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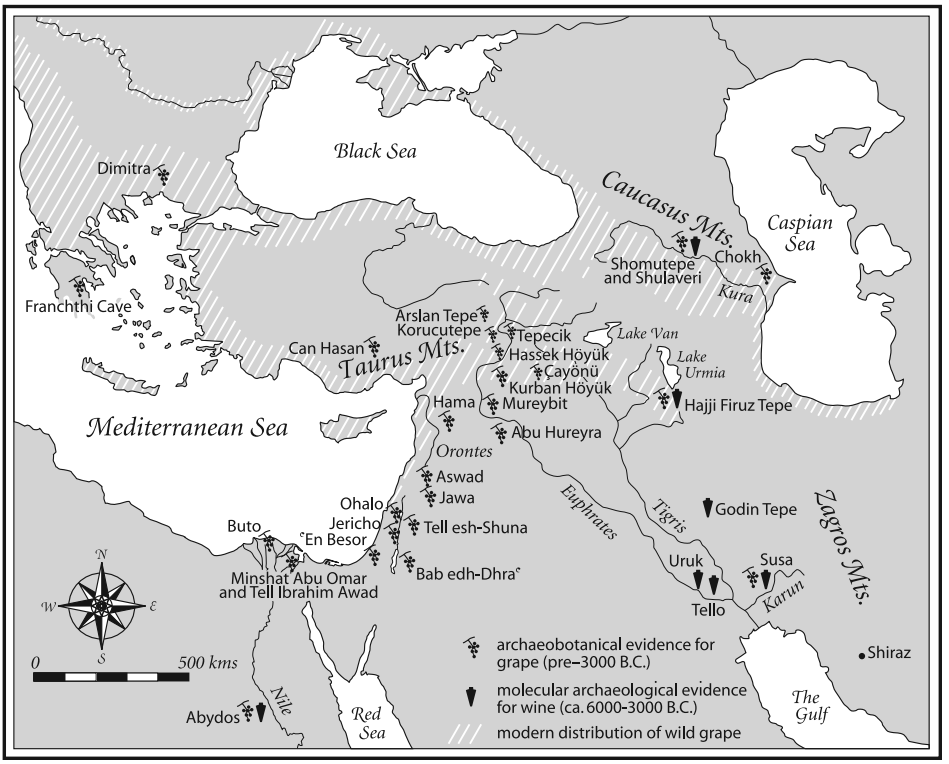
CHAPTER 1

Stone Age Wine

A SINGLE Eurasian grape species (*Vitis vinifera* L. subsp. *sylvestris*), among approximately 100 that grow wild in temperate zones of Asia, Europe, and North America, is the source of 99 percent of the world's wine today (color plate 1). We may call the vine a Cabernet Sauvignon, a Gewürztraminer, or a Shiraz cultivar. We may be impressed by the varietal wines that are produced from the fruit of these vines, whether a dense red color, redolent of blackberries and cedar, or a flinty white with a hint of straw. The fact remains that we owe the seemingly infinite range of color, sweetness, body, acidity, taste, and aroma of this delectable beverage to one grape species.

The predominance of the Eurasian grapevine is all the more remarkable because the ancient inhabitants of the regions in which numerous wild grape species thrive today—China and North America, in particular—do not appear to have exploited the grapevine as a food source or to have brought it into cultivation. Leif Eriksson and his Viking compatriots were impressed enough by the proliferation of grapevines throughout the northeastern forests of the New World to call it Vinland. Yet, except for the occasional grape seed from an ancient village or encampment, there is as yet no archaeological evidence that Native Americans collected the wild grape for food, let alone domesticated the plant and made wine from its fruit.

Ancient Chinese sites are thus far similarly devoid of grape remains, although that picture is changing as more sophisticated techniques are used (see chapter 12). The earliest literary reference to



Map 2. The ancient Near East and Egypt. The distribution of the modern wild grapevine (*Vitis vinifera sylvestris)* is shown by hatching; isolated occurrences of the wild grape also occur in Turkmenistan, Uzbekistan, and Tajikistan, off the map to the east. The grape cluster symbol indicates wild and domesticated grape remains—primarily pips but occasionally skins and wood—that were recovered from representative sites primarily dating from the Neolithic to the beginning of the Early Bronze Age (ca. 8000–3000 B.C.) but sometimes much earlier (e.g., Ohalo, dating 20,000 years ago). The jar symbol marks wine jar types for the period from ca. 6000 to 3000 B.C., which have been chemically confirmed.

wine in China is the account of General Zhang Qian, who traveled to the northwestern fringes of the Western Han realm in the late second century B.C. He reported that there (in the modern province of Xinjiang), astride the Silk Road, and farther along in Bactria and Sogdiana in Uzbekistan whose grapes were already legendary in the

West, the most popular beverage was wine. Indeed, in the fertile valley of Fergana on the western side of the Pamir Mountains, the wealthiest members of the society stored thousands of liters of grape wine, aging it for a decade or more. Zhang was so impressed with the beverage that he brought cuttings back to the imperial palace, where they were planted and soon produced grapes whose juice was made into wine for the emperor. Zhang's vines, however, did not belong to any East Asian species, such as *Vitis amurensis* with its huge berries growing along the Amur River in Manchuria, but to the Eurasian grape species, *Vitis vinifera*.

How can the Eurasian grape's dominant position in the world of wine be explained? *Vitis labrusca* and *Vitis rotundifolia* (the latter also known as scuppernong or muscadine) eventually established footholds as wine grapes in the New World, despite their foxy or sour undertones and a cloying sweetness that seemed better suited to a Concord jelly than a Niagara or Manischewitz wine. By crossing an American species with the Eurasian species, experiments that were promoted by Thomas Jefferson and others, varieties that produce quite good wines were eventually established in Virginia and in the southeastern United States. In China, grapes with high residual sugar, such as *Vitis amurensis*, which can be further enhanced by raisining, can also produce a decent wine. But again, the Eurasian grape was crossed with Chinese species in recent centuries to provide the impetus for developing a native industry.

Sifting Fact from Legend

To understand why and how the Eurasian grapevine is central to the story of wine, we must travel back to a period in human prehistory shrouded in the mists of time. Barring time travel, would-be interpreters of the past are trapped within the fourth dimension. Time's arrow is pointed in one direction, and our task is to peer back millions of years and reconstruct the series of unique events that led to the domestication of the Eurasian grape and wine.

Archaeology—the scientific study of ancient remains—will be our principal resource and guide in proposing a plausible scenario for

Stone Age wine. Ancient records provide no signposts in this quest, because the earliest written texts, dating to about 3500 B.C., are much later and consist of brief, often cryptic records. Extensive treatises on wine—such as chapter 14 of Pliny the Elder's *Historia naturalis* (*Natural History*), written in the first century A.D.—are only as good as the writer's sources or experience and are refracted through the Weltanschauung of the time.

As intriguing and often exciting as the stories of the origins of viniculture (encompassing both viticulture—vine cultivation—and winemaking) are, this tangled "vineyard" needs to be trod with caution. Many books on the history of wine give undue weight to one legend or another and rely on dubious translations. If ancient Greek writers variously state that Dionysos, the Greek god of wine, came from Phoenicia, Crete, Thrace, Lydia, or Phrygia, one must plumb deeper. Another widespread view, shared by many ancient Mediterranean cultures, was that the vine sprang from the blood of humans who had fought against the gods.

A Persian tale of a king Jamsheed, otherwise unknown in that country's dynastic history, is very endearing. The monarch was fond of fresh grapes and stored them in jars to have a year-round supply. One consignment unfortunately went bad, and the jar was labeled as poison. Suffering from severe headaches, a harem consort then mistakenly drank from the jar and fell into a deep sleep, to awake miraculously cured. She informed the king of what had happened, and, in his wisdom, he discerned that the "poison" was actually fermented grape juice or wine with medicinal effects. He then ordered more such poison to be prepared, and thus humanity embarked upon its ages-long wine odyssey.

The Jamsheed story says nothing about how a mass of solid grapes could have fermented into a liquid beverage. Was the same procedure followed to make subsequent batches? There is also no mention of the domestication of the grapevine and vineyard management. In short, it is a simple tale, floating somewhere in time, like many other origin legends. If its historical details are suspect, it cannot be a basis for inferring that Iran is the homeland of winemaking, as has been done.

Archaeology, together with other historical sciences dealing with

geology and plant remains (paleontology and archaeobotany), is able to provide a better starting point for hypotheses about the beginnings of viniculture than ancient texts. Despite its narrow database and mute testimony, archaeological evidence has a powerful explanatory dimension. There is no hidden bias lurking in a pottery sherd or a stone wall, as there might be in a written document. The archaeological artifact or ecofact (a term for a natural object, unmodified by humans, such as a grape seed or vine) is there because it played a role in the life of the community or was incorporated into the deposit by some other natural agency. It represents unintentional evidence that is contemporaneous with the events that one seeks to explain.

A host of scientific methods—ranging from radiocarbon dating to high-resolution microscopy to DNA analysis—can now be used to extract the maximum amount of information from archaeological remains. Increasingly, minuscule amounts of ancient organics, sometimes deriving from grapes or wine, have a story to tell.

Sufficient archaeological excavation has now been carried on around the world to reveal that human beings, given enough time, are remarkably adept at discovering practical and innovative solutions to life's challenges. Beginning as small bands, increasingly complex societies developed and led to the earliest civilizations of the world—those in the Middle East, East Asia, South Asia, and Mesoamerica and Peru in the New World. Although sporadic interactions between these regions might have occurred from time to time, their writing systems, monumental architecture, arts, and technologies are largely explainable within their own contexts.

One example of human innovation that occurred in different regions is purple dyeing. It was most likely independently discovered by humans living along the coasts of the Mediterranean Sea and on the western and eastern shores of the Pacific Ocean in China and Peru. The intense purple dye has only one source in nature: chemical precursors of the indigoid compound (6,6′-dibromoindigotin) contained in the hypobranchial glands of certain marine mollusks. These animals, variously assigned to the genera *Murex, Concholepas, Thais*, and *Purpura*, among others, live in saltwater bodies around the world. Somehow, beginning as early as 1500 B.C. in the Mediterranean region, probably somewhat later in China, and about 700 B.C. in Peru,

human beings discovered by extracting the glandular contents in quantity and exposing the liquid to light and air enabled them to produce this unique color for dyeing textiles and other materials. Because it requires as many as 10,000 animals to produce a gram of the dye, it was very expensive to make. In each civilization, the molluscan purple dye eventually came to be associated only with the highest political authorities and was imbued with special religious significance. In first-century Rome, Nero issued a decree that only the emperor could wear the purple—hence, the name Royal Purple.

Some observers might argue that a transference of dyeing technology from a more advanced culture (e.g., the Near East) to a more fledgling one (China or Peru) accounts for the available evidence. Some might even go so far as to invoke a deus ex machina or extraterrestrial visitors. Another scenario is more likely for this example of convergent development, in keeping with Occam's razor or rule (the simplest, most straightforward explanation is often the right one). It runs as follows. The mollusks with the purple dye precursors were probably also a source of food in each region. The Mediterranean species, for example, are still a great delicacy in France and Italy, and the Chinese are renowned for exploiting every food source in their environment. When the animal is removed from its shell in preparation for eating, the hypobranchial gland, which is located on the outside of the creature, is easily broken. Once the liquid has seeped out, it will immediately begin to change from greenish to purple. A shellfish-monger's hands would soon be covered with the purple dye, which is one of the most intense natural dyes known and can be removed only by using a reducing agent. By no great leap of imagination, people began to collect the purple and use it as a dyeing agent. Although this scenario may never be proved absolutely, it accounts for the archaeological data and is in keeping with human inventiveness.

Food is a basic necessity of human life. It is also one of life's main pleasures and serves many auxiliary roles in medicine, social interactions, and religious symbolism. Just as people probably discovered the famous purple dye in the process of exploiting a food resource, humans have long been in search of that strange or exotic taste, texture, or aroma that will stimulate their senses, provide a sense of

well-being, or even elevate them to metaphysical heights. Food is thus much more than simple nourishment, taken three times a day to survive. Because humans are omnivores who came on the world scene relatively late in the earth's evolution, they had an enormous range of plants and animals from which to choose. Yet they had to be willing to explore their environment and experiment to discover the delectable foods and beverages awaiting them, as well as to avoid danger.

Man Meets Grape: The Paleolithic Hypothesis

The wild Eurasian grapevine (*Vitis vinifera* L. subsp. *sylvestris*) grows today throughout the temperate Mediterranean basin from Spain to Lebanon, inland along the Danube and Rhine Rivers, around the shores of the Black Sea and the southern Caspian Sea, at the headwaters of the Tigris and Euphrates Rivers, and farther east in the oases of Central Asia. This distribution is likely only a shadow of what prevailed some 50 million years ago in warmer times, leading up to the most recent Ice Age in Quaternary times, starting about 2.5 million years ago. Pockets of the wild Eurasian grape managed to survive the four cold, dry spells of this Ice Age in lower-lying valleys and plains.

Fossil seeds and leaf impressions of the family Vitaceae, including the American, Eurasian, and Asian groups, shared more physical features during the late Tertiary period, 50 million years ago, than now. Possibly, this plant even traces its ancestry back much earlier—to *Ampelopsis*, a climbing vine of 500 million years ago. With the breakup of the single landmass (Pangaea) and a gradual distancing of the continents from one another, however, the individual groups emerged. More recently, increasing desertification in Central Asia, North Africa, and North America and other natural barriers have isolated populations and led to the approximately 100 modern species thus far described.

Just as they were with the mollusks and their purple dye, humans certainly would have been acquainted with the wild Eurasian grapevine and its peculiar fruit at a very early date. Groups of human

beings (*Homo sapiens*) migrated from East Africa about 2 million years ago, across the natural land bridge of the Sinai Peninsula into the Middle East. Their first encounter with the wild grape might have been in the upland regions of eastern Turkey, northern Syria, or northwestern Iran. Perhaps they saw the plant in a more southerly locale—the Hill Country of Palestine and Israel or the Transjordanian Highlands—because of moister conditions prevailing during interglacial periods than at present.

The general framework that brings human and grapevine together for the first time in the Paleolithic period also leads to a set of postulates about the discovery of wine, which is conveniently referred to as the Paleolithic Hypothesis. It was seriously entertained and debated at a watershed conference titled "The Origins and Ancient History of Wine" at the Robert Mondavi Winery in 1991 (see chapter 3).

One can imagine a group of early humans foraging in a river valley or upland forest, dense with vegetation, at some distance from their cave dwelling or other shelter. They are captivated by the brightly colored berries that hang in large clusters from thickets of vines that cover the deciduous or evergreen trees. They pick the grapes and tentatively taste them. They are enticed by the tart, sugary taste of the grapes to pick more. They gather up as many of the berries as possible, perhaps into an animal hide or even a wooden container that has been crudely hollowed out. A hollow or crevice in the rock might also serve the purpose. Depending on the grapes' ripeness, the skins of some rupture and exude their juice, under the accumulated weight of the grape mass. If the grapes are then left in their "container," gradually being eaten over the next day or two, this juice will ferment, owing to the natural yeast "bloom" on the skins, and become a low-alcoholic wine. Reaching the bottom of "barrel," our imagined caveman or -woman will dabble a finger in the concoction, lick it, and be pleasantly surprised by the aromatic and mildly intoxicating beverage that has been produced accidentally. More intentional squeezings and tastings might well ensue.

Other circumstances could have spurred on the discovery. Many animals, especially birds, have a fondness for grapes, probably as a result of their having occupied the same ecological niches as the grapevine since at least the Tertiary period. Under the right climatic

conditions, grapes will ferment on the vine. The berries are attacked by molds, which concentrate the sugar and open up the grape to fermentative attack by the natural yeast, to yield an even higher alcoholic product than normal. As an aside, the deliberate use of a mold to a make a late-harvest, ambrosia-like wine had to wait another million years or more, when in the late seventeenth and eighteenth centuries A.D. both the Hungarians at Tokay and the Germans in the Rheingau took credit for discovering noble rot (*Botrytis cinerea*).

Observant humans, such as our prehistoric ancestors must have been to survive, would have seen birds and other mammals eagerly eating the fermented grapes. Their intrigue would have been aroused if they saw any ensuing uncoordinated muscular movements (robins have been known to fall off their perches). Sooner or later, humans would have carried out some firsthand experimentation.

Organisms as different as the fruit fly and the elephant gravitate to fermented fruits, and they have similar physiological responses. In the most general sense, their predilections are understandable because sugar fermentation (or glycolysis) is the earliest form of energy production for sustaining life. It is hypothesized that the earliest microbes dined on simple sugars in the primordial soup of 4 billion years ago and excreted ethanol and carbon dioxide. Yeast carry out a similar kind of anaerobic metabolism today, although they are hardly primitive; their single cells contain many of the same organelles as a multicellular plant or animal as well as a nucleus with chromosomes. Their ethanol production is like a signal sent up to the sugar lovers of the world, since this pungent, volatile compound leads back to a source of glucose or fructose.

Our common biological heritage with Stone Age humans, with a mental acuity similar to our own, strongly supports the Paleolithic Hypothesis. Yet it is extremely unlikely that the supposition will ever be proved. The greatest obstacle in the way of the Paleolithic Hypothesis is the improbability of ever finding a preserved container with intact ancient organics or microorganisms that can be identified as exclusively due to wine. In later chapters, we will see how fired clay (pottery) was ideal for absorbing and preserving ancient organic remains. The earliest fired clay artifacts—figurines in the form of

pregnant females from the site of Dolni Vestoniče in the Czech Republic—date to about 26,000 years ago. Yet, the figurines were a serendipitous discovery, isolated in time and space; no evidence has been found that they were followed up by the making of any pottery vessels. The earliest pottery containers as such were produced toward the end of the Paleolithic period at about 10,000 B.C. in East Asia and Japan.

If pottery vessels were nonexistent, might tightly woven baskets, leather bags, or wooden containers have been used? Again, although the occasional plaited grass or reed textile fragment or impression on clay may be found, a preserved specimen is yet to be recovered from a Paleolithic excavation. Stone vessels have been found, and, if the stone was porous enough, they might retain enough intact organic material to determine what they contained. Rock crevices in the vicinity of an encampment are another possibility, but they would be exposed to weathering and degradation. As yet, none of the stone vessels have been tested by molecular archaeological techniques (chapters 3 and 4). It should be noted that most such vessels are open bowls and do not have a narrow mouth that might have been stoppered. Any Paleolithic wine made in such a receptacle must have had a very restricted production schedule, only during the fall when the grapes matured, and must have been drunk quickly before it turned to vinegar. We might imagine it as a kind of Austrian Heurige or Beaujolais nouveau. The latter is the intensely fruity wine of the Saône River region of France that is produced by carbonic maceration and released to the public a few months after the harvest. In this fermentation process, whole grape clusters are piled into a vat (as the Paleolithic Hypothesis proposes) and the accumulated weight of the grapes above crushes those below. The free-run juice then begins to ferment because of the natural yeast present, setting up an anaerobic, carbon dioxide–rich environment that triggers the whole grapes to alter their metabolism and to break down their sugar reserves into alcohol.

Paleolithic humans would have had little control over the fermentation process. Their vessels, whatever they might have been made of, were not airtight. Carbonic maceration might have taken place at the bottom of the vessel, but the overripe grapes and juice, harboring

many other microorganisms, would have developed off odors and off tastes. The erratic fermentation would also have yielded less alcohol. Still, the final concoction or compote might have been quite stimulating and aromatic.

The analysis of Paleolithic stone vessels holds out the prospect of eventually determining where and perhaps how "Stone Age Beaujolais nouveau" was made. Its discovery might have taken place at many times and in many places within the geographic range of the wild Eurasian grapevine. One thing we can be sure of: once the delights of this new-found beverage were known, roaming bands of humans would return year after year to the same vines.

Whence the Domesticated Eurasian Grapevine?

Winemaking, whether in the Paleolithic period or in today's wineries with all the tools of the trade and means to preserve the product, is very much limited by the grapevine itself. The modern wild vine of Eurasia exists only in areas with relatively intact woodlands and sufficient water, but it is fast disappearing because of modern development. Studies of *Vitis vinifera* L. subsp. *sylvestris* are important, because as the living progenitor of the domesticated species and its numerous cultivars, it accounts for nearly the entire stock of the world's wine.

Between 1950 and the present, wild grape populations were botanically described in the upper Rhine River region; at Klosterneuberg near Vienna along the Danube River; in the mountains of Bulgaria; in the lush, almost tropical, lowlands of Georgia along the eastern Black Sea (ancient Colchis, where Jason sought the Golden Fleece); and in the oases of arid Central Asia. Collectively, these investigations underscore the fact that the primitive forms of *Vitis* of Tertiary times were possibly hermaphroditic plants like the modern domesticated *Vitis vinifera* L. subsp. *vinifera*. Thus, on either end of the long time span that *Vitis* has existed on the earth stands a grapevine that combines the male (stamen with anthers bearing pollen) and female (the pistil or ovary from which the seeds and fruit develop, after pollination) on the same flower. The advantages of this arrangement

are obvious: the pistil is readily fertilized by wind and gravity and bears fruit that falls to the ground or is eaten (largely by birds). The seeds germinate in the area of the parent plant or are transported and take root some distance away, perhaps hundreds or thousands of kilometers distant.

For reasons yet to be explained and possibly related to harsh climatic conditions during the last Ice Age, the wild grapevine became dioecious throughout its range; that is, the sexes were segregated from one another on separate plants. Each still had stamens and pistils, but in males, a dominant mutation of a gene on one of the 38 small nuclear chromosomes, found in all *Vitis* species, suppressed the development of the female organ (denoted Su^F). In females, a recessive mutation (Su^m) impeded the development of the male stamen. Cross-pollination under these circumstances is more difficult than for hermaphroditic plants and must be helped along by insects or other animals, including humans. As a result, the male flowers rarely produce any fruit, and, to make matters worse, the female fruit is highly variable in its palatability because of the genetic polymorphism of the plant. In general, the modern Eurasian wild grape produces a rather astringent, small fruit with many seeds, hardly the kind of grape for making a good wine. Its sugar is relatively low and acids are high, as compared with the domesticated Eurasian cultivars, and the skin of its fruit is tough. Wild grapes are black or dark red, rarely white.

In contrast with that of its wild ancestor, the fruit of the domesticated Eurasian plant almost defies description. Its berries can be large or small; spherical or elongated and date-shaped, like the Mare's Nipple of Central Asia; of almost any color in the visual spectrum; and with varying amounts and endless combinations of sugars, acids, and a host of other chemical compounds. It is no wonder that a Wine Aroma Wheel had to be developed to deal with the plethora of tastes and smells of which this grape is capable. The wine taster performs an almost Herculean feat by characterizing the fruit (Is it a fresh, tart grapefruit; a clean, mild apple; or a rich, succulent blackberry?), together with its spicy accents, earthy or woody undertones, and more oxidative, even caramelized qualities. The sheer number of cultivars or clonal types, which has been estimated to be as many as 10,000

worldwide, further testifies to the plant's pliable, almost chimeric nature.

Much of this diversity, of course, is very recent, and the result of choosing those traits that are desirable and propagating them by cuttings or rootings. The grapevine growing tip actually consists of a core and an outer epidermal layer comprising different genetic systems. With time, mutations of one sort and another—often deleterious—accumulate in these tissues. After a vine has been dormant because of shorter days and lower temperatures, growth is reinitiated not at the old tip but at new lateral shoots with different genetic histories and different characteristics.

Horticultural methods of selecting and propagating desirable traits—whether size, shape, juiciness, color, skin toughness, taste, or aroma—were unknown to our Stone Age forebears. Each wild Eurasian vine is highly individual because it derives from a single grape seed with a unique genetic heritage, resulting from the combination of male and female gametes from specific polymorphic plants. Even before nuances of grape taste and aroma were made, however, a more basic decision had to be made by the first "viticulturalist." A single individual probably had an intuitive insight and acted on the idea, as has happened for many other advances in human history. He or she had to select plants that had reverted to their primitive hermaphroditic state. Such plants might have been observed to produce a large and regular supply of fruit. But how could a population of largely dioecious plant be converted to one that was hermaphroditic and a guarantor of greater productivity? If propagation by cuttings or rootings was not yet known, a very concerted effort must have been made, perhaps over generations, to plant and nurture seeds of hermaphroditic vines. In short, the wild vine had to be taken into cultivation, thus beginning it on its way to become the domesticated Eurasian grapevine that we know today. Once the basic principles of interbreeding and transplanting were mastered, additional crosses could be made or germ plasm chosen that produced the traits desired. The goal might have been a sweeter eating grape; a sourer, more bitter grape for vinegar; or a wine grape with balanced sugar content and acidity.

When and Where Was Wine First Made?

The wild Eurasian grapevine has a range that extends over 6000 kilometers from east to west, from Central Asia to Spain, and some 1300 kilometers from north to south, from the Crimea to Northwest Africa. Somewhere in this vast region, the wild Eurasian grapevine was taken into cultivation and eventually domesticated, perhaps more than once and in more than one place. The plasticity of the plant and the inventiveness of humans might appear to argue for multiple domestications. But, if there was more than one domestication event, how does one account for the archaeological and historical evidence that the earliest wine was made in the upland, northern parts of the Near East? From there, according to the best substantiated scenario, it gradually spread to adjacent regions such as Egypt and Lower Mesopotamia (ca. 3500–3000 B.C.). Somewhat later (by 2200 B.C.), it was being enjoyed on Crete. Inexorably, the elixir of the ancient world made its way in temporal succession westward to Rome and its colonies and up the major rivers into Europe. From there, the prolific Eurasian grapevine spread to the New World, where it continues to intertwine itself with emerging economies.

Winemaking implies a whole constellation of the techniques beyond taking the wild grapevine into cultivation. The plants must be tended year-round to ensure that they are adequately watered and protected from animals, which might trample them, graze on the vegetation, or eat the fruit. Pests, such as mites, louses, fungi, and bacteria that the vine is subject to, might have been invisible or just barely perceptible to Stone Age humans, but an early viticulturalist would have observed the tell-tale signs of disease and have tried to find a solution. Perhaps, suspect plants were rooted up, or the healthy plants moved and segregated elsewhere. With increasing knowledge of horticulture and natural contingencies, growers established new plants with the desired characteristics. The magnitude of this accomplishment is accentuated by the fact that it takes five or six years before a young vine produces fruit. Other prerequisites of the technology probably were developed in tandem with vineyard management. Airtight vessels were needed to control the fermentation and

to prevent the beverage from becoming vinegar or otherwise spoiling. Subsidiary equipment, including hoes and cutting implements, vats for stomping out or pressing the grapes and separating the pomace from the must, funnels and sieves, and stoppers, were also essential.

The tool kit of a Paleolithic hunter-gatherer was well enough stocked with blades and pounders to squash grapes at the right time of the year and make wine. Yet the essentials of deliberate wine production—horticultural technique, pottery, and food-processing techniques such as fermentation—lay in the future. The Neolithic period, from about 8500 to 4000 B.C., is the first time in human prehistory when the necessary preconditions came together for the momentous innovation of viniculture. Numerous year-round villages had been established by this time in the Near East, especially in upland regions bordering the Fertile Crescent—the foothills of the Zagros Mountains bordering the Tigris and Euphrates Rivers on the east, Transcaucasia to the north, and the upland plateaus descending from the Taurus Mountains in eastern Turkey.

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