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1. Introduction and Overview

In the past decade, indigenous knowledge systems have witnessed a belated renaissance, both in policy instruments of international organizations[1] and in some international law agreements.[2] In the progressive emancipation of indigenous knowledge systems, two key issues have arisen. The first is the controversial appropriation of various products, innovations, art forms, and intellectual property of indigenous knowledge systems. A particularly contested aspect of this phenomenon has been characterized as biopiracy.[3] The second closely related issue is whether dominant regimes for the protection of intellectual property are compatible with indigenous knowledge systems. The latter issue often finds resonance in contemporary debates on how best to make the legal regimes of impoverished states compatible with the demands of the World Trade Organization. Both issues are recondite and complex, especially in light of the fact that indigenous knowledge systems traverse a wide gamut of life, experiences, epistemologies and empiricisms of thousands of disparate cultures.

Indeed, indigenous knowledge systems are implicated in ecology, agronomy, agriculture, medicine, animal husbandry, music, storytelling, and cloth weaving, to name but a few areas, across several thousands of different cultures and peoples. Given the multitudinous nature and diversity of indigenous knowledge systems, it becomes intellectually risky, if not fraudulent, for general claims to be made regarding such knowledge systems. With particular reference to innovations and inventions made within the context of traditional knowledge systems, it is impossible to resolve the question of the relationship between patents and indigenous knowledge systems without first narrowing the scope of inquiry to a specific set of indigenous knowledge systems.

Thus, with respect to the contested issue of biopiracy and the related issue of how best to protect indigenous knowledge from the predations of unscrupulous "free-riders" and "bioprospectors",[4] I limit my analysis to traditional knowledge on the medicinal uses of plants. Indeed, my analysis is further limited to the protocols, norms and practices regulating the acquisition, use, transfer, and alienation of such knowledge among indigenous healers, particularly herbalists of southern Nigeria. The question that this paper seeks to tackle is whether in the contest of allegations of biopiracy and in the search for effective mechanisms for the protection of indigenous knowledge of the medicinal uses of plants possessed by traditional healers of southern Nigeria, there is any role for the patent regime. Given the popularity of alternative forms of health care,[5] this question is of importance in contemporary discourse.[6]

Before delving further into the aforementioned issues, the concept of biopiracy needs clarification. What is "biopiracy"? Does the term have a relevant and juridical significance beyond its apparent rhetorical[7] and emotive value? The term "biopiracy" was coined by the Canadian activist Pat Mooney. As a concept, "biopiracy" was devised as

> [P]art of a counter attack strategy on behalf of developing countries that had been accused by developed countries of condoning or supporting "intellectual piracy", but who felt they were hardly as piratical as corporations which acquire resources and traditional knowledge from their countries, use them in their research and development programs, and acquire patents and other intellectual property rights — all without compensating the provider countries and communities.[8]

When the concept of biopiracy is used or deployed in relation to plant resources,[9] there is a distinction between traditional knowledge of the medicinal uses of plants and the broader issue of indigenous peoples'[10] knowledge. The former is only an aspect of the latter.

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The concept of traditional knowledge of the medicinal uses of plants pertains specifically to the diverse knowledge possessed by the relevant healers of the various medical uses or properties possessed by certain parts of certain plants. Such knowledge differentiates other uses and properties of such plants, such as food, as distinct from the plants' medicinal efficacy. Second, it must be borne in mind that peoples' health systems are a reflection of their philosophical and cultural tenets.[11] Consequently, knowledge of the medicinal uses of plants is just part of a more holistic conception of disease, treatment, and recovery. Traditional medicine, it must be emphasized, focuses on the psychosomatic dimension of illness. It is therefore invidious to examine traditional uses of medicinal plants outside of the prevailing cultural conception of illness in traditional societies. Third, it must be clarified at the outset that the notion of traditional knowledge as an antiquated and inferior body of knowledge is clearly rejected.

The central question posed in this paper is whether the patent system is relevant or useful for the protection of indigenous knowledge of medicinal uses of plants.[12] This question cannot be resolved without some reference to the politics of intellectual property rights vis-à-vis plant resources.[13] Of course, such an inquiry must also take into account the theoretical justifications for the existence of patent regimes, the search for effective legal measures to protect indigenous knowledge systems, and the growth of medical pluralism around the world.[14] There are also issues related to the ramifications of globalization and the economic, political, and human rights implications of the emergent dispensation of patents on indigenous peoples' knowledge. In sum, the debate is inherently complex, especially on matters pertaining to the increasing role of patent systems in contemporary global politics and economics.[15]

The analysis in this paper is divided into four parts of which the first, presented above, is introductory.

Part two briefly examines the origin, nature, and functions of the modern patent system with particular attention to the dominant theories advanced to justify its existence.[16] The central thrust of part two is that the patent system, developed in the cultural hearth of Europe, is fundamentally construed as an incentive mechanism for the encouragement and protection of inventors in a capitalist market.

Part three explores the nature and diversity of native healing in southern Nigeria. A feature of this phenomenon often overlooked by scholars is that native healers are largely categorized into two groups: diviners and herbalists. Both categories require immense and rigorous training and tutelage. More importantly, native healers embody and reflect the cosmological world view of indigenous peoples. As practitioners of a distinct type of health care, native healers operate from a theoretical standpoint that construes ailment and disease as psychosomatic, rather than biological or pathogenic. Hence, as part two argues, the practices of native healers constitute a complex institution and unique paradigm distinct from the Western allopathic theory of illness. This epistemic schism is at the root of the misunderstanding between Western allopathic medicine and the indigenous psychosomatic conception of illness.

Consequently, native healers' knowledge of the medicinal uses of plants cannot be narrowly construed or understood as knowledge about the "active ingredients" in a given plant. This striking feature of the conception of medicinal uses of plants is at the centre of the antimony and conflict between the doctrine of patentability and the holistic world views of indigenous healers. While the patent system seeks to isolate and privatize the "active ingredient" in any given medicinal plant, native healers tend to conceive of the plant as one part of a larger repertoire for the alleviation of illness. More importantly, native healers do not require the incentives offered by the patent system.

Another fundamental philosophical difference between patents and indigenous protocols for the identification and protection of indigenous knowledge of the medicinal uses of plants is that while the patent system is designed to recompense investors with a temporary monopoly over the invention, indigenous protocols for the protection of the knowledge of native healers are deployed in the service of status and division of labour in a traditional economy. Consequently, this paper argues that whether as an incentive mechanism or as a protective regime, patents do not offer much benefit to the native healers of Southern Nigeria.

In expatiating on some of these difficult issues, part three explores and assesses recent doctrinal changes in patent law. Hence, this paper analyzes whether as an incentive mechanism and protective regime, contemporary patents afford sufficient inspiration to native healers while providing effective protection from biopirates. If the answer is in the negative, what then is the best manner by which to encourage native healers and to protect their knowledge from the grasp of unscrupulous "free-riders" and "biopirates"?[17]

In sum, it is argued that inasmuch as the patent system has shown itself to be eminently flexible,[18] it is theoretically and operationally incapable of accommodating the peculiar demands of native healers. Ultimately, the best method for the protection of such indigenous knowledge is to give juridical legitimacy to the various pre-existing methods by which native healers in southern Nigeria historically encouraged and protected their practices. Thus, a conception of intellectual property rights as a policy instrument of states[19] is crucial to fashioning a juridical response to the problem of biopiracy.[20] Neither indignant outrage against "biopiracy"[21] nor the neglect of native healers yields an institutionalized solution to the problem of biopiracy and the delegitimation of indigenous approaches to healing.[22]

2. The Patent System

What is a Patent?

Although there is no universal patent law *per se*, Article 27(2) of the TRIPS Agreement defines patents in terms of a legal protection for products or processes that are *new*, *involve an inventive step*, are *useful* and *capable of industrial application*.[23] The *Patent Act* of the United States provides that "whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor".[24] Machlup defines a patent as "that which confers the right to secure the enforcement power of the State in excluding unauthorized persons, for a specified number of years, from making commercial use of a clearly defined invention."[25]

The essential ingredient of a patent is that it is a time-limited type of property right granted by the state[26] to a person who has met certain criteria in respect of an invention. Patents purport to encourage inventiveness as well as to protect the invention from unauthorized manufacture, use, or commercialization. However, a patent does not offer any guarantee that the inventor will in fact be adequately recompensed. There are three basic types of patents: utility patents for utilitarian inventions; design patents to protect new, original and ornamental designs; and plant patents. Controversy around patents centres largely on utility and plant patents.

Theories of Patents

Various theories have been posited to justify the existence of patent systems. A careful survey of various patent regimes shows that patent systems have no universal theory[27] but are premised on a mixture of theories. However, four leading theories on patents (the natural right theory, the contract/disclosure of secrets theory, the reward theory, and the incentive theory), are discernible from the gamut of national patent systems.

The Natural Rights Theory of Patents

This theory posits that an inventor has a natural right in her invention and that society, represented by the state, has an obligation to recognize, protect, and enforce that right. Not surprisingly, this theory sprung from the French Revolution and is eloquently enshrined in the French *Patent Law* 1791. The natural rights theory is a flawed justification for the patent system. First, it requires an acceptance of the notion that ideas are possible subjects of exclusive ownership. This is a problematic proposition that is difficult to maintain in ordinary societal relations and experience. Second, it posits that patents are not governmental privileges but an inherent right of the inventor. Such a proposition flies in the face of various limitations contained in virtually all nations' patent laws. The limitations in question often pertain to patentable subject-matter, duration of patents, compulsory licensing, and government appropriation of certain inventions.[28]

Consequently, no patent law of any state is based on natural law theory. Instead, patent systems are often based on policies of economic and political orientation. Indeed, the natural rights theory of patents has been forcefully rejected in a report by the Secretary-General of the United Nations.[29] According to the report:

> [P]atent legislation has never been based solely on the concept of the patent as the confirmation of an inherent, rather than the creation of a statutory, property right. Such a concept would have left no room for such restraints on the patent grant as its fixed duration, its exclusion for inventions in certain fields … and the forfeiture or compulsory licensing of patents for failure to work them.[30]

However, failure of a state to recognize or create effective legal regimes for the protection of indigenous knowledge may raise issues of discrimination and human rights violations. It is within this context that various indigenous peoples' groups have protested against the privileged status of the dominant forms of intellectual property rights. Given that intellectual property rights are often a reflection of the interests of dominant segments of society, it is not a coincidence that indigenous knowledge systems play a marginal role in comparison to major intellectual property rights regimes.

The Reward Theory

This theory posits that inventions come forth because the patent system offers rewards to inventors. By this theory, without the reward promised by the patent system, there would be no inventions.[31] Problems with this theory include the undue emphasis on monetary gain. Not all inventions are motivated by lucre or expectations of material fortune. Moreover, commercialization of inventions and inventiveness *per se* are two distinct phenomena, and one ought not to confuse them. Human experience shows that irrespective of a patent regime, inventions would always occur.

The Contract/Disclosure of Secrets Theory

The contract theory describes a patent as a contract between the inventor and the state or society. The inventor grants society access to valuable information and knowledge in return for the limited monopoly over the use of the invention. This theory is problematic on several fronts. First, it has been pointed out that where secrecy is possible, inventors and industry prefer to employ legal protection through trade secrets. Indeed, it is a matter of fact that even if the inventor kept his or her invention secret, others might eventually hit upon it because invention is ultimately called forth by the needs of society. Necessity, it is often said, is the mother of invention. Further, it is always uncertain whether the monopoly granted to the inventor is actually equal to the social benefit of the invention. Several inventions that later proved immensely useful were somewhat ahead of their time when patented, earning nothing for their cre-

ators. A good example is the fax machine, invented in 1842, but not commercialized until the early 1980s.[32]

Encouragement of Invention Theory

Another economically inclined theory of patents is the notion that patents have a causal or organic link with inventiveness and industrialization.[33] This idea is deeply ingrained in popular discourse. Surprisingly, the proof, if any, of the causal relationship between patents and inventiveness and any concomitant economic progress is questionable, and, at best, very meagre. The prevalent notion that patents propel inventiveness is founded on inferences from anecdotes[34] and dubious assumptions. The fact remains that the most well-reasoned studies of patent systems fail to establish a cause and effect relationship between the existence of patent systems and inventiveness.[35] Surveys of business leaders (with the notable exception of pharmaceutical companies) typically place a low ranking on patents as a stimulant for research and development.[36]

The most fundamental difficulty in making any rational claim for or against the alleged relationship between patents and inventiveness is the impossibility of separating out other factors that contribute to technological inventiveness, such as local resource endowment, type and quality of education of the labour force, availability of capital, and dynamism of the local market. In sum, it seems that the preponderance of reasoned opinion and empirical research shows that the industrialization of a country can proceed vigorously without a national patent system. Indeed, the notion that patent systems are coterminous with industrialization or that the patent system is a historical necessity is not supported by the history of industrialization and the practice of states. Given the propertarian[37] and economic inclination of the patent system, the question that arises in the context of this paper is whether the regime of patents is relevant to native healers?[38]

Colonialism and the Patent System

A resolution can only be achieved by a holistic analysis of the ideological and philosophical dimensions of the encounter between indigenous knowledge systems and dominant intellectual property regimes. Without question, the colonization of non-Europeans, especially Africans, was partly justified on the hypothesis of racial superiority of Europeans and the inferiority of "the savages and primitives" of Africa (and Asians, natives of the Americas, aboriginal Australians and the Maoris of New Zealand, etc.). Another anchor of colonialism, and part of its justification, was economic: to loot and dispossess the colonized.[39] It was largely on the former, that is, the mission to civilize and redeem the savage, that the colonialist enterprise justified the delegitimation of the knowledge systems of peoples in the so-called "backward territories."[40]

It is one of the enduring gaps in current scholarship in patent law that few academics bother to address the racist nature of the encounter of indigenous and traditional peoples with patent law. This oversight or amnesia often assumes that the patent system is culturally neutral and untainted with epistemic bias. The truth is that colonialism, properly understood and construed, was not only an affirmation of a racist hierarchical ordering of cultures, but also a violent imposition of foreign legal norms and institutions on conquered peoples and cultures.[41]

Consequently, as a matrix of "western civilization", the institution of patents has been promoted as one of the hallmarks of development, progress, and economic modernization. The obvious implication is that the patent system, like similar aspects of European values, norms, and institutions must be internalized by colonized societies if such societies are to be regarded as worthy of membership in the elect club of "developed" and "civilized" society.

Despite its contemporary reinvention as a non-racist concept,[42] the idea of "civilizing" or bringing "development" to the "savages"[43] was at its core a racist mantra that operated upon the notion that colonized peoples and cultures had no civilization, no body of knowledge, no science, and no culture worthy of respect, let alone legal protection.[44] It was thus on the notion or mindset that the colonized territories and peoples presented a cultural and legal *tabula rasa*,[45] that the colonial enterprise proceeded to inscribe European institutions, norms, and systems, including the patent system, on the cultural and legal landscape of conquered peoples of Africa and elsewhere. Aided or sanctioned by such spurious doctrines as "discovery" and "*terra nullius*", European colonialists engaged in an unprecedented robbery of Africa, and almost complete annihilation of native legal systems and protocols. In the process, non-Western knowledge frameworks, epistemologies, and epistemic schools were thoroughly ridiculed as "folk knowledge", "quackery", "black-magic" and "voodoo."[46]

The patent system, as imposed on African peoples, was part of the colonial project to remodel non-Western peoples and cultures in the image of Europe on the hypothesis that indigenous peoples had no pre-existing institutions worthy of respect.[47] Thus, while non-Western epistemologies, cultures, and value systems were dismissed as irrational, mystical, natural and undeveloped, Western norms of civilization, world view, epistemology and culture were uniquely positioned as rational, empirical, and universal ideals attainable by all, regardless of cultural differences.[48]

As Makau Wa Mutua notes, within this prevailing logic of progress, "history is a linear, unidirectional progression with the 'superior' and 'scientific' Western civilization leading and paving the way for others to follow."[49]

In this bizarre re-ordering of the world, Western forms of intellectual property protection, such as patents and copyrights, became the recognized and enforceable mechanisms for articulating and protecting intellectual property. In comparison, indigenous methods for the protection of cultural and intellectual property were largely dismissed and ridiculed as the noxious notions of "inferior creatures of God".[50]

The dominant narrative of development proceeded on all fronts as if there were no alternative frameworks for articulating and protecting intellectual property among the colonized peoples of Africa.[51] It is therefore understandable that a significant number of vocal human rights activists and traditional knowledge practitioners argue that the patent system has not been respectful of the dignity and rights of indigenous and traditional peoples and other cultures outside the Western hegemony.[52] Some critics argue that the patent system is incompatible with the values and culture of traditional and indigenous peoples.[53]

Ideologically, the patent system is deeply immersed in the ideology of accumulation of capital. The question that arises, therefore, is whether having regard to the overtly economic impulses of the patent system, there is any reasonable prospect of making the patent system compatible with the needs of native healers in southern Nigeria, whose expert knowledge of medicinal uses of plants are not necessarily deployed to the service of capital. Or would indigenous systems of cultural and intellectual property protection better serve those healers?[54]

3. Native Healing in Southern Nigeria

The Protection of Traditional Knowledge of the Medicinal Uses of Plants (TKMP) Among Native Healers in Southern Nigeria

Southern Nigeria is occupied by hundreds of nations and cultures.[55] Pottery shards, stone tools, rock shelter, and other anthropological and archaeological evidence, show southern Nigerian territories were peacefully occupied at about 12,000–15,000 B.C. Presently, major ethnic groups include the Edo, Igbo, Ijaw, Ishan, and Yoruba. Igbo civilization is distinct from those of the Ife and Benin civilizations.[56] Despite their diversity, a major commonality is that the languages of the southern peoples seem to derive from the Kwa family of languages. Linguists posit that three of the major languages of southern Nigeria, Edo, Igbo, and Yoruba began to diverge 4,000–5,000 years ago.[57] It is apparent that the various nations and cultures of southern Nigeria are of ancient origins.[58] Apart from language, these groups share other similarities,[59] especially of world views and medicine, in particular.[60]

The world view of many southern Nigeria cultures is "predominantly holistic rather than analytic. The cultures tend to see the total picture, not parts of it".[61] The central thrust of this holistic conception of the world is that southern Nigerian cultures are inspired by the concept of dynamic duality and balance between opposites, and the interactive roles of the entities and spiritual forces in both cosmic and temporal realms. The spirit world, an animate and inanimate place, is also the abode of both the creator and the ancestral spirits.

The temporal world is construed as a marketplace for both the dead and the living, who are in a constant state of birth, death, and rebirth. In this dynamic equilibrium, the dead are expected to come back to life to join the lineage. Life is thus a cycle in which all created beings — animate and inanimate — are in a constant interactive cycle. Violations of traditional laws constitute a disturbance of the harmony between the spiritual and the temporal. Events that upset the equilibrium include natural disasters such as drought, famine, and epidemics, as well as antisocial forces such as sorcery, litigation, homicide, violation of taboo, and other incidents deemed infractions of the natural balance.[62] As Francis Cardinal Arinze observes, maintaining the social and cosmological equilibrium may take the form of several types of sacrifices (*ichu aja*),[63] and other means of restoring social and cosmological order. Pre-colonial southern Nigeria world view and culture often distinguish the subtle differences between custom, law, and good morals or admirable conduct.

Another radical feature of most southern Nigeria cultures is that despite the appearance of "openness", most of the societies were in fact "closed". Consequently, only those who participated in the inner workings and dynamics of various aspects or parts of society could speak with authority on how that aspect or dimension of society was configured.[64] For example, unless one were a chief, one could not exactly know how chiefs conducted their businesses. Similarly, unless one were initiated into a particular cult or group, it would be difficult to speak knowledgeably about the workings of the cult or group.

Southern Nigerian societies, contrary to extravagant claims by some colonial historians, were bifurcated and often secretive in their imagery and operations. On the one hand, there stood a façade for all to see. However, beyond the veil were layers of exclusion and levels of social ordering in which only those who by age, class, cult-membership, gender, or other identifier, were members could participate in, and more importantly, speak authoritatively about. As Professor Anene aptly observed, concerning the Igbos,

> [T]heirs is essentially a participatory society. You can't know the inside facts about Mmanwu (masquerade) unless you are admitted to Mmanwu and participate in operating Mmanwu. You cannot say much about the various Ozo titled societies unless you are admitted to them and participate in their rituals and activities. You can't know the impli-

> cations of various socialization rites, ceremonies, including rites of passage, unless you participate in them.[65]

With particular reference to the issue of whether traditional knowledge of the medicinal uses of plants is capable of protection under a Western patent system, two immediate consequences arise from the preceding discussion of the nature of southern Nigerian societies. The first immediate consequence of these two radical attributes of southern Nigerian societies is that disease and infirmity are largely construed as a symptom of spiritual imbalance or disorder; a psychosomatic phenomenon.[66] Therapies are therefore designed to restore balance in the spiritual realm, which in turn restores the sick person to a state of good health. It must be understood here that good health is not merely the absence of disease, but the totality of physical, emotional, and psychological well-being. As Chidi Oguamanam rightly points out, this is a radical departure from Western allopathic medicine, which conceives of illness, however complex, as a biological process or condition,

> [r]equiring a directly targeted course of treatment. As such, a medical condition is generally perceived as Newtonian, mechanical and organismic in nature. For this reason, allopathic or orthodox medical science is divided into several major disciplines, which in turn are divided into various sub-disciplines, based on organismic conception. Thus … part of the diagnostic process is to break down the situation, including the human body, into component parts. Effort is directed at tracing a single causal agent responsible for the ailment. When identified, treatment is administered on the implicated organ or targeted at the causal agent now isolated … the overtly mechanistic approach is a consequence of the philosophical revolution of the Renaissance and the success of the germ theory.[67]

This approach has been very successful despite the fact that research shows more than seventy per cent of illnesses could be psychosomatic in origin.[68] In contrast with the hegemony's allopathic approach, cultures in southern Nigeria, like many other non-Western paradigms of health care and medicine, emphasize the psychosomatic dimension of illness. An individual's health is interpreted through a harmonious relationship with both community and supernatural forces. Given this holistic conception of health, the germ theory of disease, which is the mainstay of western medicine, was not well regarded in southern Nigerian indigenous medicine, in whose conception of illness, spiritual, emotional, and psychological factors constitute the primary focus of the diagnosis as well as the location of the remedy. The restoration of sick persons to good health often involves sacrifices, prayers, incantations, and other rituals ostensibly designed to restore order and harmony in the spiritual realm.[69]

This paradigm implicates medicinal plants in that when plants are used in the treatment of a sick person, the healer does not rely on the so-called "bioactive" part of the plant, but conceives of the plant as part of a complex and holistic regime deployed towards the alleviation of illness. Herbs and other material forms of treatment are then employed to supplement the spiritual and psychological aspects of treatment offered by the native healer. This approach is quite different from allopathic medicine, in which the primary focus is on the "active" component of the plants or materials used in conjunction with the plant. In Nigerian cultures, the plant itself is representative of a beneficial spirit entity. Such a view is quite at odds with a patent regime, which seeks to protect isolated "active" chemicals found in medicinal plants.

A second radical consequence of the indigenous world view of medicine coupled with the "closed" nature of southern Nigerian societies is that, contrary to the assertions of many scholars, knowledge and practice of medicinal uses of plants by healers is not always in the public domain. General, traditional knowledge among the local populace of medicinal properties of certain plants has led to the unfounded notion that this knowledge is always in the public domain. Arguably, this notion arises from a misconception of the character and functions of native healers. While many local people may have common knowledge of the medicinal uses of certain plants or parts of a plant, the practice of native healing is not an "all-comers" affair. As in Western medicine, common knowledge that aspirin could alleviate pain does not make everyone with such knowledge expert in the subject of the causes and alleviation of body pain.

The reality in southern Nigerian societies, and by analogy, many traditional African societies, is that the native healer is both a complex person and an institution of itself.[70] Generally speaking, there are two classes of native healers, both of which undergo different types of tutelage, training, and socialization. Each perform different functions, and in each class, there are different levels of skills, competence, knowledge, specialization, experience and prowess, much like the classifications in western orthodox medicine. A particular segment of native healers practise in mediating between human beings and spiritual entities such as gods/goddesses, spirits, natural forces, and supernatural elements. These healers' forte includes ritual, making of incantations, divination, removal or placement of curses, and other such functions that are largely meditative, and focused on the spiritual realm. As intercessors and diviners, these groups diagnose and treat spiritual causes of ailments, whether simply ill luck, or worse, tragedies. The healers then prescribe such remedies as sacrifice and removal of curses, Of course, in their ministration, it is possible they use plants that possess spiritual qualities. However, their area of core competence is not medicinal herbs, *per se*.

Such healers are often "called" to their professions by the "spirit" or deity whom they serve. It is not unusual for a famous healer to die without any of his or her many children being called to serve the deity in question. In addition to those who have been "called" by spirits and deities, it is also possible for individuals to choose training in special schools designed for appren-

tice native healers. The training often lasts seven to fourteen years and requires the performance of remarkable feats of endurance, and many years of tutelage under experienced native healers. At the end of an apprentice's training, whether called or chosen to be a diviner, the graduate native healer is "given" or inherits the tools of the trade, which include idols, deities, various charms, and amulets.

It must be emphasized that admission to the schools is not open to all comers. Rigorous admission tests are required. Certain signs and manifestations of admissibility are also taken into consideration. It is not unusual for certain body features, such as a physical deformity, to be a disqualifying feature. At the same time, other institutions may prefer candidates with certain body features, for example, albinos, or persons with hunchback. Moreover, the length of time and stress of the apprenticeship has been known to deter many dilettantes. Apprentice healers often have to memorize thousands of different incantations, learn how to perform thousands of different sacrifices to hundreds of deities, and above all, master the ethics of the job. It must be emphasized that there exist thousands of deities of varying power. Before an apprentice becomes a powerful native healer, she or he must acquire enormous experience and will probably have "taken" many other deities.

Furthermore, deities that are "taken" do not all possess equal power or authority over all ailments. In effect, the deity a native healer serves plays a role in determining whether that native healer is reputed to have expertise in curing certain types of ailment. For example, a native healer who worships the "god of insanity" is far more likely to be efficacious in dealing with patients with mental illnesses than a healer who worships the "goddess of infertility". It is not unusual for a native healer who is expert in one field to refer a patient to another or more senior colleague with expertise in the pertinent field. Consequently, a lack of appreciation by many scholars of the complexity of the institution of native healing has led to generalizations in contemporary literature on the subject. Generally speaking, native healers who are primarily diviners are not as knowledgeable about medicinal plants as those healers who are primarily herbalists. As I observed earlier, there are a few cases where both categories intersect or tend to converge, but the primary distinction between both categories remains generally valid.

The other group of native healers comprise those whose expert knowledge of the medicinal properties of thousands of plants is simply legendary. It is this group of healers that has largely drawn the attention of both individual Western scholars and institutions. Conversely, diviners are treated with immense scepticism by Western researchers and bioprospectors. The practices of herbalists have been defined by the World Health Organization ("WHO") as "the sum total of the knowledge, techniques, skills and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not to Western science, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical or mental illness".[71]

Like native healers with expertise in divination, healers in this category often receive many years of training and tutelage from older and more experienced healers. The tutelage and training often takes the shape of the apprentice watching the experienced healer ply the trade, as well as helping to gather various plants and to mix pertinent plants with other plants and materials. As I repeatedly caution, there are instances where it would be invidious to separate the work of the diviner from that of the herbalist. There are cases where the herbalist acts as diviner, and *vice versa*. The point remains that native healing, whether in the field of divination and sacrifices or herbal medicine, is a complex and sophisticated institution as opposed to a pedestrian practice as portrayed in contemporary literature.

Western Science, Patents, and Native Herbalists

It is not a coincidence that of the two main categories of native healers, the diviner is the least popular and has thus been banished to the periphery, while the herbalist has widely become the darling of the biotechnology industries, WHO, and many Western scholars. The diviner is virtually feared as well as despised by many Western institutions and dismissed as a quack, a fraud, and a relic of a devilish, primitive age, as recent discussions on medicinal plant patents focus on the knowledge possessed by herbalists. The emphasis has thus been on the "active" ingredients of medicinal plants.

Such focus by the industry, scholars, and WHO on the herbalists' phenomenal knowledge of the medicinal uses of plants tends to dissociate that knowledge from the wider cultural and holistic contexts in which both the diviner and the herbalist operate.[72] As pointed out by Professor Chidi Oguamanam, "the emphasis on active ingredients … advances not only the Western scientific culture but also advocates 'mercantilism' and 'extractivism', with which Western science and its intellectual property allies have besieged indigenous knowledge systems".[73] Although the dominant notion that patents propel the march of technological progress by offering an incentive to inventors [74] is largely unproven in many well-reasoned studies,[75] the ascendancy of the patent system as a preferred method for the protection of innovations is beyond doubt.

However, a question arises as to whether traditional knowledge of the uses of plants, in spite of the epistemic and ideological divide between Western allopathic medicine and holistic conceptions of illness, is protectable by the patent system. Touted as a mechanism to deal with allegations of biopiracy, or a preferred legal

regime for complying with prerequisites for membership in the World Trade Organization, issues remain as to the compatibility of patents with economic and cultural world views of native healers. While supporters of a harmonized, global patent regime may have their own force of logic, there is still a question as to whose version of "harmonization" is forced on others, and at what costs to marginalized cultures?[76] The ideological and economic issues at stake compel a need for careful thinking and respectful consideration of the role of local plant breeders, farmers and native healers in an increasingly globalized world.

In attempting to apply patent concepts to traditional knowledge on the medicinal uses of plants, various jurisprudential hurdles must be carefully assessed. Some of these issues pertain to widely held misconceptions and exaggerations about the character of traditional knowledge of the medicinal uses of plants. These include the unfounded notion that all forms of indigenous knowledge of the medicinal uses of plants are in the public domain. Also problematic is the belief that indigenous knowledge is simply knowledge about the "natural" workings of nature as opposed to its "scientific" workings. The implication here is that natural healers or herbalists do not have intellectual input in the identification, preparation, and prescription of herbal remedies. References to the innovations and knowledge of traditional societies, especially on the issue of knowledge of the medicinal uses of plants as "traditional", are often misconstrued to imply that the inventions and innovations of native healers are not new or innovative, but static and antiquated. In an attempt to dispel this notion, the Four Directions Council pointed out that,

> [W]hat is "traditional" about traditional knowledge is not its antiquity but *the way it is acquired and used*. In other words, the *social process of learning and acquiring which is unique to each indigenous group, lies at the heart of its "traditionality"*. Much of this knowledge is actually quite new, but it has a social meaning and legal character, entirely unlike the knowledge indigenous people acquire from settlers and industrialized societies.[77]

Article 8 (*j*) of the Convention on Biological Diversity (CBD) also recognizes the dynamic and living character of traditional knowledge.

The second common misconception about traditional knowledge is the notion that indigenous knowledge of the medicinal uses of plants is merely the discovery of "natural phenomena" waiting for the fortunate discoverer. As Gurdial Nijar has observed,

> [T]traditional uses, although based on natural products, are not "found in nature", as such. They are products of human knowledge. To transform a plant into a medicine, for example, one has to know the correct species, its location, the proper time of collection (some plants are poisonous in certain seasons), the part to be used, how to prepare it (fresh, dried, cut in small pieces, alcohol, the addition of salt, etc.), the way to prepare it (time and conditions to be left in the solvent). And finally, the posology (route of administration and dosage).[78]

As noted above, native healers undergo many years of rigorous training and apprenticeship. Native healers vary in their skills, competence, and knowledge. Difference in skill is often a function of their research abilities, experience, and willingness to experiment or innovate. It is therefore no coincidence that a decisive number of drugs derived from plant resources have been created with the help of the most knowledgeable and innovative native healers.[79]

Other misconceptions suggest patents constitute an appropriate mechanism for the protection of traditional knowledge on the medicinal uses of plants.[80] One commonly held belief is the alleged absence of novelty in TKMP. It rests on two faulty assumptions: the individual character of the inventive process; and the absolute and global criterion of novelty and prior art. An evaluation of these assumptions, as the following pages will demonstrate, reveals a misapprehension of the modern character and dynamics of the contemporary patent system. The social processes by which native healers acquire, transmit and modify knowledge has been posited as one of the grounds for which such indigenous knowledge systems are ineligible for patent protection for their intellectual contributions to traditional knowledge.[81] In contrast to traditional processes, inventorship in the Western paradigm is portrayed as individualistic. The contention is that the patent system is partly predicated on the concept of the inventor as an individual, and the inventive process itself as an exercise in solitude.[82] These assumptions are incorrect.

The idea that the inventive process in Western societies is a solitary work is not only antiquated, but also erroneous. The mythic image of the inventor as a solitary figure does not conform to contemporary reality.[83] In the modern world, communities of scientists and researchers work in teams in large laboratory complexes where ideas are exchanged. According to David Safran,

> [I]n this age, most inventions result from corporate research efforts . . . a growing number of these research efforts are the result of the work of several research and development teams that are located in different countries.[84]

Both corporate and publicly funded institutions, including universities, where researchers and inventors routinely work in groups, own an overwhelming proportion of patents issued in the last forty years. In fact, the inventive process in Western societies is in several material respects similar to the inventive process in indigenous knowledge systems practised by native healers in southern Nigeria. The inescapable conclusion is that, like the scientists in the laboratories of the industrialized states who exchange information, collective groups of native healers, whether as apprentices or as qualified native healers, also exchange ideas to resolve and find solutions to deep and complex medical problems. As the Crucible Group recently observed, "farmer's fields and

forests are laboratories. Farmers and healers are researchers. Every season is an experiment".[85]

Furthermore, the alleged boundary between individual and collective creativity is a conflation of communalism with the notion of collective inventions. Oftentimes, a native healer in a community may derive inspiration from pre-existing knowledge, just like his western counterpart, and from thence invent things "of intricate detail and complexity, reflecting great skill and originality".[86] In short, generalizations about the complex nature of native healers often conceal or ignore subtle but profound differences between the various practices of native healers and the tenets of the patent system. On the alleged public character of traditional knowledge of the medicinal uses of plants, it is incorrect to assert that the knowledge and skills possessed by native healers are in the public domain of sub-saharan African societies. This belief is flawed on several grounds. First, native healers rarely reveal the secrets of medicinal or herbal remedies. As the preceding pages demonstrate, herbalists undergo many years of tutelage and training. While training, some undergo various rites of initiation, "fortification",[87] and socialization. The skills and knowledge they acquire are not in the public domain. With particular reference to diviners, one cannot become a diviner unless a deity or a spirit force "calls" one to service. In this important respect, native healing is not a trade that one can learn simply because a person is interested in divination.

Secrecy and the closeness between the diviner and the deity or deities she or he worships ensure that power and influence in the community derives from metaphysical and extra-human sources. Indeed, the rituals, magic and spirituality which often surround the practice of traditional healing form, in addition to other myriad societal functions, a crucial aspect of the "secrecy regimes"[88] imposed on traditional healing by herbalists and diviners. Second, native healing is not necessarily limited to, or about, the so-called bio-active ingredients of a plant or mixture thereof. The art and science of native healing often embraces a holistic approach to well-being that transcends the chemical composition of the concoction or herbal decoction. Herbs are routinely prayed upon, praised as if they were living entities, and sacrifices are made.

In traditional healing using biological resources such as plants, it is not unusual for healers to maintain a monopoly of their knowledge by tying biological remedies to physical objects that the inventor can monopolize, or elaborate procedures that are hard to copy without initiation. Sometimes, a herbalist, in the course of preparing medicine for a patient, may demand articles that only he or she can provide, as, for example, asking a patient to provide the carcass of a rare bird that died during a lunar eclipse! Such difficult or impossible demands ensure that the healer is in control of the condiments of the pertinent medicinal preparation. While such practices may yield the impression that trade secrets may be pertinent to native healers, the spiritual source of their powers makes the regime of trade secrets incompatible with the peculiar needs of the native healer. The native healer is not an ordinary tradesperson.

Ultimately, there are epistemic differences and philosophical and ideological schisms[89] between the patent system and the needs and world view of native healers. The gaps are so fundamental that they cannot be papered over with cosmetic changes in patent law. Arguments for modifications to the patent system in order to deal with the problems of biopiracy, or to bring native healers within the ambit of patent law misapprehend the cultural and epistemological gulf between patent systems and indigenous medicinal knowledge systems. While there may be broad similarities, the differences in how both regimes operate and in what animates them make the patent regime an inappropriate response to the problem of biopiracy, or the need to harmonize intellectual property regimes regardless of cultural outlook.

4. Conclusion

The foregoing pages show that there are differences of cultural reference points and epistemic world views between the dominant patent system and native healing. Given the problems with adjusting the patent system to suit the needs of the native healer, some scholars suggest that dealing with the question of loss or appropriation of indigenous knowledge systems is imperative, with particular reference to the issue of medicinal plants. A major trend in this regard has been the establishment of a so-called Register of Uses.[90] This body of documented knowledge is designed to form the basis of contracts for the commercial exploitation of traditional medicinal knowledge.[91] This concept has found root in India,[92] Uganda, and South Africa. Indeed, India has recently launched a project to digitize an enormous wealth of traditional medicinal knowledge.

The Indian approach it is commendable. It underscores the fact that mere documentation of traditional medicinal knowledge is not enough. Traditional medicinal knowledge is an evolving and living experience. Recording such knowledge in a manner in which it could be used to avoid appropriation without exposing the information in a manner detrimental to native healers achieves key objectives. As the cases of patents from *Neem Tree*, *Turmeric*, and other controversial patents indicate, mere publication may not debar the emergence of such patents. In addition, a digital record of such knowledge avoids such dubious patents without risking the culture and livelihood of native healers.

However, where local communities cannot afford a digital recording or archiving of traditional medicinal knowledge, efforts should be geared towards a local legal validation of the traditional methods whereby native

healers sanction those who misuse knowledge pertaining to the medicinal uses of plants. The emerging view that "we must mold and expand [the] existing regime to the needs of indigenous peoples"[93] is one that perpetuates the myth that prior to colonization, there were no legal mechanisms for the protection of the skills and knowledge of the native healer. Tinkering with dominant intellectual property regimes perpetuates the colonial mindset that indigenous peoples did not have autochthonous and effective legal regimes for the propagation, transfer, sharing, and alienation of knowledge. The better view, in my opinion, is to revitalize pre-existing rules and sanctions by which traditional knowledge of the uses of plants by native healers were protected. It is not too late to accord native healers the legal cover for autochthonous and familiar protocols by which they have protected, transmitted, and improved upon their knowledge for thousands of years.

Notes:

[1] See for example, *Convention on Biological Diversity*, done at Rio de Janeiro on 5 June 1992, entered into force 29 December 1993, reprinted in 31 I.L.M. 818 (1992).

[2] See for example, *Convention on Biological Diversity*, done at Rio de Janeiro on 5 June 1992, entered into force 29 December 1993, reprinted in 31 I.L.M. 818 (1992).

[3] See generally, Ikechi Mgbeoji, *Global Biopiracy: Patents, Plants, and Indigenous Peoples* (UBC Press, Vancouver: 2005).

[4] Dominic Keating, "Access to Genetic Resources and Equitable Benefit Sharing Through a New Disclosure Requirement in the Patent System: An Issue in Search of a Forum" (2005) 87 *Journal of Patent and Trademark Office Society* 525.

[5] Wayne Jonas, "Policy, the Public, and Priorities in Alternative Medicine Research" (2002) 583 *The Annals of the American Academy of Political and Social Science* 29.

[6] Compare Davis Fidler, "Neither Science Nor Shamans: Globalization of Markets' Health in the Developing World" (1999) 7 *Indiana Journal of Global Legal Studies* 191.

[7] Paul Heald, "The Rhetoric of Biopiracy" (2003) *Cardozo Journal of International and Comparative Law 519.*

[8] Graham Dutfied, "TRIPs-Related Aspects of Traditional Knowledge" (2001) 33 *Case Western Reserve Journal of International Law* 233 at 235; Sabrina Safrin, "Hyperownership in a Time of Biotechnological Promise: The International Conflict to Control Building Blocks of Life" (2003) 98 A.J.I.L. 364.

[9] Michael Woods, "Food For Thought: The Biopiracy of Jasmine and Basmati Rice" (2002) 13 *Albany Law Journal of Science and Technology* 123.

[10] On indigenous peoples, see *The International Labour Organization Convention 169 Concerning Indigenous and Tribal Peoples in Independent Countries*, 7 June 1989, *reprinted* in 28 I.L.M. 1382; *Commission on Human Rights, Preliminary Report on the Study of the Problem of Discrimination Against Indigenous Populations*, UN Doc.E/CN.4/sub.2/L.566 [1972]; *Chapter 2 paragraph 34, UN Declaration of the Rights of Indigenous Peoples*, UN. Doc. E/CN.4/1995/2, reprinted in 34 I.L.M. 541 (1995); Rudiger Wolfrun, "The Protection of Indigenous Peoples in International Law" (1999) 59 *Zaorv-Heidelberg Journal of International Law* 369.

[11] Patrick Twumasi, "Aging, Illness, and Traditional Medicine in Ghana" in Wilburn Watson., ed., *Black Folk Medicine: The Therapeutic Significance and Faith and Trust* (Guildford Press).

[12] *Agreement on Trade-Related Aspects of Intellectual Property Rights*, 33 I.L.M 1197.

[13] Anthony Stenson & Tim Gray, *The Politics of Genetic Resource Control* (London: Macmillan, 1999); Ulf Anderfelt, *International Patent Legislation and Developing Countries* (The Hague: Martinus Nijhoff, 1971).

[14] Obi Aginam, "From the Core to the Peripheries: Multilateral Governance of Malaria in a Multi-Cultural World" (2002) 3 Chicago Journal of International Law 102.

[15] Owen Lippert, "One Trip to the Dentist is Enough — Reasons to Strengthen Intellectual Property Rights through the Free Trade Area of the Americas Now" in Owen Lippert, (ed.,) *Competitive Strategies for the Protection of Intellectual Properties* (Vancouver: The Fraser Institute, 1999) at 129.

[16] Carlos Correa & Abdulqawi Yusuf, (eds.,) *Intellectual Property and International Trade* (The Hague: Kluwer, 1998); Michael Gadbaw & Timothy Richards (eds.,) *Intellectual Property Rights: Global Consensus, Global Conflict?* (Boulder: Westview Press, 1988); Michael Goldman (ed.,) *Privatizing Nature — Political Struggles for the Global Commons* (London: Pluto Press., 1998).

[17] The literature on this burgeoning school of thought is quite remarkable. See generally, Tom Greaves, (ed.,) *Intellectual Property Rights for Indigenous Peoples: A Source Book* (Oklahoma: Society for Applied Anthropology, 1994).

[18] Maureen Coulter, *Property in Ideas: The Patent Question in Mid-Victorian Britain* (Missouri: The Thomas Jefferson University Press, 1991).

[19] David Vaver, "Intellectual Property Today: Of Myths and Paradoxes" (1990) 69 *Canadian Bar Review* 98.

[20] Edith Penrose, *The Economics of the International Patent System* (Connecticut: Greenwood Press, 1973).

[21] Ikechi Mgbeoji, *Global Biopiracy: Patents, Plants, and Indigenous Peoples*, *supra* note 3; Peter Drahos, "Indigenous Knowledge and the Duties of the Intellectual Property Owners" (1997) 11 *Intellectual Property Journal* 201.

[22] Lara Ewens, "Seeds Wars: Biotechnology, Intellectual Property and the Quest for High Yield Seeds" (2000) 23 *Boston College International and Comparative Law Review* 285 at 307.

[24] *Patent Act*, 35 U.S.C. §101; Michael Gollin, "Using Intellectual Property to Improve Environmental Protection" (1991) 4 *Harvard Journal of Law and Technology* 193.

[24] *Patent Act*, 35 U.S.C. §101; Michael Gollin, "Using Intellectual Property to Improve Environmental Protection" (1991) 4 *Harvard Journal of Law and Technology* 193.

[25] Fritz Machlup, *An Economic Review of the Patent System — Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary* (United States Senate, 85th Congress, 2nd Sess, Study No. 15) at 2.

[26] A state may under certain circumstances confiscate an invention. For example, inventions solely directed to the use of special nuclear material or atomic energy or weapon cannot be patented. See *Atomic Energy Act* of 1954 (42 USC 2011).

[27] Samuel Oddi, "Un-Unified Theories of Patents — The Not-Quite-Holy Grail" (1996) 71 *Notre Dame Law Review* 267.

[28] M. Bruce Harper, "TRIPs Article 27.2: An Argument For Caution" (1997) 21 *William & Mary Environmental Law and Policy Review* 381.

[29] *The Role of Patents in the Transfer of Technology to Developing Countries, Report of the Secretary-General, United Nations* (New York: Martinus Nijhoff, 1964) at 9.

[30] *Ibid.* P.J. Michel observes that "patent systems are not created in the interest of the inventor but in the interest of the national economy. The rules and regulations of the patent system are not governed by civil or common law but by political economy", as quoted in S. Vedaram, "The New Indian Patents Law" (1972) 3 *International Review of Industrial Property and Copyright Law* 39 at 41.

[31] Penrose, *supra* note 20.

[32] Samuel Oddi, "Beyond Obviousness: Invention Protection in the Twenty-First Century" (1989) 38 *The American University Law Review* 1097. Other examples include the automatic transmission, which was invented in 1904 but was only commercialized in 1937; the cotton-picker, invented in 1850 but only commercialized in 1942; the magnetic recorder, invented in 1898 but only commercialized in 1939; penicillin (1928–1944); radar (1904–1935); silicon (1904–1948); television (1905–1940) and xerography (1937–1950).

[34] Robert Merges, "Battle of Lateralisms: Intellectual Property and Trade" (1990) 8 *Boston University International Law Journal* 239; Robert Sherwood, *Intellectual Property and Economic Development* (Colorado: Westview, 1990) at 2. But see Robert Sherwood, "Intellectual Property Systems and Investment Stimulation: The Rating of Systems in Eighteen Developing Countries" (1996-7) 37 *IDEA* 261.

[34] Robert Merges, "Battle of Lateralisms: Intellectual Property and Trade" (1990) 8 *Boston University International Law Journal* 239; Robert Sherwood, *Intellectual Property and Economic Development* (Colorado: Westview, 1990) at 2. But see Robert Sherwood, "Intellectual Property Systems and Investment Stimulation: The Rating of Systems in Eighteen Developing Countries" (1996-7) 37 *IDEA* 261.

[35] William Lesser, *Sustainable Use of Genetic Resources under The Convention on Biological Diversity — Exploring Access and Benefit Sharing Issues* (CAB International, Oxford, 1997) at 167.

[36] Lesser, *ibid.* See also, *The Impact of Intellectual Property Rights Systems on the Conservation and Sustainability of Biological Diversity and on the Equitable Sharing of the Benefits from Its Use*, UNEP/CBD/COP/3/22, 1996.

[37] Stephen Osborne, "Protecting Tribal Stories: The Perils of Propertization" (2003) 28 *American Indian Law Review* 203.

[38] For a treatment of similar questions within the American milieu see, David Jordan "Square Pegs and Round Holes: Domestic Intellectual Property Law and Native American Economic and Cultural Policy: Can it Fit?" (2000/2001) 25 *American Indian Law Review* 93.

[39] Makua wa Mutua, "What is TWAIL?" (2000) 94 ASIL Proceedings 31.

[40] Mark Lindley, *The Acquisition and Government of Backward Territory in International Law: Being a Treatise on the Law and Practice Relating to Colonial Expansion* (New York, 1969).

[41] Ikechi Mgbeoji, *Global Biopiracy*, note 3, *supra* at 82.

[42] Douglas Sanders, "The Re-Emergence of Indigenous Questions in International Law" (1983) *Canadian Human Rights Yearbook* 1.

[43] *Supra* note 39.

[44] Mohamed Bedjaoui, "Poverty of the International Order" in R. Falk, F. Kratochwil & S. Mendlovitz, eds., *International Law: A Contemporary Perspective* at 153.

[45] Phillip Jessup, "Non-Universal International Law" (1973) 12 *Columbia Journal of Transnational Law* 415; Rosemary Coombe, "The Cultural Life of Things: Anthropological Approaches to Law and Society in Conditions of Globalization" (1995) 10 *American University Journal of International Law and Policy* 791.

[46] Given the dominance of the Western paradigm of "science", there is a tendency to ethnicize and consider as culture-specific, unsophisticated and inferior, non-Western paradigms of knowledge. Philosophers like Karl Polanyi, Alfred Kuhn and others have, however, demonstrated that non-Western forms of knowledge have their own internal logic and are not necessarily crude or inferior. Moreover, Western science, like all other structural forms of knowledge, is also cultural and not inherently global. See D. Michael, (ed.,) *The Cultural Dimension of Development: Indigenous Knowledge Systems* (London: Intermediate Technology Publications, 1995); John Dewey, *Philosophy and Civilization* (New York: 1931); Harold Dorn, *The Geography of Science* (Baltimore: John Hopkins University: 1971); N. Ezeabasili, *African Science: Myth or Reality* (New York: Vantage Press, 1977). See also, The Crucible Group, *People, Plants, and Patents: The Impact of Intellectual Property on Trade, Plant Biodiversity, and Rural Society* (Ottawa: IDRC, 1994). But see Barbara Ward, "The Rich Nations and the Poor Nations" (Toronto: Canadian Broadcasting Corporation, 1961) at 3 (arguing that "… traditional societies had virtually no science").

[47] But see, Andrew Sommer, "Trouble on the Commons: A Lockean Justification for Patent Law Harmonization" (2005) 87 Journal of Patent and Trademark Office Society 141.

[48] Vandana Shiva, *Staying Alive: Women, Ecology And Development* (London: Zed Books Ltd., 1988).

[49] Makau Wa Mutua, "Savages, Victims and Saviours: The Metaphor Of Human Rights" (2001) 42 *Harvard International Law Journal* 201.

[50] Brian Easlea, *Witch-Hunting, Magic, and the New Philosophy: An Introduction to Debates of the Scientific Revolution, 1450–1750* (Brighton, Sussex: Haverfield Press, 1980).

[51] Erik Bluemel, "Substance Without Process: Analyzing TRIPS Participatory Guarantees in Light of Protected Indigenous Rights" (2004) 86 *Journal of Patent and Trademark Office Society* 671.

[52] Shubha Ghosh, "Traditional Knowledge, Patents, and the New Mercantilism" (2003) 85 *Journal of Patent and Trademarks Office Society* 885.

[53] Lakshmi Sarma, "Biopiracy: Twentieth Century Imperialism in the Form of International Agreements" (1999) 13 *Temple International and Comparative Law Journal* 107.

[54] Angela Riley, "Straight Stealing: Towards an Indigenous System of Cultural Property" (2005) 80 *Washington Law Review* 69.

[55] J.A.B. Horton, *West African Countries and Peoples,* [reprint], Edinburgh, 1969 at 157; J. A. Umeh, *Igbo People: Their Origin and Culture Area,* Enugu, 1999; J.H. Jennings & S.O. Oduah, *A Geography of the Eastern Provinces of Nigeria,* Cambridge, 1966 at 10.

[56] P. Okigbo, *Toward a Reconstruction of the Political Economy of Igbo Civilization* Ahiajoku Lecture, 1986, Owerri, Ministry of Information, 1986 at 10.

[57] Igbo language broke away from the Kwa sub-family circa 600 B.C. G.M. Umezurike, *Amamife na Ako na Uche: The Hub of Igbo Culture Renaissance in the Scientific Age*, Ahiajoku Lecture 1992, Owerri: Ministry of Information, 1992; I. Amadiume, *Male Daughters, Female Husbands: Gender and Sex in an African Society,* London, 1987.

[58] A. Afigbo, *Ropes of Sand: Studies in Igbo History and Culture,* London, 1981, 1-50; J.N. Oriji, *Traditions of Igbo Origin A Study of Pre-Colonial Population Movements in Africa,* New York, 1994 (Peter Lang: New York, 1994) at 3.

[59] M. Echeruo, *Ahamefula: A Matter of Identity*, Inaugural Lecture, Ahiajoku, 1979, Owerri: Ministry of Information, 1979, at 7.

[60] M.A. Onwuejeogwu, *A Brief Survey of Anambra Civilization in the Igbo Culture Area,* Onitsha, 1972; M.A. Onwuejeogwu, *An Igbo Civilization: Nri Kingdom and Hegemony,* London, 1981 at 14; T. Agbasiere, *Women in Igbo Life and Thought,* London, 2000, at 2.

[61] Anya O. Anya, "The Environment of Isolation", 1982 Ahiajoku Lecture, Ministry of Information, Owerri at 9.

[62] V.C. Uchendu, *The Igbos of South Eastern Nigeria,* 1965 at 11.

[63] Francis Arinze, *Sacrifice in Ibo Religion* (Ibadan University Press, 1970).

[64] Azuka Dike, *The Resilience of Igbo Culture* (Enugu, 1985) at 157.

[65] John Anenechukwu Umeh, *Igbo People: Their Origin and Culture Area* (Enugu, 1999) at ii.

[66] This does not imply that modern drugs are not useful in the Third World. See Remigius Nwabueze, "What Can Genomics and Health Biotechnology do for Developing Countries?" (2005) 15 *Albany Law School Journal of Science and Technology* 369.

[67] Chidi Oguamanam, "Between Reality and Rhetoric: The Epistemic Schism in the Recognition of Traditional Medicine in International Law" (2003) 16 *St. Thomas Law Review* 59.

[68] Oguamanam, *ibid.*

[69] A.O. Ekwunife, "Integration of Traditional African Values in Priestly Formation" (1997) 39 # 4 *African Ecclesiastical Review* 7.

[70] A.N. Okoro, *Chukwu ka Dibia,* Ahiajoku Lecture 1988, Owerri, Ministry of Information and Culture, 1988.

[71] WHO, "General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine".

[72] Chidi Oguamanam, *supra* note 67.

[73] *Ibid.*

[74] Robert Sherwood, "Human Creativity for Economic Development: Patents Propel Technology" (2000) 33 *Akron Law Review* 351.

[75] See Machlup, *supra* note 25. See also, C.T. Taylor & Z.A. Silberston, *The Economic Impact of the Patent System — A Study of the British Experience* (Cambridge: Cambridge University Press, 1973).

[76] Charles McManis, "The Interface Between International Intellectual Property and Environmental Protection: Biodiversity and Biotechnology" (1998) 76 *Washington University Law Quarterly* 255.

[77] Graham Dutfield, "The Public and Private Domains: Intellectual Property Rights in Traditional Ecological Knowledge" *Oxford Electronic Journal of Intellectual Property Rights* at http//users.ox.ac.uk/~mast. Accessed on 9/21/99.

[78] Gurdial Nijar, *TRIPS and Biodiversity: The Threat and Responses — A Third World View* (Malaysia: Third World Network, 1996) at 16.

[79] Naomi Roht-Arrioza, "Of Seeds and Shamans: The Appropriateness of the Scientific and Technical Knowledge of Indigenous and Local Communities" (1996) 17 *Michigan Journal of International Law* 940.

[80] Shiva, *supra* note 48. See also, Ruth Gana, "Has Creativity Died in the Third World? Some Implications of the Internationalization of Intellectual Property" (1995) 24 *Denver Journal of International Law and Policy* 109.

[81] Gana, *supra* note 80; Horton, *supra* note 55.

[82] Kirsten Petersen, "Recent Intellectual Property Trends in Developing Countries" (1992) 33 *Harvard International Law* 277; Mark Hannig, "An Examination of the Possibility to Secure Intellectual Property Rights for Plant Genetic Resources Developed by Indigenous Peoples of the NAFTA States: Domestic Legislation Under the International Convention for New Plant Varieties" (1996) 13 *Arizona Journal of International and Comparative Law* 175.

[83] In virtually every patent jurisdiction in the world, an employer owns the patent right to an employee's invention if the employer is hired to invent or the invention is made in the course of the employment using the employers' tools. However, under some narrow circumstances, the employee may own the invention. Similarly, governments and their research institutions can own acquire the inventions of its employees. See David Vaver, *Intellectual Property* (Concord, Ont.: Irwin Law, 1997) 147–149.

[84] David Safran, "Protection of Inventions in the Multinational Marketplace: Problems and Pitfalls in Obtaining and Using Patents" (1983) 9 *North Carolina Journal of International Law and Commercial Regulation* 117.

[85] The Crucible Group, *supra* note 46, at xviii.

[86] See Justice Von Doussa, in *Milpurrurru v. Indofurn (Pty) Ltd.* (1995) 30 IPR 209 at 216.

[87] This is usually a process or processes of making the native healer spiritually strong.

[88] WIPO Report, *supra* note 1.

[89] Oguamanam, *supra* note 67.

[90] William Lesser, *Sustainable Use of Genetic Resources Under the Convention on Biological Diversity: Exploring Access and Benefit Sharing Issues* (Oxford: CAB International, 1997) at 129. The register is to constitute knowledge of the occurrence, practices, propagation, and varied uses of biological resources in local communities.

[91] R. V. Anuradha, "In Search of Knowledge and Resources: Who Sows? Who Reaps?" (1997) 6 *Review of European Community and International Law* 263.

[92] Lyle Glowka, *A Guide to Designing Legal Frameworks to Determine Access to Genetic Resources* (IUNCN, 1998).

[93] Hannig, *supra* note 82, at 197.