Review of literature

Higher plants have been used as medicinal resources—perhaps in all human cultures. The relationship between the human disease and curative properties of plants for the concerned diseases have been established based upon the experiences of various cultures/ethnic groups. While a vast body of information on medicinal properties of the plants existed as folklore and got passed on from person to person by word of mouth, some of the information was documented at various times in different culture/ethnic groups/countries.

India, China, Greece and Arabia have been some of the geographical locations where in practice of traditional medicine was based upon scientific methods which was documented by scholars based upon their own work and information collated by their preceding scholars. The kinds of treatises that give the pharmacopoeia information on medicinal plants in their respective systems of medicines dates as long on 1000-5000 years. Chinese traditional pharmacopoeia published by the name of Pen Tsao prepared during 2000 BC. Indian ayurvedic pharmacopoeia was documented as long back as 2000 ago. The Unani pharmacopoeia based on experience of Greece and Arabia was about 1000 years old. Such pharmacopoeial documents on the use of medicinal plants as tradition are not available for the African, Latin American, Australian continents. The information on the use of certain plants in Europe and North America lies scattered and a document of the kind as Charaka Shamhita or Chinese pharmacopoeia in not available for traditional medicine practiced in these areas. In last century, especially in last few decades there has been resurgence of interest in traditional medicines to identify therapeutics for various diseases. Considerable research has been carried out on the composition of effective medicinal plants and determination of the biological activities of the constituents in the plants responsible for their effectivity. The present work has made use of all kinds of sources of information from ancient treatises and modern research publications. (Table 1 and 2).

This review will first give a historical account of the development of plant based medicinal systems in different civilizations and then consider general aspects of common human disorders which were apparently treated/ addressed by the traditional systems of medicine.
Plants were the earliest source of medicine, and until comparatively recent times, they remained mankind’s chief method of healing. The use of herbal drugs goes back to time immemorial, ever since primitive man resorted to the world around him to derive remedies which could alleviate pain and cure. Even now, in an age dominated by scientific and technological marvels, by miracle therapies, botanicals—or their synthetically derived equivalents—account for the majority of prescription medicines. The knowledge of drugs has developed together with the evolution of scientific and social progress.

The wealth of lore accumulated for millennia by folk medicine has developed into the critical study of native medicines. Although the identification of pharmacologically active plants and plant derivatives is far from complete, it is nevertheless very extensive. The aboriginal cultures existing in the remote areas of Africa, Asia and Latin America are yet to be resourced for information on medicinal plants used by them.

**Historical development**

Archaeological evidence indicates that the use of plants for healing dates far back into prehistory. The therapeutic use of naturally occurring drugs has gone on for millennia. It has long been thought that Greece was the source of every medical practice, but when, in the last century, archaeologists started to research and interpret the traces of past civilization, they found precise documentation with regard to preparations based on natural drugs used by doctors of ancient times in the cure of various sicknesses, hundreds of years before the first Greek doctor. Excavations at the Shanidar cave in northern Iraq have revealed the 60000 year-old grave of what appears to have been a Neanderthal medicine man. Arrayed around the body were the remains of eight species of flowers. Seven of them are used even today for medicinal purpose by inhabitants of the region. Mexican Indians of thousands of years ago used peyote cactus. Possibly then, as now, peyote was valued for its hallucinogenic properties, and equally are still used to heal bruises and wounds, and are now known to have antibiotic properties.

In most past societies sickness was viewed as a punishment from the Gods. Early medicine men treated the sick with prayers and rituals which included which may have been considered “magic potions”. Most of these medicinal preparations were concocted from local herbs. Though it may be true that the herbs were selected first because of their color, odor, shape, or rarity.

The cuneiform writings of the Sumerian who inhabited an area around the Tigris and Euphrates rivers (Iraq) about 4000 B.C., we know that their medicines included opium, licorice, thyme and mustard. The Babylonians who followed apparently expanded the Sumerians’ stock of medicinal substances, adding senna leaves, saffron, coriander, cinnamon and garlic, among other herbs.
Proto-historical societies of the present

Africa— a continent of rich and varied tropical floras—harbors millions of natives still living in primitive societies. One of the most important gifts of Africa to modern medicine has been phytostigmine, an alkaloid isolated from the calabar bean (Phytostigma venenosum) of Nigeria. It is exceedingly toxic and was administered as one of the many ordeal poison of Africa and Madagascar to determine guilt and innocence. Another African gift to modern medicine comes from several species of *Strychnanthus* which, with a variety of medicinal uses as well, were employed by the natives in preparing arrow poisons and contain potent glycosides acting on heart muscle. African species of *Rauvolfia* (African snakewood) replaced the once supreme Indian snake root as a source of reserpine. This African species had a host of indigenous medicinal uses, including the treatment of snakebite, leprosy, jaundice, venereal diseases, rheumatism, and skin rashes, as it was valued as a vermifuge, purgative, emetic, abortifacient and as an excellent inducer of sleep.

The flora of the Americas has been a prodigious provider of economic plants now used the world around. This has been true especially of healing plants. Although its flora is rather limited, North America has given modern medicine a number of drug plants, most of them with histories of folk uses among the Indians. *Podophyllum* (May apple or American mandrake) had numerous uses in native medicine. Juice of the rhizome is used to relieve deafness. The Iroquois committed suicide by ingesting the raw rhizome of this plant. Despite its toxicity it was valued as an emetic, purgative, and anathemetic. Tobacco emerged as a medicine in Europe.

The Cola plant, the most famous medicine in Peru, was used as an analgesic, anorectic, and stimulant, and may even have been effective as an anesthetic. The plant’s cocaine is important in modern medicine. The extract from the bark of cinchona tree, quinine is western medicine’s greatest debt to ancient Peru. It was used by Ecuadorian Indians to relieve fever, the plant and was later cultivated by the Dutch and British in Asia.

Early man was very close to nature, living in daily contact with the plants and animals of the forest, hills, and valleys which were his home. Thus he was sensitive to the behavior of animals and the properties and powers of plants, and it is of more than passing interest that some traditional medicinal uses of plants originating in those early days have found confirmation in modern science. Our forefathers knew nothing of chemistry and pharmacology but relied entirely on their natural power of observation, on their intuition. Valuable knowledge concerning the medicinal actions of plants was often acquired by careful observation of animal behavior. This inherited, intuitive knowledge of plant is the right remedy for a given ailment is one of the most fascinating aspects of nature.

At first, herbs were taken in their crude form— one simply swallowed a leaf, some bark, a flower, or a root. The health of earlier human beings, however, was determined to a large extent by the variety in their natural diet. In spring bear’s garlic, watercress, and dandelion provided nourishment, vitality and resistance to disease. In June, they would eat fennel and buckbean, in July borage, marsh mallow, marjoram, thyme and bedstraw in August. In autumn they used to eat lots of berries like blueberries, cranberries, elderberries, barberries haws, and rowans. Thus in the cycle of season human organism
was kept and refreshed in a natural ways. As people moved farther to nature, they became more prone to disease.

Herbal remedies those cures discovered by primitive man and developed through the ages, remain one of nature’s greatest gifts. Most medicinal herbs grow wild in our flora. It is astonishing that nearly every species is accorded its own place in nature so that it can develop its active principles in the best circumstances. The fact that we have for centuries been cultivating basil, sage, balm, rosemary, linden, and other plants in our gardens shows how eager people have been to have these helpful plants near them.

**Ancient Egyptian medicine**

The most important document that is known with regard to the history of the materia medica of ancient Egypt and of the east Mediterranean, is the most famous of all papyri. This papyrus, which might be considered as one of the most ancient pharmacopoeias and principal source of information on Egyptian medicine. Out of the next great civilization, the Egyptian, Imhotep, a skilled physician who later became the Egyptian God of healing. Ancient Egypt also gave the world one of its first the German Egyptologist George Ebers. The Papyrus of B.C. times contains some 800 recipes and refers to over 700 drugs, including aloe, worm wood, peppermint, henbane, myrrh, hemp, dogpane, castor oil and mandragora. With such ingredients, the Egyptians prepared decoctions, wines and infusions. A recipe suggests that the Egyptians had a treatment for diabetes.

Ancient Egypt was not alone in recording the healing powers of plants. At least 2000 years ago, the earliest known Chinese pharmacopeia, the Pen Tsao, appeared. Attributed to the legendary emperor Shen Nung, this work described the use of chaulmoogra oil from trees of the *Hydnocarpus* genus to treat leprosy. Among its listings are hemp, dogbane, opium poppy, rhubarb and aconite. These ancient Chinese first recorded the use of the desert shrub called Chinese ephedra, or mahuang, to improve circulation, reduce fevers, help urinary function, suppress coughing, and relieve lung or bronchial disorders.

The Jews of the old testament period are remembered for their high standards of public health and hygiene. Yet among these people of the rugged terrain at the eastern end of the Mediterranean, the use of plants for medicinal purposes was an accepted custom. The book of this practice says: “the lord created medicines from the earth, and a sensible man will not despise them”. Dozens of plants from juniper to mandrake, from cotton to mustard, yield substances that were used medicinally in old testaments times.

**Ayurveda and other Indian traditional medicinal systems**

In India, many generations of medical tradition were formalized in the Ayurveda, a collection of medical lore that was first put into writing about 20 centuries ago. The doctrine itself goes back to the much earlier, Rigveda and its hymns dedicated to the medicine-god-narcotic soma, since identified as the narcotic and hallucinogenic mushroom *Amanita muscaria*. Atharveda contained all the medical references. Prescriptions for the cure of maladies recognized as rheumatism, neuralgia, gout, jaundice, tumours, bronchitis, elephantiasis, skin diseases etc. are given in this book and in the numerous treatises of vedico-Brahminic medicine. The most important of which is the susruta (1300 B.C), wherein myriads of drugs are described, including opium,
rauwolfia, nuxvomica, aconite, hashish, datura, mustard seeds, lemon, antimony, sulphur and gold which was considered an extremely potent drug. The Vedas written down originally in Sanskrit, made many references to healing plants, including the snakeroot Rauwolfia serpentina, used in India to treat snakebite, epilepsy, mental disorders, and other illnesses.

The Charaka Samhita, a comprehensive Indian herbal text, cites more than 500 plant remedies. Ayurveda, meaning the science of life, is reported to have been practiced for over 3000 years. Ayurveda is rooted in the rich back ground of social, cultural and philosophical principles prevailing in India during the period 600 B.C. to A.D. 700. At the beginning of the Christian era, Ayurveda had spread beyond the continent of India and it even influenced the systems of medicine in Egypt, Greece, Rome and Arabia. The advent of Moslem rule in India brought the Unani or Arabic system of medicine, so that both Unani and Ayurveda were then used in India.

Individual constitution in very important in Ayurveda, It is determined by the state of one’s parent’s doshas at the time of his/her conception and each individual is born in the “prakruthi” state. But as we go through life, diet, environment, stress, trauma, and injury cause the doshas to become imbalanced, a state known as the “vikruthi” state. When levels of imbalance are excessively high or low it can lead to ill health. Ayurvedic practitioners work to restore individuals to their “prakruthi” state.

There are three further bio-energies, called doshas, which exist in everything in the universe, and which are composed of different combinations of the five elements. The three doshas affect all body functions, on both mental and a physical levels. Good health is achieved when all three doshas work in balance. Each one has its role to play in the body: Vata constitution (ectomorphic, neurotropic, or acetylcholine predominant) is the driving force; it relates mainly to the nervous system and the body’s energy; Pitta constitution (mesomorphic, or catecho lamine predominant) is fire; it relates to the metabolism, digestion, enzymes, acid, and bile; Kapha constitution (endomorphic, histamine secretors) is related to water in the mucous membranes, phlegm, moisture, fat, and lymphatic.

The balance of the three doshas depends on a variety of factors, principally correct diet, and exercise, maintaining good digestion, healthy elimination of body wastes, and ensuring balanced emotional and spiritual health.

The principle of qualities in Ayurveda is similar to the Chinese concept of Yin and Yang, in that every quality has its opposite, and good health depends on finding a balance between the two extremes of qualities such as slow and fast, wet and dry, cloudy and clear. For example, hot and cold exist together as a pair of qualities, and everything in between is composed of levels of heat and cold. Imbalance in the doshas also causes imbalance in the seven body tissues, or “dhatus”. These are: plasma (rasa), blood (raktha), muscle (mamsa), fat (madas), bone (asthi), marrow and nerves (majja) and reproductive tissues (shukra). The dhatu support and derive energy from each other, so when one is affected the others also suffer.

In Ayurvedic medicine it is essential to detoxify the body before prescribing restorative treatment. It is called shodana second process is panchakarma. This is a process of profound detoxification. It is traditionally a fivefold therapy but all five aspects are used only in very rare cases. These are nirjua vasti (oil enema therapy),
anuvasana vasti (herbal enema), vireka (herbal laxative therapy), vamana (therapeutic vomiting), and nasya (herbal inhalation therapy). After the detoxification process the practitioner may prescribe herbal or mineral remedies to correct imbalances in the doshas. This process is called samana.

In many cases the whole plant is used in an Ayurvedic treatment, in others, only a part. All plants are associated with the properties and effects as follows:

1.) doshas - plants can be used to increase or decrease an influence as required; 2.) shad rasa - (the tastes)-every plant contains one or more of the six basic tastes, which are sweet, acidic, salty, pungent bitter and astringent; 3.) gunas (the properties)- distinctive characteristic that can be related to matter, thoughts, and ideas.

The Unani system of indigenous medicine originated in Greece but it has absorbed much from other native medical systems during its long journey through the Arabian countries. The Unani system is also based on the theory of humours.

The Sidha system of medicine is practised mainly among Tamil speaking people in India and south-east Asia and like Ayurveda and Unani, it also has a long tradition. Its unique feature is that it makes extensive use of minerals and metals, especially mercuric preparations.

The Tibetan system of medicine has drawn considerably on Ayurvedic medicine and has also been influenced by the Chinese. It also makes use of drugs of plant, animal, and mineral origin. Cauterization at special points on the head is carried out by Tibetan practitioners in treating certain forms of mental disturbance.

Acupuncture is a traditional form of therapy which has gained much popularity recently. The term is derived from the Latin words acus meaning needle and punctura meaning puncture. It has been applied as a therapeutic medical technique in China for over 2000 years and is believed to have originated during stone age. Sometimes the acupuncture practitioner burns moxa leaves (Artemisia vulgaris) either near or on the skin when treating a variety of illnesses. It was first introduced to the western world in the sixteenth century.

Medicinal plants of China

China has a long history of herbal medicine and has developed a unique system for using it. It is noteworthy that the use of many plants has with stood the test of time, and the safety, efficacy of some of them have been established by means of modern tests in a scientific frame-work.

There are about 7000 species of medicinal plants in China and 150 of those are most commonly used. China is famous for its unique system of traditional medicine, and medicinal plants are an important means of treating and preventing disease throughout the country. The theories that govern the prescription of medicinal plants are taken from traditional Chinese pharmacology, itself based on long centuries of clinical observation and practice. In China health and illness are described as natural phenomena subject to investigation and observation. Natural law operates upon the cosmos, the human body, and the connection between them.

The primary health care providers were Shamans (uri), many of whom were women. They were like the shamans of the various north Asian tribal people. Archeological remains depict the dress of Chinese Shamans, which resemble the bird-like
costumes of the Siberian shaman. Medicines had to be empowered by words, ritual. And sacred space and time. The aromatic smells of such herbs as *Cortex Cinnamomi Cassiae* (nou gui), *Fructus Evodiae, Rutae carpae* (wu zhu yu), and *Folium Artemisiae, Argyi* (ai ye) were considered to have magical properties that affected demons or a person's own spiritual powers.

By the later Han dynasty (25-220 A.D.), people believed in their ability to observe and understand the natural world. After taking power in 1949, the Communist Party of China encouraged the use of Chinese herbs as a cost-effective alternative to western drugs and a tool of self-reliance. The traditional Chinese herbs, especially the folk herbs, were plentiful and locally available while modern pharmaceuticals were both difficult to obtain and relatively expensive.

The characteristic of Chinese herbs are divided into two different aspects one is the four qi. This term usually refers to the temperature characteristic. There are presently five major designations used to describe this aspect: hot (me), cold (hain), warm (wen), cool (liang) and neutral (ping). This provides a preliminary clue regarding the clinical situation in which a substance should be used. Like “Hot diseases must be cooled, cold diseases must be warmed.” The other primary property of the herbs in traditional Chinese medicine is the taste (wei). The five tastes are acrid (xin), sweet (gan), bitter (ku), sour (suan) and salty (xian). The taste of a medicinal substance partly determines its therapeutic function. Like acrid substances disperse and move; sweet substances tonify, harmonize; bitter substances drain or dry; sour substances are astringent and prevent or reverse the abnormal leakase of fluids and energy; salty substances purge and soften; and bland substances leech out dampness and promote urination.

Throughout the history of traditional Chinese medicine there have been many different methods to classifying the ways in which medicinal substances can be combined. There are classification based upon disease, pattern, symptoms complex, etiology, form of application and organ, treatment strategy.

There are many important consideration in the cultivation of traditional Chinese herbs. Owing to differences in climate and topography, there are areas of China most suited for the cultivation of certain specific forms of vegetation.

Decoctions (tang), literally soups, are by far the most common form in which traditional Chinese medicine is taken in China. They are solutions and suspensions that lend themselves readily to absorption, thus expediting their effect. This is why they have traditionally been considered the form of medication most appropriate for acute disorders. The goal of traditional Chinese medicine is the development of a clinical strategy that is most appropriate to a particular patient at a particular moment.

Most medicinal materials contain a large variety of known or still unknown compounds. Traditional Chinese medicine prefers modalities characterized by a combination of numerous individual materials, sometime up to a hundred or more. The Chinese employ a number of practices to use medicinal herbs. Herbal material is often mixed with food. Anti-cancer agents come from plants which are grown in China. For example: hydroxycamptothecan from *Camptotheca*, podophyllotoxin from *Podophyllum*, vinblastine and vincristine from *Catharanthus roseus* etc. Four classes of herbs are used to make a traditional medicinal formula:

**The Greek contribution**

In ancient Greece medicine was practiced by secular physicians, called sons of Asclepius. The sick sought these doctors help in temples built in Asclepius’ honour. Treatment was a religious ritual full of incantation and mystery, carried out over several days of fasting and bathing. About 400 B.C., a Greek named Hippocrates moved the healing profession away from the realm of mysticism and religion. He asserted that medicine was a science and not an art. For this he is called the father of modern medicine.

The teachings of Hippocrates, contained in the Hippocratic collection, place great emphasis on diet, life style, exercise, sunshine and water. His underlying principle was that the “important thing is to do no harm”. Hippocrates believed that the four elements—fire, water, earth, and air, were represented in the human body by yellow bile, phlegm, black bile, and blood. When the balance became upset, sickness was the result.

After Hippocrates came Aristotle, whose far-ranging scientific work included an effort to catalog the properties of the various medicinal herbs. Aristotle’s pupil Theophrastus wrote ‘Inquiry Into Plants and Growth of Plants’. These works-covered some 550 plants used in areas from Europe to India.

In the first century A.D., Greece produced the forerunner of all modern pharmacopoeias and the authoritative text on botanical medicine for over a thousand years, “De Materia Medica”. This work featured hundreds of medicinal plants. Its author was Dioscorides, one of the last of the ancient Greeks who cast giant shadows forward to modern medicine.

Dioscorides indicates the origin, describes the characteristics and uses in therapy of about 500 drugs of vegetable origin (pyrethrum, rue, scamony, squill, gull nut, castor oil, poplar, various species of poppy, myrrh, colocynth etc.), of 106 animal drugs

**Roman advances**

Before Dioscorides, to the west, Rome had begun its rise to power in Europe and the lands around the Mediterranean sea. Medical practice in the first century A.D. seems to have included three approaches: diet, pharmacy, and surgery. Most infectious diseases were treated with diet and rest. In the tradition of Hippocrates, body “balances” were restored by surgery. Along with such procedures, botanical treatments were also prescribed to correct body imbalances.

This, too, was the age of the theriac (from the Greek theriakon, a remedy for animal bites). A theriac was a combination of many different herbs, primarily opiates and antispasmodics. It was given as a general cure-all. “Mithridates Antidote” was the name of one famous theriac. It was devised in the first century B.C. by Mithridates Eupator, king of Pontus, a kingdom on the shores of the Black sea that was conquered by the Roman general Pompey in 66 B.C. Mithridates concocted an antidote out of many poisonous ingredients, including blood from ducks that had been raised on toxic plants and then he reputedly took small but increasingly larger doses of the mixture, in an effort to make himself immune to poisons. Later this antidote was improved by ‘Andromachus’, which included mixture of 70 vegetables, mineral, and animal substances. Other than his
antidote, Mithridates Eupator is remembered for an entire plant genus, Eupatorium, with between 40 and 1000 species.

Pliny's "Natural History", published in the first century A.D., was a compilation of thousands of Greek and Roman treatises, which was major source for herbalist and botanist from medieval period. Much of what Pliny wrote down eventually passed into the folklore of Europe and the New world. In the same period another great figure of medicine, Galen, a Greek physician who practiced in Rome during the second century A.D. became very popular for his 500 books and manuscripts. He is considered the most distinguished physicians of antiquity after Hippocrates. He treated diseases essentially by use of herbs. His methods eventually developed the sect known as 'Eclectics' who employed herbal as well as mineral substances in treating the sick. He revolutionized medicine by performing animal experiments, out of which he developed the first medical theories based on scientific investigations. Later, the divergent medical theories of allopathic, and homeopathic medicine grew out of the Galen’s doctrines.

**Medicine under the Christian church**

From about A.D. 400 to 1500, a period that included the Crusades and the Inquisition, the church controlled almost all medical knowledge and aspired to absolute power in its domain. Medicine, as the treatment of human illness, became an extension of church teachings. The church made a point of discrediting much of what non-Christian scholars had advanced. It was during this period, that many plants acquired names linked to Jesus, the Virgin Mary, saints, and martyrs. Christianity's second great contribution to medicine was the establishment of the first university medical schools. The famous medical school at Salerno was founded by four men, known to tradition as Adale the Arab, Salernus the Latin, Pontus the Greek, and Elinus the Jew.

**Arab medicine and alchemy**

Outside the Christian world, the culture of Islam was rediscovering the medical works of the Greeks. Translating these original works into their own language, the Arabs made refinements based on their own experience. Rhazes, a physician born in Persia in the late ninth century, wrote a famous treatise correctly describing smallpox and measles for the first time. And a hundred years later, Islam gave to history the "Prince of Physicians", Avicenna. He earned a reputation as a healer by curing a ruler of a critical illness. The most important of his 131 authenticated works is the "Voluminous Canon of Medicine". It contains many references to the teachings of Galen and Aristotle.

Islam created secular hospitals, formalized medical education. Through the Arabs, also came the peculiar mixture of philosophy and chemistry known as alchemy, whose origins, in such widely separated parts of the world as ancient Alexandria and China, are still not fully known. Alchemy had become well established in Europe by the 13th century. Alchemy's goal was to use the laboratory to penetrate the secrets of nature and the universe.

The golden age of Arab medicine came to an end with the invasion of the Mongols in the 13th century. The medical school at Salerno had begun to decline but one at Montpellier, France, and another at Paris were in full flourish. The most famous medical school of all had been founded at the university of Bologna.
The Renaissance

At the University of Bologna at the end the 13th century dissections of human cadavers were being done. This was beginning of truly scientific studies of the human body by physicians. The great Leonardo da Vinci, with desire to know more about the structure of the human body, performed many dissections. The result was one of the world’s greatest artistic and scientific treasures-more than 760 drawings by Leonardo that accurately illustrated human anatomy. Leonardo’s works were followed by Andreas Vesalius, a physician who was a professor of medicine at the university of Padua. His dissections resulted in the first scientific anatomy text, ‘On the Fabric of the Human Body’, published in 1543.

Herbal medicine also experienced a kind of rebirth in the new editions of Dioscorides, most notably those published by Pietro Matioli. The prime mover of a new direction in medicine was named at birth Theophrastus Bombastus von Honnenheim, but later took the name Philippus Aureolus Paracelsus. The Swis-born physician, who was also an able chemist, realized that the virtues of medicinal plants came from their chemical makeup. He pioneered in the extraction of plant essences and the use of tinctures, a revolutionary advance over the pharmacology of his day, which was settled for less meticulous ways of producing drugs. Regarded as a founder of homeopathy, some 300 years later a German physician named Samuel Hahnemann introduced homeopathic practice on a large scale.

Towards modern medicine

Modern estimates of the plant kingdom vary between 250,000 and 500,000 species or more. No botanist, with certainty, can give an estimate of the size of the plant kingdom.

It is estimated that there are some 1,500 species of bacteria, fungi are estimated to be from 30,000 to 100,000, algae estimated to be from 19,000 to 32,500 species, lichens 16,000 to 20,000 species, mosses and liverworts around 25,000 species and fern and their allies 10,000. The gymnosperms are of around 700 species in 65 genera.

The scientific curiosity awakened during the renaissance was period gradually adding to man’s knowledge of himself. In the early 1600’s, William Harvey produced the first true explanation that how blood circulates. In 1796, Edward Jenner used cowpox to immunize a young boy against smallpox, and the science of immunology was born. The pace of medical discovery quickened dramatically in the 19th century. In 1815, the term ‘Pharmacognosy’ made its appearance for the first time, and was gradually adopted throughout the world. It was Chr. A. Saydler who adopted it in the title ‘Analecta Pharmacognostica’, a brief dissertation on some classical medicinal drugs, published at Halle. This denomination gained rapid success and was adopted by J. Chr. Ebermaier in the ‘Pharmacognostische Tabellen’, printed in Leipzig in 1827, by Th. W. Chr. Martius in ‘Das neueste aus de Gebiete der Pharmakognosie, printed in Nürnberg in 1830, the ‘Pharmakognostisch-Pharmakologischen’. Tabellen by Walther made their appearance in 1838. Later the term ‘Pharmacognosy’ became more or more diffused, substituting the former term Materia-Medica’. The germ theory of disease was established by Louis Pasteur and Robert Koch. Antiseptic surgery was introduced by Ignaz Semmelweis. In the 1840’s William T. Morton, a dentist demonstrated the value of ether as a safe
anesthetic. In 1899, Marie and Pierre Curie discovered the radioactive element radium, used in the treatment of cancer and other disease.

Alongside this burst of scientific and technological discovery, the story of plants as medicine had continued to unfold, however quietly and independently. Rich herbal traditions reach far back in Europe. During the eighth century, for example, the emperor Charlemagne named the group of herbs to be grown with in his domain. Among them was house-leek, to be planted on the roof tops as a protection against lightning, as well as roses and lilies. In Britain, following its fifth-century invasion by Germanic tribes, the medical texts were Anglo-Saxon translations of Latin manuscripts, called leech books. These books were essentially herbals, books about herbs and their medicinal uses. One of the best known of these Anglo-Saxon herbals is Bald’s Leechbook. Written in the 10th century, Bald’s book combines the herbal-lore of ancient Britain with prescriptions from the East. British herbalists at this time knew upwards of 500 medicinal plants. In the 12th century, Hildegard of Bingen, a German abbess, compiled a book of Healing Herbs. Hildegard had vast knowledge of healing herbs, a medieval pioneer in natural science. Her book described a wide range of plants and their application in healing, as well as the origin and treatment of various diseases. The most famous herbals in the English language were published in Britain during the 15th, 16th, and 17th centuries. It was a “golden age of herbals”. The Grete Herball was published in 1526, in the mid-16th century, by an herbal written by William Turner, considered to be the father of English botany. The most famous herbal of all was ‘The English Physician’, written by Nicholas Culpeper’s English translation of the Latin Pharmacopoeia of the college of Physicians had been published. Which included 369 medicines made of English herbs.

Early settlers in North America quickly discovered that many plants that had always been familiar to them and were recommended in their herbals could not be found in their new home. As a result, a business developed in the importation of seeds and plants from Europe. Many of these eventually escaped cultivation to become naturalized in the new world.

A towering figure in herbal tradition is that of the German chemist-physician Samuel Hahnemann, founder of the system of alternative medicine known as homeopathy. During the 1790’s Hahnemann made the discovery that Peruvian bark called cinchona, the source of quinine, was effective in treating malaria, and from this discovery deduced the basic principle of homeopathy, “Like cures like”.

Samuel Thomson was a New England healer who attracted thousands of followers in the United States in the 1820’s and 1830’s. His favorite plant drug was a lobelia, Indian tobacco, which he used as a emetic. Thomson used approximately 65 plants in his herbal practice.

The native Americans had extensive knowledge of medicinal plants and their uses. They could also teach white settlers about surgical techniques, setting fractures and replacing dislocations, healing wounds, and making birth safer. They were less accomplished in treating infectious diseases, because few Indian medicines were effective against the ravages of chickenpox, diptheria, malaria, measles, scarlet fever, small pox, typhoid, tuberculosis and other sicknesses introduced by the white man.

For Indians, the ultimate test of a medicine’s value was its effect on the human body. This was determined through trial and error and careful observation. Indian
medical training has parallels in modern organized medicine. Among the Chippewas, for example, the aspiring shaman received a broad education in the various types of plant medicines and their uses. Then the student began to specialize, learning all about one disease or group of related diseases and about the plants that were effective in the treatment. This knowledge represented the accumulated medical experience of the tribe. The Indians added many drugs to our modern pharmacopeia, including cascara sagrada, Indian tobacco, American ginseng Joe-pye weed, may apple, goldenseal, sassafras and witch hazel. In South America, Indians taught Spanish colonists the medicinal uses of ipecac, Peruvian bark and coca.

Traditional herbal medicine today

In the last few decades, a curious thing has happened to traditional medicine. Instead of being killed off by medical science and pharmaceutical chemistry, it has made a come back. Traditional medicine has benefited from the objective analysis of medical science, herbal treatments and plant medicines that work have been acknowledged. It has been found to have some impressive credentials. No laboratory has yet produced a substitute for digitalis. The penicillin that put an end to so many of the deadly epidemics comes from plant molds. Belladonna still provides the chemicals used in ophthalmological preparations and in antispasmodics used to treat gastrointestinal disorders. In fact, plant substances remain the basis for a very large proportion of the medications used today for treating heart disease, hypertension, depression, pain, cancer, asthma, neurological disorders, and other ailments. For at least 2000 years, traditional Chinese herbal doctors have been prescribing ephedra, or mahuang tea to treat coughs, colds, asthma, bronchitis, and other respiratory problems.

People, fearing the harmful effects of chemical substances, are leaning towards anything “natural”, including medicinal plants and their products. At Harvard university and at the university of Illinois at Chicago among other institutions, scientists have reopened the field of botanical medicine and folk remedies.

In the rural areas of Misouri’s Ozark mountains, many people are folk healers of sorts. Ozark gardens and woods and fields are filled with herbs that have been used in medicine. In New Mexico, Curanderos and Curanderas use the manzanilla, a local chamomile, to treat colic and other infant ailments. A salve of comfrey is applied to pimples. The osha root is chewed for toothache, headache, and indigestion, made into a poultice for sores, brewed into a tea for colds. The curanderos’ pharmacopeia includes sage and purple sagebrush, Mormon tea and plants such as canutillo, mariola (castor) and yerba de la negrita (a mallow), used to treat everything from rheumatism, urinary and kidney disorders and congestion, skin ailments and fevers. They also mix wild cinnamon with a plant called Calabazilla to make a pesticide, to drive insects and mice out of the house.

Ethnomedicine and sustainable development

The majority of this world’s human inhabitants live in nations with underdeveloped infrastructures and meagre economic resources. A world where development is often measured in terms of gross national product with little attention to equitable distribution of social supports, human rights, or environmental quality. A world where funding for health care programs has diminished and emphasis is given to cost and sustainability rather than need. Many aspects of the current global medical system may be
inappropriate to meet the needs of the developing world “dumping” of outdated or unregistered pharmaceutical products in “poor” countries combined with a lack of international regulation has meant widespread misuse of drugs, making drug companies widely regarded as pariah rather than saviors. The use of third world people in drug trials has always been ethically problematic and “modern” drug products are increasingly recognized as prohibitively expensive and in some instances, potentially hazardous. The interaction of ethnobotany and pharmacology has led to patents and profits, contributing to the institutionalization of allopathic, drug-based therapies and serving as a boon to the multinational pharmaceutical industry. Indigenous people and their international allies could gain support for health care projects that incorporate ethnomedicine.

Perhaps marginalized ethnic group and traditional healers can secure a foothold in the struggle for scarce health care resources. Promotion of ethnomedicine will help protect environmental conservation and biodiversity through the establishment of traditional medicine preserves. The ethnomedical practice of indigenous peoples has much to lend to Western medicine, but also much to treasure, protect, preserve, and perhaps, promote.

During the past few years, considerable interest has been generated around the concept of new phytomedicines. Rainforests and other areas are being explored and sampled, native peoples are being interviewed and watched, and pharmaceutical companies are making contracts and large investments in the hope of identifying drugs for historic and more modern applications. While the concept of medicines from plant is not new, the enormous, unexplored chemical diversity available within the plant kingdom holds tremendous promise for additional weapons in the continuing struggle against diseases. By working together for sustainable development of natural plant resources with a fair sharing of profits, business, citizens, and society will benefit. Opportunities in phytomedicines should continue to expand and we will have improved medical treatment, preservation of natural areas, and plants for tomorrow.

The status of traditional medicine and the use of medicinal plants in the world today

An investigation throughout the world into the status of traditional medicine generally, and the use of medicinal plants in particular, shows that whereas in some areas competition and confrontation with conventional health care are occurring, in others it is collaboration between the systems.

The African region

In the African region the traditional medicine has become a part of the people’s culture even though this form of medicine is not well organized as for example, in India and China. Practitioners include herbalists, bone setters, village midwives or traditional birth attendants, traditional psychiatrists, spiritual healers and other specialists. Many countries in Africa now have a division, or task force on traditional medicine. Research in African traditional medicine and pharmacopoeia had been spearheaded by the organization of African unity through its Scientific, Technical and Research Commission since 1968. Most African countries now have at least one research group investigating medicinal plants and the OAU/STRC continues to finance research on African medicinal plants in many countries including Angola, Egypt, Senegal, Ghana, Mali, Nigeria, Guinea, Congo, Uganda, Tanzania, and Madagascar. Many countries have associations of
traditional medical practitioners (e.g. Mali, Tanzania, etc.). Other states in Nigeria have enacted laws recognizing traditional medical practitioners.

**The American region**

In the American region more is heard of traditional medicine and its practice nor in south America and amongst the Amerindians than in north America and Canada. The latter two countries, however, use many drugs of plant origin. For example, 25 percent of all prescriptions dispensed in public pharmacies in the USA in 1973 contained drugs extracted from higher plants. This region also has its herbalists, bone setters, masseurs, diviners, counter magic practitioners and spiritual healers. Studies on traditional medicine and medicinal plants are being carried out by medical anthropologists. Organized research groups exist, as for example in Mexico where a drug research institute (MEPLAM) undertakes multidisciplinary research on local medicinal plants. Studies on medicinal plants especially related to psychiatry are being undertaken in some Latin American countries for example Brazil, Colombia, Mexico and the Peru.

**The south-east Asian region**

This region of the world is one of the areas where traditional medicine has been integrated into the official health care system and where formalized as well as informal training of practitioners exists.

**The western Pacific region**

This part of world includes countries where traditional medicine and the use of medicinal plants thrives. Traditional Chinese medicine has had several thousand years of practical experience as well as its own theory. The unity between practitioners of traditional medicine and those of western medicine is one of the cardinal principles of health work in China. School and research institutes for traditional medicine have long been established. China offers an enviable example of integration of traditional medicine and modern medicine, and delegations from various countries of the world (Nigeria, the USA, etc) have visited China to study the successful merger of traditional and modern medicine.

Research on medicinal plants and the production of phyto-pharmaceuticals is being undertaken in several countries in this region.

**The European region**

The European region of the world apparently has little use for traditional medicine. Many countries disapprove of the WHO’s promotion of traditional medicine, perhaps because these countries have such highly developed health care for their people. For example in Britain the days of using a concoction of some 20 plants to treat dropsy have long gone, and now active component, digitalis leaf, is used in standardized tablet form.

Traditional medicine is practiced in some remote areas, however; but it is difficult to separate such practice from quackery or chiromancy. Practitioners of fringe medicine—which includes herbalism, homeopathy, osteopathy, and chiropRACTICE—are classed somewhere between traditional healers and graduates of recognized medical schools.
Eastern Mediterranean region

Traditional medicine in the countries of the eastern Mediterranean region enjoys a rich cultural heritage that is still reflected in a variety of indigenous practices. While traditional medicine is generally accessible and acceptable to the community, particularly in rural areas, official and professional attitudes vary widely, from recognition and support to reflection and even suppression. However, several countries have developed training programmes for traditional birth attendants, thus enabling them to play a more effective role in the maternal and child health services. In several countries activities have been focused on research on medicinal plants and their production of pharmaceuticals from locally available herbs.