M	liquid	eye inflammation
21	57	<i>Calanthe arfakana</i> J.J. Sm.	Orchidaceae	gambekamp M	leaves, fruits	hair growing (dogs), scabies, sores
22	8	<i>Caryota rumphiana</i> Mart.	Palmae	kupanga M kauriya E	pith	cough
23	103	<i>Castanopsis acuminatissima</i> (Bl.) A.DC.	Fagaceae	kuan M	rotten trunk	burns
24	80	<i>Chloranthus officinalis</i> Bl. Syn. <i>Chloranthus erectus</i> (Buch-Ham.) Verdc.	Chloranthaceae	arapandana M	whole plant	eye inflammation
25	9	<i>Cinnamomum frodinii</i> Kosterm.	Lauraceae	kunyakunya M sini P	bark	boils, head pain, mosquitos
26	30	<i>Cissus aristata</i> Bl.	Vitaceae	yara E	liquid from the stem	eye inflammation
27	25	<i>Clematis clemensiae</i> Hj. Eichler	Ranunculaceae	alga M maruka E nadat P	stem	cough, head pain
28	62	<i>Colocasia esculenta</i> (L.) Schott	Araceae	barka P me M taro nabu P	leaves	wounds
29	54	<i>Cordyline terminalis</i> (L.) Kunth	Liliaceae	kumin M usa P tanget (Pidgin)	leaves	hair growing & bilas (decoration)
30	34	<i>Cryptocarya idenburgensis</i> C.K. Allen	Lauraceae	kaima P	fruits	wounds, sores
31	3	<i>Cryptocarya weinlandii</i> K. Schum.	Lauraceae	palima M	bark	head pain, mosquitos, boils
32	75	<i>Cyathea</i> sp.	Cyatheaceae	lokokos P	leaves	cough
33	82	<i>Datura arborea</i> (L.) Steud.	Solanaceae	spak (Pidgin)	leaves, flowers	mosquitos
34	24	<i>Dausonia gigantea</i> C. Muell. ex Schl.	Musci	ue E	called in spell	contraceptive magic
35	31	<i>Decussocarpus wallichianus</i> (Presl.) De Laub.	Podocarpaceae	butuk P	sap	wounds, sores, bilas
36	58	<i>Derris koolgibberah</i> Bailey	Leguminosae	omakan M akra P	root	fish poison

TABLE 1.—Plants Used in the Treatment of Illness Collected between August 1986 and March 1987 in the Territory of Lai and Yuat Rivers, Papua New Guinea. (continued)

Ser. No.	Coll. No.	Plant name	Family	Native name	Part used	Application
37	27	<i>Digitaria bicornis</i> (Lamk.) R.&S.	Gramineae	<i>dondanbil</i> M	called in spell	asking ghosts who brought illness
38	68	<i>Elaeocarpus sphaericus</i> (Gartn.) K. Schum.	Elaeocarpaceae	<i>silaga</i> P	leaves	wounds, sores
39	83	<i>Elatostema beccarii</i> Schroter	Urticaceae	<i>kengana</i> M	leaves	counter magic
40	23	<i>Emilia prenanthoidea</i> DC.	Compositae	<i>naka</i> E	leaves	wounds, sores
41	104	<i>Emilia sonchifolia</i> (L.) DC.	Compositae	<i>kint koyma</i> M	leaves	leprosy
42	10	<i>Euodia hortensis</i> J.R. & G. Forster	Rutaceae	<i>lingit</i> M <i>limbili</i> E	leaves	worms, stomachaches
43	49	<i>Euodia latifolia</i> Bl.	Rutaceae	<i>kilt</i> M <i>alink</i> E	leaves	eye inflammation, to stop menstruation
44	51	<i>Euphorbia plumerioides</i> Teyssm.	Euphorbiaceae	<i>temp</i> M	sap, latex	toothache, sores, boils
45	13	<i>Eurya tigang</i> Laut. & K. Schum.	Theaceae	<i>kelyua</i> M	leaves	leprosy
46	59	<i>Ficus adenosperma</i> Miq.	Moraceae	<i>bandji</i> M	leaves	counter magic
47	5	<i>Ficus botryocarpa</i> Miq. var. <i>subalbidoramea</i> (Eln.) Corner	Moraceae	<i>kindap</i> M	sap, latex	wounds, sores
48	55	<i>Ficus crassiramea</i> Miq. var. <i>patelifera</i> (Warb.) Corner	Moraceae	<i>kele</i> M	sap, latex	toothache
49	84	<i>Ficus dummaropsis</i> Diels.	Moraceae	<i>menimba</i> M	latex, sap, pith	cough
50	35	<i>Ficus pungens</i> Reinw. ex Bl.	Moraceae	<i>uwakai</i> P <i>uwataly</i> M	leaves	sores, wounds
51	37	<i>Ficus wassa</i> Rosb.	Moraceae	<i>makus</i> P <i>sebana</i> P	sap, leaves	sores, wounds
52	22	<i>Gentostoma rupestre</i> J.R. & G. Forster	Loganiaceae	<i>kengaba</i> M <i>kengap</i> E	leaves	sores, wounds
53	101	<i>Geunsia farinosa</i> Bl.	Verbenaceae	<i>muripamp</i> M	leaves	counter magic
54	41	<i>Gigasiphon schlechteri</i> (Harms) De Wit	Leguminosae	<i>sakai</i> P <i>baya</i> M	seeds	hair growing and decoration

TABLE 1.—Plants Used in the Treatment of Illness Collected between August 1986 and March 1987 in the Territory of Lai and Yuat Rivers, Papua New Guinea. (continued)

Ser. No.	Coll. No.	Plant name	Family	Native name	Part used	Application
55	4	<i>Glochidion novoguineensis</i> K. Schum.	Euphorbiaceae	<i>eym</i> M	bark	toothache
56	32	<i>Grevillea papuana</i> Diels.	Proteaceae	<i>aulu</i> P	leaves	sores, wounds
57	32	<i>Hemigraphis</i> sp.	Acanthaceae	<i>sudime</i> P	leaves	hair growing
58	96	<i>Holochlamys guineensis</i> Engl. & Krause	Araceae	<i>kuoypaga</i> M	leaves	burns
59	98	<i>Homalanthus novoguineensis</i> (Warb.) Laut. & K. Schum.	Euphorbiaceae	<i>kurup</i> M	sap, pith	boils, abscesses
60	20	<i>Homalomena cordata</i> Schott.	Araceae	<i>kuaiernalimamp</i> M <i>yadik</i> P	leaves	sores, rain magic
61	73	<i>Homalomena versteegii</i> Engler	Araceae	<i>kurimp medana</i> M <i>kogolo</i> P	leaves	sores, love magic
62	93	<i>Hornstedtia lycostoma</i> K. Schum.	Zingiberaceae	<i>d(11)imba</i> M <i>tumbi</i> E <i>gorgor</i> (Pidgin)	seeds, mucus from flowers	diarrhoea, eye inflam- mation
63	99	<i>Impatiens hawkeri</i> Bull	Balsaminaceae	<i>kundip krapa</i> M	leaves	scabies
64	14	<i>Ischaemum polystachyum</i> Presl.	Gramineae	<i>pozgel pora</i> M	mucus	eye inflammation
65	1	<i>Laportea decumana</i> (Roxb.) Wedd.	Urticaceae	<i>nunt</i> M <i>nagau</i> E <i>jabu</i> P	leaves	universal
66	7	<i>Lycopodium serratum</i> Thumb.	Lycopodiaceae	<i>mayrepa</i> M	whole plant	antidote for poisons
67	94	<i>Macrothelypteris</i> <i>torresiana</i> (Gaud.) Ching	Thelypteridaceae	<i>kota</i> M	leaves	boils, abscesses
68	18	<i>Maesa haplobotrys</i> F.V. Muell.	Myrsinaceae	<i>gap</i> M	leaves	sores, wounds
69	102	<i>Maoutia</i> sp.	Urticaceae	<i>namp</i> M	leaves, called in spell	fish poison, burns, cuts, sores
70	29	<i>Morinda umbellata</i> L.	Rubiaceae	<i>tipopamp</i> (<i>tipokoypamp</i>) M	leaves	sores, wounds
71	26	<i>Mucuna cyanosperma</i> K. Schum.	Leguminosae	<i>kuguba</i> M	whole plant	hair growing

TABLE 1.—Plants Used in the Treatment of Illness Collected between August 1986 and March 1987 in the Territory of Lai and Yuat Rivers, Papua New Guinea. (continued)

Ser. No.	Coll. No.	Plant name	Family	Native name	Part used	Application
72	105	<i>Nothofagus starckenborghi</i> van Steenis	Fagaceae	<i>kraip</i> M	rotten trunk	burns
73	43	<i>Oenanthe javanica</i> DC.	Apiaceae	<i>kun</i> M <i>chakam</i> P <i>tasida</i> P	leaves	earache, inflammation
74	77	<i>Ophiuros tongcalingii</i> (Elmer) Heurad	Gramineae	<i>por</i> or <i>qui por</i> M	leaves	contraceptive for pigs
75	16	<i>Pangium edule</i> Reinw.	Flacourtiaceae	<i>mut</i> E <i>uya</i> M <i>sis</i> (Pidgin) <i>masa</i> P <i>chebela</i> P	bark, leaves	sores, lice, food, pig's wounds
76	61	<i>Paspalum conjugatum</i> Berg.	Gramineae	<i>chebela</i> P	leaves	sores, wounds
77	21	<i>Pentapthalangium pachycarpa</i> A.C. Smith	Guttiferae	<i>noga</i> E	sap, latex	scabies
78	64	<i>Piper betle</i> L.	Piperaceae	<i>mada</i> P <i>daka</i> (Pidgin)	leaves	boils, abscesses
79	45	<i>Piper wichmannii</i> C. DC.	Piperaceae	<i>koke</i> M <i>kyengaly</i> E	leaves	counter magic
80	78	<i>Pipturus argenteus</i> (Forst.f.) Wedd.	Urticaceae	<i>kilip</i> M	bark, leaves	plaster, counter magic
81	15	<i>Platea excelsa</i> Bl. var. <i>borneensis</i> (Heine) Slum.	Icacinaceae	<i>ipik</i> M <i>tindokop</i> E	fruits	sores, wounds, leprosy
82	100	<i>Polyscias ledermannii</i> Harms.	Araliaceae	<i>puli</i> E <i>pembla</i> M	called in spell	contraceptive magic
83	40	<i>Pometia pinnata</i> J.R. & G. Forster	Sapindaceae	<i>kobia</i> (<i>kobyama</i>) P <i>ton</i> (Pidgin)	leaves, fruits	sores, wounds, food
84	87	<i>Premna obtusifolia</i> R. Br.	Verbenaceae	<i>bapa</i> M	leaves	counter magic, vegetable
85	6	<i>Rhododendron</i> sp.	Ericaceae	<i>pil</i> M	leaves	antidote for poisons
86	50	<i>Sacciolepis indica</i> Chase	Gramineae	<i>gangalye</i> M	whole plant	in magic against menstruation
87	46	<i>Setaria palmifolia</i> (Koenig) Stapf.	Gramineae	<i>kura</i> M <i>wandama</i> P	leaves	counter magic
88	91	<i>Solanum lasiocarpum</i> Dun.	Solanaceae	<i>rik</i> M	leaves	boils, abscesses

TABLE 1.—Plants Used in the Treatment of Illness Collected between August 1986 and March 1987 in the Territory of Lai and Yaut Rivers, Papua New Guinea. (continued)

Ser. No.	Coll. No.	Plant name	Family	Native name	Part used	Application
89	86	<i>Sphaerostephanos unitus</i> (L.) Holltum	Thelypteridaceae	<i>pulpint</i> M	leaves	protective magic
90	36	<i>Syzygium pteropodum</i> (Laut. & K. Schum.) Merr. & Perry	Myrtaceae	<i>qui</i> M	leaves	counter magic
91	17	<i>Ternstroemia cherryi</i> (F.M. Bailey) Merr.	Theaceae	<i>por</i> M	leaves	back pain (pigs)
92	19	<i>Uvaria rosenbergiana</i> Scheff.	Annonaceae	<i>kendelh</i> M	leaves	eye inflammation
93	11	<i>Zingiber officinale</i> Rosc.	Zingiberaceae	<i>konga</i> M <i>itamaiya</i> E <i>hamu (omu)</i> P <i>kawauar</i> (Pidgin)	root	universal

M = Melpa E = Enga P = Pinai a is pronounced as a in 'along' ch is pronounced as ch in 'church'

body pains and pains in the joints, legs and arms. The leaves and young shoots are cooked in an earth oven, boiled or steamed in pots and eaten by the sick person. The main nutritive value of *aibika* lies in its high protein-to-calorie ratio and high mineral and vitamin content (Powell 1976:124). Pain in the mouth including the tongue, palate, gums and teeth, can be alleviated by chewing wild or cultivated *Areca* nut with leaves, fruits or bark of *daka* (*Piper betle*) and lime. Although the practice of chewing betel nut turns the teeth black (mouth cancer is not yet known in this area), it also has the useful effect of cleaning them after meals.

Leaves of *Laportea decumana* have a miraculous role in people's lives all over the New Guinea Highlands. What aspirin and antibiotics are to Western scientific medicine, stinging nettles are to New Guineans in the bush. Nettles are used in cases of major illness and minor ailments, but mostly as an analgesic and antirheumatic. They are used in headache, backache, stomach complaints, diarrhoea, fever and general weakness. In such treatments innumerable small lumps appear after the rubbing, but they disappear within half an hour. Nettles work as a rubefacient and stimulate the circulation of the blood in that part of the body. Injected histamine leads to hyperemia in the treated area and gives relief to pain resulting from ischemic conditions, while the acute pain it causes is superimposed so that the deep and heavy pain the patient was complaining about is not felt to the same degree as before (Schiefenhoewel 1971:143). If the skin is itchy because of fleas, for instance, nettle leaves are rubbed over the body in the evenings before going to bed. In serious illness *L. decumana* is used together with spells against sorcery or malevolent spirits. The plant is common on trail sides and it is planted around houses. Leaves are kept in bundles in people's homes and are carried around in their *bilums* (string bags in Pidgin).

Another universal plant is ginger (*Zingiber officinale*). Although rarely used among the Meiwa, the last Northern Melpa group, it is very well-known and used among the Hagahai, Kombolo, and Sau Enga. When a man is wounded in a fight, and the head of an arrow remains in the body, leaves and rhizomes of ginger are chewed and spat over the wound, while the leaves are used as a dressing, and bandaged with a creeper. People use chewed ginger when they cut their hands or legs with knives and axes. When somebody has an eye inflammation, a bit of ginger is masticated, spat onto the leaf, and the eyes are then washed with the saliva. In the case of a cough, people eat and inhale rhizome of ginger. Since ancient times this species, cultivated in the tropics, has had varied therapeutic uses, and it is widespread (Perry 1980:443; Ayensu 1981). The effects of gingers have been tested for a number of different pharmacological activities, and *Zingiber* specimens have been chemically analysed (Perry 1980:443; Reutrakul *et al.* 1986:197).

As the whole collection is given in Table 1 and the uses of individual plants are described in my thesis (Telban 1988), I do not intend to discuss the particular use of each plant here. I also omit in this paper all those plants that are used as poisons, whether fishing or for homicide. Melpa people are not experienced sorcerers (Strathern 1979b:80), but fear of poisoning is present all the time. In a discussion that follows I exclude nettle and ginger, because of their wide use, and those plants which are used for decoration and poison. The Northern Melpa use 36% of medicinal plants for external lesions (Pinai and Mamusi 48%) and 15% together with spells (i.e. healing plants) for exorcizing malevolent powers, sorcery or spirits, out of the body (Pinai and Mamusi 17%). Between 7 and 8 percent are used as pain relievers (earache, toothache), for cough (7-8%), for eye inflammation (7-8%), and 9% for animal treat-

ment. The rest are single plants used as contraceptives or emetics (poison antidotes), for leprosy and scabies, and for repelling mosquitos.⁵ Twenty percent of medicinal plants shown in Table 1 were known to only one or two people, and were not used at all in practice.

PLANTS THAT HEAL

Healing plants are used only by ritual specialists in cases where sorcery or spirits are suspected as the main cause of illness. As there is insufficient space here to discuss how and why spirits or sorcerers bring illness to the patient, how people perform divination, sorcery, and how they sacrifice (A. Strathern 1968, 1969, 1979b; Strathern A. and M. 1968; M. Strathern 1968; Bulmer R. and S. 1962; Telban 1988), I will just mention some cases of treatment known and performed by Meiwa, the last Northern Melpa tribe, to show how healing plants are used.

When Reka, an honest, influential, old big-man from Kokowa was struck by 'eye' sorcery on his return from Enga territory, his skin was burning, he felt tired and weak, with pain all over the body. He groaned, cried and screamed. He immediately sent for a man whose name was always mentioned with respect and fear, as people knew about his command of magical practices. But only a minority of them knew that in the past he had helped many people from the Ukini tribe around Baiyer River. When the ritual specialist arrived at Reka's hamlet he ordered Reka's relatives to prepare food for a *mumu* (earth oven). He went into the bush and collected branches with leaves of (all terms in Melpa) *bapa* (*Premna obtusifolia*), which is often used as the green component in earth ovens, *kengana* (*Elatostema beccarii*), and *muripamp* (*Geunsia farinosa*), and one big leaf of banana, *be*.⁶ A pig was killed with a blow to its head and its blood was collected in the banana leaf. Reka and the ritual specialist went to the nearest stream with a small pool, while all the relatives stayed waiting in the house. The blood was mixed with a little water. A bunch of leaves (*bapa*, *kengana*, *muripamp*) was first dipped into the stream and then the specialist gently struck Reka's shoulders, back, stomach, arms and legs. After a while, he started whispering an incantation to expel the sorcery. He moistened the leaves with the pig's blood and beat the patient's skin, smearing the blood all over his body, still uttering the spell. In the spell he called the names of two Pinale sorcerers (one of the Hagahai groups), some trees (which burn well), and added the standard phrase: 'Cook in the fire.' He used the same spell when we went to a foreign area as a preventive measure against 'eye' sorcery (Telban 1988). The specialist beat the water and the patient's skin alternately, washing away all of the pig's blood from his body, and thus washing away all the illness. All the leaves were then thrown away into the stream, including the banana leaf with the rest of the pig's blood. Then the two men returned to the house. Meanwhile Reka's family cooked a pig in an earth oven, shouting loudly, pretending that they did not have any interest in what was going on near the stream. They distributed the best pork to the specialist and to Reka, who quickly got better, and after a couple of days had totally recovered. The only sign that he had been attacked by 'eye' sorcery were the scars (which looked like dead flesh excrescences) on his back.

Another woman explained to me that when she was sorcerized, she and the ritual specialist went to the stream and made an artificial pool.⁷ During the ritual she sat in the middle of the pool, which was broken up when the ritual ended. For a week she was not allowed to come close to water, and the place of ritual was also taboo

for others from the village. If the other people were present during the ritual, or if they visited the place later, they could get sick and die. Some months later I was told of this same practice by an old woman in Rappgam (Ukini tribe, Melpa); the only difference was that she did not mention *bapa* leaves.

Some older people still remember how to expel *kum*, the kind of sorcery in which a sorcerer who has changed into an animal, insect or stone, has entered the victim's body through his or her buttocks, and is eating him or her inside. The ritual specialist takes *kilip* (Melpa) leaves (*Pipturus argenteus*) and utters a long spell, blowing between each few words, calling the places of *kum*, prohibiting *kum* from coming close and telling *kum* to stay in its own place. In the spell a specialist shoots into the armpit of a cassowary and throws the *kum* towards the junction of the Jimi and Lai rivers. With the leaves he rubs the patient's skin, eyes, head, neck, and testicles, and throws the leaves into the stream in the forest. This practice is not performed anymore as people do not go to the place of *kum*, and because they now follow the church.

If a person is possessed by a bush spirit demon, or by a ghost, a ritual specialist collects four different types of leaves (all names in Melpa): *qui* (*Syzgium pteropodum*), *bandji* (*Ficus adenosperma*), and the indispensable *kura* (*Setaria palmifolia*) and *koke* (*Piper wichmannii*).⁸ He binds them together at the stem with some bush rope or a vine and cooks them over glowing embers. He rubs the skin of the sick person with these hot leaves using an incantation at the same time. Many specialists use only leaves of the last two species, or *koke* together with *pombukma* leaves (*Angiopteris* sp.) or with *kengana* (*Elatostema beccarii*). Pig's blood is often smeared over the patient's skin, and then washed with water and leaves (just as described in the first case for 'eye' sorcery).

Almost all of the practices are accompanied by pig sacrifice to please spirits, and the stick which is used to kill the pig is taken far away into the bush and thrown into the river Lai or buried. I describe all the plants used in these practices as 'plants that heal' (as they are not supposed to have any pharmacological or chemical activity on the patient's body) as distinct from 'plants that cure'. 'Plants that heal' are said 'to be the forest abode of the spirit so that it will be attracted out of the man and back to its proper home' (Strathern, A.J. and M. 1968:183). After use, the leaves are thrown into the stream which will take them to the Jimi and Lai rivers' junction where spirits belong.

PLANTS USED FOR ANIMAL TREATMENT

References concerning animal treatment are very rare in the literature. This is surprising as we know how important pigs, dogs, cassowaries and even chickens are to the people of Papua New Guinea. Counter magic is not performed for animal treatment. People use magical incantations for piglets' birth and growth, but I have never heard of sorcery against pigs, or that they were spiritually possessed. When a pig disappears in the bush, people will say: 'Maybe a rotten tree killed it, or it fell into a hole or cave; maybe somebody stole it; but the most likely event is that bush spirits—demons—killed and ate it.' Pigs fight among themselves and with dogs. Wild pigs attack dogs during hunting, and so wounds occur quite often. When a pig suddenly dies, people examine its liver and usually eat it. But when it is sick or wounded, they will feel sorry for it and will try to relieve its discomfort. When a poisonous snake bites a pig or a dog, people will usually cut the animal's ear and let the blood run. They say that all the bad blood will pour out.

The red oil liquid of *Pandanus* fruit, known as *marita* in Melanesian Pidgin,

pig's fat, ashes and clay are often applied to animal wounds and sores. Some Northern Melpa prepare a fish poison with the *omakan* root (*Derris koolgibberah*), the stem of *alga* (*Clematis clemensiae*) and *temp* (*Euphorbia plumerioides*) and apply the boiled and mashed mixture onto purulent sores and wounds of their pets (all names in Melpa).

When Parka's (a boy around 16 years of age) dog was wounded fighting with a wild pig, and its wounds subsequently festered, he heated some leaves of *wataly* (Melpa), (*Ficus pungens*) over the fire, and when they were soft and hot he crushed them with his hands and rubbed them into the dog's wounds. He repeated this for a couple of days and the dog recovered almost completely. *Ficus pungens* was reported for different purposes also in other parts of Papua New Guinea (e.g. Clark 1971: Appendix; Holdsworth 1977:31) and Indonesia (Perry 1980:274).

For animal wounds and sores Parka used some other leaves mashed with a bush knife and a stone, bound in a banana leaf and cooked in the ashes for an hour. Leaves of *gambelkamp* (Melpa), (*Calanthe arfakana*) release a juice which is rubbed together with the leaves over sores on a dog's skin. When I watched this, a boy, Gris, who was approximately 10 years old, told me that he had done the same thing when his father's dog lost almost all its hair. He did not cook the leaves, but simply hung a bundle high over the fire during the night. In the morning he rubbed juice and leaves over the dog's naked skin. Both dogs yelped, because the leaves and the juice were hot (both in temperature and symbolically 'hot') when applied. People avoid getting this juice in their eyes. Gris told me that the dog's hair grew again with the same speed as his hair after his mother shaved his head. I saw two men during my fieldwork who applied this juice to infected sores which developed from scabies under the bark belts. The treatment was unsuccessful.

When a pig's legs bend and shake, or it falls to the ground, people rub leaves of *por* (Melpa) (*Ternstroemia cherryi*) over its back and make its bed in the sty with these leaves. That helps it to recover. On Manus island the fruit is scraped and placed onto a cut or sore (Holdsworth 1977:62). When domestic pigs fight and their wounds fester, people scrape the inner part of the bark of *uya* (Melpa) (*Pangium edule*) and apply the scrapings to sores and wounds where pus occurs. This bark is not used for fresh wounds, but as they say: 'When "animals" (maggots) are in the injured parts.' The bark of this tall tree, known as *mus* in Pinai vernacular (whose fruits are prized locally as the most delicious food after *Pandanus* [Miklouho-Maclay 1886:349]), is smashed and applied to sores among all Hagahai groups. The sliced fruit is used for sores and cuts in Northern Province (Holdsworth 1977:46). *Pangium edule* is found all over South East Asia and has an exceptionally large quantity of hydrocyanic acid, with the seed rich in oil (Perry 1980:156). A greatly thinned prussic acid solution, such as a cold water infusion of the fresh leaves or seeds, makes an excellent external antiseptic, disinfectant and antiparasitic (Perry 1980:156).

When people are preparing for feasts and do not want their pigs to carry piglets in the meantime, they give them big leaves of *l'gou* (Melpa) (*Asplenium nidus*) to eat, and they say that these protect pigs from pregnancy. The same is said of leaves of *por* (*Ophiuros tongealingii*). *Asplenium nidus* (syn. *Neottopteris nidus* J.Sm.) is considered to be depurative. In the Malay Peninsula, one tribe is reported to give an infusion to ease labor pains; a lotion obtained by pounding the leaves in water is applied to cool the feverish head (Perry 1980:323).

Leaves of a shrub with violet flowers, which is planted around the houses as decoration, are used for the opposite purpose. When pigs do not bear piglets,

people will give them the leaves of *kurtununinga* (Melpa) (*Begonia serratifetala*) to eat, which should help them to carry. Stopp reported that the juice from the leaves of *Begonia augustae* Irmsch., known as *nuninga* among Mount Hagen people, is applied locally for itching conditions. The whole plant is mixed with hog feed in order to cure skin eruptions on these animals (Stopp 1963:18). Among the Kukukuku, leaves of *Begonia* sp. are heated and rubbed on the skin for abdominal pains (Blackwood 1940:123); and in the Eastern Highlands, crushed leaves and scraped stems are heated in a hollow bamboo and eaten with other food to give relief to stomach aches (Holdsworth and Giheno 1975:191). The Pinai use leaves of *manana* (*Acorus calamus*) to rub on the bellies of sows that have already carried piglets and have difficulty in breathing. They then cook withered leaves together with sweet potato and cassava, and give the food to the pigs. I have never witnessed these practices for contraction and fertility.

A SHORT REVIEW OF OTHER TREATMENTS

What do people do then, if they do not use medicinal plants? Besides healing practices known to specialists where healing plants are used, experts also perform rituals where the emphasis is on spells and the extraction of objects from the patient's body; plants are not used at all in these cases. In societies such as the Meiwa (Northern Melpa), social conceptions of illness play an important role. Wrongdoings and 'wrongtalkings', breaches of taboos, and moral or social transgressions are considered important causes of illness. People and ghosts can both experience anger and frustration. Because of people's wrongdoings ghosts can send illness either as punishment or because they feel sorry for a sufferer (A. Strathern 1968, 1977; M. Strathern 1968; Telban 1988). In such psychosocial illness only special treatments like sacrifice, compensation, and confession (to 'speak out') will remove the source, allowing the patient to recover.

Good food, especially pork, fresh greens or the oily juice of *Pandanus* fruit, is almost always included in treatment. A very sick patient usually refuses all food and just sits or lies quietly, with grief on his face. There are also a number of common 'lay' treatments that require no plants. Everyday practice is to bathe in the stream, to wash away illness. Drinking cold water is also considered a useful treatment. Pinai people, when covered with festering sores and skin ulcers, would often go to the Mina river. Its water is considered curative and people would stay and sleep there for two or three days, washing everyday in the river, until all the skin lesions dried. Water from pig wallows is recognized as health-giving and is recommended quite often as an externally applied treatment (sometimes together with soil from the wallow) for *otitis media* in children and for boils and abscesses. Among the Kombolo this soil is rubbed above the navel in the case of diarrhoea. Northern Melpa, but Hagahai and Kombolo even more so, recognize the importance of soot, ashes, earth, soil, and clay in the treatment of illness to much the same extent that they recognize medicinal curing plants. Small cuts and sores are sometimes covered with pig's or cow's fat (they obtain the latter from the Ruti Cattle Station in the Jimi valley). In the case of *cystitis/nephritis* a patient will cook a stone in the fire, take it into the bush and urinate on it.

As there is no space in this paper to discuss all the practices, why these treatments are performed, and how people explain them, I would just like to mention a treatment which was recommended after I suffered recurrent abscesses. I was told to take

a hard piece of wood and make a digging stick approximately one meter long. Then I was to press the pus out of the abscess onto a leaf and smear it over that part of the stick which I had previously sharpened. I should thrust this stick into the ground beside the path, or even on the path, so that the sharpened end was pointing up. Somebody, whether man, woman, or child, would then pass by and see this nice digging stick. He or she would fancy using it for digging sweet potato, sowing corn or peanuts, and would take it away, together with the pus. All the boils and abscesses would thus go away and never return to me again.

CONCLUSION

What I have suggested in this paper is that indigenous medical ethnobotany in the New Guinea Highlands cannot be shown to have great antiquity of practice, anymore than elsewhere in the South Pacific. As I stayed with isolated populations in the bush, I was able to observe the dual process of adoption and loss of different portions of this knowledge. I agree neither with the majority of medical anthropologists who neglect the existence of medical ethnobotany, nor with those who sing its praises. I distinguish plants that heal from plants that cure, arguing that the latter constitute the corpus of lay, non-professional medical knowledge. People living in remote areas use these practices, but their medical beliefs are more oriented towards moral, social, magical, and spiritual causes of illness (which are natural for them, but not so for us), for which treatment is offered in kind, rather than with the aid of detailed medical ethnobotanical knowledge.

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During 18 months of ethnomedical research in Papua New Guinea, between June 1986 and December 1987, I carried out 7 months field work in a remote area at the border of Western Highlands, Enga, and Madang Provinces, among Northern Melpa, Sau Enga, and some Hagahai and Kombolo groups of people. I am most grateful to many individuals, but most of all to Kela, Krai, Olyua (Melpa), Iwat (Pinai), Bidali (Mamusi), and Mokome (Luyaluya). This work could not have been undertaken without the generous support of my parents and the Slovenian-Australian Association from Canberra, especially two of its members: Roman Bizjak and Erik Fras. A grant from the World Wide Fund For Nature and the financial support of the Research School of Pacific Studies at the Australian National University enabled me to write up my results. Both the Biology Department at University of Papua New Guinea and Department of Anthropology in the Research School of Pacific Studies at Australian National University provided me with excellent working conditions. I am most grateful to all of them.

My voucher specimens are stored in two places: one collection in the National Herbarium in Lae (Department of Forests, Division of Botany), and an identical one in the Herbarium of the University of Papua New Guinea. I am grateful to Paul Katik and Jim Croft of the Herbarium in Lae for their identification of my specimens, to Dr. Helen Hopkins for 'supervising' my botanical collection, and to Dr. Topul Rali for friendship and consultations.

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NOTES

¹Present address: Periceva 7, 61000 Ljubljana, YUGOSLAVIA.

²I have adopted from Dr. Carol Jenkins (1987, pers. comm.) the term Hagahai when referring to the people who comprise the following parishes: the Aramo, the Miamia, the Luyaluya, the Mamusi, the Pinale and the Pinai. 'Hagahai' is their own word for 'people' although the Pinai, the Mamusi and the Luyaluya have, to my knowledge, never grouped themselves under this name. As significant differences exist among the languages within the same sub-family, I must point out that the local Hagahai names used in the text and Table 1 are in the Pinai language, which is understood by the other groups. A short note on orthography is included at the end of Table 1.

³When referring to medicinal plants, I distinguish between 'plants that cure' and 'plants that heal' in the same way that researchers have accepted the distinction between 'disease' and 'illness' drawn by Fabrega (1972:213; 1974). This distinction has been followed by a majority of workers (Colson and Selby 1974:246; Kleinman 1980:72; Young 1982:270), and, in Papua New Guinea for instance, by Lewis (1975:149) and Frankel (1986:2-3). The distinction is also valid for the terms 'curing' and 'healing.'

⁴*Buchnera tomentosa* Bl., Scrophulariaceae is the only plant known as a contraceptive to the population around the Lai and Yuat rivers. Family limitation is controlled by socially determined norms (abstinence) or, in individual cases by magical contraceptive practices (Telban 1988). In addition we may observe that prolonged breast-feeding of infants is known to retard the return of ovulation (Schaefer 1985:318; Wirsing 1985:308-9). Postpartum amenorrhoea can prevent conception in excess of 18-24 months in breast feeding women in traditional societies, regardless of any cultural taboos on sexual intercourse (Schaefer 1985:318).

⁵Among the Maenge, according to Panoff (1970:81), half are employed for wounds, sores, and the like, about a quarter for pains, and another quarter for digestive disorders. Stopp (1963:21) noted for the Central Melpa people that about 60% of medicinal plants are used externally, but if we include so-called 'magic' (healing) plants, the figure rises to 80%.

⁶Strathern (1970:581), in describing performances associated with the female and male spirit cults, says that earth ovens are covered at the bottom with *kengana* (*Elatostema beccarii*) leaves. An expert explained to him that *kengana* is a cool thing, which grows in watery forest places and stays fresh after it is picked. To put it together with pork in an earth oven, means that their crops will grow well and the men will be healthy and live long.

⁷'The dead aspect of still lake, however, is contrasted with the life of running water, which has primarily beneficial attributes' (Strathern, A.J. and M. 1968:195).

⁸Strathern (1979a:63) noted that Ongka had explained to him that very young children, whose skin was soft and tender, were put in net bags where their bed was prepared with the soft round leaves of, as he called it, the *koki*. I think that this was done to protect a child from the spirits. Strathern states that nowadays, leaves of *koki* are also used for chewing together with *Areca* nut.

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BOOK REVIEW

Pharmacopées traditionnelles en Guyane: Créoles, Palikur, Wayãpi. Pierre Grenand, Christinan Moretti, and Henri Jacquemin. Collection mémoires No. 108. Paris: Institut Français de recherche scientifique por le Développement. 1987. Pp. 569 + 76 colored plates. n.p.

The meticulous work of Drs. Grenand, Moretti, and Jacquemin is immortalized in one of the most complete and beautiful works in ethnobotany and ethnomedicine/ethnopharmacology that has ever appeared in any language. *Pharmacopées traditionnelles en Guyane* is an ethnobiological achievement as well as a superb scientific contribution to our understanding of native and creole knowledge and use of medicinal plants.

This volume not only discusses the medical concepts of the three groups studied (the indigenous Palikur and Wayãpi, and the Créoles of Cayenne), but it also offers linguistic details of plant names and variations in names between groups. In addition, ethnographic detail is provided for each entry in the pharmacopoeia, including data on plant selection and medicinal preparations. To make this work even more distinct, pharmacological data are also provided for many of the major species. Complementary bibliographic data on the plants and pharmacological sources also contribute to the scientific quality and value of the volume. Numerous magnificently-done colored plates not only enhance the utility of the work by providing visual guides to many of the plants discussed, but they also mark the exceptional quality of production of the book.

Botanists, ecologists, anthropologists, physicians, and pharmacologists interested in traditional medical and pharmacological knowledge *must* have this book, which will undoubtedly serve as a standard for ethnoscientific research for many decades to come.

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