

NEW DIRECTIONS IN ETHNOPHARMACOLOGY

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ABSTRACT.—New directions in ethnopharmacology must be concerned with more than the recording and preservation of folk knowledge of plant and animals species with biodynamic compounds. Native concepts of disease and illness, collection and preparation procedures, religious and ceremonial contexts, etc. must also be studied and understood. Such additional information will aid in identifying prototype drugs as well as their development and return to the indigenous cultures from which they came.

The growth of Science would depend on man's willingness to believe the improbable, to cross the dictates of common sense.

Daniel J. Boorstin

INTRODUCTION

Several workers (Farnsworth and Morris, 1976; Farnsworth and Pezzuto, 1983; Holmstedt and Bruhn, 1982) in discussing the historical importance and potential of ethnopharmacological research have emphasized that such studies may lead to (1) the discovery of prototype drugs¹; (2) the recognition of new therapeutic actions of compounds already commonly in use for other purposes (Peigen 1983); (3) the discovery of new sources of crude material for semi-synthetic drugs; and, (4) the utilization of *in natura* plants or their simple pharmaceutical formulations as a means of attaining the development of low cost medicines. Some 7,000 compounds currently used in modern medicine are derived from natural products; most had been used for centuries by European, Asiatic and Amerindian healers. This can be better appreciated when one considers that even in highly industrialized countries, 40-45% of the commercial pharmaceutical products come from natural sources. For the USA in 1980, this amounted to US\$ 8 billion (Jaroszewski 1984; Farnsworth 1985). The contribution of natural products to world health care is even greater in Asia, Africa and Latin America, where a large portion of the world's population lives. There, either by choice or necessity, plants are used as medicine directly from nature (Svendsen and Scheffer 1982).

Various persons are often repositories of a great deal of knowledge of natural medicinal sources within isolated indigenous and peasant cultures. There is now a considerable danger of loss in the oral transmission of medical plant lore to the youth of the societies because of pressure from economic development and accelerated interaction with dominant cultural systems. Unless this trend changes or unless the information is recorded, this valuable knowledge will be lost. Reversing this trend will require detailed ethnographic research which is crucial for the understanding of drug use and medical practices of a given society, because these are inextricably integrated with religion, ritual, social relations, etc. Native knowledge and understanding of medical concepts is

fundamental for ethnopharmacological research, for only then can we understand why and how such a treatment is used.

Interaction between anthropology and ethnopharmacology is the basis upon which holistic research on medicinal plants in particular, and medical care in general, must emanate (Elisabetsky & Posey 1985; Elisabetsky & Setzer 1986). The purpose of this paper is to elaborate the linkages between anthropology and ethnopharmacology, stressing their relation with further laboratory procedures.

ETHNOLOGY AND DRUG EFFECTIVENESS

The concepts of health and disease, as well as the medical system as a whole, are articulated within a given society, as cultural systems (Kleinman 1978). Although anthropologists frequently stress that indigenous societies deal with "sickness" as interrelation between nature, supernature, society and the individual (Fabrega 1975; Tsunoo 1978; Worsley 1982; Young 1982 and others), ethnopharmacologists nevertheless, often select traditional medicine to be screened by laboratory procedures in hope of the discovery of new universally applicable drugs without considering their cultural contexts. This leads to a shortcoming because not every traditional remedy is necessarily acting upon the physiological processes responsible for the proper functioning of the organism. Since a truly holistic view of the individual person is the reference basis for indigenous medical reasoning, treatments are often directed to possible sources of sickness other than physical ones. Thus, religious/ceremonial aspects integrated into indigenous medical systems are viewed as a way to cope with psychological needs, social control, and adoptions of preventive steps (Fabrega 1975) instead of just "folk" explanations or "superstitions".

Although the necessity of interdisciplinary work is frequently stressed (e.g., Bruhn and Holmstedt 1981), most ethnopharmacologists consider anthropological data merely as a catalogue of remedies, methods of preparation or simple lists of medicinal plants. Even this very fundamental information is often not considered in the overall research designs. It is because medicinal plants (or animals) are used in different therapeutical contexts that ethnopharmacology requires an interdisciplinary approach that includes anthropologists.

Ethnological studies deal with disease concepts, belief systems and attitudes as conceptual frames of references, stressing their internal logic and coherence (Quintanilla 1978; Young 1982; Worsley 1982). The position of many anthropologists may thus be limiting to ethnopharmacology for they preclude the possibility of attaining universal medical advances based on different cultural experiences. We cannot disregard the possibilities of attaining new medical ideas by integrating traditional and modern knowledge. For instance, this comprehensive view of the individual, so common and fundamental in indigenous societies in its approach to health or sickness, is now only receiving much attention in our own medical science, thanks to recent development of such new disciplines as psychosomatic medicine, medical ecology and the recognition of the true importance of social conditions in relation to individual and public health. It is well to note that, in relation to prototype drugs, medical practices would likely change for "more frequently than not, it is the availability of drugs that permits new biochemical, physiological and specially, pharmacological knowledge to accrue. This in turn often allows for the theoretical rationalization of human disorders" (Maxwell 1984:377).

The success of this interdisciplinary approach lies, therefore, in the understanding of the physical and cultural treatments of a holistic medical system. Only then can we isolate and scrutinize particular aspects of medicine (Elisabetsky and Setzer 1986).

GOALS OF ETHNOPHARMACOLOGY

Although to many "the goal of ethnopharmacologic research is to find new prototype drugs" (Malone 1983:134), this is not and should not be considered the only one. If, for example, a country dependent on foreign sources of a certain pharmacological compound (see Gereffi 1983) detects, through ethnopharmacologic research, another source of this compound in a native species, a critical first step will have been taken in making that drug available for lower costs. For developing countries, where importation of pharmaceuticals is one of the fastest growing drains on hard foreign currency (Antezana 1981:175), this extremely valuable contribution from ethnopharmacological research, i.e., a national source of crude material, is necessary before the drug can be developed and promoted (see WHO 1979). To take specific examples, in China there are 200,000 people engaged with the planting, processing and distribution of medicinal herbs, including 800 pharmaceutical industries producing 2,000 types of remedies (Wang 1983). In India, there is a network of more than 600 hospitals and 15,000 dispensaries providing health care facilities based on traditional medical systems such as Ayurveda, Unani and Siddha (Akerele 1985).

From those plants, today used as crude materials, many will eventually be transformed in the so-called prototype drugs (Peigen 1983). Nevertheless, a great part of China and India's populations are already profiting from their herbal lore, long before Western science achieves its goal. Different goals may require procedures other than those now used by pharmaceutical industries and/or some academic laboratories where the complete pharmacological evaluation of each plant coupled with the complete phytochemical analysis of the whole plant (or the part used by natives) is undertaken (see Malone 1977, 1980). This is an unrealistic goal for most laboratories in developing countries because of high cost and unavailable technology. The ultimate goal of complete evaluation and analysis is the patent of a new molecule and this may not be the only—or even the most important—goal to Third World countries. Although complete laboratories may be rare in developing countries, some specialized in specific pharmacological/therapeutic actions can be found. Indigenous knowledge, and its evaluation through ethnological research, coupled with biomedical data, becomes crucial since therapeutic action indicated by users can give the clues to those physiological processes most likely related to the action of the active compound(s) of the indigenous medicine (Peigen 1983).

The possibility of correlating the native therapeutic use with our own biomedical concepts would therefore fit important roles for ethnopharmacological research in developing countries: first, it permits the selection of the correct disease experimental model, that is, the one that would most likely reveal the pharmacological activity necessary to attain the described therapeutic action; secondly, it would allow researchers to direct plants to the appropriate laboratory for analysis and testing. Once this laboratory is provided with the means to make the complete analysis regarding one specific pharmacological action, it would be able to analyse many other plants used for the same purpose with medium costs. Reduction of costs at the research/development stage would be reflected in the cost of the final product (Elisabetsky 1985).

INDIGENOUS PHARMACOTECHNICS

Bernardi (1980) reminds us " . . . we (scientists) cannot but consider medicines as natural objects, but we have to visualize them in their cultural background as the products of man, aimed at being used for the health of man" (Bernardi 1980:95). As Evans-Pritchard (1937:448) put it: "medicines are not natural objects but human artifacts." Native users, though, are well acquainted with the importance of different steps to be

followed in order to transform a plant into a medicine. As different parts of the same plant may vary according to their chemical constituents (qualitative or quantitatively), the part selected by natives is of critical importance for phytochemists as well as pharmacologists. It is known that environmental factors may alter chemical constituents (Brown 1984). Users, for example, may state that a certain plant is more effective when collected along the river than this very same species collected in any other place. Or, they may note that a plant is suitable for making the remedy only if collected in the summer, because it is toxic when gathered in winter. Since we are increasingly becoming aware of the importance of such environmental factors as sources of modification of chemical profiles of plants, such information should be recorded and carefully analysed.

There are several traditional ways to prepare remedies, e.g., concoctions, infusions, cold or hot teas, baths, alcoholic infusions, fermented beverages, heated leaves for plastering, roasted seeds for coffee-like beverages, cigars made out of dried flowers or leaves, enemas, extracted oils and saps, syrups and still many others made by natives (Elisabetsky and Setzer 1986; Posey and Santos 1986). The quality and/or quantity of the substances that will be extracted varies significantly with each of these procedures. Methods of preparation may indicate the means by which an indigenous population determines the best therapeutical use of a particular species (i.e., by extracting the active substance, eliminating the toxic ones and, determining the appropriate mode of administration). Indigenous methods may, and most likely will, be improved through the use of modern technology, but should be taken as important clues in beginning stages of research.

It is a common practice among natives to mix more than one species of plant in making a medicine. This can have two basic consequences to further laboratory analytical procedures: (1) it may be possible that only one of the several plants used is actually the one responsible for the desired pharmacological action, although this plant may not be reported as the most important in the remedy; (2) since drugs interact with each other, the presence of one may alter the pharmacological properties of another. There is also the possibility that all or several of the plants used in the mixture have the same pharmacological action that adds to overall effectiveness.

Posology (the administration mode and dosage regime) determines the effectiveness of any kind of medicine. Natives can give specific information regarding the posology of their medicines. The same plant, prepared and/or ingested in different ways, is often used for different purposes. Even baths and massages, widespread practices in several indigenous medical systems, as well as among caboclos, are now being reevaluated since new evidence regarding skin permeability may offer a scientific basis for their claimed efficacy (Lewis and Elvin-Lewis 1977). I suggest that, if all these items are carefully taken into account, the results of ethnopharmacological studies can be improved.

INTERACTION BETWEEN MEDICAL SYSTEMS

Contacts between Western medical care and indigenous concepts of disease, diagnosis, and cure are continuously growing throughout the world. Contradictions in conceptual frameworks are apparent and it is clear from ethnographic studies "how ineffective modern therapeutic programs can be when medical personnel fail to gain a thorough understanding of the principles and concepts of traditional medicine that govern the behavior of these patients" (Logan 1978; Rubel 1967). Chen (1978:273) properly concludes: "If the dominant system recognizes that it is unable to provide adequately for the care of the population and that other medical systems are filling in this gap for a sizeable part of the population, it has little choice but to accommodate this fact."

There is not necessarily conflict between indigenous curers and their biomedical counterparts. This can be seen in the integration of traditional and Western trained practitioners in China, India, Brazil or Malasya where folk and Western care are both institutionally provided (Elisabetsky and Setzer 1986). It is both possible and necessary to improve the interaction between folk and modern medical systems. It should be possible to return ethnopharmacological knowledge, improved through scientific analysis, to the people that most contributed to it and most desperately need it. We can use this knowledge for their benefit through the distribution of scientifically tested active medicinal plants, advising against the use of toxic ones, providing dried plants (cultivated under controlled conditions in order to optimize and maintain a constant chemical constitution) making them available through the whole year and/or to places where they do not originally exist; and providing simple pharmaceutical (Gallenic) preparations.

Contacts between native and Western medical systems are inevitable. If correctly done, anthropologists can propose health programs that teach the importance of an understanding of and appreciation for local medical theories to western biomedical practitioners (Alvarado 1978; Logan and Hunt 1978; Press 1978; Rubel 1967; Spector 1979; Scrimshaw and Burleigh 1978; Worsley 1982). In addition, programs can be devised for indigenous populations with the purpose of informing them about the deleterious effects of allopathic drugs that are more likely to occur due to their misuse (Illich 1975). Such effects are more widespread in the Third and Fourth Worlds as the result of, among other causes, failures in the control of sales, delivery, distribution, and consumption of drugs. This problem is further complicated by the misinformation that accompany remedies sold in these areas (Silverman et al. 1982). Needless to say, ideological influences and economic pressures that result from multinational pressures, colonialism, and imperialism make the resolution of these problems even more difficult (see Silverman et al. 1982; Van der Geest 1981).

CONCLUSIONS

The discovery of prototype drugs (Malone 1977) is just one of the ways ethnopharmacology can contribute to the improvement of health systems throughout the world. Although a desirable goal, another important contribution is the development of low cost medicines. Figure 1 shows a proposed research model for the various possibilities deriving from ethnopharmacological studies and how these goals can be achieved through interdisciplinary collaboration. It stresses the crucial role of ethnographic research into the practical aspects of indigenous health care as the first step of such a model. It specifies the sequence of steps needed for collection and classification of specimens involved in plant selection, together with the different levels of treatment that can be worked out from the data.

At this point it should be emphasized that medicinal plants can be used in different therapeutical contexts. This is the area in which ethnobotanists, botanists, chemists, pharmacologists and anthropologists should work together (Bruhn and Holmstedt 1981). The outcome of such interdisciplinary research perspective will be (1) the preservation of knowledge that would be otherwise lost because of the abrupt urbanization and development process occurring throughout the world (Prance 1972; Schultes 1984); (2) the rationalization of ethnopharmacological and phytochemical laboratory procedures with a consequent reduction of investments and a greater possibility to develop low cost medicines (Elisabetsky 1985); (3) the promotion of understanding of the impact and possible damage that a careless and negligent use of allopathic medical care may have upon native populations that comprise the bulk of the planet's population (Van der Geest 1981, 1983).

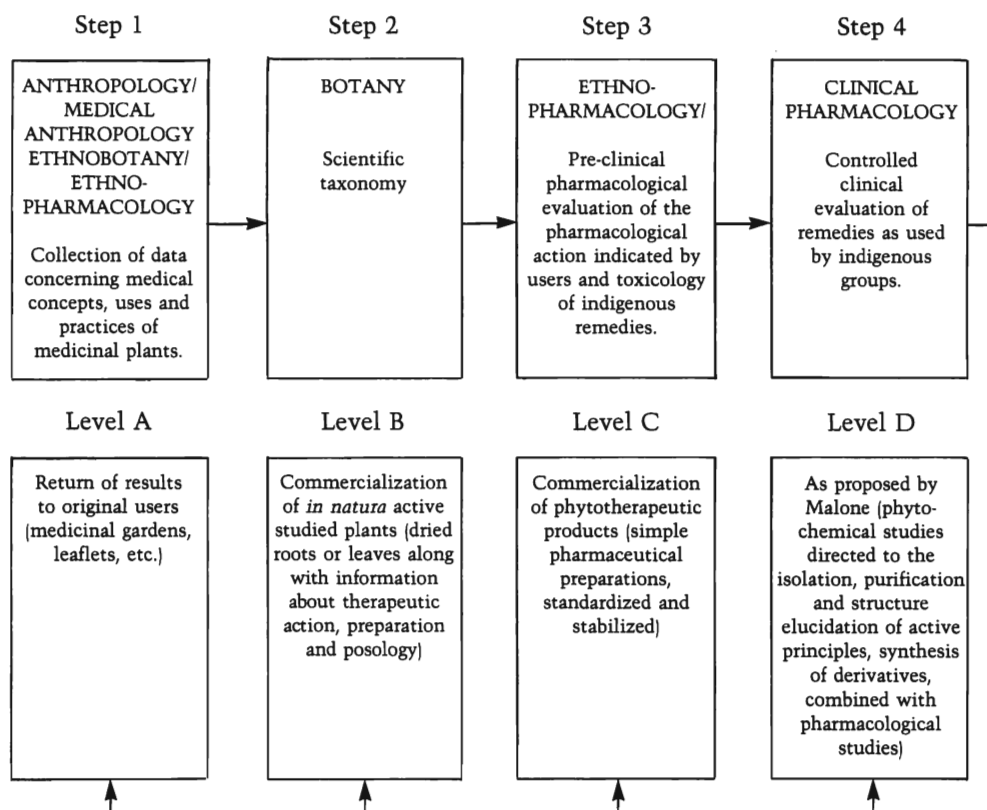


FIG. 1.—Propose line of ethnopharmacological research. Based on Carlini (1983).

NOTE

¹"one that has a wholly different chemical structure from existing agents and a wholly different medical application. Every time such a drug is discovered, there will be major changes in the practices of medicine." (Malone 1983:128).

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