CHAPTER ONE

Introduction to the Multipurpose Plant *Cannabis*

> Throughout the ages, [*Cannabis*] has been extolled as one of man's greatest benefactors—and cursed as one of his greatest scourges. [*Cannabis*] is undoubtedly an herb that has been many things to many people. Armies and navies have used it to make war, men and women to make love. Hunters and fishermen have snared the most ferocious creatures, from the tiger to the shark, in its Herculean weave. Fashion designers have dressed the most elegant women in its supple knit. Hangmen have snapped the necks of thieves and murderers with its fiber. Obstetricians have eased the pain of childbirth with its leaves [female flowers]. Farmers have crushed its seeds and used the oil within to light their lamps. Mourners have thrown its seeds [inflorescences] into blazing fires and have had their sorrow transformed into blissful ecstasy by the fumes that filled the air.
>
> (ABEL 1980)

In the Beginning: Circumstances of Early Human Contact with *Cannabis*

Over the vast time span within which humans have known and used *Cannabis* for many purposes, it has been heralded as one of humankind's supreme resources and cursed as one of our utmost burdens. As an introduction to this controversial plant, we have constructed a possible scenario for the origins of *Cannabis* use by humans, utilizing botanical, ecological, and archeological evidence. Hypothetical early human contact with *Cannabis* and the subsequent discovery and application of its useful resources took place during the distant past in one of the more temperate and well-watered areas of ancient Central Asia.

It was springtime many thousands of years ago. A long ice age had recently ended, and a small group of nomadic people was on the move, venturing far from their ancestral territory. Finding a suitable clearing near the bend of a meandering river, they stopped to camp. They had migrated into this remote location under pressure from other more powerful and aggressive human groups.

In their new open environment, they constructed simple thatch shelters in which to sleep, store their few belongings, and protect their families from the elements. At this time, humans had not yet developed techniques for cultivating plants and domesticating animals. Like all other peoples during this ancient era, this group depended completely on hunting and gathering their food and other required resources.

Women spent much of the day searching for and collecting seasonal wild edible fruits, roots, grains, vegetables, grubs, and nuts, as well as cordage fibers and fuel wood. Meanwhile, men tracked and stalked deer, pigs, goats, horses, certain birds, and other land animals in nearby forests and grasslands, as well as assisting with seasonal gathering. The river adjacent to their new settlement supplied water and promised other important natural resources critical for survival. Fish were also potentially useful if they could figure out how to catch them.

As time passed, they increasingly disturbed the clearing surrounding their settlement and in the process, inadvertently created nitrogen-rich soil environments by depositing organic waste materials in dump heaps. By trampling and cutting back much of the original vegetation, the immigrants unintentionally favored several sun-loving plants that were preadapted to the new, human-made open scars with waste-enriched soil.

One plant that often colonizes dump heaps or waste areas in open environments is *Cannabis*, a tall herb that is naturally adapted to disturbed or sunny habitats. Toward the end of the short, warm summer, women gathering seasonal fruits and nuts discovered stands of wild hemp full of ripe seeds along the river near their settlement. They teased out and tasted a few seeds and decided they were worthwhile food. Unable to remove the myriad of seeds easily, they cut whole plants with seeds still attached and dragged them back to camp. Thus seeds of this conspicuous herb were brought into the group's clearing during their search for food. Here, *Cannabis* found a favorable niche in the sunny, moist, and well-drained soil, nutrient-enriched by human activities.

Women experimented with these plants, letting them dry and flailing them against cleared ground. As they whipped the dry plants against the open earth, seeds flew into the air. Most landed near the threshing where they were swept up, but a few strayed farther and were not retrieved. Others seeds were left behind in threshed plants that were discarded onto dump heaps.

By the end of the next cold season, new spring showers gave the forgotten hemp seeds the necessary moisture required for germination and growth, and the plants

FIGURE 1. *Cannabis* naturally colonizes open streamside habitats with ample sunlight, water, nutrients, and air movement. The plants shown-here are *Cannabis* spontaneously along a watercourse (A) in the northeastern State of Megalaya in India. Feral *Cannabis* is highly adaptableand can grow and reproduce in a wide variety of temperate habitats, even under extreme conditions such as in a concrete culvert (B) along a high-way in rural southwestern China. *Cannabis* is opportunistic and thrives in nutrient-rich waste heaps resulting from human activities (C) as illustrated by this population in Arunachal Pradesh, India. *Cannabis* is also a formidable weed in field crops as seedlings (D) grow rapidly incompetition for sunlight.

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FIGURE 1 (*continued*). Adult plants commonly appear in temperatefield crops *Cannabis* on open fertile land, as in Yunnan province, China (E). Feral plants are often favored by humans and encouraged to survive, either because they are potentially useful for seed and drugs, as in western Nepal (F), or simply because they are strikingly attractive, as along a main street in Kunming in Yunnan province, China (G).

FIGURE 2. Humans living across a wide geographical range have found diverse uses for *Cannabis*. Examples of this remarkable variety include the cloth of Hmong tribal weavers (A) in rural villages of southwestern China, snack seed food sold (B) in eastern Chinese cities, ritual clothing worn in traditional Korean Confucian funerary worship (C) and contemporary Western recreational and medicinal drug use (D).

FIGURE 3. *Cannabis* is a versatile crop plant grown with various strategies for different uses. Hemp fiber fields are sown close together to promote stalk elongation and fiber yield, as in the Netherlands (A); hemp seed fields are sown farther apart to allow branching to maximize seed yield as in Gansu province, China (B); and uniform crops of potent seedless female flowers for medicinal and recreational uses are produced by transplanting genetically identical vegetative cuttings as in Switzerland (C).

flourished through the summer, thriving on available water, sunlight, and nitrogen-rich piles of organic waste. Soon the women began to harvest the hemp seeds around their nearby rubbish piles, making fewer trips farther from home in search of wild hemp. Within a few years, trips to collect wild hemp ceased, and then the seed was harvested only from self-sown *Cannabis* plants in disturbed environments near their settlement. Human and plant interactions such as these were the bridge between hunting and gathering and agriculture; these were the incipient moments of early settled farming.

Like all traditional peoples, past and present, these early humans knew their immediate environment intimately through their own experiences and information passed on orally from their ancestors. As a key element of survival, they were quite familiar with local plants, animals, and inorganic materials, and most of their hunting and gathering equipment was fabricated from local plant and animal sources.

The group's store of knowledge developed slowly, and when challenged by a new living situation, they were eager to develop new techniques to utilize unfamiliar animal and plant resources. As the newly introduced *Cannabis* populations grew larger around the settlement, they became increasingly conspicuous. Could *Cannabis* offer other benefits for survival? Their curiosity grew, and through a process of trial and error, they experimented with its uses.

They knew initially that edible *Cannabis* seeds borne in clusters on the female plants contained a nutritious oily substance. Soon they discovered that they could also be used as a source of oil for cooking, fuel, or even as a base material for crude soap. They already knew about the uses of fibers and eventually recognized the extraordinary fibrous qualities of *Cannabis*. They wore animal skins and furs held together with thongs and were always searching for new plants and animals that could provide durable fibers. However, they had yet to learn the crafts of spinning and weaving.

These early settlers eventually learned they could peel bark from the hollow *Cannabis* stalk and extract long fibers that were easily utilized. They also learned that hemp fibers were very strong, long lasting, and water resistant. As they experimented with methods for fiber extraction, the group saw that by soaking long *Cannabis* stalks in pools along the river and letting them partly decompose, the process now known as retting took place. After sufficient time, most of the adhesive layers of the stalk decomposed into water-soluble juices, and the insoluble, water-resistant materials (the long fiber cells) were left to be more easily collected and dried. They experimented with the fibers, creating strong, durable, waterproof cords and later discovered how to spin yarn and weave cloth with hemp fiber.

Fish in the retting pools were stunned by a lack of oxygen and/or the water-soluble plant juices and floated to the surface in a senseless state. They were in no way rendered inedible; however, in a stupefied state they were easily gathered. Relatively easy access to an important food resource

stimulated early humans to experiment with the construction of fish lines and nets made from water-resistant hemp fibers.

But was the need for fiber or food the only reason for their interest in *Cannabis*? Perhaps it was first used for its spiritual or euphoric value and thus initially employed for entertainment or ceremonial purposes. In their ceaseless quest for food, they could have first realized *Cannabis*'s psychoactive potential while eating its seeds. The small, resin-covered bracts surrounding the seeds are potentially psychoactive and could have been ingested along with the seeds; however, the potent smoke breathed in when *Cannabis* plants were burned would have induced a more rapid onset of mind-altering experiences. At first unintentionally, early humans ventured into new realms of cognitive experience and soon favored *Cannabis* as a spiritual, recreational, or medicinal ally.

Psychoactive *Cannabis* resin (complex mixture of aromatic compounds and cannabinoids) can induce rapturous and joyous sensations, ranging from mild reverie and a general sense of well-being to ecstasy and hallucination. In our ancient past, these experiences probably generated a deeper interest in the plant as they do for some today. If only temporarily, the mind-altering resin could have opened new "doors of perception" for early peoples. Use of the psychoactive resin may have become a key mental and physical refuge from frequently monotonous and strenuous patterns of life.

Consuming *Cannabis* also could have had an explosive effect on early people's world view and ideology. Early hunting and gathering groups guarded and handed down "mysteries" or cosmological explanations that served as their interpretations of reality, and these spiritual explanations helped them understand life and death in their own cultural contexts. The ecstatic, visionary effects of *Cannabis* ingestion may have morphed these mysteries into a new system of beliefs and symbols, psychologically precipitating the invention and interpretation of invisible spirits, both malevolent and benevolent. If so, these early people came to regard the plant as a gift from their ancestors and their gods to be used as a vehicle for transcending to higher planes of consciousness. Essentially, *Cannabis* would have provided a means by which they could communicate with their deities—an early "Plant of the Gods" (Schultes and Hofmann 1992).

Regardless of their initial motivation for using *Cannabis*, the group soon realized its many possibilities. They used the plant as a food supplement, an important source of fiber, fuel, and medicine, and they revered its psychoactive properties as a mental elixir for relaxation, recreation, and spiritual communication. Most importantly, by consciously or inadvertently carrying seeds as they migrated, *Cannabis* became part of their transported entourage. Humans and *Cannabis* became linked in a number of ways very early on and have remained so until modern times.

The scenario presented earlier involves a series of hypothetical yet plausible ancient Holocene events in the lives of a Mesolithic hunting and gathering group that was just beginning to experiment with fishing, farming, weaving, and ritual plant use. This succession of events probably recurred often in several regions during the recession of the last glacial age that began the Holocene Epoch about 12,000 years ago and possibly much earlier in the Pleistocene Epoch. This hypothetical group's experiences symbolize some of the possible circumstances behind early human experimentation with *Cannabis*, which evolved into an important and long-lasting multipurpose relationship affecting the evolution of both human culture and *Cannabis* as a crop plant. The antiquity and depth of this relationship forms the basis of this book.

A Brief Summary of the Long and Diverse History of Relationships between *Cannabis* and Humans

Cannabis has played a profound role on the stage of human history. The development of agriculture, which began approximately 10,000 years ago, has had monumental consequences for humans and our planet, allowing us to exert more control over our food supply and vastly increase our populations and success as a species. In this book, we argue that in some areas of Eurasia, *Cannabis* was a major, if not crucial, player in this transformational change in human ecology. The so-called agricultural revolution in fact took millennia to unfold and is still progressing with new scientific breakthroughs in genetic engineering and environmental manipulation. These modern innovations also affect the role and impact of *Cannabis* in our lives. Through artificial selection of desirable qualities and for a variety of purposes, humans have been manipulating *Cannabis* plants for many thousands of years.

The saga of human-*Cannabis* relationships has been a long, drawn-out affair, an epic association of people and a plant that has influenced history on many fronts in various regions of the world. For instance, hemp was a significant and possibly crucial source of rope used to trap, harness, and command the power and versatility of horses, beginning thousands of years ago in the Eurasian steppes. In this huge region horses have long been used in transportation, hunting, farm work, recreation, and war. Hemp also provided rigging and sails that allowed sailing vessels of the great fleets of Europe and Asia to navigate the oceans for exploration, exploitation, battle, commerce, and travel. *Cannabis*'s function as a vital, nutritious food and source of vegetable oil was significant in the past. Its use for drug purposes, medicinal and mind-altering, licit and illicit, has been widespread not only in our time but also throughout history.

A review of the ancient biogeography, history, breeding, genetics, and multiple uses of *Cannabis* provides us with an enlightened perspective on this age-old natural resource. Before we roll back the clock and consider how our ancient roots intertwine with *Cannabis*, let us review some basics about the genus as it grows naturally in the wild and as a crop plant under cultivation.

What Shall We Call These Plants?

There are many names for the plant in question. You say "weed," and I say "hemp." You say "marijuana," and I say "*Cannabis*." Are we talking about the same plant?

If you call this plant a weed, you may be right depending on your definition of a weedy plant. Some define a weed as a plant growing where it is unwanted. Others refer to a weed as a plant that has escaped cultivation. It is true that in some regions, such as Central Asia, which is probably its original homeland, or in other areas that have similar ecological conditions, such as the American Midwest, *Cannabis* escaped from hemp fields and thrives as a feral plant or naturalized alien weed.

On the other hand, if you define a weed as a plant considered troublesome or useless, you may or may not be right. *Cannabis* plants are troublesome to some, especially farmers

FIGURE 4. *Cannabis* provides many natural resources for humans. Hemp stalks provide fiber used to make cordage (A) and weave cloth. Female flowers (B) provide medicinal and recreational drugs, edible seed (C), hemp seed oil and essential oils (D) are used to make packaged foods and beverages (E).
(*continued*)

FIGURE 4 (*continued*). Whole plants serve as fodder (F), provide educators with a compelling example of a traditional, multipurpose plant (G) and add ornamental beauty to our lives (H).

as well as officials enforcing laws prohibiting cultivation, possession, and use. On the other hand, for many centuries *Cannabis* has provided us with valuable resources, including fiber, food, medicine, and religious sacrament, and so it can hardly be considered useless. Use of the term "weed" is also a colloquialism, being one of many English language nicknames for drug type *Cannabis*.

What about the term "hemp"? The word hemp originally, and still formally, refers to *Cannabis sativa*, a tall Eurasian herb that is widely cultivated for its tough bast (bark) fiber. However, in more recent times the word "hemp" has been applied as a collective noun representing many additional fiber-bearing plants. Today, "true hemp" or "common hemp" refers to *Cannabis*, or more specifically European *Cannabis sativa* or narrow-leaf hemp (NLH). The complex history of *Cannabis* as a fiber source in ancient East and South Asia, somewhat later in Western Europe, and during more recent times in North America, is described in detail in Chapter 5.

"Marijuana" is a common, often notorious nickname for our ancient cultivated and weedy ally and is probably of Hispanic derivation. The name "marijuana" refers to both the plant and the dried leaves and flowers that are smoked for mind-altering purposes. The term "sinsemilla" is derived from the Spanish phrase meaning "without seed" and is the name most commonly used for seedless marijuana.

There are many other colloquial or ethnic names that refer to the plant, or more specifically its mind-altering products,

FIGURE 5. The range of variation within each *Cannabis* species and their respective biotypes can be quite pronounced, yet each taxon is characterized by certain common phenotypic traits. Narrow-leaf hemp ancestor (NLHA), *C. sativa* ssp. *spontanea* plants are most often of medium height with medium length internodes and less developed branching, small light to medium green leaves with narrow leaflets, and small, leafy inflorescences and seeds, as in this Central Asian population (A). Narrow-leaf hemp (NLH), *C. sativa* ssp. *sativa* plants are taller with long internodes and more branch development, medium green leaves with large narrow leaflets and larger inflorescences with medium size seeds, such as this French fiber and seed cultivar growing in the Netherlands (B). Broad-leaf hemp (BLH), *C. indica* ssp. *chinensis* plants have more robust stalks and medium to long internodes, more and longer branches, larger deep green leaves with broad leaflets and much larger inflorescences with large seeds, as seen in this fiber and seed crop from Yunnan province, China (C). (*continued*)

including grass, pot, hashish, *kif*, *ganja*, and so on. Biological taxonomists (scientists who systematically classify and name plants and animals) have placed all marijuana, or true hemp plants, in genus *Cannabis*. Today, many professional and nonprofessional people in countries around the world refer to these plants as "cannabis". Although both common and scientific names will be used in this study, we will predominantly refer to them as *Cannabis*.

It is particularly important to understand the names used throughout this book for various kinds of *Cannabis*. A modern taxonomic treatment of *Cannabis* is presented in Chapter 11. The use of acronyms (e.g., PA, BLD, NLH) to represent different *Cannabis* gene pools, in addition to their scientific Latin binomials with subspecies designations (indicating biotypes or groups of organisms with similar phenotypes or observable characteristics) should encourage readers to think in terms of gene pools while tracing the natural and human-directed evolution of *Cannabis*. Even readers familiar with the history of the taxonomic study of *Cannabis* will find the modern system presented in this book to be quite different from what was previously proposed and of considerable use in resolving previous taxonomic discrepancies.

Should We Praise or Condemn This Multipurpose Plant?

People have cultivated many different kinds of plants since the dawn of agriculture thousands of years ago. Yet perhaps none have been both praised and condemned so much as *Cannabis*. As noted in our hypothetical scenario, *Cannabis*, the notorious provider of mind-altering Δ^9-tetrahydrocannabinol (Δ^9-THC, or simply THC) and other psychoactive substances, has been utilized for many purposes in addition to its common use as a religious and recreational drug plant. Its stalks can be used as a fuel source. As we noted earlier, the durable tissue derived from the elongated cells found in the outer bark of *Cannabis* provides fiber for clothing, furnishings, sails, rope, canvas, and other woven materials, as well as for paper. Its nutrient-rich seeds feed humans and domesticated animals; the seed oil is useful for cooking and burning as lamp fuel. And of course, *Cannabis* has many medicinal applications, most underrealized today but which proved helpful in the past and may become even more valuable in the future.

Although people have enjoyed an extraordinarily long and diverse association with *Cannabis* over large parts of our planet, it is now almost universally illegal to grow and sell. There are many books describing various generally illicit aspects of this relationship, but few offer a satisfactory look into the vast and interesting shared history of humans and *Cannabis*, especially our early biological and ethnobotanical experiences with this useful, hardy plant. Hopefully this book sheds more light on a most controversial subject and will help readers better understand why *Cannabis* has been referred to as both the "devil's weed" (from the film *Marijuana* 1936) and the "giver of delight" (from ancient Vedic texts).

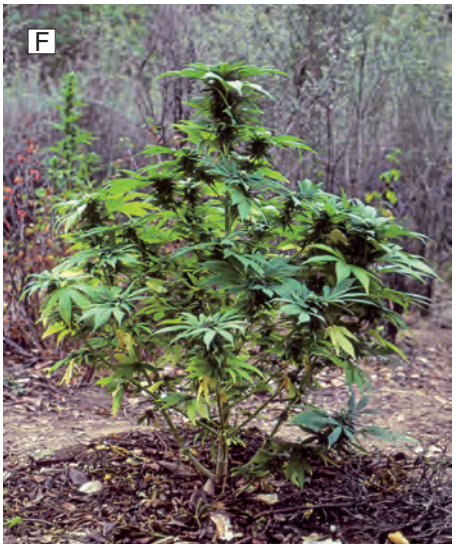

FIGURE 5 (*continued*). Putative narrow-leaf drug ancestor, *C. indica* ssp. *kafiristanica* plants are short to medium in height, with short internodes and many branches, small medium green leaves with narrow leaflets, and small inflorescences with small seeds, such as this example from Bihar state, India (D). Narrow-leaf drug (NLD), *C. indica* ssp. *indica* plants are often tall with medium to long internodes and well developed branches, medium to large medium green leaves with narrow leaflets, and large, long inflorescences and medium size seeds, such as this Mexican variety growing in California (E). Broad-leaf drug (BLD), *C. indica* ssp. *afghanica* plants are often short to medium in height with short internodes, well developed branches, large dark green leaves with broad leaflets, and large leafy inflorescences with medium to large seeds, as seen in this Afghan hashish variety growing in California (F).

What We Discuss in This Book

Where, when, why, and how did early humans use *Cannabis*? What were the environmental conditions in which our relationships with these plants actually began? How and why did the many uses of *Cannabis* spread from one society to another during ancient times? How have humans and *Cannabis* interacted and affected each other, even perhaps directing their coevolution? And what are the lessons to be learned for our time and for the future? This is the story of the evolution of *Cannabis* and its connections to our cultural evolution.

As the "father of modern ethnobotany," Richard Evans Schultes (1969b), pointed out more than 40 years ago, progress in the study of psychoactive drug plants during the second half of the twentieth century owes its "spectacular success to interdisciplinary studies and consequent integration of data gleaned from many seemingly unrelated fields of investigation: anthropology, botany, ethnobotany, chemistry, history, linguistics, medicine, pharmacognosy, pharmacology and psychology." This investigation of *Cannabis* brings together information from all these disciplines and more.

Chapter 2 presents an overview of the natural origins and early evolution of *Cannabis* and proposes a hypothetical model for the evolution of *Cannabis* up to the time when early humans first encountered it. Is the scenario presented in this introduction a realistic description of the earliest human contact and use of *Cannabis*? A coherent, convincing hypothesis regarding the origin of human relationships with any plant must be based on a fundamental understanding of the botany of that species, and especially important is a thorough ecological understanding including environmental adaptations to such variables as climate, soil, landform, and other organisms such as humans. Thus a brief botanical and ecological description of *Cannabis* is also presented in Chapter 2, including an attempt to identify the probable centers of species formation—the regions where the early evolution of *Cannabis* occurred.

Chapter 3 provides a critical, in-depth discussion of the cultural circumstances within which people began to use *Cannabis*, offering an overview of how the early collection of wild plants led to cultivation and in due course to artificial selection of desirable traits and eventually domestication. Human selection

has been the most important determinant of *Cannabis*'s evolution and has radically influenced the geographical range of divergent *Cannabis* taxa (reflected in phenotypically differing genotypes or genetic inheritance). Many botanical aspects of *Cannabis* relevant to its natural evolution are discussed, along with a detailed discussion of evolutionary changes in *Cannabis* imposed through artificial selection, using the present-day distribution of chemical variants as a case in point.

Chapter 4 presents methodology for interpreting material evidence for *Cannabis*'s antiquity, its biogeographical spread, and general aspects of its multipurpose use over time and space. This includes reference to pertinent paleobotanical, archaeobotanical, archeological, and historical evidence. Chapter 4 also presents our hypotheses for the ancient use of *Cannabis* seed and fiber in fishing and the early relationships among humans, hemp, and horses tracing a series of phases of cultural dispersal of *Cannabis* from its Eurasian homeland to various regions of the Old World. In the prehistoric period this involved migrating nomads, who perhaps first spread it into China, India, Southwest Asia, Europe, the Mediterranean, and Africa. A six-phase model is presented for the historical dispersal of *Cannabis* by humans.

Chapters 5 and 6 present detailed histories of different traditional uses of *Cannabis* fiber and seed. Thus we learn how *Cannabis* fiber has been utilized for cordage, cloth, and paper in Chapter 5, and then how it provides seed oil, food, and fodder in Chapter 6. In these two chapters, the ancient as well as modern cultural dispersal of *Cannabis* for fiber and seed use throughout much of Eurasia, Africa, and the Western Hemisphere are described and explained.

Chapter 7 presents a detailed discussion of ancient through more modern *Cannabis* use for psychoactive purposes in ritual and recreational contexts. Special consideration is given here to traditional ritualistic applications in order to address the question of whether or not *Cannabis* was originally a "Plant of the Gods" (see Schultes and Hofmann 1992; Merlin 1972, 2003). Ethnobotanical traditions of *Cannabis* use for medicinal purposes are explored in Chapter 8. *Cannabis* also has a long, widespread, and continuing history as a therapeutic agent, and we review medical usage in East and South Asia, the Middle East, Europe, Africa, and the New World. Some major aspects of *Cannabis*'s use in modern medicine are also discussed.

Chapter 9 examines the large body of evidence from ancient texts, historical accounts, ethnographic research, and archeological sites concerning the ritual use of nonpsychoactive *Cannabis* in various parts of Europe and East Asia. Here we focus attention on symbolic, ceremonial, and spiritual aspects of hemp in traditional cultures where it has long been cultivated.

Chapter 10 continues our investigation of the influence of humans on the evolution of *Cannabis* by following the work of plant breeders during the last century. Through the use of Mendelian selection and breeding techniques, plant breeders developed industrial hemp varieties—seed-propagated cultivars (cultivated varieties) suitable for fiber and/or seed production. Other breeders, both professionals and amateurs, have developed a myriad of seed and vegetatively propagated cultivars for recreational and medical purposes.

Chapter 11 reviews the taxonomic history of *Cannabis*, explores the realms of modern chemotaxonomy and molecular taxonomy, and assesses their bearing on both the *Cannabis* "species question" and evolutionary studies. Recent phylogenetic research is also described and analyzed in terms of its relevance to our understanding of the evolutionary and ethnobotanical history of *Cannabis*.

Chapter 12 expands upon ideas in Chapter 2 and proposes a model for the early evolution of the hemp and hop family (Cannabaceae) and the migration of *Cannabis* as the Holocene epoch began 12,000 years ago.

Chapter 13 reviews the long and complex history of *Cannabis* and its use by humans, continues to examine the depth of our relationship with *Cannabis*, and critically evaluates new evidence for biological coevolution of humans and *Cannabis* at the DNA level. Its past, present, and future multipurpose uses are reviewed with special focus on the present position and future potential of recreational, ritualistic, medical, agricultural, and industrial applications of this resource-rich genus. Here we also present new evidence to support our model for the evolution of *Cannabis* and offer food for thought for future researchers. The comprehensive references section at the end of the book includes citations of all authors cited in the text and should serve as a valuable bibliographic source for further study.