

NORTHWESTERN UNIVERSITY

**Illness and Medical Care
In a New Guinea Highlands Society**

A DISSERTATION
SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

for the degree

DOCTOR OF PHILOSOPHY
Field of Anthropology

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Evanston, Illinois

June 1976

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Preface

The research on which this study is based was carried out over a period of thirteen months from mid-August 1970 through mid-September 1971. This -- rather than a pre-contact "ethnographic present" -- is the time period referred to throughout the study. Although my research focused on indigenous medical beliefs and behaviors which are, as yet, little altered by the European presence, no attempt was made to reconstruct a purely traditional medical system. On the contrary, I have noted the occasions on which Nekematigi turned to me for medical care (though I was rarely able to offer more than aspirins, antacids or topical antibiotics) as well as their use of more institutionalized forms of western medicine.

The Australian colonial administration in Papua New Guinea established a network of medical aidposts at the ratio of one to approximately ten villages (serving one to three thousand people). Local aidposts are staffed by indigenous orderlies. A year's training enables the orderlies to bandage wounds, administer anti-malarials and anti-biotic injections, and make hospital referrals

in cases of serious illness. One of these local aidposts was built five minutes' walk from my field site during mid-1971 and staffed by an attendant who, though not originally a member of that community, is from a nearby village and speaks the vernacular. Another aidpost of longer standing is located in a neighboring community, twenty to thirty minutes' walk away.

Rural health centers with a European medical assistant or trained nurse in attendance have been established at the ratio of one to approximately sixty villages. Rural health centers have taken over much of the public health survey work and preventive medicine (such as tuberculosis vaccinations and well-baby clinics) that were formerly the responsibilities of roving medical patrol officers. Such a health center is located at Sigerehe, six miles, or two to three hours' walk, from the settlement in which I worked. In spite of the distance, Nekematigi frequently prefer to seek care at the health center rather than at either of their local aidposts.

Fully equipped hospitals are located only in the urban areas, in this case the town of Goroka, thirty-five miles away. Like many newcomers to western medicine, Nekematigi tend to use the hospitals primarily for infant illnesses and for only the most serious illnesses in adults.

Service at rural centers and hospitals is, for the most part, free to indigenes. While Nekematigi make

frequent use of these services, the relative novelty, inaccessibility and ineffectuality of government medicine have meant a continued reliance upon traditional forms of medicine.

Beyond routine anthropological practices, such as participant observation and the recording of genealogies, aimed at attaining a generalized understanding of the local society and its culture, my field methods included approximately three parts elicitation to one part observation of things medical. Most questioning was conducted through local interpreters using the lingua franca referred to variously as Neo-Melanesian, Pidgin or tok pisin. For companionship and for assistance with language translation I am fondly indebted to Ketna, Gotoga, Sotaibo, Namavi, Lobutopa and Getoa'e, all of Napayufa clan, Sobeyagu district. A community of eighty persons within the larger village designated as Megabo #1 by the administration, Sobeyagu was both home and the focus of most of my fieldwork. I am grateful to all the Sobeyagu people for their hospitality, as well as for their tolerance of my undisciplined desire to take part in all their activities while still demanding at erratic intervals to be left completely alone.

During the year's residence with the Sobeyagu I recorded the occurrence of approximately fifty illnesses. Relatively complete data were compiled on twenty-eight of

the recorded illness episodes; these individual medical case histories are included as an Appendix to this study. The generally good health of the Nekematigi and the reluctance of those outside the Sobeyagu residential group to discuss their illnesses with me (or with my interpreters) made obtaining a larger sample impossible. Due to the intimacy of a small community and the patience of the Sobeyagu'mo, however, I was able to observe much treatment-related decision-making and many treatment procedures first hand. More direct observation was possible in relatively prolonged and debilitating illnesses because of their length and the social mobilization that occurred. I am sincerely indebted to the many individuals involved for allowing me to intrude thusly into their personal crises.

Discussion of medical beliefs and related matters took place frequently in the course of relatively unstructured conversations with virtually every member of the Sobeyagu local group as well as with members of neighboring groups. Most elicitation, however, occurred in the context of actual illness-treatment episodes, or following word that someone had been ill or sought treatment. Though probably regarding me as the local equivalent of an "ambulance chaser," Nekematigi generally found it easier to articulate the foundations of their medical system at such times. Or perhaps I

should say it was easier for me to make my questions intelligible to them in the context of an existing (rather than hypothetical or remembered) illness situation. In addition, an actual illness provided the opportunity to check individuals' interpretations against one another -- to assess the degree of fit between theory and action and to ascertain which members of the group were more or less informed about medicine.

The general outlines of Nekematigi medical theory, i.e., that most illness and death is due to various forms of enemy sorcery, are known to all members of the community except unsocialized infants. Nonetheless, for detailed explication of the theory, I was dependent upon adult males. To the women I bored, particularly Boinasa, Napaso and Aliye, and the young people I embarrassed or amused with my questions, I express here my appreciation for their renewable goodwill and occasionally delightful cultural inventions. To the men -- Nekematigi, Orogeigabo and Numuyagabo -- who eventually agreed to discuss their secrets with me, I confess a solemn debt of gratitude, not only for the time they spent with me but also for the risks they accepted in so doing. Since sorcery was illegal under the Australian colonial administration, and bore a rather stiff penalty, they often must have felt that conceding this knowledge was

not only pointless (since I am female) but dangerous since I am white. For obvious reasons, I cannot acknowledge here the good faith of specific individuals.

While many adult men know sorcery, fewer have comparable sophistication in medicine. Fortunately for this research, two men with recognized skills in curing lived in Sobeyagu. I interviewed both of them repeatedly and accompanied them on their "rounds." While I would like to express openly my indebtedness to these men, I have decided to forego personal acknowledgements in favor of pseudonyms to protect their privacy and that of others.

The younger man, known herein as Yasi, was just learning medicine in 1971. Consequently, he provided less substantive information; but increasing demand for his services during the year provided me the opportunity to observe the informal training of a medical practitioner.

The somewhat older and vastly more knowledgeable man, referred to here by the fictional name of Loiye, became my chief medical informant and one of my best friends. Loiye's quick wit, boundless curiosity and facility for self-expression made it possible for us to learn from each other and like each other despite the differences in our backgrounds. His patient repetition of specialized information was extremely valuable as was his willingness to inform me of curing events, introduce

me to curers from other districts and assist me in the collection of medicinal plants.

The botanical specimens were identified by John Womersley and his staff at the national herbarium in Lae, Papua New Guinea. The frequent absence of identifications beyond the level of genus or family reflects either the dearth of botanical knowledge of some highlands flora or mistakes I made in preserving or selecting the specimens. Thanks go to the Lae Herbarium staff for their assistance in spite of the difficulties.

The faculties of the Australian National University, its New Guinea Research Unit and the University of Papua New Guinea were most helpful in providing temporary housing in addition to expert advice on field conditions and government requirements.

Fortuitously, Professor Lew Langness and his wife Joany were also in Papua New Guinea during 1971. Their gracious hospitality and amiable companionship provided many pleasant "escapes."

For financial, emotional and intellectual support during the field research, I happily acknowledge my debt to Dana Keil, my husband. During the writing too, Dana offered constructive criticism, editorial advice and assistance with the illustrations. Without his initial encouragement and continuingly cheerful insistence this study would never have been completed.

For additional financial support during 1971-72 I am grateful to the American Association of University Women.

Professors Mervyn Meggitt of Queens College, City University of New York, and Edward Wellin of the University of Wisconsin, Milwaukee, were very kind to allow me to make reference to unpublished works of theirs.

Finally, I would like to express my appreciation of the entire anthropology faculty at Northwestern University. My classroom training was supported in 1968-69 and 1969-70 by University Fellowships. During and since that time the faculty as a body has not only insisted upon theoretical and methodological clarity but also supported the pursuit of personal insights and interdisciplinary interests. Paul J. Bohannan conducted with concern the administrative details enabling my timely departure to the field. He and Roy Wagner were reflective correspondents. Early drafts of the dissertation were read by Ethel M. Albert and Roy Wagner who offered many helpful suggestions. All the members of the examining committee have given willingly of their time but special thanks go to Ronald Cohen who conscientiously guided a nearly overdue and poorly organized first effort through to its completion.

A Note On Orthography

Both Pidgin and Benabena terminology are used occasionally in the text. Both appear with underlining. Where unspecified, the terms are Benabena; Pidgin is distinguished in textual commentary. I have transcribed both in a single system and as simply as possible: a is pronounced as in English "father," e as in "hay," E as in "bet," i as in "tea," o as in "oh," u as in "cook" or "boot;" ' indicates a glottal stop. This deviates somewhat from the Benabena orthography used by Robert Young (1964:46) in his studies of the Namalo dialect.

CHAPTER ONE

The Anthropological Study Of Medicine

Introduction

Stated simply, this is a study of a New Guinea highlands medical system. Stated somewhat more precisely but neologistically, the study is an "ethno-bio-medical" analysis of Nekematigi illness and medical care, one purpose of which is to argue by example that cross-cultural studies of medicine must take into account both cultural and biological factors to explain medical beliefs and practices. This research report is thus intended as a contribution to both medical anthropology and New Guinea highlands ethnography. Of medical anthropology I shall have more to say later. Here I shall outline the place this study occupies in New Guinea highlands ethnology.

The current proliferation of field studies from the New Guinea highlands is the result of the very recent accessibility of this area for study. Although the New Guinea coast and Melanesian islands have been known to anthropology since the nineteenth century (Codrington 1891; Landtmann 1927; Rivers 1914; Seligman 1909, 1910), the more populous highlands societies of the interior were literally discovered only in the 1930's. In

addition to the reports of early explorers (Champion 1931; Leahy and Crain 1937), some anthropological reports are based on pre-World War Two fieldwork (Chinnery 1934; Fortune 1947a, 1947b), but it was only in the late 1940's that the interior of the island was really opened for study. Since that time ethnographers have committed themselves primarily to documenting basic features of social structure while these societies remain intact. Because of the great cultural and linguistic diversity which overlay a compelling sense of similarity among highlands societies, comparative questions have been a second major focus of anthropological interest in this area (Cf. Read 1954a; Watson 1964; Vayda 1966).

As a result of the recency of investigation in the New Guinea highlands, there has been uneven anthropological coverage. Archaeology and physical anthropology have lagged behind ethnographic and linguistic studies. Ethnographic fieldwork has been intensive in certain parts of the highlands while other areas remain virtually unknown. And, even for groups who have been the subjects of anthropological study, selected aspects of culture remain little known. Art, social change, symbolism and medicine are some of these relatively unexplored areas.

A lack of research on medicine is unfortunate

inasmuch as highlands populations provide especially good opportunities for testing and developing cross-cultural medical theory. Precisely because of the recency of European intrusion, highlands societies are as epidemiologically and culturally "pure" as any contemporary societies can be.

The people with whom I worked call themselves Nekematigi; they are a Benabena speaking people located in the Eastern Highlands District of Papua New Guinea. Nekematigi physical characteristics, environment, subsistence techniques, values and social organization -- including the relationships between sick persons, their kin and medical practitioners -- have undergone minimal change as a result of a generation of white contact. It is the interplay between these factors that provides the focus for this study.

The general features of eastern highlands cultures surrounding Nekematigi are now well known to the anthropological community. Benabena speakers at Korofeigu have been studied by Langness (1963, 1964a, 1964b, 1965, 1967a, 1969, 1971a) and ethnographies of peoples in neighboring language groups are also available (Berndt 1962; Newman 1965; Read 1951, 1952a, 1952b, 1954b, 1955, 1959, 1965). These scholars and others have reported extensively on marriage (Glasse and Meggitt 1969), male initiation (Allen 1967),

religion (Lawrence and Meggitt 1965), law and politics (Berndt and Lawrence 1971; Langness 1971b; Strathern, M. 1972a), economy and ecology (Brookfield 1964; Brookfield and Brown 1963; Bulmer 1968; Finney 1968, 1969; Salisbury 1962). Because medical behavior is integrally tied to other aspects of culture it is often alluded to in general ethnographies or specialized reports. But, to my knowledge, only one anthropologist (Glick 1963, 1967, 1971a) has devoted himself to a study of medicine among an eastern highlands people.¹ The present study was designed to provide a comprehensive picture of medicine among another such people.

The research on which this study is based included examination of not only beliefs -- the usual focus of anthropological interest in medicine -- but also illness patterns, treatment procedures and related social processes. In the context of a sizable body of ethnographic literature, presentation of these data should both broaden the understanding of one New Guinea culture and provide a vehicle for the exploration of analytic options for the study of non-western medical systems.

Primarily descriptive, this study nevertheless treats issues of importance for the general cross-cultural study of medicine. A basic premise underlying my interest in medicine, and my eventual argument for the

adoption of an ecological model, is a personal and professional conviction that human beings' biological, environmental and cultural characteristics must be studied as related facets of a unitary phenomenon. In this view, the study of illness and its treatment requires some understanding of local nutrition and pathogens, medical botany and general therapeutics as well as local social organization, ethnomedicine and patterns of communication. Some of this knowledge originates outside the disciplines known best to an anthropologist; the totality is impossible for a single worker to obtain in an average field stay. Consequently, the analysis relies upon published botanical and medical data as well as upon data gathered during my own fieldwork.

Initially innocent of the direction this theoretical predilection would take me, I conducted my research among the Nekematigi with three deceptively simple questions in mind:

- (1) What is the nature of medical belief and practice?
- (2) Why is it that way?
- (3) Does indigenous medicine work? (Or, more specifically, in what ways does it work?)

My purpose, in other words, was -- and is -- to provide a comprehensive description of the local medical system.

The bulk of the dissertation, then, is a response to the first of my questions, a response which synthesizes the results of interviews with informants, observation of illness-treatment episodes, and ethnobotanical and linguistic investigations. Chapter Two is an overview of highlanders' physical and social environment, the essential backdrop for Chapters Three and Four where Nekematigi theories of illness and treatment are presented. Chapter Five is an analysis of the dynamics of Nekematigi medicine in terms of its social and medical functions. The individual case histories (Appendix I) complete the picture by providing a focus on the processual integration of the physical and behavioral aspects of illness. (For other researchers, reference to the case histories also offers the opportunity to create interpretations of the data which may differ from those presented here.)

The question, "Why is Nekematigi medicine this way?" is addressed with reference to the multiplicity of social, environmental and psychophysiological constraints under which it operates. The question, "Does it work?" is addressed with reference to the outcomes of individual cases and the relative therapeutic value of the medicines used. To handle these questions I was drawn beyond the bounds of the field data to an interdisciplinary body of literature on the intercultural

variability in illness and medicine. The following review of this literature reveals several alternative ways in which the nature and relative utility of medical behavior may be assessed. The careful reader will note that the word "illness" did not appear in my original three questions; yet I have indicated repeatedly that the study is concerned with illness as well as with the Nekematigi response to it. In the development of a straightforward yet thorough account of this medical system it became necessary to consider the nature of Nekematigi illness as one potential answer to the question: why are beliefs and practices this way? To understand why I did not initially treat illness as a variable -- and why others have not -- it is necessary to explore in some depth the scope and history of medical anthropology.

Toward A Theory Of Medicine

A medical anthropological inquiry is defined as one that

(a) elucidates the factors, mechanisms, and processes that play a role in or influence the way in which individuals and groups are affected by and respond to illness and disease, and (b) examines these problems

with an emphasis on patterns of behavior.

(Fabrega 1971:167).

In terms of this broad working definition, an anthropological interest in medicine is nearly as old as the discipline itself, although the delineation of a field of "medical anthropology" occurred only recently.

Death and disease, as well as attempts to prevent or treat them, are universal in human societies, yet are highly variable. Such universal categories of behavior -- language, sexual taboos and medicine -- have always been among the most provocative theoretical areas facing us, representing a professional challenge to identify and explain the limits of human nature.

Despite its longevity, however, medical anthropology has experienced little theoretical development in response to this challenge. This is true whether theory is defined as cumulative sets of testable hypotheses or as broad-based explanations of observed phenomena. While medical anthropology may be no worse off than other branches of anthropology in this respect (Cf. Scotch 1963:32), there are identifiable and unique circumstances which have contributed to its current situation. These include the breadth of its subject matter and the pragmatic milieu in which it has developed.

The well-worn truism is as applicable to medical anthropology as it is to general anthropology: that (medical) anthropology is simply whatever (medical) anthropologists do. Its practitioners include sociologists and psychologists, demographers and pharmaceutical researchers, physicians and laboratory technicians, as well as anthropologists. Indeed, role tension between professional groups has itself been a focus of medical anthropological study (see Polgar 1962). Their tasks range from observing the social processes surrounding the introduction of boiled drinking water in a Peruvian village (Wellin 1955) to studying the differential perception of pain in multi-ethnic societies (Zborowski 1952, 1969; Zola 1966); from analyses of Melanesian medical beliefs and ethnobotanical treatments (Panoff 1970) to analyses of the social organization of American and Japanese psychiatric hospitals (Caudill 1958, 1959); from worldwide surveys of abortion (Devereux 1955) to intensive interdisciplinary studies of highly localized illnesses (Alpers and Gajdusek 1965; Fortune 1960; Gajdusek 1963; Glasse, R. 1967, 1970; Glasse, S. 1964). The study of cultural variation in the incidence, recognition and treatment of illness is the study of the points at which cultural and physical features of human existence articulate directly; but their articulation may be studied from

many different perspectives. Medical anthropology encompasses the study of medical phenomena as they are influenced by social and cultural features, and social and cultural phenomena as they are illuminated by their medical aspects. These distinctions may be seen as two facets of a set of interrelated phenomena. But depending on the nature of the study and the interests of the investigator, one or the other at times may receive greater emphasis or be the focus of attention (Lieban 1973:1034).

Several review articles and edited volumes have categorized the wide-ranging activities of individuals who may be considered medical anthropologists (Caudill 1953; Polgar 1962; Scotch 1963; Weaver 1968; von Mering and Kasdan 1970; Fabrega 1971; Lieban 1973; Coulson and Selby 1974) so I shall not repeat that effort here.

There are, however, two related characteristics of the field that merit special attention -- its development within a context of applied research, and the distance between anthropological and medical goals in basic research. These two factors are of interest because, until recently, they have served to limit the analytic scope of medical anthropological investigations.

The period following World War Two saw the United States, several European countries and the newly created United Nations organization become directly involved in the medical treatment of large numbers of unfamiliar peoples. Programs promoting public health measures and the use of antibiotic medicines were envisioned as the means of ending disease throughout the world. Many anthropologists have worked with these programs, or with similar community health programs at home, usually providing intellectual or personal liaison between medical institutions and the consumers of medical care. Many other anthropologists have assumed roles as educators, teaching concepts of behavioral science and cultural relativity to medical practitioners. To the extent that practical considerations have outweighed theoretical considerations, research has suffered. Anthropologists have been criticized for "their practice of telling physicians and other health personnel about the native culture and native medicine and then leaving the rest up to them" (Gladwin, in von Mering and Kasdan 1970:247). But, with the press of local epidemics, national utilization studies and narrow or unclear research frameworks, there is often little more possible.

An ethnocentric faith in the basic assumptions of twentieth-century medicine has also influenced the outcomes of research. Running through the reviews cited

above is a distinction, either tacit or explicit, between studies that are "ethnomedical" and those that are "biomedical" (see especially Fabrega 1971). Ethnomedical studies, broadly considered, are those of illness beliefs, medical institutions, and the roles and behaviors of sick persons and curing personnel, within a particular social setting. The focus is on understanding treatment patterns in terms of a culturally-bounded framework of beliefs, values and social structure. Most of this work has been done by anthropologists.

Biomedical studies are those devoted to what we might call health problems, specifically research on differential health status, the incidence of illness and cultural pathologies, and the problems of health care delivery systems. The focus is on understanding epidemiological patterns and treatment processes which are applicable cross-culturally. Most of this work has been done by medically-trained personnel. One result of this division of labor has been a lack of development in areas of mutual theoretical concern. Medicine has been an area in which problems of theoretical import for anthropology are examined, problems such as evolution and cultural patterning. Likewise, anthropology has provided data and theoretical insights to medical scholars interested in developing models of, for example, psychosomatic disorders or healing processes.

For some, however, these cross-fertilizations represent just the early stages in the anticipated development of a substantive and theoretical area -- "medical behavioral science" -- capable of genuinely productive syntheses of anthropological and medical concepts (Weidman 1971).

Just as New Guinea highlands societies present an ethnographic paradox of extreme diversity within a basically similar culture pattern, so the anthropological study of medicine presents a history of diverse lines of inquiry within a series of fairly circumscribed conceptual frameworks. Diversity in research has been the inevitable result of studying a system which "transgress[es] the boundaries of...[the] purely material, purely spiritual, or purely social...." (Ackerknecht 1971:115). Consistency in conceptual orientation has just as inevitably resulted from the intellectual and historical constraints of the discipline.

Although there is little theory in medical anthropology, there are nonetheless distinct theoretical orientations (Wellin 1975). Theoretical orientations -- which guide research rather than explain events -- are recognizable in terms of the questions being asked and the answers that are acceptable at any given time (Jarvie 1964; Manners and Kaplan 1968). Students of comparative medicine have historically come from cultural rather than physical anthropology and have

assumed the theoretical orientations dominant in general cultural anthropology at the time. Thus, major developments in the anthropological study of medicine have taken place within the frameworks prescribed by the varying historical emphases upon (1) diffusionism and historical particularism; (2) structural-functionalism and its cross-disciplinary outgrowths, psychological anthropology and ethnoscience; and (3) ecological studies. A brief critique of each of these theoretical orientations -- focusing on the questions they seek to answer -- will provide the background for the framework adopted in this study.

Diffusionism and Particularism

Some of the presuppositions that underly the current study of medicine were present already at the turn of the century. W. H. R. Rivers was the first anthropologist of reknown to take a special interest in medicine. His Medicine, Magic and Religion was published posthumously in 1924. Rivers' earlier work is characterized by the beliefs in unilinear evolution, independent invention and "progress" that characterized early nineteenth-century anthropology. But, having reversed his position by the time of these medical essays, he is now regarded as the "father of British diffusionism" (Harris 1968:380; Langness 1974:51). While the British were primarily

interested in the processes which linked elements of different cultures, the American particularists and German diffusionists were more interested in documenting actual historical connections. Out of this tradition came the first major American monograph on medicine, Primitive Concepts of Disease, by Forrest Clements in 1932. These two studies have a great deal in common and both were influential in anthropological thinking about medicine for many years.

These early scholars sought to abstract the general characteristics of pre-industrial medical systems and to explain the geographical distribution of specific elements of belief and behavior. The question posed is twofold: Given the psychic (and, presumably, physical) unity of humankind, how to account for observable variations in medical belief and treatment? And, conversely, how to account for the apparent similarities throughout the world? The answers to these perennial questions were found in current diffusionist theory.

In order to make general statements about the reported variability in non-western medical practices, Rivers and Clements created categories to encompass individual types of beliefs or treatments. For Rivers, etiologic beliefs fell into three categories:

- (1) human agency, in which it is believed that disease is directly due to action on

the part of some human being; (2) the action of some spiritual or supernatural being or, more exactly, the action of some agent who is not human, but is yet more or less definitely personified; and (3) what we ordinarily call natural causes (1924:7).

Within Rivers' human and super-human categories, Clements distinguished five separate classes of illness beliefs: soul loss, spirit-intrusion, disease-object intrusion, breach of taboo and sorcery. Many later students of medicine have devoted themselves to refining, disputing or expanding his disease categories with reference to ethnographic data on particular peoples (Cf. Cawte 1974; Ritzenthaler 1963; Rogers 1944).

In order to determine the origins of categorized belief-types, Rivers and Clements -- either figuratively or literally -- plotted them on maps. Geographic continuities supported their arguments regarding the importance of direct contact between social groups; (for Rivers) independent invention and the selective effects of internal cultural logics were supplementary theories used to explain geographical irregularities.

There are three identifying features of this approach to the study of medicine; the first is an assumption that "primitive" medicine is different in all

particulars from contemporary European medicine. Though both Rivers and Clements acknowledged the widespread distribution of beliefs in "natural" causation and familiar treatment techniques (such as poultices), these are omitted in their comparative analyses. Neither the "rational" aspects of primitive medicine nor any aspects of modern medicine are plotted on their maps.

Faith in the scientific rationality and superior effectiveness of western medicine has perpetuated the blind spots of these early scholars. Apparently effective remedies -- when they occur among non-western peoples -- have been taken for granted as evolutionary imperatives (Murdock 1965a:51), trial and error accidents (Ferguson 1947) or the expression of innate animal behaviors (Ackerknecht 1971:22,129). Because of our persistent equation of rationality with western thought, little has been resolved by the cumulative insights regarding magic, science and religion as similar but complementary or differentially-emphasized means of explaining and coping with events beyond human control (vide Field 1937; Horton 1967; Hsu 1952). Consequently, there continues to be relatively little comparison in medical anthropology except that implicit in works relating to the interaction of modern and traditional systems (e.g., Foster 1952,1958; Paul 1955; Saunders 1954; Schwartz 1969; von Amelsvoort 1964).

Nonetheless, the utilitarianism of modern medicine has created a willingness to examine non-western medical systems for information which might be usefully incorporated. Ethnobotanical and pharmacognostic studies are of this nature (for instance, Hartwell 1967, 1969; Uhe 1974) as are comparative studies of modern medical systems vis-a-vis one another and vis-a-vis the great traditions of Ayurvedic and Chinese medicine (Fry 1970, Mann 1971).²

The second characteristic feature of the diffusionist approach is a willingness to lift specific cultural (i.e., medical) practices out of context for analytic purposes. Much of modern anthropology has rejected this practice as methodologically unsound, yet questions regarding the distribution of medical institutions are still concerns of comparativists and evolutionists. Whiting and Child (1953), for example, conducted a major study aimed at correlating the occurrence of categorized types of medical belief in unrelated cultures with differences in child-rearing patterns and resultant personality structures. Anticipating a later discussion, we may also note here, as Wellin has (1975:23), that more recent ecological-evolutionary studies of medicine have also "resurrect[ed] Clements' use of the single trait as a unit of study and analysis but on a more viable conceptual and

methodological basis," that is, as part of broader, multi-factorial analyses.

The third characteristic of the diffusionist approach is a strictly extra-somatic view of culture which expresses itself in the disregard of differences in disease pattern that might be related to differences in medical behavior. It is clear from Rivers' own writing that this view resulted from analytic choice rather than from ignorance of variable illness patterns. There are some notable exceptions (Cannon 1942; Mead 1947; Wallace 1961), but most anthropological studies of illness and medicine have continued to focus upon their social features rather than upon their physical features. Otto von Mering has expressed both the assumption and its consequence very succinctly:

In preliterate tribal societies and folk cultures.....[t]he therapeutic effort rather than the disease-specific conception of cure tends to be institutionalized. This may also explain why most anthropological reports on "primitive theories" of disease have consisted of statements about social structural-functional interpretations of disease (1970:275).

Functionalism

With the further development of historical particularism in America and the rise of culture-specific functionalism in Great Britain, students of comparative medicine have come to focus more on the internal meanings of medical behaviors than on their historical derivations. The writings of Erwin Ackerknecht (1942a, 1942b, 1943a, 1943b, 1945b, 1945c, 1946, 1947, 1958) provided a major stimulus to the modern anthropological study of non-western medicine and are cited in virtually every treatise on the subject. Ackerknecht's influence is both anti-evolutionist and anti-diffusionist. His anti-evolutionism expresses itself in the argument that, since non-western medicine operates on principles fundamentally different from those of scientific medicine, the two cannot be dealt with in the same framework. His anti-diffusionism expresses itself in an insistence that medicine be studied as a patterned system rather than as a collection of isolated beliefs or behaviors. His non-comparative stance and his explanation of medical phenomena in terms of local cultural configurations place him squarely in the tradition of structural-functional anthropology.

The questions posed in functionalist studies of medicine are largely oriented toward description; for example, from Ackerknecht's list of

Suggested Topics for Field-Workers
Concerned with the Sociopsychological
Situation of the Sick:

1. Is the sick man neglected or well-treated?
3. Is the tendency to keep the sick man's daily life as much as possible in the rhythm and routine of the life of the community or to isolate him and create a special routine for him?
4. Who bears the economic burden resulting from his illness?
11. Does the idea exist: "It is to the common interest to get the sick well again"?
19. Has he a feeling of inferiority (being physically invalid, being supernaturally weak)?
26. Does he believe in the healer rather than in the treatment?
30. Is there one generally accepted "theory" of disease...?

(1945c:431-432)

The answers are found in a tradition of excellent medical ethnographies focusing on beliefs, treatment or medical personnel (Cf. Blum and Blum 1965; contributors to the Galdston 1963 and Kiev 1964 volumes; Schofield and Parkinson 1963). The answers, insofar as they are analytic rather than descriptive, are derived from structuralist or functionalist theory which emphasizes the integrative nature of culturally-shared beliefs and relationships between social sub-systems tending toward equilibrium. In this tradition are the now-classic

studies of medical beliefs as social control mechanisms (Hallowell 1938a,1939,1941,1963; Kluckhohn 1944a; Lieban 1960,1962,1965) and those of the medical manipulation of symbolic structures (Ingham 1970; Turner 1967,1968; Yalman 1964).

The central feature of functionalist (or what I called earlier ethnomedical) analyses is the supposition that by regarding illness and its treatment as sociological events the researcher is accurately reflecting the native reality. Even at the descriptive level, information on the physical or behavioral antecedents and outcomes of medical events is generally slighted in favor accounts of the meanings attributed to these events. With Harris (1968), I would attribute this to a persistent predilection toward idealism, and a concomitant neglect of materialism or environmentalism, characteristics of the entire discipline.

Harris and others (viz. Jarvie 1964) have criticized functionalist theory for its circularity and untestability but, as regards the study of medicine, its major shortcoming is its selectivity. This theoretical orientation has inspired important questions and hypotheses relating to the social and institutional functions of medical systems while virtually ignoring their potential physical functions. Oddly enough, such selectivity is not inherent in the functionalist

"manifesto." Malinowski (1944:75f.) postulated the functions of social organization as responses, if only secondary, to the biological needs of group members. Using an organismic analogy to illustrate the needs of society, Radcliffe-Brown (1952:178-187) was also sensitive to these issues. Granted that the needs of society are often different from, even contradictory to, those of individuals, there have been surprisingly few analyses of the relationship between human beings as biological organisms and their social (in this case, medical) institutions.

The early influence of psychoanalysis upon functionalism had the effect of broadening the scope of ethnomedical analyses. Though retaining an idealistic bias, students of culture and personality (or psychological anthropology) began to study individuals as well as institutions. A focus on individuals, as more or less successful bearers of their culture, has major implications for the study of medicine. Such a focus requires an examination of the mechanisms of interaction between individuals and their societies, rather than reliance upon assumptions as to the nature of this interaction (Sapir 1934,1938; Kluckhohn 1944b). While much of psychological anthropology has been devoted to delineating the mechanisms by which modal personalities or national character are formed (e.g., Benedict 1946;

DuBois 1944; Inkeles 1961, Inkeles and Levinson 1954), much of it has also been devoted to analyses of intra-cultural diversity and deviance (Devereux 1963; Honigmann 1953; Wallace 1952, 1968). With illness a prominent form of deviance (Parsons 1951), psychological anthropologists were necessarily drawn to focus on illness itself.

The first descriptions of illness -- as distinct from illness-related institutions -- that appear in the anthropological literature are those of mental illness (Hallowell 1938b; Jewell 1952; Paul 1953; Langness 1965). Reactions to these and to early mental health surveys in Africa suggested that both the incidence and expression of mental illness varied with cultural milieu (Opler 1959). On the other hand, ongoing study of the so-called "culture-bound syndromes" like amok (Aberle 1952; Van Loon 1926; Yap 1952), windigo (Hallowell 1936; Parker 1960) and piblotq (Brill 1913, Gussow 1960) suggests that the pathology of mental illness remains fairly constant regardless of culture (Kiev 1964; Langness 1967b; Shaper 1972:331f.; Yap 1974).

In other words, both comparative and epidemiological questions are raised in this interdisciplinary approach. Answers to them have been sought in psychological (especially Freudian) theory which postulates a universal set of psychic processes (Gussow 1960), in empirical and theoretical works suggesting the

culturally-patterned variability of psychic manifestations (Cf. Kardiner 1939; Whiting and Child 1953), and in the continuing development of explanatory concepts such as stress which link individuals, environments and societies (Caudill 1964; Hallowell 1936; Froberg et al 1971).

Although working within a fairly narrow range of assumptions dictated by psychotherapeutic theories, psychologically-oriented anthropologists have nonetheless expanded our perspective on both illness and treatment. Redefinition of mental illness, in terms capable of embracing both general diagnostic features and locally recognized behavioral features, has been continuous (Cf. Edgerton 1966; Henry 1947, 1954, 1970). The therapeutic, as well as strictly sociological, functions of indigenous curative methods have been explored in comparative and evolutionary frameworks (see Hartog and Resner 1972; Kiev 1964; Wallace 1959).

While the biological aspects of illness and curing are still slighted in this approach, attempts to develop cross-culturally valid definitions of illness and models of healing are part of a trend toward comparative medical anthropological research which encompasses both the ethnomedical and biomedical perspectives. At historical odds with this trend is the application of ethnosience to medical anthropology.

Advanced in the 1950's as an improved method for achieving precision and clarity in functional analyses (Sturtevant 1968:491), ethnoscience has become a theoretical orientation as well. As a methodology, ethnoscience does not inherently preclude consideration of behavior and its outcomes but as a theoretical orientation it leads almost exclusively to considerations of meaning; indeed, the field is frequently referred to as "cognitive anthropology." The questions addressed in ethnoscience have to do with the patterning of knowledge (Cf. Werner and Fenton 1973:537-539) -- more specifically, "how natives think" about kinship, soil types or symptoms of illness. The answers are culturally specific sets of rules for perception and information processing, rules obtained characteristically by linguistic methods of elicitation and formal analysis.

Sophisticated use of linguistic techniques certainly has elucidated in much greater detail than possible before the diagnostic, anatomical and other classifications actually made by members of certain cultural groups (e.g., Frake 1961; Franklin 1963). The promise of ethnoscience, however, lies in its ability to relate these emic categories to etic "reality" or to emic categories of symptoms, body parts, remedies and results that we recognize. The studies by Fabrega and his colleagues are among the few to focus on the ways in

which cognitive classifications predicate behavioral choices (Fabrega 1970; Fabrega and Silver 1973). To the extent that students of ethnoscience are unwilling or unable to undertake behavioral, comparative or ecological analyses, their implicit ethnologic goals will go unrealized. Moreover, little will have been added to our understanding of medical phenomena. Increasingly -- and inevitably -- "medical phenomena" are coming to include not only illness perceptions and treatment preferences but also the roles these play in cultural adaptation and human evolution (see Vayda and Rappaport 1968). Proponents of this viewpoint express grave doubts regarding the contribution to be made by ethnoscience.

The current tendency in anthropology to stress "ethnoscience" can have the dangerous effect of transforming ecological analyses into a series of ethnological just-so stories. This is particularly true when the researcher fails to observe actual behavior patterns which pertain to a particular set of stated rules. Equally dangerous is the tendency to restrict observations to a single ethnosemantic domain. Disease-related behavior must be treated as

more than just a linguistic category

(Alland 1970:10).

The Ecological Approach

As formulated by Steward (1955) and others (e.g., Sahlins 1968), the school of cultural ecology is an explicit attempt to get anthropological analyses out of the circle where culture explains culture, behavior explains behavior, or cognition explains cognition. To break the analytic circle, Steward recommends determining first the relationship of each of these factors to environmental factors.

First, the interrelationship of exploitative or productive technology and environment must be analyzed. This technology includes a considerable part of what is often called "material culture"... or subsistence devices such as weapons and instruments for hunting and fishing..., transportational devices..., means of counteracting excessive cold...or heat.... Relevant environmental features depend upon the culture... [but include] climate, topography, soils, hydrography, vegetational cover and fauna.... Second, the behavior patterns involved in the

exploitation of a particular area by means of a particular technology must be analyzed.... The third procedure is to ascertain the extent to which the behavior patterns entailed in exploiting the environment affect other aspects of culture (1955:40-41).

The central question in this approach is one of origins: to what extent are social institutions "created" through cultural adaptation to environment? In its earliest formulations, cultural ecology provided answers that are either deterministic or possibilistic (rather than relational). On the one hand, environment simply sets the boundaries or provides the resources for cultural development; on the other, it directly perpetuates or inhibits that development.

As applied to the study of illness and medicine, this environmentalist approach is very similar to the biomedical perspective, or what Rene Dubos calls the "ontological doctrine" in medicine (1965:240). From this perspective individuals and groups are "attacked" by (or free from) disease entities located in their environment but separate from themselves. Such an orientation contributes little that is new to medical anthropology.

In another sense, however, the ecological approach may be regarded as a logical extension of the

functionalist model in anthropology. Functionalists have been interested in the relationships between things; cultural ecologists have simply sought to expand the universe of things between which there are relevant relationships.

A working integration of these points of view is nonetheless difficult to achieve:

Even among...social scientists who are especially concerned with the relations between cultural and non-cultural phenomena, the prevailing tendency has been to define the cultural variables and the other ones as belonging to separate systems and then to ask about the influence of the systems upon one another. In the case of many social scientists, the procedure seems to be an almost automatic one, consonant with the ingrained habit of seeing the inorganic, organic, and socio-cultural as separate realms or levels of phenomena (Vayda 1967:xiii).

This habit persists in medical anthropology as well, despite its very raison d'etre being an interest in the mutuality of relationships between physical and social phenomena.

[T]he central problem continues to be the failure of medicine and anthropology to come to grips with the role of social factors in disease, and vice versa.

Physicians tend to see social factors only as clues to real causes of disease. Equally inappropriate, anthropologists continue to view biology (disease) as a given, which it is not, being affected by and affecting in turn the social environment. The failure to theoretically integrate these two sets of factors (disease and culture) is the biggest stumbling block to real development (Scotch 1963:59; emphasis in original).

Nonetheless, as Scotch goes on to suggest, "there is movement in this direction and room for optimism."

Despite the limitations inherent in early formulations of cultural and the cognitive "stumbling blocks" provided by our philosophical heritage, ecological studies are achieving increased sophistication in general anthropology and medical anthropology alike. Within general anthropology, studies such as Rappaport's Pigs For The Ancestors (1967) address themselves boldly to questions regarding the inter-relationships between variables --

organic (e.g., food), inorganic (e.g., soil elements) and sociocultural (beliefs and ritual) -- presumed to be part of the same behavioral-ecological system. Within medical anthropology, advances in the conceptual synthesis of cultural and biological factors have occurred more indirectly as part of a series of independent theoretical and empirical developments. In both medicine and anthropology the simple accumulation of empirical evidence has created a receptivity to theoretical orientations capable of encompassing a wide range of variables.

Within social sciences, studies in descriptive epidemiology have created an awareness that various life ways contribute directly not only to the variable perception and meaning of illness but also to the variable occurrence of different illnesses. Well-documented "cultural" causes of illness include: hunting-gathering subsistence patterns in which mortality is more highly correlated with violence and trauma than with malnutrition or chronic disease (Dunn 1968); ritual cannibalism which transmits a slow-acting fatal virus only to certain segments of a New Guinea population (Gajdusek 1963); membership in American social classes which predispose individuals to different types of mental illness (Hollingshead and Redlich 1958); the presence of trypanosomiasis parasites in west Africa

with differential effects upon Europeans and Africans (Gelfand 1966), effects in the latter often mistaken for symptoms of schizophrenia (Tooth 1950); and stressful interpersonal relations which lead to high female incidences of a specifically Mexican illness known as susto (O'Neil and Selby 1968; Rubel 1964). A conclusion of multiple causality is inescapable. Moreover, several processes interact to determine the outcome, as well as the initial occurrence, of illness.

Illness is a universal situation to which all human beings are subject whatever their cultural heritage. But a belief that illness may be due to witchcraft, when typical of a culture, precipitates anxieties and fears if an individual falls sick that would not have to be faced by most persons in western civilization.... Illness as such cannot be dissociated from theories of disease causation entertained.... In any disease situation the reality-order of one culture may induce psychological involvements which are entirely absent in a parallel situation in another (Hallowell 1941:361).

Thus, prior anthropological designations of "folk" illnesses are giving way to the recognition that "all

illnesses are folk" (Fabrega 1971:213) in that they represent localized adaptations to particular clusters of environmental and social conditions.

Within the health sciences there is a parallel awareness that

the doctrine of specific etiology [which has] constituted the most powerful single force in the development of medicine during the past century....fails to provide a complete account of most disease problems as they naturally occur.... (Dubos 1965:326)

A microbiologist, Dubos outlines in lengthy and brilliant detail the evidence that malnutrition, stress and even identifiable pathogens produce quite different symptoms in different settings. In effect, different illnesses -- or no illness at all -- arise from the same apparent cause because pathological states are the consequence of several determinant factors acting simultaneously.

As is well known, the response of the human organism to many noxious agencies is profoundly conditioned by adrenal and other hormones. The secretion of these in turn is affected by psychological factors and by the symbolic interpretation the mind attaches to environmental agents

and stimuli. This interpretation is so profoundly influenced by experiences of the past and anticipations of the future that the physicochemical characteristics of noxious agents rarely determine the characters of the pathological processes they set in motion (1965:328).

Hence, in medicine as in anthropology, the current trend is away from the search for single disease-causing agents, and away from simple interactive models, toward a definition of illness -- and of life -- that is complex and multi-factorial (Dubos 1965; Engel 1960; von Bertalanffy 1964, 1971).

Similarly, the realization that the actual physical viability of sick individuals (and ultimately of groups) is influenced by their medical beliefs, behavior and organization, requires consideration of treatment, along with illness, as part of a complex adaptational process. Studies of the shift from yaws to syphilis in developing countries (Hackett 1967; Hudson 1965) and studies of doctors' variable cure rates with schizophrenics (Whitehorn 1963:14-15) reveal the same thing: both the pattern of illness and the success of treatment result from an interplay of technological, cultural and biological factors. The shift from infectious disease to degenerative disease in the European countries is

clear evidence that modern western medicine does not abolish illness; rather, it leads to modifications in the societal pattern of illness. We do not know, however (because we have not considered), the extent to which non-western medical systems affect illness patterns. An evolutionary perspective underlies recent efforts to deal with this question. Alland (1970), for example, attempts to incorporate, in a single diachronic schema, analyses of parasitic diseases and folk models of illness; analyses of behaviors which, though not defined as medical by the people under study, do in fact influence their health; and analyses of the impact of both traditional and European curers upon the adaptive potential of the group.

The emergence of what we might call the "new" (medical) ecology is due only in part to the compelling nature of the data; it is due also to the changing nature of the theoretical milieu. Wellin traces the development of the ecological orientation in medicine to the successes of the synthetic theory of evolution (1975:16-18). Emphasizing the study of adaptive and selective mechanisms developed from mutual feedback between cultural, physical and environmental variables, proponents of the synthetic theory of evolution, in effect, absorbed and combined what had been competing and presumably incompatible theories of evolution.

Similarly -- and as a result, says Wellin -- the ecological approach to the study of illness and medicine encompasses all the theoretical orientations I have discussed in the foregoing pages. But

It departs strikingly from previous orientations in that it comprehends biologic variables, viewing health and disease (whether as dependent or independent variables) as expressions of dynamic relationships between populations, their cultures, and their environments. Thus, the scope of the ecological model includes societies and populations, the behavior of human groups and of microbiota and vectors, perceptions of the environment and primary environmental features, definitions of disease and disease itself, ethnomedicine (and traditional medical systems) and modern medicine (Wellin 1975: 22; emphasis in original).

Attention to meaning is not rejected in favor of attention to physical factors or environmental processes as some critics fear. Rather, as Bateson puts it, the unit of survival may be regarded as the mind itself when consciousness is seen as the link between human organisms, society and ecosystem (1972:460,483f.). The

importance of the ecological approach thus lies in the fact that "many significant questions are asked at once, rather than a few at a time" (von Mering 1970:291).

The Goals Of This Study

Earlier approaches to the study of medicine have been criticized because their theoretical orientations are insufficiently broad to address issues of fundamental interest to both medicine and anthropology. By asking questions only of distribution (diffusionism) or of meaning (ethnoscience), of social functions (functionalism) or the psychological derivation of illness and treatment (culture and personality), ethnomedical studies have obscured the influence of biological components on (culturally defined) illnesses. At the same time, the traditional biomedical approach has obscured the influence of cultural systems, adaptive mechanisms and individual idiosyncracies upon (medically defined) diseases. Moreover, it is true that

Regardless of which analytic framework is adopted it is usually the case that the illness episode itself is not differentiated in such a way that it allows others to build on the impressions and insights gained in the field. Briefly, the illness episode is

treated either as a specific but rather abstract biologicistic category...or as a generic (and global) culturally organized and temporally patterned occurrence.... A realistic appreciation of the reciprocal influences that cultural factors have on illness and disease requires a more fine-grained depiction of medical happenings (Fabrega 1971:187-188).

The material presented in the following chapters represents an attempt to reconcile the ethnomedical and biomedical perspectives by providing descriptive material on "medical happenings" as well as on the Nekematigi interpretation of these events.

The over-all thesis that has emerged from this research is that, while Nekematigi medical beliefs may be understood with reference only to their symbolic or social reality, medical treatment cannot be explained unless we consider the physical and environmental framework within which Nekematigi illness takes place. The type of illness and medical resources available, along with beliefs about illness, all serve to structure the medical realm into a system which has an impact upon the total society and its adaptation.

Major Concepts

What I called earlier an "ethno-bio-medical" analysis of the Nekematigi material relies upon definitions of illness and medicine that are derived from an ecological orientation. Illness is defined as an impaired state experienced by an individual organism at a given time. This is the "physiological view" of disease propounded by Dubos (1965:240f.); it encompasses the simultaneous effects of microbiota, cultural meanings and internal bodily processes as causative. From an observer's point of view such abnormal states reflect temporary setbacks in the adaptive success of individuals (individual setbacks which may, in some circumstances, represent the price of group adaptation). From the point of view of a group member, it "is assumed that either behavioral, phenomenological, or biological (symptomatic) indicators lead lay individuals to designate a state of compromised health" (Fabrega 1971:213). The relative importance of each -- whether in causation or perception of illness -- is, of course, a matter for empirical investigation.

Medicine is defined as a behavioral system which mediates between society and environment, and which has (or is intended to have) short-term or long-term effects upon general levels of adaptation as expressed in levels

of health and illness. Again, the extent to which, or ways in which, a given medical system is adaptively effective is an empirical question.

Illness is frequently the dependent variable in medical anthropological research using an ecological model. That is, relative levels of health or disease are viewed as measurable expressions of adaptive relationships between populations and environments. The famous malaria studies (Ackerknecht 1945a; Livingston 1958), for example, interpret the nature and prevalence of disease in terms of the interaction between local customs, environmental features and the biological or genetic characteristics of humans and pathogens. Since ecological theory is not developed sufficiently to specify the precise direction or nature of these interactions, any one of these factors may be regarded as the dependent variable. In this study, I regard the Nekematigi medical system as a composite of dependent variables and attempt to explain its nature and effects with reference to local ideology, technology and disease, all regarded as independent variables.

Major Issues

While not an ecological analysis per se, this study study is set in an ecological framework since it alone

facilitates discussion of biological, environmental and ethnological observations within terms of a single system. An ecological perspective is promising because of its comprehensive scope, though several problems combine to create a gap between the theoretical orientation and the means currently available to undertake the desired analyses. The following brief review of these problems serves to highlight the specific objectives of this study.

The first problem is that the number of variables to be considered is potentially overwhelming. For instance, even Wellin's (1975:18) highly generalized portrayal of the "ecological model with cultural and biological parameters" illustrates quite clearly the need for both empirical and analytical investigation of ideology, custom and cognitive factors; social and political organization; technology, environmental adaptation and environmental features themselves; population variables; genetic, immunologic and other biologic factors; the characteristics of disease, pathogens and vectors; and, finally, illness and medicine as intervening phenomena. Selection and operationalization alone present formidable hurdles, hurdles acknowledged by even the most enthusiastic proponents of the ecological-evolutionary approach:

I am not unaware of the fact that the approach stressed here has its own peculiar difficulties. It is quite likely that all aspects of behavior have some effect on the epidemiological patterns of a population. Thus, if my prescription for research were to be followed literally it would be impossible to exclude any data from the realm of medical anthropology (Alland 1970:11).

To ameliorate these difficulties, Alland suggests randomization and simulation of data with the aid of computers as well as the development of unavoidably limited, but problem-specific, hypotheses to guide research.

My research was guided by the hypothesis that Nekematigi medicine has medical (i.e., therapeutic) functions as well as social and psychological functions. That hypothesis is tested here by evaluating the outcomes of observed illness-treatment episodes. The relative efficacy of Nekematigi medicine is examined with reference to others' proposed explanations of non-western healing, including the positive effects of beneficial drugs (LaBarre 1942), psychological suggestion (Kiev 1964), medically-induced emotions upon

the endocrine system (Frank 1961) and spontaneous remission (Murdock 1965a; Maclean 1971). Hence, close attention is paid to the cultural and biological factors involved in illness perception, to environmental variables such as natural (e.g., botanical) medical resources, and to socio-political factors influencing the techniques and selection of curers. Correspondingly less attention is paid to population and genetic variables which are taken as "given."

The second problem in ecological analyses is data collection itself. To quote Alland again:

Ecological analysis in anthropology is in the peculiar position of emerging as a scientific pursuit at the same time that the material for investigation is becoming either scarce or contaminated by the influence of Western technology. This is particularly true in the realm of health and disease, since many governmental, international, and religious institutions have embarked recently upon a medical crusade of world-wide proportions. Local methods of population control and "native" diets are particularly susceptible to influence from the outside.... Relatively isolated

populations present the most interesting data for research relating to environmental adaptation, and it is these groups which are disappearing most rapidly. Adequate and accurate data for internal as well as cross-cultural analysis must be gathered in the near future or be forever lost (1970:14-15).

It is to this issue that this study is specifically addressed. New Guinea highlands societies have only recently been subject to external cultural and ecological adaptive pressures. Nonetheless, several studies of highlanders' general nutrition, disease patterns and demographic characteristics have been completed. My field research focused on Nekematigi medical beliefs and behavior; a primary goal of this analysis is simply to render explicit the characteristics of that medical system. A secondary goal is to set the Nekematigi medical system into the context of what is already known (or hypothesized) about biological and environmental factors influencing illness in the New Guinea highlands. By synthesizing the two types of data it becomes possible to determine with some certainty the "at-contact" adaptations in terms of illnesses experienced, treatments employed and results obtained.

The third problem in ecological analyses is "the principle of multiple determination which it is easier to

name than explain" (Early 1970:292). The most popular notions regarding how culture and nature interact posit continuous feedback between variables leading either to maximization of life chances or to homeostatic maintenance of equilibrium. In the absence of comparative measurements or the development of competing hypotheses, ecologists' notions about the "adaptiveness" of social behaviors may suffer from the same criticisms leveled at the most panglossian forms of functionalism. Only theoretical insight or the accumulation of sufficient empirical evidence will lead us to more precise statements of these relationships.

An interim strategy that may be used to arrive at answers to questions regarding the influence of cultural factors in the population-environment exchange involves analyzing

how representatives of particular "preliterate" cultures actually respond to medical phenomena; that is to say, how they define illness, how they treat it, how they organize their social lives when they judge it to be in their midst, and, especially, the potential biological consequences for the group of the various actions that are taken in response to

native categories of meaning (Fabrega 1971:212, from Vayda and Rappaport 1968).

This is the strategy adopted here. Data obtained first-hand on the definition and treatment of illness are reported. The potential biological consequences of these perceptions and actions are evaluated with reference to secondary data and the observed results of medical treatment. Two specific aspects of this strategy involve the inclusion of case history data and the reliance upon symptoms -- rather than disease categories, either Nekematigi or American -- as the descriptive keys to conceptual integration of cultural and biological phenomena.

Summary

The overall goal of the study, then, is the ethnographic treatment of Nekematigi medicine within a comprehensive behavioral framework which allows for cultural specificity while also allowing for a measure of cross-cultural abstraction. A framework which relates the relatively limited range of human biological responses to the environmental and social conditions specific to Nekematigi life is presumed to be of maximum value to later researchers. As Fabrega puts it:

If medically relevant behaviors are linked in a systematic fashion with even rather

general biological parameters of illness it should be possible to construct a typology of illness that bridges the sociocultural and biomedical frames of reference and that in time might allow anthropologists to develop models of medical care (1971:187).

Not only does a unified perspective offer analytic utility; it is also the most true to Nekematigi conceptions of illness and the restoration of health.

As the reader will see, while Nekematigi notions about the causation of illness are largely supernatural, their perception and treatment of illness rely firmly on a foundation incorporating both physical ("natural") and social ("supernatural") factors.

CHAPTER TWO

The Nekematigi, A Highlands People

Land And Climate

The entire island of New Guinea lies within the sub-equatorial tropics, from 1° to 12° south latitude and between 130° and 156° east longitude. For occupants of the island's interior, however, it is altitude rather than proximity to the equator that determines local environmental conditions. Following a general northwest-southeast geologic contour of recent and continuing fault activity, the central cordillera consists of a series of rugged mountain ranges with peaks as high as 15,000 feet enclosing broad valleys between 5000 and 8000 feet. The lower parts of the highlands basins, from 2000 to 4000 feet, are sparsely populated because of low rainfall, the predominance of anthropogenic short grassland and depleted soil, difficulty of defense in warfare, and disease, particularly malaria (Brookfield 1964:32-34). The high valleys, by contrast, are home to over one million people.³ Here, locally variable combinations of soil, temperature minima, rainfall and cloud are the environmental features of most direct relevance to human subsistence activities.

Local temperatures are relatively constant and diurnal changes are greater than seasonal changes. At 5000 feet altitude, the mean maximum temperature is 80° and the mean minimum is 60° (Howlett 1967:33),

dropping as altitude increases. Humidity, like temperature, is relatively constant, ranging from 60 to 80 per cent. Day to day variability, and variations from place to place, are magnified (as compared with the coastal lowlands) by the effects of altitude and local topography. Most days are sunny though clouds are usually visible somewhere in the sky. Cloud levels affect both temperature and humidity, which in turn affect human and plant life. A sunny 75° day drops quickly to an uncomfortable 60° or 65° when the cloud level lowers. At the same time, because of its insulating character, cloud makes nights warmer. Thus, nights tend to be somewhat warmer during the rainy season (generally December through March) than during the dry season (May through August). In Goroka (5120 feet), the average 3 p.m. temperature in February is 77° as compared with a year-round 3 p.m. average of 56°. With little protective clothing, people often build wood fires even during the daytime to warm themselves; in the evenings at home, they regularly do so. The cold night air and inhalation of smoke particles from fires in unventilated houses have been implicated in the high incidence of respiratory disorders in the highlands (Cleary and Blackburn 1968; Littlewood 1972:15).

To speak of a rainy season and a dry season in the Nekematigi area is somewhat misleading. Generally speaking, it is rainy the year round; only the intensity

varies. During the dry season, there tend to be short showers in the late afternoon or early evening whereas during the rainy season the rain starts in the afternoon and may continue through the night and even into the next morning. It rains nearly 100 inches per year in the Nekematigi region and some parts of the highlands receive significantly more than this. Because of the unpredictability of the rains -- especially their frequent occurrence during what people expect to be the dry season -- Nekematigi often suspect their neighbors of performing sorcery to create a sudden downpour which thwarts their plans for a wedding, garden work and the like. Nekematigi also associate some illnesses with the rainy season though this aspect of medical theory is not well developed (see next chapter).

Regular and heavy rainfall on straight slopes of 35° to 45° results in heavy water run-off and frequent flooding. Just one afternoon's rain converts the numerous clear mountain streams into raging muddy torrents carrying with them boulders, large trees, sides of modern roadways and even children or adults who are caught crossing at inauspicious times. Nekematigi are somewhat frightened by their waterways. They neither bridge them nor use them for transport. They do, however, seek food, especially eels and frogs, in the

streams. And, in spite of the risk of loss, they plant crops on the fertile banks flat enough to allow it.

Agricultural Resources And Technology

A wide range of agricultural practices and a variety of crops make possible the successful use of quite varied terrain. All Melanesian cultivation systems are a variation on the classic swidden or shifting cultivation system. At one end of the continuum, the garden plot only temporarily replaces the tropical forest which regrows in five to thirty years; at the other, the landscape is transformed completely by elaborate systems of water control and soil management, never returning to anything like its original state (Brookfield and Hart 1971:88). Throughout the New Guinea highlands, dense populations are supported by means of long fallow agriculture dependent upon non-storable root crops, principally the sweet potato (Ipomea batatas). Large herds of domestic pigs (Sus scrofa), as well as fowl and pet dogs, are also supported by intensive sweet potato agriculture.

Archaeologists and linguists concur that the highlands have been inhabited for at least 10,000 years (see Bulmer and Bulmer 1964), but the origin of the sweet potato is obscure. Watson (1965a, 1965b, 1967) has argued that the prehistoric highlands were inhabited only

by small patrilineal bands of hunters and gatherers prior to the arrival of the sweet potato. Since the sweet potato is of undisputed South American origin, he dates its introduction with the sixteenth-century Spanish and Portuguese explorations of the New Guinea coast. Watson posits an "Ipomean revolution" which resulted in marked population growth, expansion of settlement and the flexible forms of social organization observed today (see also Nelson 1971b). More recent archeological work has suggested that the date of entry for the sweet potato may be much earlier (Bellwood 1975:24) while Brookfield and White (1968) have argued that even pre-sweet potato settlements of 5000 years ago were probably agricultural. In their view, the displacement of taro and yams by sweet potato allowed the gradual upward expansion of a gradually increasing population.

Whatever its history may be, sweet potato now contributes from 72 to 94 per cent of total caloric intake in this "man-pig-Ipomea ecosystem" (Oomen et al 1961; Oomen 1971). Supplies of the staple are generally abundant so undernutrition is a rare health problem.⁴ A Nekematigi adult consumes four to five pounds of sweet potato per day, at an estimated 681 calories per pound (Hipsley and Clements 1947). Oomen (1971:12) summarized the results of fourteen highlands food surveys and concluded that the average adult energy intake is 1880

calories per day which, given highlanders' small body size, supports a level of good general health.⁵

The sweet potato is propagated by planting leafy shoots in raised mounds. Maturing in from four to eighteen months (six months at 5000 feet and longer at higher altitudes), it produces from eight to fifteen tons of tubers per hectare. One hectare is less than the average per capita land holding in even the most densely populated Chimbu region (Shand 1966:69). Given an average adult consumption of four to five pounds of sweet potato per day -- or 1500 to 2000 pounds per year -- and an approximately equal consumption for each of one to two pigs per person, there are still free supplies for exchange, feasting and the like (see also Brookfield and Hart 1971:86-87; Rappaport 1967:60-61; Waddell 1968:175).

Pigs are important items of wealth, prestige and animal protein throughout the highlands. Free of specialized parasites like trichina, pigs figure minimally in the disease pattern though they provide some important slack in the agricultural system. Pigs are fed regularly -- indeed, plots are planted specifically for them -- but when sweet potato is in short supply they are fed less from the harvest and must forage more.

Crop failure is, however, a rare problem. Locally damaging rains, winds, drought and frost have been

reported for some parts of the highlands (Cf. Brookfield 1964:24-25) but Nekematigi deny that their harvest is ever adversely affected by weather conditions.

Informants did recall one freak hailstorm many years ago, but it caused no extensive damage. Gardens were traditionally destroyed more often by enemy raids than by weather. Sweet potatoes cannot be stored against the eventuality of crop failure or destruction but economic transactions involving sweet potato do, when necessary, facilitate geographic distribution of food during times of localized shortage (see Keil 1974).

Abundant and easily grown, the sweet potato is the basis of a high carbohydrate, low fat diet (Cf. Sinnet and Whyte 1973) which is correlated with a very low incidence of toxemia of pregnancy (Barnes 1963,1969), a low incidence of metabolic disorders such as diabetes mellitus (Campbell 1963) and low blood pressures with a correspondingly low incidence of heart disease (Polunin 1967; Scragg 1969). Highlanders' sweet potato diet also contains most vitamins and minerals essential to normal life. According to recent surveys, ascorbic acid, carotene, potassium and calcium are present in adequate amounts and iron may actually exceed needs; sodium and iodine, on the other hand, are traditionally in short supply in some areas due to the leached out condition of the soil (Oomen 1971:16). Low sodium intake is

correlated with non-pathological but high serum urate levels (Jeremy and Rhodes 1971) and localized iodine deficiency is correlated with pockets of endemic cretinism (Pharoah 1971). The main criticism of the sweet potato as a nutritional mainstay, however, is its low protein-calorie ratio, which we shall come back to in Chapter Five.

While the sweet potato is successful in ranges up to 8500 feet where seasonal frost becomes a problem, subsidiary crops have a more restricted altitude and soil distribution. Among the Nekematigi, and generally below 6500 feet, supplementary cultivars include taro (both Colocasia esculenta and Xanthosoma spp.); yams; bananas of two major varieties, those which must be cooked and those which may be eaten fresh; sugar cane (Saccharum officinarum) an asparagus-like stalk called pitpit in Pidgin (Saccharum edule); several unidentified legumes; cassava; winged beans (Psophocarpus tetragonolobus); and many varieties of leafy greens. Crops introduced as a result of European contact include corn, potatoes, ground nuts and several varieties of cabbage, cucumber and pumpkin, all of which are both consumed locally and marketed as cash crops. Papaya, Pandanus conoideus (marita in Pidgin) and breadfruit (Artocarpus spp.) are also cultivated by some Nekematigi who live at the proper altitude.

Nekematigi gardens are planted on land fallowed under secondary growth or on plots newly cleared of lower montane rain forest. They are fenced -- with wood, stands of cane grass (Saccharum spontaneum or Phragmites karka) and/or live stands of Cordyline terminalis -- to keep out the pigs who forage freely during the daytime. Straight downhill ditches are dug to check soil creep and to carry off surplus water. Fencing and initial clearing is men's work, accomplished with steel (formerly stone) axes. Burning, tilling, planting, weeding and harvesting of all but certain specialty crops is women's work which they accomplish with the aid of digging sticks and steel shovels.

Nekematigi families regularly have two or more gardens in various stages of production. For example, a woman may be harvesting from a garden made with her husband and helping a brother to clear a new garden at the same time that her husband and his mother are preparing a second planting in yet another. The family will share in the harvest from each. There are no large communal work groups; gardening groups of two to four individuals are created by individual bonds of kinship and friendship.

Garden size and contents vary greatly. Just as Waddell has noted for the Enga, garden types "are loosely linked with topographic units, which in turn

reflect either microclimatic or soil variations" (1968: 201). Tiny dooryard gardens, of no more than a few square yards, often contain only a few stands of tobacco and some greens. Gardens of well over two acres in extent, located high on the slopes above the settlement area, are predominantly sweet potato but often contain sizable plantings of bananas, peanuts and sugar cane as well. Mixed gardens of taro, greens and smaller amounts of sweet potato, planted on lower and wetter ground, range from half an acre to an acre in size. Men's gardens of sugar cane or medicinal plants are relatively small and are planted either in out of the way places or right beside their houses. Orchards of marita, areca (the only stimulant in the highlands) or coffee (the principal cash crop) are planted along the flood plains of streams and on former house sites as shade and soil conditions allow.

Decisions regarding garden sites are made in terms of the differential fertility of "black" and "red" soils (respectively, nupa and safa in Benabena). Soil color, texture and prior experience provide the ethnoecological equivalents of chemical analyses. Both Waddell (1968: 197-253) and Clarke (1971:67-74) have published reports of the variable porosity, relatively high acidity and quickly depleted mineral content of these post-Pleistocene soils. Rarely deficient in water, but

generally low in available plant nutrients, the soil requires a fallow period of fifteen to twenty years after two to three years of cropping.

Natural Resources

Horticulture and pig husbandry are the primary subsistence activities of the Nekematigi but their environment, like that of most Melanesians, includes only a limited managed sector within an extensive wild integument, and folk taxonomies range deeply into this wild integument, so that the plants of the forest are as well understood as the cultivated plants of the village gardens (Brookfield and Hart 1971:3).

Approximately one thousand Nekematigi inhabit the northern and southern slopes of the Bismarck range. At 4500 feet on the northern slopes they are on the fringe of lower montane rain forest. At 5300 feet on the southern slopes they are in an area transitional between montane rainforest and stabilized grassland. Nekematigi regard themselves, and are regarded by their neighbors, as "people of the bush" because of their access to forest products. Most items of sustenance come from the managed sector but many valuables, specialty foods and construction materials come from the wild

sector. Between the Nekematigi and their grassland neighbors there is a regular trade in wood for bows, bird feathers and other produce of the forest (Keil 1974).

The montane forest is a hospitable environment, the source of many foods and materials enjoyed or required by Nekematigi. The thick forest is almost noisy with the persistent sound of rushing water and the humming of cicadas and other insects whose larvae are consumed eagerly by the resourceful or lucky children who find them. Trees form a two-tiered canopy thinning to one at higher altitudes. Several species of Pandanus and hardwoods tower above at fifty to one hundred feet, while mixed stands of oak, laurel, Eleocarpus, palm and several Ficus species top at twenty-five to fifty feet. Wood is gathered and carried or floated downstream for making houses, fences, bows and barkcloth. Leaves are used for making cooking containers and for insulation between the woven walls of houses. Wild bamboo grows in profusion, making walking off the path difficult, but valued when converted to bowstrings and containers. Lianas, too, coil everywhere; some are useful for lashing fences and other construction. From their bases to their tops, the trees support epiphytic ferns and orchids including the Dendrobium which provides a brilliant yellow fiber used in making arrows and decorative armbands. Lending color

to the whole scene, and regularly used as food or medicine, are wild raspberries, Euphorbia, Begonia, Impatiens and several varieties of large and small fungi.

Forest fauna include several species of tree kangaroo, cuscuses (Phalanger spp.) and gliders, all of which are hunted enthusiastically with bow and arrow. The meat is eaten, pelts used for personal decoration, skins for drumheads, and bits of fur woven into the strings of women's skirts and net bags. Lizards, snakes, "flying foxes" (Pteroptus spp.) and bats are also caught and eaten when possible. The attitude in hunting these small animals is indignant as well as sporting: flying foxes regularly eat ripening bananas just about the time their owners are getting ready to harvest them. The largest animal in the forest is the cassowary (Casuarius bennetti) which provides eggs, meat and decorative plumes. The cassowary is rarer than Nekematigi would like but they and other highlanders have tried without success to induce it to breed in captivity.

Contrasting with the forest, stabilized grasslands are of use in the local economy only for hunting rats and feral pigs. Except during hunting or overland trading trips Nekematigi avoid the grassy valleys, partially because of the venomous death adder found there. Grasslands, varying in extent from narrow bands in much

of Nekematigi country to hundreds of square miles in the broader valleys, reflect the historical impact of human settlement upon the natural vegetation (Robbins 1963; Brookfield and Hart 1971). The original forest has been cleared, burned, farmed and fallowed. Miscanthus japonicus, a useless tall grass, dominates the first phase of regrowth and is followed by the short grasses (Themede-Arundinella and Imperata cylindrica) commonly called kunai, a roofing material throughout the highlands.

Areas of transition between kunai and forest contain heavier and more diverse secondary vegetation. Regrowth flora include many forest forms as well as nitrogen-fixing trees (e.g., Casuarina) planted by the people themselves. These are the areas of primary habitation and cultivation by Nekematigi.

The two areas of Nekematigi habitation are linked by footpaths through high (6400') mountain passes in cold, damp upper montane forest. These areas are perceptively and precisely referred to in the geographers' literature as "cloud forest" or "mossy forest" (Brookfield and Hart 1971:50; Clarke 1971:53). Here the epiphytic ferns and orchids of lower elevations are replaced with mosses, lichens and liverworts, only a few of which have any value. Trees are tall, thin and gnarled; only a few shrubs, such as rhododenron and

myrtle, are found.

Though not permanently settled, the high forests are heavily used by Nekematigi as hunting and silvicultural grounds. Leeches make walking unpleasant, the stillness above the level of the streams is eerie, and the presence of deformed and spiteful spirit-creatures make Nekematigi cautious, but they come here seasonally to tend the individually-owned nut-bearing Pandanus.

Skilled hunters make more frequent trips seeking the many varieties of birds whose plumes are highly valued for personal decoration and for exchange. Birds found at this altitude include parrots, parakeets and several varieties of the spectacular birds of paradise.

Social Units

The Nekematigi are known to Europeans as Bena Bena. The name Benabena'mo traditionally referred only to one local group who resided near an airstrip built by gold prospectors in the 1930's. The shortened indigenous name of this group has been extended by the government, and by the people themselves, to all those who speak the same language. Including the Nekematigi, Bena Bena now number 16,000 to 17,000. While most highlanders still identify with social units considerably smaller than linguistic groups (and occasionally overlapping linguistic groups), these post-contact identities are assuming

increased reality as indigenes pay taxes, elect officials and compete for government resources in terms of them.

Langness has written extensively on the Bena Bena at Korofeigu and his materials are drawn on heavily throughout this section to supplement my observations on the Nekematigi. The local group of Benabena speakers with whom Langness worked identify themselves as members of a smaller group known as Numuyagabo. Numuyagabo, like Nekematigi, is one of fourteen named Bena Bena groups who distinguish themselves from one another on cultural and linguistic grounds. Following Langness' revised terminology (1971a) I call this group a "tribe." A looser term like "people" (but not "community") might be preferable; for the tribe has no centralized authority and, indeed, no unitary political orientation at all. Neither is the tribe a land-holding unit though its constituent sub-units exist contiguously in space. The tribe's defining characteristics are ethno-anthropological: they are distinctions of dialect and shared personal habit such as style of dress and, in the case of Nekematigi, betel chewing.

The tribe is composed of named sub-units which I call districts, again following Langness (1971a; see also Read 1951:156; Berndt 1962,1971). The administration census in 1960 recognized sixty-five of these autonomous groups in the Bena Bena census division. This is a

useful numerical approximation even though it is not an entirely accurate reflection of traditional reality (since individual "village" census books often include two or more villages who consider themselves separate entities or, less often, split a single village/district into two census books). There are nine Nekematigi districts.

The district (but not the administration "village") is a landholding unit and a political unit. Its members live together and any individual can lay claim to district land by simply tilling it. District members are expected to cooperate in collective exchanges, feasts and initiations. They are further expected to refrain from warfare against one another. These expectations are enforced by public opinion, group ritual and the withdrawal of communal support from those who violate the norms. While members of the tribe could and did make war upon one another, members of one district were expected to settle their disputes peacably or, at worst, by fighting with sticks (rather than with bows and arrows). I say "were" expected to do so because the Australian administration began enforcing a colonial prohibition on warfare in the late 1940's. Nonetheless, the terms of warfare are the terms in which in-group and out-group are defined today.

The district is comprised of (commonly two to four) groups which can be called clans. In local ideology a clan is a patrilineal and patrilocal group composed of the sons of a single male ancestor; its members are "one rope" (naga'i in Benabena). Clans are exogamous. Members of different clans in the same district can intermarry though most marriages are outside the district (see also Langness 1969:43,51). Clans reside together in a district, men say, simply because their fathers lived together, not because of genealogical ties between them.

Large clans often recognize further divisions into sub-clans and lineages. Though the behavioral importance of these finer subdivisions is minimal in Bena Bena (Cf. Langness 1971a:301), the ideological and observed nesting and splitting of kin groups has led ethnographers to argue the reality of unilineal descent groups and classic segmentary lineage systems in some highlands societies (Cf. Meggitt 1962,1965). Even among such segmentary groups, however, "genealogies show many inconsistencies" (Brown 1971:207; see also Lawrence 1971a:8-13). This is so because, among Nkematigi as in all highlands societies (though apparently to varying degrees), clan membership is as much a result of co-residence as it is of descent (Langness 1964a; de Lepervanche 1967-68; Wagner 1967).

And residents are recruited through affinal, cognatic and non-kinship ties as well as through agnatic relationships. Langness, for example, reports that nearly thirty per cent of the adult males in one Korofeigu clan are unrelated in terms of descent, brotherhood or marriage; yet their rights and responsibilities to the clan and its land are behaviorally the same as those of individuals who are related by descent (1971a:300).

In the Nekematigi clan I know best, three of seventeen (16%) resident adult males are completely unrelated; an additional two of the seventeen are related by marriage to daughters of lineal members of the group. In spite of stated preferences for men living where their fathers live, and for women living with their husbands' natal groups, these men are not considered unusual in any way. Thus, the term clan, insofar as it implies unilineal descent or corporate unity is not entirely appropriate for this basic social unit. Not all members of the clan reside on the clan's land, nor are all residents on the land biologically related to the clan. Nonetheless, in the context of the New Guinea ethnography, most readers will understand the qualifications inherent in the continued use of the term.

The important point is that "local groups" (i.e., residential, or land-holding groups) and "formal groups" (i.e., descent groups) overlap (see Brookfield and Hart

1971:230-242). Two recruitment processes -- residence and kinship -- operate simultaneously to create "clans" and thus districts where individuals are mutually identified as having rights to the land they occupy and responsibilities to the people with whom they live.

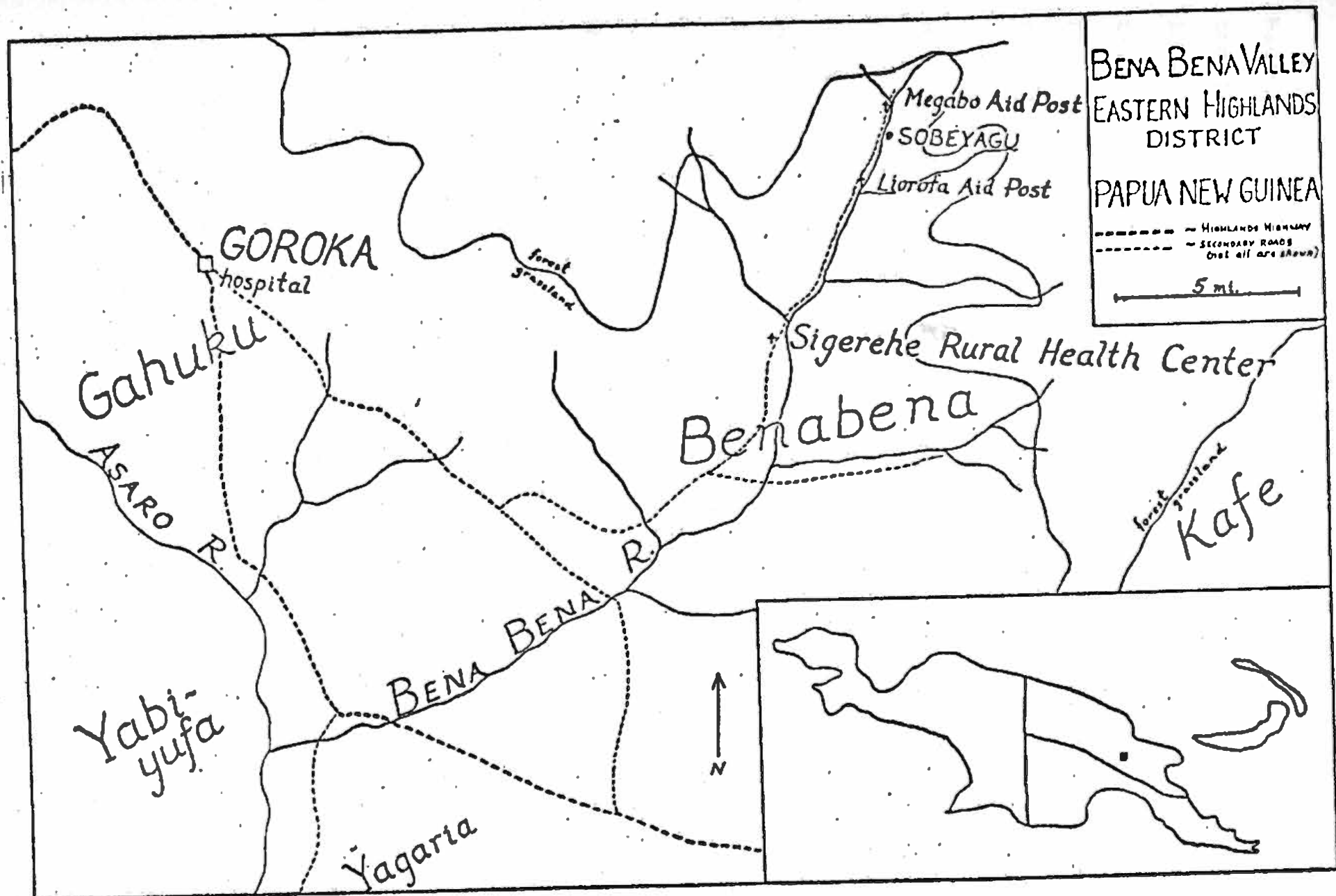
The Sobeyagu'mo

During the course of my fieldwork, I lived with Napayufa naga'i (clan) of Sobeyagu district. Sobeyagu land is near the headwaters of the Bena Bena river, on the southern side of the Bismarck Range (see map, next page).

Napayufa is the only remaining one of two clans that formerly comprised Sobeyagu district. Clan members are distributed among six named "houseines" or hamlets on either side of the river. Living arrangements are established by personal preference. Some houseines contain a man and his wife (or wives), their children, the man's brothers, their wives and their children; others consist of just two families, no more closely related to one another than to anyone else, living together because of affection or convenience.⁶

In contrast to the district of Korofeigu studied by Langness, which consisted of 750 persons and dominated the entire southern end of the Bena Bena valley at the time of European contact, Sobeyagu district had been

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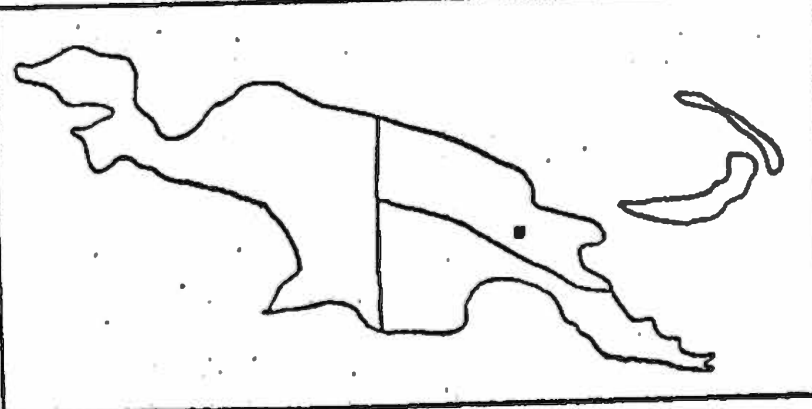


BENA BENA VALLEY
EASTERN HIGHLANDS
DISTRICT

PAPUA NEW GUINEA

----- Highlands Highway
- - - - - Secondary Roads
(not all are shown)

5 mi.



badly defeated at the same time and numbered only 78 residents in 1970. Okofu'e clan was entirely destroyed in warfare, except for a very few persons who sought refuge with Gahuku speakers near the town of Goroka; they have never returned. Living as refugees with friendly districts nearer their natal lands, Napayufa clan obtained return of some of their land only as a result of a patrol officer's decision in the late 1950's. The clearing of new gardens on Sobeyagu's southern fringes, either by Napayufa or by Liorofa, their immediate neighbors and traditional enemies, still occasions disputes over land rights which are resolved by threats of war or by "courts" held at the nearby police post.

For purposes of this presentation, then, the terms Napayufa and Sobeyagu are synonymous and interchangeable. I use either of these terms when my comments are certainly or probably applicable only to the district as an entity or only to this particular district (that is, when no comparable information was gathered from neighboring districts, or when it was and the situations differ). I use the term Nekematigi in statements referring to the Sobeyagu and eight northern districts which identify themselves, and are regarded by others, as Nekematigi.

Although most data were drawn from direct observation of Sobeyagu'mo (-mo or -bo is a Benabena

suffix meaning "man" or "person"), they appear to be applicable to all Nekematigi and immediately proximate non-Nekematigi districts. There is no term which refers inclusively to Sobeyagu and their non-Nekematigi neighbors; yet relationships between Sobeyagu'mo and their nearest neighbors, whether identified as Nekematigi or as some other tribe, are the most important aspects of day to day life. Individuals' group identifications -- and so the ethnographers' generalizations -- span an ego-centered and overlapping set of what may be called "fields" (Keil 1974:33f.), "domains" (Brookfield and Hart 1971:234), "security circles" (Lawrence 1955;1971b:76f.) or "interactory zones" (Berndt 1971 395-409). In other words, the pyramid of relevant groups for a Sobeyagu'mo is not clan--district--tribe, but clan--district--nearby districts. Neighboring districts, as discussed below, are the source of all that Sobeyagu'mo value -- brides, cooked pork, opportunities for display and victory -- and all that they fear -- defeat, destruction and illness.

While Sobeyagu is small, it is not atypical of New Guinea highlands societies. Wherever warfare is as continuous and devastating as that in pre-contact New Guinea, there must be both winners and losers. And, losers or winners, local groups are always small, indeed,

minute in scale. The same culture and language are often shared by thousands, but the widest social unit possessing a coherent system for the maintenance of internal order consists of the seventy to three hundred persons resident within the boundaries of a clearly defined area seldom more than a few square miles in extent (Hogbin and Wedgewood 1953:242).

This generalization has not been rendered inaccurate by twenty years of intensive fieldwork in the highlands, though the upper limits of settlement have been raised slightly. Throughout New Guinea, population densities range from 25 (Fore) to 320 (Chimbu) per square mile. Settlements, defined by the maintenance of internal order and a bounded territory (i.e., districts), range in size from 50 to 550 persons. (See tabular summaries in Brown 1971:222-223; Forge 1972:2-3.) Nekematigi settlements all fall at the lower end of this range in both size and density.

Fission and fusion are (or were) constant processes serving to alter the sizes of settlements while keeping them within this general range. Fission often results from intra-district sorcery accusations or similar irreconcilable differences between members of the settlement. Observers frequently relate the division of

large groups into smaller, more dispersed groups to the carrying capacity of the land as well as to sociological processes (vide Forge 1972; Rappaport 1967:25). Less frequently documented though equally important is the corollary process of fusion. Small lineages -- created by fission from a larger group or by losses in warfare -- ally with other clans, eventually becoming part of them (Cf. Berndt 1964:188,193; Glasse and Lindenbaum 1971:368-369). More common is what might be called absorption rather than fusion (Meggitt 1962:111). This is the situation where presumably patrilineal groups expand by recruiting unrelated individuals or families -- sometimes refugees, sometimes malcontents and sometimes just friends -- who then become clan members.

Contemporary settlement size is also related to the variable effects of contact. Sobeyagu'mo abandoned centralized stockaded settlements when the cessation of warfare made them unnecessary whereas Korofeigans appear to have moved together as a result of administration urging to live in centralized villages.

Under different historical conditions several options would have been open to the Sobeyagu'mo, each with a different effect upon settlement size. They might have been completely absorbed by the district that took them in as refugees. They might have been destroyed altogether either by their hosts or by some other group. Or they

might have eventually, with the assistance of their hosts or some other allied group, fought to regain their land and then expanded their numbers by recruiting residents from friendly districts, affinal kin, other refugee groups, etc.

Interactions Between Districts

Residential groups in New Guinea are often regarded as "primitive isolates," a notion that is intuitively sensible given the language diversity, intergroup hostility and rugged terrain which would all appear as obstacles to interaction between groups. The geography of disease, most notably malaria, also tends to reduce interaction across micro- and macro-environmental boundaries. Blood group studies have further contributed to the notion of population isolates. Rather than continuous gradients of variation, such studies have often revealed internal homogeneity and apparently unpatterned differences between groups (e.g., Macintosh et al 1958; Walsh et al 1960). Giles et al (1970:60) concluded that the whole of New Guinea is "an enormous, intricately but only slightly related set of genetic isolates." This view, however, conflicts with the historical and ethnographic accounts of marriage, trade and other forms of social intercourse taking place between groups several hours and often several days' walk

from one another.

A reconciliation of these conflicting perspectives is essential to an understanding of disease pattern and social process as discussed in later chapters. Highlands cultures are composed of small isolated groups, but each local group is party to a series of geographically wide-spread social processes. Similarly, the highlands contains a multiplicity of micro-environments within a constant physical and biotic ecological zone. The overall pattern of illness, like the cultural pattern, is by and large the same throughout the highlands. Specific variants on the pattern of chronic communicable disease result from highly localized adaptations. Analogously, highlands societies have developed a wide range of theories regarding illness causation but, regardless of belief, therapeutic efforts in all highlands societies involve combinations of verbal incantations, plant medicines and cooked pork.

Brookfield and Hart have offered an hypothesis which is capable of reconciling the view of highlands villages as functional isolates with view of them as open systems. They find that throughout Melanesia population distribution over land is accurately and regularly portrayed by a strongly skewed statistical curve known as a Pareto distribution. As they explain these results and their hypothesis:

Distributions of the Pareto family are notoriously difficult to interpret [since they are so widespread, occurring in the size distributions of cities, of firms, of incomes, and of biological genera by number of species], but they suggest the presence of a steady state given by a stochastic process incorporating proportionate effect so that net change from all causes in any area is proportional to present population. This is a situation that could only be achieved if migration operated to balance demographic variations, so that in a changing situation the system tends to a condition of dynamic equilibrium. But this is not easy to suggest in a region so diverse ecologically, and so compartmentalized into tiny local communities and larger isolated regions [e.g., highlands vs. coastal lowlands] as is Melanesia. What we have to do is to regard the very large number of local small communities as local, open systems, all interconnected and aggregated into a wider system that can only notionally be bounded at the edges of Melanesia, or of any one territory within Melanesia.... This is a lot to ask...

The hypothesis requires us to assume that all local systems, wherever located, are in interdependent relationship with all others. It becomes feasible if we allow that the influence of any one system on its neighbours diminishes very rapidly with distance, for while the direct effect may speedily become nil there continues to be an indirect effect rather as an impulse is transmitted down a line of railway waggons (1971:77; emphasis in original).

There is physical anthropological evidence to support this general principle. Freedman and Macintosh (1965) concluded on the basis of a survey of 2248 individuals that Enga-speakers (western highlands) do not constitute a single normally distributed population. Rather, they appear to be "a number of reproductively isolated groups which in stature differ significantly in means and distributions of the variable...." Nonetheless, a patterned overall decrease in mean stature is reported, from east to west, which is not attributable to local differences in food availability, population density or altitude. Similarly, in a carefully controlled sample of over 1000 adults from twenty-one villages in four adjacent language groups, Littlewood found a "definite cline from Gadsup to Awa in stature and its components".

(1972:38). Both physical and social distances are involved here, as are variables of both high and low heritability. On a range of genetic factors, the greatest physical differences were found between individuals of Gadsup villages and those of both Awa and Auyana. Differences were attributed to reduced gene flow between those groups (i.e., genetic drift within groups). Consistent physical similarities, the effect of gene flow or migration, were found between Tairora and Auyana. Ethnographic studies, undertaken as part of the same micro-evolutionary project, revealed variable incidences of inter-marriage and migration patterns which correspond with the genetic findings. (Genetic and social patterns, however, do not correspond with the lexicostatistical evidence; the latter revealed close affinities of Gadsup, Awa and Auyana to each other and the divergence of Tairora).

What becomes clear through close examination of genetic and behavioral patterns is that both social distance and social interaction are maintained between social units. For Sobeyagu'mo, as for all highlanders, the three most important processes of interaction between social entities are warfare, exchange and marriage.

Warfare

To this point I have spoken only indirectly of warfare. Here, as well, I shall restrict the discussion to brief comments on its role in intergroup relations and its effects upon the pattern of mortality. The brevity of this treatment is not intended to minimize the significance of warfare: throughout the highlands warfare was a continuous and central feature of life, and it is still the favorite topic of conversation. Preparation for and conduct of raids and pitched battles was virtually a full-time occupation for adult men. As a primary cultural theme, the influence of warfare was felt throughout society from settlement and gardening patterns to childrearing and initiation customs, from relations between the sexes to medical beliefs.

Warfare may be defined as planned violence carried out by members of a political unit, in the name of that unit, against another (Berndt 1962:232;1964:183). Defining "the political unit," however, is more difficult than it might seem. Berndt (1971) has argued that, allowing for the internal dissensions resulting from the ambitions of individual strong men and the diffuse loyalties resulting from individual ties of marriage and friendship, the district is the functional political unit. I have also stated that Nekematigi districts are

political units; but the definition is in fact a negative one. Districts are characterized by the absence of war (i.e., the presence of authority) within them but not by the extension of authority to the actions of the district as a unit vis-a-vis other units. Indeed, Langness has argued that a district only rarely acted as a single group, that although informants' descriptions of warfare

are given in terms of districts or clans...

this means only "selected men of" those places, and does not imply an activity between districts and clans acting as "corporate" in the usual meaning of that term.... [T]he polity most typically at war seems not to have been a district or a clan, or even an alliance of such units, but, rather, an essentially unpredictable alliance of numbers of men from different places who joined together on a purely temporary basis (1971a:207-308).

The Nekematigi data shed no additional light on what is, overall, a very elusive picture of highlands warfare. Sobeyagu and neighboring districts appear to have acted consistently as united defensive units but inconsistently as offensive units. Informants speak in terms of battles between districts; they also speak in terms of battles

led by individual men who gathered followers from several districts. (The benabena name for such a man is gipi'na, a big man or warrior, literally, "our bow.") Informants' recollections of the frequency, haste and treachery with which individual and district alliances were created, broken and reversed all point to what Langness has interpreted as a "relatively lack of rules governing warfare. These were strictly relations of power" (1971a: 308). Theoretical questions regarding the distribution of power and authority are not directly relevant to this discussion but we shall recall later the issue of fluid groups and shifting loyalties for it underlies both the Nekematigi theory of illness causation and individuals' selection of medical practitioners during illness.

Warfare is a medical phenomenon as well as a political phenomenon not only because of its effects upon medical theory and practice but also because of its direct effects upon the mortality patterns of the population. It is difficult to reconstruct an accurate mortality rate for pre-contact warfare because of the lack of first-hand observations. The goals and realities of highlands warfare are reported inconsistently in the literature and conclusions are infrequently supported with mortality projections. Indeed, in the only full-length work to focus exclusively on warfare, Koch (1974) makes no mention at all of the death rate.

Berndt's view is that highlanders did indeed have a "casual attitude toward killing. But opponents were not there to be annihilated -- although this did on occasion happen. They were there to be fought" (1964: 183). Drawing upon his own fieldwork among the Kainantu peoples and survey materials from other highlands societies, he concludes that warfare was an "antagonistic game" which resulted in few deaths. Glasse and Lindenbaum report more ambitious goals for the Fore but similarly low death rates: "While destruction was the aim of war, the goal was seldom realized" (1971:367). Langness, however, paints a more devastating picture:

In Bena Bena the stated aims of warfare were the complete and total destruction of the enemy, if possible. This included every man, woman, and child, whether old, infirm or pregnant. Although it is true that most raids resulted in only one, or few deaths, cases are known in which entire groups were destroyed. Many groups are represented today, in fact, by very few (and in some cases only one) living members, as the outcome of a series of grievous defeats. This appears to have been one of the most continuous and violent patterns of warfare on record (1964a:174).

For Nekematigi, as for Korofeigans, destruction was the aim of war; and that aim was accomplished reasonably often in the memories of adult informants. Sobeyagu district, having been repeatedly defeated, lost well over half of its population to warfare. One entire clan, at least the size of present-day Napayufa, was decimated. And genealogies show at least thirty per cent of the parents and parent-siblings of current residents (adults) to have been killed in warfare. This figure includes some deaths initially attributed to "sorcery" by informants. In translation, prolonged but eventually fatal wounds are often attributed to lipi'na sorcery which is in fact a form of warfare (see Chapter Three). It also, of course, includes non-Sobeyagu parents of in-married women and unrelated men. It is clear nonetheless that warfare accounted for 40 to 60 per cent of deaths of Sobeyagu'mo and their kin just prior to Australian control. Genealogical depth being minimal, there is less reliable information on deaths in the preceding generation.

The mortality rates for Sobeyagu'mo -- since they were losers -- are not valid for highlands societies in general, but ethnographers have reported high losses for larger, presumably more successful, groups as well. Meggitt reports two forms of warfare among the Enga: "jousting" between phratries which resulted in few deaths,

and inter-clan fighting in which one man in four was killed (1958:268). And Heider, though describing warfare among the Dani as highly ritualized, reports death counts as high as 28.5% for males and 2.4% for females from genealogies and .48% per year of the total population from observation (1972:24). Data are not sufficient to allow us to conclude what the overall impact of warfare may have been on the morbidity-mortality pattern, but the figures that are available are strongly supportive of the paleontologists' and microbiologists' hypothesis that most adult death in small, (relatively) isolated, non-industrialized populations results from violence rather than from infectious or organic illness (Cf. Brothwell and Sandison 1967; Dubos 1965:228; Dunn 1968).

Exchange

The peaceful equivalent of warfare is exchange, and the occasions for the exchange of goods are as numerous as the short-term reasons for fighting. In a sense the huge pig-exchange systems of the highlands are possible only because of the surpluses produced by intensive horticulture. In another sense, however, the surpluses are produced specifically for the purpose of exchange. Like warfare, exchange is expressive of competition and conflict, albeit within a system of carefully balanced reciprocity. The giving of gifts and food always

simultaneously discharges past obligations and creates new ones. It also creates the opportunity for individuals and groups to outdo their rivals -- the recipients -- in prestige gained from display of their productivity and generosity. Like warfare, exchange occurs both between individuals as individuals and between individuals as representatives of larger groups.

Exchange occurs between individuals within a district in continuous and subtle fashion. Such things as assistance in housebuilding, wood-cutting or garden clearing and small gifts of salt, tobacco, areca nut, sugar cane or other specialty foods, are constantly being given and received. Reciprocal gift-giving also takes place between individuals of different districts. For instance, a grasslands visitor (a friend or affinal kinsman) bringing seasonal foods may admire a bird plume recently acquired by his Nekematigi host. The host may respond by giving it on the spot; or he may wait until some future visit to give the plume or something of equal value. Exchange between individuals also occurs in the context of long-distance trading trips.

Nekematigi and members of some neighboring tribes made trips of several days duration, into the Finisterre mountains, specifically to trade their dogs, net bags, etc., for direct returns of pottery and shells from the Rawa people. (see Keil 1974).

More institutionalized and public forms of exchange occur in the context of numerous ceremonies marking significant episodes in an individual's life history.

Some of these occasions are birth, naming, walking, the assumption of hair ornaments by prepubescent girls, nose-piercing for boys, a boy's first productive hunt, the onset of menstruation, male initiation, the rejection of a girl's marriage offer to a boy of her choice, betrothal, the passage of a betrothed girl's first month in her new village, the planting of a betrothed girl's first garden, the presentation of first food by a wife to her husband, any pregnancy, the first crop from any new garden, the successful conduct of a trading expedition, preparation for death, and death itself (Newman 1965:53).

Other occasions which Nekematigi mark with ceremonial exchanges are serious illnesses and, nowadays, a boy's successful completion of a term in school and a man's release from jail. On all these occasions cooked pork and other gifts are exchanged among individuals related to Ego as paternal kinsmen, maternal kinsmen, people affinally related through Ego, and among Ego's parents and other members of the district such as foster-

parents, agemates and persons who share the same name.

Marriage is a major event in this chain of exchanges. Women themselves are objects of exchange. The men of a district or clan expect to receive brides from, and send their sisters and daughters to, any given other clan in roughly equal numbers. Perceived inequities in these relationships lead to refusals of marriage offers, increasing hostility between the groups and perhaps fighting (although, in any case, marriage, like other forms of exchange, takes place between "enemy" groups as well as between "friendly" groups).

There are several subsidiary gift exchanges that occur as part of marriage negotiations, but during the accumulation and payment of bridewealth alone several purposes are served and several sets of partners are involved at different stages. (For first marriages neither bride nor groom are involved in mate selection or exchange transactions. On the contrary, they are under strict rules of avoidance until all the groom's agemates have been married and the proper ceremonies performed. Wealthy men take second and third wives, providing a larger portion of the bridewealth themselves.) Pigs and cash (formerly shells) form the largest portion of the bridewealth. Within the groom's district or clan, accumulating a sufficient amount of these valuables provides the opportunity (or necessity) for

individuals to discharge past obligations (or create new ones to their advantage) by helping a man raise a bride-wealth for his son. Payment of shells or cash from the groom's line to the bride's cements the negotiations. It is conceived of as compensation to her family for their loss of her childbearing and work capacity. At the time of the marriage ceremony, however, live pigs and ceremonial foods pass in both directions. On each side, payments received are further distributed internally.

The most ceremonial, most delayed in terms of reciprocity, and most nearly approximating exchanges between groups are the large inter-district pig feasts. These are arranged by a coalition of districts, sometimes to repay another group for past help in warfare, sometimes (in former days) as a maneuver to negotiate future alliances. They often occur in the context of large scale male initiations or courting parties. Contemporary pig feasts also occur in the context of the opening of new hospitals or schools. During these events up to several hundred pigs may be slaughtered and exchanged, by individuals but in the name of groups. Mountains of food are consumed and exchanged. Participants dress in their most spectacular finery, sing, dance, make speeches and conduct mock battles, all to demonstrate their superiority over their neighbors.

Exchange, like warfare, is a social phenomenon with medical, in addition to political and economic, implications. Economic considerations directly influence the treatment of illness (see Chapter Four). Patterns of exchange, and inter-district communication in general, play important roles in the spread of illness as well. Since social groups are in constant interaction there are no effective barriers to the spread of disease. Thus, in the pre-contact highlands, most disease was endemic. Epidemics, of increased severity and higher mortality, occur when new strains of infection are introduced through contact and/or when the level of immunity in a group drops as a result of lack of exposure. From the point of view of the germ theory of disease, large numbers of people gathering for a pig feast or individuals travelling to trade with members of other groups create obvious opportunities for the spread of illness by infectious microorganisms. "Pig bel," a type of enteritis with a high mortality rate, is an apt though extreme example (see Murrell 1966; Murrell and Roth 1963). We shall see, however, that such contacts between the members of different groups are equally important to the Nekematigi theory of illness; they create obvious opportunities for the spread of illness by enemy sorcery.

CHAPTER THREE

Nekematigi Medical Theory

Definitions: Illness, Disease And Medicine

In the following two chapters I shall be discussing what anthropologists call "illness" rather than what physicians call "disease." First made explicit by Fabrega (1971; Fabrega and Manning 1972), this is now a generally accepted distinction (Cf. Coulson and Selby 1974).

Disease is a concept of contemporary biomedical science which has limited cross-cultural applicability. A diagnosis of disease depends upon recognition of either the presence of pathogenic microorganisms or an alteration in organic structures or processes. Diagnosis is thus complicated when clinical illness exists in the absence of identifiable foreign microbes or tissue change. This is recognized as problematic with regard to the so-called mental diseases or functional disorders, but it is no less so with infectious disease resulting from invasion of unidentifiable or normally harmless microbes. Because of these difficulties with the concept of disease, anthropologists tend to rely on the concept of illness.

An illness is an impaired state of being which is seen and labeled as discontinuous with routine everyday affairs, which is believed to be caused by socioculturally defined agents or circumstances, and for which there are culturally specified forms of treatment (Fabrega

1971:185). Excluded from a cross-culturally applicable definition of illness are (1) disease states recognized by medical scholars but ignored or regarded as normal by individuals in the societies where they occur, and (2) pathological conditions recognized as such, but for which no explanation or treatment exists. The criteria by means of which illness is defined are culturally determined and logically separate from those employed by western medicine to designate a disease state -- though the two may coincide. Indeed, our argument for anthropological consideration of the cultural significance of biological symptoms is based on a comparative interest in the extent to which the two do coincide. The relationship between highlands disease and Nekematigi illness will be treated in Chapter Five.

Just as the concept of illness must be distinguished from disease, so it must be distinguished from medicine -- the response to illness. Yet the interdependence of illness and medicine creates a certain circularity in attempts to define them. Glick, for example, defines a medical system as a "patterned set of ideas and practices having to do with illness" (1967:32) and illness as "any situation evoking a response that can be identified as part of the medical system" (1967:35). Similarly, for Fabrega, the term illness designates that someone is sick in culturally-specific social and psychological

terms (1971:213) while the medical care system is the constellation of beliefs, knowledge, practices, personnel, facilities, and resources that together structure and pattern the way in which persons of a sociocultural group obtain care and treatment for illness (1971:214).

These are laudable attempts to avoid the limitations of the biomedical definitions of illness (disease) but they are not terribly useful as guides to research or analysis.

Rivers' earlier definitions are in some ways more useful. He defines medicine as

a set of social practices by which man seeks to direct and control a specific group of natural phenomena -- viz. those especially affecting man himself, which so influence his behaviour as to unfit him for the normal accomplishment of his physical and social functions -- phenomena which lower his vitality and tend toward death (1924:4).

Rivers' definition of illness is pegged to phenomena outside the medical system itself, thus avoiding the circularity of cultural-relativists' definitions. The difficulty in this formulation is that it depends upon a definition of health, or "normal" functioning, for the

recognition of illness, or abnormal functioning.

It is probably safe to say that for most people the healthy, normal state of being is regarded as a physical and mental state fairly free of discomfort and pain, which permits the persons concerned to function as effectively and as long as possible in the environment where chance or choice has placed them (Dubos 1965:351). Indeed, adequate health on the part of most group members most of the time is certainly a functional prerequisite of any extant social system. It is nonetheless impossible to define health in the abstract because its criteria differ with environmental conditions, with the norms and history of the group, and with the aspirations that govern individual lives. Illness and infirmity of varying types exist to varying degrees in all populations, yet members of all known societies regard ill health and death in the individual as abnormal. Thus, a culturally relevant theory of illness is based upon a culturally-specific theory of health or normalcy.

We may begin with the proposition that health -- the normal course of affairs -- does not demand an explanation whereas illness -- a dysfunctional deviation from the behavioral and/or biological norms of a given population -- does demand such explanation. One may then ask: what are the signs or indicators of a condition which require (medical) explanation?

This chapter focuses on Nekematigi illness as defined by them in terms of relevant indicators of illness, theories of illness causation, and recommended techniques to alleviate conditions caused by specific illness agents. The process of diagnosis, i.e.; the attribution of a given set of illness indicators to a particular etiologic agent, will be discussed with medical practice in Chapter Four. A medical system is a culturally patterned set of both ideas (potential diagnoses) and actions (treatments) related to illness. Here I shall concentrate the reader's attention on Nekematigi ideas about illness, and in the following chapter we shall concentrate upon Nekematigi actions in regard to illness. To separate them is, in one respect, only a device to facilitate exposition; ideas and actions are logically and behaviorally related aspects of the same phenomenon. The separation, in another respect, however, underlies a separation which is itself characteristic of the Nekematigi medical system. As discussed in more detail below, medical actions derive only in part from diagnostic ideas; they derive also from a separate set of therapeutic ideas and from the exigencies of individual circumstances.

The Indicators Of Illness

Health for Nekematigi is a condition so taken for granted that I could not even elicit a Benabena term for it. To be "not sick" or "allright," as it is expressed in translation, is to be strong. Strength refers to the ability to work hard, for example in one's garden, and the ability to impress others, for example in public discourse. A "good" state of being -- the normal and desirable state -- is one where one's skin shines, one eats well and the food "sits" well, one can foster many children and breed many pigs who in turn also eat well, "grow up big," and inspire public admiration. To be sick, by contrast, is to experience some interference with one's normal abilities.

There is nonetheless a gradation, rather than a sharp demarcation, between health and illness. Conditions which are recognized as non-normal and not-good, but common enough and minor enough to be non-illness include cough, headache, toothache, cuts, sores and boils, complications of childbirth, aches in the joints, sore throat and stiff neck. Glick (1967) reports an analogous category of recognized but socio-medically unimportant "ailments" among the Gimi, an eastern highlands population similar in many ways to the Nekematigi. For both Gimi and Nekematigi illness requires explanation while

ailments are unexplained or explained with off-hand and inconsistent references to natural events. While illness signifies behavioral changes that require treatment, ailments are untreated or treated informally by the afflicted individuals themselves. While illness is most often diagnosed because of the co-occurrence of several bodily symptoms, ailments are usually single symptoms.

While there is no vernacular expression which refers collectively to ailments, there is a general Benabena term for the state of being ill; it is nEvEsi'Ehive, meaning "he, she or it is sick," or "I am sick." An alternate usage is nEvEsi'Ehi nohube, meaning "I am sick, I am [existing] here." Beyond these comprehensive verbal descriptors there is no naming or categorization of illness states. Rather, the characteristic of being ill is localized in various body parts. There are three different but equally common ways of expressing this. In each usage, the locus (or loci) of the illness must be identified, then its condition must be specified as either sick (nEvEsi'Ehive or some derivative), in pain (gabun in some derivative form), or simply existing (nohi, nohibe forms) when the conversational focus on illness or pain is already obvious. For example:

lutati yave no nEvEsive

back it is/am sick

"The lower portion of my back is sick."

or lutatni nagabu' nokive

my back pain is

"My lower back hurts."

Similarly,

lata i'Ehive

head is/am sick

"My head is sick."

or latahatni nohi

head my is

"My head is." In other words, "It is my head [that is sick, or hurts]."

Illness, then, is a totality of abnormal states experienced by various aspects of the person regarded as a being composed of parts. In one sense, the more "parts" that are afflicted, the more serious the illness.

On the opposite end of the continuum from ailments are sipi nEvEsi'Ehi, or "big illnesses," which are regarded as very grave indeed. This term, as opposed to nEvEsi'Ehi alone, is reserved for situations where fear for the sick person's life is apparent, often situations where initial attempts at treatment have failed.

Despite a linguistic distinction, the status of any given condition as an ailment, illness or serious illness is not predictable before its occurrence. This is because bodily, behavioral and social indicators all play a role in illness perception.

Abnormal conditions of the body that indicate illness include pain, feelings of internal motion, and sensations of hotness or coldness especially in the blood or internal organs. These feelings may be expressed as follows:

nagabu'ni

"my pain," locus unspecified;

lopatna nagabu' nokive

literally, "hip my pain it is," or, "my hip hurts;"

gafiluga luga noti

"[something in] this part of my side, going round and round, it is;"

goloha'nimo logona nEVEsive

literally, "blood of mine, this, hot [fire], is sick," or, "my blood is [too] hot."

Other bodily signs which are perceived as definitive are those which interfere directly with some physiological function. Hence, choking, vomiting, difficult breathing and diarrhea -- whether reported by a sick person or observed by his associates -- are responded to with alarm and an unambiguous definition of illness (see, for instance, cases #1 and #6).

Abnormal behaviors that indicate illness include an unwillingness or inability to eat, to talk, or to work. Also, uneasy sleep, especially crying out in one's sleep, is a sign of illness. Generally speaking, any

change in personal habits may be taken as a sign of illness, but these four are the most critical and are the ones explicitly named by informants as matters of concern. Regarding silence and a lack of interest in work, there is for Nekematigi as well as for the anthropologist a circularity in the definition of illness. An individual's predilection to stay at home, especially a lack of interest in a public gathering of some local significance is regarded by his associates as a sign of illness; yet staying home and out of public view (although accompanied by close kin) is part of recommended illness behavior. In other words, persons may be deemed ill because they are socially withdrawn, but once they are defined as ill they must (or should) become socially withdrawn.

Social conditions influencing the perception of illness include the likelihood of a person's contact with illness-causing agents (see next section) and the relative status of the person manifesting the symptoms. Any one of the conditions mentioned as ailments, occurring in the absence of other indicators of illness will be regarded as a sik nating (Pidgin), a sore, or "just something;" it will not be described in the terms used to refer to illness. But should the same condition occur simultaneously with others, or become unusually painful, or develop in an especially important

person or favored child, it is likely to be perceived as an illness. Omegliso, for example (case #2), suffered from a single tropical ulcer, a condition often untreated. That she was perceived as ill and treated reflects the importance of her family, especially her newborn infant, as recent recruits to Sobeyagu district.

There is also a time element in the Nekematigi distinction between levels of illness. If an ailment lasts longer than prior experience indicates it should, it may come to be regarded as an illness and treated accordingly. Conversely, if an illness goes on too long and has been repeatedly explained and treated without success, it will revert to the status of ailment (see case #7).

Finally, the notion of "statistical" abnormality is relevant to the definition of illness. From mid-May through mid-July of 1971 there was a virtual epidemic of upper respiratory infection in Sobeyagu and neighboring districts. The first few Sobeyagu'no to complain of congested and painful throats, coughing, watery eyes, headache, and pains in the chest and back were treated, and theories were put forth as to the cause of their illnesses. However, for those who became ill later, the clan collectively decided not to pursue the orthodox forms of treatment. Sick persons minimized their own discomfort and tried to pursue normal activities. This

alteration in perception of the same bodily symptoms reflected a conscious decision to conserve the group's rapidly diminishing medical resources; but it also reflected the belief that if everyone was experiencing the same thing it could not be too serious.

In summary, then, the co-occurrence of two or more physical, behavioral or social indicators is essential to the designation of an illness. However, there is a ranking of the indicators of illness so that certain factors, even when occurring singly, lead immediately to a diagnosis of illness. For instance, prolonged silence and ill humor in a normally gregarious individual, even if unaccompanied by any other sign or suspicion of illness, is an almost certain indicator of illness because of its association with a particularly feared type of sorcery (see case #9). Another indicator that is compelling even when not accompanied by others is pain.⁷ Especially attended to is pain which occurs inside the body as opposed to "skin pain." The distinction between skin pain and internal pain corresponds to the distinction between conditions which are said to arise by themselves and those which have a cause. There are even different linguistic forms for reporting, say, that the skin of one's neck hurts, or that the inside of one's neck hurts, or that the pain

starts on the inside and also afflicts the skin. Strictly superficial pains, which have "just happened," are disregarded; they may be self-treated by application of leaves or lime, but they are not responded to with medical care unless accompanied by other signs. Pain which occurs inside the body, however (particularly pain in an internal organ rather than muscular pain), indicates an illness and, in most cases, leads to formal medical treatment. Informants cite pain in the liver,⁸ for example, as an especially common and serious sign of illness (although they reported stomach pain and back pain more often than liver pain in the cases I observed).

A word about Nekematigi knowledge of internal anatomy is perhaps called for here; it is, in fact, fairly comprehensive. Nekematigi routinely have the opportunity to observe mammalian internal anatomy in the course of pig butchering. Their experience (in the past) with cannibalism provided the opportunity for comparison between human and porcine anatomy. Consequently, the terminology for virtually all body parts is identical for pigs and humans. People know the location of the liver (luhaiya'a), they understand that intestines (ipa) curl around and around inside the abdomen and contain excreta, and so on. I am satisfied that the

symptomatic reports I received from Nekematigi have physiological accuracy (leaving aside the question of the accuracy with which any sick person can sense the origins of his pains).

The Explanation Of Illness

The indicators of illness serve to define the illness state; they signify that a person is sick, or has an illness, but they do not lead directly to a diagnosis. Diagnosis is a procedure which goes beyond the acknowledgement of illness to a conception and classification of the type and/or cause of an illness. Nekematigi medical theory postulates the activity of a wide variety of illness-causing agents, most of which are found, to varying degrees, in the belief systems of all New Guinea highlands societies. Etiologic agents and processes known to Nekematigi include certain features of the landscape, improper disposal of food, forest-dwelling spirits, improper or excessive intimacy between men and women, the ghosts of recently-deceased kinsmen, and several varieties of sorcery. Each of these exist as potential diagnoses and thus potential bases for medical treatment.

Not all theories of illness causation, however, are of equal importance in medical practice. Rather there is a hierarchy of belief which corresponds to the

differential importance of various treatment practices. Some theories of illness causation exist only as potential explanations of illness; they are unclearly or inconsistently related to specific indicators of illness and fail to provide a basis for techniques of medical treatment. Others account for symptoms rarely observed and underlying treatment methods infrequently used; these treatment methods are discussed here as part of the belief system since they are not active parts of medical practice. Finally, certain theories of illness causation are of great explanatory value, accounting for nearly all the symptoms of illness observed, and providing the epistemological basis for the most commonly employed forms of treatment.

When one examines the explanations offered for actually occurring illnesses, rather than responses to general inquiries about illness, one finds that the range of explanations and treatment methods is considerably reduced in scope from that suggested by the belief system itself. The activities of ghosts are postulated in a small number of cases and sorcery is postulated in the overwhelming majority of cases. Moreover, it is one variety of sorcery that is most commonly invoked as the cause of illness, regardless of symptoms. Finally, it is the treatment procedures, theoretically specific to this form of illness, that are used in virtually all illness

situations. The cultural basis for this selectivity will become apparent as the discussion proceeds.

Hypothetical Illnesses

Following Glick (1967:44), I regard Nekematigi ideas which exist as possible explanations for illness but which are never employed when illness occurs -- or only as a last resort -- as explanations for "hypothetical illnesses." They are important parts of local folklore, serving as medically-based behavioral sanctions, but they are excluded from medical theory itself inasmuch as they lead to neither diagnosis or treatment.

There are, for example, certain features of the natural landscape which are regarded as dangerous for medical reasons. The rainy season is said to be a time of sickness for Nekematigi. When Sobeyagu'mo become ill during this time, an observer can hear speculation that heavy rains themselves somehow cause illness, that spirits who come out only in the rains cause illness, or that eating certain greens and fungi that proliferate on the trunks of trees during the rainy season results in illness. Despite such reflection, treatment invariably follows a course prescribed for illnesses due to other causes.⁹

Similarly, some named, uninhabited, and usually wet or barren localities are said to be capable of causing

illness in individuals who walk about in them. They do so either by their inherently deleterious qualities or because illness-causing sorcerers or spirits inhabit them. Nekematigi simply avoid such areas and attribute their ills to other causes.

When we were new residents in the community, the role of flies and mosquitoes in the spread of illness from one person to another was also explained to me in some detail. This is a post-contact addition to medical theory which has no practical application.

Nekematigi say that one must not toss away scraps of food or cigarette butts near an anthill because the ants will bore holes in these materials, as they do in the earth; this will result in a sympathetic deterioration of the nose and face of the person to whom the scraps belonged. People do observe this injunction as far as disposal of wastes is concerned but they do not explain existing cases of facial deformity in terms of its breach. There are two elderly women in the community whose faces are deformed in the manner described, probably as a result of facial yaws (gengosa). In one case the deformity is attributed to the woman having been attacked by her husband's ghost (see below); in the other case no explanation is offered. These women are offered as examples of situations like that arising from ants' actions, but they and their

associates deny that such a process occurred in their cases.

Throughout Melanesia one encounters the practice of putting spells and substances on one's valuable crops or possessions to cause illness for would-be thieves. Sobeyagu'mo protect their groves of areca nuts by applying materials regarded as poisonous on the base of the trees; a thief is said to develop sores on his face and hands as a result of touching the poison. But such sores occur commonly and are not regarded as evidence of theft or as signs of illness; they are regarded as ailments. Langness has told me that in Korofeigu certain symptoms are perceived by the sufferer as retribution for having stolen from someone's garden. To obtain relief the thief must go to the owner of the garden and request that he spit or spray water over him. This may happen amongst the Nekematigi as well, though I never heard of it. If so, such behavior would be included within our defined rubric of illness and medical service.

Nekematigi say that men may become ill from association with women. Sexual intercourse is dangerous to men both because of loss of semen and because of the inherently polluting nature of women. Simply being in the company of women too often can be deleterious to a man's health. Neglect of any of the numerous taboos associated with accepting food from a woman, most

particularly food prepared by a menstruating or post-partum woman, can result in a man's skin, blood or internal organs becoming too "hot." These beliefs are part of an elaborate system of moral and behavioral prescriptions which support the pronounced antagonism and ambivalence characterizing the relationships between men and women, to varying degrees, in all highlands societies (see Langness 1967a; Lindenbaum 1972; Meggitt 1964; Read 1954b). As part of Nekematigi medical theory, however, they are relatively peripheral. Nekematigi -- men and women -- experience many illnesses in which hotness is a primary symptom. Its occurrence in these cases is never attributed to the nature of the sufferers' relationships with women; rather it is attributed to enemy sorcery. Treatment for illnesses involving hot skin or a hot liver is a central feature of Nekematigi medicine and will be described in the following chapter; male debilitation, which results from imprudent association with women, is prevented or alleviated by male purificatory rites rather than by medical treatment.

Spirit-Induced Illnesses

There are a variety of peculiar living beings who inhabit the bush around Nekematigi settlements and are capable of causing illness. Like the etiologic agents

discussed above, these spirit-creatures are usually referred to in explaining only hypothetical illnesses. Nevertheless, some conditions for which spirits are held responsible do actually occur, albeit infrequently. Treatment for such illnesses occurs either as part of more orthodox treatment or in a format specific to spirit-induced symptoms; the latter are used rarely, when more routine treatments have failed. Thus, we may consider the following illness explanations as part of medical theory though they lead to treatments which are low in the "hierarchy of resort" (Schwartz 1969).

On the upper slopes of Mt. Otto and other high mountains live the naboli, violent, hysterical and deformed, yet human-like, creatures. Naboli are distinguished by their location, their insane behavior and their bizarre physical appearance. It is difficult to convey the hilarity and wonder that naboli inspire in Nekematigi informants. They are said to have lopsided faces and asymmetrical bodies, with various features or limbs missing. They are frequently missing an eye, but if they have both eyes, they will be without an ear; they may be found hopping on their only leg, but if they have both legs, they will be missing an arm. They look like injured World War Two veterans, but act wilder, commented one worldly Sobeyagu man. Naboli are not much feared under normal circumstances, but if a man goes hunting

for game or searching for sorcery materials in places where they are known to reside he will be wary and fearful. For to fight a naboli, or even to look upon one, can result in the man developing the naboli's physical or behavioral attributes.

Much more benign are the motabo, men, women and children who live in the heavens. When one of them dies, his fellows hang up his body so that the skin dries, leaving only the bones. When thunder and lightning occur or when a loud shriek is heard, like that of a giant bird, it is a sign to Nekematigi that the motabo are sending their bones (motabo felisa'a) or the bones of heavenly birds (namayapifa) to earth. Nekematigi desire these bones because they can be used in the preparation of nalisa sorcery (see below), rain magic and certain forms of medicine. When a man carries such a bone on his person he is protected from sorcery, capable of frightening away his enemies and lucky at cards.

In spite of their potential benefits, the bones are associated with danger. They come down to barren places (motabo hepa'mo) in the forest which have big stone outcroppings: one is likely to encounter naboli in such places. Each bone or group of bones (such as ribs, finger bones, etc.) lies in a different spot in the immediate vicinity of the rock. A man may be tempted to take several bones at once because of their beneficial

power and because he can sell them to other men, but he should take only one or the single group found together. He should also go alone and dress shabbily to find the bones. Nekematigi do not like to venture into the bush (or anywhere) alone, and to be away from home without one's finery is to be humbled and vulnerable. But if a man ignores the injunction as to dress, or if he takes too many bones, he is liable to die, to become insane, or to wander aimlessly to other places and never return to his home.

Behavioral injunctions surrounding naboli and the proper acquisition of motabo felisa'a are more important to the system of moral sanctions surrounding caution, humility and greed than they are to medical theory. Deformed limbs, theoretically a result of contact with naboli, are uncommon and are explained in terms of prenatal accidents or misbehaviors on the part of the individuals' mothers. Sudden death or disappearance, although possible results of flaunting convention regarding the acquisition of motabo felisa'a, are attributed to attack or abduction by human enemies. Episodes of temporary insanity of the type potentially attributable to naboli or motabo felisa'a are in fact attributed either to sorcery or to ghosts. When deviant behaviors such as homelessness and aimless wandering

occur over a long period, they are not regarded as manifestations of illness. Nekematigi say that such people are negi nagi, not nEvEsi'Ehi; their behavior is neither explained nor treated.

The concept negi nagi -- negi negi in Korofeigu dialect (Cf. Langness 1965) and long long in Pidgin -- refers to silliness and mental slowness of a chronic nature as well as psychotic outbursts that are acute and short-lived. Such episodes in previously ordinary individuals represent illness whereas conditions of long standing do not. Persons who are chronically negi manifest a persistent inability to hear, comprehend or speak; they do not care about the things which matter most to other people -- marriage, enemies and gardening. I met two individuals who had been negi nagi for years. One is a single adult male, a perennial wanderer with no responsibilities who speaks rarely and oddly. The other is a young single adult woman who generally attends to her gardening duties but continually confuses items of vocabulary, never grooms herself with pig fat and colorful beads, and occasionally disappears for a day or two at a time. When I inquired as to the possible reasons for these persons' unusual behavior, informants rarely responded with an explanation beyond, "She is just negi, that's all." Two persons ventured the cautious suggestion that

their actions might represent the result of something which had happened to their mothers before they were born. In any case, the deviants are neither ostracized nor cared for in any special way. The girl lives with her family as any young single girl might and men consider it possible, though unlikely, that they may receive bridewealth for her. The wanderer is fed and housed good-naturedly by whomever he visits. (This appears to have been the case traditionally as well. A negi nagi man, unlike a normal man, would not be deliberately attacked even by enemies of his district because of his recognized harmlessness. Normal men regard such individuals as sources of amusement and information about other places.) Inquiries as to possible medical treatment for chronic negi produced only laughter.¹⁰

There is, however, a medicinal plant with the power to counteract the adverse effects of prolonged contact with a strong motabo felisa'a. The symptoms of this condition include bleeding from the nose and flailing about of the arms and legs. When it is suspected that such convulsions are due to motabo felisa'a this particular plant (Commelinaceae family) is combined with a variety of others and fed to the sick person as part of a general treatment prescribed for sorcery (see Chapter Four).

Less benign than motabo and less bizarre than naboli, numulitEna'i are small, capricious human-like creatures associated with muddy uninhabited places. Though they frequent areas near human settlement, numulitEna'i are rarely seen. They cause illness deliberately but apparently without motive, doing so by stealing the soul (meha'a) of someone's liver, or limbs, or of an ante-partum woman's uterus. Alternatively, they may take a piece of food a person has thrown away, or tobacco, or a piece of the person's hair or clothing. By securely tying up a parcel containing the stolen material and various sticks and garbage, then burying it beneath the mud, numulitEna'i cause the individual feelings of stiffness or numbness in the body part missing its vital essence, overall sluggishness or fatigue, and, in the case of a pregnant woman, the refusal of the fetus to be born.

Treatment for removing the numulitEna'i influence is most often sought by women when a child is long overdue and normal inducements to birth have failed. It was also tried once in the case of a man who had been seriously ill for months with no improvement following the efforts of several local practitioners and weeks of confinement in Goroka hospital (see case #17). In both situations, it is young men -- initiated and perhaps married but not cohabiting -- who perform the treatment ceremony on

behalf of the afflicted individual.

The boys go to a place where numulitEna'i are likely to have been; their goal is to locate the parcel (gieto'ehibe) containing the sick person's belongings which should be buried there. Having obtained a piece of pork and other good foods, they prepare a muma'e hetilutne. This is a small earth oven, like those ordinarily used for cooking, but connected by means of a specially marked path to a disturbed muddy spot thought to be the location of the parcel. The pathway from the earth oven to the place is marked with waist-high archways constructed just for the occasion of cane grass and decorated gaily with criss-crossed layers of brightly colored leaves. The leaves are those of ginigi (*Cordyline* spp.), yuguyufa (*Cyperaceae* family), hatakuya (*Adiantum* spp.) and kukapEtanaga'i (a tree of the *Urticaceae* family). After cooking the food and preparing the pathway, one of the young men takes some cooked pitpit and pork from the oven and holds them together in his hands. Walking down the path from the earth oven toward the mud, he holds the foods, shaking them, in front of his lips and whistles over them. Then he slips his hand into the mud to find the parcel.

After finding the parcel, the boys take it and the cooked food back to the woman who requested the

ceremony. She eats the food and hangs up the parcel¹¹ over the firepit in her house. When it has dried, the vines with which it was tied are burned in the fire, thus removing completely the last of the numulitEna'i's restrictions upon her movement.

Ghost-Induced Illness

Whereas the ghosts of long-deceased ancestors are harmless or beneficent, the ghosts (fleya) of recently-deceased clansmen sometimes return and cause illness by entering a person's body and "eating" his liver, obstructing his throat or just moving around inside. The indications of such a condition are said to be the eruption of sores on the face and peculiar behavior, especially in women and, most likely, in the deceaseds' wives. Langness (1965) reports that young married men in Korofeigu experience temporary psychotic episodes -- involving running, shouting and threatening violent attacks on other members of the district -- which are also attributed to possession or attack by the ghost of a kinsman or kinswoman recently deceased.

Sobeyagu'mo do not use either the Benabena or Pidgin terms for sickness to refer to conditions resulting from ghost possession. Indeed, I was told by my chief informant, an experienced curer, that this is

not being sick, it is "something different."

Descriptions of the condition are simply offered in the form fleyumato luhaya nominabe -- "there is a devil or spirit inside his (or her) liver [eating it]" -- or fleyumau to gufalo nominabe -- "it (the ghost) comes up in the (his or her) stomach." While these conditions may not fit the Nekematigi definition of illness, they do fit mine inasmuch as there is a recognizably impaired condition for which a treatment exists, a treatment derived logically from etiologic ideas and intended to relieve the symptoms. At the same time, illness attributed to ghosts occurs infrequently in Sobeyagu and neighboring districts. No cases were observed in thirteen months of observation and only two were recorded from the recent past. No deaths in genealogies were attributed to ghosts.

In order to induce a ghost to leave a person's body, a medical practitioner prepares a special meal which includes the leaves of mapi'na (Cudrania javanica), ufe ufehi (Rubus muluccanus) and mitri'a (Rubus rosaefolius). According to informants, it is important that several of the items in this preparation have thorns, although it is the new leaves rather than the thorns themselves which are used. (Because of the infrequency of ghosts' activity, I never saw this treatment ceremony performed. Nor did I obtain a

satisfactory explanation of the ingredients in the meal. In other therapeutic contexts thorns of some of these plants are used to puncture pieces of root ginger so that it will receive the spoken words better and, when eaten, carry them effectively through the patient's body.) The curer in charge of the ceremony provides the medicinal leaves and instructs the afflicted woman as to what ordinary foods to bring. He also names one of her matrilinear kinsmen, usually a young male child, to share the meal with her. The curer also instructs the patient to bring a gift for this kinsman -- something small, but nice, perhaps a spoon made of coconut shell or an item of personal decoration. The child is viewed as a link with the deceased, who may have been treated poorly by his wife (or someone else) before death. When the curer, the patient and the child-assistant have finished their meal, the child is given the gift and told to run away quickly -- hopefully taking the offending ghost with him.

Sorcery-Induced Illness

As a rule, Nekematigi do not blame remote forces for their ills; neither do they hold themselves, their intimates, or their ancestors responsible. Rather, they attribute illness to the same forces which cause all other misfortunes -- killings, stolen pigs, untimely

rains, destruction of property -- that is, to their immediate enemies. It is enemy sorcery that is posited most often as the cause of illness, whether in general discussion or in actually-occurring cases. Sorcery here refers to any ritual designed to kill or harm human beings (Lawrence and Meggitt 1965:9); there is no witchcraft in Nekematigi society, in the sense of human powers for evil which are not under the conscious control of the person using them (Evans-Pritchard 1937:34; Middleton and Winter 1968:3).

Before going on to discuss the varieties and outcomes of the varieties of sorcery known to Nekematigi, I should make it clear that the boundaries of sorcery coincide with the boundaries of warfare. The relationship between sorcerer and victim thus differs from that reported for some other highlands societies. Sorcery accusations are not directed at any person living in the same clan as the victim. Informants do not attribute illness to the activities of sorcerers (or witches) in their own midst, although this has been reported for the Chimbu (Brown 1972), the Gururumba (Newman 1965) and the Fore (Lindenbaum 1971), among others. Not only do Nekematigi state that sorcery is not expected within the clan, they make it clear that sorcery attacks come from the same enemies from whom warfare attacks may come. Since the boundaries of enemy activity are not constant,

when illness occurs persons in a number of nearby districts become suspect. Potential enemy groups which are too far away to be regular enemies are suspect only when there has been recent social intercourse.

Each type of sorcery known to Nekematigi is defined in terms of its means of operation, the symptoms it produces in its victims, and the procedures necessary for alleviating its effects. In the following discussion, I have categorized sorcery types on the basis of their means of operation. This is part of the established wisdom of the people, whereas the application of that wisdom to specific cases of illness is the business of experts and is often in dispute. Since sorcery is illicit, I never saw sorcery materials in production or use. For this reason I am unable to report on the incantations used in the preparation of sorcery materials; informants were unwilling to even suggest the types of phrases that might be used. Most responses to questions regarding sorcery were qualified by the assertion that, "We, of course, do not perform sorcery, but we know that the So-and-so's do it in the following way...." It is perhaps true that sorcery is attempted far less often than it is postulated as a cause of illness, but it is not merely the subject of paranoid imaginations. During my field stay one man from a neighboring district was arrested for having been found

in the Goroka market with what he admitted were sorcery materials on his person.

Sorcery operating by means of material placed on arrowtips -- lipi'na

It is not clear that this category should, in fact, be regarded as "sorcery." It may include the operation of actual chemical poisons, though the description of the ingredients and the essential nature of auxiliary verbal formulae render this somewhat unlikely. In any case, the use of physiologically active poisons is excluded from neither the Nekematigi nor the anthropological definition of sorcery.

Bena Bena peoples manufacture a great variety of arrows: some for hunting birds, some for hunting marsupials and small mammals, others for wounding adulterers, still others for killing pigs, and a large number of types for killing men in battle. During the manufacture of man-killing arrows verbal formulae are employed to insure their deadliness. For the same reason, decorative orchid fiber bindings are attached at various places on the arrowhead. One end is left loose intentionally so that, even if the enemy is able to easily remove the arrowhead after being shot, the bespelled orchid fiber will separate from the arrowhead and remain inside his body causing physical difficulty and eventual death. For even greater assurance of the

deadliness of their arrows, Nekematigi apply a substance called lipi'na to their tips.

Lipi'na is described as a colored substance (red, white or green) contained in the water precipitating from cracks in huge rocks at the uppermost reaches of high mountains in the Bismarck range. It is said to cause mild ill effects in a victim as a result of mere association or very brief contact, as when an arrow flies by. If it enters the body, though the wound may be minor, lipi'na is said to ensure death.

Because of its potency and the dangers associated with its place of origin, lipi'na can have ill effects upon its users as well as upon their victims. To obtain it, one must go to one of three named mountains, Samanuga (Mt. Helwig), Katrofi (un-named in English) or Ploploman (Mt. Otto) and risk the hazards of the peculiar terrain at their peaks. The risks include encounters with the dangerous naboli, the temptation of a type of banana which looks large and sweet but can make you crazy if you eat it, and contact with poisonous trees (yafameta) which, by their very existence, cause birds and lizards in their vicinity to die. Because of the dangers, it is recommended that only one man go at once; preferred are a district's "orphans" -- men without natural siblings, or who have no living

parents, or no immediate families of their own -- so that there will not be many to mourn (or demand death payment) if they are lost in the attempt. Water containing lipi'na is collected in lengths of bamboo tubing and carried home. The collector must be careful not to let the substance touch himself; so must those who later apply it to their arrows. The tubes are placed in the rafters of a house roof, above the firepit, to evaporate the water. The dried lipi'na is applied to arrows individually by inserting them into the tube and coating their tips.

Lipi'na is not sorcery designed to make one's enemies more susceptible to being shot. Nor does it improve the shooter's aim. Its purpose is to increase the effectiveness of the shot or, looking at it from the opposite perspective, to decrease the wounded man's ability to recuperate from having been shot. Thus, the use of lipi'na is suspected in cases of arrow wounds which do not heal as past experience indicates they should. Nekematigi say they know no effective cure for lipi'na; expert curers, however, regard one plant as at least potentially antidotal to lipi'na. Though arrow wounds are relatively uncommon nowadays, lipi'na is said to be used in other forms of sorcery. Accordingly, the appropriate plant antidote (Acanthaceae, Hemigraphis spp.) is often combined with others in the medicinal meal

prescribed for illness due to other, or unknown, causes.

Sorcery operating by means of manipulation of the victim's personal belongings -- imusa

To implement this technique, a sorcerer must obtain something which has been in close contact with the intended victim. Locks of hair or fingernail cuttings, scraps of food recently eaten or shells from areca nuts recently chewed, strings from clothing, feces, or mucous from the nose may all be stolen by would-be sorcerers. Consequently, people are rather careful about the disposal of their personal debris, especially when they are away from their homes. A man's semen may be obtained through his seduction by a woman acting for her clan brothers; or a crafty sorcerer may follow his intended victim's wife, with the knowledge that she recently has been with her husband, and touch her or seduce her, thereby obtaining her husband's semen from her body.

Men in some eastern highlands societies are reportedly very fearful of their wives' complicity in such affairs (Cf. Berndt 1962:158f.; Read 1954b:870). But Nekematigi and other Bena Bena men deny that their wives would knowingly participate in such a plot (Cf. Langness 1967:166). Men protect themselves against women's inherently dangerous qualities, and complain a good deal of their irresponsibility, but they do not fear their treachery. Though they may suffer the effects of men's sorcery,

women are said to be uninterested or incapable of participating in such activities themselves. Despite the maintenance of affectionate ties with her fathers and brothers, a married woman's loyalty is presumed to lie with her husband's clan. In fact, I was told of a situation in which a woman thought that someone might have obtained some of her husband's personal substances from her person, so she initiated the treatment designed to combat the effects of imusa sorcery.

The leavings are taken by the sorcerer to the bush where he combines them with a particular kind of grass (sisifulu'e) and cooks them slowly in an earth oven. During this time the victim feels overcome by a general weakness. After cooking the things, the sorcerer finally hits them with a stick, which causes the victim's death. The victim may experience a lack of control prior to his death characterized by walking in a strange manner, falling to the ground and bleeding from the nose.

The specific symptoms and treatment of this sorcery are not well known to Nekematigi. They say this is a new form of sorcery which has come to them since contact. When Sobeyagu'mo postulate its occurrence in a given illness situation, they say they are "just thinking," and they often treat it with the standard treatment for nali-sa, a more common and better understood form of sorcery. Only one man with whom I spoke had a spontaneous and

thorough explanation of the way imusa is produced and the symptoms to be expected. He is from Orogeiga tribe whose geographical location facilitates access to Kafe speakers in the next valley among whom knowledge of imusa is highly developed (see Berndt 1962:194). The Kafe are neighbors of the Fore where a recent elaboration of this theory is the attribution of the devastating kuru syndrome to imusa which makes use of sex-associated substances, especially menstrual blood, and the attribution of less serious illnesses to imusa which makes use of substances less intimately related to the victim, such as food scraps (Glasse 1970).

The Nekematigi treatment for imusa is unique in that it embodies notions of prevention. Generally, freedom from illness is maintained by simply following normal precautions, such as not going out alone at night where there may be ghosts or sorcerers, avoiding menstruating women, and the like. A person normally has no knowledge that sorcery is being performed on him or her, and there are no measures beyond ritual purification to maintain one's strength to combat the ever-present possibility of becoming ill. But in the case of imusa preventive medicine comes into play since recalling carelessness with personal belongings may lead a person to suspect that he or she has given a potential sorcerer the opportunity to obtain the substances required for this type of

sorcery. If these suspicions are acted upon quickly, and the appropriate antidote is eaten before the sorcery act is completed, the victim will only become ill. He would die were no action taken.

When imusa is suspected, a medical practitioner, the presumed victim and his wife (if she brought the situation to notice) gather privately to prepare an imusa efahi, a specialized earth oven. In it they cook the medicines to strengthen the patient against the sorcery.

The first step in preparing the medicinal foods is chewing and mashing sweet bananas (Musa spp.) which are not yet ripe. Sweet bananas are somewhat of a specialty food, whereas plantains are cooked and eaten fairly routinely. In a medical context their sweetness is said to be beneficial to the body. Various parts of banana plants are regarded by Nekematigi as beneficial, and not only in illness. The leaves are used in poultices for cuts and sores, for pigs as well as humans. The liquid from inside the trunk is drunk and/or poured or spat over the head in cases of headache, fever, or sore eyes. Menarcheal girls are ceremonially cleansed with this fluid before being dressed in their new beads and clothing. The fluid is said to be revitalizing because it has a cooling effect on the skin and because it has absorbed the strength and other virtues of pigs who often scratch themselves by rubbing against the base of banana trees.

Secondly, the curer prepares a mixture of pieces of pork, a special kind of tree bark obtained from Lufa (many miles away) and the shiny new leaves of forest trees called bukefa and oklauklabehi. The use of pork in medicine will be discussed in more detail in the next chapter; it is a central ingredient in nearly all therapeutic meals especially those designed to combat one or another variety of sorcery. Bukefa (Acanthaceae, Graptophyllum spp.) is also called imusasumehi because it is the antidote specific to this sorcery. Oklauklabehi (Araceae, Pothos spp.) is said to be an all-purpose restorative though its use is reported only when imusa is suspected. Nekematigi say that they have learned about these plants from other people, from people of the bush far away, who told them they are effective against imusa. There is no other rationale for their use.

The pork and plant mixture is spit over the banana mash. Then half a dozen or so little packages are made of the mixture, spoken over by the curer, wrapped in leaves and steam cooked in the earth oven. The intended victim and his wife are instructed to eat one of the packets every following day until they have all been consumed.

When treatment for imusa follows the development of an illness -- rather than preceding it as described here -- the antidote imusasumehi is combined with other

medicines in the general purpose sorcery treatment to be described below.

Sorcery involving an attack of the victim --
gu'nakafe'i

This is the form of sorcery which is referred to as sangguma by informants who speak both Benabena and Pidgin. It occurs in societies throughout Papua New Guinea and may be a post-contact phenomenon, at least in the highlands.¹² In any case, knowledge of it is very new to Nekematigi. It may have originated with Bena Bena in the grassland, they say, or maybe in Lufa or Yagarua. It is the most dreaded and least understood form of sorcery known to them.

When a gu'nakafe'i victim is walking alone at night he is attacked by a group of men (who may be visible or invisible) who beat him senseless with large sticks. The attackers then cut open his body and insert thorns, sticks or iron nails into his vital organs. Finally, they close his body again and perform a spell so that the wounds he received will be invisible and he will forget the entire episode.

When the victim awakes he will return home, where associates may notice his subdued and/or unusual behavior. Some individuals react with uncontrollable laughter, others with constipation, others by simply not speaking to anyone and lying down to sleep. Taciturnity

and tiredness may not seem unusual, particularly if the person has just walked home from a visit or from the garden. But this is exactly why Nekematigi so fear gu'nakafe'i: victims will die very rapidly -- overnight or within three days -- if no one suspects their behavior and begins medical action. The death of my female interpreter's mother, upon her return from a visit to a grassland district, is widely conceded to be the result of just such an episode. One of the case histories (#9) involves a young man whose attack was not fatal.

Nekematigi know no cure for gu'nakafe'i which they feel is effective. It is treated by means used for other types of sorcery or by special means devised by curers for specific occasions.

Sorcery involving substances placed on the victim's path -- keyakapo

To perform keyakapo an individual prepares a tiny bundle of (unspecified) grass, speaks words over it, and buries it under a footpath, or hides it in a crack in a gate or in the doorframe of the intended victim's house. After the victim has walked by it (kapo- means path or road), he will be afflicted with sores or swellings, the severity of which varies with the skill of the sorcerer.

Keyakapo is less predictably specific in its aim than are any of the other varieties of sorcery. Whoever

is first to pass the sorcery bundle, whether or not it is the intended victim, will suffer its effects. Once a keyakapo packet was placed inside the doorframe of one of our neighbors, to harm the man who lived there, it was presumed. But his young son, being the first one home, developed sores on his face. The father, who returned later, suffered no ill effects. Only if the talk put on the grass was very powerful, it is said, will it affect a second person.

This is a relatively minor variety of sorcery, both in terms of its medical effects and in terms of the number of instances in which it is suggested.

Gemasohafa, the subject of a lengthy case history (#17), developed a large and uncomfortable swelling under his chin at one point in his illness which was attributed to keyakapo. Neither he nor the young boy mentioned above bothered to have it treated. Keyakapo is regarded as annoying but never fatal.

Sores and swellings attributed to keyakapo do not differ from severity from those which are unexplained, but they are more often treated. Treatment involves obtaining water from a medical practitioner, usually stream water or banana-tree water, to which he has addressed verbal spells. The patient spits or pours the water over the affected parts of his body. If the sorcerer's verbal formulae were powerful than those used

by the curer, the sores may not be alleviated by this treatment. When they are the only manifestation of illness, people then just wait for them to go away. When they are accompanied by other signs of illness they are treated by the same means used for the accompanying illness.

Sorcery which operates by means of substances placed on food -- nami, giyo'na, mayayanakofa'i and mula'mula

These forms of sorcery act by means of poisonous substances placed on food, tobacco or betel ingested by the intended victim. In the case of giyo'na, the poison is a combination of lipi'na and a certain tree bark from the grassland. In nami, mayayanakofa'i and mula'mula the poison is called nami and is said to be "like paint;" some informants say that lipi'na is used, others insist it is something else.

Application of the poison is sometimes done by sleight of hand. When visiting someone in another district, a sorcerer carries the nami or lipi'na in a tiny length of bamboo hidden inside his wristlet. Then, as he and his host are sitting down to eat, the sorcerer can reach over the food to deposit some of the substance on his host's food unseen. He must be careful, however, not to let too much get on the food, or the victim will become very sick too quickly. If this occurred, the victim's kin would immediately kill the sorcerer who stood

revealed.

More often, it is said, the sorcerer either sneaks to the homestead of the victim and places the poison on foods stored there or, at his own home, applies it to foodstuffs or tobacco later given to the victim as gifts. When Tutupa (case #1) and his family were taken in as refugees by a group of Megabo'mo he was the victim of such treachery perpetrated by his erstwhile hosts.

It is expected that nami will cause pains in the stomach and intestines. Tutupa's symptoms included a violent stomach ache and diarrhea, stools which were watery and alternately yellow and black in color. Other symptoms include a churning type of cramps, shooting pains in the liver, the sensation of one's liver or blood being "tight," nausea or vomiting, choking and the inability to breathe. People tell me that one can die overnight from nami though there is one man in Sobeyagu (case #8) who claims to have been suffering from it, off and on, for years.

The symptoms of giyo'na and mula'mula are similar to those of nami. Additional signs suggesting the likelihood of one of these varieties of sorcery include bloody stools and a "tight," swollen or tender, stomach.

The symptoms of mayayanakofa'i are similar to these but include also the patient's disinclination to eat sweet potato and a willingness to eat only greens (maya

is sweet potato, nakofa is leafy greens). As a result of mayayanakofa'i the sick person may also experience pain on either side of the stomach which shoots up to his chest "like fire." He may also complain of pains in his eyes and back. He will lose weight and will die in two to three years of treatment is not successful. The status of mayayanakofa'i is somewhat ambiguous. It is sometimes discussed by informants in the context of nami-based sorceries, which depend on the application of a substance to materials taken internally by a victim. But it is also regarded as a variety of nalisa (see next section) and is akin to it in the variety of symptoms it is capable of producing, many of which are not gastrointestinal disorders like those normally attributed to ingested poisons. Recommended treatment is sometimes that prescribed for the poison sorceries, sometimes that prescribed for the varieties of nalisa.

There are three modes of treatment for these related nami-type sorceries. All are regarded as somewhat unsatisfactory and are undertaken in a hopeful but strictly experimental frame of mind. Men say that nami sorceries are new to them and they have not yet learned any consistently effective treatment. Most commonly, treatment involves the use of a plant antidote to nami (Rubiaceae, Ophiorhiza spp.) in combination with the general treatment for nalisa sorceries (discussed in

Chapter Four). The other two forms of treatment rely upon techniques to induce vomiting and thus rid the body of the poisonous substance. In the first, the leaves and roots of two local plants are used -- yafakafi (Lobelia angulata) and fenigapa (Amaryllidaceae, Crinum spp.). They are pounded together with bits of tree bark in a small bamboo tube to extract their juices. The sick person is given these juices to drink. The result is a temporarily increased intensity of the intestinal pains and severe vomiting. In the alternate treatment, the nami antidote is mixed with tree bark and the oil of the pandanus fruit. Then a small worm is introduced into the mixture. After the worm has had time to move throughout the liquid, it is removed and the patient drinks the liquid. Because of the disgusting nature of the worm, the patient is said to vomit and expel poison, while the medicinal mixture that is swallowed will help to de-activate any poison remaining in the body.

Sorcery operating by indirect means -- nalisa, gupa'nalisa, kleotahi, yahafeya, uwatagohi, logo'nalisa, lakegusa'i, yasasalihi, and nakofa'i.

These are the forms of sorcery referred to as poison by Nekematigi who speak Pidgin. Nalisa is the generic Benabena term for sorcery as well as the term for this sub-variety. That is, the term refers to "sorcery in general" in contexts where there is no concern over

the type, but only over the existence or non-existence, of sorcery. Or it refers to the variety of sorcery I have labelled as "operating by indirect means" by contrast with, for instance, that "operating by means of substances placed on food." Finally, nalisa also refers to one sub-type within the category operating by indirect means. I use the term to refer inclusively to the several types of sorcery operating by indirect means.

Both the category and the sub-type of nalisa are well-known to Sobeyagu'mo and their neighbors. Even small boys and teen-aged girls could tell me most of the essential steps in the manufacture and employment of nalisa. They are as follows.

One must first obtain a supply of lipi'na and yafameta leaves. The attributes of lipi'na and the hazards entailed in acquiring it are discussed on pages 127-128. Yafameta is a tree with red leaves which grows only in the sparse bush on the tops of Mt. Helwig and Mt. Otto. It is such a powerful poison that its location can be recognized by the surrounding carcasses of flies, rats and snakes which have died as a result of approaching it too closely. From the forest at lower altitudes one must also obtain the feathers of the gibi or nola, red parrots, and some yellow tree orchid fiber, yasi'na. Acquiring the latter poses fewer dangers than

collecting lipi'na and yafameta but it is not an easy task. Hunting birds for their plumage is not an unusual occupation for men, yet not many are truly expert at it. Similarly, climbing the fifty to sixty foot trees in which the needed orchid grows is a skill not practiced by many. Certain men who are well-versed in bush lore, who know the verbal formulac to ensure that they will not fall out of the trees while climbing, are much admired. The final material required is psi'i, a relatively common, nettle-leafed shrub.

When there is a sufficient quantity of the necessary ingredients, a group of men from the district gather to prepare nalisa. Inside the nettle leaf is placed a leaf of yafameta, and inside of that is placed some lipi'na and subsidiary ingredients, the specifics varying with the sub-variety of nalisa being made. The leaves are rolled up together so as to form a small tube; one end is sealed and the other end is left open. A feather is placed the length of the tube and the whole package is secured by tying it with orchid fiber. The nine varieties of nalisa are prepared in this same way, varying or adding secondary ingredients and altering the verbal incantations appropriately. The sorcery bundles are prepared in great quantity and then are divided amongst the men, with a few of each type given to

each individual for his use and safekeeping. The packets are stored in bamboo tubes in secret places in men's wives' houses, in pig houses (and, formerly, in the central men's house).

It is said that some sub-types of nalisa are particularly efficacious in the hands of certain men, while others are for other men. They must be tried and tried again over a period of time. Through this process of trial and error, a man finds the type that works best for him, the one that enables him to most consistently induce the illness or death of his enemies. Then he will no longer use the others, but only that one -- until his luck changes.

When an individual wishes to use his nalisa he takes two or three of his bundles out of storage, invites one or two of his fellows to accompany him, and goes out in search of his victim. They need not approach too close, but they must be able to see the target or at least be certain of his or her location. Each of the partners takes one of the sorcery bundles and hides it, inside his hand while clutching his bow, or between his teeth with the open end of the tube pointing in the direction of the unaware victim. The sorcerers deploy so as to get different angles of attack, then blow in the direction of the victim. It is not necessary to be in physical contact with the victim because the wind, and the

sorcerers' breath, will carry the heat and power of the sorcery. The process was once explained to me by means of an insightful post-contact analogy: "It is just like the radio," Loiye said. "The broadcasting station is miles away in town and there is nothing connecting us with it. The people in the station can't even see us and we cannot see them. Yet when they send out talk or music we can hear it. It's the same with nalisa."

If the victim is visible during the performance of nalisa and if he is seen to stumble during this time, the sorcerers can be assured of their success. In any case, he should begin to feel sick by the next day. The symptoms of nalisa and its sub-types include severe headaches; pains in the chest, back and liver; tremors of the skin; hot skin; cold skin in some cases; an inability to sleep or fitful sleep; and the symptoms of mayayanakofa'i enumerated above. If a post-partum woman is the victim of nalisa both she and the neonate may die. Symptoms are rarely attributed to a specific sub-type of nalisa though temporary blindness is somewhat consistently related to lakegusa'i, weakness and fever to logo'nalisa, and digestive disturbances or refusal of food to nakofa'i (or mayayanakofa'i). In most cases, since the range of symptoms is so broad and the prescribed treatment has the potential for encompassing them all, a diagnosis of nalisa -- generic

type -- is sufficient.

It is preferable, say Nekematigi men, to have at least two persons involved in the transmission of the sorcery. One of them "kills," or weakens the protective influence of the victim's shadow or soul (meha'a) so that the other can attack the person himself, his inner being. Sometimes there are three sorcerers, one to remove the protective shadow, and a second to remove the victim's clothing, net bags and decoration, so that he is completely (but figuratively) naked and vulnerable to the force of the third. Variations in the seriousness of sorcery-induced illness are related to whether only the sick person's soul is affected or whether his entire self (i.e., both selves) is affected. The distinction between skin pain and inside pain, or between an illness and a big illness, is often explained in terms of there having been two, three, or just one "shots" of nalisa.

The treatment for illness resulting from any variety of nalisa is a multi-faceted communal ritual and meal directed by a medical practitioner. Because of its complex nature and the central position it occupies in Nekematigi medicine, I shall defer a complete discussion of the treatment procedure to the following chapter, restricting myself here to general comments regarding its nature. During the treatment the curer

uses techniques of verbal counter-sorcery to weaken the effects of the illness; he also uses venesection and the application of stinging nettles to strengthen the sick person. In addition, he prepares a medicinal meal consisting of pork provided by the sick person's kin, several plant medicines that are each antidotal to a particular variety of sorcery, and a number of other plant medicines that are all-purpose restoratives. Depending upon the seriousness of the case and the resources of the district, the treatment may be done in full or only in part as explained in Chapter Four.

My observation of illness among Sobeyagu'mo reveals that the nalisa treatment format is the one most commonly employed. Indeed, with the exception of western medicine, it is virtually the only one of the available treatment methods actually used by them. In the 28 illness episodes reported in Appendix I the complete form of treatment was used 15 times and a partial form was used 44 times. (Obviously, each illness was treated more than once.) This compares with 15 times in which recourse was made to western medicine (from me, an aidpost, or mission personnel), twice for the water-treatment appropriate to keyakapo, once the special meal and search for numulitEna'i, once or twice each for a variety of innovative treatments, and none for the other specialized ghost and sorcery treatments

described above.

The frequency of resort to nalisa-based treatment is predictable given that sorcery diagnoses are more common than other diagnoses and that nalisa is the best known variety of sorcery, accounting for the widest array of illness indicators. But the nalisa treatment is not only the most frequently used, it is also the prototypical medical treatment in the minds of Nekematigi. This is the treatment format described by experts and non-experts alike in response to non-directive inquiries about medicine. Its central position in the medical repertoire results from its wider applicability and potentially greater therapeutic value than the treatments prescribed in response to other diagnoses.

Whereas the treatments for other types of illness are relatively specific to the type of sorcery (or ghost or spirit) suspected of causing them, the treatment for nalisa incorporates techniques useful against several etiologic agents and techniques useful in alleviating illness itself, whatever its cause. The medicinal meal can be used not only for illnesses due to nalisa and its sub-types, but also for those due to the nami sorceries, imusa, keyakapo and lipi'na simply by adding the antidote specific to each of them to the meal. Because it relies upon a variable combination of medicines, it is thus a potential treatment for illness-

es due to all types of sorcery. Moreover, illnesses which are not the result of sorcery are also treated by this method, just in case sorcery is involved, and because the all-purpose medicines do not depend for their effect upon matching with a specific etiologic agent. Thus, by combining medicines appropriate to several types of sorcery with those appropriate to any type of illness, a curer has a chance of success even when the illness-causing agent is unknown or when there appears to be more than one at work.

Sorcery operating by means of interference with medical treatment -- mati, menemehi

Regardless of the original cause of illness, enemy sorcerers may cause sick persons to die by interfering with their medical treatment. Standing outside the house in which a treatment ceremony is proceeding, a sorcerer will take either a piece of the kunai grass (menemehi) from the rooftop or a discarded bone from the pig prepared during treatment. With this item in his hand he walks around the house, muttering malevolent verbal incantations. Finally, he takes the item home and buries it under a tree, or hangs it up in a tree, or feeds it to one of his pigs. Weeks, months or years later, when he cuts down that tree or kills that pig, the sick person will die. There is no known cure for such sorcery. It is prevented by moving sick persons

from their homes, holding treatment ceremonies in secret, and guarding patients against the presence of enemies during illness, treatment and convalescence.

Summary

The importance of sorcery in medical theory is a direct reflection of the importance of warfare in Nekematigi life. Prior to Australian rule warfare was the predominant feature of social life and the generalized conflict and competition between groups and individuals retains a primary position despite the cessation of active fighting. Thus, those parts of medical theory that derive from notions of warfare, conflict and competition are of more regularized explanatory value to these people than those notions that derive from knowledge of other, more neutral, parts of their environment. As Lieban put it, "concepts of disease are cultural classifications of adversity" (1973: 1047). Neither ghosts, nor women, nor strange creatures of the forest, nor nature itself is as clearly or consistently seen as adversaries as are human beings in neighboring districts. Nekematigi customarily expect their enemies to be the cause of their bodily injuries and deaths -- whether directly as in warfare or indirectly as in sorcery.

Sorcery accusations are often mentioned in the

highlands literature as causes of the outbreak of war; for Nekematigi, sorcery is the functional and affective equivalent of war. Sorcery and warfare are analogous or parallel institutions in major aspects of their organization. Neither occurs within the district where mutual trust and restraint prevail; but both may be expected from any and all other districts with whom normal social interaction takes place. Sorcery is directed at individuals by individuals; but both are acting as representatives of their respective groups -- whether these groups are seen as districts or alliances of loyal followers. Sorcery, like warfare, is primarily a male activity, but women are frequently its victims. To kill or injure a woman or child is a coup for the perpetrators, causing insult as well as emotional pain and economic hardship for the men in her district. Like warfare, the performance of sorcery is potentially dangerous to the individuals engaging in it as well as to the intended victim.

Traditionally, one could become an important man either by being a good fighter, a gipi'na (literally, "our bow"), or by being a skilled sorcerer, a nalisarobo ("poison/sorcery man"). Though being a brilliant warrior brought more public acclaim, illness was another weapon men could use to harm their enemies.

Since the colonial administration prohibited warfare -- in effect, removing the bow and arrow from the arsenal of weapons -- Nekematigi say that there is both an increased variety and increased usage of sorcery. Another indication of the complementary roles of the various institutions of conflict is that in western highlands societies, where public exchanges of goods are much larger and more openly competitive than in the eastern highlands, both sorcery and warfare were correspondingly less important traditionally. Illness in these societies is explained with primary reference to angry ghosts -- ancestors who become offended because of inequities in the distribution of goods -- rather than with reference to enemy sorcery (Cf. Bulmer 1965: 138-146; Meggitt 1956, 1965: 111-113; Strathern 1968). But there, as among Nekematigi, enforced pacification has resulted in the increased importance of sorcery (Meggitt 1974).

CHAPTER FOUR

Nekematigi Medical Practice

The Relationship Between Theory And Practice

An understanding of a people's medical beliefs in terms of their correspondence with central cultural themes is a necessary but not sufficient basis for explaining the application of those beliefs to medical practice. While the treatment methods of central importance to Nekematigi are based upon beliefs which are of fundamental symbolic and social importance to them, they are also based upon the results of experimentation with plants and other medicines, experimentation that neither conflicts with nor directly supports medical belief itself. As I shall outline more fully in the following discussion, some of Nekematigi spells and medicines are used with the rationale that they are effective against certain varieties of sorcery; others are used with the rationale that they are good for sick people regardless of what caused their illness. In both cases, the observed outcomes of their use are as important to their continued employment as is their logical "fit" with etiologic theory. The Nekematigi search for medically active substances and techniques, in other words, is neither limited nor directed solely by medical belief. This explains in part a ready acceptance of western medicine as well.

When seeking to assess the impact of indigenous

medicines upon societal well-being, one cannot assume as have Alland (1970:7,130) and Aufenanger (1972:392), for example, that "bad theories" lead necessarily to bad medical practice. That certainly may occur. But in many medical systems treatment behavior changes, even quite radically, while medical beliefs remain fairly constant (see Caudill 1953:774; Hsu 1952; Schofield and Parkinson 1963). Nekematigi are another society in which treatment and beliefs evolve separately to some extent. Indeed, the same phenomenon occurs in western medicine as well; in what Whitehorn (1963:32) has called its "meanwhile phase," cures are often developed prior to an understanding of the agents involved in causing the illness. Without arguing at this point the effectiveness or ineffectiveness of Nekematigi medicine, I would like to stress that the principles of medical treatment must be examined as an action system unto themselves as well as an action system related to ideas about illness causation. Not only in the overall evolution of a medical system, but also in specific individual instances of illness, the development or selection of treatment may proceed without any direct reference to notions of causation (or none beyond a general suspicion of germs, or a general suspicion of sorcerers).

In the 28 Sobeyagu illness episodes presented in the Appendix, for example, a relatively stable diagnosis was

reached in less than half the cases (13) yet treatment of some type was proffered in nearly all (22) cases. Sorcery was the certain or most favored cause of illness in 9 episodes -- 2 in which gu'nakafe'i was suspected and 7 in which nalisa or nami were likely. Natural causation (or "no cause" in Nekematigi terms) was postulated in 4 episodes. Three of the 4 cases of natural causation were treated by the same means ordinarily used for sorcery-induced conditions (cases #2, 5, 11b). In 15 episodes the cause of illness was either never discussed or was discussed with no conclusion being reached. Yet in the majority of these cases (11), as in those due to "natural" causes, treatment followed a course ordinarily prescribed for nalisa -- 6 partial treatments and 5 full ceremonial meals (cases #3, 4, 13a, 15, 16c). To suggest that treatment may proceed in the absence of ideas about causation is not to suggest that treatment proceed in the absence of ideas; rather, it proceeds in terms of a separate set of ideas, namely those having to do with the curative potential of plants, foods, words, medical personnel, and so on.

In this regard Leonard Glick's formulation of medicine as a system having to do with power is very useful. Glick suggests that, "to meet standards of ethnographic [i.e., ethnoscientific] fidelity without sacrificing all possibility of ethnological comparison,"

medical anthropologists should examine

the idea of power -- not diffuse unattached power, but power existing as a manifest attribute of persons and of objects in their environment. Where power resides in a particular socio-cultural system is a question for the ethnographer to answer. Obviously the answers will not be the same everywhere, but that is where the comparison enters in. Likewise, how power is controlled -- how it may be mobilized, counteracted, neutralized or otherwise resisted -- will also vary cross culturally; again, that is what one compares (1967: 33-34).

For Glick, culturally relevant answers to questions about the locus and control of power -- beneficial or harmful, human or non-human -- correspond to what are ordinarily, and comparatively, signified by the terms diagnosis and treatment, the former involving ideas about the sources of disease-causing power and the latter involving attempts to overcome that power. We have seen that Nekematigi believe that neighboring districts are the source of the greatest power to do them harm. In this chapter we shall examine their attempts to neutralize that power and to harness additional sources of power with which to strengthen themselves. It will become

apparent that the range of illness-curing power is considerably broader than the range of illness-causing power.

In analyzing Nekematigi efforts to control illness-causing and illness-curing powers we shall be using a very general definition of medical care. Medical care is here defined as any behavior stimulated by the recognition of illness and intended to decrease its severity (compare Fabrega 1971:214). For Sobeyagu'mo and their neighbors, medical care of some type becomes necessary when an individual is perceived as ill in terms of the factors outlined in the preceding chapter. The care that follows is a patterned sequence of events including the specialized behaviors of sick persons and their kin; diagnostic procedures; the employment and payment of medical practitioners; and medical treatment itself, the use of substances, objects (i.e., medicines) and spells in which power is believed to inhere (Cf. Evans-Pritchard 1937:9-10; Glick 1967:38,44):

Illness Behavior

Illness behavior is a term used to refer to the concerns and actions exhibited by individuals who are defined by themselves and others as sick.

The term designates general responses to stress and coping behaviors as well as

more specific and socially organized behaviors (i.e., sick-role behavior, patient-role behavior) (Fabrega 1971:213).

I have here expanded the concept of illness behavior to include the illness-related concerns and actions of individuals in association with those who are defined as sick. Just as Nekematigi individuals are not held responsible for their own illnesses, neither are they expected to get well by themselves. Included in the following discussion of illness behavior are activities which must be pursued jointly by sick persons and their intimates, namely, the observation of certain social precautions and making decisions regarding illness causation and treatment.

Sick persons often move (or are moved) away from their homes, to the homes of kinsmen, to pig houses, or to hurriedly made shelters in otherwise uninhabited spots uphill behind the community. One reason for this is that moving may be therapeutic (see cases #3, 13a, 14). The illness/sorcery influence may be "infecting" the person's house itself so that staying there will impede recovery. The notion of illness inhering in a house or an area is casual but deeply rooted. For example, two young boys were planning to build a house on a certain spot behind our village but gave up the idea when they were told that a man, now dead, who had a house there

was continually ill. The second reason for sick persons moving is to minimize the danger of sorcery (see cases #1, 6, 17). There may be uncertainty as to whether sorcery originally caused the patient's condition, but there is no uncertainty that sorcerers will be looking to take advantage of any sick person's weakened condition. Weakness makes a person more vulnerable to sorcery of all types; medical treatment makes him vulnerable to the specialized types of sorcery that use medical leavings (page 146). To avoid both the general and specific possibilities of sorcery, sick persons frequently hide. Once a sick person is hidden -- as opposed to having just moved -- it becomes very difficult for anyone other than his clan brothers to obtain information on his condition. Secrecy is a protective and preventive medical behavior (and one, I might add, which makes the ethnographer's job a difficult one).

Whether or not sick persons leave their homes, they are usually inactive, particularly in public; they are not, however, left alone. During a sick person's inactivity or seclusion, close kin are expected to stay with him or her. In the case of an unimportant person or a relatively minor illness, this may just mean that a child or young woman stays with the person while the adults are out (see case #14). In the case of a more

important man or a very critical illness, several adults may stay continuously (see cases #1b, 6c). The rationale for staying with a sick person is partly protection. Persons must be protected from sorcery, from falling into the fire during sleep, and from the possibility of suicide due to fear or depression. But equally important is the intention that the companions watch very carefully for changes in the person's level of well-being. Facial contortions, refusal of food, crying out in sleep may all indicate increasing seriousness of the person's condition and/or reveal a clue as to its cause. To plan effective treatment, kinsmen and sick persons themselves are expected to observe carefully and report any changes in the indicators of illness.

While some individuals are guarding the sick person and planning for treatment, others are expected to bring food, firewood and other essentials to the sick person and those sitting with him. The attentiveness of kinsmen, of course, like the perception of illness itself, varies with the perceived seriousness of the symptoms and the nature of each person's relationship to the patient. Young unmarried men often volunteer to bring firewood and to purchase specialty foods such as chicken or tinned meat. Married women, depending upon their affection for and relation to the sick person, provide sweet potato and specialty greens from their gardens. The purpose of

the specialty foods -- meat and favored greens -- seems to be twofold. On the one hand, better-than-routine foods are seen as an inducement to eat; and since eating is a way to maintain strength it is particularly important that sick persons eat well. On the other hand, certain greens, and particularly meat, have qualities that are not specifically therapeutic but are more beneficial than ordinary foods (e.g., cases 11b, 12).

The length of time between the onset of illness and the beginning of treatment varies with the severity of the illness, the level of fear in the community and the availability of medical personnel. Once illness has been recognized, so that illness behavior occurs as described above, it is normally no more than a week before treatment of some type occurs. It is the responsibility of a sick man's brothers, or a sick woman's husband or brothers, to arrange for the services of a man who is knowledgeable in medical treatment.

Medical Practitioners

Nekematigi describe medical treatment as a battle of wills between a medical practitioner and an offending illness agent. Whether the illness-causing agent is a ghost, a bush spirit, or a man (sorcerer), the curer's techniques are directed at strengthening a sick person and/or outsmarting or overpowering an illness agent.

Thus, it is of utmost importance that a medical practitioner be "a man who knows." He must know the magic, the plants and the personal procedures to follow in each case. He must also be "strong." That is, he must possess an irresistibly forceful and persuasive personality so that his spells and selection of medicines overcome those of the offending agents.

The terms "medical practitioner" and "curer" as used here simply designate someone who is socially recognized as having the ability to treat illness (Cf. Fabrega 1971: 214). I do not use the more commonplace anthropological term "shaman" because this term implies the singular importance of possession or other supernatural aspects of a curer's skill and recruitment (vide Ackerknecht 1971: 28; Fejos 1963; Loeb 1929) whereas Nekematigi curers (lusarobo) rely on both supernatural and natural powers. Although a lusarobo, "a man of talk," relies upon spells in some therapeutic settings, his knowledge of physical techniques and medicines is more important in others. Neither type of knowledge is obtained through visions or communion with the spirits. It is obtained through discussion with other men, through training and through practice.

It has been argued that non-western medicine men should be regarded as the lineal ancestors, or contemporary analogs, of modern day psychotherapists rather than

of modern day physicians (Kiev 1964,1968; Murdock 1965a: 53) because they treat spiritual ills rather than physical ills (Bidney 1963:144). The Nekematigi curer, however, is expected to be in command of both supernatural and natural forces, to treat spiritual as well as physical ills. Or, as Levi-Strauss puts it, his job is, at one point, to manipulate a bodily organ and, at another point, to manipulate a set of ideas, curing by achieving a meaningful equivalence between the two (1963:187-197). To state the same idea yet another way, no distinction is made between physical and spiritual ills. As outlined in the previous chapter, bodily, behavioral and emotional malfunctions are equally important indicators of one condition -- illness (nEvEsi'Ehi). Likewise, there is no conceptual distinction between supernatural and natural as regards the causation or cure of illness. In this respect, Nekematigi are a typical Melanesian society. Throughout the area there are beings and forces (like those described in the foregoing chapter) which an observer may regard as supernatural. But to the societies' members the characteristics of these beings and forces are not much different from those of human beings and forces. Moreover, they are subject to human control. Given the pronounced tendency toward secularism and materialism

in New Guinea highlands societies, the supernatural is most properly regarded as within the realm of the natural, within the realm of things than be understood and controlled by humans (Cf. Lawrence and Meggitt 1965: 19-22; Watson 1964:9)

Nekematigi curers, then, are those men (and only men) whose personal powers and acquired knowledge enable them to understand and control events -- natural or supernatural -- which affect the health of their fellows. It is said that all men know some medicine but in practice only a few men in each district (and none in some) have the range of knowledge and reputation for success that leads to being sought out in times of illness. Many men know the names of the more common medicines and perhaps a few spells, e.g., for relieving the skin diseases of pigs, but they, like the women who know none, defer treatment (and the ethnographer's questions) to the few men who can discourse comfortably for an entire afternoon on the nature and rationale of various forms of medical treatment.

Men become medical practitioners simply because they have the interest and/or knowledge; they continue to act as medical practitioners as long as they are regarded by others as successful. Loiye, the most successful curer in Sobeyagu, is the son of a man who was a skilled curer

and taught him much when he was a boy. After his father's death, Loiye continued to seek out knowledgeable men from other places and ask them about curing. His early successes -- with people who were not very ill, he recalls -- won him the respect of his elders who encouraged him to learn more. As an adult he continues to seek out famous curers from other districts, purchasing spells and medicines from them. With the establishment of an aidpost nearby he has also taken the opportunity to discuss medical techniques with the dokta boi (Pidgin) assigned there. By contrast, Yasi, the junior curer in Sobeyagu, expressed no interest in medicine as a young person. Nor did he have occasion to learn casually from a close relative. But now, a 35-year old family man, he is attempting to learn, following the same general pattern of watching and learning from more experienced men and trying his skills whenever the opportunity presents itself.

The healer's role is a very generalized one and there is little social differentiation between medical practitioners and non-practitioners. The practice of medicine is not a full time occupation, though a man like Loiye, consistently in demand by Sobeyagu'mo and people of neighboring districts, spends five to ten per cent of his time on activities directly related to medicine.

Both egalitarian and competitive, Nekematigi society encourages the recognition and respect of individually held skills, but there are no specializations which take people away from the routine business of gardening, tending pigs, building houses and discussing political matters such as marriage and land rights. Rather, there are people who, along with all of these things, do some other things especially well. When such people develop skills that are valued by the community at large their reputations spread and other people who lack those skills turn to them for assistance. I have mentioned that some men are unusually adept at climbing trees and seeking sorcery materials, not because of any special training or inherited rights but because of their own proclivities and abilities. Similarly, other men are known as proficient hunters, eel trappers, sorcerers, pig raisers, barkcloth makers, and so on. The mastery of none, some, or many of these skills underlies the social differentiation that does exist between "rubbish" men, ordinary men, prominent men and big men (Brown 1971: 216). Rubbish men are men who have very few or no socially valued accomplishments. Relatively dispensable, these are the type of men that Sobeyagu'mo say a clan or district should send as envoys during alliance negotiations -- so that, if treacherous allies change their plans and murder the messengers, important men would

not be lost. Big men, on the other hand, inspire the loyalty and admiration of men from many districts by combining some of these skills with even more highly esteemed skills in warfare, political manipulation and thundering public oratory.

In successful Nekematigi curers there is a coalescence of abilities and personality attributes which make them prominent men. Loiye, for example, is assertive and self-confident but more reserved in his dealings with other people than the flamboyant and demanding older warriors known as big men. He is too young (35-45) to have gained a name in warfare and he is not wealthy, having only a small herd of pigs and no wives (though he has had two). Nonetheless, he is esteemed for his talents in both the traditional and modern aspects of Nekematigi life. His experiences with wage labor and his knowledge of Pidgin led to his election as a representative to the first government public works committee established in Sobeyagu territory. Like the Washo shaman described by Handelman (1967), he serves as a local innovator and cultural broker. Although he personally stands to benefit by the continued use of traditional medicine, he is often the first to encourage people to go to government aidposts or hospitals for care. His magical and practical abilities have earned him the respect of old and young in Sobeyagu and

surrounding districts. His help is sought not only to cure illness, but also to predict the outcome of distant events, to make unwanted rain stop and to make sugar cane grow exceptionally tall and sweet. He is admired for his skill in carving fine arrowheads and in butchering pigs so that there are just the right number of properly sized pieces for everyone in attendance. He is an eminent ceremonial expert so his presence is valued at communal feasts and certain rituals associated with male initiation, girls' first menstruations and pregnancy.

The rewards of practicing medicine are economic as well as social. Payment is anticipated for medical care though the amount varies with the nature of the service performed and with the relationship between curer and patient. In a minor illness the preparation of water or stinging nettles does not normally require payment. But curers are often paid (fifty cents or a stick of trade-store tobacco) if they volunteer such service rather than waiting to be asked, or if they come in person rather than sending the medicines, or if they come from another district. Curers must be paid for preparing the medicinal meal associated with treatment for nalisa. In 1970-71 the payments ranged from two to twelve Australian dollars (or a small live pig) and the hind quarter of the pig cooked for the meal. My data suggest that payment

tends to be larger when a curer is from a different district than the sick person (see cases #4, 13, 17). Medical practitioners are paid whether or not their treatment is successful; that is, they are paid on the spot, before the outcome is known. Though their reputations eventually suffer as a result of repeated failures, curers are not held responsible for individual sick person's lack of recovery. People simply conclude that the illness/sorcery is stronger than the medicine and continue the search for a knowledgeable man with medicines of sufficient power to combat it.

Diagnosis

Selection of medical personnel is based upon diagnosis to the extent that some men are known to be more successful in certain types of illness than in others. However, diagnosis does not really exist in Nekematigi medicine as a procedure separate from treatment.¹³

In the initial stages of an illness a general diagnosis emerges from simultaneous consideration of a sick person's manifestations of illness and the social circumstances surrounding the onset of those symptoms or behaviors. Though a person's condition might indicate ghost possession, for example, ghost possession cannot be adduced as the cause of illness if no one close

to the afflicted person has died recently. Similarly, symptoms potentially attributable to the actions of naboli or numulitEna'i are not attributed to them unless there is a compelling reason to suspect that the sick person has been near their habitat within a relatively recent time span. Conversely, sorcery can be diagnosed as such even though there are no current hostilities because the range of symptoms for which sorcery is held responsible is so broad and because there are always unavenged deaths and old grudges against other districts. For this reason, some form of sorcery (nalisa in its most comprehensive usage, page 138) is suspected, if not agreed upon, as the cause of virtually all Sobeyagu illness. Agreement that illness is due to sorcery rather than to something else is achieved most easily when an individual falls ill immediately following a dispute with an enemy district (see case #6b). Agreement that illness is due to one type of sorcery rather than another is achieved most easily when an individual's symptoms correspond closely to those associated with a specific variety of sorcery (see case #9). Consensus, or even suggestions, may be difficult to obtain in other cases but lack of conviction regarding illness causation does not lead to lack of treatment (e.g., cases #3, 13); rather, treatment is one means of achieving diagnosis.

When a person's condition changes rapidly and/or when the cause of his condition is unknown or in dispute, the employment of a medical practitioner results in a de facto diagnosis. If the curer is from the same district as the sick person, his choice of medicines may be based on observation of the patient and knowledge of the social situation. If he is from another district, he selects a treatment with substantially less of this knowledge. In either case medical practitioners tend to select treatment techniques in accordance with their past successes as well as the specifics of the case at hand. Their diagnoses and planned treatments are not evaluated by others ahead of time: proof of their correctness lies in the recovery of the sick person.

An explicit diagnosis rarely precedes treatment; on the contrary, informants state that they expect to know the cause of an illness after treatment has been accomplished. If, for instance, treatment for numulitEna'i is followed by the patient's recovery, it can be concluded that numulitEna'i was indeed the cause of his or her illness. Similarly, if one of the specialized treatments for a certain variety of sorcery is successful, it can be concluded that that variety of sorcery was responsible. For this reason, people normally expect to employ several treatments in series --

as one fails (and the diagnosis is thereby altered) or as one succeeds partially (indicating that more of the same or related techniques will be beneficial) or as the person's symptoms change. (Although Nekematigi expect to know the cause of illness after recovery, they in fact lose interest in the matter after recovery. Only in the case of death do further diagnostic, i.e., divinatory, procedures ensue; these are aimed not at determining the type of sorcery but at determining who perpetrated it so that revenge may be sought.)

Diagnosis, in other words, is not so much a determination of illness causation as it is an identification of an illness that falls by definition within the range of potency of a particular variety of treatment. Since the wide-spectrum nalisa treatment is capable of treating several kinds of illness, whether due to sorcery or not, more precise diagnostic procedures become unimportant. To proceed with treatment it is unnecessary for a curer to determine which type of sorcery is operating or, in fact, if sorcery is operating; he need only determine the range of possibilities. Such a procedure results in multiple diagnoses expressed in the administration of a combination of single-purpose medicines (antidotes), in non-diagnoses expressed in reliance upon all-purpose medicines (restoratives), and

in tentative diagnoses reflected in the use of some, but not all possible, antidotes in conjunction with a selection of general-purpose health restorers.

Selection of treatment not only implies a tentative diagnosis; it is also a function of the district's medical resources. When the treatment appropriate to a suspected illness agent is not available -- as in cases of nami and gu'nakafe'i, where Nekematigi say they simply know no cure -- illness is treated by a pragmatic, "try anything once," approach. Illnesses with unknown causes, like those with presumed causes for which there is no known cure, and those in which orthodox treatment fails, all require a creative persistence on the part of patients and medical practitioners. Curers often repeat the same basic treatment several times, altering the precise combination of plants or verbal formulae in an attempt to find one that will work. Loiye's use of wine (case #11) and Yasi's use of kerosene (case #15) are examples of experimental additions of (potential) medicines that have only recently become available to them. Just as this trial and error approach creates opportunities for the discovery of new medicines, so it creates opportunities for inexperienced curers to practice their skills. Men with no reputations as curers at all are asked to "just try" in minor illnesses, when more prestigious medical practitioners have failed

(as in case #4), or when personal or inter-district disputes rule out the employment of a highly respected medical practitioner (as in case #6). Similarly, practitioners of European medicine are sought out when (a) the sick person has been effectively missionized and will not consider traditional diagnoses or treatment (as in case #12) and when sorcery is suspected but (b) the illness is not regarded as very serious or (c) it is regarded as very serious but all other avenues have been exhausted (cases #1, 17). In many cases western and indigenous practitioners are seen in quick succession, almost as part of one treatment episode (e.g., cases #3, 11, 13b).

Medical Treatment

Nekematigi medical activities take two directions, simultaneously or in series; these are exactly analogous to the "positive" and "negative" mobilizations of power that Glick describes for the Gimi (1967:44f.). On the one hand, treatment is addressed to the sick person himself with the goal of enhancing his powers to resist or overcome the influence of his illness. On the other hand, treatment is addressed to the illness and/or its cause with the goal of sending it away, neutralizing it or overpowering it.

In some treatment situations, one of these medical

principles is dominant; in others both are active. In ceremonies designed to remove the influence of numulitEna'i, for instance, the primary activity is directed at "tricking" the bush sprite into revealing the location of the hidden parcel so as to free the afflicted person from its effects. No medicinal action is directed toward sick persons themselves; indeed, they are not party to the procedure. Likewise, in ceremonies to remove ghost influence, although the affected person is present, efforts to seduce the ghost into eating and departing with gifts are more pronounced than action directed toward changing the patient's condition. The treatment for nalisa and other forms of sorcery relies upon both processes. Hiding patients prior to and during the treatment has the dual purpose of weakening the ability of would-be sorcerers to find them and do harm while strengthening and invigorating sick persons by removal from the pernicious aura of illness in their homes. The consumption of what I have called all-purpose medicines is designed to have a positive effect upon the sick person's powers of recovery; what I have called antidotes are medicines designed to have a negative effect upon the illness. The verbal formulae used are also multi-directional. They are directed at suspected sorcerers, to de-activate or reverse the direction of spells used to cause the illness. They are

directed at animals whose assistance is sought in removing the illness. And they are directed at the medicines consumed and the patient's internal organs so that the reaction between them increases the person's vigor.

When a suspicion or certainty of sorcery leads to medical treatment, whether by an expert or a relatively inexperienced man, a two-stage curing process begins. In the two stages there are differential emphases upon each type of power. Although the two stages of treatment are not explicitly defined or named by Nekematigi my observations indicate that therapy regularly takes this sequential course. Between the two types of treatment there are differences not only in relative emphasis upon the positive or negative mobilization of medical power but also in resource requirements and expected outcomes. I shall discuss briefly the character of each stage, then proceed to more detail on the medicines used in each.

In the first stage of treatment, the healer uses all-purpose medicines which are recognized even by non-experts as health-maintaining or health-restoring. Singly or in combination he uses stinging nettles, ginger and bleeding, referred to in Chapter Three as partial nalisa treatments. Here I call the use of these techniques "preliminary treatment." The goal of

preliminary treatment is to augment the power of the sick person rather than to directly counteract the power of the illness-causing agent. Preliminary treatment involves a very minor investment of resources: the medicines are commonplace and curers need not be paid for the brief time they spend preparing them. The results expected are correspondingly modest. If a person has a minor illness, he or she may recover -- in which case there is no need to go on with further treatment. No change in the person's condition may lead to either repetition of preliminary treatment or progress to second-stage treatment. A slight improvement is taken as a sign that treatment is appropriate and should proceed to the second stage.

In the second stage of treatment preliminary techniques are repeated but in conjunction with an elaborate communal meal and the use of esoteric medical procedures known only to the medical practitioner. This is what I call "primary treatment," the full-scale treatment for nalisa. In primary treatment the objective is twofold: to neutralize or counteract the power of the illness and to strengthen the patient. So, in addition to the general-purpose medicines, the curer uses a combination of spells and medicines each of which is specific to a particular variety or sub-variety of sorcery. Unlike preliminary treatment, primary treatment

involves a sizable investment of resources by both the curer and the sick person's kin. Someone in the district must slaughter a pig for use in the curative meal and pay the curer. The curer himself must obtain a variety of non-domestic medicinal plants by trading for them in other communities or gathering them from the rain forest. There is also an emotional "investment" in primary treatment, lacking in preliminary treatment, in that one risks betrayal by a non-local curer as well as the possibility of mati or menemehi sorcery. Consistent with increased effort and risks are increased expectations.¹⁴ While preliminary treatment is in some sense diagnostic or experimental, primary treatment is expected to "finish it [the illness] altogether."

There is a complex rationale for this two-stage treatment process and there are analogies to it in other aspects of Nekematigi life. Other important events which involve the future well-being of individuals at critical stages of their lives are also handled in two successive and related stages.

For example, when a young girl is secluded after her first menstruation, she is first, after about a week, brought out "a little bit." That is, she is allowed to leave the enclosed platform constructed to hide her in her mother's house and is able now to move around the

entire house. This event is celebrated with a small feast and gift exchange participated in by only very close kin and neighbors. After about ten days more have passed she is brought out of the house altogether. At this time there is a great, two-to-three-day long, celebration and feast. All relevant kin from miles around are invited and there is singing, dancing and stylized joking followed by exchanges of pigs, cooked food, cash and gifts.

A similar series of events surrounds birth. A post-partum woman is prohibited from eating for several hours after her delivery. When the taboo is lifted there is a small celebration involving only the mother, her husband, his age-mates and their wives. After this small feast the mother is allowed to eat "a little bit," but not complete meals. Weeks later there is a larger district-wide celebration after which she can resume her normal eating pattern.

Similar examples might be drawn from Nekematigi bridewealth negotiations and male initiation; in each case there are verbal and behavioral expressions of a distinction between skin and the internal self. The skin, one's external or superficial self, requires only minimal maintenance -- the "preliminary" stage in all the events mentioned. More elaborate ritual is oriented toward an individual's internal self, the vital essence

which maintains the regular functioning of one's bodily organs and social relationships. It is this internal essence which interacts with other humans and with unseen forces, so "primary" celebrations of life crises involve proportionately greater commitments of communal effort and symbolic expression. Although it is the body beneath the skin, the "real" self, that interacts with the world, actions oriented toward the skin -- first stage celebrations -- are only slightly less vital than those oriented toward the real self because the condition of the skin abets or inhibits the effects of external influences upon one's internal self.

With regard to medical care, the two-stage process is based on the perceived difference between illnesses which occur by themselves and those resulting from sorcery; this distinction is, in turn, related to the dichotomy between skin and internal self. Illnesses with no socioculturally significant cause and those due to weak or improperly performed sorcery will affect only the skin. They should be relatively non-incapacitating and should pass quickly. Illnesses resulting from more potent forms of sorcery or from several types of sorcery acting at once are expected to be considerably more debilitating, to affect internal bodily functioning, and to last longer. Nekematigi recognize that it is difficult to tell the two apart since sick persons'

symptoms change, often including both external and internal discomfort. Preliminary treatment is, accordingly, conceived of as both diagnostic and therapeutic. It is expected to terminate those illnesses, or aspects of illness, affecting only the skin. Since no agent of causation is presumed, medicines and procedures are used which are undifferentiated in their positive effects upon human beings. Illnesses, or parts of illness, that remain after preliminary treatment suggest the need for primary treatment which uses medicines intended to influence the patient's internal being and the agents of causation. Preliminary treatment enables a curer and others to judge the severity and type of illness through observation of a sick person's response to medicines expected to be sufficient for a minor illness. If the illness is serious enough so that these medicines fail to cure it, preliminary treatment is still seen as helpful because it "opens the body" so that medicines used in primary treatment will be more effective.

In medicine there is a practical as well as a conceptual basis for conducting treatment in two stages. Preliminary treatment provides a structured but relatively risk-free opportunity for a sick person and his kin to evaluate the adequacy of a curer (or his advice). Although certain principles of medical

practice are adhered to by all curers, there are actually as many separate treatment methods as there are medical practitioners. Each man is expected to have a unique repertoire of spells, medicines and skills which he has learned under conditions different from those under which other men learned. Even the same medicinal plant used by different men will vary in its impact because of the spells used on it or because of the personal strength of the curer. Accordingly, if there is no improvement at all after the first stage of treatment, a different curer is usually called to repeat preliminary treatment or to pursue primary treatment. In addition, since preliminary treatment requires less expertise than primary treatment, it is often provided by patients themselves or by inexperienced men. Preliminary treatment in such situations serves as a stop-gap measure while the group decides on a man for primary treatment or waits for him, once called, to arrive.

The time lag, usually two to five days, between preliminary and primary treatment allows the group to make arrangements to slaughter a pig, to gather food and to collect payment for the curer. It also, of course, provides the curer time to make a tentative diagnosis (i.e., decide on treatment) and gather the appropriate medicines.

Medicines Used in Preliminary Treatment

The following medicines when used in preliminary treatment have several things in common. They are aimed at symptom relief rather than at removal of an etiologic agent. They create some sort of a temporary sensory shock. They are administered in an informal setting. Each is also used in primary treatment where the setting is far more ritualized and the intent behind the use of a given medicine may vary from or supplement that in preliminary treatment. Where they differ, both uses are described here. The focus is on the Nekematigi rationale for their use rather than upon external appraisals of their effects; the latter will be discussed in Chapter Five.

Nettles

The most important medicine in preliminary treatment is stinging nettles -- sanat in Pidgin, psi'i in Benabena. Used medicinally throughout the Pacific, their use in Nekematigi medicine is so basic that, when questions are asked through an interpreter about "medicine," psi'i is often volunteered as a synonym by children and other non-experts. Well-known and widely used as a medicine, psi'i is also known and used as a central ingredient in nalisa. To my knowledge psi'i is the only substance Nekematigi use in both sorcery and

medical treatment. Contact with psi'i causes a sudden burning, stinging sensation which lasts or, more accurately, recurs with diminished severity for several hours. In addition to their use in medicine and sorcery, nettles are occasionally used to threaten unruly children!

There are several varieties of nettle grown locally, e.g., gofElaketna which has red leaves, gopi'ne which has very large green leaves and stiff nettles, kalapsi'i, a yellow-leafed shrub, and so on. Although psi'i as a generic category is very well known, not many separate varieties are known to any single individual. Even medical practitioners tend to rely on one or two varieties, personal preferences being based on convenience as well as past results. Those used most commonly are Urticaceae, Dendrocnide spp., low-growing, generally purple-leafed shrubs with fine white hairs on the upper surfaces of the leaves.

During both preliminary and primary treatment medical practitioners rub sick persons' skin with the leaves of psi'i, sometimes at the site of localized pain, sometimes on the back for an overall effect. I confirmed on my own skin informants' observation that nettles actually cause two pains -- one where they touch the skin and a separate, though similar, pain in another

part of the body. Although painful, nettles are used for their effect of deadening the original, i.e., the illness-associated, pain for a day or two. The pains caused by the nettles, say Nekematigi, drive out the other pain, at least temporarily and sometimes permanently. When used immediately prior to a medicinal meal, psi'i is expected to have an expansive, opening effect on the body so that substances ingested later will circulate quickly. Psi'i also may be eaten as part of a therapeutic meal; in this context it is regarded as an all-purpose health restorative.

Sobeyagu'mo attribute the healthful effects of flagellation with psi'i to its inherent beneficial powers. It is presumed to be helpful in alleviating pain whether external or internal, whether naturally occurring or occurring as the result of sorcery. Certain people use psi'i as a general tonic even in the absence of pain or other indicators of illness. Though it is often used in association with verbal magic, it need not be. Indeed, people with minor backaches, sore joints and the like often just find some growing in a field and rub themselves with it. Or they ask a curer to send them some when they are not really ill enough to ask him for treatment. Nettles planted and tended by a medical practitioner are said to be more powerful than those found in the wild; and a medical man's application of

verbal formulae during their growth or application enhances their power further.

Venesection

Instead of stinging nettles, or in addition to stinging nettles, bleeding may be used as preliminary treatment. Often the two are combined, psi'i being rubbed first over the area to be bled.

Bleeding is accomplished by means of a miniature bow and arrow, uti'i gimi. Formerly tipped with bits of hard white stone (kalaifahi), the arrows are now tipped with pieces of broken glass approximately one quarter-inch across. The tiny bow, about a foot long, is the same size and style that men use for shooting their tongues in ritual purification. Medically, it is used on both men and women, and is used most commonly on the back.

Four points on the back are designated as appropriate for shooting with the uti'i gimi. These are two points on the upper back, just below each shoulder blade, and two points on the lower back, just above the waistline. These four points form the mental model for the use of uti'i gimi, and are indeed the places most often bled, though persons are also bled wherever they have pain -- on the temples, just above the brow ridge, on the shoulder, or just above the abdomen. Normally six to twenty shots are used, from a distance of about

five inches from arrowtip to skin. The flow of blood is profuse but the wounds are not deep.

The rationale for bleeding with the uti'i gimi is that, by cutting the skin and letting the blood run, the harmful substances in the blood are let out. This is the same logic applied to the expulsion by vomiting of nami which has been ingested (see pages 137-138). By contrast with nami, nalisa and related forms of sorcery do not create their ill effects by means of tangible substances taken into the body. (Lipi'na, a central ingredient in these varieties of sorcery, is said to be a poison, but it does not come into direct physical contact with the victim except in the sorcery applied to arrowtips.) Nonetheless, the power of the sorcerer and the air ("wind" or breath) which transmitted it, are internalized and create a disturbance in the victim's body. Several components of medical treatment represent attempts to reduce the concentrated power of the sorcery by opening the body and allowing the alien influences to dissipate. While psi'i opens the body only figuratively, bleeding does so literally.

A closely related part of medical theory is that hot blood, which may be either a cause or a symptom of illness, is released by bleeding. Hotness of the skin, blood or internal organs results from sorcery (which is hot),¹⁵ excessive emotion and repeated sexual contact.

Nekematigi notions of hotness are partially related to the occurrence of fever but more consistently related to a generalized malaise or subtle debilitation. Much of medical treatment is designed to cool sick persons either by the application of cooling medicines (such as banana water and pork) or by removing hot "wind" and blood itself.

When bleeding is followed by a medicinal meal, spitting the cooking juices onto the wounds resulting from bleeding replaces the evil substances with beneficial ones. Even when a full therapeutic meal is not prepared, spitting of chewed substances on the points bled is an important means of transferring the power of the curer and his medicines to the patient. Plants particularly useful in this respect are said to be gupa'i (Zingiberaceae, Zingiber spp.), gEnegine (Moraceae, Ficus spp.), imusasumehi (Acanthaceae, Graptophyllum spp.) and fakiyakoka (unidentified). The intent of these more complex applications is the simultaneous removal of harmful substances and their replacement with beneficial substances, exactly the same effect expected from an injection at the aidpost.

For Nekematigi, bleeding with the uti'i gimi has a clearly medical foundation, although Glick suggests that venesection among the nearby Gimi is more properly understood as a part of male purificatory ritual than as

part of medicine (1967:49). Glick puts bleeding of the veins with a miniature bow and arrow in the same class with male bleeding of the nose with sharpened blades of grass for initiation. He argues that neither of these are strictly medical because (1) they are not used to treat illness but are used generally to restore health and vigor, (2) when health deteriorates further, individuals turn to procedures which are unambiguously medical in function, and (3) such bleeding is used only by men. In contrast to the Gimi situation, the conditions surrounding Sobeyagu'mo medical usage of venesection are quite distinct from those surrounding its purificatory usage. Sobeyagu'mo use four forms of male purification: shooting of the penis and the tongue with miniature arrows, bleeding of the nose with sharp grass, and swallowing lengths of cane to induce vomiting. Any of these may be employed as a general tonic (for example, young men often bleed themselves just before a public dance so that their skins will "shine" and women will admire them) but none is used in medicine. As a response to specific indicators of illness, the miniature bow is used at the site of localized pain; or, like psi'i, it is used on the back to counteract a non-specific malaise. Its use on the penis and tongue is reserved for male purificatory rites. Male purificatory bleeding is done near a stream and the blood is

carefully washed away; medical bleeding is done in front of a house and no effort is made to dispose of the blood in a secret place. When men are ill, they seek assistance in bleeding from a lusarobo not from an expert in male ritual (although the two are sometimes the same). Male purification is always performed under conditions of strictest secrecy; this need not be true of medical bleeding (see case #6a). When venesection is done in secret, secrecy surrounds the entire medical procedure, not only the bloodletting, because of the fear of interfering sorcery. Moreover, while the sick person is hidden from outsiders, local women are frequently present; women (except for the very aged) are prohibited from observation of male purification upon threat of death. Finally, women themselves, and children of both sexes, are often bled with uti'i gimi for explicitly medical rather than ritual reasons (see cases #13, 15). Indeed, women may be asked to do the bleeding (as in case #11b) which is unthinkable in a purificatory context.

Ginger

Like stinging nettles and bleeding, root ginger (Zingiberaceae, Zingiber spp.) is regarded as a powerful and versatile restorative. Known as kawan in Pidgin and gupa'i in Benabena, it is used in both preliminary and

primary treatment. Various species of ginger are used throughout the Pacific to treat cuts and sores, headache, cough and stomachache (Cf. Altshul 1973; Panoff 1970; Wedgewood 1934-35).

For Nekematigi gupa'i has wholesome qualities which are active in many contexts. They use ginger not only for medicinal purposes but also for many ceremonial purposes, frequently in combination with salt. Ginger and salt are spat over food distributed at several types of ceremonial meals (e.g., the first meal consumed together by a group of agemates and their wives, the first meal consumed by a woman and her husband's cohort after the birth of a child). They are valued both for their flavoring and for their salubrious properties. Chopped ginger root and salt are put on the sharp-bladed grasses men use to bleed themselves in purificatory ritual; they assist in the total process of making the body cool and the skin "light." Gupa'i leaves are used in rain magic and various parts of the plant are used in magic (medicine) prepared for travellers to prevent contracting malaria in the lowlands. Gupa'i is believed by both Sobeyagu'mo and Korofeigans to prevent conception and cause abortion (see Langness 1965:270). Because of its contraceptive value, gupa'i is cultivated in secret by Korofeigan women while in Sobeyagu most gardens, whether tended by men or women, contain a stalk or two

and there is no secrecy associated with its cultivation. Women eat chopped ginger at feasts and chew the rhizome for relief of pain as publicly and frequently as men do. Apparently very secret and specialized knowledge is required to convert the highly esteemed medicine into a contraceptive for, while Nekematigi women would certainly value an effective contraceptive, their public consumption of one would not be tolerated by men.¹⁶

Like psi'i, gupa'i cultivated by a medical practitioner is regarded as a somewhat more effective medicine than that found in the wild or cultivated by a non-curer. But, again like nettles, ginger does not require special preparation. Its inherent power, say Nekematigi, is obvious in the way it "fights" (i.e., stimulates) the mouth when it is chewed. (My Sobeyagu friends used a similar phrase to describe their reactions to radishes, which I introduced, but radishes never gained favor either as a food or as a medicine.)

In preliminary treatment ginger is used either alone or in conjunction with either psi'i or bleeding; in primary treatment it is used as an ingredient in the therapeutic meal. When used a medicinal meal it is usually mixed with salt and spat over the other medicinal substances and foods prior to cooking them.

Because of its smell, gupa'i is believed to circulate very quickly throughout the body. By thus opening the body, it increases the absorption of the other medicines and spells. Whether chewed alone, spat on the skin in conjunction with bleeding, or eaten, ginger is said to be sweet, to be cool, to be analgesic, and to clean the intestines.

Summary

The three major techniques of preliminary medical treatment are rubbing with stinging nettles, venesection and chewing ginger root. Since each may be employed singly or in combination with the others there are actually seven common forms: nettles alone, bleeding alone, ginger alone, nettles and bleeding, nettles and ginger, ginger and bleeding, and a combination of all three. Examination of the illness episodes in the case histories I obtained suggests that the most common form of preliminary treatment is psi'i (nettles), used at least 19 times in 28 illnesses, with or without associated spells. Used less often than nettles alone and about equal in frequency to one another are combinations of nettles and bleeding (5), combinations of nettles and ginger (7) and bleeding alone (7). The numbers are not definitive because I did not observe all treatments and have relied upon memory or estimates when people reported receiving nettles or ginger from "many men;"

still the pattern accords well with informants' stated preferences.

In addition to the three major preliminary treatments, there exist several unusual or innovative treatments. Water from banana tree trunks is taken internally or placed on the skin for a cooling, analgesic effect. Coleus leaves, mixed with water are used the same way. For a persistent cough, and as a general tonic, people chew the stems and flowers of lEkEla'mehi (Helichrysum bracteatum). Leaves of ginigi (Cordyline spp.) are warmed in the fire and tied around the brow for relief of headache. Kerosene is sometimes used on sores as are the bodily fluids from a certain variety of small green worm. Ashes are occasionally combined with psi'i for external use, especially in arthritis. Garden greens and bits of pork (on hand from a recent feast, not prepared for the illness) are consumed in minor but persistent illnesses; this strikes me as being mid-way between illness behavior (the normative offering of specialty foods) and primary treatment (the formalized combination of pork with many plants and verbal incantations). Australian medicine is also sought during the preliminary stages of an illness.

The range of individual treatments used and the statements of informants suggest that medicines are

constantly being invented and discarded. The popularity of certain medicines waxes and wanes not only with their observed level of effectiveness but also with their availability. The latter is a function of the resources of the group and the imagination of its members.

Lusarobo purchase and learn new spells and medicines from other curers and from Europeans. The curer I know best used several forest plants unknown to other curers because, he said, they had worked well for a famous curer from the bush. Non-experts, too, try new medicines on themselves or on others as opportunities allow or necessity demands. Eno fruit salts, for example, became very popular as the result of my introduction and its early successes. In both preliminary and primary treatment, old stand-bys are often replaced by or combined with new treatment techniques. In these novel, or semi-novel, situations, the Nekematigi explanation of their behavior is: "We don't know if this is a good medicine or if it will work. We are just trying. If we find a good one we will use it again."

The epistemological paradigm underlying Nekematigi medicine is clearly positivistic. It is the observed results of medicines and medical practitioners that lead to their repeated use. To find out what works best, Nekematigi are guided by both the wisdom of their elders and personal experimentation. Much as individual men

"test" varieties of nalisa to determine which is most effective in their hands (see page 141), so they experiment with different types of arrows, garden plots, new crops and medicines. Preliminary treatment provides a setting -- free of socio-economic investments and communal expectations -- in which new medicines or variants of old ones can be tried.

The Elements of Primary Treatment

The important elements in primary treatment are (1) the repetition of some parts of preliminary treatment, (2) the use of verbal incantations (lusana), and (3) the preparation of a medicinal "soup" (lusakohi) containing staple foods, medicinal plants (seva) and pork (yaga). Preliminary treatment tends to be relatively informal, usually arranged simply between a curer and sick person, and taking only a few minutes. Primary treatment, by contrast, is a formal stylized ceremony, involving not only the curer and patient but also the sick person's intimate associates. The major emphasis in preliminary treatment is on relieving the patient's discomfort and empowering him to overcome his illness. In primary treatment this concern is continued and expanded. Many more medicinal plants are used as broad-range boosters, as is pork, the most highly valued of all Nekematigi foods. At the same time, the selection of medicines and

spells for primary treatment includes several which are oriented toward weakening the sorcerer or the sorcery, i.e., the illness, itself. Whether or not an explicit diagnosis of sorcery is made, primary treatment for all serious illnesses includes verbal and botanical antidotes to several varieties of sorcery. Thus, two medical procedures -- strengthening the sick person and weakening (many possible) illness agents -- become one in the preparation and communal consumption of a therapeutic meal called lusakohi.

The Ceremonial Meal

Lusakohi means, literally, "talk" (lusa) "bamboo" (kohi); the word refers to a meal cooked in a bamboo tube and accompanied by verbal incantations. Guyakohi ("greens bamboo"), by contrast, refers simply to garden greens cooked in bamboo. Mekohi ("nothing bamboo") is just an ordinary meal cooked in bamboo as opposed to a meal boiled in a pot or steamed in an earth oven. After a brief narrative description of the lusakohi I shall return to an examination of each of its constituent elements.

The preparation of the lusakohi takes place at dusk -- the curer having spent the afternoon gathering medicines, the sick person's brothers slaughtering a pig or going to town to purchase meat, and related women gathering greens and sweet potato. While gathered inside

a house with the sick person and relatives, the curer mixes pieces of pork with ordinary edible greens, bits of sweet potato and, if he has them, pieces of motabo felisa'a or namayapifa (sky beings' bones, see page 113). To this mixture he adds seva, medicinal plants, of great variety. Usually the new leaves of the plants are the part used, in the case of trees it is often the bark, and in the case of very small shrubs or flowers and fungi the entire plant may be used. In all cases the curer breaks the plants into small pieces with his hands, speaks over a piece of root ginger, mixes pieces of the ginger with salt, places the ginger and salt in his mouth, and spits them over the plant and pork mixture. Presently the entire combination is placed in a bamboo tube for cooking. When the mixture in the lusakohi begins to steam, the curer removes the cooking tube from the firepit and decorates it or, in some other individualized manner, provides a visual reminder that this is an important medical meal being prepared.

The senior Sobeyagu curer is the only one I observed to adorn the lusakohi with artful representations, though he did so regularly. Slowly and carefully he first etches geometric designs around the mouth of the tube with a knife, then paints them with red betel juice from his mouth. When the painting is completed he ties a collection of multi-colored leaves

(Cordyline, Coleus and others) upright, rather like a headdress, around the neck of the tube. Loiye never gave any reason for this embellishment except to say that it was his way and that he believed it made the whole thing better. I suspect that, indeed, there is no rationale that is more widely shared. Each curer has idiosyncratic preferences he brings to the treatment ceremony. While some men rely on loud shouts or secretive manipulations of the plants, Loiye's appreciation of color and drama led to his selection of this particular addition.

Decoration of the cooking tube is one procedural variant which may interrupt the cooking of the meal at mid-point; rubbing the sick person with red or white mamufa grass (Graminae) is another. (It may also precede putting the lusakohi in the fire.) Leaves of mamufa are used because they have a delicate, pleasant fragrance which they impart to the skin and to the room. The curer may or may not speak over the leaves before applying them. Whether or not he does, he rubs them over the patient's skin slowly, lightly and stylistically -- rather like a dance -- directing his motions to the outward extremities of the sick person's body, from the upper leg down to the foot, from the upper arm out to the hand, from the neck up to the top of the head. After thus stroking and scenting the person's body, the curer may choose to wrap a single piece of

pork in the leaf and include this small parcel in the lusakohi. When this is done the patient will be given this piece of meat to eat first, taking it with the mouth directly from the grass loop so that the meat is handled by no one after cooking. The curer may once again rub the mamufa and pig grease over the patient before discarding the leaf.

After cooking has been interrupted for decoration of the tube or insertion of mamufa, it is replaced on the fire until the contents are thoroughly cooked. During the interim the assembled group simply smokes, engages in small talk, etc.

When the food is done, the curer picks up the tube from the firepit and strikes the ground with it several times, such that a line drawn between these points would encircle the patient. Combined with dramatic verbal incantations, this re-focusing of the group's attention on the patient is a moving prelude to the culmination of the treatment ceremony.

When venesection is part of treatment it will occur at this point. The medical practitioner, setting the cooking tube aside temporarily, rubs the sick person with stinging nettles. Then the group moves outside and, in the near darkness, the curer shoots the patient several times with the uti'i gimi. After a few shots he removes some of the fluid from the lusakohi and spits

it on the bleeding wounds. After more bleeding, more spitting and, perhaps shouting spells at suspected sorcerers, the group returns to the house and consumes the contents of the lusakohi.

Spells and Medicines

It is significant that the medicinal meal is referred to as lusakohi. While verbal formulae are sometimes used in preliminary treatment, they are not essential. The use of spells is more characteristic of -- indeed, essential to -- primary treatment. Lusa, or talk, is the most important aspect of the event for Nekematigi. It is equally significant that medical experts are referred to as lusarobo. Their having learned powerful verbal formulae is regarded as perhaps their most important achievement.

The term lusakohi, or some verbal derivative of lu-, is the Benabena synonym for "making medicine" when "making medicine" means a complete, i.e., primary, medical treatment ceremony involving simultaneously magical words, nettles, bleeding, medicinal plants and pork. For example, lusa no giyeta means, literally, "he does talk," but, in context, it means "he does a medical talking." Similarly, lusageto asu hu'ehibe means "talk was done, it is finished," or, more accurately, "I made talk/medicine [and now] it [the illness] is finished." In the negative statement, the

direct reference to lusa is sometimes omitted, as if to include it would be a reflection upon its power. In the following sentence, for example, the hearer must surmise, if he does not know, what exactly was done: nani mo bugo'ohuna hawatave; gai bugobo or "I myself looked at it [and tried something] [but] it [the illness] did not finish; [now] you go look at it."

There are actually, however, two Benabena words which are translatable as synonyms for "medicine." One is lusa and the other is seva, the generic term for plants of medicinal value. When speaking generally about medical treatment either term may be used to indicate the subject. When speaking specifically about some instance of medical treatment, however, one must be more precise. Though sometimes synonymous with medicine in general, seva often means more narrowly the plants themselves and/or a limited variety of plants within this category (see page 216). Lusa, though it means specifically "talk," refers generically to medical treatment itself as well. Lusa, in its generic sense, or lusakohi in a specific instance, must refer to a medical treatment composed of both lusa, meaning simply "talk" and seva, meaning simply "medicinal plants" or one type of medicinal plant. The variable usage of the two terms reflects both the central importance of speech and the fundamental inseparability of speech and plants.

Nekematigi explicitly make the same distinction between medicines (seva, pork and other relevant natural substances) on the one hand, and spells (lusa) on the other, that Evans-Pritchard made years ago: medicines are substances that one uses, while spells are things one says (1937:9). The operational distinction, however, is not as simple as the conceptual distinction might lead one to believe. While some plants have inherent beneficial properties, others, though potentially medicinal, are worthless unless they have the appropriate spell associated. And even those of inherent value, like psi'i, can be enhanced in value by the use of a spell. So, while seva refers to plants as distinct from words, it equally often refers to plants and their associated words (thus distinguishing them from non-medicinal plants, i.e., plants without words).

When curers purchase a new medicinal plant from another man, for example, they expect to purchase the "talk" along with it. If they later experience a failure with the newly acquired assortment of medicines, they are as likely to accuse the seller of giving them false words as they are to suspect an ineffectual plant.

Similarly, in preparing a lusakohi, curers may attempt to enhance the specific appropriateness of the general procedure by using an old combination of plants

but creating a novel combination of words. Alternatively (but equally as likely), they may use the same words as on another occasion but apply them to a different assortment of plants.

Words are regarded as having a power of their own which may be transmitted by the curer and combined with that of the plants, but the words must get "into" the patient somehow. To create easy internal access of medicinal words and plants is the reason for the emphasis upon "opening" the body with nettles, ginger and bleeding in preliminary treatment or immediately prior to consuming a primary treatment meal. During the preparation of the meal, the curer facilitates the patient's internalization of his words by blowing in the latter's direction while speaking over the medicinal plants. The medicinal meal itself includes several plants (e.g., ginger) selected especially because of their presumed ability to travel quickly through the body and "carry the talk." Others (e.g., mamufa in the narrative above) are used externally because their own medicinal powers complement their ability to transmit verbal incantations.

Despite their close association with plants, medical spells are also addressed to sick persons themselves and to suspected agents of illness causation. Whatever their direction, they are, in Bloch's terms

(1974), a form of "hortatory ritual" that seeks to limit, and direct or focus, the needed activity onto the illness.

Words directed to patients' bodies and to medicinal plants are whispered or spoken in low tones so those assembled do not hear.¹⁷ Some spells are admonitions to the illness itself to depart the person's body, for example: "The sickness should come out of the skin like oil and go into the water [i.e., the river]...." Other spells are instructions to the medicines as to the effects they should have: they should make the person's skin good, they should be very powerful, they should go around very speedily in the person's body, and so on. Still other spells are directed at animals which have sympathetic properties of curative value. The curer I knew best directed his pleas most often to eels (fenimo) because, in his words, "they are in the water and don't have sores; they are slippery and can disappear fast." He felt that fish (faya'i) and frogs (saloi'i) could be addressed in the same way and for the same reasons: they are clean and have healthy, clear skins which one hopes to achieve for sick persons. Other men "sing out" to cassowaries and other birds, to named mountains, and to streams to take away illness. Glick (1967:45-46) suggests that Gimi curers have familiar animal spirits with whom they communicate, in trance, during treatment ceremonies. This is not the case with curers I know.

Nekematigi and Orogeiga curers simply call on animals for assistance because of preferred qualities -- like smoothness, speed, strength -- that they would like to activate on their patients' behalf. They do not enter trance, nor do they claim to have acquired any of their skill from animals: "We learn from our fathers and from trying, that's all."

While words directed at patients' bodies, and at plants and animals, are whispered and secretive, words directed at suspected agents of illness causation are delivered in a loud and flamboyant manner. Verbal formulae which command respect for patient and curer and which protest the actions of enemies are shouted boisterously -- over a fence, over the roof, or over the heads of the group assembled inside a house. The words may testify to the strength of the medical man and his commitment to drive out the illness:

I am Sotaibo of Napayufa clan, the son of
Susulo'e, great warrior and medicine man
like my father before me. I have prepared
strong medicines, medicines from near and
far, and given good talk, and I say now
that this sickness is finished. Finished!

Or the curer may direct his words at nearby districts demanding that the men of these places retract their

sorcery or simply informing them that their malicious intentions are being thwarted:

You men of Mipo, men of Mega, men of Liorofa, men of Safa, men of Napainye, all you no good men have tried to kill one of us.... But we are stronger, we will send this illness back to you, back to the Mipo'mo, back to the Megabo, back to the Safabo....

Verbal incantations certainly hold a place of central importance in primary treatment, providing the symbolic interface between a patient and the cause of his illness and between a patient and the agents of his recovery. Precisely because they constitute a link between classes of phenomena, words are incapable by themselves of effecting a cure. Nekematigi believe that for the lusakohi to be therapeutic all its three essentials must be employed together -- talk, plants and pork. A lusakohi cannot be made of simply ordinary foods and spells. It must include them but it must also include specialized foods, namely medicinal plants and pork.

Pork

For Nekematigi, and throughout the New Guinea highlands, pork represents both a social and physiological investment in a sick person's well-being. Pigs are

highly valued prestige items and items of wealth. More precisely, they are the most valued form of wealth, prestige and food. As such, they are killed, eaten and given away only on very important occasions such as marriage, male and female puberty rites, inter-district celebrations of past alliances and so on. Since the size of a man's pig herd is a measure of his social standing, killing a pig for someone represents the utmost in inter-personal and inter-group commitment. Classificatory brothers and fathers have a generalized responsibility for killing pigs for men, women and children in their charge, at all important life crises including illness and death. There is, in addition, a reciprocal relationship between father's sister (mopo'afu) and brother's child (mobi'afu) which is explained in medical exchange idiom: it is the child's responsibility and pleasure to give a pig for curing when his father's sister is ill. Illness, thus, creates the opportunity for affirmation of these ties; at the same time, affirmation of important social ties creates a socially supportive therapeutic setting.

Pigs are not sacrificed, however; they are eaten. Their meat is regarded as a source of natural power comparable to plants and human beings' words. The power of pigs, it is said, comes from the fact that they are somewhat like men and somewhat like wild things. From

both consuming domestic foods and foraging wild foods, they acquire a cumulatively internalized resistance to life's hazards. The fact that pigs are sick less often than humans is taken as proof of their superior strength, a strength both inherent and acquired. By eating pork, humans can in turn acquire some of pigs' attributes, including strong skins, good senses of direction and resistance to illness.

The medical value of pork lies not only in the fact that it imparts strength to the consumer but also in its additional qualities of "sweetness" and "coolness." The rationale for cooling sick persons has already been discussed (see pages 185-186). Imputing the property of sweetness to medicinal foods seems to reflect an equation of sweetness with goodness. Sweetness is an attribute of all somewhat rare but much appreciated foods -- pork, bananas, pandanus fruits and certain wild fungi. Just because they are tasty yet relatively hard to come by, these foods have positive qualities not attributed to staple foods. The Sobeyagu'mo, who were cannibals, describe human flesh in similar terms. Indeed, they say, the meat of humans is even more sweet and more capable of cooling the body than that of pigs. Although these characteristics of human flesh are numbered among their reasons for cannibalism, Sobeyagu'mo deny every using

human meat in medicine. Nowadays, because they feel they are short of pigs, they often purchase frozen mutton, fresh or frozen chickens, or canned fish to replace the preferred pork in the lusakohi. Acknowledging that these are less than perfect substitutes, they feel strongly that meat of some sort is essential to the medical meal.

The killing of a pig serves as an acknowledgement of the seriousness of a person's illness and as an indication that something is being done it. For example, to suggest to me the gravity and intractability of Tutupa's long-standing illness (case #1), informants often remarked, "we have killed many pigs for him...." On the other hand, during the May-July epidemic (see page 104), the district consciously re-defined the widespread incidence of respiratory disorders as "small illnesses" rather than "big illnesses." While minimizing the escalation of anxiety, this decision also minimized the strain upon their limited medical resources -- both people (to sit with sick persons) and pigs. During this period it was decided collectively not to kill any more pigs for curing ceremonies; they would use tinned meat, wild game or nothing. The senior curer argued persuasively that if they used pigs for what he called "this small malaria" (ufana), they were likely to be stricken later with real malaria (kana).¹⁸ Though sorcery was generally discounted as the cause of these

illnesses, some men argued that if they were the result of enemy sorcery, they would be weakening themselves even further by killing all their pigs. This too was a persuasive argument: the clan had so few pigs they would surely have been at an inter-group disadvantage (even without presuming their neighbors' hostility) if they had used pork in all routine curing.

Plants

Both pork and medicinal plants are regarded as what we might call drugs. They are physical substances which are taken into the body and expected to have observable, fairly immediate, beneficial effects upon the consumer's health. Plants accomplish their medicinal purpose in several ways. Some are health restoring in and of themselves. Others are of value because they are presumed antidotes to certain etiologic agents. Still others are of value because of their intimate association with verbal incantations. The following is a summary, in tabular form, of the medical plants used by Nekematigi and the rationale for their use. They are alphabetized by scientific (family) names which are included for ease of reference when we return to a discussion of their psychophysiological effects in the following chapter.

A finite list of medicinal plants would be difficult to establish. Indeed, such a list might well be

impossible to create, given that the total repertoire, as well as the preferences of individual medical practitioners, undergo continual change. The assortment in a given lusakohi varies with these preferences, with the illness situation and with the availability of some species. A great variety of medicinal plants is known to Nekematigi curers (yet to non-curers very few are known beyond those used in preliminary treatment); the following compilation includes most of the plants used regularly by the curer I know best as well as those mentioned by men I know less well. Items that are starred (**) are medicines regarded as essential by my chief informant. They are botanical health aids he would use regardless of diagnosis and regardless of what others might recommend for the same condition. Some species grow locally, either wild or tended by a lusarobo; others must be obtained in uninhabited areas, either just above the settlement or from the rain forest considerably further away. Those from the forest are generally regarded as much more potent than those grown locally, and this distinction is noted below where relevant. Where no rationale for use is given, none could be obtained from informants. Alternative Benabena names are in parentheses below the primary entry. Question marks (?) indicate uncertainty on the part of the botanists who did the identifications for me.

Table I: Plants Used In Lusakohi

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|-------------------------------|--------------------------------------|--|
| Acanthaceae, Graptophyllum | bukefa (imusasumehi) | Antidotal to <u>imusa</u> , it is used both in the special treatment (pages 129-131) and in <u>lusakohi</u> . In addition, it is an all-purpose strengthener said to be especially beneficial when used in conjunction with bleeding either in preliminary treatment (page 186) or in <u>lusakohi</u> . In the latter, it is recommended that it be used in large quantities so that its juice will be certain to enter the wounds made by <u>uti'i gimi</u> . |
| Acanthaceae, Hemigraphis | lipi'na seva | (**) Antidotal to <u>lipi'na</u> . |
| Amaryllidaceae, Crinum | fenigapa | Antidotal to <u>nami</u> and <u>mula'mula</u> , it is used in specialized treatments (pages 129-131) as well as eaten in <u>lusakohi</u> . |
| Balsaminaceae, Impatiens | segitave (segitave seva) | |
| Balsaminaceae, Impatiens | fomu (gigupa fomu) (fomu seva) | (**) Regarded by some curers as a general-purpose restorative and pain reliever, by others as antidotal to <u>gupa'nalisa</u> , <u>uwatagohi</u> , <u>mayayanakofa'i</u> and/or <u>imusa</u> . |
| Begoniaceae, Symbegonia | lose' | (**) An all-purpose medicine said to be especially powerful because it was brought from the forest (though it is now planted locally). |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|--|------------------------|--|
| Commelinaceae | motabo seva | Used to counter the effects of exposure to <u>motabo felisa'a</u> (page 114, 116) and as a general restorative. |
| Commelinaceae, ?Aneilema | foma (fomai) | Recommended as a very powerful general restorative by some men; used by others with <u>motabo seva</u> (above) as a specific response to effects of <u>motabo felisa'a</u> or any of the <u>nalisa</u> sorceries. (Also used in medicines for pigs). |
| Commelinaceae, Tradescantia | migufa'i | Used as above. |
| Compositae, Helichrysum bracteatum | lEkEla'mehi | An all-purpose medicine especially useful for cough (see also page 192) Grown locally, it was originally imported from a grassland district. |
| Cyperaceae | yuguyufa | The roots are an all-purpose medicine making breathing easier and relieving pain; the leaves are used like Graminae (below) and to decorate the cooking tube. |
| Euphorbiaceae, Acalypha | golaha ¹⁹ . | An all-purpose medicine |
| Euphorbiaceae, Acalypha | kokeplapa | As above |
| Graminae | mamufa | (**) The leaves, though cooked in the <u>lusakohi</u> , are not eaten but are rubbed on sick persons' skin. Said to be powerful because of its smell |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|-----------------------|----------------------|--|
| | | and because of its ability to absorb and carry spoken words, <u>mamufa</u> is an all-purpose restorative used in many non-medical contexts as well to "prevent trouble." |
| Labiatae, Coleus | moipa | This and the following five are all different species, or sub-species, of <u>Coleus</u> identifiable to <u>Nekematigi</u> in terms of color, size and habitat. <u>Moipa</u> is the variety used most often for making dye used in coloring string bags, clothing, etc. It is a general restorative sometimes eaten with the <u>lusakohi</u> , sometimes used to decorate the cooking tube. (It is also applied to the skin in a variant of preliminary treatment, see page 192 and case #16c.) |
| Labiatae, Coleus | nalisa seva | (**) A general purpose medicine said to be especially powerful because it was introduced by a famous curer from a forest district. |
| Labiatae, Coleus | fulala (fulula) | (**) An all-purpose restorative said to circulate quickly and completely through the body (like ginger, due to its fragrance) acting to both drive out (i.e., replace) the illness and transport associated medicines and spells. |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|--------------------------|----------------------|--|
| Labiatae, Coleus | nakofa seva | The antidote to <u>mayaya-nakofa'i</u> , also used as a general restorative. |
| Labiatae, Coleus | kubesifahi | A non-specific remedy for pain and discomfort. Used infrequently in <u>lusakohi</u> , it is applied externally in preliminary treatment to remove the worms or insects suspected of causing toothache. |
| Labiatae, Coleus | ybo ybo pahi | Used primarily to decorate the cooking tube. |
| Lauraceae, Cinnanomum | yahuma | Although only one specimen was submitted to the herbarium for identification, several varieties of <u>yahuma</u> are known to Nekematigi. They are all regarded as broad-spectrum medicines, powerful because of a fragrance (retained in the dried bark) which circulates speedily. (The dried bark is also mixed with water and spat on sores in preliminary treatment.) |
| Liliaceae, Cordyline | fagaginigi | Used primarily to decorate the cooking tube, the leaves are also consumed as a non-specific medicine (and used in preliminary treatment, see page 192). |
| Liverwort, Marchantia | nagami seva | The antidote to <u>gupa'nalisa</u> . |
| Loganiaceae, Buddleia | ifa afa | Used primarily to decorate the cooking tube. |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|-----------------------------------|-----------------------|---|
| Moraceae, Cudrania javanica | mapi'na | Not consumed in <u>lusakohi</u> (though it is in ghost treatment, page 120), the thorns may be used to puncture pieces of ginger to open them (as they in turn open the body) to receive verbal formulae. |
| Moraceae, Ficus | gEnegine | An all-purpose medicine said to be especially good at cooling patients when spat on wounds from <u>uti'i gimi</u> . |
| Myrtaceae, Eugenia | hihanyuhi | An all-purpose medicine said to being out the best in the plants with which it is combined. |
| Polypodiaceae, Adiantum | hatukfi (hatukafi) | An all-purpose restorative and pain reliever recommended by some men especially for abdominal pain. The leaves are also used to decorate the cooking tube. |
| Rubiaceae ? | soko | |
| Rubiaceae, Borreria | yafagepa | A medicinal of uncertain status, apparently the focus of current experimentation. Some men regard it as therapeutic, others regard it as an edible but non-medical form of wild greens. |
| Rubiaceae, Ophiorhiza | seva (agepa) | (**) See below |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|--------------------------------|----------------------|--|
| Rubiaceae, Ophiorhiza | seva (agepa) | (**) These are two plants with the same name (and botanical identification, as far as genus) but distinguishable by size, leaf structure and native habitat. They are both called <u>seva</u> , the generic term for medicinal plants becoming the specific name for these two medicinal plants (see page 200). They are also called <u>agepa</u> which simply refers to a class of edible greens, sometimes wild, sometimes cultivated. They are broad spectrum medicines similar to one another in their ability to induce "quietness" and good feeling in all internal organs but especially the liver and intestines. One is from the forest, is taller and said to be the "big brother" of (i.e., more powerful than) the other, though it is recommended that they be used together for maximum benefit. |
| ?Rubiaceae, Ophiorhiza | nami seva | (**) Regarded by some men as a general medicine, by others as the antidote to <u>nami</u> sorcery, it is used in the specialized <u>nami</u> treatments (pages 137-138) and/or in <u>lusakohi</u> . |
| Scrophulariaceae, Lindernia | metnifaIopa'i | An all-purpose medicine. |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|-----------------------------|--|--|
| Scrophulariaceae, Striga | fayakafi | |
| (Unidentified) | asalikafi (kasalikafi) (nalisa seva) | Regarded variously as the antidote to <u>kleotahi</u> and/or <u>kasasalihi</u> |
| (Unidentified) | namaguya | A general restorative from the bush (the name means "edible greens for birds"). Like <u>seva</u> (Rubiaceae, <u>Ophiorhiza</u>); it comes in large and small varieties which are correspondingly more or less powerful. |
| (Unidentified) | habalu | Said to have a cooling effect, especially good to use in conjunction with bleeding. |
| (Unidentified) | masimas | Used like <u>habalu</u> (above) |
| (Unidentified) | fakiyakoka | As above. Also chewed and spit on the contents of <u>lusakohi</u> (or on ginger in preliminary treatment) to insure speedy diges- tion. |
| (Unidentified) | lakegusakafi (lakegusahi seva) | The antidote to <u>lakegu- sahi</u> sorcery. |
| (Unidentified) | slok'fi | A general purpose medicine said to be particularly useful for pains in limbs and joints. |
| (Unidentified) | igluhunagahi | A general restorative |
| (Unidentified) | somehi | From the bush, a non- specific strengthener (the heated leaves are also used on cuts). |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|----------------------------|----------------------|--|
| (Unidentified) | glipiyave | Used like <u>somehi</u> (above) |
| (Unidentified) | ufa ufa kafi | A non-specific medicine from the bush (<u>kafi</u> is "weed" or wild, uncultivated plant) also cooked with salt and chewed in preliminary treatment to relieve skin pains and toothache |
| (Unidentified) | kakfi | A non-specific medicine from the forest recommended by some men for illnesses characterized by headache. |
| (Unidentified) | fremu | An all-purpose pain reliever (mixed with ginger and spat on the skin for superficial pain in preliminary treatment) |
| (Unidentified) | namagalofe | |
| Urticaceae, Dendrocnide | psi'i | (**) An all-purpose pain reliever both eaten and applied externally, it opens the body to better receive other medicines (see pages 181-184). |
| Urticaceae, Elatostema | kse'e | (**) A general purpose pain reliever and health restorer regarded by some curers as the antidote to <u>nalisa</u> (sub-type). Said to be stronger than local medicines because a famous curer introduced it to Sobeyagu. |
| Urticaceae, Elatostema | psupsu | Makes a person (or pig) who eats it stronger, said to work like <u>fomu</u> (<u>Balsaminaceae</u>) |

Table I: (Continued)

| <u>Botanical Name</u> | <u>Benabena Name</u> | <u>Rationale for Use</u> |
|------------------------------|----------------------|---|
| Urticaceae, Pipturus | gugupEta'i | May be eaten as a general restorative but its primary use is to decorate the cooking tube. |
| Zingiberaceae, Zingiber ? | gupa'i | Cools the body, improves the condition of the skin, relieves pain and "carries the talk" (see pages 190-191). |

Summary

The Nekematigi use of medicinal plants in primary treatment is perhaps the supreme example of the eclectism, pragmatism, individualism and holism that characterize their entire approach to illness. Botanical medicines are employed in wide variety and for a wide array of reasons (and some for no reason at all). Medical theory attributes a range of both physical and mystical power to some species, a much more limited form of just one type of power to others. They are employed in varying combinations reflecting, not any shared ideal of a "right" procedure but, their availability and individual interpretations of medical theory. They are administered in conjunction with pork, verbal formulae and mechanical techniques (i.e., bleeding and nettles) also selected in accordance with individual circumstances and designed to reinforce or complement the biological

effects of plants. They are consumed in a communal setting reflecting the commitment of a social group to patient and curer, a commitment reflecting, in turn, the shared antagonism of the entire group toward presumed etiologic agents.

There is a fundamental difference, then, between the Nekematigi theories underlying the explanation of illness and those underlying the treatment of illness. The explanation of illness relies heavily upon just one etiologic theory, postulating the powers of human beings to induce each others' illness and death. This theory is highly generalized, serving not only to explain medical events but also to explain unwanted rain, infertility, loss of pigs, runaway brides, unfavorable decisions by government officers, etc. From an outsider's point of view this theory also perpetuates the fears, precautions, and conflicts essential to the maintenance of inter-group hostility and intra-group cohesiveness. The treatment of illness, on the other hand, relies upon many theories, postulating the powers of humans, pigs, sky beings' bones, plants and physical manipulations to induce recovery from illness. Most of these theories are not highly generalized (the exceptions being the presumed powers of certain plants, e.g., ginger and mamufa, and of verbal incantations). Most serve no additional social purpose other than providing understanding of the means

by which illness recovery is achieved.

According to Horton (1967:166f.), the multi-purpose nature of traditional etiologic theory, combined with a relative unawareness of alternate theories, should retard the progressive acquisition of knowledge. An additional feature of traditional theories that differentiates them from what we consider scientific theories is a protective attitude which produces ad hoc excuses for the failure of established theory to accurately predict events. This attitude results in the "secondary elaboration" of traditional theories rather than theoretical change based on empirical observation.

For Nekematigi, however, the acquisition of new knowledge is not precluded by the characteristics of medical theory. On the contrary, the continuing creation of medical knowledge is encouraged by a social appreciation of individual variation. Individual and social variations in therapy arise within an epistemological framework the boundaries of which are considerably broader than the boundaries of etiologic theory itself. Nekematigi concepts of the dynamics of medicine are related to the prevailing theory of causation of illness, but this is by no means the only determining factor. Treatment theory develops inductively from experience and deductively from

etiologic theory. Consequently, while treatment is indeed deeply embedded in the social and magico-religious system, it does not manifest the characteristics of traditionalism, conformity or conservatism attributed to such belief systems (Cf. Ackerknecht 1971:21f., 129f.; Horton 1967). Belief in enemy sorcery as the primary cause of illness, rather than leading to reliance upon strictly anti-sorcery techniques of medical treatment, leads to the search for any and all possible means of overcoming the illness. As a result, etiologic theory (in the form of a diagnosis) can be held in abeyance while treatment proceeds; similarly, conventional therapeutic theory may be held in abeyance while curers "just try" new medicines. Despite the flexible application of etiologic theory to practice, it and parts of treatment theory are protected by secondary elaboration. When Nekematigi use sorcery and their enemies fail to become ill, they explain this failure in terms of their improper preparation of the sorcery materials, or their enemies' access to more powerful medicines. They do not question the potential powers of sorcery itself. Similarly, when treatment fails, it is presumed to do so because the curer was not sufficiently strong, or because he chose the wrong plants or spells. Failure does not challenge the belief that plants -- general -- or words -- in general are

effective in curing illness but it does lead to change, abandonment and recombinations of medicines within these categories, as well as to the addition of entirely new categories of therapeutic agents. Older curers' tales of searching the forests and trading for new medicines leads me to conclude that this is not merely the result of a post-contact awareness of medical alternatives. Rather than being "insensible to experience" (Ackerknecht 1971:123), Nekematigi take conscious advantage of new illness experiences to vary medical techniques and observe the results. (They do not, on the other hand, create experiences, i.e., experiments, in which they can observe the results of variable techniques.)

Because there is no one-to-one correlation between etiologic theory and treatment theory, and because treatment theory includes a range of sub-theories, a great diversity of treatments may be employed in any given case. In just the twenty-eight illnesses reported in the Appendix, at least 87 separate treatment regimes were utilized. For Gemasohafa alone (case #17), at least ten separate treatment procedures, administered by a great variety of medical personnel, were employed during a three-month period. Suffering from severe pains in several parts of his body,

diarrhea and delirium, he was treated first with a lusakohi prepared by the senior Sobeyagu curer, then with stinging nettles from two different men. When these efforts failed he was taken to an Australian medical center and eventually to the hospital in town. While he was in the hospital, his kinsmen conducted a ceremony to retrieve the souls of his limbs from the bush sprite (numulitEna'i) who had apprehended them. Following his departure from the hospital, still ill, he hid in an abandoned house for three weeks during which time lusa-kohi was prepared for him three different times, each time by a different curer, and the local aidpost attendant brought him anti-biotic tablets.

Gemasohafa'a case is somewhat exceptional because of its severity and long duration, but many of the cases exhibit a similar catholicity of approach.

To stress that there is a great deal of diversity and innovation in Nekematigi medicine, however, is not to deny that there is a general pattern. There is, and repetition of familiar forms of medicine is as important as the search for new ones.

The usual pattern involves first seeking (or being offered) a variant of the traditional preliminary medicine. Stinging nettles and/or ginger and/or bleeding are used; with or without verbal formulae, when illness is first perceived. They are often administered just

prior to or following a trip to the aidpost to kisim shut (Pidgin, "get a shot"). These medicines are expected to either relieve the symptoms or provide an indication of the direction additional treatment should take. A partial recovery, or a change in the biological or social indicators of illness, leads to either repetition of preliminary treatment or provision of primary treatment. If the sick person's symptoms are alleviated after the lusakohi, he will resume his normal activities and the reputation of the curer will be enhanced. If the sick person shows no improvement or becomes worse, the entire procedure will be repeated and/or medicine will be sought from different, often non-indigenous, practitioners. Attempts at treatment are abandoned eventually when persons fail to respond; but this occurs only after the pattern has been repeated several times and/or the group's resources have been depleted.

CHAPTER FIVE

The Medical System In Operation.

An "Ethno-Bio-Medical" Perspective

To this point my account of Nekematigi medicine has focused on questions that are specifically ethnomedical in orientation. We have seen that illness is defined in terms of a configuration of locally significant biological and social indicators. Consistent with a cultural orientation toward intergroup hostility and aggression, illness is explained and experienced primarily as the result of enemy sorcery. Treatment is a variable series of ritual events and physical ministrations occurring in response to the perceived seriousness of illness, suspicions as to its cause, and a set of ideas about the power inherent in certain medicines.

Many anthropological studies of medicine would end with this ethnomedical presentation. But the methodological and analytical argument underlying this study requires that biomedical questions be addressed as well. The questions of fundamental biomedical concern are those regarding the biological or adaptive inputs and consequences of ethnomedical processes.

An analysis of the results of Nekematigi medical care is undertaken here for two reasons. First, it serves as one means of integrating the ethnomedical and biomedical perspectives on non-western medicine.

Beliefs and customs, while of profound importance in and of themselves, do not exist unto themselves; they are maintained, ignored or changed by people who (particularly in the realm of medicine) may live or die, adapt well or adapt poorly, because of them. Second, the results of treatment are one basis upon which Nekematigi themselves retain, modify, abandon, select and create items and procedures in their medical repertoire. Just as it is essential to understand Nekematigi relationships with their neighbors, their ancestors and their local spooks in order to make sense of their dependence upon sorcery in etiologic theory, so it becomes essential to understand how they evaluate their medical procedures to make sense of their variable dependence upon nettles, bleeding, ginger, pork, etc. In other words, a dual perspective is not only dictated by the multi-factorial analytic framework outlined in Chapter One; it is also necessary for an accurate depiction of Nekematigi medicine.

A medical system is not only a response to socio-cultural realities, the organizational and cognitive imperatives of a particular lifestyle; it is also a response to environmental and physical realities, the diseases which must be faced and the resources available to combat these diseases. Having discussed the former in Chapters Two, Three and Four, I shall begin this

chapter with a brief summary of the outcomes of 28 illness episodes observed from onset through outcome. I shall then turn to a discussion of New Guinea highlands disease as it relates to these outcomes. Following that, I shall turn to an appraisal of Nekematigi medical resources as they relate to these outcomes.

The Response To Treatment

While there is little precedent and no refined methodology for analysing a non-western medical system in terms of its effectiveness, there is considerable encouragement in the recent literature for undertaking the task. Whether the goal is an ethnographic understanding of the patterning of illness and medical care in a single society, an ecological understanding of the role of medicine in the overall adaptive pattern, or a comparative understanding of illness and healing across societies, it is becoming increasingly apparent that medical anthropologists must adopt a focus on the relationship of "a given disease condition to selected aspects of relevant patient-care processes and their outcome" (von Mering 1970:274). Others express the same view in somewhat more global terms:

[M]edicine and anthropology share a fundamental concern over man's capacity and means of survival. Both disciplines are

committed to the intellectual inquiry into the biocultural "fitness" of the human animal and the individual organism for the comprehensive phenomenon of life.

Because life is rooted in adaptational processes and adjustmental efforts under specific environments and conditions, the scientific-humanistic problem of human life involves reciprocal transactions between man and the natural and man-made aspects of his total milieu.... The professional partnership of anthropology and medicine, therefore, must strive together toward a scientific-humanistic understanding of both the biocultural nature of man and his works and the biocultural processes underlying his organic and behavioral well being (Hochstrasser and Tapp 1970:260).

In spite of this growing conviction, Caudill's observation, made over twenty years ago, still holds true:

The ethnographic material that is available is relatively good concerning concepts of disease and therapeutic practices but studies of disease itself are almost totally lacking (1953:772)..

In other words, medical personnel now know quite a bit

about the diseases existing in various parts of the world, and anthropologists know quite a bit about the medical theories of cultural groups in various parts of the world, but medical anthropologists know very little about the interaction of these two phenomena.

Individual medical case histories such as those appended hereto are examples of the type of data collection urged by von Mering, Caudill and Fabrega (1971) to bridge the gap in our knowledge. Providing longitudinal data on the symptoms and relief of illness as perceived by both informants and ethnographer, the case histories are capable of both biomedical and ethnomedical interpretation. We have turned to the case histories for illustrative material on the patterning and process of Nekematigi illness; now we turn to them for information on the impact of medical treatment upon illness.

In a general form, the question "does it work?" or "how does it work?" is implicit in many studies of non-western medicine. The answer is an important one, potentially satisfying not only our intellectual curiosity but also some of the data requirements of comparative, functional or evolutionary hypotheses regarding local adaptations. Yet, medical anthropologists have rarely addressed these questions explicitly.

Rather, by limiting their focus to the social or psychological parameters of illness or curing, they have intimated levels, limitations or types of medical effectiveness. Those medical anthropologists who have ventured outright conclusions as to the effectiveness (e.g., Ackerknecht 1971:72,128;1973:7) or ineffectiveness (e.g., Alland 1970:95,134) of non-western medical systems have done so with reference to theoretical sympathies (e.g., the likelihood or unlikelihood of effective drugs, physiotherapy, psychotherapy, etc.) rather than with reference to (a) a systematic appraisal of the properties of the medicines used, (b) statistical information on the frequency of recovery, or (c) informants' perceptions of the effectiveness of their treatments. The first of these tasks is undertaken in a later section of this chapter; here I have attempted to synthesize the two latter approaches by tallying the number of observed recoveries and non-recoveries within the terms used by Nekematigi.

From a cross-cultural perspective, the effectiveness of treatment cannot be defined or evaluated in terms external to the culture at hand any more than the seriousness of illness can. Death is an objective, easily measurable, failure of treatment; but improvement and deterioration, continuation of illness or change in illness, are all in part subjective outcomes,

correspondingly less easy to assess. Healing efficacy, then, insofar as it depends upon the relative frequencies of positive and negative outcomes, is also subjective and culture-bound. Although medical effectiveness could be measured in some empirical terms, e.g., post-treatment exercise tests, blood counts, or an observer's perceptions, these would be difficult to apply cross-culturally and would tell us little about how people feel. Thus, it seems wiser to rely upon experiential measures, specifically individuals' self-reports of improvement or non-improvement.

Recovery in Nekematigi terms refers to the immediate or gradual disappearance of some or all of the indicators of illness. In this operational and culturally-specific view, no distinction is made between what we might call a complete recovery and one that is only partial or temporary. In the summary below, once-sick persons are regarded as recovered if they state that they came to "feel better." This includes those who are relieved of all signs of illness, those who are relieved of some, and those who feel better following treatment but become ill again later. The process of recovery, like the process of becoming ill, is a multifaceted one involving Ego's and others' perceptions of biological, social and other factors. For example, no

western observer would have considered Tutupa (case #1) "cured" after his first, second or third episodes of illness (what I believe to be chronic gastroenteritis and, possibly, an ulcer). But he, his associates and I considered him recovered each time because he was better than he had been. He was relieved of pain and was able to function actively and publicly again. His repeated illnesses were not regarded as negative reflections upon earlier, successful treatments; they were seen as new illnesses that required additional treatment.²⁰

Summary of Outcomes of Illness (N=28)

| | <u>Traditional Medicine Only</u> | <u>European Medicine Only</u> | <u>Both Traditional And European</u> | <u>No Treatment</u> |
|------------|--|---------------------------------------|--|-------------------------|
| No Change: | 1 | 0 | 1 | 0 |
| Recovery: | 12 | 1 | 7 | 6 |

Since a Nekematigi illness often inspires a diversity of treatments administered in rapid succession, the observer cannot make a one-to-one correlation between an outcome and a treatment (e.g., one man's lusakohi vs. another's). But I have attempted to reduce the "noise" in Table II by distinguishing outcomes associated with traditional medicine from those associated with European medicine. The reader is referred to the

Appendix for chronological accounts of treatments and the specific types of relief they provided in each case. Even with only 28 cases one can see that Nekematigi have a sound empirical basis upon which to conclude that their medicines are effective, at least as effective as European medicines.²¹ Twelve out of 13 illnesses treated by only traditional means ended in recovery (there were no deaths in Sobeyagu during the fieldwork period). This high recovery rate requires some explanation in terms of the application of medicine to perceived illness conditions. On the other hand, 6 illnesses resulted in recovery with no treatment at all. This too requires some explanation.

The fact that many sick persons recover regardless of what is done for them (or even if nothing is done for them) is taken by some observers as an indication that non-western medical treatments are basically ineffective, indeed, irrelevant in a strictly therapeutic sense. Such conclusions are based upon the observation that a large percentage of illness in all populations is self-limiting. The other interpretation of the fact that many illnesses do not require modern life-saving techniques (e.g., organ transplants, synthetic antibiotics) but do respond to natural drug therapy, rest, dietary changes and psychotherapy is that the latter represent satisfactory evolutionary adaptations. We may label the first position

"the theory of spontaneous remission" and the second "the theory of effective medicine." Both of these positions are relevant to an understanding of Nekematigi therapy.

The situation in New Guinea is similar to that described by Maclean:

Both in Britain and in West Africa a great many minor illnesses are self-limiting, that is to say they will get better by themselves regardless of what anyone does about them.

There are also many diseases, of a more serious, chronic type which, though they are by no means immediately fatal, are marked by an uneven succession of partial recoveries and relapses, times when the patient feels completely well and other times when his "old trouble" returns. And there are also very many symptoms and sets of symptoms which are produced in people who are anxious or upset, for one reason or another.... People with any of these sorts of conditions, short-term illnesses, or chronic complaints, or with illnesses which we would say have "a psychological basis," are all likely to benefit from medical treatment. The precise nature of the treatment is not all that important

since in the case of the short-term illness the condition will get better anyway, and in the case of chronic illness, although it may be incurable, acute symptoms are likely to fluctuate and sometimes to disappear for a time. In the third group of conditions, those with a psychological basis, what the patient needs more than anything is understanding and reassurance and help with his personal problems.... (1971:20-21).

Not only in England and Africa but also in New Guinea the nature and outcomes of medicine are inextricably related to the psychophysiological conditions of life. For Nekematigi the nature of illness is as important in determining the nature of medicine as are cultural factors: the interaction of illness and medicine lead to certain outcomes, the observation of which serves to pattern the character of future medical events and, so, their outcomes. To illustrate the role that illness itself plays in the development of medicine we must link the Nekematigi perception of illness to what we know about the nature of the diseases they face.

The Epidemiological Pattern

The theory of spontaneous remission is most applicable to socio-environmental situations with a relatively low incidence of epidemic or degenerative organic disease and a correspondingly higher incidence of functional disease or endemic infectious disease. In such situations the disease pattern outlined by Maclean will account for the greatest share of morbidity. This is precisely the traditional disease pattern in pre-contact New Guinea.

New Guinea highlanders have not been faced with the virulent epidemics of pre-industrial Europe and Asia, e.g., smallpox and cholera. Nor have they been faced with the crippling degenerative diseases of post-industrial society, e.g., cardio-vascular disease. Moreover, because of the limiting effects of altitude upon the agents and vectors of infectious disease, they have been free of many of the more debilitating tropical maladies that occur in lowland regions of New Guinea. Filariasis does not occur above 2000 feet (Ward and Lee 1970:27; Wilkey 1971); fungal diseases, e.g., Tinea imbricata, occur rarely (Reid 1971; Vines 1971); and tropical ulcer occurs with much reduced severity (Hunter et al 1960:607f.; Kariks 1957). Malaria appears to have existed only sporadically and seasonally

in the highlands; it has increased markedly in prevalence since contact with the coast has become more frequent (Black 1956; Ward and Lee 1970:28). Though government DDT-spraying programs have controlled its transmission to some extent, malaria is now the fifth leading cause of death in Papua New Guinea, accounting for 10-15% of all illness in some highlands communities (Black 1971; Ivinskis et al 1956). Rural health centers regularly administer anti-malarials to patients complaining of chills, fever and overall achiness. By far, however, the most common diseases occurring in the highlands are still infections of the respiratory system and gastrointestinal tract. These are communicable diseases of a chronic or recurrent nature but comparatively low severity (Cf. Maddox 1971).

Infectious disease tends to stabilize at low levels of severity as a result of the mutually adaptive evolution of host and pathogen. Humans develop resistance or immunity (with the most susceptible dying or failing to reproduce) and pathogens become less virulent over time (the most lethal kill their hosts and thus themselves). Some diseases, as clinical entities, are actually eliminated from stable populations in this way. Blood tests on highlanders reveal the presence of antibodies for poliomyelitis and diphtheria, for

instance, but reports of clinical cases are non-existent. The incidence and severity of endemic disease appear to be more strongly dependent upon the constitutional resistance of the population than upon preventive or therapeutic measures. Adult resistance, however, seems to be achieved at the price of much sickness and death in childhood. Infant mortality is as high as 50% in some highlands communities (Scragg 1962,1971).

Malnutrition

Highlands children suffer the double disadvantage of lack of immunity and protein-calorie malnutrition (see footnote 4). The ages two to five are particularly dangerous for this is when weaning occurs, leaving a child without the passive immunity or the high-quality protein of mother's milk. Nekematigi children do not suffer the severe psychological trauma associated with weaning in some African societies (Shaper et al 1972: 231f.) but, since the diet consists largely of sweet potato and greens, children can become sated before having ingested sufficient protein to meet their growth and energy needs. Moreover, the introduction of solid foods increases the likelihood of infection which can both increase protein need and create a loss of nutrients (Biddulph and Pangkatana 1971; Jelliffe 1968:62f.; Ryan 1962).²² Severe protein-calorie malnutrition

(kwashiorkor) is a complex syndrome characterized by growth retardation, metabolic changes, edema, skin lesions, and general apathy and misery. Some form of malnutrition is estimated to occur in 3 to 12 per cent of highlands children (Bailey 1966b; Kariks 1960).

Protein malnutrition poses much less of a problem for adults. Although several studies have concluded that highlanders fall short of optimal health because of their dietary dependence upon sweet potato, there is no consistent evidence that this is the case. Vekatachalam and Ivinskis (1957) and Ward (1958) have reported widespread kwashiorkor throughout the highlands while Blackburn et al (1966) surveyed several thousand individuals and reported none. Ivinskis et al (1956) sampled 300 males and 299 females in Chimbu and concluded that malnutrition was the main cause of death, occurring at all age groups though most prevalent among pregnant women, nursing mothers and infants. Contrary to this is Hipsley and Kirk's finding that the Chimbu mother meets the increased energy requirements of pregnancy and lactation without increased dietary intake (Bailey 1966a) and may indeed be "the finest lactator in the world" (Bailey 1966b:8). Nelson (1971a:147) attributed the malnutrition of Kaimbi children still at the breast to maternal malnutrition resulting in reduced quantity and quality of milk after the sixth month, but

Becroft (1967) found that, among the neighboring Enga, milk output actually increased up to two years and that neither its quality nor the mothers' health suffered. This is an apparent paradox given our current knowledge of nutritional processes, but it has been reported for other parts of the world as well (Dubos 1965:83; Jelliffe 1968:165).

Generally speaking, protein intake, especially animal protein, appears low yet highlanders have robust physiques, astounding strength and great endurance. These discrepancies make it difficult to establish a relationship between diet and illness. Rappaport, for example, found that the Maring daily protein consumption is in excess of the WHO/FAO standard daily requirements yet reported signs of protein deficiency in children and suggested that adult intake might be just marginal such that nitrogen balance would be inadequate for stress situations (1967:73). Littlewood (1967:14,40), on the other hand, noted no deficiency symptoms in four eastern highlands populations. Considerably more research needs to be done to determine (a) what the metabolic needs of people living under different conditions are, (b) what the exact intake of various forms of protein is in the highlands, and (c) what clinical signs or laboratory results are consistently related to protein deprivation (Cf. MacArthur 1974;

Poleman 1975).

Respiratory Disease

The single most important category of disease in the Nekematigi area is respiratory disease (Kariks et al 1960). Respiratory disorders include syndromes recognizable to western medicine as pneumonia, chronic bronchitis, acute upper respiratory infections and, since contact, tuberculosis. In addition, there is a chronic lung disease of unknown etiology (Woolcock et al 1970;1973). The only common form of heart disease found in the highlands, cor pulmonale, is also a result of pulmonary disease (Blackburn and Green 1966).

Of the respiratory diseases, pneumonia accounts for most morbidity and mortality in children and adults alike (Vines 1971). Scragg estimates that pneumonia is responsible for 27 to 34 per cent of highlands deaths (1962,1969,1971; see also Becroft et al 1969; Riley 1973; Wigley 1971). Not all forms of pneumonia are deadly, however; influenzal pneumonia, for example, may run a course ending with recovery in three to five days (Viswanathan 1967:113).

Pneumonia is an infectious disease, but one that may result from a variety of causative agents (pneumonia is simply a descriptive term referring to inflammation or consolidation of the lungs). Some of these are normal parasites of the human upper respiratory tract

(e.g., species of Staphylococcus or Streptococcus).

Such microbes can exist as inhabitants of the mouth and throat without causing any symptoms of disease, but when they invade the lungs, they become pathogenic. Individuals may become immune to their own parasites but lack protection against others'. Thus, it is assumed that many forms of respiratory disease are caused by aspiration of infected material, e.g., through coughing and shouting. Tuberculosis, more clearly than the others, is both a stress disease and an infectious disease, characterized by insidious onset with cough or other chest complaint together with loss of energy or weight.

The symptoms of pneumonia and other respiratory disorders are as varied as their causes but generally include chills, fever, chest pain (very severe in pneumonia), cough, discolored sputum, difficult breathing, vocal changes and, occasionally, distension of the abdomen or aches throughout the body. Meningitis (stiffness and pain in the head and neck) can also result when pneumococcus or other microbes invade the tissues surrounding the brain and spinal cord. Onset of any of these conditions may be acute or insidious. Western biomedical treatment generally consists in the recommendation of bedrest and the administration of either wide-spectrum antibiotics or an antibiotic specific to the pathogen once it is identified by

laboratory tests (Shaper et al 1972:123f.).

Gastro-intestinal Disease and Parasitism

The second most important category of diseases is gastro-intestinal disorder, causing 12 to 26 per cent of highlands deaths (Murrell 1966; Scragg 1971) and often co-occurring with respiratory disease (Ryan 1962). These disorders are usually referred to collectively as simply "diarrheal disease" or "gastroenteritis" (inflammation of the stomach and/or intestine), reflecting their complex etiology and variable manifestations. Most are the result of infection but, as with the respiratory disorders, many of the infectious agents are normal inhabitants of the human intestinal tract (bacteria such as Salmonella spp. and Shigella spp., protozoa such as Escherichia coli), implicating stress, malnutrition or secondary infection as additional etiologic agents. The infectious agents are assumed to be transmitted by fecal or insects' contamination of water and food.

Acute gastroenteritis is characterized by a sudden onset of profus diarrhea and vomiting leading to dehydration and rapid deterioration. These are similar to the similar to the symptoms of enteritis necroticans (pig bel in Pidgin) which can cause sudden death due to gas gangrene of the small bowel (Murrell and Roth 1963; Shaper et al 1972:395f.) This latter form of enteritis is unusual in its severity and in that it is apparently

produced by the toxins of Clostridium welchii, normally a soil-inhabiting bacterium but one that can be transmitted in cooked pork. Dysentery is an acute intestinal disease of short duration characterized by cramps, diarrhea and fever; it was an uncommon disorder in New Guinea until post-war epidemics broke out in the Bena Bena area (Ivinskis et al 1956).

Chronic forms of gastroenteritis manifest themselves in successive periods of exacerbation and remission of fever, cough, diarrhea, vomiting and related symptoms. For most forms of diarrheal disease, biomedical treatment is simply supportive, i.e., giving fluids to replace those lost in vomiting, and symptomatic, i.e., anti-diarrheal drugs (Hunter et al 1960:156f.) Recovery confers a variable level of resistance.

Helminthic parasitism is also responsible for forms of gastroenteritis and related disorders. Infestations with roundworm (Ascariasis), hookworm (Ancylostoma) and whipworm (Trichurius) are widespread in New Guinea; indeed, only 11 per cent of indigenes surveyed were found to be free of all three (Kariks et al 1960; Vines et al 1966). Ascaris is most common, parasitizing 50 to 60 per cent of highlanders.

Pathologic changes due to worms may be varied and severe, acute or chronic. Acute abdominal pain and intestinal obstruction are frequent signs of helminthic

disease. Chronic gastroenteritis is another. Malnutri-
tive syndromes are another. Helminths contribute to
malnutrition by causing loss of appetite, by causing
intestinal malabsorption, by increasing the need for
certain nutrients beyond that which can be satisfied by
the normal diet, or by using nutrients themselves (Cf.
Hunter et al 1960:422f.). Hookworm, for instance, feeds
upon blood and is often associated with anemia and
resultant pallor, fatigue and palpitation.²³

The most important non-communicable gastro-
intestinal disorders are gastric and duodenal ulcerations.
Reasonably common in the Nekematigi area (Kariks et al
1960), ulcers are generally believed to be the result of
stress (Rioch 1971) though genetic factors may also be
involved (Schmale et al 1970). Blackened or bloody
stools are one sign of ulcerative hemorrhage, though
gastro-intestinal hemorrhage may also result from portal
hypertension (MacBryde and Blacklow 1970:399f.; Shaper et
al 1972:418). Ulcers are most often recognized by the
intense pain that accompanies acute perforation.
Biomedical treatment is usually surgical.

Minor Endemic Diseases

Other diseases in the Nekematigi area include perio-
dontal disease, arthritis (Jeremy et al 1969), skin
cancers (Scragg 1969, Vines 1971), boils, carbuncles and

other pyogenic skin lesions. Though there are localized pockets of leprosy in the highlands (Russell 1973), I am aware of none in Nekematigi.

Yaws (Framboesia) was endemic throughout the highlands but its eradication through the use of penicillin and NAB has led to a relatively greater importance of syphilis in the overall disease pattern (Garner et al 1972; Garner and Hornabrook 1970,1973; Rhodes and Anderson 1970; Sterly 1973). Since they are divergent clinical manifestations of infection with the same pathogen (Treponema pallidum), the eradication of yaws has left highlands populations with no immunity to syphilis which has coincidentally increased in prevalence as a result of social change and increased mobility.

Also widespread throughout the highlands are a variety of behavioral disorders. Especially common are hysteria and shaking syndromes, usually of short duration (see Burton-Bradley 1968; Hornabrook 1970; Hoskin et al 1969; Koch 1968; Pulsford and Cawte 1972: 86f.; Zigas 1971).

Finally, inflammation and cirrhosis of the liver are widespread though poorly understood conditions. Enlarged liver and/or spleen (tropical splenomegaly syndrome) may result from malnutrition, malaria, genetic predisposition or unknown factors (Cf. Blackburn et al 1966; Blackburn

and Ma 1972; Crane 1972; Cunningham and LePage 1972; McGovern and Kariks 1966; Shaper et al 1972:306f.).

It causes pain in the abdomen, intermittent fever, sometimes a noticeable internal mass, and weakness and incapacity, but rarely death. Western treatment is addressed toward symptomatic relief.

Disease and Medicine

Both the comparatively standardized portions of Nekematigi medicine and its built-in potential for diversification become more understandable when viewed within the framework of this overall disease pattern. The perception of illness and the treatment of illness differ from the explanation of illness in that, while the latter can best be viewed as a cognitive adaptation to social conditions, the former represent cognitive and behavioral responses to both social and physical conditions. Because the perception and treatment of illness take into account a greater range of factors than does explanation, they are subject to greater situational variation. The perceptual gradation between ailment--illness--big illness corresponds to the behavioral differences between no treatment--preliminary treatment--primary treatment; these distinctions represent pragmatic adjustments to variable clusters of biologically and socially important factors. Ailments -- what we

call self-limiting diseases -- will usually get better by themselves so there is little need to pursue treatment. Illnesses -- statistically frequent manifestations of unpredictable, what we call chronic, conditions -- require at least preliminary treatment to increase the speed and likelihood of recovery. Social factors modify these perceptions of disease so that ailments become illnesses, and illnesses become big illnesses, in more important persons and/or when sorcery is suspected on the basis of additional, non-physical evidence. In such cases the speed and likelihood of recovery cannot be left to nature or to all-purpose medicines alone; Nekematigi seek to improve their odds, as it were, by upping the ante in treatment. Big illnesses -- especially unusual or frightening or prolonged manifestations of less common diseases -- require primary treatment, embracing virtually all known or potential forms of treatment, directed toward both the cause and the manifestations of illness. At any of these levels of illness, successful treatment leads to continuity or patterning, i.e., the repetition of once-effective forms of medicine. Failure is the stimulus to diversification and innovation, the search for additional or more powerful forms of medicine. At the same time, continuity and variability in the treatment pattern reflect social values, e.g., the importance of pork, and social conditions, e.g., the

availability of medical personnel. Let us pursue each of these points separately.

The indicators of illness perceived by Nekematigi are, for the most part, the same as the symptoms attributed by western science to the diseases known to occur in this area. Compare, for example, the symptoms attributed by Nekematigi to nami (page 136) and those attributed by biomedicine to gastro-intestinal disorders (pages 245-247). They are virtually the same: stomach ache, cramps, diarrhea, watery and/or discolored stools, abdominal tightness or swelling, vomiting, loss of weight. Likewise, the signs of nalisa and those of respiratory disease are largely the same: headache, chest pain, chills, fever, etc. There is, of course, considerable overlapping of symptoms attributed to one or another variety of sorcery, and Nekematigi single out certain symptoms as more definitive than others. My point here is not to suggest a similar medical taxonomy between the two cultural systems but to highlight a similar attention to bodily processes in the perception of illness. The most frequent indicators of illness for Nekematigi, whether reported in actual cases or in response to questioning, are those associated with physiological sensations rather than behavioral or social manifestations. Moreover, parts of illness behavior, specifically the importance of constant

companionship and observation, are consciously oriented toward ascertaining and monitoring changes in a sick person's biological functions. This keen attention to the physical aspects of illness is especially notable in comparison with the reported medical behavior of some other cultural groups, e.g., Mexican-Americans, for whom social indicators assume far greater importance in several of the most widespread illnesses (Cf. Rubel 1960).

Attentiveness to biological processes also underlies Nekematigi therapy although upon initial examination neither preliminary nor primary treatment is symptom-specific. Nettles, for instance, are presumed to be effective against all forms of pain or malfunction. A lusakohi is used in all serious illness regardless of its nature. Nonetheless, preliminary treatment is symptom-specific in that the site of application corresponds to the site of the malady. Headache is treated by the application of nettles, treated water, or bleeding to the head. Backache is treated by their application to the back, and so on. The substances are not symptom-specific, but their use is. The lusakohi, similarly, contains many plants which are intended to be specific to particular complaints, e.g., foma for convulsions, habalu for hotness, slok'fi for pains in the limbs, kakfi for headache, etc. The diversity of

medicines used is thus as much a result of the diversity of patients' complaints as it is a result of curers' pragmatic combinations or inventiveness. A belief in sorcery as a primary cause of illness, along with the careful observation of physical processes, has led to the search for both counter-sorcery techniques (e.g., spells and botanical antidotes) and techniques designed to alter body processes (all-purpose medicines and those aimed at relief of particular symptoms). It is by combining medicines specific to symptoms, those specific to causes, and others of an all-purpose nature, that the general utility of the lusakohi is achieved.

Since medicines are perpetuated on the basis of their correlation with recovery, self-limiting disease and remissions of acute episodes of chronic disease play a part in the evolution of treatment. Medical treatment often "gets the credit" for a recovery which would have undoubtedly occurred even in the absence of treatment. A good example of this is case #5. Ikapa was suffering from arthritis. When his knee had been stiff and painful for several days he asked the Sobeyagu junior curer for some stinging nettles. The worst of his pain subsided soon thereafter, though he still limped. After applying nettles a few more times, over a period of weeks, the pain subsided entirely and his knee caused him no more difficulty, leading him and his associates to conclude

that psi'i is, indeed, good for aching joints. What the European physician-researcher in New Guinea has concluded is that the characteristic form of arthritis found there is very often self-limiting. In a sample of 22 arthritics at Goroka hospital, Jeremy et al (1969) found that at least seven had had a similar episode six months to one year prior to this one which had passed without complications or degenerative after-effects. Differing from the rheumatoid arthritis occurring most often in Caucasian populations, the New Guinea arthritis is generally limited to one or two joints, limited in duration rather than progressive, unassociated with other disease, unassociated with other disease, and does not lead to tissue deformity.

The frequency of cases like Ikapa's is undoubtedly related to the consistency in preliminary treatment as compared with the diversity in primary treatment. In evolutionary theory, successful behaviors tend to reduce the numbers of options available in any given situation (Alland 1970:80f.). Since preliminary treatment is virtually always successful, it remains relatively constant over time. The three major forms of preliminary treatment -- bleeding, nettles and ginger -- all have the tendency to distract attention from the presenting complaint and thus to provide a form of immediate symptomatic relief. Bleeding and nettles do

so by the strong physical sensation of pain they induce and ginger does so through the excitatory oral sensations that result when the rhizome is chewed. By the time these effects are over, the original complaint has often passed as well, obviating the need for further treatment and reaffirming the potency of the preliminary treatment. When illness remains, it indicates not the ineffectiveness of the medicine, but the need for primary treatment. Hence there is little opportunity for preliminary treatment to fail.

On the other hand, Nekematigi realize that there are some illnesses they cannot cure (and that will not cure themselves). The most dramatic examples are provided by informants' descriptions of the personality changes and quick death associated with gu'nakafe'i sorcery. Having never seen a confirmed case, I cannot be sure, but I imagine such rapid death to be the result of the rarer diseases, e.g., enteritis necroticans or myocardial infarction. It is the contrast between these two types of illness -- those that are very often treated successfully and those that almost never are -- that lead Nekematigi to continually search for new medicines to use in the lusakohi. In case #9, for example, Gigopatni's father brought Coleus leaves, a commonplace medicine, but he had obtained them from a man reputedly able to make them work against gu'nakafe'i. While he

was skeptical that this was just a rumor, or the curer himself "talking big," he was also hopeful; his son's condition was beyond the bounds of orthodox treatment.

The large majority of illnesses are diseases of moderate severity which may or may not result in recovery. Uncertainty is induced by the fact that in chronic illnesses the same symptoms will, on one occasion, be alleviated and, on another, lead to death. Unlike preliminary treatment, primary treatment can, and does, fail, forcing the re-evaluation of curers and their medicines. Abisaluga'e (case #4), for example, could not understand why Loiye's lusakohi and bleeding had not cured her this time when he had been successful in the past with what she felt was the same illness (she may have had influenza, pneumonia or even malaria). She and her husband did not invest any more pigs in curing ceremonies but turned, instead, to the junior curer for repeated preliminary treatment. Gemasohafa (case #17), on the other hand, because he remembered being treated successfully in the past -- and because he was in grave discomfort (with tuberculosis)-- did not give up, but continued to seek out men for make lusakohi for him, the history of his illness encouraging each to be more creative or comprehensive than the last. The intermittent reinforcement inherent in such medical situations leads to the repetition of older behaviors in

conjunction with the search for new techniques.

Exactly the same phenomenon occurs in western medicine. Although 40 per cent of schizophrenics and two-thirds of neurotics recover regardless of what is done for them, the rest remain ill regardless of what is done for them (Frank 1961:13; Kiev 1964:5). The ambiguity in the relationship between illness, treatment and outcome leads some therapists to rely on "tried and true" methods, others to continually experiment with new techniques. The Nekematigi lusakohi is a perfect medical format for handling such ambiguity because it incorporates the old and the new, the all-purpose and the specific, in a single procedure. The curer is not forced to choose between competing theories of causation or between recommended treatments. He may rely on any or all as his assessment of the situation dictates.

(Interestingly enough, modern medicine is developing its own form of "lusakohi" as a result of the growing awareness of the role played by psychosomatic factors in illness. In at least 40 per cent of abdominal complaints, for instance, no organic lesions can be identified which would indicate orthodox forms of surgical or pharmacological treatment. In these cases, treatment often consists of a simultaneous combination of drug therapy, psychotherapy and behavioral modification [see Giora 1972; Hill 1970].)

From an evolutionary point of view, a successful adaptation must incorporate mechanisms of variation and mechanisms of continuity (Cf. Alland 1970:46). Continuity is essential for the retention of behaviors which are maximally adaptive, either within the medical system itself or in some other aspect of life. In this view, Nekematigi etiologic beliefs would remain fairly constant as long as they serve important social functions.

Anthropologists hold differing views as to whether warfare itself is adaptive or not, but given its cultural importance, beliefs which maintain vigilance and intergroup suspicion certainly serve to protect the integrity of the social unit. Etiologic beliefs also serve an important medical function, the explanation of illness, though these explanations do not directly inspire either conservatism or innovation in medical practice.

(Alternatively, one might say, they do both.) Conservatism is inspired by the perception of success. Success, in turn, is directly related to the nature of Nekematigi disease, much of which requires symptomatic treatment and rest to alleviate temporary exacerbations of chronic infection. Conservatism also results from what Ackerknecht calls "habitual" medical behaviors, that is, those pursued essentially out of convention, without critical appraisal (1971:140;1973:8). Habitual treatments are most likely to develop with self-limiting

disease, in which there is no physiological challenge to the medicine.

Variance is as essential as continuity in the adaptive process, to enable the development of medical responses to new situations or to unstabilized situations. Variance is created in Nekematigi medicine by the demands of diseases with uncertain outcomes (e.g., pneumonia, from which a person recovers on one occasion and dies on another) as well as by socio-political conditions expanding or restricting the individual training and recruitment of medical practitioners. The evolutionary advantages of a medical system which encourages variability, over one which does not, are obvious: the opportunity for discovery of truly useful medicines is created with every illness. The likelihood of their discovery is limited only by the natural resources available in the environment and by the susceptibility of the diseases occurring in that environment to treatment by the medicines existing there. The potential short-run disadvantages, however, are as obvious as the long-term advantages: the opportunities for discovery of lethal medicines are also created with every instance of treatment. Respect for medical practitioners and medicines which have been correlated with sick persons' recoveries in the past perpetuates the use of effective medicines, once discovered.

Nonetheless, the Nekematigi tendency to combine medicines, rather than using them singly, mitigates against their ability to make correlations between specific medicines, specific indicators of illness and observed outcomes.

Medical Resources: The Dynamics of Treatment

We have seen that the so-called "theory of spontaneous remission" explains some of the outcomes and, thus, part of the character, of Nekematigi medicine. Now let us examine the applicability of "the theory of effective medicine."

Much of medical treatment, western and non-western, functions to reduce suffering and to facilitate or accelerate a healing process that would go on (but slowly or less comfortably) in the absence of treatment. Medical practitioners seek to prolong life, minimize pain and increase the functional capacities of sick persons even when there may be no hope of a "cure." To the extent that they are successful, practitioners (and observers) of all forms of medicine risk making "the error of the fictitious doctor who concluded that he could cure colds, because all of his patients with colds got better and none of them died." Mechanic (1968:201) uses the tale to remind researchers that evaluating the efficacy of therapeutic agents depends upon a careful

differentiation of the degree to which improvement is the effect of a curative and the extent to which it is the result of suggestion, encouragement and support offered by the physician, or of other factors. While experiments or controlled studies may enable an observer to isolate the effects of specific medicines in specific disease occurrences, no controls of this type are possible in the field situation. The following discussion, therefore, is strictly exploratory. Focusing on the dynamics of treatment, it suggests that the apparent success of Nekematigi medicine is at least as much a result of the wise selection of medicines as it is a result of disease remission. Drawing upon a variety of hypotheses, the discussion highlights many areas in which further medical and anthropological research is required. The conclusion, then, as presented in Chapter Six, becomes as much a recommendation for more, carefully designed and interdisciplinary, study as it is a synthesis of my findings regarding the nature and adaptive potential of Nekematigi medicine.

The Pharmaceutical Basis of Nekematigi Therapy

Drugs are the area of non-western medicine that has been explored most extensively, though botanists and medical personnel have shown more interest in this aspect of medicine than have anthropologists have. Glick, in

fact, suggests that to search for pharmacological qualities in plants used, to determine whether or not they are "really" therapeutic, is to leave the principles of highlands medicine, or at least Gimi medicine, far behind (1967:45). Unless the Gimi are less like the Nekematigi than his written accounts lead me to believe, this is a misleading interpretation. My interpretation of Nekematigi motives for using plants as medicines is that they are expected to have physiologically active properties. To examine these properties compromises the principles of Nekematigi medicine no more than examining the properties of "mother's brother-hood" compromises the principles of local social organization. Nekematigi attempt to mobilize many forms of medical power -- verbal, social, magical, manipulative, animal and what we can call pharmaceutical. When a Nekematigi curer speaks to me of medicinal foods circulating in the body, or of a particular plant inducing vomiting or another helping the intestines to be "quiet," or of kerosene killing worms in the stomach, I interpret these intentions as very definitely physiological, especially in light of the close attention paid to sick persons' bodily functions. Whether or not the plants used by Nekematigi actually have the properties attributed to them is, of course, a separate question -- one that it is worth exploring if one is concerned with the biological consequences of

socio-cultural processes.

While some early observers commented on the "universality of useless polypharmacy" (Cleland 1953: 395) others recognized that a high percentage of plants used by non-industrialized peoples are effective drugs (e.g., LaBarre 1942). Before modern pharmacy became fully enamoured of synthesizing these compounds, many of our own drugs were derived from plants. And many of these plants were first recognized as a result of their medicinal use by other peoples. Important drugs obtained from non-western pharmacies include the opium derivatives such as morphine and cocaine (pain killers), cinchona bark (the source of anti-malarial quinine and of quinidine which is useful in controlling cardiac fibrillation), curare (a muscle relaxant though, in large doses, a paralytic poison), eucalyptus (a cough remedy and mosquito repellent), digitalis (a cardiac stimulant and diuretic), ipecacuanha (an emetic), podophyllin (a cathartic and anti-tumoral agent), copaiba (a stimulant), jalap (an anti-hemorrhagic), ephedrine (a decongestant respiratory stimulant), and many, many more.

As the foregoing list suggests, plants are capable of influencing health and illness in several ways. Some do so by their chemical effects upon bacterial parasites. Others do so by their direct effects upon human physiology.

[Note: pagination skips from page 263 to 265. No page 264 in copy scanned.]

Many higher plants contain fixed oils, volatile oils, and alkaloids with antibiotic or antiseptic properties. Plants of at least 28 families (63 genera) are effective against Staphylococcus aureus, Escherichia coli or both (Majno 1975:64; Mitxcher et al 1972:157). Thus, their leaves, roots, fluids or bark are medically useful when taken internally for microbial infection or when applied externally to wounds or topical infections.

Alkaloid compounds are the most important, or at least the best understood, plant constituents with chemical effects upon the human organism itself. Capable of a wide range of physiological effects, from the reduction of fever to the creation of hallucinations, alkaloids are found in at least 4350 of the higher plants and in several fungi (Schultes 1972). Some alkaloids act upon the mammalian nervous system, e.g., by inhibiting, stimulating or mimicking the action of enzymes upon chemoreceptors; others act directly upon muscle tissue or visceral organs; others appear to do both. Our use of alkaloids is a good example of effective treatments being identified before they are understood:

We do not understand the theoretical basis for this correlation between the basicity of plant constituents and their action on the nervous system; it is purely an empirical observation (Hansel 1972:160).

Still other alkaloids directly influence the reproduction or metabolism of cells though, again, the mechanism by means of which they do so is poorly understood (see Frei et al 1967).

After alkaloids, the next most important chemical constituents of plants are the glycosides, some of which have direct effects upon human physiology, others of which have toxic effects upon human parasites. Tannins, for example, frequent components of tree bark, cause constriction of the blood vessels. Thus reducing blood flow, they are useful in localized hemorrhage. Other glycosides act as pain relievers, relaxants and emetics, by means not fully understood.

There are many other potentially biodynamic compounds in plants, but these have not been explored as fully as the alkaloids and glycosides.

When it is realized that there are more than 50 categories of secondary organic constituents known from the world of higher plants alone and that only a small fraction of the higher plants [possibly numbering 200,000 to 250,000 species] have been phytochemically investigated -- and then usually only for one or two categories of constituents -- the wide open field for research must be

obvious (Schultes 1972:120).

Indeed, even the known alkaloids, glycosides and oils are sometimes difficult to detect in field and herbaria studies because the compounds often occur in only one part of the plant and/or are very fragile, susceptible to loss in dehydration or identifiable only in certain chemical solutions.

One might ask how non-industrialized peoples acquire knowledge of plant medicines when botanists and pharmacists have difficulty doing so even with the specialized support of modern technology. There are at least three processes by which this may come about. First, of course, trial and error leads to an appreciation of the physical effects of ingestion or application of plants. These associations occur even when the stated reason for using the plant is ritual rather than physical. Secondly, the observation of plants in their natural habitats plays a role. While the function of antibiotic and antimycotic properties in the plant itself is unclear (Cf. James 1950; Robinson 1963:25), some researchers believe that they evolve for the plants' own protection (Majno 1975:64). If this is so, a people's intimate knowledge of their local environment, an awareness of plants which resist decay or infestation with insects, may lead them to medicinally active plants.

Finally, the sense of smell aids in the recognition of medicinal plants, since a strong scent often indicates the presence of volatile oils (Cf. Alland 1970:119; Majno 1975:208). The fragrant Cassia alata, for instance, is an effective fungicide used for mycotic skin diseases in the southern New Guinea highlands and in Samoa (Schiefenhoevel 1971; Uhe 1974). Nekematigi select many of their medicines because of their smell; especially important in this respect are mamufa (Gramineae), fulala and moipa (Coleus spp.), yahuma (Cinnamomum spp.) and gupa'i (Zingiber spp.). Stopp (1963) reports that western highlanders also have a preference for medicinal plants with a strong smell.

The few New Guinea populations that have been studied from an ethnobotanical perspective are reported to have developed rich pharmacopeia. Indeed, medicine accounts for at least 25 per cent of 360 uses for all indigenous plants according to recent surveys; unfortunately, because their discovery is so recent, few of these floral forms have been satisfactorily identified (Straatmans 1967). Consequently, assessing the effectiveness of indigenous medicinals is a complicated task. Not only are precise identifications lacking; but comprehensive pharmacognostical data are also unavailable. Schiefenhoevel (1971), for example, reports on 25 medicinal plants in use among the Kaluli-Waragu and

concludes that six may be effective because they contain alkaloids. Stopp (1963), on the other hand, concludes that none of 55 Mbowamb medicinal plants are likely to be effective since they contain no alkaloids, are used primarily externally, and appear to be used magically rather than in response to physical symptoms. Skingle (1970) obtained thirty-six botanical specimens in medical use among peoples in the Western District and West Sepik District, concluding that the effectiveness of many is questionable but recommending further investigation since many are related to species with comparable uses elsewhere or known to contain active compounds. These conflicting, diverse and incomplete reports represent very nearly the total of what is known about the chemical properties of medical plants in mainland New Guinea.

The following review represents my effort to add to this an understanding of the possible or probable effects of selected Nekematigi medicines. Nekematigi use at least 60 different plants; the indicator of their pharmacological effectiveness employed here is their relationship to reportedly active plants of the same species, genus or family found elsewhere. While information on species is relatively reliable (though incomplete), information on higher taxonomic levels is obviously less definitive because the degree of similarity between two species in the same genus or

family cannot be specified. In defense of this methodology, the history of empirical research in botanical chemistry indicates that there are likely to be consistent chemical, as well as morphological, similarities between species of the same genus or family (Cf. Hansel 1972; Swain 1972). For just this reason chemo-taxonomy itself has become an increasingly important research branch of general botany (Cf. Swain 1963; Tyler 1961). Because most of the medicinals I collected are not completely identified, the following discussion is primarily a review of the known physiological properties of species related to those used by Nekematigi. Though I shall be emphasizing the positive aspects of these relationships, the reader should keep in mind that in many instances the data are suggestive rather than conclusive. Only one major phytochemical survey has been conducted in Papua New Guinea (Hartley et al 1973). Although over 2300 species were examined, the survey sought the identification of only alkaloids; in addition, field sampling was not guided by ethnomedical considerations. Because of the incompleteness of data from New Guinea, information on species from other parts of the world is presented in conjunction with that from New Guinea.

According to Schultes (1972), the botanical families

richest in alkaloids are the Amaryllidaceae and Liliceae; Manske (1950) lists Amaryllidaceae, Compositae, Graminaceae, Lauraceae, Liliaceae, Lobeliaceae, Loganiaceae, and Rubiaceae. The New Guinea survey revealed the presence of alkaloids in several additional families heretofore disregarded as alkaloid sources (Hartley et al 1973). Liliaceae, Moraceae and Scrophulariaceae are major sources of glycosides; families yielding still other important drugs are the Graminaceae and Rubiaceae. Nekematigi derive medicines from these and several other families; the reader is referred to previous chapters (Three and Four) for discussion of the indigenous rationale for their use. Here we shall focus on external appraisals of their utility. To the extent that the power attributed by Nekematigi to certain plants corresponds to the presence of active chemicals, western science provides the "proof" of Nekematigi medical hypotheses.

Acanthaceae

Hartley's group tested Graptophyllum pictum and two Hemigraphis species found in New Guinea; they proved negative for alkaloid content.

Amaryllidaceae

Alkaloids are consistently found in certain genera of this family, including Crinum, the source of one Nekematigi medicine (Cf. Cook and Loudon 1952a; Tyler

1961; Wildman 1960). Experiments with the alkaloids found in several African Crinum indicate that some are of medicinal value while others are toxic (Watt and Bryer-Brandjeweik 1962). The Crinum macrantherum found in New Guinea contains lycorine, crinamine, criwelline, acetyl caranine and four other alkaloids (Hartley et al 1973) with variable effects upon the body. Lycorine, for instance, can be a toxic poison in large doses. Stopp (1963) reports that the juice of Crinum macrantherum causes vomiting. While the western highlanders he worked with do not use it that way, Nekematigi do use a Crinum to induce vomiting (see page 138).

Araceae

Nekematigi use a representative of this family (Pothos spp.) in the specialized treatment for imusa sorcery (see pages 129-131). Araceae are quite systematically cyanogenetic (Tyler 1961). Pothos hellwigii and Pothos rumphii proved negative for alkaloid content; an Aglonema species was the only one of eleven New Guinea Araceae to contain alkaloids (Hartley et al 1973). On the other hand, alkaloids have been identified in Pothos scandens, so recently that its biological effects, if any, are unknown (Kapoor et al 1975).

Balsaminaceae

Four New Guinea Impatiens species and one Indian Impatiens have been tested negative for alkaloids

(Hartley et al 1973; Kapoor et al 1969).

Begoniaceae

Many species of Begoniaceae are used medicinally all over the world but there is no published information on their chemical properties (Cf. Altshul 1973; Hartwell 1967; Stopp 1963; Watt and Bryer-Brandjeweik 1962).

Nekematigi use a Symbegonia species in their lusakohi.

Two Symbegonia have been examined for alkaloids and reportedly contain none (Hartley et al 1973).

Commelinaceae

Nekematigi use three representatives of this family in the lusakohi, one unidentified, one of Aneilema, one of Tradescantia. People from China to North Carolina use many others (Altshul 1973). One African species is reportedly aperient (Watt and Bryer-Brandjeweik 1962).

Ten New Guinea varieties, including Aneilema acuminatum, tested negative for alkaloid (Hartley et al 1973).

Compositae

Compositae is a botanical family containing several species used medicinally, e.g., colt's foot and chamomile in Europe and many others in other parts of the world (see Altshul 1973; Hartwell 1967). Compositae inconsistently contain alkaloids (Cf. Kapoor et al 1967, 1975; Manske 1950); those that have been isolated are among the most powerful inhibitors of cholinesterase (Orgell 1963). Nekematigi use Helichrysum bracteatum

both as a preliminary treatment for cough and as an addition to the meal in primary treatment. It reportedly contains no alkaloids (Hartley et al 1973), though some Helichrysum contain irritant poisons, e.g., pyrethrum.

One African species used for pulmonary affliction is reported to contain helichrysin, an effective remedy for coughs and colds (Watt and Bryer-Brandjewiik 1962).

Millspaugh (1882) obtained drug provings on 19 North American species, one from New Zealand and several from Europe. General bodily effects include initial vasomotor irritation followed by relaxation, then by an increase in heart rate. Some species are diaphoretic, diuretic and expectorant, acting, that is, as gentle stimulants to the organs of secretion.

Cyperaceae

The only available information on this family consists of negative alkaloid tests on 38 New Guinea species (Hartley et al 1973).

Euphorbiaceae

Representatives of this family, like Compositae, are important medicinals in virtually all parts of the world. Several Indian and African Euphorbiaceae contain tannins, flavonoids and/or narcotic alkaloids (Cf. Evans and Kinghorn 1975; Saxena 1975; Watt 1967). Many species are mildly toxic, acting as irritants to the mucous membranes of the alimentary canal. Nekematigi use two

Euphorbiaceae in primary treatment, both Acalypha spp. Hartley tested Acalypha insulana and three unidentified Acalypha, reporting them all negative for alkaloids. However, other Acalypha are known to contain active alkaloids, cyanogenetic glycosides, resins, tannins and volatile oils (Watt and Bryer-Brandjeweik 1962). Acalypha lindheimeri is a purgative and is also slightly astringent and narcotic (Millspaugh 1882). Acalypha virginica is antibiotic against the tubercular agent Mycobacterium smegmatis (Mitscher et al 1972).

Graminaceae

This is considered an alkaloid-bearing family (Manske 1950; Tyler 1961) but none were isolated from 69 New Guinea species tested (Hartley et al 1973). Stopp (1963) suggests that Saccharum species act as mild laxatives. I could find no additional published evidence of this, though the Japanese have also used several species as diuretics (Altshul 1973). The Gramineae used by Nekematigi is not ingested anyway, though it is conceivable that any active chemicals it might contain could be obtained in solution when it is cooked.

Labiatae

Nekematigi use at least six representatives of this family, in both preliminary and primary treatment; all are Coleus species. Coleus are aromatic and contain fixed oils, essential oils, albumin and astringents.

Watt and Bryer-Brandjwiik (1962) suggest that certain African species act as galactogogues, that is, inducing or increasing internal secretions. Millspaugh (1882) reported that various North American species affect circulation and cause nausea, numbness or exhilaration. There is no published information on the chemical makeup of New Guinea Coleus except that three samples of Coleus scutellarioides tested negative for alkaloids (Hartley et al 1973).

Lauraceae

This entire family consists of trees and shrubs with aromatic qualities. The use of various parts of local species is reported from virtually every part of the world. The leaves and bark of many Lauraceae contain alkaloids which are generally the source of their effects upon the body. Nekematigi use the dried bark of Cinnamomum spp. both externally and internally. One of nine New Guinea Cinnamomum tested is reported to contain several alkaloids, including two new forms not previously reported for any known plant (Hartley et al 1973). The physiological effects of the known Cinnamomum extracts are highly varied, depending upon species-specific potency, nature of administration, and dosage. Cinnamomum camphora, for example, is the source of natural camphor. Used externally, camphor is weakly antiseptic, irritant, rubifacient and mildly analgesic.

Taken internally and in small doses, it produces a feeling of warmth and comfort in the gastric region; large doses, on the other hand, produce nausea and vomiting (Hoerr and Osol 1956). Cinnamon oil and cassia oil, derived from closely related species, contain eugenol and safrole. Applied externally, these are effective germicides, fungicides and pain relievers (McMillian 1968; Majno 1975:221). Internally, they act as stimulants and carminatives (expelling gas); excessive amounts of cinnamon oil may be fatal as a result of over-irritation of the gastro-intestinal tract (Watt and Bryer-Brandjewiik 1962). Hartwell (1969) reports that two Cinnamomum have been used successfully against cancer in English hospitals.

Liliaceae

Schery (1952) reports that many Liliaceae contain glycosides and other chemicals with diuretic and cardiac stimulant effects. Millspaugh (1882) reports that some North American species are stimulants, causing exhaustion and increased appeti-e. In general, the Liliaceae are rich in alkaloids of diverse types (Manske 1955; Tyler 1961) including colchicine which is known as an effective treatment for gout (Fell and Ramsden 1967) and rheumatic pains (Dowling 1970), a possible arrestor of cell division (Cook and Loudon 1952b) and a possible uterine stimulant (Reynolds 1955). Colchicine can also

be toxic, causing vomiting, diarrhea, pain in the bowels and a drop in body temperature. One of 8 New Guinea Liliaceae tested by Hartley's group appears to contain alkaloids, but there is no information on Cordyline terminalis, the variety most used by Nekematigi.

Lobeliaceae

Nekematigi use Lobelia angulata in one of the specialized treatments for nami sorcery (pages 139-140). Regrettably, the New Guinea alkaloid survey included no Lobelia. We do know, however, that several Indian and American Lobelia contain a variety of alkaloids (see Kapoor et al 1972; Krochmal et al 1972; Manske 1955) of which lobeline is the most important (James 1950). Lobeline is an effective emetic -- which is the Nekematigi rationale for using it; it is also an effective respiratory stimulant, causing bronchial dilation and increased respiratory rate, amplitude and volume (Dallemagne and Heymans 1955).

Loganiaceae

Loganiaceae is considered a potentially drug-rich family because it is from one of its members that curare comes; strychnine is found in many species as well. In the New Guinea survey, Nuebergia corynocarpa tested positive for alkaloid (primarily diaboline) but Buddleia asiatica, more closely related to the plant used by Nekematigi, was negative (Hartley et al 1973).

Moraceae

This is the family to which the powerful Cannabis sativa belongs, as well as Artocarpus incisus which contains a hydrocyanic acid. Nekematigi use Cudrania javanica in the specialized treatment for ghost-induced illness and they use a Ficus spp. in preliminary and primary medical treatment. There is no published information on the former; as for the latter, five of 60 New Guinea Ficus tested contain identifiable alkaloids (Hartley et al 1973).

Myrtaceae

This is the family to which Eucalyptus belongs; most species contain volatile oils. Watt and Bryer-Brandjwiik (1962) report that ingestion of some causes gastrointestinal irritation and cerebral stimulation which can be followed by paresis and paralysis. Thirty-five Syzygium species from New Guinea have been examined for alkaloids; one is weakly positive (Hartley et al 1973). (Syzygium includes part of the genus formerly called Eugenia, the genus to which the species used by Nekematigi belongs.)

Polypodiaceae

Nekematigi use one Adiantum species as an all-purpose medicine in the lusakohi. Adiantum diaphanum and Adiantum philippense, found in lowland New Guinea, test negative for alkaloid content (Hartley et al 1973)

yet Adiantum (ferns) are reported to be both emetic and astringent (Schery 1952). Astringency produces contraction of organic tissues with the potential to arrest hemorrhage or diarrhea when taken internally. In addition, Adiantum are consistently reported to be effective in killing and expelling intestinal helminths (see Dowling 1970; Majno 1975:349; Watt and Bryer-Brandjwiik 1962).

Rubiaceae

Extracts of the bark of some of the trees in this family have been given strongly antibiotic tests (this is the family to which Coffee arabica, fever-wort and Cinchona belong). Many yield alkaloid extracts which are useful amoeboids and diuretics (Dowling 1970). Cinchona alkaloids, for example, have been used extensively as anti-malarials (Schmidt 1955) and in the control of cardiac arrhythmia (McCawley 1955). Cinchona species are found in New Guinea; they and several other Rubiaceae give highly positive test results in alkaloid screening, though closer relatives of those used by Nekematigi (Ophiorhiza spp. and Borreria spp.) give negative results (Hartley et al 1973).

Scrophulariaceae

There are many narcotics and poisons in this family (e.g., digitalis). Many of the plants resemble the

Labiatae. Indian species regularly test positive for alkaloids (Kapoor et al 1969,1972) and Scrophulariaceae alkaloids are among the most powerful inhibitors of cholinesterase enzyme (Orgell 1963). Various North American species which have been tested in tincture of leaves cause fullness of the head, vertigo, free bleeding of the gums, salivation, increased appetite, weakness and sleepiness (Millspaugh 1882). Nekematigi use a Lindernia spp. and a Striga spp.; two of the former and one of the latter produced negative results in the New Guinea alkaloid survey (Hartley et al 1973).

Urticaceae

This is the family to which psi'i and a great many other stinging nettles belong. Nekematigi use species of three genera, both internally and externally. None in these genera appear to contain alkaloids (Hartley et al 1973) though histamine, formic acid, possibly acetylcholine, and other unidentified chemicals appear to be responsible for their pain-producing properties (MacFarlane 1963; Millspaugh 1882; Watt and Bryer-Brandjeweik 1962). The botanical literature also verifies the phenomenon of referred pain, though the mechanism is not understood. I have suggested that psi'i works to displace, or distract from, an illness-induced pain which itself often passes by the time the effects of the nettles wear off. Schiefenhoevel (1971) suggests, along somewhat different

lines, that nettles are an effective cure-all because, when the acute pain of their application departs, it leaves a sensory "pain vacuum." However that may be, some nettles are also capable of genuine pain relief because they tend to bring blood to the surface, thus relieving discomfort due to localized tissue anemia and/or relieving tension on vital organs by reducing congestion or hemorrhage (Millspaugh 1882; Schiefenhoevel 1971). Used externally, some nettles arouse paralyzed muscles to action and relieve inflammation by retarding peripheral circulation. Taken internally, nettles have similar localized effects. They are styptic, anti-hemorrhagic and diuretic, stimulating the excretion of uric acid by the kidney with observed clinical benefit (Watt and Bryer-Brandjewis 1962).

Zingiberaceae

The entire family is rich in volatile oils though they are inconsistently distributed (Tyler 1961). Zingiberaceae are reported to be alexipharmic (active against poison, venom or infection), febrifuge (fever-reducing), anti-rheumatic (relieving discomfort in bones, tendons and joints), tonic and excitant; chemical analysis of one Philippine species verified a cooling sensation on the tongue, effectiveness as a carminative and possible effectiveness as an anti-helminthic (Pineda-

Ocampo, et al 1954). Four of 15 Alpinia spp. from New Guinea are weakly positive for alkaloids (Hartley et al 1973). Used throughout New Guinea and elsewhere, ginger has a variety of clinical effects upon the gastrointestinal tract. Watt and Bryer-Brandjewis (1962) report that the rhizome of Zingiber officinale contains an irritant carminative and zingerone, the latter being a chemical which relaxes the intestinal muscles of experimental animals. Older medical dictionaries cite zingerone as a useful carminative in dyspepsia and flatulent colic (Cf. Hoerr and Osol 1956).

The presence of physiologically active substances in several Nekematigi medicines, or in closely related species, leads me to believe that some of these plants are effective in exactly the ways Nekematigi hope or intend them to be. Data on the Amaryllidaceae, Lauraceae, Polypodiaceae, Urticaceae and Zingiberaceae are especially suggestive. A variety of analgesic, anti-bacterial, anti-helminthic, stimulant and styptic effects may be achieved through their combined use.

There is an alternative explanation, however, which may underly the effectiveness not only of plants but also of other parts of the medical procedure. This is the famous placebo effect.

The Psychological Basis of Nekematigi Pharmacy

Reviewing the great variety of useless, non-specific and downright dangerous medicines that we have used throughout the ages, Schapiro concludes that they could only have been effective due to psychological factors, that, in fact, "the history of medical treatment can be characterized as a history of the placebo effect" (1963: 164). His definition of placebo is in general usage:

A placebo is defined as any therapeutic procedure (or that component of any therapeutic procedure) which is deliberately given to have an effect on, or does have an effect on, a symptom, syndrome, or disease, but which is without specific activity for the condition being treated. The therapeutic procedure may be given with or without conscious knowledge that the procedure is acting as a placebo. It may be active (non-inert) or nonactive (inert), and may include, therefore, all medical treatment no matter how specific or how administered....

The placebo must be differentiated from the placebo effect, which may or may not occur and which may be favorable or unfavorable. The placebo effect is

defined as the changes produced by placebos or procedures acting as placebos (1963:166-167, author's emphases deleted).

The occurrence of positive placebo effects has been repeatedly documented, with a variety of placebos, in everything from warts to peptic ulcers, systemic cancer, the alleviation of post-operative pain and surgery itself (Cf. Beecher 1961; Frank 1961:65-73; Schapiro 1963:167f.). In controlled studies, placebo effects occur in an average of 35 per cent of individuals.

(Unfortunately, placebos have been studied primarily in western settings so there is little information on cultural variations in their effects.) The susceptibility of certain types of persons to placebos has been investigated with few conclusive results. Schapiro suggests that those with free-floating anxiety react more frequently than those with elaborate defenses (1963:172) while Frank suggests that increased susceptibility occurs in individuals who are dependent and conventional, easily accepting of others in their socially defined roles (1961:70). Both regard the phenomenon as more complex than suggestibility or gullibility.

While the mechanisms are by no means well-understood, positive placebo effects appear to be related to patients' faith in the placebo. Volgyesi (1954), for

example, obtained 70 per cent positive placebo effect when using distilled water as a peptic ulcer treatment and telling patients it was a newly developed, highly effective medicine, but obtained only 25 per cent positive effect when it was described as experimental and of unknown effectiveness. Equally dramatically, medical practitioners' attitudes influence the nature and incidence of placebo effect. Schapiro reviews several studies indicating that positive placebo effects increase directly with the positive expectations of medical practitioners -- even when these expectations are not consciously communicated to the sick person (1963: 171f.).

The way faith operates to assist in recovery is not at all clear, but it seems most likely that the endocrine system is the mediator between social situations, psychological phenomena and physical states. (In strictly social or "mental" illnesses, of course, such mediation may be unnecessary.) Cannon's (1932, 1942) theory that anxiety leads to increased endocrine secretion has received widespread support. Recent research has shown that not only anxiety but a variety of emotional stimuli lead to adrenal cortical or medullary stimulation with direct effects upon the secretion of gastric acids, the level of fats in the blood, the health of the skin, volume and rate of respiration, and

susceptibility to infection (see Baker and Barcai 1970; Dubos 1965; Froberg et al 1971; Hawkins 1963; Selye 1971; Stein et al 1963; Wittkower and Lester 1963; Wolf 1971).

It is equally apparent, although little experimental work has been done, that socio-medical manipulation of a person's emotions will have direct effects upon his or her recovery from illness. Just as social situations exacerbating feelings of helplessness or hopelessness are implicated in the onset of a variety of diseases (Schmale 1972), so they are correlated with delayed recoveries from a variety of diseases (Imboden 1972). Illness itself generates anxiety and other feelings which, if not relieved, can thwart the most comprehensive forms of medical treatment. Whether through psychotherapy, placebos or group support, the activation of positive emotions such as hope and trust -- or at least the diminution of morbid emotions such as fear and despair -- definitely aids in the healing process.

To the extent, then, that Nekematigi believe in the ability of their medicines to help them get well, it matters little whether these medicines have the direct impact upon physiology imputed to them in my earlier discussion. (Positive placebo effect, of course, can enhance the value of an active drug as well, and it is tempting to view the Nekematigi preference for applying spells even to medicines with presumably inherent powers

as their formulation of the same observation.) Whatever the original source of medicines' power, medical personnel play a critical role in mobilizing therapeutic beliefs and we shall return to a focus on Nekematigi curers below.

The Psychological and Nutritional Potential of Pork

Like plants, pork may be important medically because of its chemical composition, its psychological impact, or both. I have indicated that pork represents a social tribute to the value of a sick person and an acknowledgment of the seriousness of his condition. At one level, then, since pigs are so important to Nekematigi, their use in curing requires no further explanation. Pigs are killed in all important social situations, and all important social situations provide opportunities for the exchange of pork and valuables which is vital to the maintenance of the economic system. At another level, however, pigs are used specifically as medicines. Consumption of pork is intended to transmit pigs' strength to sick persons, to cool them, and so on. Pork is likely, therefore, to be a highly effective placebo because of general cultural values and because of specific beliefs about its salubrious qualities. Alternatively, pork may function as an important dietary boost.

In western medicine, high protein diets are recommended to speed convalescence after surgery and in febrile disease. Added dietary intake of high quality

protein during times of stress or infection helps to restore physiological equilibrium by replacing lost nutrients and/or providing the excess necessary to the formation of antibodies and phagocytes. Rappaport (1967) has suggested that the addition of protein to the diets of sick New Guineans may be especially beneficial since their normally small intakes of protein may be insufficient to meet the additional demands of illness. His hypothesis merits serious consideration since it suggests the operation of selective adaptive processes that perpetuate the medical use of pork (and, nowadays, frozen and tinned substitutes):

It appears...that illness and injury are marked by negative nitrogen balance, which can have dangerous implications for protein-depleted organisms. The effects of negative nitrogen balance, however, may be offset rather quickly by the ingestion of large amounts of protein. It also may be, although this is far less certain, that the consumption of high-quality protein for relatively short periods of time may significantly improve the ability of uninfected organisms to withstand infection. I suggest that, given the adequacy of the protein derived from vegetables and non-

domesticated animals for maintaining the Tsembaga in nitrogen balance at low levels in the absence of stress, the practice of sacrifice in situations of misfortune and emergency is a highly effective way to utilize the scarce and costly pigs.

Individuals who are already traumatized or diseased are provided with high-quality protein, which may go far to offset the nitrogen losses they are already experiencing as a direct result of the injuries to their bodies, and which also assists them in producing sufficient antibodies to resist infection. Those close to the victim also receive protein, which not only may offset the nitrogen loss resulting from the anxiety they may be experiencing but also might possibly prepare their bodies better to withstand the injuries or infections likely to be forthcoming if the victim is suffering from a contagious disease, for example, or was wounded in warfare that must be continued (1967:86-87).

Rappaport's thesis obviously depends for proof on a better understanding of New Guinea nutrition that we have at present. It is not at all clear that either the

Tsembaga Maring or the Nekematigi are "protein-depleted organisms." On the contrary, Rappaport's own measurements showed the Tsembaga protein intake to be in excess of need, although there are serious questions regarding both the validity of his measurements and the presumed needs of the Tsembaga. Moreover, the question of nitrogen metabolism is exceedingly complex. MacArthur, for example, refers to studies showing New Guinea highlanders' normal excretion of nitrogen to be so great that some subjects actually lose more in urine and feces than they ingest, leading some researchers to suspect that New Guineans may harbor nitrogen-fixing intestinal bacteria (1974:112). Such an adaptation, if verified, would render simplistic intake-to-need formulations untenable. Finally, there is the question of how much usable protein sick persons actually receive. Much of the meat is distributed to the curer, to kinsmen, and to outsiders to whom the owner of the pig has obligations. In any case, cooked pork cannot be stored for more than a few days. As MacArthur stresses, large single intakes of protein are wasted because nitrogen is not stored; to be effective protein must be ingested in small but regular amounts (1974:113). In my experience, sick persons tend to receive only a few pieces of meat at the curing ceremony. The secrecy surrounding serious illness in Sobeyagu makes it impossible to say how long a sick person's total portion

actually lasts. In serious illness, of course, several pigs may be killed, but this occurs over a period of weeks, not days.

Though I find Rappaport's argument very persuasive, further research and more detailed measurements are necessary to determine the exact role of prok in the treatment and prevention of illness. One should bear in mind, in any case, that the medical value of pork lies not only in its potential to restore nitrogen balance but also in its potential to stimulate therapeutic emotions. It is as part of a total medical complex that it becomes most important. The same is true for plants, bleeding and spells. Each makes a contribution which singly might be of relatively little therapeutic import. The whole, in my estimation, is considerably greater than the sum of its parts.

Venesection: Curiosity or Cure?

Nekematigi often use pork and medicinal plants in conjunction with bleeding, yet a potential contribution of the latter is substantially more difficult to identify. In primary treatment, when the juice from pork and other medicines is spat on the open wounds, it is said to replace the harmful fluids with helpful ones. Although some of the plants used by Nekematigi may indeed have antibacterial qualities, it is unlikely, though certainly not impossible, that they enter the bloodstream in this way.

Used alone, as in preliminary treatment, bleeding is intended to cool the body by releasing the "hot" sorcery affecting the blood. Relying on a similar rationale, western medical practitioners also used bloodletting routinely until the mid-eighteenth century. Despite widely differing beliefs as to illness causation, societies in many parts of the world have used venesection as a means of releasing "bad blood" and so restoring health. Even Nekematigi's "queer variation of bleeding techniques..., the shooting of little arrows into the skin," is reported not only from New Guinea but also from Africa, Central and South America and Greece (Ackerknecht 1971:100).²⁴

According to Sigerist, a prominent physician and medical historian, the widespread use of bleeding may have originated with the empirical observation that individuals suffering from fever do feel relieved when they have a spontaneous hemorrhage, such as a nosebleed or the onset of menstruation (1961:116). He notes that venesection is likely to be particularly helpful in pneumonia, pleurisy and similar febrile diseases, bringing relief by decongesting the system (1951:202). A medical practitioner and historian especially interested in comparative phenomena, Ackerknecht concurs that bleeding is effective in some diseases but says that western medicine has discarded it because we do not understand the mechanism of

its effectiveness (1971:150). Majno, on the other hand, suggests that bleeding was abandoned not because of intellectual incongruity but because of increased understanding of its dangerous side effects, including infection and anemia; tacitly acknowledging a potential placebo effect in its historical importance, he advises: We must remember that what makes a physician is not only what he knows, or what he does, or even how he does it much of the time, just that he does it (1975:68).

The Importance of Medical Personnel

The medical practitioner is, finally, the single most important factor in the medical formula. It is through him that a sick person gains access to some or all of the cultural repertoire of medicines. Moreover, the curer's role has certain attributes which are themselves active in the healing process. That medical practitioners are universally respected members of their cultures, regardless of the techniques they use or the sources of their knowledge (and even if they are also feared, regarded as deviants, etc.), suggests that there is something in the social position itself that renders it therapeutic. Placebo research, indicating that any medicine in the hands of medical practitioners who believe in it is more effective than the same medicine in the hands of one who does not, highlights the importance of the curer as a leader in the healing process. Yet, curers need not

necessarily believe in the effectiveness of their techniques; Levi-Strauss, for example, describes a young Kwakiutl shaman who entered the profession intending to expose its deceptive practices, yet -- using methods he felt to be equally deceptive -- he was a resounding success (1963:169-173).

Given the importance of psychological factors in healing, the first task of a successful curer must be to arouse expectations of recovery. Nekematigi curers do so in several ways. Since a Nekematigi man becomes a medical practitioner because he and other people believe that he has been successful in achieving cures, he is able to inspire confidence on the basis of his reputation alone. Nekematigi healers are men of action whose names are known widely. Successful curers tend to be prominent in non-medical ways as well; and prominent men evoke admiration and respect even on the part of people outside their residential group. Much as Sobeyagu'mo and neighboring people take Loiye's advice on the butchering of pigs, dealing with coffee buyers, and negotiating marriages, so they put their faith in him in medical matters. He has social influence because he is able to heal and perform other socially valued tasks. Conversely, he is able to heal because he has interpersonal influence. As Levi-Strauss notes of the Kwakiutl curer mentioned above: "Quesalid did not become a great shaman because

he cured his patients; he cured his patients because he had become a great shaman" (1963:174). Although determining which comes first -- the reputation or the cures -- is rather like determining whether the chicken or the egg comes first, it is clear that a man like Quesalid or Loiye -- "a man who knows" -- is an essential figure in successful medical care.

In a primary treatment ceremony, a sick Nekematigi has additional reason to believe in a curer's abilities. The curer has already relieved some of his pain or disability, at least temporarily, in preliminary treatment. Thus, the patient has tangible, immediate and very personal proof of the man's reputed skill.

It has been suggested that curers may retain their reputations for success by rejecting patients with whom they are likely to fail (Cf. Boyer 1964:403; Fabrega and Silver 1973:6,134; Frank 1961:44). Cohen (n.d.), for example, reports that this occurs frequently in Bornu, the local curer often using the anthropologist as a reliability check on his own assessment of incurability before deciding not to proffer treatment. Nekematigi may make the same self-protective decisions, though I never heard of a curer refusing to help when asked. On the other hand, sick persons frequently declined to ask one or another curer for help either because they felt he was no good or because of current interpersonal or inter-

group hostilities (see, for example, case #6).

A curer's own estimate of his abilities is as important as other people's estimate of his abilities (though, of course, the two often coincide). Nekematigi curers' self-confidence varies and leads me to hypothesize that older, more famous, self-assured men have a higher success rate than men who, by their own admission, are "just trying" (either just learning medicine or rarely practicing, though respected for other skills). My own data are insufficient to support or refute this idea, but informants consistently indicate that they expect this to be the case. This is the stated reason inexperienced curers are called upon only in minor or just-moderately severe illnesses.

A curer's personality and manner play a role in his success too. Though the therapeutic relevance of certain personality attributes undoubtedly varies across cultures, dynamism, leadership and emotionality are suggested consistently in the literature as positive aspects of curers' demeanor. Even in America, where the public expression of emotion is fairly unusual, we expect not only expertise but also compassion and direction from medical personnel; indeed, we often resent modern physicians for their lack of emotional leadership. That these expectations affect the outcomes of illness is clear from reports that doctors with a commanding presence

and outgoing, active manners achieve a three times higher cure rate, at least in schizophrenia, than do doctors who are more aloof, non-directive and passive (Whitehorn 1963; Whitehorn and Betz 1975). As I have indicated before, Nekematigi curers tend to be more assertive, outspoken and directive than non-curers and unimportant men, though less so than political big men. They are not as demanding or obstreperous as big men, even in public conflict, relying instead on drama, sequential arguments and persuasion. It may well be that these are self-selective personal attributes that are more suited to the medical than the political arena.

Finally, in primary treatment, the medical practitioner mobilizes emotions by the way in which he directs the curing ceremony. While Nekematigi medical knowledge is not secret or sacred, it must be learned, and the men who have learned it have complete control over its application to individual situations. The preparation of the medicinal plants, the whispered words, the delicate rubbing of leaves on the patient's limbs, the careful decoration of the cooking tube, all serve to emphasize the curer's specialized knowledge. At the same time, his use of bleeding, his acceptance of exchange valuables, and his shouting curses at enemies all serve as reminders of social processes to which all are party. Through his manipulation of shared symbols, he lends meaning to the

entire process. If one grants that psychological or emotional processes have an influence upon health, indeed, upon specific vital organs, then providing meaning is not a separate function from curing; rather, providing meaning facilitates the cure (compare Kleinman 1973 and Levi-Strauss 1963:193).

Providing meaning requires only that social interpretations of events be coherent; it does not require that they be pleasant. The administration of medicines believed to be very powerful, the expert preparation of a lusakohi, and the slaughter of a pig may all serve as encouragement to a Nekematigi patient, signs that all the resources of his society are being mobilized to combat his illness. Nevertheless, the decision to move from preliminary to primary treatment may also be discouraging, serving as public recognition of the perilousness of his condition. Furthermore, the inclusion of sorcery antidotes in the lusakohi and the curer's use of spells directed at enemy sorcerers may confirm the patient's worst fears: he is in the hands of his enemies. These fears can have detrimental effects upon the healing process even though, since Nekematigi rarely know that sorcery has been done, classic forms of thanatomania do not occur.²⁵ But even when a sorcery diagnosis has not been agreed upon, suspicions of sorcery are constant reminders of individuals' vulnerability to the power of

others. Thus, it is essential that a sick person believe in the strength of his district, his curer's magic, and his own forthcoming response to the medicines, rather than being overwhelmed by the potential strength of his enemies. It is in tipping the balance between faith and fear that the mobilization of a group fighting on the patient's behalf becomes most important.

In Nekematigi medicine, as in virtually all but post-industrial medical systems, the therapeutic setting includes not only curer and sick person but also other representatives of the patient's social group.²⁶ (Here I am referring to primary treatment; preliminary treatment varies greatly in the extent to which other persons are involved.) Although sometimes acting as no more than spectators or sources of undifferentiated consolation, a sick person's intimates often become actively involved in the medical process. As in case #6, they may act as guards and protectors, seeking to forestall any possible attempts at sorcery during treatment. As in case #15, they may actually participate in the treatment ceremony. The group's interest in the success of the curer's efforts is not simply altruistic or based on affection for the sick person, important as these considerations obviously are. If the curer is successful in sending the illness (back) to another district he will benefit not only the patient but the entire district by causing

failure or, better yet, hardship for a presumed or real enemy. Treatment is as much a simile to warfare as is sorcery. The therapeutic importance of enthusiastic participation in curing cannot be minimized in a society where aggression toward enemies is the single most prized social characteristic.

The participation of persons other than medical practitioners tends to enhance the drama of the treatment ceremony. The tone of Nekematigi curing is similar to that reported for the nearby Gururumba: the ceremonies "are not spectacles by any means, but they seem carefully staged for dramatic effect" (Newman 1965:46). Case #15, for example, is a case of a sick child who had become suddenly and perplexingly ill. After several curers had prepared unsuccessful preliminary treatments, the senior Sobeyagu curer made lusakohi for her. Although the group was small -- consisting of the child, her parents and sisters, her mother's brother, the curer and his brother -- the curer encouraged more group discussion and participation than is often the case. Prior to opening the cooking tube, he passed it around the room, instructing each individual present to rub their hands on it and say something. Loiye had already offered his own spells over the medicinal plants, over the decorations on the cooking tube and over the stinging nettles used prior to bleeding. He had called aloud upon the men of

other places to cease their evil magic against the child; he had exhorted the ginger to circulate thoroughly in her body and make it free of illness; and he had called upon the spirit of the water eel to make the illness go away and hide, the way eels can hide in the still pools at the side of a river. Now was the opportunity for everyone else in the group to call upon their own personal powers or favorite spirits to rid the child of her pain. Most spoke silently, slowly and deliberately while lightly rubbing their hands over the charred bamboo. The child's mother seized the tube with both hands, shouting loudly and repeatedly: "Anasi, anasi, anasi," -- "enough, enough! enough!!"

Summary

The dramatic tension of communal medical performances in many non-western cultures has led the vast majority of anthropologists to conclude that the greatest portion of non-western medicine is essentially psychotherapy. This viewpoint is made explicit by several contributors to the Galdston (1963) and Kiev (1964) anthologies and reiterated by specialists and generalists alike (e.g., Ackerknecht 1971:passim, 1973:11; Corlett 1935; Honigmann 1954:420-422). Indeed, in societies where theories of illness are based on the violation of social norms, anthropologists often view medical institutions as restorers of social harmony rather than as restorers of individuals' health per se.

(Cf. Fox 1964; Hallowell 1963; Lieban 1965; Strathern 1968; Turner 1967,1968). Murdock has taken the argument one step further and offered an evolutionary explanation for "why primitive medicine reveals so great an emphasis upon magical psychotherapy and so relatively slight a development of rational or scientific techniques" (1965: 54). In his view, the mutually adaptive evolution of both disease agents and their human hosts tends to reduce the significance of organic and infectious disease so that most illnesses are "psychological" or "functional" in nature. Therefore, concludes Murdock, the medicine man's techniques are adjusted to the actual demand. Alland reaches a similar conclusion:

The fact that so many aspects of medical practice [e.g., spells, trance, fakery] in one social group would be familiar to individuals in another social group cannot be gratuitous. It must represent a widespread adaptive trend based on rather effective positive feedback. Such feedback is most likely to be successful in the area of psychosomatic medicine because extraneous factors are shut out of the system (1970:136).

I am in general agreement with this view except I feel it is consistently overstated. This overstatement

reflects the important influences of psychiatry upon anthropology and the historically less important influences of other branches of medicine, perhaps as much as it reflects the ethnographic "realities." My data suggest that psychotherapeutic (and sociotherapeutic) mechanisms are exceedingly important in the high recovery rate achieved by Nekematigi curers -- and it is much easier to find comparative support for this conviction in the anthropological literature than it is to find such support for an equally plausible interpretation -- that physiotherapeutic and pharmacological processes are also exceedingly important in curing Nekematigi illness. Medical anthropology may now suffer from an unnecessarily limited analytical perspective due to a neglect of the insights of "physical" physicians in favor of those of "psychiatric" physicians, but there are indications that that professional distinction itself is becoming blurred, in much the same way that the distinction between "organic" and "functional" illness is becoming less and less meaningful as we learn more about the multiplicity of factors invariably involved in the occurrence of either type.

The relative incidence of physical or psychological illness -- and thus the appropriateness of one or another form of medicine -- is nowhere as easy to assess as the medical epidemiologists might have us believe. In East

Africa, for instance, the expression of "mental" illness as either a syndrome of bodily aches, pains and fatigue or as a syndrome of emotional misery, anxiety and depression, varies not with etiology but with educational level (Shaper et al 1972:331). And, in this country,

The more we see of patients who come to the general practitioner or the internist, the more we are convinced that the most complete diagnosis... usually includes elements of social, cultural, as well as psychic and somatic factors. Sometimes one seems to predominate or precede the others in time and importance; at other times several or all factors seem to be of equal importance (Schmale et al 1970:10).

It is certainly true that social factors and personal emotions play a major role in both the onset and relief of illness, and I have suggested some of the ways in which this may occur in Sobeyagu. It appears, for example, that important men and aggressive, "masculine" women become seriously ill more often than ordinary men and women suggesting an important stress factor in Nekematigi illness and/or differential recognition of illness. But, given the disease pattern outlined in pages 238-248, it is equally certain that physical factors play an important role. And, given the diversity of treatment

mechanisms employed, it appears that several processes are at work in recovery as well. Combined with increasing cross-cultural evidence of this type, new discoveries in psychosomatic medicine have led many European physicians to recognize that much of the practice of medicine involves making the patient more comfortable and productive while he and his body reach new levels of adaptation during various phases of growth and ageing. Our therapeutic zeal to cure "the disease" must be tempered by our understanding of the many levels at which each patient experiences "dis-ease" (Schmale et al 1970: 19).

On the basis of the data available to me, I cannot say with certainty that it is (1) the natural course of a disease, (2) a social re-definition of illness, (3) the psychotherapeutic impact of a curer's leadership and social support or (4) direct effects of physical medicines that leads to recovery in any given case of illness. While it is possible that single, or most important, therapeutic factors could be isolated with the proper methodology, I am convinced, given the Nekematigi insistence on the sequencing and interdependence of their various medicines, that a range of factors is, and probably must be, involved in successful treatment. Fundamentally different from western medicine and its reliance upon drugs, Nekematigi

medicine embraces the simultaneous use of procedures we may label social, psychotherapeutic, pharmacological, nutritional and physiotherapeutic. It is also, therefore, fundamentally different from the best known African and North American medical systems where psychotherapy reportedly dominates. In its prototypic and most complex form -- the lusakohi -- Nekematigi treatment leaves virtually no part of a sick person's being untended. It relieves his pain and releases "bad blood" through the repeated use of bleeding and stinging nettles. It fights his enemies through the use of verbal weapons and botanical antidotes to sorcery. It rallies his kin to provide care, companionship and expressions of concern. It soothes and strengthens his body through rest, seclusion and the offering of specialty foods. It provides him with access to the personal powers of a curer and, through the curer's use of verbal formulae, to the powers of admired animals. It provides him with medicines potentially capable of reducing fever, killing microbes, expelling helminths, and slowing internal hemorrhage and diarrhea. The lusakohi is, in sum, a model of medical treatment of the whole person.

CHAPTER SIX

Conclusion

The Nekematigi medical system, like every medical system, manifests unique characteristics which reflect imperatives of society and imperatives of human psychophysiology, both of which vary cross-culturally. In the Nekematigi case, beliefs about illness causation mirror people's concern with a wide range of potential dangers in their socio-physical environment while treatment techniques are based on faith in and experimentation with a wide range of potential medicines found in that environment. The greatest danger results from the perpetual tension between districts, tension apparent even to an outsider in gloating tales of thefts of others' pigs, raids upon their gardens, and renegeing on alliances, angry accusations of others doing the same, competitive dances and shouting litigation over land and women. Consequently, enemy sorcery is regarded as the most likely explanation of illness, though illness is also said to result from possession by the embittered or confused ghosts of recently deceased clansmen, attacks by capricious or crazy demons of the bush, excessive intimacy between men and women, improper disposal of wastes, stealing, rainy weather, bad foods, and greedy or incautious use of powerful natural substances. Each illness-causing agent corresponds to a (theoretically) distinct cluster of social, behavioral and physical illness indicators, and to an appropriate procedure for alleviating them. Nonetheless,

diagnosis is often difficult, and one treatment format dominates. In the early stages of treatment, when the chances for recovery are good, no etiologic agent need be presumed and treatment is aimed at strengthening the patient. In more serious illnesses, the commonly employed treatment procedures assume the likelihood of sorcery and incorporate, along with these all-purpose medicines, techniques aimed at weakening illness-causing agents. A high recovery rate results from the sometimes serious but often self-limiting nature of Nekematigi disease and from an ever-changing but patterned complex of spells, meat, and medicinal plants, carefully developed through individual trial and error, and capable of mobilizing a variety of positive psychological and physical responses in sick persons.

Responding to the demands of both society and biology, medical systems serve many functions. Broadly speaking, there are three. The first is the explanation of illness and death, the provision of a culturally-specific response to humans' universally compelling need to see order in the world around them. In the Nekematigi case, these explanations serve to provide additional stress on the need for intra-district loyalty, continuing vigilance and willing revenge. The second important function of medical systems is the mobilization of personnel, resources and social institutions to cope with illness

and death, providing at the same time, for Nekematigi, avenues for economic exchange and some measure of social differentiation in terms of roles and specialized expertise. Finally, medical systems function to (try to) control or prevent illness, disability and death, in the Nekematigi case, with a good deal of apparent success.

Although anthropologists have shown the greatest interest in the socio-psychological functions of non-western medicine, no known medical system is purely psychological, solely physical, or exclusively social in its nature or its impact. On the contrary, every form of medicine has each of these aspects, though the emphasis reportedly varies. The Nekematigi medical system may be unique in its reliance upon such a diversity of therapeutic support mechanisms, but this seems unlikely. It may be, on the other hand, that it is post-industrial western medicine that has been unique in its attempt to separate one curative mechanism from another (and so influence western anthropologists to do likewise). It is most likely, however, that the relative dependence upon (and relative effectiveness of) one or another medical process will vary with cultural milieu and environmental conditions. Just as each society is characterized by a specific disease pattern with multiple manifestations and causes, so each medical system represents a cluster of principles of belief and treatment. Given the proper

theoretical orientation and methodology, locally clustered emphases in cognition and therapy will undoubtedly lend themselves to correlation with disease patterns, evolutionary options taken or missed, and/or sociocultural dynamics.

Even without such correlations, what appears distinctly "medical" about the beliefs and behaviors summarized in my description of Nekematigi medicine, and in others' descriptions of other medical systems, is that they mediate between individuals' ideas and values, social situations, environmental opportunities and physical well-being. My "empirical" conclusion, i.e., that a range of factors is essential to Nekematigi curing, leads directly to a "theoretical" conclusion, i.e., that it is the interaction between factors that is of primary interest. Human beings do not interact directly with their environments, with other people, or even with their own bodies; rather, we convert environmental, social and biological processes into meaning. These meanings -- as well as the "real" forces behind them -- mediate our influences upon one another and upon our surroundings. For Nekematigi this mediation is achieved at one level, in the perception and explanation of events (like the appearance and disappearance of indicators of illness), by a culturally-prescribed set of theories regarding the properties (powers) of sorcerers, plants and so on. At

another level, in the attempt to control events, this mediation is achieved by recourse to symbols (e.g., words), theories and physical objects which all involve an interface between supernatural, social and physiological processes. The occurrence, nature and outcomes of illness are thus mediated by a variety of meanings and processes acting simultaneously upon one another.

In Nekematigi thought, humans are capable of doing physical harm to one another, even from remote distances, by physical and magical means. Physical or behavioral disabilities thus induced can be alleviated by activities designed to have direct effects upon the body and (no less direct) effects upon offending human agents. Manipulations of sick persons' bodies and their social environments form mutually indispensable parts, not only of the medical system as analytically conceptualized, but also of the healing process itself. The explanation of illness in terms of sorcery functions not so much to order treatment as to provide meaning for observed sets of illness events. The latter in turn plays a role in treatment while treatment is influenced by the characteristics of illness and the availability of medical resources as well. Whereas most anthropological studies of medicine tend to focus on one or another of these aspects (Cf. Alland 1970:134; Fabrega 1971; Kleinman 1973), I have attempted to present treatment in

conjunction with belief. By doing so, we can see that the former is not necessarily or predictably derived from the latter; indeed, I am inclined to agree with Schofield and Parkinson (1963) who suggest that ideas may emerge from actions, serving as ad hoc rationalizations for empirically observed correlations (or non-correlations). In any case, Nekematigi therapeutic theory is much broader and more positivistic than etiologic theory, though both serve to interrelate biological, social and environmental observations. Etiologic theory is basically conservative while therapeutic theory is both conservative and innovative -- conservative when successful, increasingly innovative when unsuccessful. Together -- or through one another -- illness beliefs, disease and medicine structure the outcome of illness which, in turn, influences the evolution of the medical system and the overall adaptation of the population.

Given that medical anthropology as a whole is concerned with all these factors -- beliefs, disease, illness perception, medical practice, the consequences of each (short-term and long-term, social and physical), as well as the ways in which each varies cross-culturally -- there are at least three ways in which an analytic position may be devised to facilitate exploration of their mutually reciprocal effects. (1) One may create a compromise position between existing theoretical orientations each

addressed only to one factor or another. This is the approach taken by Glick (1967) whose development of the notion of medical "power" is an explicit attempt to reach a middle ground between the strictures of ethnoscience -- with a focus on internal cultural patterning -- and the goals of ethnology -- understanding worldwide similarities and differences. (I may, nonetheless, have taken Glick's power concept further than he would recommend by using it to guide my search for pharmaceutical, nutritional and psychological correlates of the powers Nekematigi attribute to their medicines.) (2) Alternatively, one may adopt already existing analytic frameworks but use more than one at a time. Just as our understanding of social organization and process has been enlightened by applying both theories of "descent" and "alliance," rather than forcing a choice between the two, so Fabrega (1971:209-210) recommends adopting a behavioral framework in which medical phenomena can be viewed from both ethnomedical and biomedical perspectives. This is basically what I have done in the present study -- describing the indicators, causes, treatment and results of illness both as Nekematigi perceive them and as western medicine perceives them. (3) Finally, as an extension of #2, one can combine theoretical orientations, attempting to achieve a synthesis rather than merely a dual perspective. Cohen describes systems

analysis, for example, as one technique for generalization which includes the methodologies of descriptive, associational and functional models but transcends them by introducing the requirement for specifying boundaries and feedback mechanisms (1973:42). Similarly, Wellin attributes the potential importance of the new "ecological approach with cultural and biological parameters" to the fact that it not only comprehends biological, social and environmental variables but also seeks to specify their dynamic inter-relationships (1975:22). One example of an attempt to apply such an approach is Lindenbaum's (1972) correlation of the differential importance of ghosts, sorcerers, and polluting women in illness theory to the differential population pressures as one moves from east to west in the New Guinea highlands. Whereas I have analyzed the importance of sorcery to Nekematigi in terms of its relation to warfare -- a social process examined in terms of another social process -- she has analyzed social processes (medical beliefs and related behaviors) in terms of both social process (e.g., structural constraints, the need for group integrity) and demographic, i.e., environmental, process, including disease.

Having argued in Chapter One that option #3 is the inevitable and desirable route for medical anthropology to take, I have begun moving in that direction in Chapters

Three, Four and Five by, first, specifying as completely as possible the multiple properties of the variables (procedures, definitions, substances and conditions) in the Nekematigi medical system, and, second, analyzing the short-term outcomes of Nekematigi reliance upon these procedures, definitions and substances in these conditions. What remains, then, is to (a) develop measures of the relative importance of each variable, and of the properties of each variable, and (b) to develop and test hypotheses as to the nature of the interactions between variables, the historical evolutionary-adaptive interaction that creates such a system, and the contemporary interaction that produces the observed outcomes and thus alters or maintains the character of the system.

The former will require substantially more data of the type employed here, e.g., phytochemical analyses of plants and longitudinal case histories of sick persons. By means of careful use of case histories and comparative data from many societies, it may be possible to simulate the conditions of controlled, e.g., placebo, studies and so sort out the relative effects of "physical," "psychological" and social processes in different diseases and in different physical-cultural environments. While the one variable experimental model advocated for so long by biomedical

science will not achieve our purpose, single factors will continue to be of importance for, as Dubos puts it, "the concept of multifactorial causation is but an extension of the doctrine of specificity;" the latter is not discredited but must be expanded to include the operation of external agents as well as factors that govern the response of the human organism (1965:329 et passim).

The development of explanatory theory and testable hypotheses regarding the interaction of biological, cultural and environmental variables will depend upon careful induction from such data as are obtained and bold deduction from the combined insights of the medical and anthropological communities. Theoretical development can be facilitated by the adoption of a humanistic, rather than reductionist, appreciation of human systems (von Bertalanffy 1971) and by the development of a meta-language enabling us to translate between "mental" and "physical" which, Graham (1967) argues, are the names of different languages, not of different events, or even different aspects of the same event. "Mental" has meant for medicine "unpredictable in the light of today's knowledge," and "folk" (illness or medicine) has meant for anthropology much the same thing. To deal with dynamic realities which are neither "physical" or "mental" -- but are cultural -- we must develop an isomorphism of constructs between

disciplines (von Bertalanffy 1964). The precursors of such constructs are being developed in psychosomatic medicine with its new focus on field theory and the concept of dis-ease (Schmale et al 1970); in microbiology with increasing evidence for multifactorial causation in all diseases (Dubos 1965); in general anthropology with growing interest in the relationship between "structuralism and ecology" (Levi-Strauss 1972), "ecology of mind" (Bateson 1972), and ecology, "cultural and non-cultural" (Vayda and Rappaport 1968); and in medical anthropology with a recent interest in evolutionary adaptation and medicine (Alland 1970) overlaying a well-established focus on "health action systems" (Polgar 1962). Applying the cumulative results of such conceptual efforts to ethnographic work, as in this study of a New Guinea highlands medical system, serves to highlight the current weaknesses in medical anthropological constructs and so contribute to their ongoing refinement.

Notes

¹ Although reference is made in the text primarily to published accounts of eastern highlands peoples, there has also been extensive ethnographic reportage on peoples south (Glasse 1968; Ryan 1959, 1961) and west of this area (Cf. Brown 1972; Bulmer 1960a, 1960b; Heider 1970; Koch 1974; Meggitt 1965a; Ploeg 1959; Pouver 1964, 1966; Pospisil 1958; Reay 1959; Strathern, A. 1971, 1972; Strathern, M. 1972b) and on the so-called highlands fringe peoples (Rappaport 1967; Wagner 1967, 1972). While the highlands represent in most respects a single ecological zone and a unified culture area, there is a precedent for working on the assumption of a "cultural divide" between peoples east and west of Chuave (see Brookfield 1964; Bulmer and Bulmer 1964; Meggitt 1964). The issue of geographic cultural continuity in the highlands is nonetheless a complex one (Cf. Langness 1967, 1971a) that will not be dealt with here. The point -- that there has been relatively little study of medicine -- is as valid for the western highlands as for the east, though there have been a few more published reports from the former than from the latter. Missionaries and anthropologists who have reported on western highlanders' medical beliefs include Aufenanger (1972), Brandewie (1973), Nelson (1971a) and A. Strathern (1968).

² A major contribution to the literature on classical Asian medicine, and a promising attempt at comparison, is forthcoming in early 1976. Edited by Charles Leslie and published by the University of California Press (Berkeley), the volume is to be entitled Asian Medical Systems.

³ Population figures refer to the eastern half of the island, formerly governed by Australia, now the independent nation of Papua New Guinea.

⁴ The term "undernutrition" is generally reserved for situations in which total caloric intake is insufficient to meet growth and/or energy needs. "Malnutrition" refers to a condition in which the intake of one or more essential nutrients is deficient despite the overall adequacy of caloric intake. Because of their frequent co-occurrence and complex etiology, however (often reflecting the co-existence of infection and/or metabolic disorder), the comprehensive term "protein-calorie malnutrition," (PCM) has come into general usage.

⁵ Probably as an adaptation to a low-protein environment, New Guinea highlanders mature very slowly and attain, even as adults, a relatively small stature (see Gajdusek 1970; Littlewood 1972; Malcolm 1970). Reported heights and weights for sample populations are as follows (from Barnes 1969; Freedman and Macintosh 1965; Ivinskis *et al* 1956; Kariks *et al* 1960; Rappaport 1967):

| | <u>Western Highlands</u> (Enga) | <u>Northern Fringe</u> (Maring) | <u>Central Highlands</u> (Chimbu) | <u>Eastern Highlands</u> (Gahuku, Asaro, Bena Bena) |
|----------|--|--|--|--|
| Males | | | | |
| --Height | 59.35"- 62.1" | 58.5" | 62.93" | 60.75" |
| --Weight | | 101# | | 120.6# |
| Females | | | | |
| --Height | | 54.4" | 59.13" | 57.36" |
| --Weight | | 85# | 111# | 105.5# |

⁶ Prior to Australian rule and the consequent disruption of warfare and male initiation activities, men slept and ate together in a central men's house. Some Nekematigi men still maintain residences separate from those of their families but segregation of the sexes has been relaxed greatly.

⁷ New Guineans, however, are notable for their comparatively high tolerance of pain (see Gajdusek 1970; Pulsford and Cawte 1972:113).

⁸ The liver is of symbolic importance to Nekematigi and members of many other New Guinea highlands societies, often regarded as the seat of human emotions (see Glick 1963:107; Newman 1964:258).

⁹ Looking only at the episodes reported in the Appendix, I would conclude that the rainy season does coincide with a heightened prevalence of illness; 15 of those 28 illnesses either began during the period December to March or continued into that period from an earlier onset. Looking at my more general observations of illness in Sobeyagu

and neighboring districts, I would conclude that it is not the rainy season itself but the change in seasons that is associated with an increased onset of illness. December and May were the months during which most illnesses began.

10 See Glick (1963:Appendix, 1967:42-43) for descriptions of neki behavior among the Gimi.

11 The once that I saw this ritual performed during my fieldwork I was unable to examine the parcel for its contents.

12 For additional information on sangguma, see Berndt (1962:194), Blick (1971b, 1971c) and Pulsford and Cawte (1972:95).

13 Ackerknecht has suggested that the fusion of diagnosis with therapy may be a general characteristic of medicine in pre-industrial societies (1971:25).

14 There are also costs and risks associated with seeking European medicine. Although treatment at a local aidpost is usually free, hospitals charge for food and drugs, 20¢ to 50¢ per day in 1971. In addition, there are transportation costs, 90¢ to A\$1.00 one way from Sobeyagu to Goroka; and, for women, who feel they should dress in European style when visiting a hospital, there is often the cost of new clothing (men have, and generally wear, shirts and shorts, rather than traditional clothing, anyway). At a hospital or health center (and en route) one is openly exposed to strangers who may be sorcerers or conveyors of messages to sorcerers. At the hospital, there is also the possibility of being cut, something which Nekematigi fear greatly and which they believe is resorted to much too often by European medical practitioners.

15 Throughout Melanesia, sorcery (as well as some spirits and natural events) seems to have this quality of "hotness" (Cf. Hayano 1973:184; Patterson 1974:148) and heat is very often associated with illness, although local differences complicate the picture. Panoff (1970) and Salisbury (1965:56), for example, report medicines which are intended to heat, as well as some which cool, sick persons. As yet, no one has undertaken a full study of the concepts of hot and cold in New Guinea, thus, their philosophical and symbolic ramifications are poorly understood.

16 Barnes and Price (1975) conducted a series of experiments, using laboratory animals, to assess the effectiveness of plants used as anti-fertility drugs by many indigenous peoples. Unfortunately, no Zingiber spp. was included in their sample.

17 Most curers were unwilling to repeat, for taping or transcribing, the Benabena words used in treatment. This may be partially due to a reluctance to reveal esoteric information to a white female, or the inappropriateness of repeating the spells outside a medical context; it is probably also due to the fact that men are protective of their individual expertise and expect to be paid rather handsomely by other curers for it. The men I knew best, however, were willing to give me the gist of their spells in Pidgin.

18 These are the only two illness syndromes for which I was able to elicit Benabena names. Kana is regarded as alien; it is a disease (apparently malaria) people fear when they travel to the lowlands. Ufana, a local and less serious illness (upper respiratory infection), is said to be easily confused with kana (see case #12b).

19 This is a large poinsettia (8-12' tall) referred to by the same term (golaha) as that for blood, because of its dark red flower bracts.

20 Fabrega and Manning (1972:96) have suggested that perceiving as separate illnesses what we perceive as recurrent exacerbations of chronic conditions may be a universal feature of non-scientific medical systems as compared with western scientific medicine. As a cross-cultural generalization, the statement requires further documentation, but for Nekematigi it appears quite accurate (though Nekematigi also recognize that some people are "always sick.")

21 The duration of illness does not appear to be shortened by recourse to European medicine. When traditional medicine only was used, the duration of illness ranged from four days to 3 1/2 months, with an average of 4 1/4 weeks. When both traditional and European medicine were employed, the duration ranged from one week to four months with an average of 7 1/2 weeks. In untreated episodes, duration ranged from two days to three weeks, with an average of 6 1/2 days before recovery. My sample is too small to illustrate the point effectively, but, as Maclean points

out (1971:24), European medicine is obviously superior to traditional systems only in the treatment of acute conditions, e.g., severe and sudden infections, surgical and obstetrical emergencies, etc., conditions which comprise a minority of illnesses in any population.

22 It is not at all clear, however, that infection is alone, most important, or even essential in the etiology of diarrheal diseases (Cf. Biddulph 1971; Dubos 1965, 1968).

23 Since formation of the hemoglobin molecule requires free protein stores, anemia may also result from malnutrition. Still poorly understood though being studied intensively, the incidence and causes of anemia in the highlands appear to vary greatly (see Kariks 1960, 1969; Kariks and Woodfield 1972; Kariks et al 1960; MacGregor and Hornabrook 1971; Vines and Kelly 1966; Vines et al 1967; Walsh et al 1960; Zigas 1973).

24 Whiting and Child (1953) correlate the use of blood-letting techniques with the early inhibition of aggression in childhood. This strikes me as an unlikely explanation in New Guinea, given that children, at least Nekematigi children, are rarely inhibited from expressing themselves of any emotion, such inhibition occurring usually only when they are interfering directly with some adult activity, e.g., pig butchering. In fact, much of child-rearing seems oriented toward encouraging aggressiveness, for example, laughing rather than scolding when youngsters bite one another, praising young boys for taking an active interest in learning to shoot even when it involves stalking their sisters, etc.

25 There is a difference between the induced results of knowing one has been ensorcelled (as in Australian bone-pointing) and hypothesizing sorcery after one is already ill (Cf. Middleton and Winter 1967). I believe Stopp (1963) is incorrect in his suggestion that Mbowamb may die through "sheer fright" from the suggestion or knowledge that sorcery has been performed on them. Although this phenomenon has been reported from some lowlands societies (see Schofield and Parkinson 1963), it has never been verified in the highlands. I never heard of its occurrence among Nekematigi where sorcery is the primary cause of illness; and it seems even less likely in the western highlands where ghosts are the primary cause of illness.

26 The recent increase in group therapy in Europe and the United States may be regarded as the medical profession's acknowledgement that "each person constructs his assumptive world through interaction with others and has a strong need to check the validity of his perceptions and feelings against theirs" (Frank 1961:171). Similarly, even with institutionalized patients, sociotherapy appears to be gaining ground as a complement to individualized psychotherapy (Cf. Edelson 1970).

Appendix

Included here are 17 narrative medical case histories, representing 28 separate illness episodes. The case histories follow the outline suggested by Fabrega (1971: 188), beginning with an introduction including the person's age, sex, and socio-medical history (where known and/or relevant), followed by a description of each illness including numbers and types of visible and reported symptoms at various stages in the episode, suggestions as to what these symptoms might mean in western bio-medicine, behavior of the sick person and associates, duration and presumed cause(s) of the illness, treatment strategy and outcome. The cases represent a wide range in illness severity, a range which reflects accurately the range of illnesses occurring in the community. They are not, however, a random sample (or a statistically representative sample) of all illness that occurred while I was in the field. The cases presented are those for which information on the entire duration of the illness-treatment episode is relatively comprehensive. Consequently, all the individuals are residents of Sobeyagu (my home district), with the exception of one Sobeyagu man who is now a resident of Goroka. (All names are fictitious.) The following tabulation summarizes the age and sex characteristics of the total Sobeyagu population (as of January 1971) and of those in this sample, omitting the non-resident who accounts for 2 illness episodes.

| Estimated Age | Male | | Female | |
|---------------|------------------|-------------------|------------------|-------------------|
| | Residents (N=38) | # Cases (N=8) | Residents (N=40) | # Cases (N=8) |
| 1 - 10 | 12 | 1 (3 episodes) | 11 | 1 (1 episode) |
| 11 - 19 | 3 | 0 | 3 | 0 |
| 20-30 | 7 | 0 | 6 | 1 (1 episode) |
| 31-50 | 10 | 4 (7 episodes) | 8 | 2 (3 episodes) |
| 51-65 | 6 | 3 (7 episodes) | 12 | 4 (4 episodes) |

(1) Introduction: Tutupa is 55-65 years old, male, husband to 3 wives, father of 7 living children. Feared for his temper, he is also regarded as the big man of Sobeyagu because of his age, his experience as a warrior prior to contact, and his wealth. He is, nonetheless, frequently disabled by illness and unable to participate in public activities. His physical strength and size are less than those of other men partially, perhaps, because of his age and partially because he eats poorly, having lost most of his teeth. In addition, he has a long history of gastro-intestinal disorders.

Tutupa recalls that his first serious illness occurred about 20 years ago. He had severe diarrhea, bloody stools, stomach cramps and nausea. On that occasion he obtained the services of a curer from the Kafe, a neighboring language group. The man rubbed him with nettles and prepared a lusakohi for him, Tutupa's younger brother providing the pig. He recalls vomiting after eating the medicinal meal, being rubbed again with nettles, improving slightly (so that his "belly slept"), and paying the curer \$6 and a leg of the pig.

On another occasion, while living as a refugee with a neighboring district, he became very weak and his stools were discolored yellow and black. He attributes his condition to nami sorcery by his host. On this occasion he improved with no treatment.

Another time, for the same symptoms as he remembers, he called a curer from Napainye, a distant district, who fed him medicinal plants (ginger and fenigapa), and he improved somewhat.

Never having been completely restored to health, Tutupa has, through the years, called upon several curers from the neighboring districts of Napainye, Gogalu, Bonabi, Mipo, Kafonaga and Safa. Now that there is a young man within Sobeyagu who has gained a reputation as a successful curer, he rarely calls on anyone from outside. Tutupa is described by his kinsmen as having a very serious illness but one that comes and goes. His kinsmen, and he himself, describe him as smaller than he used to be: having been ensorcelled so often (because he is a big man), he has lost blood and his size has diminished accordingly.

(a) Illness Episode #1: Late one evening in August, 1970, Tutupa and Loiye, the curer, came to me for medicine for Tutupa's stomach pains and cramps. He had been ill for several days and had not even been involved when I moved into Sobeyagu and negotiated a house site. It was apparently the curer's decision to ask me for medicine. Though he did not appear anxious over Tutupa's condition, noting that he was able to walk unassisted and eat well, the curer was leaving for the forest the next morning to

gather materials for an upcoming inter-district festival and hoped that I might give Tutupa something to insure his well-being during his absence. I did not; the history of Tutupa's ill health and the reported failure of previous treatments indicated the unlikelihood of any of my patent medicines doing him any good. I also suspected a hemorrhaging ulcer of the stomach or intestine which an aspirin-based pain reliever would only have aggravated. Neither curer nor patient suggested a cause for Tutupa's current condition and, with no additional treatment, he improved after 4-5 days. He was publicly active for a few weeks but, by mid-September, was feeling ill again, with the same complaints of weakness and stomach cramps. He stayed at home but did not seek medical treatment. By the end of September he was well again, walking long distances to neighboring districts to participate in weddings and so on.

This pattern of being well for a week or two, then ill for a few days, continued for several months. Indeed, my delineation of separate illness episodes is simply a means of ordering the crises in Tutupa's always rather precarious health.

(b) Illness Episode #2: In mid-December, Tutupa again asked me for medicine. Although he was still able to walk about, he stayed close to Sobeyagu territory. Others in his household commented on his red eyes and the fact that he was not sleeping well. Tutupa himself complained of headache and diarrhea. He was feeling both feisty and morose, beating his wives and relating to me in unhappy detail the history of his former illnesses. Several other Sobeyagu'mo were also ill at this time which added to his general anxiety. I gave him anti-diarrheal tablets (Lomotil) but after two days they had done no good. In fact, his condition had become more serious; his headache was more continuous and there was blood in his stools. By this time he and others had become fairly secretive about his condition. I was unable to find out if a local curer performed a treatment ceremony for him or not. He was regularly rubbing himself with stinging nettles which he said "many men, various men" had given him. In spite of his apparently deteriorating condition, Tutupa participated in a clan party on December 30 for one of his sons' agemates for whom a bride had been acquired.

But during the following two weeks, he, 2 other Sobeyagu men and 4 men from another district went into hiding because of a dispute they were having with men from Mipo who had allegedly stolen a Sobeyagu pig. The men lived in pig houses and lean-tos in uninhabited areas above the gardens. They kept their location and activities secret from all but a few younger men who brought them food and news from time to time. The group's general fear of sorcery

had become specific as a result of Tutupa's illness and the dispute over the pig.

During the period of seclusion, Tutupa's condition improved and the fear of sorcery subsided. On January 15 he and the others came out of hiding to attend a feast for a Sobeyagu girl's first menstruation. Tutupa reported feeling strong again and he participated actively. Late in January he was still well and unafraid, even travelling to a neighboring district to negotiate death payments with matrilineal kinsmen.

His well-being was only temporary, however. By the end of the first week in February the entire clan was fearing Mipo sorcery again. They had heard that several Mipomo had died recently and anticipated that, because of the recent hostility, the Mipomo would be holding Sobeyagu'mo responsible. They had also heard that the Mipomo had been in communication with people from Lufa who are presumed to be the source of the dreaded gu'nakafe'i sorcery. Everyone was instructed to avoid walking alone and going out after dark. Tutupa stayed secluded near his house, even missing a party the next week (February 10) for his daughter's newborn child. The day after this party, Tutupa called the junior curer in, though not for himself but for his wife who had also become ill (see case #3). The next week, having gotten no relief, Tutupa and his wife went together to the government medical center at Sigerehe. They apparently used different names because I was later unable to obtain any information on their treatment from the medical personnel there. His wife came home immediately but Tutupa was admitted. Two days later, the rest of the men were plotting to get him out of the hospital: they wanted to hide him again, convinced now that he had been ensorcelled.

On March 4 Tutupa was home again and not in hiding. Indeed, he was cheerful and lively as he and other older men gathered to tease and cook food for the teenaged girls of another district who were visiting the young men of Sobeyagu for a courting party.

But on March 7 a crisis occurred. At about 10 p.m., well past dark, my rooster crowed, long and loud. The chief curer, who lived nearby, came to the house and informed me that cocks crowing at night were a very bad omen. His past experience indicated that someone would die within a month. Just moments after his announcement, Tutupa's sons came calling for him to help their father whose health had worsened rapidly just that afternoon. He was headachy and occasionally delirious. When calm, he complained of feeling hot and cold and of severe stomach pains. Virtually all the adult men of the district sat up with him that night, alarmed by his obvious pain and his continuing inability to sleep or eat. Together, the senior curer and junior curer prepared lusakohi for him. In their haste,

they did without killing a pig. There was some discussion of slaughtering and using the omen-bearing fowl but most of the men were against it. The curers each rubbed Tutupa with nettles and spat chewed ginger and salt on his skin and on the medicinal foods they prepared together. Each silently spoke his own spells over the medicines. It is rare to have two curers involved simultaneously with one sick person, but all these men are brothers and they were trying their utmost to save Tutupa's life.

They succeeded. By the next morning Tutupa was lucid and in considerably less pain. For the next several months he was ill off and on again but never completely disabled. For these lesser pains he received preliminary medicine from virtually every adult man in Sobeyagu and Orogei (a friendly district).

(c) Illness Episode #3: On July 3, Tutupa's condition became serious enough so that clan members felt he should be hidden again. He was so weak he had to be assisted on the walk from his home to the hiding place above the gardens. He was now suffering from pains in the chest and back, and from stiffness -- "something heavy" -- in the back of his neck (meningitis?). Enemies were said to be responsible for this new illness though no one knew the type of sorcery they were using. The next night one of the young men purchased some meat and the boy's father, an older man with no particular reputation for curing, prepared a medicinal meal.

After 5 days Tutupa had improved enough to come out of hiding, but he was never completely well the 14 months I lived with him. Neither our medicines, nor those at the health center, nor those of his kinsmen brought more than temporary relief. In mid-September of 1971, when I left Sobeyagu, he was too ill to come to the good-bye party we hosted; he was weak and in hiding again. The next morning as we left, he crept through the tall grass at the side of the road, a towel covering his perspiring forehead, to whisper a furtive good-bye. I received word recently that Tutupa died in 1973.

(2) Introduction: Omegliso is Tutupa's eldest daughter, in her mid-30's, living with her husband and 2 children in Sobeyagu. This living arrangement and others like it are part of a conscious effort on the part of Sobeyagu'mo to increase their numbers. In late November, Omegliso gave birth to a third child who was "adopted" by her father's brother so that its name could be entered in the Sobeyagu-Megabo administration census book (rather than his father's group's census book). There is nothing of significance in Omegliso's medical history.

Her Illness: During the last month of her pregnancy Omegliso developed a very large sore (hepuhi) on her left breast above the nipple. This was an open infection, about 1 1/2" in diameter, very similar to the tropical ulcers that children get frequently (which heal quickly with daily use of anti-biotic, e.g., Neosporin, spray powder). Adults rarely get these sores though some women seem especially prone to them, developing them most frequently on the breasts, hips and buttocks. Nekematigi say these sores have no cause; they just happen. But, apparently because of the value placed on her and her children as new members of the district, Omegliso was treated for what in most people is simply an untreated ailment.

The senior curer sent her two small bamboo tubes of spring water which he had spoken over, recommending that her husband spray the contents of one tube over her breast by spitting and that she drink the contents of the other. They did so. A few days later, the curer prepared a poultice of banana leaf and fluid from the trunk of a banana tree which she applied to the sore. Four to five weeks after the second treatment, Omegliso's breast had healed and she was able to nurse her newborn comfortably.

(3) Introduction: Mebiso, third wife of Tutupa and mother of 5 children (2 living), is approximately 55 years old and in good health, though she has frequent back pains. She was not incapacitated by them, nor did she seek help from a curer, though I often saw her rubbing her back with nettles which she picked herself.

Her Illness: During February, when the entire district feared Mipomo sorcery, Mebiso's pains worsened. Since both her husband (case #1) and another woman living in their hamlet (case #4) were very ill, Mebiso and her daughter moved to her son's house. Initially some people speculated that her illness was the result of sorcery, others that it was due to the rains, others that it just happened by itself. Since she was not debilitated by the pain, tending her gardens regularly, no one found it wise or necessary to speculate further. After a week her condition worsened. She complained of pains in her head, her hands, her legs: "Every part of my body hurts," she said, reflecting that she had never felt this way before. She began staying inside or in front of her son's house, relying upon him or her daughter to tend the pigs and bring food for the household.

Her husband sent for Yasi, the junior curer, who prepared a lusakohi with a pig killed by a co-wife's son. Yasi left nettles and ginger for her to use afterwards. The day after the treatment ceremony, Mebiso felt no better so she went to the Sigerehe medical center hoping to get a shot. Later she reported that she had been given medicine "to eat" instead (most likely an anti-malarial). She

improved rapidly in the next few days, returned to her own house and normal behavior, and was not ill again while I lived there.

(4) Introduction: Abisaluga'e is a childless woman of approximately 50 years. exceptionally tall, robust and outspoken for a women, with a memory of only one serious illness, much like the one described below.

Her Illness: Abisaluga'e was disabled by a varying combination of muscular and internal pains from mid-December through March. The first I heard of her illness was on December 30. After a feast in honor of a newly married man, which she did not attend, her husband approached me asking for medicine. He reported that she had cold skin and pains in her stomach which "went up to her liver and her head." She had had these pains for 5-6 days and was unable to leave the house. Her husband reported that the senior curer had rubbed her with stinging nettles but it had not helped. I gave him aspirin for her to take that evening and the next morning. The next day I visited her. She said she had been staying in the house but today had come out to sit in the garden. She complained primarily of headache, feeling cold and pains in her back and shoulders (a systemic bacterial infection? helminthiasis?). According to her report, the curer had not only rubbed her with nettles but also had prepared a medicinal meal, with \$2 worth of pork purchased from someone in another district, and bled her on the shoulder blades and just above the hairline at the center of her forehead. She seemed perplexed, recalling that she had had a similar illness many years before and Loiy'e's lusakohi had cured her completely whereas this time "it only helped a little." Loiy'e, on the other hand, felt that he had cured her, that all she had was a cough, and was as uninterested in her case as she was in seeking him out for more medicine.

Three weeks after the first treatment, Abisaluga'e was still ill. She became increasingly weak and asocial. In late January, she was the only woman in the district not to attend a raucous all-night singing party for a menarcheal girl. On January 27 she sent for Yasi, the junior curer, to prepare medicine for her. He rubbed her with ashes and nettles on the places that hurt. Abisaluga'e reported later that his application of nettles had made her feel somewhat better -- about as much as the aspirin I had given her before. Her head and chest stopped hurting, so she began to work again but, after a few hours in the garden, her stomach and back began to ache again. Nevertheless, she was optimistic about Yasi's treatment and planned to ask him again if she continued to feel bad. On February 1, her symptoms remained the same: a pain in

in the head (latahatni nohibe); a round pain in the stomach (figeti gelito nobibe); a sickness/pain in the chest (libisa'mo nonEvEsibe), in the buttocks (feniti no nEvEsibe), and in the shoulder blades (glosati no nEvEsibe). She received more nettles from Yasi on this day -- he sent them home with her husband -- and every third day or so for the next several weeks. Yasi was not paid for any of this.

Abisaluga'e's illness was not a great hardship on her household since there were no children or visitors to be fed. Her husband and neighboring women brought food for her and, since she was always able to eat well, she was not regarded as very seriously ill. Since she is a fairly solitary person normally, many people were unaware of the course of her illness. No one, including Abisaluga'e, mentioned sorcery or any other likely cause of her illness, though it continued into the time when everyone was so afraid of the Mipomo (see #1b). Without further treatment she recovered completely by the end of March.

(5) Introduction: Ikapa is a man, 55-60 years old, with no history of serious illness.

His Illness: During September, Ikapa developed a sore knee; it was painful, swollen and caused him to limp (arthritis). After a day or two of discomfort, he asked the junior curer to treat it. Yasi used stinging nettles, first sprinkling ashes on both the leaves and the knee. (Many informants report that nettles are used in conjunction with ashes, especially for "loose joints," though Yasi is the only curer I know to actually use them in this way.) He repeated the procedure several times over a period of weeks. Neither man suggested a reason for Ikapa's pain (in many other situations painful joints are said to "come up by themselves" and are not treated). Ikapa continued to complain of a painful, "loose" knee for the next 5-6 weeks, though his limp disappeared after 10 days.

(6) Introduction: Metahafa is one of the oldest men in Sobeyagu, somewhere between 50-65, has had 3 wives and 18 children. He is in good health and reportedly has been throughout his adult years. He does recall having survived an attack of qu'nakafe'i though survivors of this form of sorcery are said to be very rare. He attributes his survival to his strength and good luck rather than to the care of any medicine man. This incident took place many years ago but Metahafa is now very afraid of any possibility of this type of sorcery. So, although he was not ill, he went into hiding during a January 1971 disagreement with a district suspected of allying with

the alleged inventors of gu'nakafe'i (see #1b).

(a) Illness Episode #1: Metahafa was first sick about a month after this sorcery scare. He reported pains in his back and had his youngest son (10-12) shoot him in the back with the miniature bow and arrow. Apparently unafraid of sorcery now, they did this right near the river and road, in full view of anyone passing by. Metahafa said he chose his young son for the bleeding not only to relieve his pain but also to teach the boy to perform medicine.

The timing of this episode and the treatment selected suggest social as well as medical motivations on Metahafa's part. During the previous weeks he and his older sons had been arguing over Metahafa's desire to initiate his youngest son and another boy. The older boys and some other men argue that these things of the past should be forgotten. While the outcome of the initiation dispute was still unclear during mid-February, Metahafa had already been defeated in a simultaneous dispute regarding sending the boy to school. The younger men and the boy's mother felt he should go; the father adamantly refused. In the end, the forces of modernization won out and the boy began school but not before days of shouting during which Metahafa beat his wife and threatened the whole lot of us with his bow and arrow. His illness provided an opportunity to demonstrate that he too had something to teach the boy.

On separate occasions during the next week Metahafa had an older son, his teenaged daughter and her mother bleed him again with the uti'i gimi. In each instance, he said a spell over nettle leaves and had his assistant rub his back with them before the bleeding. Metahafa also asked his other older son to bleed him but the young man refused, saying he was "afraid." This young man is a Seventh Day Adventist and takes seriously the mission's preachments against the use and practice of traditional medicine. Metahafa said he did not ask either Loiye or Yasi, the known curers in the district, for help, because they did not "know how." He may indeed have felt that way about Yasi who, by his own admission, was just learning medicine. But it is more likely that his reasons for not calling Loiye had more to do with the fact that the two of them were involved in an argument over the guardianship of their two daughters.

Metahafa had killed a pig for Loiye's daughter when she was a baby, at one of the numerous ceremonies held to mark significant events in the growth and maturity of a child. As far as he was concerned, he had "marked" her: he would kill pigs again when she menstruated for the first time and would receive payment from her father at that time; later he would negotiate and receive her bridewealth. Likewise, Loiye had been the designated foster father for Metahafa's pre-menstrual daughter. However, there had been

an argument between Loiye's mother and the girl's mother over one's chickens ruining the other's gardens. During the course of the argument, the hot-tempered Metahafa had stated that Loiye could no longer be his daughter's guardian. As a result of this argument, when Loiye prepared to celebrate his daughter's menarche in November, he did not inform Metahafa. Metahafa was offended but offered a pig anyway. Loiye refused the offer. He no longer wanted to be party to any exchange relationship with Metahafa. Consequently, Metahafa and his sons "boycotted" the feast. In mid-March, when Metahafa was ill, no reconciliation of these issues had been achieved.

The third week in March, Metahafa was still ill, complaining now primarily of headaches. He had another young boy bleed him, this time just above the eyebrows. He was never incapacitated by these pains in his back and head, never suggested a cause for them, and recovered by the last week in March.

(b) Illness Episode #2 : At the end of May, Metahafa developed severe pains in his stomach and liver. He said the pain made his neck "dry" (swollen, painful and lacking in saliva); he coughed and had difficulty breathing and swallowing. He regarded his condition as similar to that being experienced by Tutupa (case #1) and Gemasohafa (case #17) at the same time. Indeed, many people besides these three were ill during late May, June and July, with respiratory problems. Some informants attributed the widespread illness to the time of year, others to bad food, others to sorcery. It was generally agreed that Metahafa's liver pain and coughing were due to sorcery though no one cared to speculate as to the type of sorcery or the identity of the attackers.

Metahafa said he had been having pains for several days but on the evening of May 25 they became much worse and he vomited several times. So he came to me for medicine. Suspecting a combination of intestinal and respiratory (e.g., bronchial) infection, I didn't know what to give him and suggested that he go to the local aidpost instead. But his wife was ill at the same time and he didn't want to leave her until she felt better (he was obviously thinking of the several hours' walk to the health center, not of the five minutes' walk to the village aidpost). Nor did he want to seek treatment from either of the village curers. (The previous month the dispute between him and Loiye had peaked again.. Metahafa's daughter had menstruated for the first time and he asked Loiye to perform the first rite which involves dropping food to the girl from the roof of the house in which she is secluded. Loiye refused and the celebrants simply had to omit that part of the procedure -- no one else knew how to do it.) Metahafa considered treating himself

but, as it turned out, the day after his worst pain and vomiting, he arranged with his younger brother (not a curer) to rub him with nettles and use the uti'i gimi on his right shoulder. By May 30, although he continued to have pains in his back, his stomach pain, vomiting and coughing had ceased.

(c) Illness Episode #3: In late July Metahafa became ill again, this time with what people referred to as a "big sickness." His sons feared that he was near death; he had pains in his stomach, his skin hurt all over, and his throat was constricted and congested. Many men became involved in his treatment though, again, Loiye and Yasi did not participate. A Napayufa man from a neighboring hamlet and a brother from Orogei district each administered preliminary treatment in the form of psi'i and gupa'i. The local man has no special reputation for curing; he was "just trying," much as Metahafa's brother had in his previous illness. The Orogei man does have a reputation as a curer, comparable to Loiye's in his own district. Since he and Metahafa are brothers he came quickly when he heard of the seriousness of Metahafa's illness. Metahafa's sons purchased a chicken in town and the Orogei man prepared a lusakohi (because of the number of people who were ill at the same time there was a general prohibition on killing pigs; see pages 208-9).

Prior to the preparation of the medicinal meal, Metahafa was moved from his wife's house to a brother's house, more secluded and further away from the road. He was hidden so that sorcerers could not come and get a piece of grass or a chicken bone from the house where the lusakohi was prepared and use that to kill him. As an additional precaution, his son and another young man stood guard the night after the medicine was administered. The younger man thought he had seen someone run by the house, but too fast to see well or to shoot at. This story frightened Metahafa's son: in order for anyone to have passed the second guard they would have had to run right past him, and he had seen no one. He suspected that he himself had been the temporary victim of lakegusahi, sorcery which would have made him unable to see. The boys later tried to convince the rest of the men that they ought to cut down some of the trees that had been tabooed formerly, and break Metahafa's garden fences, in a mock mourning to make Metahafa's enemies think he had died so they would not bother to interfere with curing any further.

I was unable to see Metahafa after his seclusion but informants reported that this current attack had been cured quickly; his worst pain had passed and he was able to breathe normally again after just 2-3 days. He was still ill for several more days, however, as a result of a previous sorcery attack, the effects of which lingered

on. In general, men attributed his illness, the old and the new, to nalisa and speculated that Metahafa's old enemies, the Mipomo and Safanaga'bo, were responsible. After 8 days he had recovered completely and came out of hiding. There was no further talk of a mock mourning or any planned action against the suspected sorcerers. Metahafa attributed his recovery to the prompt and skillful medicine of his Orogei brother.

(7) Introduction: Melukaluto is a woman in her late 50's or early 60's, the mother of many children. During the last few years she has often been ill, and her stamina and persistent hard work in spite of recurring illness has earned her respect from her kinsmen. She was very gravely ill during the year preceding my arrival in Sobeyagu. She had been weak and in pain for many months; after unsuccessful treatment by many indigenous medical practitioners she was taken to the hospital in Goroka. There, according to her sons, she nearly died; only a complete transfusion of blood saved her. After her recovery in the hospital she stayed with distant kinsmen near town for several weeks. When she returned in Sobeyagu, in May or June of 1970, her husband sponsored a pig-kill and feast to celebrate her return.

Her "Illness": During 1970-71, Malukaluto continued to be ill frequently, though not as seriously, and rarely exhibiting normal illness behavior. Occasionally she would prevail upon her husband or her sons to pick the coffee, or upon her daughters to work in the garden for her; but, generally, in spite of recurring chest pain (chronic lung disease?), she was an active gardener and participant in community activities. She did not ask for treatment and rarely was medicine prepared for her, even when she was ill enough to require staying at home. When treatment was proffered, it was of the stage one variety, ginger and/or nettles. The two men I know of who sometimes brought medicine to her were from other districts; never was she treated by one of the local curers (though they had treated her in the past). She was described as "a woman who is always sick" or as a woman with "something different" than an illness; no one understood the cause of her condition and, apparently, it seemed hopeless for anyone to attempt seriously to alter it.

(8) Introduction: Avenigo is a mild-mannered, rather foolish man, considered a "rubbishman" by his peers. He is 35-40 years old, the father of one child; for the last 5-6 years he has had what he describes as "strong" stomach pains that sometimes keep him from working or walking about.

His Illness: In mid-November Avenigo came to me wanting medicine for stomach pains, saying that he had eaten spoiled sweet potato. I gave him Alka-seltzer on several occasions before I understood that he didn't really think it was spoiled food that caused his pain; he thought it was food that someone had put poison (nami) on when he had been visiting another district several years before. Others agreed that sorcery may well have been the cause, though the senior curer doubted this; no one recalled having made medicine for him in the past few years.

In mid-December Avenigo reported that his stomach pains had become worse and that his intestines were swollen and hard (intestinal blockage -- worms?). There were no other symptoms, he said, and his abdomen hurt only when he was working or moving about. When he "just sat down" it was alright. He himself killed a pig -- other people said it had been sick anyway -- and asked the junior curer to make lusakohi for him. Yasi di so, but in January, Avenigo came to me for medicine again. This time I gave him a milk-of-magnesia type of preparation. He reported that Yasi's medicine and mine had each helped a little bit, and after the end of January he no longer discussed his illness. When asked, he said he still had pains in his intestines from time to time, but he didn't think he was sick anymore. He did not seek additional medicine, nor was it offered.

(9) Introduction: The eldest son of Metahafa (case #6), Gigopatni is approximately 35 years old, living in Goroka and working as a truck driver for a local merchant. A strong, healthy man, he has no history of serious illness.

(a) Illness Episode #1: During mid-March when we were in town with Gigopatni's younger brother we heard that Gigopatni was in danger of sorcery. His house had burned the previous week. Then one night, his wife reported, he did not converse when he came home from work. And his brother -- a visitor who would normally receive much fond attention -- reported that Gigopatni did not even look up from the floor or respond to the offer of a handshake. In general he was withdrawn and uncommunicative: these are signs of gu'nakafe'i. His behavior, combined with the housefire which was assumed to be the result of enemy treachery, made his brother and wife afraid. So Gigopatni was moved to "the bush," that is, out of town, with his wife's kinsmen. He continued to go to work each day and did not complain of feeling ill but this was of little comfort to his family since the victims of gu'nakafe'i often don't know, or cannot say, what is wrong with them. When we returned to Sobeyagu and Gigopatni's mother heard

of his condition and the suspicions surrounding it, she and another younger brother went into town immediately to visit him, bringing food and stinging nettles. A few days had passed in the meantime and she found that, if he had indeed been ensorcelled, he had already recovered by himself. Before she arrived, Gigopatni's town-dwelling kinsmen had called a medical man from the native settlement who is a classificatory father of his. This man killed a pig and set about preparing a medicinal meal. Preparatory to this, he boiled a pot of water and bathed Gigopatni's body; during the bathing, the curer was reportedly astonished to find no evidence of sorcery. In his mind, since gu'nakafe'i involves an attack, there should have been at least minimal indication of the wounds, but there was none. So, since Gigopatni seemed to be feeling well -- and, by this time, was also acting normally -- it was concluded that either they had been mistaken in diagnosis or Gigopatni had somehow healed himself.

(b) Illness Episode #2: In early July, Gigopatni became seriously ill again. He did not describe his symptoms but sent word to Sobeyagu and Orogei that he wanted to see his father and brothers, that he was afraid he was dying. His kinsmen, including the senior Sobeyagu curer, desperately sought transportation so that they could get to town quickly. What followed our arrival the next day was nearly a repeat of the March episode. Gigopatni was no longer ill, though no more than 2-3 days could have passed since his message was sent. He felt well and exhibited none of the symptoms of withdrawal that he had previously, although he and his wife concurred that he had been acting peculiarly the previous days. He had seemed unable to speak and just stared off into space, or down at the ground. He had also been seized with an overwhelming fear of dying -- which is when he sent word to the village. The events leading up to Gigopatni's fears, as nearly as he and his kinsmen could reconstruct them, are as follows.

About 2 weeks previously, preparing to come out to a feast near Sobeyagu, Gigopatni went down to the stream behind the settlement to wash. He remembers washing, cleaning the towel, and putting one leg into his trousers. Just as he was about to put the other leg in, his thoughts became terribly confused, and the next thing he remembers is waking up in someone else's coffee grove quite some distance from the stream. He apparently was away from home several hours and when he returned, disoriented and uncommunicative, he had lost interest in coming to the feast. The consensus of the group hearing this story was that some men, or their spiritual agents, had shot irons into Gigopatni's body while he was dressing.

In accordance with this form of sorcery, they had also somehow been able to make him forget the entire incident. The group concluded that his fears had been justified: he had indeed come close to death. Since he had recovered it must have been that the sorcerers only shot him in the back and buttocks, having been unable (or forgotten) to shoot his stomach or chest before he stumbled away. Gigopatni's kinsmen attributed his recovery to the ineptitude of the sorcerers rather than to his strength; no medicine was prepared. Now over, Gigopatni's confusion and withdrawal became simply an interesting topic of discussion and conjecture rather than cause for alarm. To show his appreciation for his family's quick response to his danger, Gigopatni gave each of them some money as we departed. His father, not entirely convinced that he was out of danger, gave Gigopatni some Coleus leaves he had obtained from someone who claimed to know medicine for gu'nakafe'i.

(10) Introduction: Faya'i is a tall, strong girl in her mid-20's with no history of illness other than chills and difficult breathing which have sometimes led her to spend a day or two wrapped up in a blanket near her mother's or brothers' house.

Her Illness: On December 5, Faya'i was suddenly in pain and too weak to walk from her house unaided. She described her pain as "something inside the stomach that shoots up to the breast again and again." She spent this entire day sitting or lying inside or in front of her mother's house. Faya'i's brothers suspected that her ex-husband's clan might have ensorcelled her for running away. This was an unusual accusation inasmuch as her husband is from the nearby Megabo district, and Sobeyagu'mo usually insist that the Megabo'mo are friendly, that the two groups have not fought in many years, that they are now the same as clan brothers. But Faya'i's illness followed one round in a long series of unsuccessful negotiations regarding the return of her bridewealth (the outcome depending on an agreement as to whether she ran away or the husband was cruel and drove her away). Faya'i's brothers were afraid that she would die if she were not treated soon, but they were in a quandry: their father and the most respected medical practitioner were in the middle of an intense dispute (see #6). The day after the onset of her illness, Faya'i's brother took her to the household of a clan member who is an active member of the Seventh Day Adventist church. There, her brother -- also an SDA -- and the senior convert's family looked after her and prayed for her. After two days the boys also prevailed upon Loiye to come and prepare a lusakohi

for her and bought tinned meat at a local trade store for him to use. The treatment ceremony took place while she was still staying with the SDA family and they were praying for her recovery. Two days later she was well.

(11) Introduction: A 35-40 year old man, Loiye is the most respected curer in Sobeyagu. His personal medical history is insignificant, he recalls only occasional headaches, pains in the chest, and recurring pains in the liver.

(a) Illness Episode #1: In mid-September, Loiye and two of the other three adults in his hamlet were ill, though their reported symptoms differed (compare #13a). Loiye complained of being very tired all the time and having pains in his chest. He temporarily adopted the habit of napping in the morning, reporting that he felt stronger for a few hours immediately after sleeping. After his nap he was normally active, tending his gardens, gathering with the other men, etc. He attributed his illness to no cause, prepared nettles and ginger for his own use, and recovered within a week.

(b) Illness Episode #2: Having been well for 4 months, Loiye began staying in his house on January 11, complaining of pains in his liver, pains which he recalled having before (hepatosplenomegaly?). He was visited by a classificatory father from a neighboring district who brought betel and the news of the day. That afternoon, a neighboring family helped him with preliminary treatment. The wife rubbed nettles on the lower, right side of his back. Then her husband shot him 4-5 times in that spot with the uti'i gimi. Loiye then asked the woman to finish the shooting; she did it 4-5 more times. There was no verbal spell associated with either the nettles or bleeding (called, in combination, psi'i go'netobo). Loiye reported several days later that the treatment had helped a little, but then the pains had worsened again. Nonetheless, he was inactive for only the first 2 days. He did not fear sorcery, stating that "many men and women, from all over, have this illness from time to time. Sometimes it is very bad, but people do not die from it. It is not the result of sorcery, but happens by itself."

Two days after the preliminary treatment, Loiye cooked pork (which he had received at a wedding on the 7th) with ginger, mamufa, and a small assortment of other medicinal plants (in sort of a "mini-lusakohi"). The dish was prepared partly for himself and partly for another man who Loiye felt was suffering from "false malaria" (ufana, less serious than "real malaria," kana, which is caused by sorcery). Loiye described the meal as preventive rather

than (in addition to) therapeutic: eating it would insure that the illness would not come again.

On January 22, Loiye was still ill, complaining of liver pain (lughai'atni klabe nohave) and intestinal pain (nipalo nolibe), both of which came late in the afternoon and lasted through the night, but left in the morning, enabling him to go about normally during the day. Preparing no treatment himself, he asked me if I would buy a bottle of wine for him: several years ago, when he had had the same illness, he had been in town with his sister and her husband. They had drunk wine together and, though not intending it as a medicine, he began to feel better the next day. So, on February 3, we purchased a bottle of Mozelle in town (he had saved the bottle from the previous time so we knew what type to buy). That evening, he and I and two others shared the wine. On February 9, when asked if the wine had helped his liver pains, he reported that it had relieved them partially. Perhaps, he thought, if he had drunk the entire bottle himself, it would have done more good. In any case, he felt he couldn't be sure if it would cure him or not until more time had passed. Five days later he was completely recovered and stayed well for several months.

(c) Illness Episode #3: At the end of May, many people including Loiye were ill. He complained of severe headaches, pains in his fingers and in all his joints, and very hot skin. His eyes also watered (a viral or bacterial respiratory infection?). Loiye had two thoughts regarding his illness: either he had the same thing everyone else had, what he regarded as the relatively minor ufana, or he had kana, a feared illness from the lowlands. He was inclined to diagnosis it as the former except for the fact that he was not coughing as other people were. He was also puzzled by the pains in his arms and legs which seemed unusually severe; still, his skin did not shake and tremble the way he thought it would with kana.

During the next few days, Loiye asked for medicine from several people. He asked me; I gave him Codral, strong aspirin combination tablets. He asked his neighbor again; he asked Yasi, the younger curer; and he asked a Megabo man. Each of these men prepared nettles, ginger, bleeding, or some combination for him. He did not pay them, he said, because he had to send for them or find them; they did not come to him voluntarily. Loiye did not recover immediately and became resigned to wait and see what the effect of all this medicine would be. The Codral did not relieve his headache and he wore a warmed leaf of Cordyline tied around his brow to comfort. None of the other medicines relieved his other pains either, though he thought the last one (ginger and bleeding) might have helped because he was able

to sleep that night which he could not do before. In a few days, though still in pain, he resumed his normal activities.

On June 24, he felt worse again and stayed in his house; his primary symptoms were still pains in his back and liver. The evening before he had asked his neighbor woman to shoot him again with the uti'i gimi, in the lower portion of his back, but reported that it did no good. During the nights he woke up cold. His teenaged daughter stayed with him and sat up during the night tending the fire so he would be comfortable. During the day she gathered and cooked food for him. On the afternoon of the 24th, after sending his neighbor down to his coffee grove to gather nettles for later use, he went to the local aidpost where he was given an injection and pills to take that evening. On June 27 he was still staying near his house, too ill to attend a feast an hour's walk from Sobeyagu. Interestingly enough, though, when the returnees from the feast brought word that a serious fight was developing with another district down the road, he picked up his bow and arrow and ran with them to the designated meeting spot. The rumor turned out to be false and Loiye came back before the others, holding his side, complaining that the pain in his liver had become worse as a result.

By the next day his pain had lessened and he visited a neighboring hamlet where people were cooking pork they had received at the party. By June 29 he had recovered more and said he felt about like he did after drinking the Mozelle. He wished he had the money to buy more. So, on July 3, I purchased another bottle of wine for him. Reporting that he felt completely well now, Loiye planned to drink the entire bottle anyway in hopes that the illness would "really finish altogether" the way it had the very first time he drank wine.

(12) Introduction: Sokona'e is Loiye's mother, 55-65 years old. When she was just past child-bearing age, she had many illnesses; though neither she nor her contemporaries recall any of the specifics, she gives recurring illness as the reason for joining the Seventh Day Adventist church when it was established in the area in the early 1960's. She believes that following the SDA prohibitions on smoking, eating pork and chewing betel has been to her benefit because now, though old and thin, she is healthy and strong.

Her Illness: On November 1, Sokona'e stayed inside her house all day, saying she felt weak and her stools were watery and contained blood. She refused her son's offer of treatment because traditional medicine is prohibited by the SDA's. She requested medicine from me instead. Concluding that she had dysentery, I gave her Terramycin tablets 3

times daily for 4 days. During that time she was looked after very soliticiously by the young men of the district. One carried firewood for her, another killed one of his chickens for her to eat, and so on. She did allow her son to prepare a meal for her to relieve her stomach pain. He purchased tinned fish and mixed it with greens called nakofa, carefully explaining to me and to her that he used no ginger and no "talk" while preparing the meal. After 4 days, Sokona'e was recovered and out and about again. Her illness was said to have just happened by itself, perhaps because she had been "a women who got sick alot."

(13) Introduction: Utitiha is a married woman, 35-40 years old, mother of 4 (3 living) children, rumored by other women to be lazy and deceptive (e.g., eating ginger to prevent having more children), envied or resented perhaps because of the active role she takes in the public affairs of men. She is a small woman and thin; she does not have the "potbelly" that most women of childbearing age do. Though she had not been sick a great deal in the past, she was ill frequently during 1970-71.

(a) Illness #1: From mid-September through early January, Utitiha seemed to have a low-level illness all the time marked by crises which were treated. She was first ill on September 16 with what we would probably call a "cold," an acute upper respiratory infection. She stayed home from her garden complaining that she ached all over, her eyes watered and she was coughing and sweating profusely. The next day, with no treatment, she felt better and was involved in the negotiations regarding a district-wide feast. Her symptoms returned every second or third day for a week, but she kept active rather than staying in her house again. Then she was confined to her menstrual hut (Throughout these 4 months, the peaks of Utitiha's illness seemed to occur just before, or coincide with, her menstrual period. Though menstruation does not require complete confinement, women tend to stay in or near their menstrual huts, keeping out of public view by using separate paths, and cooking only for themselves. In this case, Utitiha's monthly withdrawals from public activity make it somewhat difficult to assess what part of her behavior was illness-related and what was related to social conventions surrounding menstruation.)

Having felt well for a few days, Utitiha developed pains on October 15 that disabled her for 5 days. She described them as follows: "It starts here [pointing to her left side, just below the ribs] and goes around the back up to the shoulder blade, then up the neck and to my head." On October 17, Loiye (who lived right next door) made preliminary medicine for her; he rubbed the painful

parts of her body with nettles, then spoke over a piece of ginger he gave her to eat. He planned a complete lusakohi for 3 days later. On the morning preceding the planned treatment, he bled her with the uti'i gimi, above the temples and on the upper arms. Then he warmed a leaf of Cordyline in the fire and tied it tightly around her forehead. On the 20th, she was strong enough to walk again, but they went ahead with the lusakohi. Utitiha's illness was serious, but not so serious as to merit killing a pig: her husband gave \$2 to one of the young men who purchased a piece of mutton in town for the medicinal meal. The curer speculated that her illness might be the result of sorcery, or the rains which had just begun, but neither he nor anyone else could decide. Utitiha's husband paid Loiye 40¢ for the curing ceremony, which was attended by her husband, 2 of their children, her sister's husband, the curer and his brother, and included a variety of Loiye's favorite spells, use of nettles and bleeding (with betel-chewing lime applied to the wounds), in addition to the meal itself. Utitiha recovered somewhat and worked in her gardens for a few days, but on October 24 she began menstruating and became inactive again.

On November 2, suffering from a headache, Utitiha asked Loiye to repeat the procedure with the bleeding and Cordyline. He did so the next day. She was well again until the 18th when she began complaining of head and chest pains once more. Again she described her pains as circular -- "going around" her chest and back: She also reported that the pains came and went, quickly and sharply. Despite her pain, Utitiha attended a feast for Loiye's menarcheal daughter held that day. The next day she was inactive, saying she stayed home partly because of her increased pain and partly just to sit and "look at" her youngest daughter who just returned from living with her grandmother. On the evening of November 22, Utitiha's mother killed a small pig and Loiye made a lusakohi for her again. Though no cause was adduced for her illness, Utitiha was not curious. She was confident that since Loiye's prior efforts had made her feel better, he would again determine the correct medicine and cure her whether there was sorcery or not. However, on the 23rd she menstruated, and when she came out of confinement several days later she felt "only a little better," saying that she had all the same pains as before, only not as severe. She did, nonetheless, resume her normal activities.

On December 2, Utitiha's husband also became ill. The two of them decided that their house must be full of poison -- and, for that reason, I was advised by others not to visit there. Recalling that, when she had visited her father's brother in her home district, she had felt better, Utitiha decided to move the entire household there. She

and her husband did go to Liorofa for a few days and, on the 9th, to an even more distant district -- primarily to collect Pandanus nuts, but also to get medicine there if they could. When they returned to Sobeyagu on the 12th, Utitiha was well but her husband was worse so they moved again to Liorofa for two weeks, Utitiha returning to Sobeyagu each morning to work in her garden.

Her condition vascillated almost daily for the next few weeks, and sounded to me very similar to what Abisaluga'e (case #4) had at the same time. Other informants said they thought the two women probably had the same illness, though Loiye was doubtful. The difference in the behavior of the two sick women is noteworthy. While Abisaluga'e sat in or near her house for weeks, Utitiha was generally as active as ever. Indeed, she brought food to Abisaluga'e during this time. By the end of the first week in January, with no additional treatment, Utitiha recovered completely and moved her household back to Sobeyagu.

(b) Illness #2: On June 23, she became ill again. This was during the period when many Sobeyagu'mo were ill with respiratory congestion and chest pains, but Utitiha's reported symptoms were somewhat different from others'. Rather than coughing, watering eyes and the like, she complained of stomach pains and "skin pain" in her arms, chest and back, explaining: "asaga nagufa nagabu' nohi" -- "every place hurts." No one knew the cause of her illness and she went that day to the local aidpost where she received an injection of penicillin. The following day her husband and eldest daughter went to the curer's garden and picked leaves of psi'i which they rubbed on her. She was partially disabled for three days and suffered a two-day recurrence in July, but the illness had passed.

(14) Introduction: Maguya'e is Utitiha's husband, approximately 40 years old, with no history of illness.

His Illness: In early December, while his wife was recovering from her illness, Maguya'e began reporting headaches and muscular, or skin, pains. They moved to her father's district to get away from the illness in their house, then returned when she was better. He remained active until December 12 when he reported very intense headache, difficulty seeing, and an inability to sleep. He stayed in his house during the day and his daughter was instructed to stay with him and keep a fire going. The next day he and his wife moved to Liorofa again, planning to stop at the aidpost there and get a shot for him, but no one was there when they arrived. Two days later, one of Utitiha's brothers bled Maguya'e with an uti'i gimi.

By the end of the week he recovered.

(15) Introduction: The daughter of Utitiha and Maguya'e, Sigeripa is 7-10 years old and healthy, having passed the stage where the wasting diseases of childhood are a threat to survival.

Her Illness: Sigeripa's first sign of illness, on the afternoon of February 10, was what her mother described as a pain in her liver, slightly off to one side of her abdomen. (I suspected a gastric upset and/or helminthic blockage.) Their neighbor and medicine man, Loiye, rubbed her chest and intestinal region with nettles that evening, but it brought no relief. Two days later her pain had intensified and become localized in the area around her navel. On the afternoon of the 13th her father asked Yasi, the junior curer, to make medicine for her. Yasi determined that a "snake" might be "eating her belly." ("Snake" is a generic term, in both Bena Bena and Pidgin, which includes actual snakes, eels, and a variety of worms.) In order to kill the snake, Yasi gave her a mixture of water, kerosene and salt to drink. Crying long and hard over the taste and her discomfort, Sigeripa finally drank about 1/2 cup of the mixture. The next day, however, she was still not eating and her stomach pains caused her to cry when she attempted to move unassisted. Her mother's mother moved in to look after her while her mother left the house to garden, tend the pigs, etc. Sigeripa spent some time sitting in the sun, singing or playing with stones, but most of her time inside the house or sitting piggy-back style on her grandmother's back -- the pressure of her stomach against the older woman's back temporarily relieving the pain. That afternoon, Metahafa, an older man of the district, rubbed her with nettles that he had grown and given his own spells. Sigeripa was able to sleep restfully that night and her parents thought Metahafa's medicine had been more effective than Yasi's. But the next morning she was still in pain and now there was blood in her feces as well. The next evening, Loiye prepared a lusakohi for her, reflecting that her illness was very serious; though not unusual, its cause is unknown.

Sigeripa's illness, though short-lived, taxed the medical resources of the community -- indigenous and imported. During just 4 days she received treatment from three different men, each generally inexplicit about their diagnoses and widely differing in their techniques. Two days after Loiye's curing ceremony, which included bleeding, a good deal of stylized ritual, and a wide variety of spells by her parents and their brothers as well as by the curer, she was still in pain, so her mother took her

to the aidpost hoping to get a shot. During the next week the family continued to seek medicine for her from a variety of medical practitioners: her father obtained nettles from men of at least three neighboring districts. He also took her to the medical center at Sigerehe. There she was given an injection, but I do not know what it was. By February 28, three weeks from the onset of her pains, Sigeripa was recovering, eating normally and strong enough to walk about unassisted. Her parents attributed her recovery to the shot she received at Sigerehe, unhappy that their local practitioners' medicines were not stronger.

(16) Introduction: Nemehiyale, an infant boy, was born in mid-December, a birth which his mother tried to hasten by having Loiye rub her abdomen with stinging nettles and from which she suffered three days of what she described as unusual post-partum pain. Though Nemehiyale was never seriously ill, his mother was unusually quick to seek treatment whenever he showed any signs of illness.

(a) Illness #1: In March, when Nemehiyale was nearly three months old, he developed a cough for no reason anyone could ascertain. His mother took him to the Sigerehe health center where he was examined but given no medication. The cough soon passed.

(b) Illness #2: At the end of March the infant developed diarrhea, again for no known reason. Again his mother took him to the health center and he was examined but given no medicine. His stools became normal within 4-5 days.

(c) Illness #3: In mid-June Nemehiyale developed a fever. For no obvious reason, his skin was alternately hot and cold and his eyes were watery and matted shut. On this occasion his mother called for Metahafa, a very minor local curer, to make medicine for him. The medicine was a combination of lusakohi and a preliminary treatment often prescribed for headache. He first prepared a mixture of water from the trunk of a banana tree (labli) and Coleus (moipa) leaves. This mixture was poured over the infant's head. The lusakohi was prepared with tinned fish, seya, mamufa, kukua'i and agepa. The curer and the infant's parents ate of the mixture, trying unsuccessfully to induce Nemehiyale to eat some of it as well. That evening his mother commented that he was breathing and sitting up better; she seemed pleased with the results. But the next morning she reported that he was no better after all, and took him to the medical center. Once

again, however, the mother complained that he was given no medicine there, claiming that they just scolded her for not bringing him more often to be weighed. Nonetheless, within 3 days, the infant had become normally healthy again.

(17) Introduction: Gemasohafa is a man in his early 40's, a respected Sobeyagu'mo though very short of pigs (partly because of all those he has killed for Tutupa's illnesses, see case #1), who has been ill off and on for the last few years.

(a) Illness #1: In mid-September of 1970, Gemasohafa came to me asking for medicine. He reported pains in his stomach and his back; he described them as sharp, overpowering pains that came and went quickly. He was sweating profusely. When I heard that he had been treated for similar symptoms with no lasting success, I was reluctant to give him anything. Several of the younger men advised him to go to the hospital in town. He did not. Instead, he stayed in his house, doing no work, for two days and recovered gradually over the next week, with no treatment and no cause for the illness having been adduced.

(b) Illness #2: Gemasohafa's most serious and long-lasting illness began in early March 1971. On March 5 he developed a very large, solid-feeling swelling in his neck, just below the chin. Very large for a glandular swelling, it might have been a goiter but for its rapid onset and disappearance, lasting only two weeks (and for the fact that goiter does not appear to be a problem in this valley). Along with the swelling, he complained of headache. The swelling was attributed by other men to keyakapo sorcery but Gemasohafa did not seek treatment.

After a few days, during which he developed a serious cough, Gemasohafa left his house and went to live in hiding with a man whose house was well-secluded and off the road. There one of his clan brothers slaughtered a pig and a curer from another district prepared a lusakohi for him. I did not observe the treatment ceremony, or the negotiations regarding it. Gemasohafa's kinsmen were quite certain he had been ensorcelled and especially anxious because of the death omen observed on March 7 (see 1b). Frightened of sorcerers finding out about and interfering with his treatment, they became very secretive; in fact, many of the women from Sobeyagu were told that his absence was due to him having gone to Goroka or to visit his son at school in Chimbu.

After two weeks, although the swelling in his neck had gone down, Gemasohafa had become completely incapacitated.

He could not work or eat or sleep; he cried out at night in pain or delirium. He reported severe pains in his stomach, back and limbs as well as diarrhea and continuing cough and headache. One or two men stayed with him at all times to care for him and observe any change in his symptoms. His wife visited daily and brought food to him and those sitting with him. Yasi, the junior curer, treated him with stinging nettles as did at least one other man from a neighboring district.

On March 21, when it looked as though Gemasohafa's condition was deteriorating rapidly, I was asked to write a note which the young men could carry to the staff at Sigerehe. The note requested them to send a care to take Gemasohafa to the medical center there.

There was a brief argument between one older man, Gemasohafa's brother, and the younger men as to the wisdom of such a move. The disagreement centered not on the suitability or unsuitability of government medicine but on the potential dangers of sorcery while he was away from home. Despair over the apparent ineffectiveness of their own medical attempts lent strength to the young men's position. The medical car came that night and Gemasohafa was admitted to the health center.

On March 23, Gemasohafa's wife and I visited him (she also hoped to get medicine for their son at the same time, see #16b). The medical orderly had diagnosed him as double pneumonia but prescribed no medicine, planning to observe his condition and obtain further advice from more skilled personnel in town. His older brother also visited Gemasohafa that morning bringing cooked sweet potato. Nekematigi regularly complain that at government hospitals (and jails) the only food served is brown rice. They do not like brown rice as well as polished rice; moreover, although they regard rice as a pleasant luxury food, they do not believe it will make one strong or satisfy one's hunger. Only sweet potato can do that. Gemasohafa's wife had also brought sweet potato, though uncooked. This led to a great deal of concern when it was discovered that there are no cooking facilities for patients at the health center. She considered borrowing a saucepan from friends living near Sigerehe but decided against it, afraid that word would get out about Gemasohafa's illness and the friends would want to kill a pig for him, creating both the potential for sorcery and a new exchange obligation.

On March 29, the Sigerehe center transferred Gemasohafa to the hospital in Goroka. The chief concerns of his kinsmen continued to be that he receive proper food while there and that he not be left alone. Every other day or so someone from Sobeyagu went into town. The clan met regularly to gather money for their carfare and for

Gemasohafa's medical expenses (he was being charged 20¢ per day for medicine). After Gemasohafa had been in the hospital a week, he reported to some of the young men that his arm and leg had "died." That is, they were numb, he could not feel them -- they had "gone to sleep" in our folk terminology. After discussion with the older men, the boys concluded that a spirit must have "fastened" or imprisoned the souls of his arm and leg. To free them, they received instruction from some young men in a neighboring district and performed the ceremony to remove the effects of numulitEna'i (see Chapter Three), later taking a parcel of ceremonial food into Gemasohafa at the hospital.

The diagnosis of hospital personnel changed as frequently as that of Gemasohafa's kinsmen. Initially, his chart read "gastroenteritis (?), malaria (?), [sic] query for TB." According to his visitors, Gemasohafa's throat had been cut during the second week of his confinement and he was being supplied air through tubes. His chart, however, never recorded tracheotomy or other surgery; nor did I ever see any physical signs of surgery. It is possible that he was being force-fed for a few days by means of a swallowed tube though I was unable to verify this. Later his hospital chart indicated negative for tuberculosis but positive for a chest infection of some sort (unspecified). He was being given regular doses of Streptomycin.

On April 30 Gemasohafa ran away from the hospital. He was still suffering from pain in his chest and back, and coughing. But he said that the doctor at the hospital had told him it would be "one Christmas," that is, one year, before he was well again. The thought of spending that long in the hospital frightened and angered him, so he came home. Rather than returning to Sobeyagu, Gemasohafa hid for a few days with a married foster daughter in a neighboring district. Then he hid for nearly three weeks in Sobeyagu in an abandoned garden house. His kinsmen stayed with him and his wife brought sweet potato daily; others brought specialty foods like boiled chicken. During this time he was treated by Loiye, whom he paid 80¢, by a man from Megabo whom he paid \$4, and by a man from Fagasa whom he paid \$6; in addition, the Megabo aidpost orderly was bringing him antibiotic tablets from time to time.

By the end of May, although he was still weak and in frequent pain, Gemasohafa returned to his own house and began working fairly regularly in his gardens again. In early September, however, events took a surprising turn. A medical team from town arrived in Sobeyagu one day; explaining that an earlier assessment of tuberculosis had

proven to be correct, they insisted that Gemasohafa return to the hospital with them. They returned two days later for his wife and children who were given tests and immunization shots. In November, after my departure from the field, I received word that Gemasohafa had been transferred from Goroka to the Butaweng hospital in Finschafen on the north coast of New Guinea. There he stayed, according to my correspondence with the sister-in-charge, receiving treatment for tuberculosis until July 1973 -- nearly two years. At that time he was allowed to return home; regular follow-up checks were planned to prevent a relapse.

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