The present-day emphasis of horticulture and health is an extension of ancient and medieval traditions. The relationship of healing and the horticultural arts predates written history and relates to ancient wisdom, custom, and folklore. The use of herbs as medicine may be part of animal instinct. Sick animals tend to forage plants rich in secondary metabolites such as tannins and alkaloids. Because these phytochemicals often have antiviral, antibacterial, antifungal, and antithrombinic properties, these wild animals may be self-medicating (Engel, 2002). The uses of herbal medicine may predate the evolutionary development of Homo sapiens based on the discovery of pollen of common herbs in Neanderthal graves at Shanidar Caves in Kurdistan, Iraq (Solecki, 1975; Solecki et al., 2004). The prehistoric discovery that certain plants cause harm and others have curative powers is the origin of the healing professions and its practitioners (priest, shaman, physician, and apothecary) as well as the professions devoted to plants (botany, pharmacy, and horticulture). The Iceman, a Bronze Age man from ≈5300 years ago murdered in the Italian Alps, carried a birch fungus attached to a leather thong probably for medicinal use.

HEALTH AND HORTICULTURE

The relationships between plants and health have been and continue to be of great concern for humankind considering both diet and medicinal uses. 

Antiquity. Plant cures as well as nutrition became part of ancient medicine based on the philosophical concepts in ancient civilizations, including those of Sumer, Babylonia, Greece, China, and India (Galambos, 1996; Hsu et al., 1986; Janick, 2003). Each of these medical systems developed a strong nexus with nutrition and medicinal plants. Health was found to be promoted by the consumption of vegetables, fruits, and herbs; well-being was rationally based on nutrition.

The earliest medicobotanical treatises of the West date to antiquity (Janick, 2003). In the Middle East, a Sumerian tablet from ≈2100 BCE contains a dozen prescriptions and describes plant sources from the ancient Nile Valley. Historical fragments of documents from ancient Egyptians such as the Ebers Papyrus and the Edwin Smith Papyrus contain descriptions of the use of herbs as medicine (Scholl, 2002). The Ebers Papyrus (1550 BCE), a 110-page scroll ≈20 m long, lists more than 700 formulae and remedies, although it is primarily a medical treatise on the heart. Herbal remedies for asthma and bowel problems are illustrated in the Smith Papyrus. From a fragment of a textbook on trauma surgery from ≈1800 BCE, includes the prevention and curing of infection with honey and bread mold.

Greek medicine. Asklepios, the Greek god of medicine and healing [his daughters were named Hygieia (health), Laso (medicine), Aceso (healing), Egle (healthy glow), and Panaceae (universal remedy)], became associated with healing temples that incorporated medicinal herbs (Arikha, 2007). Knowledge of plants that cured was practiced by root diggers (rhizotomoi), which led to the ancient Greek tradition of herbal medicine. Drug merchants (pharacopuloi), derived from the Greek word for remedy or drug, gave rise to the word pharmacy. The great botanical treatise Enquiry into Plants of Theophrastus, written in the fifth century BCE, devotes Book IX to the medicinal value of herbs. The school of the Greek philosopher Hippocrates (460 to 377 BCE), now considered the Father of Medicine, mentions almost 400 medicinal herbs (Collins, 2000).

Hippocrates proposed that health was based on a balance of humors—three observable entities, phlegm, blood, and yellow bile, and a theoretic entity, black bile (Arikha, 2007) The concept of the humors was based on observational experience related to observation of symptoms (Bates, 1995; Collins, 2000). For example, phlegm was a general term for bodily fluids such as cerebrospinal fluid, saliva, nasal mucus, gastric juices, semen, and menstrual blood. The concept of humorism was that the “humoral” condition resulted in pain or disease. The Greeks associated significance to the number four. Thus, each of the four humors was associated with four temperaments or complexio: the phlegmatic, the sanguine, the choleric, and the melancholic. The humors also correlated to four qualities (hot, dry, cold, wet), each varying in four degrees of intensity as well as to the four seasons and the four ages of man—infancy, youth, adulthood, and old age (Fig. 1).

The medical concepts of Hippocrates were further developed by Galen (129 to 200 CE) who proposed six causes (called “non-naturals” in the Latin translations) that influence health: food and drink, ambient air, movement and rest, sleep and wakefulness, elimination and retention, and psychological states. These concepts, adopted, elaborated on, and further developed by Byzantine and Arab physicians, dominated medicine until the 18th century. For a medical practitioner, a patient’s role was to diagnose the elements responsible for the loss of balance and design a treatment with elements having opposite characteristics to those of the defecting humor according to the compensation principle contraria contrarís (Ullmann, 1978).

Eastern medicine. The amount of ancient medical scholarship was greater in the East than in the West. In the East, there are two dominant traditions, Chinese medicine and Indian medicine, known as Ayurveda, “the science of life.” In prehistoric China, people of the Hsia and Shang dynasties used prayer in treating the sick (Hsu et al., 1996). Of 180,000 separate oracle bones (chia-ku-wen), 36 pieces recorded the names of diseases but mention only prayers for healing with no reference to herbal cures. The Chinese developed a legendary history and dates are suppositions (Galambos, 1996). The founder of Chinese agriculture and medical botany is the mythical emperor Shen-Nung (traditional dates 2737 to 2697 BCE). Cited in the first millennium, he is known as the “Divine Cultivator” of the five grains, inventor of the plow and soil testing for suitable crops, the originator of ceremonies associated with sowing vegetables and grains, and the supposed author of the renowned pharmacopoeia, Pen T‘soo Ching (The Classic Herbal), compiled in the first century.

In traditional Chinese teaching, the beginning of the healing arts was associated
with the legendary Huangdi, the Yellow Emperor, ~2600 BCE. His name is associated with the start of raising silkworms, origination of boats and carriages, and the invention of writing, music, and medicine. The Huangdi neijing, or the Yellow Emperor’s Inner Classic, is the fundamental text for Chinese medicine. In 1973, 14 medicinal classics were excavated from Tomb III of the Mawangdui site in Changsha, Hunan Province (Galambos, 1996; Hsu et al., 1996). These documents, written on silk and bamboo slips, describe 52 diseases, and 247 herbs contributing to the restoration of the patient’s balance. Ancient Greek medicine may have influenced Ayurvedic medicine, or vice versa, because of the striking similarities of both the bodily humors (corresponding to bile), and kapha (corresponding to phlegm). Clearly, the concepts of Greek and Indian medicine are strikingly similar. The familiarity of the Greeks during the Hippocratic era with black pepper, native to India, indicates an early interchange between these two ancient cultures (Arikha, 2007).

The herbal tradition. The Greek herbal Peri Ylis Iatrikis (De Materia Medica in Latin; Of Medical Matters in English) written by Pedanios Dioscorides of Anazarba, a Roman army physician, in the Year 65, listed health-giving properties of over 500 plants, many of which were to become horticultural crops (Beck, 2005). This medical treatise, one of the most famous ever written, was slavesly referred to, copied, and commented on for 1500 years. Compendia focused on plants, their properties and virtues, based on the Dioscoridean tradition, were referred to as herbals in medieval and Renaissance times, and were invaluable resources for the physician and apothecary (Collins, 2000; Janick, 2003). The great epoch of printed herbals started in the late 15th century, principally by German, Flemish, Italian, French, and English authors. The most notable herbals include: Das Buch zu Distillieren, 1500; by Hieronymus Brunschwig; Herbarum Plantae Icones, 1530, 1532, and 1536, by Otto Brunfels; Kreutzer Buch, 1546, by Hieronymus Bock; De Historia Stirpium, 1542, of Leonhart Fuchs; New Herbal, 1551, 1562, and 1568, by William Turner; Commentarii, 1544, by Pier Andrea Matthioli; Cróydeboec, 1554, by Rembert Dodoens; and the Herball, 1597, by John Gerard. It culminated in the great compendia of Bauhin, 1651, and Chabrey, 1666. In these Renaissance herbals, vegetables, fruits, and herbs were principally considered for their medicinal properties.

Botany and medicine were essentially in step until the 18th century, when both arts turned scientific and, from this juncture, botanical works would essentially ignore medicinal uses while medical works were devoid of plant lore, yet the medicinal use of plants continues as an alternate form of medicine and remains popular to the present day despite the questionable efficacy of many popular herbs and the reliance of many herbal recommendations on superstition and astrology. The fact that most drugs were originally plant-based has encouraged a new look at the medicinal properties of plants from traditional medicine.

Horticulture and nutrition. The modern system of horticulture and nutrition based on modern science is a relatively new science. Its beginnings date to the ancient discovery that fresh plant food could counteract the dreadful consequences of scurvy, a disease not known to be the result of a lack of L-ascorbic acid (Vitamin C) in the diet. As early as 1617, citrus was recommended for the British navy and by the end of the 18th century, limes and sauerkraut were shown to be antiscorbutic. In the 20th century, scientific research demonstrated the occurrence of various vitamins (a word derived from vital amines) or substances required in tiny amounts by various organisms, including humans (Desjardins, 2008; Finley, 2005; Goldman, 2003). Subsequently, fruits and vegetables were shown to be good sources of various vitamins. Recently, various substances in vegetables, including antioxidants, carotenoids, flavonoids, glucoisolates, polyphenols, polysaccharides, organic acids, and lipids, have been associated as protective agents against certain diseases. The concept of functional foods has been established and the benefits are under intense study but still not clearly understood or established.

THE WORKSHOP

This workshop, organized by the History of Horticultural Science Working Group of the American Society for Horticultural Science, included three presentations with the goal of drawing attention to the historical connection between horticulture and health. Articles from two of these presentations are presented here. The first article, by Kim Hummer (Rubus Pharmacology: Antiquity to the Present), discusses the changing relationship of brambles to health from antiquity to the present based on ancient manuscripts (Hummer and Janick, 2007). The second article, coauthored by Jules Janick, Marie-Christine Daunay, and Harry S. Paris (Tocumen Santitas: Medieval Horticulture and Health), discusses an illustrated manuscript from the late Middle Ages, now located in the Austrian National Library (Daunay et al., 2009; Janick et al., 2009; Paris et al., 2009), that provides information on the interrelationship of horticulture, medicine, and health and makes it possible to compare and

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Fig. 1. Cosmology of ancient medicine based on Hippocrates and Galen (Source: Bovey, 2005).
contrast medieval and modern concerns about this relationship. The third presentation, by Douglas Holland (The Library Collection of the Missouri Botanical Garden; A Resource for Historical Literature on Health and Horticulture), provided information on the early resources of great botanical literature on the subject of health, horticulture, and medicine.

**Literature Cited**


