MEDICAL ETHNOBOTANY OF SELECTED GROUPS OF PEOPLE OF SOUTHERN MICHIGAN

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ABSTRACT

MEDICAL ETHNOBOTANY OF SELECTED GROUPS

OF PEOPLE OF SOUTHERN MICHIGAN

By

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A population of southern Michigan residents with professed interest in plants and/or nutrition was sampled in an attempt to determine its medicinal uses of particular plants. Written surveys were the vehicle of data collection and were administered to groups and individuals selected in non-random fashion. One hundred-sixty questionnaires were analyzed for medicinal usage, frequency of use, association of usage with various demographic controls, and attitudes and practices in relation to medicine, both self-administered and professional. In addition, a market survey of local natural and health food retail outlets was performed in order to determine herbs and spices of medicinal value available commercially.

Questionnaires were administered at group meetings of botanical, edible weeds, organic gardening, and nutrition-oriented gatherings. Information was also collected through distribution of forms in natural and health food stores. Various criteria were applied to select questionnaires for analysis, which resulted in 160 surveys available for study.

The sampled population provided self-description in relation to age, gender, occupation, health status, education, income, residency (birth, current, most of life), and ethnicity. Nearly one-third of the sample was male. Ages ranged from 18 to 86, with relatively even distribution from 21 to 70 (in ten-year intervals). Half the sample

possessed 12 years or less of education, and half had earned bachelor's degrees or beyond. The majority was employed as profession, technical, or related workers, or as private household workers, housewives included. Nearly all considered their health good, great, or excellent, and most stated an annual income of less than $15,000l. Urban residence was predominant currently, at birth, and for most of life. Most of the population were of European or British derivation.

In relation to plants, 138 common names (58 families) were reported to be used medicinally. Such medicinal uses were listed as well as relative frequency of use. Maxima, minima, mean and standard error of usage frequencies were calculated. Chi-square analysis showed no significant relation between usage of wild plants, herbs, and spices and the demographic controls. The exception was that of finding usage of selected herbs and spices dependent upon gender (significance level greater than 0.01).

The market survey demonstrated that nearly all the herbs and spices reported used in a medicinal manner were currently available at the retail level. Price range was reported as well as uses, if any, for which the plants were marketed. An estimate of annual sales volume was also established for the best-selling herbs.

Further analysis showed that preventive medicine (as opposed to symptomatic) was more prevalent both in personal use of medicinal plants and in seeking of professional aid. Nearly all of the sample believed nutrition to have an important relation to health, and half responded affirmatively to medicinal use of plants. Although over half reportedly visited a doctor five or fewer times per year (averaged over the past five years), self-treatment of minor ailments exceeded professional

treatment in nearly all cases.

MEDICAL ETHNOBOTANY OF SELECTED GROUPS OF PEOPLE OF SOUTHERN MICHIGAN

By

Helen Klekman

A THESIS

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DEDICATION

To my parents, Jean and Philip Miller, whose firm respect and gentle care of plants has set a clear example, and to my husband, Leonard Klekman, whose humor, love, and strength of character made this work possible.

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LIST OF SYMBOLS AND ABBREVIATIONS

c = Number of columns
d.f. = Degrees of freedom
E = Expected value
n = Sum of observed values
N = Total number of plants (common names)
O = Observed value
SE = Standard error of the mean
r = Number of rows
x = Number of recorded uses/common name
$\bar{x}$ = Mean number of recorded uses/common name
χ^2 = Chi-square

bk = Bark
fl = Flower
lv = Leaves
rt = Root
sd = Seed

FP = Forest Potawatomi
Mn = Menomini
Ms = Meskwaki
Oj = Ojibwe

INTRODUCTION

1. General

Use of healing plants by man to ease pain and suffering has been practiced and recorded for centuries. In more recent times, with the development of technology, a battery of drugs has appeared with which to treat a multitude of ills. Plant sources account in one form or another for many of the medicines of the present world, including quinine, reserpine, digitalis, and aspirin. Cultures primitive in a material sense have been studied in relation to their plant medicines, methods of treatment, and attitudes toward illness in hopes of further extending the means of relieving illness and treating disease.

It has been observed that not only materially poor cultures make use of green medicines, but also that folklore of cultures more advanced materially often provides reference to healing uses of plants. An objective of this study was to determine what, if any, medicinal uses persons of a small area of the Midwest make of plants today. In addition, an indication of relative frequency of medicinal usage made of food plants, herbs and spices, and wild plants was sought. Information regarding availability of herbs and spices at the retail level was also considered relevant, both for comparison with those plants used by the population and for future economic comparisons. Further, an attempt to obtain data revealing attitudes toward medicine, both professional and self-administered, was made.

Uses, extent of usage, and attitudes were sought through the vehicle of a written questionnaire administered to selected residents of southern Michigan. The market survey was obtained through personal examination of local (Lansing-East Lansing-Okemos) health and natural food stores. Thus, it is hoped that addition to the knowledge of folk medicine of even this restricted population may supplement in a small way the healing strength available today to those in need.

2. Review of the literature

In an attempt to understand the history and development of man's interaction with plants and, in particular, cultural usage of healing plants, it is beneficial to maintain an interdisciplinary outlook. Such fields as botany, ethnology, archeology, linguistics, musicology, religion, and chemistry (Schultes, 1960) as well as medical anthropology, pharmacology, biochemistry, phytochemistry, and paleobotany can be integrated. In regard to goals or utilization of such investigations, it has been said that "while heeding the historical outlook and reporting recent discoveries,... there may be kept in mind the future or potential of the plant kingdom as a source of new biodynamic compounds." (Swain, 1972)

Plant uses have long been reported, with one of the first existing records that of Sumerian ideograms dating to 4000 BC; ancient Chinese, Indian, and Egyptian texts likewise give evidence of human interest in and usage of the green life forms, according to Schultes (1960). Other references of value for historical information include a brief account of place of origin, history, and use of 31 medicinal herbs (mainly European) with illustrations (Lehner, 1962) and a history of Amerindian medicinal plant usage encompassing in some cases usage

history of the settlers (Weiner, 1972; Vogel, 1970).

Many of the following references do present a history of the species of medicinal plants or groups of same, so that a more inclusive list of historical references is not given here. Respectful mention must be made, however, of de Candolle's Origins of Cultivated Plants and Sturtevant's Notes on Edible Plants (edited by Hedrick) as invaluable references for origins, in particular.

In examining recent ethnobotanical and ethnomedical literature, mainly of the past fifteen years, it has become apparent that several methods of investigation have been utilized. In relation to ethnobotanical research, approaches have been outlined by Schultes (1960) as (1) survey of the literature for reports of therapeutic uses or beliefs about plants, (2) chemical investigation of definite floras or of chosen families or genera of plants, and (3) field study of botany amongst primitive peoples. (He notes also the constant overlapping of field work and bibliographies.)

Literature of an ethnobotanical nature treated in this study deals mainly with field studies and literature surveys, often with the two combined in a single reference. The basic form of such reports seems to be that of focus upon a single (or several closely related) species or upon a single usage of one or more species.

Some instances of the first approach would be (1) the use of Ptelea trifoliata in North America by colonists and Indians and the Tarahumara of Mexico as well as medicinal uses in 18th century Europe (Bailey, 1960), (2) examination of medical texts of the ancient Near East as well as the Dead Sea Scrolls, New Testament, and various astrological treatises with main focus upon Amanita muscaria (Allegro, 1970), and (3) a brief history of Cannabis in various cultures with

medicinal uses included (Drake, 1971). (The services of the Department of Health, Education, and Welfare's National Clearinghouse for Drug Abuse Information should not be overlooked; they provide abstracts of published research available free upon request.)

Studies of the noted ethnobotanist, Dr. Julia F. Morton, of a similar nature include a report of specific medicinal (and dietary) uses of the emblic, Phyllanthus emblica L., in Asia as well as chemical analysis of the plant and pharmacological action of certain constituents (Morton, 1960), medicinal properties and uses of the genus Casimiroa (the white sapotes) of Mexico and Central America (Morton, 1962), and the prominence of the calabash, Crescentia cujete, in the folk medicine of the West Indies and tropical Americas as a remedy for coughs, colds, etc. in addition to its uses in India and South Africa (Morton, 1968).

Examples of those studies dealing with a single usage of one or more species are mentioned next. Chaney (1931) has discussed the geographic and taxonomic distribution of plant arrow poisons utilized in various areas of the western hemisphere. He included also the part of the plant utilized and the alkaloid(s) present with associated property or action. History of medicinal and social usage of pain-relieving species (about 80) such as mandrake, hemp, and belladonna as well as their structures has been summarized by De Ropp (1957). Harner (1973) has collected a series of articles on hallucinogens and shamanism, with a report upon the use of mushrooms for healing purposes among the Mazatecs of Mexico.

Schultes and Holmstedt (1968) have published the preparation and usage of the myristicaceous snuffs by medicine men and tribesmen of the Northwest Amazon. A summation of interdisciplinary studies of plants

sacred in primitive cultures, including 13 families with hallucinogenic properties and several with species of medicinal relevance, has been reported by Schultes (1969). Finally, Wyman and Thorne (1945) report the use of Cicuta and several other species for ritual suicide among the Iroquois and California Indians.

Another method of botanical research involves examination of herbaria for records of collection and distribution of medicinal species and possible notes on their usage. Dr. Siri Von Reis Altschul has accomplished much in this area. Her publications include a discussion of the advantages of utilizing herbaria for phytomedicinal data and methods of data compilation (Von Reis, 1962), comments upon the overlap of folk medicinal and food plants (Altschul, 1968) and details of a search of the Harvard Herbarium--of 3700 notes of interest, 14% were possibly related to psychopharmacology (Altschul, 1967). Of that 14%, the following categories of interest were examined: analgesics and anesthetics (31%), depressants (22%), excitants and stimulants (20%), common names of interest (17%), ritual materials (6%), narcotics (3%), and intoxicants(1%).

Botanical research of other than strictly ethnobotanical nature may present highly relevant findings such as Meijer's investigations of Podophyllum peltatum for its potential as a cash crop plant. Meijer presents a survey of the current status of knowledge of the medicinal value of the mayapple. Research of chemical, pharmacological, and clinical nature has revealed that several compounds present in Podophyllum may possess anti-viral properties. Further, it has been observed in the last thirty years that Phyllotoxin, a constituent of the resin, exhibits anti-mitotic activity. Herbarium sources were consulted to compile a distribution map, which was then interpreted by comparison

with a number of climatic parameters. The survey included location of optimal conditions and expressed hope of stimulating further experimentation with climatic requirements.

In addition to the research of ethnobotany, ethnomedicine and medical anthropology contribute to knowledge of healing plants. Focus upon cultural usage of medicinal plants, or inclusion of such in a cultural or community study, may involve both anthropological and botanical viewpoints; a brief review of such literature follows.

Bandoni et al. (1972) have surveyed 56 Argentine medicinal plants of popular use. They have included common name, habitat, use, chemical composition, and results of phytochemical screening. Margaret Clark (1970) has studied health in a Mexican-American community of California where folk medicine is practiced extensively. She includes 31 curing herbs with uses, descriptions of the curandero's methods, disease theory, and interaction of folk and modern Western medical practices and beliefs. Holland (1963) describes herbal remedies used by curanderos of Chiapas of southeastern Mexico, including plant names, uses, and commentary.

Isabel Kelly (1965) has studied the use of herbs in modern North Mexico for major and minor illnesses as well as for maternity. She lists herbarium specimens as well as examines ancient remedies of Mexico and Europe. Madsen (1955) has presented a treatment of shamanism in Mexico with brief mention of some healing herbs. The role of coca, Erythroxylon coca, in the history, religion, and medicine of South American Indians has been summarized by Martin (1970) who has included medicinal uses among 19th century doctors of the United States and Europe.

Metzger and Williams (1963) have studied the rôle of the curer in Tenejapa (Mexico) medicine, involving skill in the use of medicinal plants. The association of specific plant remedies with specific illness is well-known among all adults. Pennington (1965) has studied the Tarahumar (Mexico) culture and its relation to the physical environment. He includes a chapter on ceremonial and drug plants with 53 families of plants utilized for medicinal purposes.

Occurrence and usage of Egyptian medicinal plants was observed during three years among the desert Beduoin, oasis dwellers, and Nile Fellahin (Osburn, 1965). A brief historical development of Southeast Asian drug plant literature has been developed by Perry (1961), who also deals with problems of language, identification, and curing usage.

Medicinal uses of plants by the Indians of the Missouri River region are included in Gilmore (1919). H. H. Smith accomplished in the early twentieth century a series of ethnobotanical reports upon the Indians of Wisconsin, including medicinal plants and usage as well as tribal history. He dealt with the Menomini (1923), Meskwaki (1928), Wisconsin Ojibwe (1932), and the Forest Potawatomie tribes (1933). Yarnall (1971) has compiled listings of usage by species used by Indians of the Upper Great Lakes Region, medicinals included.

Plant medicines may be mentioned specifically or incidentally in research of ethnomedicine or medicinal anthropology, which has been described by Fabrega and Silver (1973) as follows. Studies of illness and medical care in a group may utilize an (1) epidemiological approach, designed to determine level and distribution of disease in a human community, (2) ecological approach examining the biological characteristics of persons living in isolated groups with the intent of gaining knowledge of how they are affected by characteristics of the ecosystem, and (3)

ethnomedical outlook emphasizing analysis of problems of illness and medical care in relation to other cultural activities of the group, with perception of illness viewed as an example of the way behavior is structured and organized by underlying roles.

Further, according to Fabrega, ethnomedical literature reveals several methods of analysis of illness episodes. "They may be treated as indicating a point of stress and dysfunction in the sociocultural unit." The illness may be examined "in terms of religious and other supernatural ideas...expressed in symbolic actions, rituals, and practices exercising powerful influence on the behavior of the sick one and his family." (The latter approach differs from the first in focus upon issues of process and symbolism.) Finally, "an illness may be analyzed as an instance of the way socio-cultural patterns shape both the expression of disability itself and the general aspects of illness and medical care."

References focussing primarily upon anthropological concerns are next discussed. Dr. Arthur J. Rubel (1960) has studied disease concepts of a Texan Mexican-American community as well as some aspects of plant medicines. Further research on current healing rites for soul loss (susto) in Hispanic America includes use of various healing herbs (Rubel, 1964). Another study of a Mexican-American community of Texas with a chapter on illness behavior and attitudes which mentions herbal remedies has also been developed by Rubel (1970).

Akerknecht (1947) has described the use of plant medicine in primitive surgery, particularily in wound treatment, fractures, dislocations, and caesarean sections. Frake (1961) has examined diagnosis of disease among the Subanum of the Southern Philippines with herbal treatments of general use among the population. Romanov (1965) has made an

analysis including the healing hierarchy of a Mexican-American population in southern Texas. A study focussing upon a Mayan community's views of illness and its organization with respect to medical treatment with a section detailing illness terms and treatments, including use of herbs, has been completed recently (Fabrega and Silver, 1973). Castaneda (1968) completed research on a Yaqui 'brujo' from Sonora, Mexico, who utilized peyote, Datura, and mushrooms for healing. Some details of plant collection, preparation, and usage are also given. (Further works of Castaneda deal with methods of developing and applying healing knowledge.) Stopp (1963) has researched attitudes toward illness and disease of the Mt. Hagen people of New Guinea. He includes a listing of species with occurrence, use, and vernacular names.

Finally, suggestions concerning research methods and extensive bibliographies may be found among the publications listed in this and the following paragraphs. Ackerknecht (1945) has discussed the relevance of concern for further research in ethnomedicine and ethnobotany and specific suggested topics for field work. Various approaches used by investigators are discussed with a main focus upon phytochemical screening (Farnsworth, 1966). According to Raffauf (1960), the search through the plant kingdom and herbal medicine of various cultures appears to require limits such as (1) specifying what is sought, (2) where it may be expected to occur, (3) how it can be identified, and (4) defining obstacles to obtaining it (1960).

Scheindlin (1964) has given consideration to research on particular discoveries as well as an overview of present and future plant chemistry--screening, university research, etc. Schultes (1960) has explored paths of research (mentioned previously) as well as the future of plants as sources of new biodynamic compounds (1972) and research

objectives and methods (1963). Considerations in selecting and investigating plant material for ethnobotanical study are further discussed by Woodward and Smith (1962). Swain (1972) has edited proceedings of a symposium stressing an interdiscliplinary outlook, with an attempt to integrate contributions and evaluate the potential of various fields.

Smith et al. (1966) have developed an extensive bibliography of American archeological plant remains with some ethnobotanical references. Dimbleby (1967) includes a chapter on plants used in ritual and medicine, such as Saskatoon berries, coca, quinine, and curare. Paleoethnobotanical evidence of occurrence and use of species such as Papaver somniferum and Cannabis sativa, as well as many food plants, is presented by Dr. Jane Renfrew (1973). Scotch (1964) has presented an exhaustive bibliography of medical anthropology to 1963; Fabrega (1972) has provided a review of the literature from 1963 to 1970 as well as a lengthy bibliography.

Works dealing with concepts of disease may yield ideas of value, such as the role of symbols in curing and a contrast of methods of South American shamans with Western psychoanalysts (Levi-Strauss, 1967) and the influence of culture upon symptoms (Zola, 1966). A comprehensive treatment of DuBos (1965) includes an overview of man as a social animal, the social limitations of applications of medical knowledge, disease as an outcome of attempts at adaptation, preventive medicine and human values, and disease patterns characterizing civilization. Shostak (1969) has studied blue collar health and illness, investigating views of health and illness, treatment, relations to ethnicity; a striking feature of the group includes little use of preventive medicine and distrust of standard referral systems (doctors and clinics) utilized extensively by other social classes.

Patrick et al. (1960) discuss epidemiology as an analytical science, diagnostic techniques, and identification of factors through closed- versus open-system models. Closed systems models view each disease as (1) having a specific cause always leading to disease, as tuberculosis, or (2) having multiple causation always leading to disease, including predisposing, contributory, precipitating, sufficient, etc. factors. Such a model is useful with communicable diseases involving microorganisms. The open-system model views a specific reaction as the result of a variety of stimuli or a variety of reactions as the result of specific stimulus dependent upon circumstances. Thus, health is defined as successful adjustment to stress and disease as a failure phase. Linked open-systems may involve stress acting upon one factor and being transmitted to others; such factors include biochemical, physiological, psychological, social and cultural.

Thus, consultation of the literature provided not only a sense of historical development and the variety of medicinal practices involving plants but also several models for medical ethnobotanical research. In obtaining data from a population lacking distinct cultural boundaries (such as would be true of isolated tribes), it was determined that a reasonable goal could be collection of usage information. The basic ethnobotanical pattern of listing species with associated uses could thus be adopted. Ethnomedical studies and consultations with a sociologist provided a mode of describing the population sample. Treatments of illness and disease provided some concept of the aspect of values and attitudes.

3. Definition of population and sample

The population sampled in this research consisted of residents of southern Michigan with professed interest in plants and/or nutrition. The sample was for the most part composed of (1) those individuals attending meetings with a plant orientation, such as the Michigan Botanical Club, (2) those shopping at a local natural or health food retail outlet, or (3) those engaged in a form of nutritional education, such as the Ingham County Extension home economist aides. The remainder of the sample consisted of individuals contacted independently due to their interest in medicinal use of plants.

EXPERIMENTAL PROCEDURES

The main goal of the survey was to determine which plants are used medicinally by selected persons of southern Michigan and to what use each is put. It was decided that no attempt would be made to determine what portion of the general population is utilizing for medicinal purposes natural organic foods, herbs or spices, or wild plants. Rather, the sample was chosen non-randomly, particularily aiming for groups of people likely to have an interest in plants or nutrition or both. It was determined that the sample size should consist of one hundred to one hundred twenty-five persons, at least, in order to attain high enough values to make use of R x C contingency tables meaningful.

Common names were selected for investigation (page 2 of the questionaire, Appendix A) upon knowledge of local usage; that is, most plants were selected due to known and supposed local medicinal usage. Several species were included to gain an estimate of usage frequency where such was unknown despite local occurrence of the plants. Examples of the latter include Echium vulgare, Chrysanthemum leucanthemum, Sanguinaria canadensis, and Acorus Calamus.

A secondary aim of the questionnaire was to provide information on beliefs, attitudes, and practices relating to medicinal usage of plants. For this purpose, it was determined that the questions be of two types: (1) response of the nature of yes, no, or don't know, and (2) response involving a brief listing or numberical estimate. Questions of the second type dealt with such topics as which herbs are grown for personal use and

estimate of times per year a doctor is consulted.

To provide a demographic description, nine controls (in the sociological sense) were chosen. These included gender, age, occupation, education, health status, annual income, rural/suburban/urban background (current residence, place of birth, most of life), and ethnic background. The last was requested with emphasis upon location of family before arrival in Michigan rather than number of generations in this country because it was felt that geographic information would be more pertinent and available than temporal information.

It was determined that the questionnaire itself should require less than half an hour to complete since it would be administered at meetings and in local natural and health food stores; a brief form was deemed advisable to promote completion of the survey by the maximum number of people. To estimate the actual time needed as well as the extent to which the questions could be understood, a pre-test was administered to four subjects. On the basis of the results, wording of several items was adjusted to more meaningful form and deletions were made.

Groups of people to whom the questionnaire was administered fell into three general categories: those belonging to no formally organized group or to an incidentally interested one (hereafter referred to as Group I), those with a plant orientation (Group II), and those with a health/natural food or nutritional orientation (Group III).

The first group accounted for 28% of the sample; included were those individuals without affiliation (11% of Group I) as well as a miscellaneous collection from the Detroit area (89%) including members of outing clubs, etc. Group II provided 44% of the total respondents and included the Edible Weed Club of Jackson (11% of Group II), the Tri-County Organic Club of East Lansing (21%), the Federated Organic

Fall Festival held in Coldwater (11%) and consisting of local organic farm and garden clubs of the State, and the Michigan Botanical Club, both the Red Cedar Chapter (20%) and a State meeting (37%) involving members from all four chapters (Red Cedar, Huron Valley, Southwestern, and Southeastern).

Group III accounted for 27% of the total respondents, including two health food stores, the House of Nutritions of Lansing (16% of Group III) and the General Nutrition Center of Okemos (9%). Three natural food stores were surveyed: the Small Planet Natural Grocery (11%) and the Family of Man (9%) of East Lansing, and the Yum-Yum Food Cooperative (formerly Green Earth) of Lansing (14%). Ingham County Extension Home Economist Aides (41%) were also surveyed.

Survey forms were placed in local stores in locations deemed prominent to the customer, such as on the counter near the cash register or on a nearby shelf. Questionnaires administered at group meetings were introduced either early in the meeting (so that completed forms could be returned at the conclusion of the gathering) or near the conclusion (so that those interested might remain afterward.)

Completed questionnaires were eliminated from further analysis according to the following criteria:

1. Less that six of the ten demographic items completed (page 3 of the questionnaire, Appendix A) or not a current resident of southern Michigan. In compiling data, if several responses were given to an item, such as residence, both were entered. Only information as written was utilized.
2. a.) No use of the plant listings (page 2 of the questionnaire) plus no response to demographic items, and b.) indication by written response on page 2 of the questionnaire of use solely as food, as

well as response of 'NO' to question 2 of page 1. The former permitted utilization of the usage list without completion of the demographic portion; the latter was considered as an indication that preventive uses were not involved. (Question 2 was utilized rather than question 3 because verbal feedback suggested that the latter was not always understood, whereas question 2 was generally considered distinctly expressed and understandable.)

After considering the options available for statistical analysis of a non-randon sample with discontinuous variables, it was decided that the chi-square statistic would be appropriate in certain instances. In particular, it could be used to test association between frequency of usage of selected species and the demographic data; this would be done through use of R x C contingency tables.

The herbs and spices as well as wild plants were chosen for chi-square analysis; those in the upper 25% of usage frequency were initially selected. Of those, a second selection occurred such that upon construction of the tables, chi-square would be computed "in a table with more than two rows or more than two columns so that fewer than 1/5 of the cells had expected frequencies of less than five and no cell had an expected frequency of less than one." (Weiss, 1968, p. 265). This may also be stated as, "if the degrees of freedom are greater than one, the expected value in 80% of the cells must be equal to or greater than five, and frequency counts must be independent of one another" (Runyon and Haber, 1967, pp. 250-2).

In some cases, intervals of the demographic control being tested were combined so that the aforementioned criteria might be met, despite the resulting weakening of sensitivity of chi-square. Snedecor and Cochran (1967, p. 235) suggest, "that the chi-square test is accurate

enough if the smallest expectation is at least one, and that classes be combined only to ensure this condition."

Page two of the questionnaire provided usage frequencies of the various species, from which maximum, minimum, and mean usage per species were computed as well as standard error of the mean and per cent of sample lying within one, two, and three standard errors of the mean.

The market survey was accomplished by visiting the seven area retail outlets and requesting permission to record pricing data for the teas or herbs available. In cases where the request met reluctance, further discussion was offered in relation to interest of the study as well as the author's interest in herbs in general. Queries by the author regarding most popular (=best-selling) teas and an estimate of volume sold per year were refused outright at two locations; otherwise, cooperation was maintained.

RESULTS

1. Demographic

In relation to gender, males formed 35% of the sample, which consisted of 160 individuals. Females were evenly distributed among the three groups, while males in Group II outnumbered the males in Groups I and III by three to one. (See Figure 1.)

Ages ranged from 18 to 86 years with the lowest frequencies from the 20 years and under interval (2%) and 71 and over (6%). The middle age categories, 31 to 40 years and 41 to 50 years, each contained 12% of the sample. Twenty-one percent of the sample was contained in each of three groups, those 21 to 30 years, 51 to 60 years, and 61 to 70 years. (See Figure 2.)

Years of education divided the sample in half when the broad categories of seven to 15 years of schooling (50%) and possession of a bachelor's degree or more (51%) were considered. Examining education in greater depth, 26% had completed seven to 12 years of education, 7% with 13 years, 6% with 14 years, and 11% with 15 years. Bachelor's degrees accounted for 22% of the second category, master's degrees 17%, Ph.D.'s 3%, M.D.'s 2%, and Ll. B.'s less than 1%. (See Figure 3.)

The 1970 Census of Population Characteristics of the Population, Michigan (Table 171, pp. 24-832 to 24-826) was consulted for occupational classifications. Professional, technical, and kindred (related) workers comprised the greatest portion of the population (30%) with private household workers, including housewives, constituting 24%. Students and

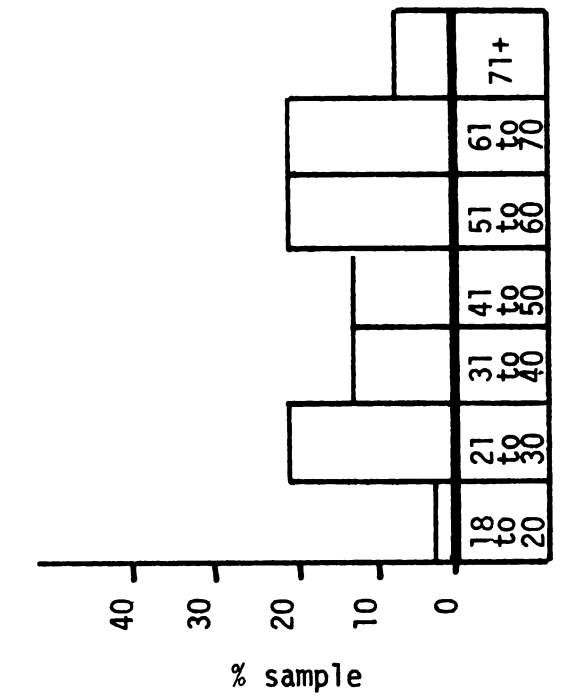

Figure 2. Age distribution

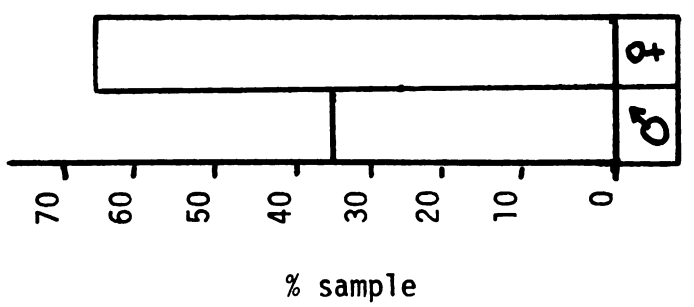

Figure 1. Gender

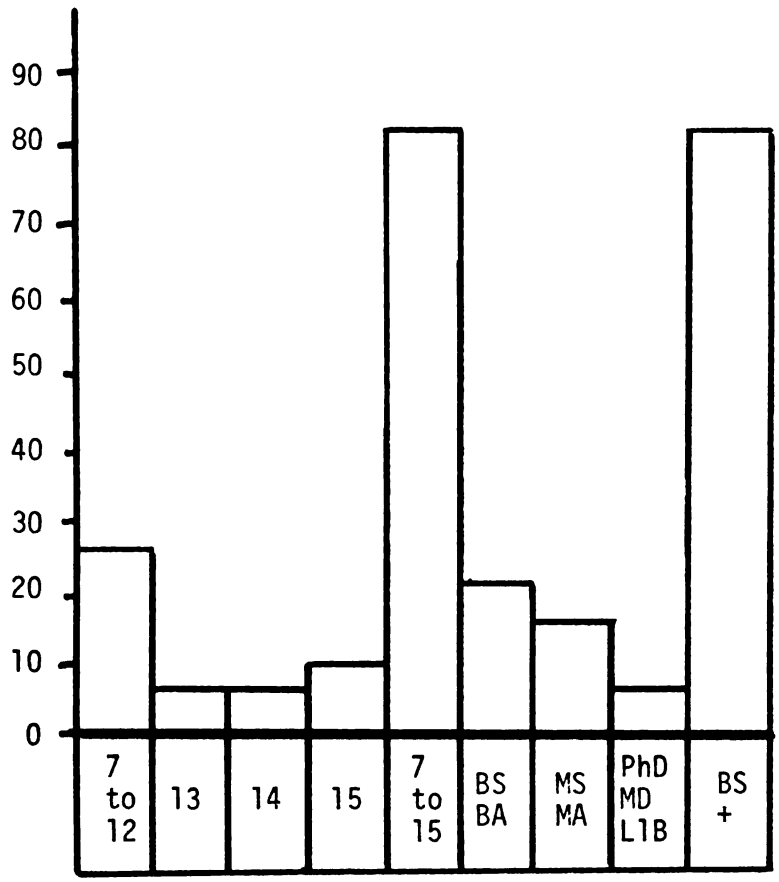

Figure 3. Educational distribution

retired individuals, neither of which were included in the census categories, each contained 12% of the total respondents. Managers and administrators, except farm, equalled clerical and kindred workers (5% each) with service workers, except private household, slightly more numerous at 6%. Craftsmen and kindred workers constituted 3% of the sample, with three groups each possessing 1%: sales workers, laborers, farmers and farm managers. Operatives, except transport, made up less than 1% of the sample. Creative responses, such as "human" or "person" were 2% of the sample. (See Figure 4.)

The majority (48%) of the respondents considered their health status averaged for the past five years as good, 27% excellent, and 14% great. Eight percent considered their health fair, while only 1% identified their health as poor. (See Figure 5.)

Approximate yearly income was nearly equal for the lower three categories: $0 to 5000 (23%), $5001 to 10,000 (20%), and $10,001 to 15, 000 (22%). The interval of $15,001 to 20,000 contained 16% and $20,001 and above held 9%. (See Figure 6.)

Current residence was nearly equal for urban (37%) and suburban (32%) respondents, with only 17% considering themselves rural residents. Residence at birth showed most individuals in the urban category (49%) with rural following (30%) and suburban least (13%). Considering residence for most of life, urban again was most frequent (47$) followed by rural (33%) and suburban (26%). (See Figure 7.)

Regarding ethnicity, as in other measurements in this paper, some respondents answered in more than one category, which accounts for percentages exceeding 100, whereas some did not fully answer, which would account for percentages of less than 100. One percent considered themselves Native American, less than 1% of Cuban descent, 8% of Canadian

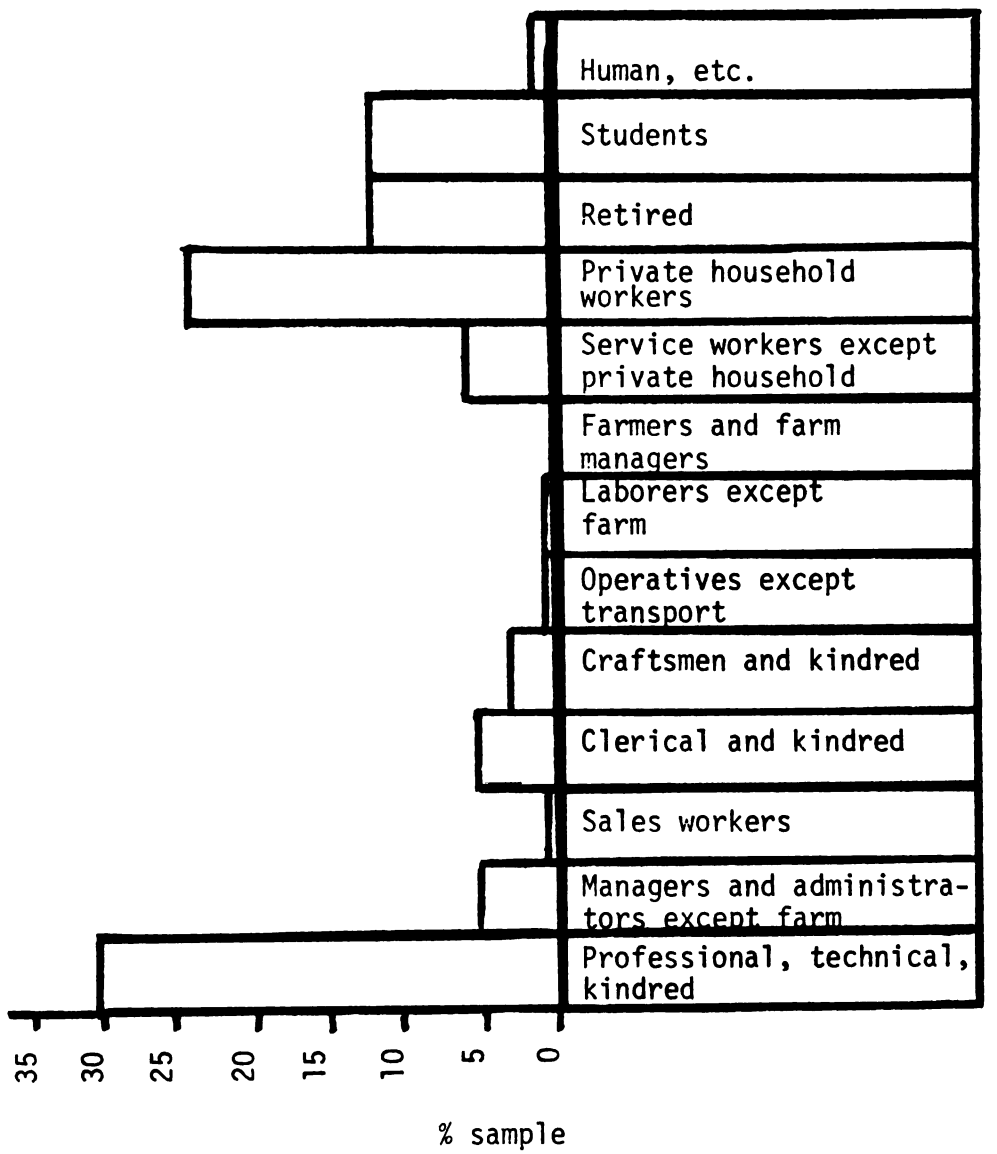

Figure 4. Occupational distribution

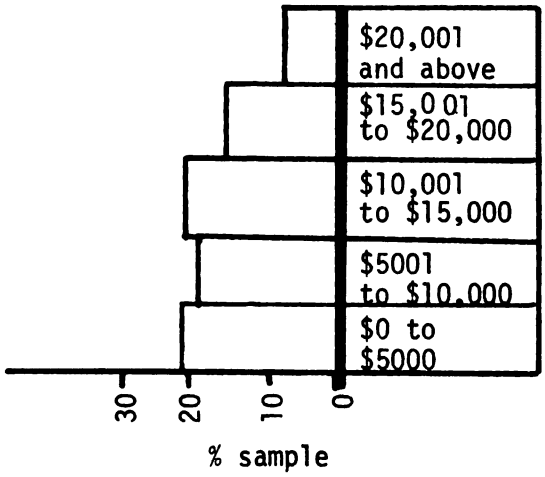

Figure 6. Income distribution

Figure 5. Health status

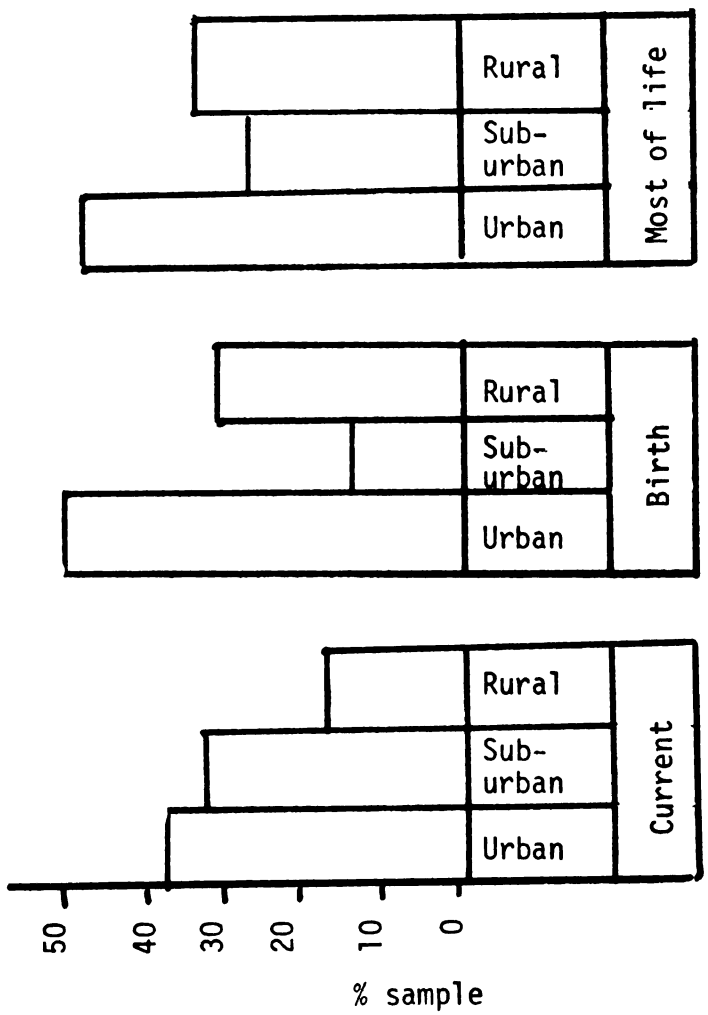

Figure 7. Residence distribution

derivation. Those with ancestors from the British Isles accounted for 42% of the sample, with European ancestry common to 71%. Further breakdown of the latter gave the following results (see Figures 8 and 9):

Western Europe (France) 9%
Central Europe (Austria, Czechoslovakia, Germany, Hungary, Switzerland) 38%
Scandinavia (Norway, Denmark, Sweden) 10%
Balkans (Bulgaria, Greece, Yugoslavia) ..... <1%
Low Countries (Luxembourg, Belgium, Netherlands) 6%
Eastern Europe (Poland, Russia) 9%
Italy 2%

2. Medicinal usage of food plants, herbs and spices, and wild plants

Simple analysis of usage frequencies obtained from page 2 of the questionnaires was performed. The groups of plants (as listed above) were examined for maximum and minimum usage per common name per group. Mean was calculated according to Snedecor and Cochran (1967, p. 39) as follows:

$$\text{Mean} = \bar{x} = \frac{\text{sum of observations}}{\text{number of observations}} = \frac{\text{sum of usage}}{\text{number of plants}}$$

The standard error of the mean, synonymous with the standard deviation, provided an estimation of the error involved in the mean and was determined as follows:

$$\text{Standard error} = SE = \sqrt{\frac{\sum(x - \bar{x})^2}{N - 1}}$$

where x = number of recorded usages per common name

$\bar{x}$ = mean number of recorded usages per common name

N = total number of common names

Usage frequencies and medicinal uses were obtained for 138 plants (vernacular names) with 2456 instances of use recorded. Usage frequencies showed an approximate ratio of 3:2:1 for food plants: herbs

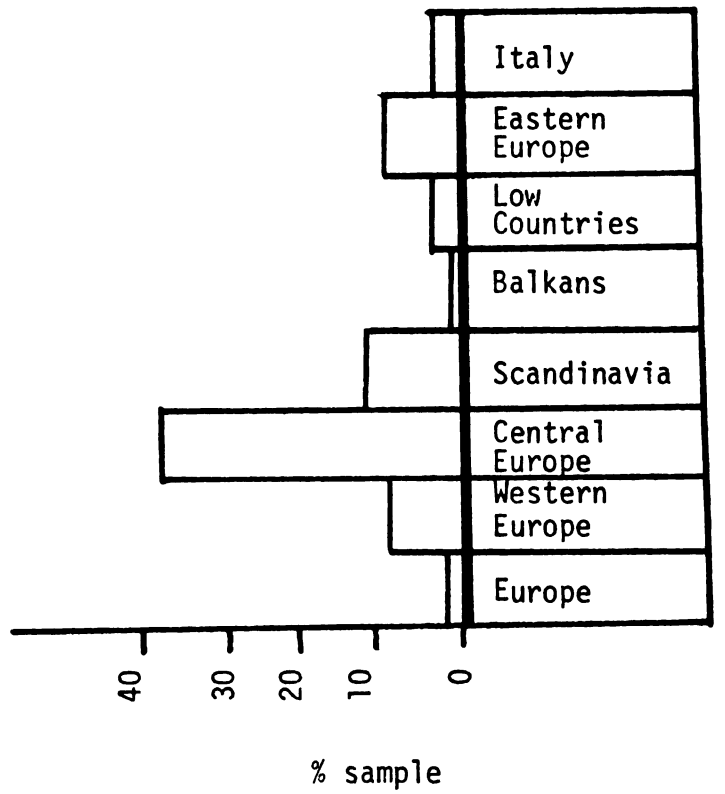

Figure 9. Ethnicity: Europe

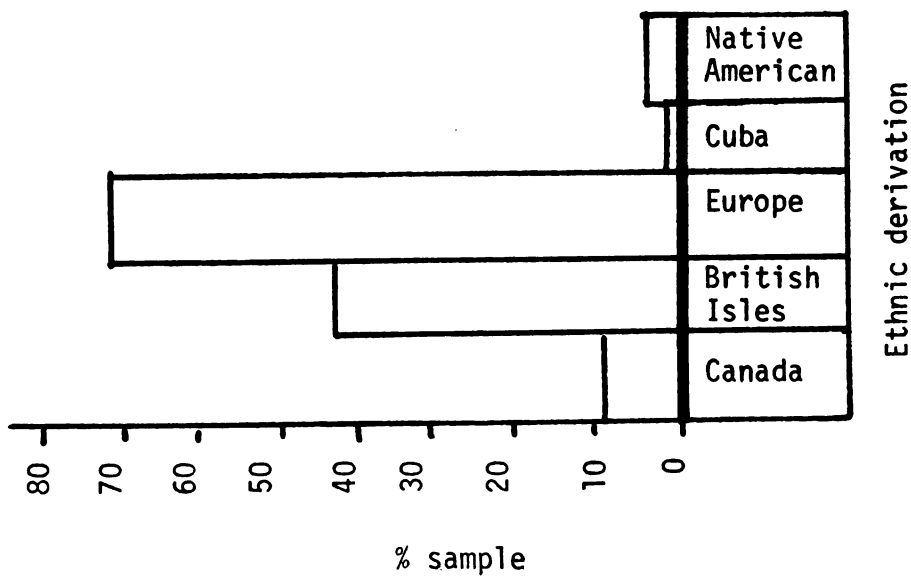

Figure 8. Ethnicity

and spices: wild plants. Maximum number of species with uses reported ranged from 79 (food plants) to 32 (wild plants) with an approximate ratio of 8:4:3 for food: herbs and spices: wild plants. Ratio of mean number of uses per species was 6:3:2, respectively.

The standard errors of the mean were 16.1 (food plants), 10.1 (herbs and spices), and 4.9 (wild plants). One hundred per cent of each of the three plant categories fell within three standard errors of the mean.

Table 1. Medicinal usage of plants

	Food Plants	Herbs & Spices	Wild Plants	Total
Number of spp.	42	54	42	138
Usage frequency:				
Maximum/species	79	43	32	
Minimum/species	1	1	1	
Total usage	1307	756	393	2456
Mean/species	31	14	9	
Standard error	16.1	10.1	4.9	
Percent of use:				
Mean $\pm$ 1 SE	73.8	72.2	42.9	
Mean $\pm$ 2 SE	97.6	96.3	95.2	
Mean $\pm$ 3 SE	100.0	100.0	100.0	

Independence of usage of species versus demographic data was tested via the chi-square statistic determined through use of R x C contingency tables (Snedecor & Cochran, 1967, pp. 250-51). Expected values were calculated as follows:

$$E_{ij} = \frac{n_{i.}\ n_{.j}}{n..}$$

where $n_{i.}$ = sum of observed values of the ith row

$n_{.j}$ = sum of observed values of the jth column

$n..$ = sum of all row values or sum of all column values

E_{ij} = expected value for cell of ith row and jth column

Then chi-square was calculated according to Snedecor:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

where O_{ij} = observed value of cell of the ith row and jth column

Degrees of freedom were determined according to the following:

$$d.f. = (r-1)(c-1)$$

where r = number of rows

c = number of columns

Results are shown in Tables 2 and 3.

It was determined through use of the chi-square association test that there were no significant associations between usage of the selected species of wild plants and age, gender, education, health, income, residence (birth, current, most of life), or ethnicity. (Species selected for testing were those within the upper 25% of reported frequency of use.) The same demographic controls were tested for independence of usage of selected herbs and spices; only in the case of gender was there any dependence (significance level better than 0.01).

3. Medicinal uses

Fifty-seven families are represented in the results of usage frequency of the species listed on page two of the questionnaire. The uses are given as written by the respondents, so that seeming redundancies such as "used for coughs, cough, and sore throat, colds..." are uses recorded by several respondents or, possibly, several uses from one individual. An attempt was made to group uses by (1) active ingredient as perceived by the user, such as calcium or iron, (2) curative role, such as sedative or cleanser, (3) symptom or organ being treated, such as indigestion or stomach, and (4) preventive use. Responses of the

Table 2. Wild plants: association of frequency of medicinal use with demographic factors

	Age	Gender	Occupation	Income	Education	Health	Residence: Current	Residence: Birth	Residence: Most of life	Ethnicity
Achillea millifolium	N*	N	N	N	N	N	N	N	N	N
Brassica nigra, B. alba	E+	N	N	N	N	N	N	N	N	E
Cannabis sativa	E	N	N	N	N	E	E	N	N	N
Impatiens spp.	N	N	N	N	N	E	N	N	N	N
Nepeta cataria	N	N	N	N	N	N	N	N	N	N
Plantago major	N	N	E	E	N	E	N	N	N	E
Sambucus canadensis	N	N	N	N	N	N	N	N	N	N
Sassafras albidum	N	N	N	N	N	N	N	N	N	N
Taraxacum officinale	N	N	N	N	N	N	N	N	N	N
Ulmus fulva	E	N	E	N	N	E	N	N	N	N
Verbascum Thapsus	E	N	E	N	N	E	N	N	N	E

N* = association not significant; usage of species independent of the particular demographic control

E+ = eliminated due to low value of expected frequency

Table 3. Herbs & spices: association of frequency of medicinal use with demographic factors

	Age	Gender	Occupation	Income	Education	Health	Residence: Current	Residence: Birth	Residence: Most of life	Ethnicity
Allium tricoccum	N*	S+	N	N	N	N	N	N	N	N
Aloe vera	N	S	N	N	N	N	N	N	N	N
Anthemis nobilis	N	S	N	N	N	N	N	N	N	N
Eugenia caryophyllus	N	S	N	N	N	N	N	N	N	N
Gaultheria procumbens	N	S	N	N	N	N	N	N	N	N
Hydrastis canadensis	N	S	N	N	N	N	N	N	N	N
Mentha piperita	N	S	N	N	N	N	N	N	N	N
Mentha spicata	N	S	N	N	N	N	N	N	N	N
Myristica fragrans	N	S	N	N	N	N	N	N	N	N
Carum petroselinum	N	S	N	N	N	N	N	N	N	N
Pimpinella anisum	N	S	N	N	N	N	N	N	N	N
Piper nigrum	N	S	N	N	N	N	N	N	N	N
Salvia officinalis	N	S	N	N	N	N	N	N	N	N
Zingiber officinale	N	S	N	N	N	N	N	N	N	N

N* = association not significant; usage of species independent of the particular demographic control

S+ = level of significance of >0.01

nature "used as food" were included as medicinal uses only if the respondent indicated a belief in preventive nature of diet or of that particular species; otherwise, that use was termed non-medicinal. (Preventive medicines include those plants used to prevent illness, while symptomatics include those utilized in treatment of the illness or problem once it has occurred.)

The response "re. Kloss" indicates that one respondent specified her use of the particular plant by reference to an herbal used locally, Back to Eden by Jethro Kloss (1970). Consultation of Kloss provided the uses indicated in parentheses. (Reference may be made to Appendix B for definitions of such uses.)

An indication of the relative frequency of use per species is provided by the percentage following the binomial and common name (see also Figures 10-13). Where several species are listed together, as is the case with cinnamon, or where several genera have the same common name, as with sarsaparilla, the percentage represents the use of plants per common name. The percentage includes only medicinal (both preventive and symptomatic) uses and was calculated from the number of respondents indicating use of each species and the sample total (160) as follows:

$$\% = \frac{\text{number of users / species}}{\text{sample total}}$$

Transposing the common names of species from the questionnaires to the scientific binomials was accomplished through the use of several sources. Potter's Guide (Wren, 1956) was first consulted for a name associated with a given medicinal usage. In the case of medicinals absent from Potter's Guide or of species more commonly noted for use as edibles, both wild and cultivated, the Dictionary of Economic Plants (Uphof, 1959) was consulted. The Manual of Vascular Plants of Northeastern United

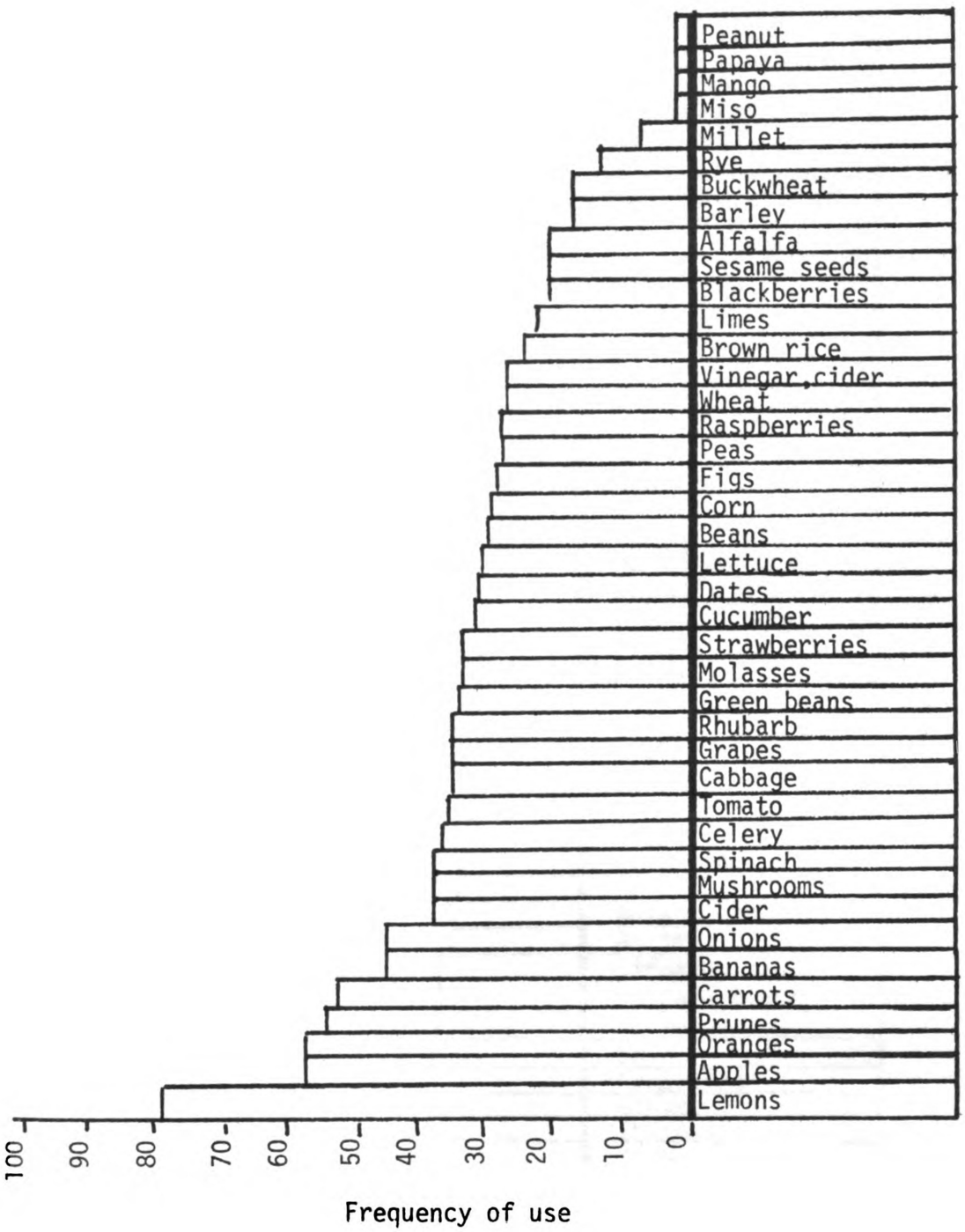

Figure 10. Absolute frequency of medicinal use of food plants

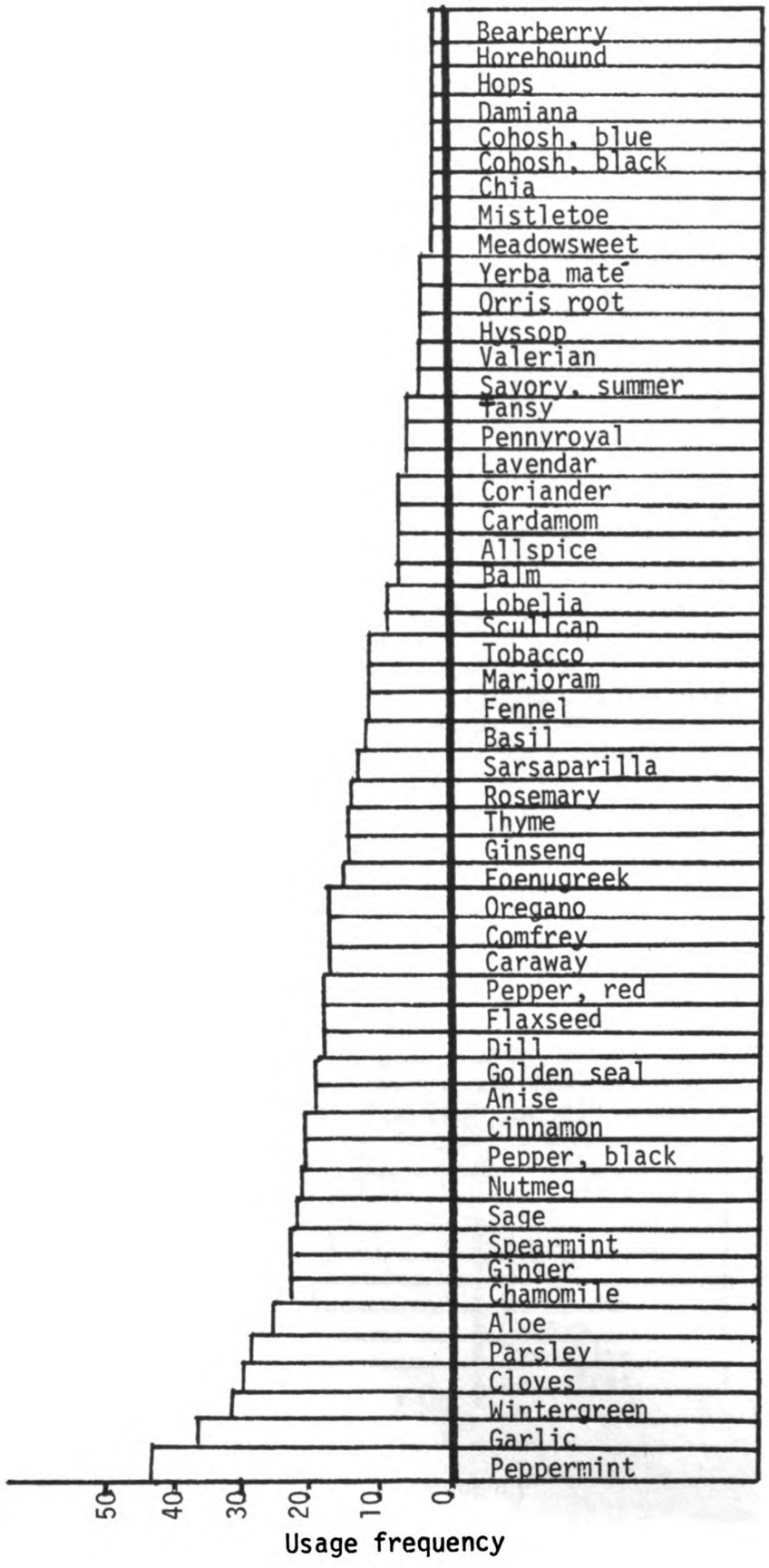

Figure 11. Absolute frequency of medicinal use of herbs and spices

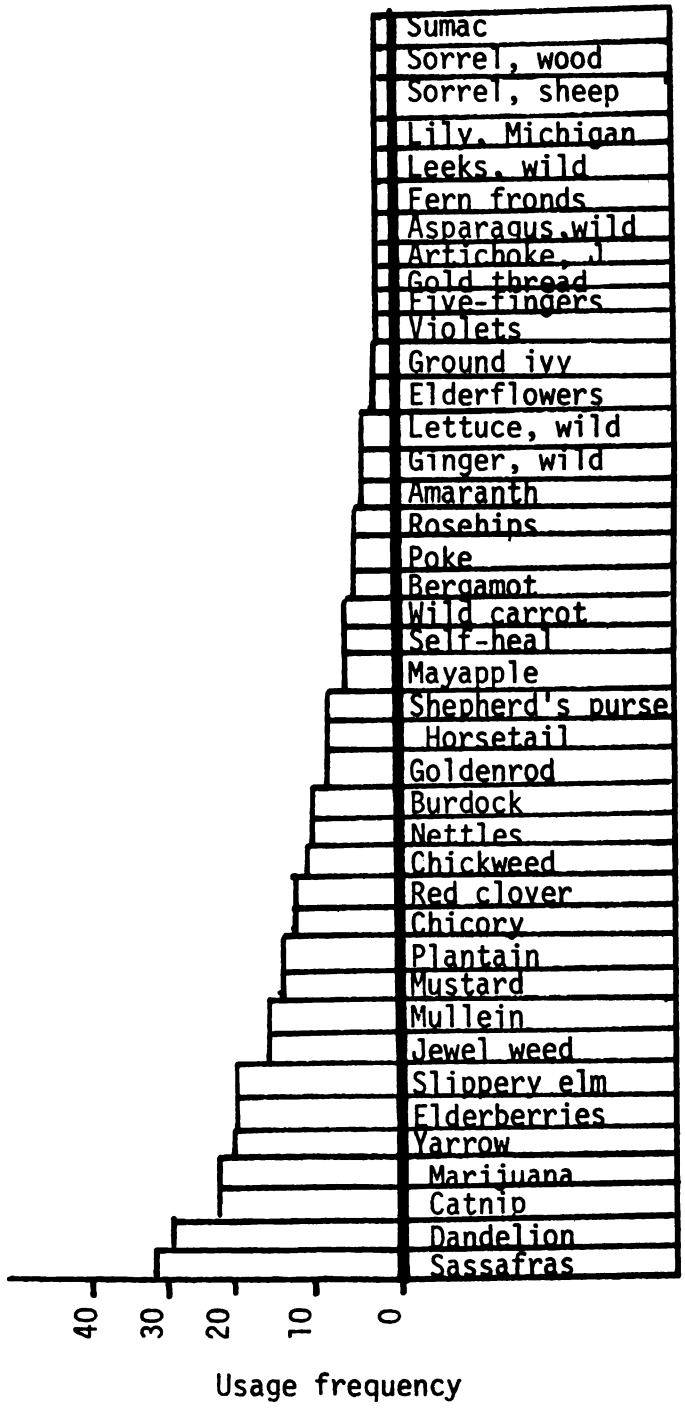

Figure 12. Absolute frequency of medicinal use of wild plants

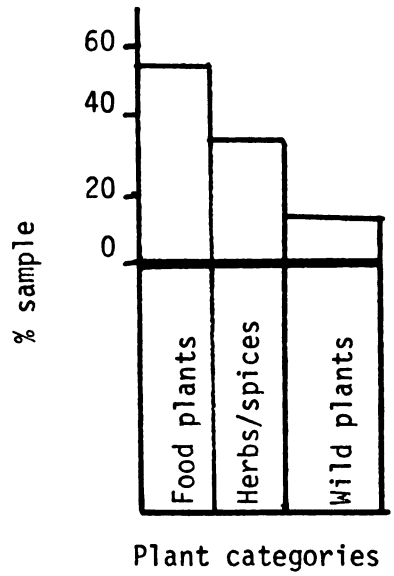

Figure 13. Relative frequency of medicinal usage

States and Adjacent Canada (Gleason & Cronquist, 1963) as well as several other volumes (Fassett, 1963; University of Illinois, 1968) were used to confirm occurrence of local species.

For example, Potter's Guide gives Panax quinquifolium L. as ginseng, with China as the habitat. Gleason and Cronquist (1963, p. 495) states that the same species is found in North America. (Bailey ((1949)) records the species of Manchuria and Korea as Panax Schin-seng Nees, Asiatic ginseng.)

Further, popularized editions likely to be available to the sampled population answering the questionnaires were in some cases also consulted (Gibbons 1962, 1966; Harris, 1971). Such a case would be that of wild lettuce, listed in Potter's Guide as Lactuca virosa L., a European species. Consultation of Uphof and Gleason provided a number of North American species; the University of Illinois bulletin listed three species of Michigan occurrence. (Uphof in some instances relates

a medicinal usage; Gleason and University of Illinois do not.) Two of the three, L. canadensis and L. scariola were given as edible and medicinal plants in both Harris (1971) and Gibbons (1966).

Gleason and Cronquist's Manual (1963) was then consulted a final time to confirm nomenclature, where possible. For example, in the case above, L. scariola, wild lettuce or prickly lettuce, would be changed to L. Serriola, the prickly lettuce of Gleason. Familial nomenclature is according to Uphof as well as Gleason and Cronquist (1963), with the latter taking precedence where applicable. Alexopoulos (1962) was consulted for fungal classification. Cronquist (1968) was the reference for phylogenetic classification, as summarized in Appendix C, of the medicinal plants included in this treatment.

DIVISION FUNGI

AGARICACEAE

Agaricus spp. - Mushroom (<1%)

Used for enzymes, vitamins, especially vitamin B; for vision; used specifically as preventive medicine (see page 28) for its food value and as preventive normal diet.

EUROTIACEAE

Aspergillus oryzae - Miso (fermenting agent) (<1%)

(Soybean, wheat or wheat flour, and rice or sometimes barley fermented to a paste which is called miso)

Used for bad digestion.

SACCHAROMYCETACEAE

Saccharomyces rouxii - Miso (fermenting agent) (<1%)

See Aspergillus above.

DIVISION PTERIDOPHYTA

EQUISETACEAE

Equisetum arvense L. - Horsetail (6%)

Used for silica and calcium; for kidneys and as a toothbuilder. (Non-medicinal use includes pot cleaning.)

OSMUNDACEAE

Osmunda spp. - Fern fronds (<1%)

Used for preventive purposes.

POLYPODIACEAE

Pteridium aquilinum (L.) Kuhn. - Fern fronds

See Osmunda above.

DIVISION MAGNOLIOPHYTA

Class Magnoliopsida

AMARANTHACEAE

Amaranthus retroflexus L. - Amaranth (3%)

Used as preventive food and preventive greens.

ANACARDIACEAE

Mangifera indica L. - Mango (<1%)

No particular use reported.

Rhus typhina L. - Staghorn sumac (<1%)

(Non-medicinal use for energy and thirst while hiking.)

AQUIFOLIACEAE

Ilex paraguensis St. Hil. - Yerba mate (3%)

Used as a stimulant and re. Kloss (no use given); for flu; as preventive.

ARALIACEAE

Panax quinquefolium L. - Ginseng (10%)

Used as a stimulant, panacea, tonic, relaxant, blood purifier, preventive, and re. Kloss (demulcent, stomachic, stimulant - see Appendix B for definitions): for flu, colds (tablet), and all purposes (tablet).

ARISTOLOCHIACEAE

Asarum canadense L. - Wild ginger (3%)

Used for digestion, colds, and stomach.

(Non-medicinal uses include tea and seasoning.)

ASCLEPIACACEAE

Hemidesmus indicus Brown - Central American Sarsaparilla (9%)

Used as a spring tonic, tonic, stimulant, blood purifier and cleanser, and re. Kloss (alterative, diuretic, demulcent, antisyphilitic, stimulant, antiscorbutic); as a preventive.

(Used non-medicinally for flavoring.)

BALSAMINACEAE

Impatiens biflora Walt., I. capensis L., I. pallida Nutt. - Jewel weed (10%)

Used for poison ivy, nettle stings, bites, and cleansing after contact with poison ivy.

BERBERIDACEAE

Caulophyllum thalictroides (L.) Michx. - Blue cohosh (<1%)

Used for female troubles, specifically cervical infection.

Podophyllum peltatum L. - Mayapple (4%)

Used for food as a preventive.

(Non-medicinal uses include jelly and for energy and thirst while hiking.)

BORAGINACEAE

Borago officinalis L. - Borage (4%)

Used as a preventive.

(Non-medicinal use includes taste and as a drink.)

(Echium vulgare L. - Bugloss) (0%)

No use reported.

Symphytum officinale L. - Comfrey (11%)

Used for bruises, healing bones, and re. Kloss (demulcent, astringent, styptic, and nutritive); as a preventive.

CANNABACEAE

Cannabis sativa L. - Marijuana (15%)

Used as a panacea, a relaxant, stimulant; for tension, nerves, headache and tension, relaxation and recreation, for generally relaxing properties.

(Non-medicinal uses include getting high, to alter reality, a smoke, and healthy enjoyment.)

Humulus Lupulus L. - Hops (<1%)

No particular use reported.

CAPRIFOLIACEAE

Sambucus canadensis L. - Elderberry (13%)

Used as a preventive.

(Non-medicinal uses include pies, food, wine, for energy and thirst while hiking.)

S. canadensis L. - Elder flowers (2%)

No particular use reported.

(Non-medicinal use includes pancakes.)

CARICACEAE

Carica papaya L. - Papaya (1%)

No use reported.

CARYOPHYLLACEAE

Stellaria media (L.) Cyrill. - Chickweed (8%)

Used as a preventive and for general health.

(Non-medicinal use includes as a vegetable and for salad.)

CHENOPODIACEAE

Spinacea oleracea L. - Spinach (24%)

Used for iron; as a laxative and preventive food.

COMPOSITAE

Achillea millefolium L. - Yarrow (14%)

Used as a demulcent; for colds, cramps, anemia, sore muscles, bleeding, lungs, cuts; as a preventive.

(Non-medicinal use includes for hair.)

Anthemis nobilis L. - Chamomile (15%)

Used as a nervine, sleep remedy, sedative, relaxant; for iron and calcium; for stomach upset, colic, sleep remedy, colds, flu, insomnia, nerves, pain, cramps, and re. Kloss (stimulant, bitter, tonic, aromatic); as a preventive.

(Used non-medicinally for flavor.)

(Chrysanthemum leucanthemum L. - Ox-eye daisy) (0%)

No use reported.

Cichorium intybus L. - Chicory (9%)

Used as a stimulant; preventive (both greens and beverage), preventive normal diet.

(Used non-medicinally as a coffee substitute.)

Helianthus anuus L. - Sunflower seeds (20%)

Used for vitamins, especially the B complex, proteins, food value, and minerals; for eyes; preventive and part of normal preventive

diet.

(Oil used non-medicinally.)

H. tuberosus L. - Jerusalem artichoke (<1%)

Used as a preventive.

Lactuca canadensis L. - Wild lettuce (2%)

L. Serriola L. - Prickly lettuce

No specific use reported.

L. sativa L. var. capitata L. - Head lettuce (20%)

Used for its vitamins and food value; as juice therapy, sedative, chlorophyl douche; as a preventive in normal diet and for general health.

Matricaria Chamomilla L. - Chamomile

See Anthemis nobilis.

M. matricarioides (Less.) Porter - Pineapple weed or chamomile

See Anthemis nobilis.

Solidago spp. - Goldenrod (6%)

Used as a tea for preventive purposes.

Taraxacum officinale Weber. - Dandelion (18%)

Used for its vitamins, especially vitamin C; as spring tonic; preventive food, beverage and normal diet.

(Non-medicinal use includes dieting, salad, wine.)

Tanacetum vulgare L. - Tansy (4%)

Used to start period.

CRUCIFERAE

Brassica alba L., B. nigra Koch. - Mustard (9%)

Used as a heat element, stimulant, and stomach stimulant: for coughs and chest colds; as a preventive food, particularily the

Brassica oleracea L. - Cabbage (23%)

Used for vitamins, especially vitamin C, minerals, and roughage; as a digestive aid; for prevention in general and as a preventive food, preventive general food, and for general health.

Capsella Bursa-pastoris Medic. - Shepherd's purse (5%)

Used for salads as a preventive.

(Non-medicinal use includes pepper substitute.)

CUCURBITACEAE

Cucumis sativus L. - Cucumber (20%)

Used for its vitamins and roughage; as a diuretic, and for kidneys; as a preventive for food value and as preventive normal diet.

(Non-medicinal use includes facial bath.)

ERICACEAE

Arctostaphylos Uva-ursi (L.) Spreng. - Bearberry (<1%)

(Named by respondent as "Uva-ursi".)

Used for female troubles, particularily cervical infection.

Gaultheria procumbens L. - Wintergreen (20%)

Used as a stimulant and re. Kloss (stimulant, antiseptic, astringent, diuretic, emmenagogue); for colds, sprains, arthritis, sore neck muscles, headaches, rheumatism, digestion, toothache, stomach upset, pain; preventive normal diet.

(Used non-medicinally for tea, taste, flavor, and for energy and thirst while hiking.)

LABIATAE

Glecoma hederacea L. - Ground ivy (2%)

No specific uses reported.

Hedeoma pulegioides (L.) Pers. - American pennyroyal (4%)

Used for menstrual ache, periods, uterine cramps, and re. Kloss

(sudorific, carminative, emmenagogue, stimulant, diaphoretic, aromatic, sedative); as a preventive.

Hyssopus officinalis L. - Hyssop (3%)

Used for colds and general purposes; as a preventive.

Lavendula officinalis Chaix. - Lavendar (4%)

Used re. Kloss (stimulant, aromatic, fragrant), for general purposes; as a preventive.

(Non-medicinal use includes flavor.)

Leonurus cardiaca L. - Motherwort (5%)

Used as a medicinal tea; for colds and vaginitis; as a preventive (green drink).

Marrubium vulgare L. - Horehound (1%)

No specific use reported.

Melissa officinalis L. - Balm (6%)

Used for headaches; as preventive tea.

(Non-medicinal use includes flavor and drink.)

Mentha piperita L. - Peppermint (27%)

Used as a nervine, blood purifier, cleanser, relaxant, stimulant, and according to Jethro Kloss (aromatic, stimulant, stomachic, carminative); for sore throat, stomach, healing, colds, stomach problems, general health, stomach ache, pains, intestinal problems, indigestion; used as a preventive when "feeling a cold or something coming."

(Non-medicinal uses include taste and flavoring, drink, and tea.)

Mentha Pulegium L. - Pennyroyal See Hedeoma pulegioides.

Mentha spicata L. - Spearmint (15%)

Used as a stomach healer and relaxant; for colds, sore throat, kidneys, toothaches, and re. Kloss (antispasmodic, aromatic,

diuretic, diaphoretic, carminative); as a preventive and preventive normal diet.

(Used non-medicinally for energy and thirst while hiking, for taste and flavoring.)

Monarda fistulosa L. - Bergamot (3%)

Used for nerves; as a preventive (tea).

(Also used non-medicinally as tea.)

Nepeta cataria L. - Catnip (15%)

Used as a nerve tonic, relaxant, and sedative; for nerves, colds, nervous tension, insomnia, sleep, cramps, colic, and as preventive tea.

Ocimum basilicum L. - Basil (8%)

Used as a preventive and re. Kloss (stimulant, condiment, nervine, aromatic).

(Non-medicinal use includes taste, flavor, normal diet.)

Origanum majoram L. - Marjoram (8%)

Used for headache, nerves; as a preventive.

(Non-medicinal use includes taste and flavoring.)

Origanum vulgare L. - Oregano (11%)

Used as a stimulant; for digestion and re. Kloss (aromatic, pungent, stomachic, tonic, stimulant, emmenagogue, carminative, diaphoretic); as a preventive part of normal diet.

(Non-medicinal use includes taste and flavoring.)

Prunella vulgaris L. - Self-heal (4%)

Used as preventive tea.

Rosmarinus officinalis L. - Rosemary (9%)

Used as a stimulant; for nerves and stomach; as preventive part of normal diet.

(Used non-medicinally for taste and flavor.)

Salvia chia Fern. - Chia (<1%)

Used for diarrhea.

Salvia officinalis L. - Sage (14%)

Used re. Kloss (sudorific, astringent, expectorant, tonic, aromatic, antispasmodic, nervine, vermifuge); for diarrhea, headache, to relax, for colds, nerves, rest, chills and sleep (with warm milk), and to sooth; as a preventive.

(Non-medicinal use includes taste and flavoring, for hair.)

Satureia hortensis L. - Summer savory (4%)

Used for digestion; as a preventive.

(Non-medicinal uses include taste and flavoring.)

Scutellaria laterifolia L. - Scullcap (7%)

Used as a stimulant, nerve tonic, and re. Kloss (antispasmodic, nervine, tonic, diuretic); for headaches, inducing sleep and to relax; as a preventive.

Thymus vulgaris L. - Thyme (10%)

Used for digestion and re. Kloss (tonic, carminative, emmenagogue, resolvent, antispasmodic, antiseptic); as preventive normal diet.

(Used non-medicinally for taste and flavoring.)

LAURACEAE

Cinnamomum Cassia (Nees) Nees ex Blume - Cassia, C. Loureirii Nees - Saigon cinnamon, C. zeylanicum Nees - Ceylon cinnamon (13%)

Used for digestion, cramps, and re. Kloss (stimulant, prevents flatulence, laxative, astringent); as a preventive food and normal diet.

(Non-medicinal uses include taste and flavoring.)

Sassafras albidum (Nutt.) Nees - Sassafras (18%)

Used as a cleanser, tonic, relaxant; for colds, flu, healing stomach; as a preventive and preventive tea. Some use the leaves for preventive tea.

(Used non-medicinally as tea, food, in food, for energy and thirst while hiking, and because it tastes good.)

LEGUMINOSAE

Arachis hypogaea L. - Peanut (<1%)

Used as a laxative.

Glycine soja Sieb. and Zucc. - Miso (1%)

(See Aspergillus, page 36.)

Used for bad digestion.

Medicago sativa L. - falfa (13%)

Used as a body healer; as a preventive.

Phaseolus lunatus L. - Lima bean (19%)

Phaseolus vulgaris L. - Kidney, bush, pole, wax, navy beans

Used for vitamins; for bowels; as a preventive food.

Pisum sativum L. - Pea (18%)

Used for vitamins, protein, and food value; as a preventive and preventive normal diet.

(Used non-medicinally as food.)

Trifolium pratense L. - Red clover (9%)

Used as a blood purifier, tonic, blood builder, demulcent, cancer preventive; for headaches; as preventive food and beverage.

Trigonella foenum-graecum L. - Foenugreek (10%)

Uses re. Kloss (poultice, gargle, lubricant); for flatulence, colds, mucous congestion of colds, cleansing, flu, and lungs; as a preventive food.

LINACEAE

Linum usitassimum L. - Flaxseed (12%)

Used for its bulk; as a poultice, healer, lubricant, and laxative; for constipation, infection, sores, and internal purposes; used re. Kloss (demulcent, pectoral, maturating, mucilaginous and emolient).

LOBELIACEAE

Lobelia inflata L. - Lobelia (6%)

Used re. Kloss (relaxant, febrifuge, cleanser, pectoral, emetic, antispasmodic, stomachic, stimulant, emmenagogue), as blood purifier; for colds, elimination, asthma, flu, and to induce vomiting; as a preventive.

LORANTHRACEAE

Phoradendron flavescens (Pursh) Nutt. - Mistletoe (1%)

Used with peppers and tobacco for heart palpitation.

MORACEAE

Ficus Carica L. - Fig (18%)

Used for its minerals, vitamins, and roughage; as a binder, laxative; for cholesterol and constipation; as a preventive and for preventive food value.

(Non-medicinal use includes for energy and thirst while hiking.)

MYRISTICACEAE

Myristica fragrans Houtt. - Nutmeg (14%)

Used for digestion, cramps, and re. Kloss (expectorant, deobstruent, sialagogue, emmenagogue, prevents flatulence); as preventive food and normal diet.

(Non-medicinal uses include taste and flavoring.)

MYRTACEAE

Eugenia caryophyllus (Speng.) Sprague - Cloves (19%)

Used for antiseptic properties, as local antibiotic, in linament. for cramps, toothache, digestion, and re. Kloss (no use given): as a preventive normal diet.

(Non-medicinal use inlcudes taste and flavoring.)

Pimenta officinalis Lindl. - Allspice (5%)

Used for digestion.

(Non-medicinal uses include normal diet, taste and flavoring.)

OXALIDACEAE

Oxalis stricta L. - Wood sorrel (1%)

No specific use reported.

(Non-medicinal use for energy and thirst while hiking.)

PAPAVERACEAE

(Sanguinaria canadensis L. - Blood root) (0%)

Not used at all.

PEDALIACEAE

Sesamum indicum L. - Sesame seeds (14%)

Used for vitamins E and B as well as for vitamins in general, food value, minerals, particularily calcium; for calcium deficiency and calcium drink; as a preventive.

PHYTOLACCACEAE

Phytolacca americana L. - Poke (3%)

Used as preventive food and greens.

(Non-medicinal use includes food and vegetables.

PIPERACEAE

Piper nigrum L. - Black pepper (14%)

Used as a stimulant, blood purifier, and cleanser; for earache, cramps; heart palpitation (with tobacco and mistletoe); as a preventive food and normal diet.

(Non-medicinal uses include taste and flavoring.)

PLANTAGINACEAE

Plantago major L. - Plantain

Used for mosquito bites, cuts and bruises, coughs, infections, poultices; as a preventive and preventive food.

(Used non-medicinally as a vegetable.)

POLYGONACEAE

Fagopyrum esculentum L. - Buckwheat (11%)

Used for its vitamins, especially vitamin B, and rutin; as a preventive and for preventive normal diet and food.

Rheum Rhaponticum L. - Rhubarb (22%)

Used for its vitamins and food value; as spring tonic, laxative, cathartic, to correct pH, for constipation, as blood purifier; as a preventive, preventive normal diet and general food.

Rumex Acetosella L. - Sheep sorrel (<1%)

(Non-medicinal use includes for energy and thirst while hiking.)

RANUNCULACEAE

Cimifuga racemosa (L.) Nutt. - Black cohosh (1%)

Used for female troubles, specifically cervical infection.

Coptis trifolia (L.) Salisb., f. Gleason and Cronquist (1%)

(Includes C. groenlandica (Oeder) Fern. of Gray's Manual) - Gold thread

No specific use reported.

Hydrastis canadensis L. - Goldenseal (12%)

Used as an antibacterial, blood purifier, and in tablet form as a demulcent; for cuts, colds, poison ivy, ringworm, throat, sinus, sores and skin eruptions, low blood sugar, liver, lungs (tablet), female infections, all-purpose, any sickness, and re. Kloss (laxative, tonic, cleansing of wounds, opthalmicum, antiperiodic, aperient, diuretic, antiseptic, deobstruent).

RUTACEAE

Citrus aurantifolia Swingle. - Lime (15%)

Used for vitamins, expecially vitamin C; for colds,sore throat, anxiety, and as a cough remedy (with bicarb); as a preventive and preventive normal diet.

C. Limon Burman. - Lemon (49%)

Used for vitamins, especially vitamin C, and minerals; for sore throat, arthritis, colds (with or without mixing with honey), cough, fever, as a cleanser, and with whisky as cough syrup; as a preventive, for general health, and preventive normal diet. Also as an expectorant.

(Non-medicinal use includes lemonade.)

C. sinensis Osbeck. - Orange (36%)

Used for vitamins, especially C and K, minerals, and food value; for colds, flu, sore throat, and as a cleanser; as a preventive, for general health.

SCROPHULARIACEAE

Verbascum Thapsus L. - Mullein (10%)

Used as a demulcent, soothing balm, cleaner and lymph cleanser; for sore throat, ears, inflammations; as a preventive tea.

(Used non-medicinally for baths.)

ROSACEAE

Fragaria vesca L. - Strawberry (21%)

Used for its vitamins, especially vitamin C, and iron; for colds, flu; as a preventive tea (leaves) and preventive food. (Non-medicinal use includes facials and for energy and thirst while hiking.)

Potentilla recta L., P. reptans L. - Five-finger (<1%)

Used as a stimulant.

Prunus domestica L. - Prune (34%)

Used for its vitamins, minerals, food value, and iron; as a laxative, for constipation, and digestive problems; as a preventive, preventive normal diet, and general health.

Pyrus Malus L. - Apple (36%)

Used for vitamins, minerals, bulk, and roughage; for cleansing, constipation, colds, clearing congestion, purging, digestion, to keep the doctor away, to mellow, to clean teeth, for juice therapy, for teeth, as laxative, for elimination and bowels, as a toothbrush; for preventive in normal diet and for general health.

P. Malus L. - Cider vinegar (18%)

Used for its acid; for dieting, sunburn, strep throat, indigestion, poison ivy, obesity, bee stings, throat, arthritis, to utilize calcium; as preventive normal diet.

Rosa spp. - Rose hips (3%)

Used for vitamins, especially vitamin C; as preventive (tablet).

Rubus allegheniensis Porter., *R. neglectus* Peck., *R. occidentalis* L., *R. strigosus* Michx. - Blackberry (14%)

Used for its vitamins; for stomach; as a preventive, preventive normal diet, and preventive food value. The brandy used for cramps.

Spiraea alba Du Roi, *S. ulmaria* L. - Meadowsweet (1%)

Used as preventive food.

SOLANACEAE

Capsicum frutescens L., C. Minimum Roxb. - Red pepper (12%)

Used as a stimulant, tonic, and re. Kloss (pungent, stimulant, tonic, sialagogue, alterative); for everything, general uses, multi-purpose, circulation, heart, and heart palpitations (combined with Nicotiana and Phoradendron); as a preventive part of normal diet. (Non-medicinal use includes taste and flavoring.)

Lycopersicum esculentum Mill. - Tomato (23%)

Used for its vitamins, especially C, and food value; as a cleansing diet, for poison ivy, and for general purposes; as a preventive part of normal diet and for general health.

Nicotiana tobaccum L. - Tobacco (8%)

Used as a stimulant, relaxant, and re. Kloss (no use reported); for heart palpatations (in conjunction with Capsicum and Phoradendron). (Non-medicinal use includes as a smoke and a moth repellant.)

TURNERACEAE

Turnera diffusa Willd. - Damiana (<1%)

Used as a laxative.

ULMACEAE

Ulmus fulva Mich. - Slippery elm (13%)

Used as an all-around body healer; for cysts, sore throat (tablet), sore throat, throat, colds, inflammation; as a preventive and preventive tea.

UMBELLIFERAE

Anethum graveolens L. - Dill (12%)

Used as a stimulant; for digestion and re. Kloss (stomachic, aromatic, carminative, diaphoretic); as a preventive normal diet.

(Used non-medicinally for taste and flavor.)

Apium graveolens L. - Celery (23%)

Used for its vitamins, roughage, food value, and potassium; for headaches, nerves; as a sedative, a potassium broth, sleep remedy; as a preventive part of normal diet, and preventive for general health.

Carum carvi L. - Caraway (11%)

Used for digestion, stomach ache, gas, and as tea following bladder infections; as a preventive part of normal diet.

(Non-medicinal use for taste and flavoring.)

Carum petroselinum Benth. and Hook. - Parsley (18%)

Used for its iron; for headaches, breath, kidneys, as pick-up; as preventive part of normal diet and for general health.

(Used non-medicinally for flavoring and food.)

Coriandrum sativum L. - Coriander (5%)

Used for sore throat, periods, as a mouthwash; as preventive part or normal diet.

(Non-medicinal use includes taste and flavoring.)

Daucus carota L. - Carrot (33%)

Used for its vitamins, especially A, for food value, and minerals; as digestive aid; for eyes, nerves, vision, bruises, constipation, nursing; as a preventive and preventive part of normal diet.

D. carota L. - Wild carrot (37%)

Used as a tonic; as a preventive and preventive food.

Foeniculum vulgare Mill. - Fennel (8%)

Used for headaches, diarrhea, stomach, sore muscles, digestion, and re. Kloss (stomachic, carminative, pectoral, diuretic); as a preventive food; as a tablet.

(Used non-medicinally as a flavoring.)

Pimpinella anisum L. - Anise (12%)

Used as a nervine and re. Kloss (aromatic, diaphoretic, relaxant, stimulant, tonic, carminative, stomachic); for colds, stomach, cough, diarrhea; as cough syrup; as preventive normal diet. (Non-medicinal use includes taste and flavoring.)

URTICACEAE

Urtica dioica L. - Nettles (7%)

Used for its iron; for anemia, as a blood builder; as a preventive, as preventive tea and food.

VALERIANACEAE

Valeriana officinalis L. - Valerian (4%)

Used for heart; as a preventive.

VIOLACEAE

Viola spp. - Violet (1%)

VITACEAE

Vitis vinifera L. - Grape (22%)

Used for iron, vitamins, roughage, food value; for cleansing, purification, grape sugar during a fast, cleanser for congestion, colds, anemia; for preventive normal diet.

Class Liliopsida

ARACEAE

(Acorus Calamus L. - Calamus) (0%)

Not reported.

GRAMINEAE

Hordeum vulgare L. - Barley (11%)

Used for vitamins; for skin; as a preventive and preventive normal diet.

Oryza sativa L. - Rice (16%)

Used for its vitamins, expecially B, and protein; as a preventive and preventive normal diet.

(Used non-medicinally as food.)

Panicum milliaceum L. - Millet (5%)

Used for digestion; as a preventive and preventive normal diet.

Saccharum officinale L. - Molasses (21%)

Used for its iron (with or without milk), vitamins, minerals, and food value; for colds, menstruation iron, anemia, building blood, diarrhea; as a cathartic; as preventive normal diet.

(Used non-medicinally as food.)

Secale cereale L. - Rye (9%)

Used for its vitamins; as a preventive and preventive normal diet.

(Used non-medicinally as food.)

Triticum vulgare Vill. - Wheat (18%)

Used for its vitamins, especially B; for general debility and as a laxative (bran); as preventive (both whole wheat and germ), preventive normal diet.

(Used non-medicinally as food.)

Zea mays L. - Corn (19%)

Used for its vitamins, especially A, roughage, and food value; as a preventive and preventive normal diet.

(Used non-medicinally as a facial and food.)

IRIDACEAE

Iris florentina L. - Orris root (3%)

No particular medicinal use reported.

(Non-medicinal uses include flavor, spice, aroma, association, for oily hair.)

LILIACEAE

Allium Cepa L. - Onion (28%)

Used for its vitamins and food value; for colds, sore throat, juice therapy, poultice for pneumonia, cold syrup, chest cold, and poultice; as a preventive and preventive normal diet.

(Used non-medicinally as food.)

A. sativum L. - Garlic (23%)

Used as an antiseptic, all-purpose, antibiotic, tonic, blood-purifier, all-around body healer, and re. Kloss (no use reported); for colds, chest colds, flu, hypertension (tablet), infections, blood pressure, high blood pressure (tablet), toothaches; as preventive normal diet.

(Used non-medicinally for taste and flavor.)

A. tricoccum Ait. - Wild leek (<1%)

(Used non-medicinally as food.)

Aloe vera var. officinalis - Aloe vera (17%)

Used for cuts and burns, burns, cleansing, poison ivy, feet, psoriases, diaper rash; as a healer and re. Kloss (cathartic, stomachic, aromatic, emmenagogue, drastic).

(Non-medicinal uses include as hand lotion.)

Asparagus officinalis L. - Wild asparagus (<1%)

Used as a preventive.

Lilium superbum L. - Turk's-cap lily (<1%)

No particular medicinal use reported.

Smilax aristolochiaefolia Mill. - Mexican sarsaparilla

S. ornata Hook - Asian sarsaparilla

See Hemidesmus indicus. (Both species of Smilax as well as Hemidesmus are given the common name "sarsaparilla". It is not known which of these are used; the possibility exists that all are. Thus, all are referenced.)

MUSACEAE

Musa sapientum L. - Banana (28%)

Used for its vitamins, potassium, iron, protein, and food value; for digestive problems, diarrhea, stomach, and constipation; for protein deficiency; as a preventive and preventive normal diet. (Used non-medicinally as food.)

PALMAE

Phoenix dactylifera L. - Date (19%)

Used for its vitamins, especially vitamin A, roughage, food value, iron; for bowels; as a preventive and preventive normal diet. (Used non-medicinally as food.)

ZINGIBERACEAE

Elettaria Cardamomum (L.) Maton - Cardamom (5%)

Used as a mouthwash.

(Used non-medicinally for taste, flavor, and food.)

Zingiber officinale Rosc. - Ginger (15%)

Used as a stimulant, heat element, and blood purifier; for cramps, digestion, sleep (in hot milk); as a preventive in normal diet.

4. Market survey

Seven local natural/health food retail stores were surveyed to determine which herbs and spices are currently available. It was in most cases not possible to determine which were marketed for medicinal purposes; most are sold simply as tea. Therefore, purpose of purchase is not included in the results. (For example, although cinnamon and oregano have both medicinal and culinary uses, it is not possible to state that they are purchased for one use or the other exclusively.)

The frequency of occurrence of each herb or spice is given and may include several brands within the same store and/or occurrence within several stores. Prices of each package were noted, and the range of prices listed. If a use was given on the label of the package or, in the case of loose herbs, of the container, such was noted.

Table 4 details the most popular (i.e., the best-selling) herbs with the number of retail outlets reporting and the estimated poundage sold per year. (In most cases, the latter was an estimated monthly sales figure expanded.) The several figures of estimated sales volumes represent different stores.

It was found that of the 96 herbs, spices, and wild plants with reported medicinal use, 71 (74%) are currently available on the retail market (natural/health food).

Table 4. Best-selling herbs

Herb	Number of stores reporting	Estimated pounds sold per year
Chamomile	6	100;96;96
Comfrey	5	160;72;20-75
Comfrey - lv	5	100;20-75
Comfrey - rt	5	60
Foenugreek	2	10
Golden seal	1	15
Gossip Tea+	1	
Kaffree	1	
KB11+	1	20-75
Lobelia	1	36
Mints	1	
Peppermint	5	100;48-72;20-75;48-60
Raspberry lv	1	48-72
Rosehips	2	48-72
Sassafras	1	100
Sarsaparilla	1	72
Sleepytime+	1	72

+Consult list of blends, pages 66-68.

Table 5. Herbs and spices available on the retail market

Herb or tea	Occur-rences	Range (Price/oz)	Use or property (If given)
*Alfalfa	3	$.09-.23	
" - lv	8**	.33-1.60	Mildly alkaline
" - lv, fl	1	.24	
" - lv, st	1	.09	
", American	1	.40	
*Allspice	1	.24	
" , ground	2	.25-.33	
", whole	1	.44	
*Aloe vera, powder	1		
Althaea rt	1	1.17	
Alum, wild - rt	1		
*Anise seed	4	.21-.39	
" ", ground	1	.48	
" ", whole	1	.46	
*Balm	1	.33	Mild carminative
Bancha	1	.32	
*Basil	3	.07-.34	Tea: upset stomach, stings and insect bites, antiseptic
Bay - lv	2	.24-.30	Relieves cramps, migraines, indigestion
Bayberry bark	1	.48	
*Bearberry - lv	1	.19	
Bistort - rt	1	.26	
Blackberry - lv	1	.50	
Bladderwrack	2	.28	
Blessed thistle	4	.28-.30	
" " , powder	1	.29	
Blood root	1	.38	
Blueberry - lv	7	.28-1.35	
Blue vervain	4	.28-.38	
Boneset	2	.35	
Buchu - lv	5	.75	
Buckthorn	4	.20-.32	
" rt, powder	1	.36	
Burdock - rt	4	.22-.30	
Calamus - rt	1	.33	
*Canada snakeroot	3	.30-.38	
*Caraway seed, whole	1	.63	Carminative tea
" ", ground	1	.36	
*Cardamom, whole	2	.82-.83	
*Catnip	6	.33-.45	Useful for pain spasms, wind, colic, relieves gas and upset stomach,soothes infants, helps in convulsions, mild stomachic and good for vitamin C

*Reportedly used for medicinal purposes by the surveyed sample (pp.36-56)
**More than one brand may have been present per store

Table 5 (cont'd.)

Catnip, powder	1	.22	
Cascara sagrada - bk	1	.34	Restricted use recommended
Celery seed	5	.12-.30	
" - fl	1	.35	
Centaury herb	2	.22-.27	
*Chamomile	12	.15-1.65	Mild relaxant tea; good amounts calcium and potassium, externally for local application and eyewash
Chaparral	7	.31-.44	
Charcoal	1	.26	Poultice ingredient
*Chia seed	1	.29	
Chervil	1	.38	
*Chickweed	5	.15-.41	Good for skin complaints,eye troubles, convalescence; aids lung, liver, rheumatism complaints
*Chicory - rt	1	.11	
" , roasted	1	.18	
Chives, dried	2	.06-2.59	
*Cinnamon, ground	1	.38	Mild carminative
" , sticks	3	.36-.58	
Cinquefoil	1	.25	
Cleavers	1	.63	
*Clover, red	3	.14-1.35	
" - fl	1		
*Cloves	2	.27-.63	
" , whole	2	.16-.63	
" , ground	1	.40	
*Cohosh, black	1	.36	
*Cohosh, blue, cut	1	.38	
Columbo - rt, powder	1	.28	
Coltsfoot	3	.37-.40	Mild demulcent, good for sore throats
*Comfrey - lv	8	.23-1.20	Emolient; contains allantoin
" - rt	6	.31-.37	Emolient
*Coriander	1	.23	Mild aromatic, carminative
Cornsilk	2	.25-.40	
Couchgrass	2	.15-.20	
Cramp bark	1	.59	
Cubeb berries	2	.38-.40	
Cumin, seed	1	.34	
Cypress sage	3	.23-.37	
*Damiana - lv	2	.30	
" , Mexican	1	.32	Mild laxative tea, good for smoking
*Dandelion - lv	3	.30-.44	
" - rt	5	.30-.50	
Desert herb	1	.30	
*Dill seed	3	.14-.54	Mild carminative
Dock, yellow, powder	1	.36	
Dogwood - bk	1	.28	
Dulse - lv	4	.31-.53	
Echinacea	1	.58	

Table 5 (cont'd.)

Echinacea rt, powder	1	.36	
*Elderberries, powder	2	.38-.45	Tea rich in vitamin C and mineral salts, eases cramps, quinsy, pharyngitis, laryngitis; cold tea for pain relief in burns; mild diaphoretic
*Elder flowers	6	.27-.37	
Elecampagne - rt, cut	1	.36	
Eucalyptus - lv	4	.14-.24	
Eyebright	3	.59-1.10	
*Fennel seed	8	.19-.78	Tea for chest complaints, eyewash, increase of lactation; rich in mineral salts, relieves nervous disorders; mild carminative
*Flax	1	.06	
*Foenugreek	5	.09-.65	Tea relieves nausea, stuffy nose and chest colds, mild demulcent
" , whole	2	.09	
" , ground	1	.22	
Fo Ti Tieng	1	1.20	
Frankincense	1	.34	
*Garlic, dried powder	1	.34	
Gentian - rt	6	.25-.90	Purifies blood; effective for liver complaints, dysentery, jaundice; improves appetite, strengthens
*Ginger	2	.16-.38	Colds, gas, gout, cholera, nausea, diarrhea
Ginger, Jamaican, crushed	1	.35	Carminative, stimulant
" " , powder	1	.46	
*Ginseng	1	4.50	
" , powder	1	1.39	
*Goldenrod	1	.33	
*Golden seal	9	.99-2.80	
" " - lv	1	1.43	
" " - rt	1	1.49	
Gotu Kola	2	.23-.36	
" " , Indian	2	.14-.35	
*Ground ivy	1	.40	
Gumbo file	1	.25	
Hawthorne berries, crushed	2	.15-.38	
" , powder	1	.40	
Heal-all	3	.40	
Helonias - rt	1	.99	
Henna, powder	1	.36	
Hibiscus	4	.39-.58	
*Hops	8	.29-.84	Calms nervous system; good in neuralgia, kidney ailments, relieves gout, strengthens

Table 5 (cont'd.)

			digestion, wards off anemia; externally for skin tonic
*Horehound	5	.17-.28	
" , powder	1	.36	
Horsetail rush	2	.12-.17	
Huckleberry - lv	6	.18-1.80	Mild diuretic
*Hyssop	3	.27-.40	Valuable in asthma, colds, chest afflictions, loosens phlegm in lungs and throat, good in children's sore throat
Irish moss	4	.16-.34	Rich in I, K, S, Ca
Juniper berry	6	.16-.30	
Kava kava	1	.69	
Kelp	2	.08-.22	
Kinnikinnik	1	.21	
Knot grass	1	.18	
Kola nuts	1	.33	
Ladyslipper - rt, powder	1	.48	
Laurel - lv	1		
*Lavendar - fl	3	.46-.60	Mildly stimulating
Lemon balm	2	.22	
Lemon grass	8	.10-.72	
" ", Mexican	1	.26	
Lemon verbena - lv	3	.57-1.30	
Licorice	1	.39	
" - rt	4	.29-.30	Demulcent, expectorant
" - sticks	3	.32-.38	
" , European - rt	1	.23	
Lily of the valley - rt	1	.26	
Linden - lv, fl	1	.31	
" - fl	2	.24-.33	
*Lobelia	4	.24-.90	Mild expectorant, powerful relaxant, reduces heart palpitations, good for fevers and nervous conditions, stops spasms of vomiting; poultice aids sprains
Mace	2	.42-.63	
Magnolia - bk	1		
Mallow	1	.15	
Mandrake	2	.20-.34	Excellent for bowels and liver, good for uterine diseases, fever, jaundice
" - rt	1	.42	
" - rt, powder	1		
Marigold - fl	1	.70	
Marigold, pot	1	.28	
*Marjoram, sweet - lv	1	.30	Tea valuable in treating nervous disorders and headaches, used cold as eyewash
Marsh mallow	1	.25	
" " - rt, powder	1	.38	

Table 5 (cont'd.)

Maté	3	.12-.45	
*Meadowsweet	1	.30	Astringent, tonic in diarrhea
Mint - lv	3	.25-.64	General stimulant; good for headache
*Mistletoe	3	.20-.28	Fine nervine, excellent for epilepsy, convulsions, delirium, nervous debility, and heart troubles
*Motherwort, Roman	1	.37	Mild relaxant
Mugwort	1	.32	
*Mullein	5	.36-.75	Dumulcent
" - lv	3	.52	
Mustard - sd	2	.15-.20	Gastric stimulant, hot water baths to prevent cold; in plasters to draw infections; antiseptic
Myrrh, gum	2	.48-.68	
Myrtle - lv	1	.34	
Nettles	4	.23-.33	Rich source of iron
" - lv	3	.40-.50	Tea good for chills, conditions of blood and circulation as well as anemia, bladder, kidney and liver troubles, gout; gargle for sore throats
*Nutmeg	1	.34	
" , ground	1	.32	
" , whole	2	.30-.37	
" , Jamaican, whole	1	.25	
Oatstraw	5	.11-.30	
Onion, dried, ground	1	.35	
" " , minced	1	.36	
Orange blossom	1	.39	
" peel	1	.22	
*Oregano	2	.26-.30	
*Orris - rt, whole	2	.30-.39	External use only
" ", powder	1	.32	
Papaya - lf	11	.20-.78	
" , Indian	1		
Paprika	1	,32	
*Parsley	8	.33-1.00	Contains valuable mineral salts; helps relieve anemia as well as glandular, hepatic and rheumatic conditions; mild diuretic with good amounts Fe, Mg, K, Vitamin C
Patchouly	1	.58	
Peach tree - lv	1	.34	
*Pennyroyal	1	.34	
*Pepper, Black, corns	2	.22-.32	
" " , powder	1	.34	
Pepper, Sweet red	1	.48	
*Pepper, Red, whole	1	.26	
" " , crushed	1	.26	
Pepper, White, corns	2	.22-.28	

Table 5 (cont'd.)

Pepper, White, powder	1	.32	
*Peppermint - lv	6	.16-1.00	
" , powder	1	.36	
Periwinkle	1	.34	Astringent
Pink rose	2	.26	
Plantago - sd	1	.16	
*Plantain	2	.22	
Pleurisy - rt	2	.28-1.30	
Poppy - sd	1	.22	
Princess pine	2	.27	
Queen of the Meadow	1	.36	
" " " ", powder	1	.48	
Raspberry - lv	5	.11-.41	
Rooibusch (Kaffree)	3	.03-.52	
Rosebud	1	.36	
*Rosehips	8	.19-.79	
" , powder	1	.21	
*Rosemary - lv	2	.22	Mild carminative
" , powder	1	.22	
Rue	1	.34	Bitter aromatic stimulant
Saffron	2	.51-.72	
" , American	1	.48	Mild diaphoretic
*Sage	3	.12-.37	Tea for colds, coughs, stomach conditions, to reduce fever, help arthritis, mild stimulant
St. John's Wort	4	.11-.32	
Sanicle - lv	1	.48	
*Sarsaparilla	7	.36-.84	Aromatic, diaphoretic
" - rt	2	.16-.36	
" , Mexican	1	.48	
Sassafras	7	.36-.75	Aromatic, diaphoretic
" - bk	3	.47	
" , powder	1	.38	
Savory	1	.33	Aphrodisiac in ancient times
Saw palmetto - berries	3	.11-.22	
*Scullcap	8	.38-.60	Relieves fever, dropsy, epilepsy, nervous and neurotic conditions, rich in mineral salts
Senna	1	.25	
" - lv	5	.17-.21	
Shavegrass	4	.18-.41	
*Shepherd's purse	1	.28	Mild astringent
*Slippery elm	5	.11-.47	Demulcent
" " , powder	1	.45	
*Spearmint - lv	5	.20-1.00	Tonic, aids in digestive complaints, chills, colds, used in nervous and psychosomatic conditions; for headaches and migraines
Spikenard	1	.58	

Table 5 (cont'd.)

Squaw vine	1	.32	
Star anise	3	.15-.30	
Strawberry, wild - lv	5	.33-.48	
*Summer savory	1	.34	
Sweet cicely	1	.38	
*Tansy	2	.28-.32	Emmenagogue; emetic in large doses; external liniment
Tarragon - lv	2	.14-.30	
*Thyme	2	.14-.30	Tea for nervous disorders
" , rubbed	1	.30	
" , Spanish	2	.24	
Turmeric	1	3.20	
" - rt	1	.36	
*Uva-ursi	3	.14-.30	
*Valerian - rt	3	.53-1.05	Tea for treatment of all nervous conditions and psychosomatic illness, frequently used in equal parts with scullcap
*Violet - lv	3	.34-.50	Mild demulcent
Walnut, black - lv	1	.28	
Watercress	4	.38-.51	Mild alterative
Watermelon - sd	1	.16	
White oak - bk	1	.18	
White poplar - bk	1	.32	
White willow - bk	1	.30	
" " , powder	1	.36	
Wild cherry - bk	3	.17-.18	
*Wintergreen - lv	2	.48-.56	
Witch hazel	1	.38	
Wood betony	1	.38	
Woodruff, sweet	1	.37	
Wormwood	1	.42	
*Yarrow	5	.25-.30	
" - fl	1	.29	
" , powder	1	.22	
*Yerba maté - lv	2	.16-.25	
Yerba Santa	3	.20	
Yohimbe	1	.76	

Table 6. Herbal blends available on the retail market

Blend	Occurrences	Range (Price/oz)	Content
Alfalfa-mint	7	.12-1.80	Alfalfa, mint
A Peeling	1	.47	Hibiscus, spearmint, orange-lemon, blueberry lv
Bouquet	1	.74	Rosehips, camomile, red clover tops, elder, hibiscus, lavendar, orange peel
Bouquet of Flowers	1	1.00	Same as above
Charm	1	.73	Chamomile, hibiscus, rosehips, mint
Comfrey-mint	1	.80	Comfrey, mint
Crescent Moon	1	.94	Wood betony, sweet orange peel, cloves
Desert Flowers	1	.94	Linden flowers, sage, borage flowers
Gest-ade	2	.42	Papaya lv, chamomile fl, fennel sd, peppermint lv, lovage rt, strawberry lv, rosemary lv, goldenseal rt, licorice rt
Ginseng	1	4.50	Ginseng, licorice, jutsu, steamed ginger
Golden mint	1	.30	Peppermint, chamomile, blackberry lv, elder fl, life everlasting fl
Gossip	2	.28	Rosehips, cloves, orange peel, hibiscus
Foraden Ruby Red	1	.70	Cloves, hibiscus, apples, black walnut, cinnamon
Hemo-T	2	.63-.75	Red clover tops, sassafras bk, chamomile fl, violet lv, sarsaparilla rt, licorice rt, dandelion rt
Herb Blend T	1	.14	Alfalfa, oatstraw, red clover, strawberry lv, fennel sd, papaya, camomile, linden fl, peppermint, billberry, sarsaparilla, cinnamon bk, anise sd, horsetail
Hidden Meadows	1	.94	Spearmint, fennel, lemon balm
Indra Devi	2	.18	Jamaican mint, lemon grass, wild mountain sage
Inner Clean Herbal Laxative	1	.56	
KB11	4	.50-1.50	Shavegrass, uva-ursi, cornsilk, juniper berries, buchu lv, horsetail, parsley, watermelon sd, cubeb, goldenrod, gravel plant

Table 6 (cont'd.)

KOFT	1	.42	Yerba santa, wild cherry bk, lungwort, eucalyptus lv, foenugreek sd, bugleweed, coughweed, thyme, flaxseed, strawberry lv, licorice rt
Laxative Tea	1	.39	Senna lv, uva ursi lv, sassafras bk, elder fl, boneset, mandrake rt, peppermint lv, American saffron
Lemon Mist	1	2.70	Lemon grass, strawberry lv, comfrey, alfalfa, eucalyptus, spearmint, orange peel, sage, linden fl, star anise
Mellow Mint	2	.28-.75	Alfalfa, papaya, peppermint, licorice
Mo's 24 Herb Tea	4	.44-.50	Hibiscus fl, raspberry lv, eucalyptus, peppermint, spearmint, strawberry lv, chamomile, anise, rosehips, alfalfa, rosemary, papaya, linden, mullein, comfrey, nettles, goldenrod, huckleberry lv, elder fl, catnip, plantain, sage, yarrow, red clover
Mountain Shadows	1	.94	Sassafras, rosehip, marshmallow rt
Mountain Spring Pink	1	.94	Spearmint, hibiscus, lemon grass
Mu Tea #9	1	.90	Herbaceous peony rt, Japanese parsley rt, hoelen, cinnamon, licorice, peach kernels, ginger rt, Japanese ginseng, rhemannia
Mu Tea #16	2	.93-1.29	Mandarin orange peel, hoelen, cnicus, herbaceous peony rt, atractylis, Japanese parsley rt, cinnamon, cypress, ginger rt, licorice, peach kernels, rhemannia, Japanese ginseng, cloves, coptis, moutan
Nervex	2	.60	Hops, rosemary lv, lady slipper, scullcap, alfalfa lv, peppermint, valerian rt, celery sd, mistletoe, anise
New Morning	1	.50	Oolong, yerba maté, fennel
Papaya Mint	6	.13-.90	Papaya lv, peppermint
PAMM	1		Peppermint lv, alfalfa lv, papaya lv, maté
Peppermint & linden	1	.78	Peppermint, linden fl
Pink Mint	1	.65	Hibiscus fl, peppermint
Pink Potpourri	2	.47-.63	Rosehips, hibiscus, anise sd
Red Zinger	6	.26-.58	Hibiscus fl, rosehips, lemon grass, peppermint, orange peel, wild cherry bk
Roasteroma	2	.19-.21	Roasted barley, roasted chicory rt, roasted carob bean, cinnamon, roasted dandelion rt, allspice, ginger, anise

Table 6 (cont'd.)

Rosemint	1	.50	Rosehips, peppermint
Sea Breeze	1	.50	Eucalyptus lv, mallow, black Chinese tea
Seeds O' Life	2	.44	Anise, foenugreek, chia, alfalfa, fennel, rosehips
Sleepytime	1	.29	Chamomile, lemon grass, spearmint, tilia, raspberry lv, rose petals
Summer Mist	1	.30	Lemon grass, alfalfa, mint
Sunrise	3	.10-.15	Green Brazilian mate, roasted chicory rt
Sunrise with anise	1	.15	Same as above plus star anise
Sunrise with orange spice	1	.63	Roasted and green Brazilian mate, sweet orange peel, lemon grass, cloves, ginger, cinnamon, star anise, pure orange oil
Sunrise Blend	1	.94	Peppermint, alfalfa, chamomile
Sunset Blend	1	.94	Hibiscus, rosemary, papaya
T-D-Lite	1	.33	Alfalfa, peppermint, rosehips, rooibusch, lemon verbena, strawberry lv, sweet orange peel, anise sd, chamomile fl, red clover tops
Tastee-T-Leaves	1	.68	Peppermint, spearmint, papaya, blueberry, comfrey, alfalfa, damiana, strawberry lv
Taste-O-Pep	1	.44	Peppermint, rosehips, camomile
Winterberry	2	.27	Raspberry lv, ginger, cloves, wintergreen extract

5. Beliefs, attitudes, practices

Those who use herbs, organic foods or wild plants as medicine constituted 44% of the sample, while 33% responded negatively and less than 1% did not know. Forty-one per cent treated themselves (19% negative) and 34% treated their families (14% negative). Use as medicine was reported as "often" by 26% (15% negative) and "sometimes" by 29% (11% negative, less than 1% did not know). Table 7 summarizes the results.

Table 7. Medicinal usage: distribution

Usage	Response (% sample)		
	Yes	No	Don't know
Medicinal	44	33	<1
For self	41	19	0
For family	34	14	0
Often	26	15	0
Sometimes	29	11	<1

Nearly all respondents (97%) felt that nutrition has an important relation to health (1% negative, 4% did not know). Preventive medicine was the more prevalent view with 71% responding affirmatively, 26% negatively, and 5% not knowing. Viewed as symptomatic medicine, only 26% of the sample responded affirmatively with 18% negative and 5% uncertain. Table 8 presents the results.

Table 8. Views of plant medicine

View	Response (% sample)		
	Yes	No	Don't know
Preventive	71	26	5
Symptomatic	26	18	5

Fifty-seven per cent did not prefer use of herbal teas or tisanes to use of coffee or non-herbal tea; 42% answered in the affirmative, and 4% did not know.

Most respondents (see Figure 14) have been interested in natural remedies from one or less to five years (29%). Interest in these remedies of six to ten years duration (9%) and or more than 25 years (13%) was nearly equal. Eleven to 15 years of interest in herbal remedies included 4% of the sample, 21 to 25 years included 2%, and 16 to 20 years less than 1%.

Reading, family, and friends were the major sources of acquaintance with the medicinal uses of plants, accounting for 22%, 14%, and 14%, respectively, of the sampled population. Other sources included clubs, church, and meetings (8%), classes (4%), health and natural food stores (3%), and folk and Indian medicine (2%). Botanical gardens and doctors were the source of learning for 1% each of the sample. (See Figure 15.)

Upon averaging the past five years, 60% reported one to five visits to a doctor per year, 14% no visits, 9% six to 10 visits, 1% each for 11 to 15 and 70 to 100 visits, and less than 1% each for 16 to 20 and 21 to 25 visits. Table 9 illustrates these results.

Table 9. Lay health referral: distribution and frequency

Visits per year	Consultant (% of sample)			
	Doctor	Friend	Food store	Other
0	14	39	47	45
1-5	60	31	27	21
6-10	9	44	2	<1
11-15	1	<1	<1	0
16-20	1	1	1	<1
21-25	1	0	<1	0
26+	1	0	0	0

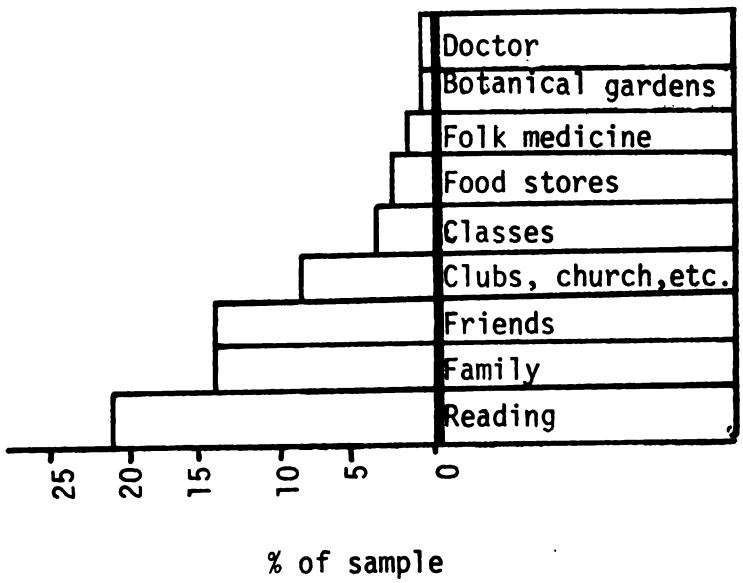

Figure 15. Acquaintance with plant medicines

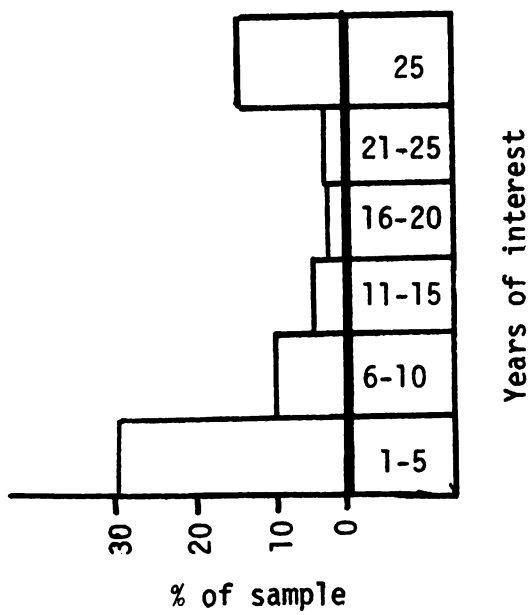

Figure 14. Length of interest in natural remedies

Figure 16 details reported causes of referral. In some cases respondents answered with a diagnosis and in some cases a symptom. (For example, ulcers would constitute a diagnosis with stomach ache a symptom.) Causes of referral were grouped according to organ or tissue system afflicted. It can be seen generally that prevention of illness was the most common reason given for consulting a doctor.

Those who collected and dried wild plants for their own use (51%) slightly exceeded those who did not (45%). Plants collected as well as uses to which they were put are listed in Table 10. Those who taught themselves to identify wild plants constituted 49% of the sample with 2% answering negatively. Also, 55% reported that someone else had taught them (39% negative).

Those growing herbs for personal use were 50% of the sample; 42% did not. Herbs grown, as well as per cent of the sample growing each, are given in Figure 17. Chives, mint, sage and parsley were the most frequently grown.

Most of the sample (71%) reported growing vegetables for their own use, while 24% responded in the negative. Figure 18 represents vegetables grown and the percentage of the sample growing each. Tomatoes were the most frequent of home-grown vegetables.

Treatment of minor ailments with plants was reported by 43% of the sample; a nearly equal number (39%) reported that they did not use such methods of treatment. Ailments treated with plants are given in Figure 19, and per cent of sample seeking treatment from a doctor for the same ailment is also given.

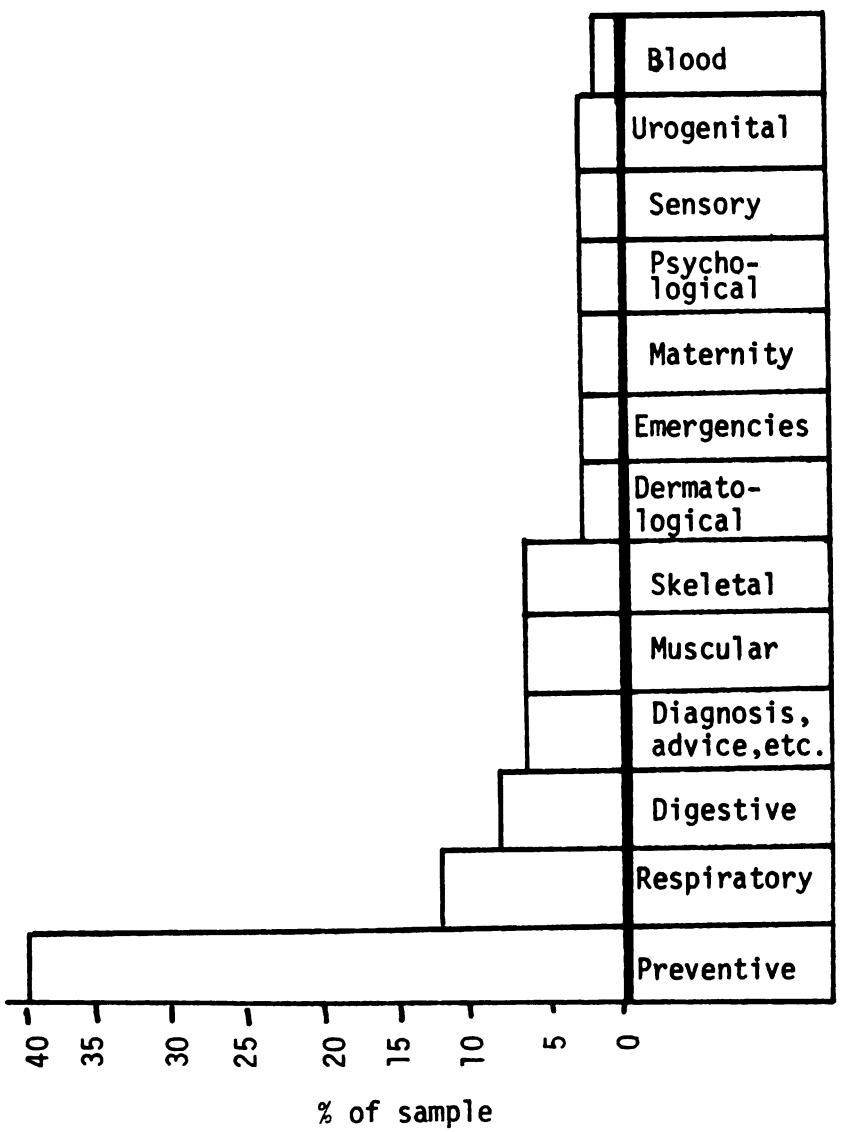

Figure 16. Cause of referral

Table 10. Wild plants collected for personal use

Plant	Use (if given)
Alfalfa	---
Amaranth	food, medicine, tea
Bergamot	sedative
Berries	---
Blueberry lv	tea
Boneset	colds
Catnip	sedative, tonic, colds, indigestion
Cheese weed	kidney inflammation
Chickweed	kidney inflammation
Chicory	---
Clover, red	medicinal, health, tea
Dandelion	greens
Dog fennel	indigestion
Edible roots	---
Elderberry	tea
Fiddle heads	vegetable
Fungi	food
Ginseng	stimulant
Jewel weed	poison ivy
Lambsquarters	tonic
Mints	stimulants
Morels	food
Mullein	medicine
Nettles	food
Nuts	food
Peach lv	tea
Pennyroyal	tea
Peppermint	colds, tonic, indigestion
Raspberry lv	pregnancy, health
Rosehips	tea
Sassafras lv	vitamins
Sassafras	tea, cleanser
Sumac	drink
Wintergreen	tea

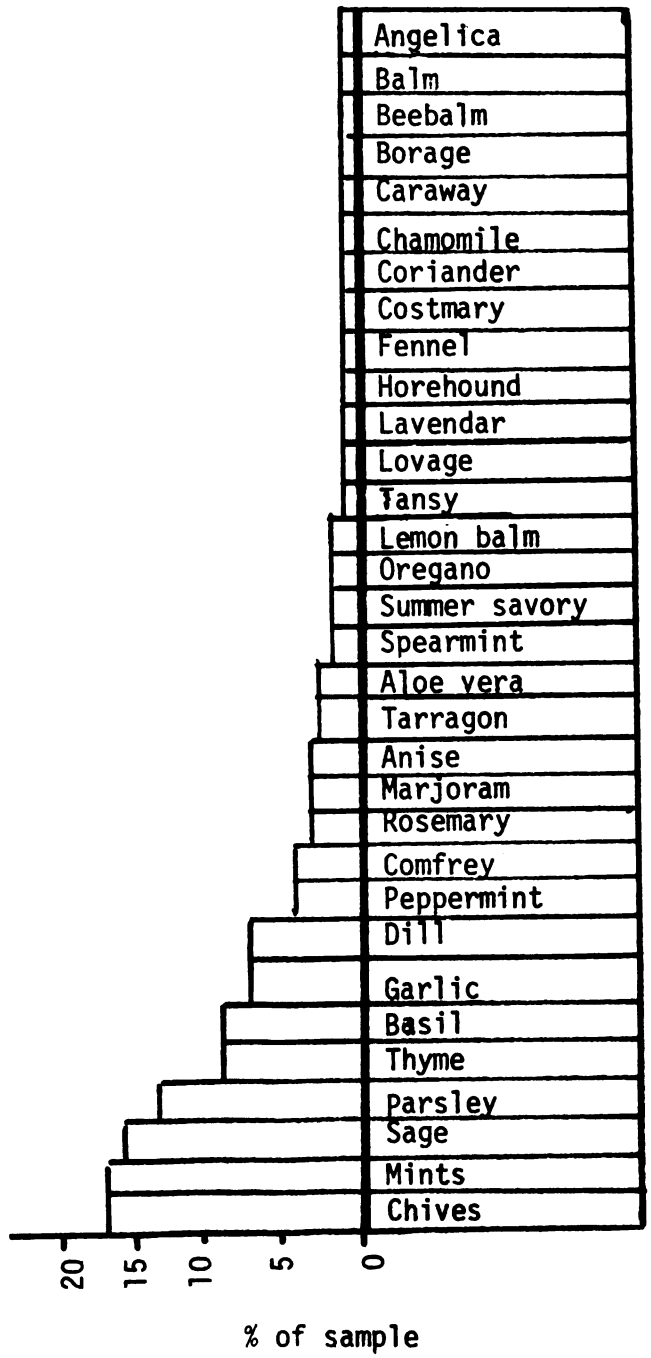

Figure 17. Growth of herbs for personal use

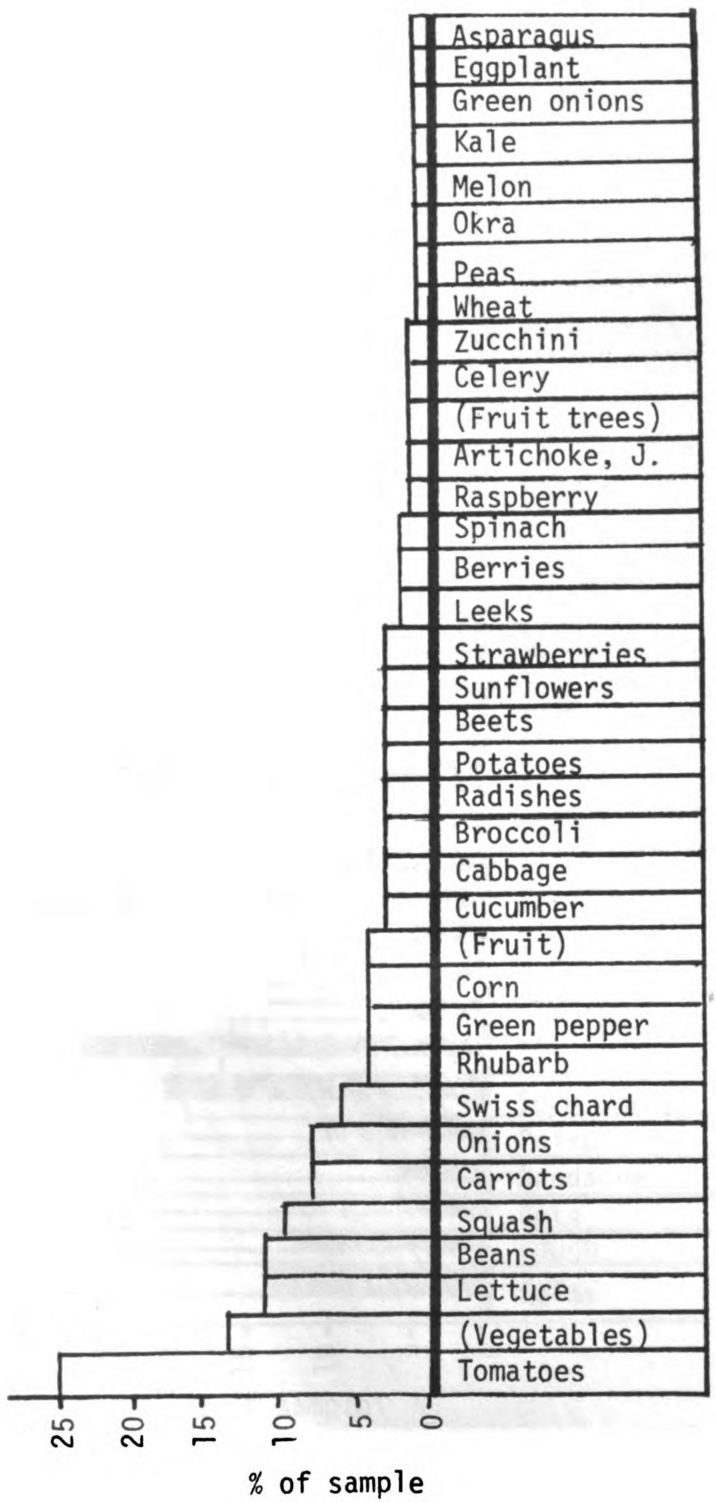

Figure 18. Growth of vegetables for personal use

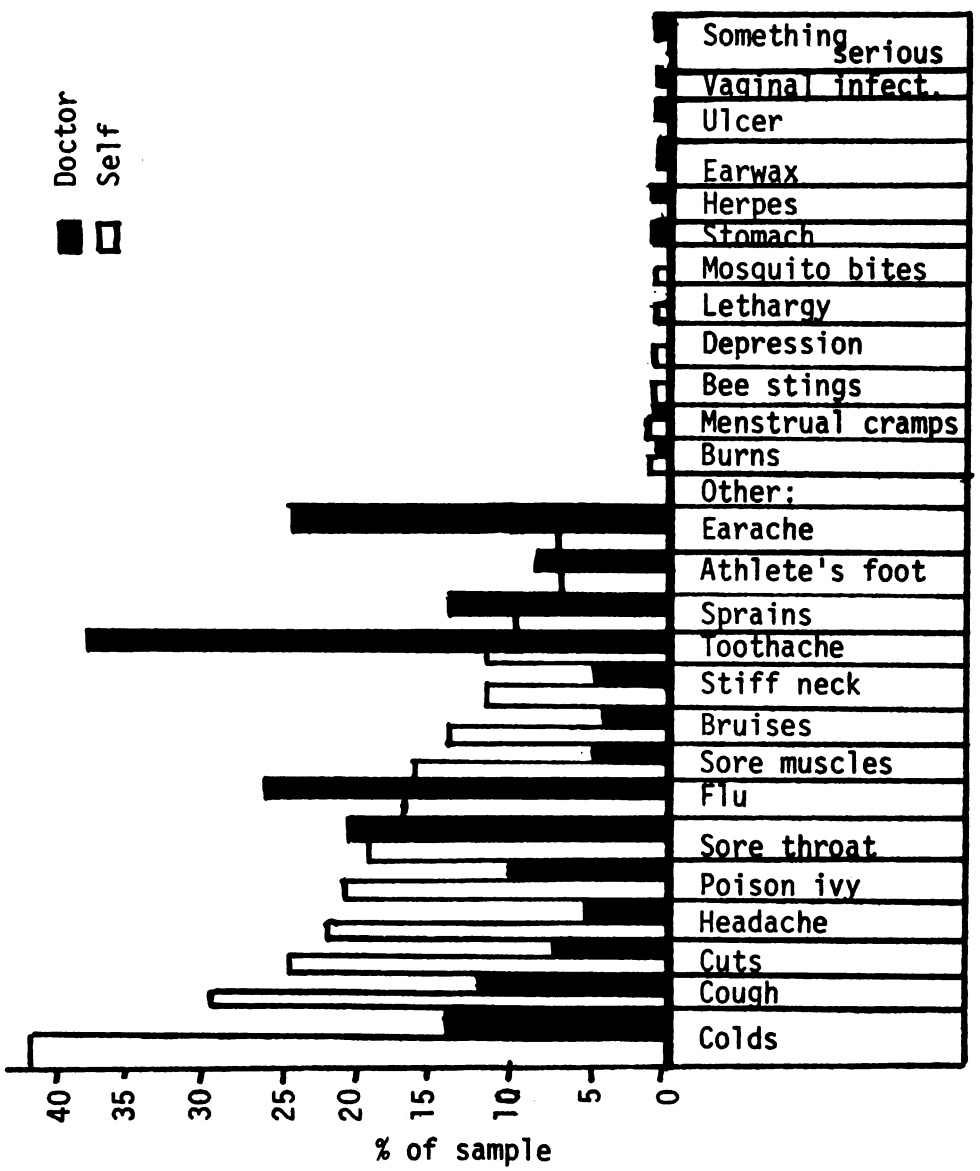

Figure 19. Minor ailments treated by self or doctor

Sources of medicinal plants (ie, collected personally, purchased from a person or store) are quantified in Table 11. It can be seen that nearly equal numbers personally collect both wild plants and herbs/spices; likewise, nearly equal numbers obtain both types of plants from a person. Nearly twice as many reported purchasing herbs and spices from a store as they did wild plants. Furthermore, there is a degree of correspondence between the number of respondents commonly growing their own vegetables and raising herbs and spices.

Table 11. Source of medicinal plants

Plants	Personally * collected		From person		From store	
	Yes	No	Yes	No	Yes	No
Herbs & spices	21	36	12	20	41	10
Wild plants	29	31	12	22	22	21

*% of sample

DISCUSSION

The questionnaire was utilized as a means of providing a quantitative measure of medicinal usages, of illness behavior and attitudes, and of population characteristics. Inherent in the nature of questionnaires is that only a portion of the relevant and possible questions are asked, especially so in this study where it was anticipated that respondents would vary widely in age and education, as well as in other characteristics.

Such was understood at the outset and led to nearly six months of re-working the questionnaire. Despite the attempt, it was found that such factors as available writing space (especially question 14) and order of the questions (placement of questions 1 and 3, for example) hindered feedback in some cases. The time required to complete the questions also affected the depth of the responses: a five to twenty minute survey did not leave much room for relating healing incidents in all but a few cases. (Such were not requested, though a few did so respond.)

Limited space on the second page of the questionnaire was listed by several respondents as a detriment. Nearly all who did respond wrote one or more usages with the particular plant so that considerable information of the desired nature was obtained. Whether or not all possible uses were listed in another question.

In regard to demographic information, several points arose in relation to definition of categories. State of health (average) was

based upon the respondent's own perception, which might not have found "great" and "excellent" distinct. There did appear to be a skew toward toward positive ratings, though, as "poor" plus "fair" accounted for less than 10% of the sample.

Again, it may have appeared that the residency categories, urban/suburban/rural, were unclear; they were also self-defined by the respondents. There was no written mention of problems in self-defining, although the form might have given definite parameters for each. (A sociologist was consulted on the final draft of the questionnaire, and it was felt that such definition was not necessary.)

Although this study did accomplish establishment of a list of species utilized medicinally and gave some indication of the extent to which the population participates in self-treatment, actual dosage of medicinals as well as methods of administration were rarely uncovered.

Further, some indication of healing hierarchy (Romanov, 1965) is given by the measure of health consultations per year and of instances of self-treatment. The implication is that although it appears that the preference of health consultation is, in decreasing order, doctor, friend, and natural or health food store, self-treatment exceeded professional for minor ailments. Further investigation of the referral system might prove fruitful.

Preventive medicine emerged as receiving more attention than symptomatic in this sample, both in regard to personal usage of plant medicines and to seeking of professional aid. Such is in accord with the view that human values place importance in the individual in medicinal matters (DuBos, 1965, Chapter XV) and that the presence of the physician likely has a therapeutic function.

The greatest limitation and thus a considerable opportunity for future work is an investigation of the role of healer. This sample is apparently well-informed and confident of self-treatment of minor ailments (as in Metzger, 1963); still, friends were sought for medical advice. Of these friends, how many regularly give health advice and do so as a major (pre)occupation? At least one person emerged who termed herself a practicing herb woman; references were made to her by several other respondents. It would seem fruitful to pursue further the role of local lay healer(s).

Thus, despite limitations of the form and content of the inquiry, a listing of plants currently in medicinal usage was obtained in addition to some measure of extent of usage and attitudes toward usage as well as relation of demographic characteristics to usage of specific plants. It is hoped that such may add in a small way to our repertoire of healing methods.

SUMMARY AND CONCLUSIONS

1. A small sample of southern Michigan residents with purported interest in plants, nutrition, or related concerns have been found to make medicinal usage of plants.
2. Nearly half the sample responded directly to use of plants as medicine and to such use upon themselves, while fewer (about one-third) used such upon their families.
3. Nearly the entire sample felt that nutrition had an important relation to health.
4. A major portion of the sample viewed their personal medicinal usage of plants as preventive; those who reported visiting a doctor periodically did so for preventive reasons more than for any other purpose.
5. Most have learned of plant medicines through reading, family, or friends.
6. Over half the sample visited a doctor five or fewer times a year; about a third consulted a natural or health food store ten or fewer times per year; three-quarters consulted a friend ten or fewer times per year.
7. Nearly three-quarters of the sample grew one or more vegetables for their own use; half reported growing herbs, and half collecting wild plants for personal use.
8. Nearly half of the sample learned to identify wild plants by themselves; a roughly equal number were taught.

9. Self-treatment of minor ailments exceeded professional treatment in nearly all cases.
10. Food plants were the most commonly used for medicinal purposes by the sample and wild plants the least; ratio of food plants to herbs and spices to wild plants was 3:2:1.
11. Most of the herbs, spices, and wild plants of reported medicinal use can be obtained through the natural/health food retail market; more people purchased herbs and spices than collected them personally, while more collected wild plants than purchased from a store or a person.
12. No significant associations were found between demographic factors and the most frequently (upper 25%) herbs and spices and wild plants with the exception of gender (for herbs and spices only), which was determined to be dependent with a level of significance better than 0.01.

Thus, in a sample with consensus of opinion of the relation of nutrition to health as one of importance, it is not surprising that those who made medicinal use of plants, food plants were the most frequently used. It should be noted, however, that despite such consensus, only half stated that they did make medicinal use of plants. Also it might be emphasized that fewer reported such use upon their families than upon themselves. Such suggests that personal experimentation was more acceptable.

The prevalence of practice of preventive medicine was true for both self-treatment and professional consultation. It is of interest that despite the indication of health referral hierarchy as doctor-friend-natural/health food store, more of the sample treated themselves for

minor ailments than consulted a professional.

In conclusion, it is suggested that the surveyed population exhibited a notable degree of self-reliance in matters of health and illness while maintaining considerable contact with both professional and non-professional services. Absence of association of demographic factors with use of plant medicines was an unexpected finding; it was anticipated that degree of education and place of residence, at least, would show significant relation to degree of usage. The prevalence of preventive medicine was also not anticipated. Although there is no objective evidence to support the statement, widespread use of plants as preventive medicine may possibly be related to the general good health reported in the questionnaire by the sample.

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APPENDIX A

Questionnaire

The purpose of this questionnaire is to attempt to learn to what degree people now use plants as medicines. The main groups of plants with which we are concerned are 1) herbs and spices, 2) wild plants, and 3) natural or organic food plants.

In answering the questions, where you find a blank (___) please respond by number: YES = 1, NO = 2, DON'T KNOW = 3. If there is not enough room for you to write, please use the end of this form and indicate the number of the question.

****

1. Do you use herbs, organic foods, or wild plants as medicine? ___ For yourself? ___ Family? ___ Often? ___ Sometimes? ___

2. Do you think that nutrition has an important relation to health? ___

3. Do you think of herbs, organic foods, and wild plants as preventative medicine? ___ As symptomatic medicine? ___

4. Do you prefer use of herbal teas or tisanes to use of coffee or non-herbal tea? ___

5. How long have you been interested in natural remedies?

6. How did you become acquainted with plant medicines?

7. Averaging the last five years, how many times a year do you estimate that you:
   a) call upon a doctor? For what purpose?
   b) seek advice from friends for treating ailments?
   c) consult a health or natural food store?
   d) call upon some other person for advice when ill?

8. Do you ever collect and dry wild plants for your own use? ___ Which plants & for what use?

9. Did anyone teach you to identify wild plants? ___ Did you learn by yourself? ___

10. Do you grow herbs for your own use? ___ Which?

11. Do you grow food plants for your own use? ___ Which? ___

12. Do you ever treat yourself with plants for minor ailments? ___ Check any of the following that you would treat:

___athlete's foot	___cuts	___poison ivy	___stiff neck
___bruises	___earache	___sore muscles	___toothache
___colds	___flu	___sore throat	___other (please
___cough	___headache	___sprains	be specific)

13. Do you ever consult a doctor for any of the above? ___ Indicate with a "D" in the appropriate blank those for which you would consult a doctor.

14. Which plants would you use to treat any of the above?

15. If you don't use plant medicines at the present time, did you ever? ___ Which and for what purpose? Why did you stop?

Appendix A3. Physical parameters recorded at the time of primary productivity studies.

	STATION					
	LAKE		RIVER		DISCHARGE	
Date	Secchi (m)	Temperature[1]	Secchi	Temperature	Secchi	Temperature
5-21-71	---	17.5-17.5	---	20.5-20.0	---	22-21
6-3	---	22-18.0	---	20-18.5	---	22-19
6-18	---	23.5-22.0	---	25-24	---	32.5-30.0
6-30	0.8	26.5-25	0.4	27.5-26	0.5	34.0-32.5
7-16	1.0	23-23	0.6	25.0-23.5	0.8	32.-29.5
7-29	1.1	22-22	0.6	25-23	0.6	31.5-30.0
8-18	0.9	23.0-22	0.5	26.0-24.0	0.6	33.5-32.0
8-26	0.6(m) 0.5(a)	23.0-22.5	0.5(m) 0.5(a)	24.0-24.0	0.6(m) 0.5(a)	24.0-23.5
9-15	0.8	22.0-22.0	0.5	23.5-23.0	0.6	29.5-29.5
10-2	1.2	21.5-20	0.5	23-21.0	0.4	26-23
10-14	0.6	15.0-15.0	0.5	16.5-16.0	0.5	25.0-25.0
10-16	1.0	14.5-14.0	0.4	15.5-15.0	0.5	19.5-19.0
10-30	0.9	17.-16.5	0.4	18.5-17.0	0.4	22-19
11-13	1.0	7.0-7.0	0.4	7.0-6.5	0.2	14.0-14.0
2-29-72	2.0	1.0-1.0	---	------	1.0	3.0-1.5
5-12	1.2	10.0-10.0	---	11.5-11.0	0.6	19.0-19.0
6-1	0.5	18.5-18.0	0.6	20-19.0	0.4	22-22
6-14	0.4	21.0-19.0	0.4	24.0-21.0	0.3	26.5-26.5

[1]Temperature (°C) range: surface to 3 meters
m - morning
a - afternoon

16. Check any of the following that you have used as medicine and write the purpose for which you used it or them:

__alfalfa	__celery	__lettuce	__rhubarb
__apples	__cider	__limes	__rye
__bananas	__corn	__millet	__sesame seeds
__barley	__cucumber	__molasses	__spinach
__beans	__dates	__mushrooms	__strawberries
__blackberries	__figs	__onions	__sunflower seeds
__brown rice	__grapes	__oranges	__tomato
__buckwheat	__green beans	__peas	__wheat
__cabbage	__honey	__prunes	__vinegar, cider
__carrots	__lemons	__raspberries	__other (specify)

Indicate with a "T" those you use in tablet form.

17. Check any of the following herbs or spices that you have used as medicine and note the purpose for which you used it or them:

__allspice	__coriander	__marjoram	__sage
__Aloe vera	__dill	__meadowsweet	__sarsaparilla
__anise	__fennel	__mistletoe	__savory, summer
__balm	__flaxseed	__nutmeg	__scullcap
__basil	__foenugreek	__oregano	__spearmint
__borage	__garlic	__orris root	__tansy
__caraway	__ginger	__parsley	__thyme
__cardamom	__ginseng	__pennyroyal	__tobacco
__chamomile	__golden seal	__pepper, black	__valerian
__cinnamon	__hyssop	__pepper, red	__wintergreen
__cloves	__lavendar	__peppermint	__yerba mate
__comfrey	__lobelia	__rosemary	__other (specify)

Indicate with a "T" those you use in tablet form.

18. Do you personally collect those of the above that you use as medicine?___ Do you purchase them from a person?___ A store?___

19. Check any of the following wild plants that you have used as medicine and write the purpose for which you used it or them:

__amaranth	__dandelion	__jewel weed	__plantain
__bergamot	__elderberries	__lettuce, wild	__poke
__blood root	__elder fl.	__mayapple	__red clover
__bugloss	__five-finger	__marijuana	__sassafras
__burdock	__ginger,wild	__motherwort	__self-heal
__calamus	__goldenrod	__mullein	__shepherds purse
__catnip	__gold thread	__mustard	__slippery elm
__chickweed	__ground ivy	__nettles	__wild carrot
__chicory	__horsetail	__ox-eye daisy	__yarrow
			__other (specify)

Indicate with a "T" those used in tablet form.

20. Do you personally collect those of the above that you use as medicine?___ Do you purchase them from a person?__ A store?__

FIELD TRIP TEAMS

1. Anderson
   Appel
   Benn
   Bielecki
   Brockway

2. Bronner
   Bryan
   Carmine
   Casbon
   Cassan

3. Collett
   Conroy
   Couchman
   Crider
   Crissman

4. Dams
   Dogras
   Donoghue
   Dudley
   Dunmire

5. Eggert
   Espie
   Frantz
   Gamble
   Graves

6. Haggarty
   Hattis
   Heinzman
   Hlinetzky
   Howard

7. Howell
   Humphrey
   Hunter
   Jokinen
   Kaczan

8. Kafcas
   Kennedy
   Krhovsky
   Lawson
   Leblanc

9. Lindenfeld
   Macdonald
   Margulies
   McHolme
   McLaughlin

10. McMaster
    Mesler
    Mikula
    Miller
    Minger

11. Mooney
    Morlan
    Nakavachara
    Ngampongsai
    Occhiuti

12. Painchaud
    Pirkola
    Polley
    Roggenbuck

13. Rountree
    Ruppert
    Ryan
    Sanburn
    Saversky

14. Schupbach
    Secor
    Seyedoleslamiesfaha
    Sicklesteel
    Smyka

15. Spencer
    Spitsbergen
    Staudacher
    Stokes
    Stone

16. Tai
    Tinberg
    Tonak
    Uhl
    Valleau

17. Vargo
    Veltema
    Walters
    Wise
    Woodruff

18. Worley
    Young
    Younker
    Zakri
    Zielaskowski

Instructors

Teams 1 - 6	Cittadino
Teams 7 - 12	Murphy
Teams 13 - 18	McLeod

PERSONAL INFORMATION

*Male or female? Age: Occupation:

*Last year of school completed (please circle):
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16/BA 17/MA PhD

*Average state of health over past five years (circle):
poor fair good great excellent

*Approximate yearly income (circle):
$0-5000 / $5001-10,000 / $10,001-15,000 / $15,001-20,000 / $20,000

*Current residence: urban/suburban/rural? Nearest city?

*Place of birth: urban/suburban/rural? Nearest city?

*Ethnic background: where did your family come from before living in America?

*Where have you spent most of your life: urban/suburban/rural

*****

If you have further comments or suggestions, please write them. Also if you would be willing to continue this discussion in person, please write your name and telephone number.

Thank you for your cooperation.

5. In the artic tundra, many successful plants reproduce almost exclusively by asexual means. With regard to the evolutionary success of an organism, how would you explain this apparent exception to what you have learned about the necessity for recombination through sexual reproduction? (10pts.)

6. Assuming that a female individual with Down's Syndrome is reproductively functional, what would be the number of chromosomes in each of the four possible gametes resulting from a single meiotic division? (10pts.)

Your homework assignment is worth 25 points. Please turn it in with this quiz.

APPENDIX B

Definitions of medicinal uses according to Jethro Kloss

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Definitions of medicinal uses according to Jethro Kloss

Alterative: producing a healthful change without perceptible evacuation
Aperient: gently laxative, without purging
Aromatic: stimulant, spicy
Astringent: causes contraction and arrests discharges
Antiperiodic: arrests morbid periodical movements
Antiscorbutic: cures or prevents scurvy
Antiseptic: opposed to putrefaction
Antispasmodic: relieves or prevents spasms
Antisyphilitic: having effect on or curing veneral diseases
Carminative: expels wind from the bowels
Cathartic: evacuating to the bowels
Demulcent: soothing, relieves inflammation
Deobstruent: removes obstructions
Diaphoretic: produces perspiration
Diuretic: increases the secretion and flow of urine
Emetic: produces vomiting
Emmenagogue: promotes menstruation
Emollient: softening and soothing to inflamed parts
Expectorant: facilitates expectoration
Febrifuge: abates and reduces fevers
Laxative: promotes bowel action
Maturating: ripens or brings boils, tumors, and ulcers to a head
Mucilaginous: soothing to inflamed parts
Nervine: acts specifically on the nervous system, allaying nervous excitement
Opthalmicum: a remedy for disease of the eye

Pectoral: remedy to relieve chest affections
Resolvent: dissolves and removes tumors
Sialagogue: increases the secretion of saliva
Stomachic: strengthens and gives tone to the stomach
Styptic: arrests hemorrhage and bleeding
Sudorific: produces profuse perspiration
Tonic: remedy which is invigorating and strengthening
Vermifuge: expels worms

APPENDIX C

Phylogenetic classification

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Phylogenetic classification

Species with reported medicinal uses were compared with those used medicinally by four Great Lakes Indian tribes: the Menomini, Meskwaki, Ojibwe, and Forest Potawatomi (Smith, 1923, 1928, 1932, 1933). Usages reported by Smith were obtained from living tribesmen in Wisconsin who had retained as much as possible the traditional medicinal practices. It was found that of the approximately 153 species used by the respondents of this survey, 22% were species also utilized by the Woodland Indians.

It is of interest to note that of those species used in common by the Indians and the sampled population, 70% (33/153) were native species (Gleason & Cronquist, 1963). In other words, in the 300 years or so from the first contacts with French and British fur traders to the time of Smith's research, introduced species were incorporated in the native American Indian medicinal flora. In fact, approximately one-third of the species utilized by the southern Michigan sample and the Wisconsin Indians were introduced.

The following phylogenetic classification includes an indication of tribes with recorded use of the species in question (see page vii for abbreviations) as well as the probable origin of the species.

DIVISION FUNGI

Class Ascomycetes
- Subclass Hemiascomycetidae
  - Order Endomycetales
    - Family Saccharomycetaceae
      - *Saccharomyces rouxii* - Miso fermenting agent

- Subclass Euscomycetidae
  - Order Eurotiales
    - Family Eurotiaceae
      - *Aspergillus oryzae* - Miso fermenting agent

Class Basidiomycetes
- Subclass Homobasidiomycetidae
  - Order Agaricales
    - Family Agaricaceae
      - *Agaricus* spp. - Mushroom

DIVISION PTERIDOPHYTA

- Order Equisetales
  - Family Equisetaceae
    - *Equisetum arvense* L. - Horsetail (native; FP,Oj)

- Order Filicales
  - Family Osmundaceae
    - *Osmunda* spp. - Fern
  - Family Polypodiaceae
    - *Polypodium aquilinum* (L.) - Bracken fern (native; Mn, Oj)

DIVISION MAGNOLIOPHYTA

Class Magnoliopsida
- Subclass Magnoliidae
  - Order Magnoliales
    - Family Myristicaceae
      - *Myristica fragrans* Houtt. - Nutmeg
    - Family Lauraceae
      - *Cinnamomum Cassia* (Nees) Nees ex Blume - Cinnamon
      - *C. Loureirii* Nees
      - *C. zeylanicum* Nees
      - *Sassafras albidum* (Nutt.) Nees - Sassafras

  - Order Piperales
    - Family Piperaceae
      - *Piper nigrum* L. - Black pepper

Order Aristolochiales
F. Aristolochiaceae
Asarum canadense L. - Wild ginger
(native; FP,Mn, Ms,Oj)

O. Ranunculales
F. Ranunculaceae
Cimifuga racemosa (L.) Nutt. - Black cohosh
Coptis trifolia (L.) Salisb. - Goldthread
(native; FP,Mn,Oj)
Hydrastis canadensis L. - Golden seal
F. Berberidaceae
Caulophyllum thalictroides (L.) Michx. - Blue cohosh
(native; FP,Mn,Ms,Oj)
Podophyllum peltatum L. - May apple

O. Papaverales
F. Papaveraceae
Sanguinaria canadensis L. - Bloodroot
(native; FP,Mn,Ms,Oj)

Subclass Hamamelidae
O. Urticales
F. Ulmaceae
Ulmus fulva Mich. - Slippery elm
(native; FP,Mn,Ms,Oj)
F. Moraceae
Ficus Carica L. - Fig
F. Cannabaceae
Cannabis sativa L. - Marijuana
Humulus Lupulus L. - Hops
F. Urticaceae
Urtica dioica L. - Nettle

Subcl. Caryophyllidae
O. Caryophyllales
F. Phytolaccaceae
Phytolacca americana L. - Poke
F. Caryophyllaceae
Stellaria media (L.) Cyrill. - Chickweed
F. Chenopodiaceae
Spinacea oleracea L. - Spinach
F. Amaranthaceae
Amaranthus retroflexus L. - Amaranth

O. Polygonales
F. Polygonaceae
Fagopyrum esculentum L. - Buckwheat
Rheum Rhaponticum L. - Rhubarb
Rumex Acetosella L. - Sheep sorrel

Subcl. Dilleniidae
O. Violales
F. Violaceae
Viola spp. - Violet

(some native, some introduced; FP,Oj)

F. Turneraceae

Turnera diffusa Willd. - Damiana

F, Caricaceae

Carica papaya L. - Papaya

F. Curcurbitaceae

Cucumis sativus L. - Cucumber

O. Capparales

F. Cruciferae

Brassica alba L. - Mustard

B. nigra Koch. - Black mustard

(naturalized; Ms)

B. oleracea L. - Cabbage

Capsella Bursa-pastoris Medic. - Shepherd's purse

(introduced; FP,Mn,Ms)

O. Ericales

F. Ericaceae

Arctostaphylos Uva-ursi (L.) Spreng. - Bearberry

(native; Mn)

Gaultheria procumbens L. - Wintergreen

(native; FP,Mn,Oj)

Subcl. Rosidae

O. Rosales

F. Rosaceae

Fragaria vesca L. - Strawberry

(introduced; FP)

Potentilla recta L. - Five-finger

P. reptans L. - Five-finger

Prunus domestica L. - Prune

Pyrus Malus L. - Apple

Rosa spp. - Rose

(some native; FP, Mn,Ms,Oj)

Rubus allegheniensis Porter. - Blackberry

(native; FP, Ms, Oj)

R. neglectus Peck. - Blackberry

R. occidentalis L. - Black raspberry

(native; FP, Ms, Oj)

R. strigosus Michx. - Blackberry

Spiraea alba Du Roi - Meadowsweet

S. ulmaria L. - Meadowsweet

F. Leguminosae

Arachis hypogaea L. - Peanut

Glycine soja Sieb. and Zucc. - Soybean

Medicago sativa L. - Alfalfa

Phaseolus lunatus L. - Lima bean

P. vulgaris L. - Kidney, pole, bush, wax, navy beans

Pisum sativum L. - Pea

Trifolium pratense L. - Red clover

(introduced; FP)

Trigonella foenum-graecum L. - Foenugreek

O. Myrtales
  F. Myrtaceae
    Eugenia caryophyllus (Speng.) Sprague - Cloves
    Pimenta officinalis Lindl. - Allspice

O. Santalales
  F. Loranthaceae
    Phoradendron flavescens (Pursh) Nutt. - Mistletoe

O. Celastrales
  F. Aquifoliaceae
    Ilex paraguensis St. Hil. - Yerba matē

O. Rhamnales
  F. Vitaceae
    Vitis vinifera L. - Grape

O. Sapindales
  F. Anacardiaceae
    Mangifera indica L. - Mango
    Rhus typhina L. - Staghorn sumac
      (native; FP, Mn, Ms, Oj)
  F. Rutaceae
    Citrus aurantifolia Swingle. - Lime
    C. Limon Burman. - Lemon
    C. sinensis Osbeck. - Orange

O. Geraniales
  F. Oxalidaceae
    Oxalis stricta L. - Wood sorrel
      (native; FP)
  F. Balsaminaceae
    Impatiens biflora Walt. - Jewel weed
      (native; FP, Ms, Oj)
    I. capensis L. - Jewel weed
    I. pallida Nutt. - Jewel weed
      (native; FP,Ms,Oj)

O. Linales
  F. Linaceae
    Linum usitassimum L. - Flaxseed

O. Umbellales
  F. Araliaceae
    Panax quinquefolium L. - Ginseng
      (native; FP, Mn, Ms, Oj)
  F. Umbelliferae
    Anethum graveolens L. - Dill
    Apium graveolens L. - Celery
    Carum carvi L. - Caraway
    C. petroselinum Benth. and Hook. - Parsley
    Coriandrum sativum L. - Coriander

Daucus carota L. - Carrot, Wild carrot
Foeniculum vulgare Mill. - Fennel
Pimpinella anisum L. - Anise

Subcl. Asteridae
O. Gentianales
F. Asclepiadaceae
Hemidesmus indicus Brown - Sarsaparilla

O. Polemoniales
F. Solanaceae
Capsicum frutescens L. - Red pepper
C. minimum Roxb. - Red pepper
Lycopersicum esculentum Mill. - Tomato
Nicotiana tobaccum L. - Tobacco

O. Lamiales
F. Boraginaceae
Borago officinalis L. - Borage
Echium vulgare L. - Bugloss
Symphytum officinale L. - Comfrey
F. Labiatae
Glecoma hederacea L. - Ground ivy
Hedeoma pulegioides (L.) Pers. - American pennyroyal
Hyssopus officinalis L. - Hyssop
Lavendula officinalis Chaix. - Lavendar
Leonurus cardiaca L. - Motherwort
Marrubium vulgare L. - Horehound
Melissa officinalis L. - Balm
Mentha piperita L. - Peppermint
(introduced; Mn)
M. Pulegium L. - Pennyroyal
M. spicata L. - Spearmint
Monarda fistulosa L. - Bergamot
Nepeta cataria L. - Catnip
(introduced; Mn, Oj)
Ocimum basilicum L. - Basil
Origanum majoram L. - Marjoram
O. vulgare L. - Oregano
Prunella vulgaris L. - Heal-all
(native; Oj)
Rosmarinus officinalis L. - Rosemary
Salvia chia Fern. - Chia
S. officinalis L. - Sage
Satureia hortensis L. - Summer savory
Scutellaria laterifolia L. - Scullcap
Thymus vulgaris L. - Thyme

O. Plantaginales
F. Plantaginaceae
Plantago major L. - Plantain
(introduced; FP, Mn, Ms, Oj)

O. Scrophulariales
F. Scrophulariaceae
Verbascum Thapsus L. - Common mullein
(introduced; FP, Mn, Ms, Oj)
F. Pedaliaceae
Sesamum indicum L. -Sesame seeds

O. Campanulales
F. Lobeliateae
Lobelia inflata L. - Lobelia

O. Dipsacales
F. Caprifoliaceae
Sambucus canadensis L. - Common elderberry
(native; Mn, Ms)
F. Valerianaceae
Valeriana officinalis L. - Valerian

O. Asterales
F. Compositae
Achillea millefolium L. - Yarrow
(native or introduced; FP, Mn, Ms, Oj)
Anthemis nobilis L. - Chamomile
Chrysanthemum leucanthemum L. - Ox-eye daisy
(introduced; FP, Mn, Oj)
Cichorium intybus L. - Chicory
Helianthus anuus L. - Sunflower
H. tuberosus L. - Jerusalem artichoke
Lactuca canadensis L. - Lettuce
(introduced; Mn)
L. Serriola L. - Wild lettuce
(introduced; Ms)
L. sativa L. var. capitata L. - Head lettuce
Matricaria Chamomilla L. - Chamomile
Solidago spp. - Goldenrod
(some native; FP, Mn, Ms, Oj)
Tanacetum vulgare L. - Tansy
(introduced; Oj)
Taraxacum officinale Weber. - Dandelion
(introduced; FP, Ms, Oj)

Cl. Liliopsida
Subcl. Commelinidae
O. Cyperales
F. Gramineae
Hordeum vulgare L. - Barley
Oryza sativa L. - Rice
Panicum milliaceum L. - Millet
Saccharum officinale L. - Molasses
Secale cereale L. - Rye
Triticum vulgare Vill. - Wheat

Zea mays L. - Corn

O. Zingiberales
F. Musaceae
Musa sapientum L. - Banana
F. Zingiberaceae
Elettaria Cardamomum (L.) Maton - Cardamom
Zingiber officinale Rosc. - Ginger

Subcl. Arecidae
O. Arecales
F. Palmae
Phoenix dactylifera L. - Date

O. Arales
F. Araceae
Acorus Calamus L. - Sweet flag
(introduced; FP, Mn, Ms, Oj)

Subcl. Liliidae
O. Liliales
F. Liliaceae
Allium Cepa L. - Onion
A. sativum L. - Garlic
A. tricoccum Ait. - Wild leek
Aloe vera var. officinalis - Aloe vera
Asparagus officinalis L. - Asparague
Lilium superbum L. - Turk's-cap lily
Smilax aristolochiaefolia Mill. - Sarsaparilla
S. ornata Hook. - Sarsaparilla
F. Iridaceae
Iris florentina L. - Orris root