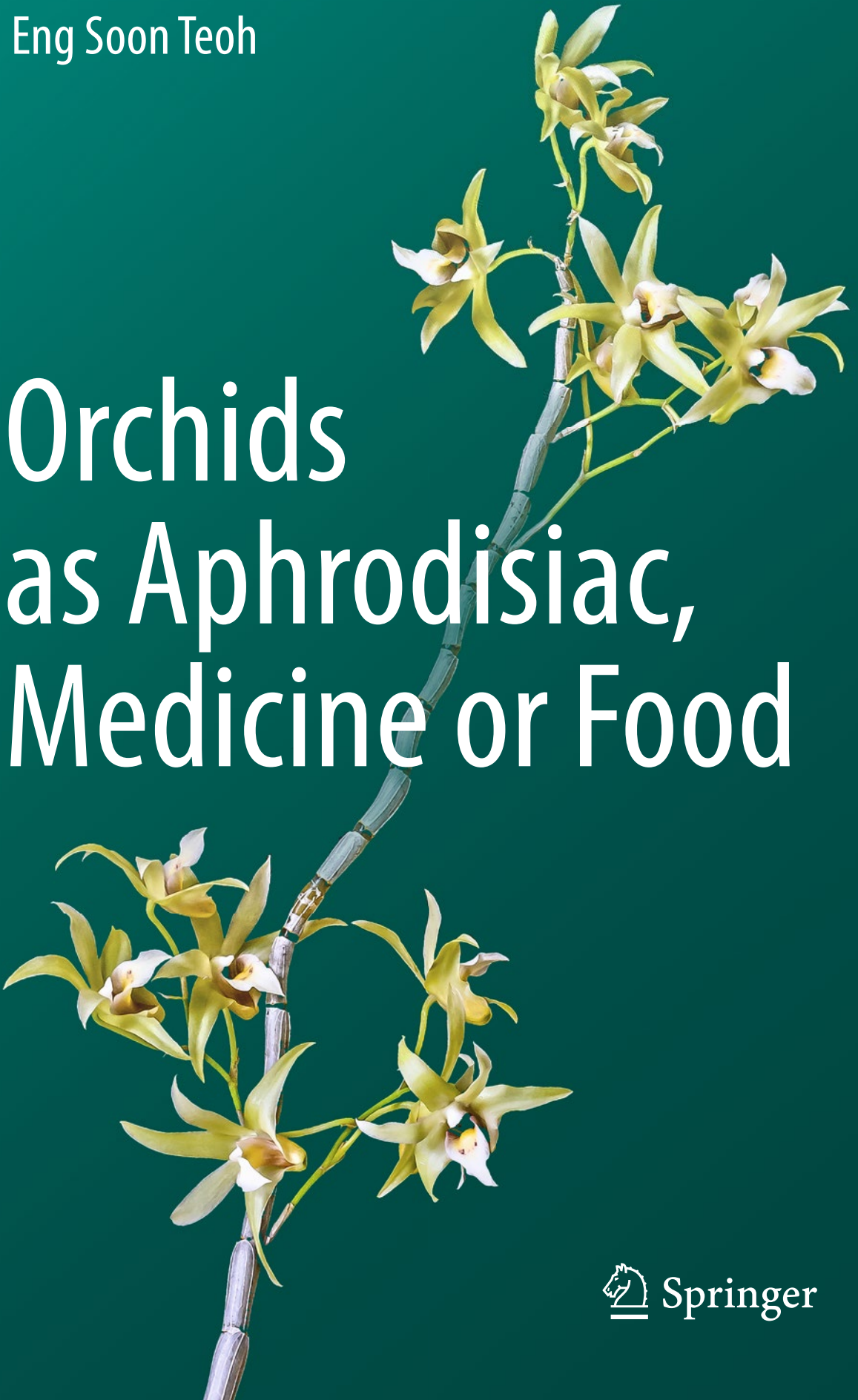
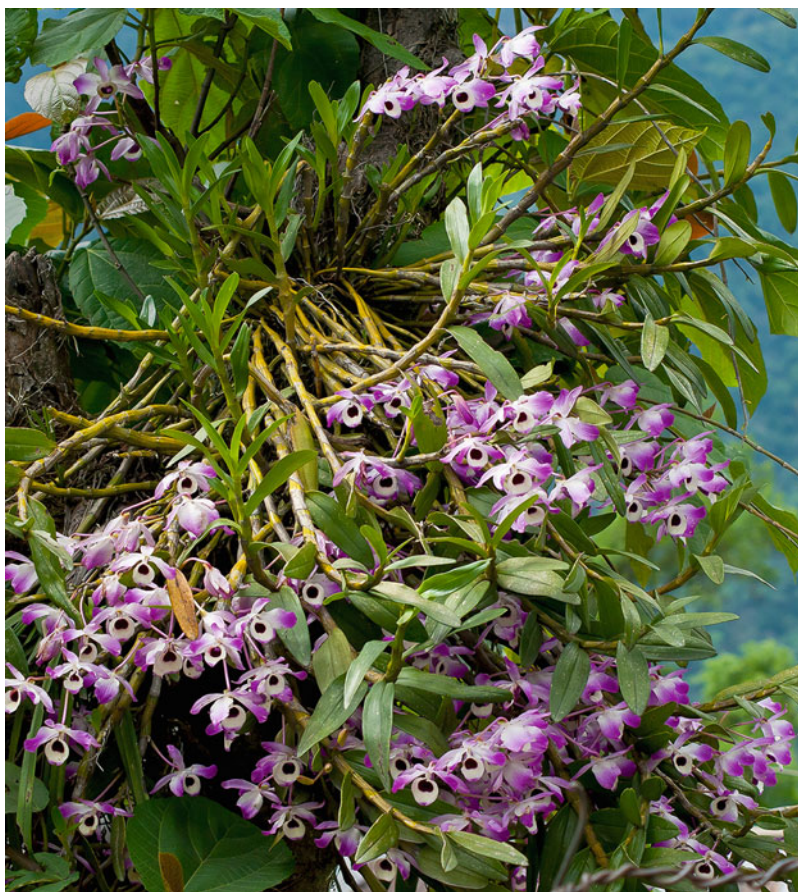


Eng Soon Teoh

Orchids as Aphrodisiac, Medicine or Food



Orchids as Aphrodisiac, Medicine or Food



Dendrobium nobile flowering in April on a tree in Sikkim, India. Pseudobulbs of this beautiful, popular orchid are employed medicinally as *shihu* in China. Although the species is widely distributed, its existence in nature is

now under threat because of over-collection from the forests of southern China and the adjacent countries. (©Teoh Eng Soon 2019. All Rights Reserved.)

Eng Soon Teoh

Orchids as Aphrodisiac, Medicine or Food

Eng Soon Teoh
Singapore, Singapore

ISBN 978-3-030-18254-0 ISBN 978-3-030-18255-7 (eBook)
<https://doi.org/10.1007/978-3-030-18255-7>

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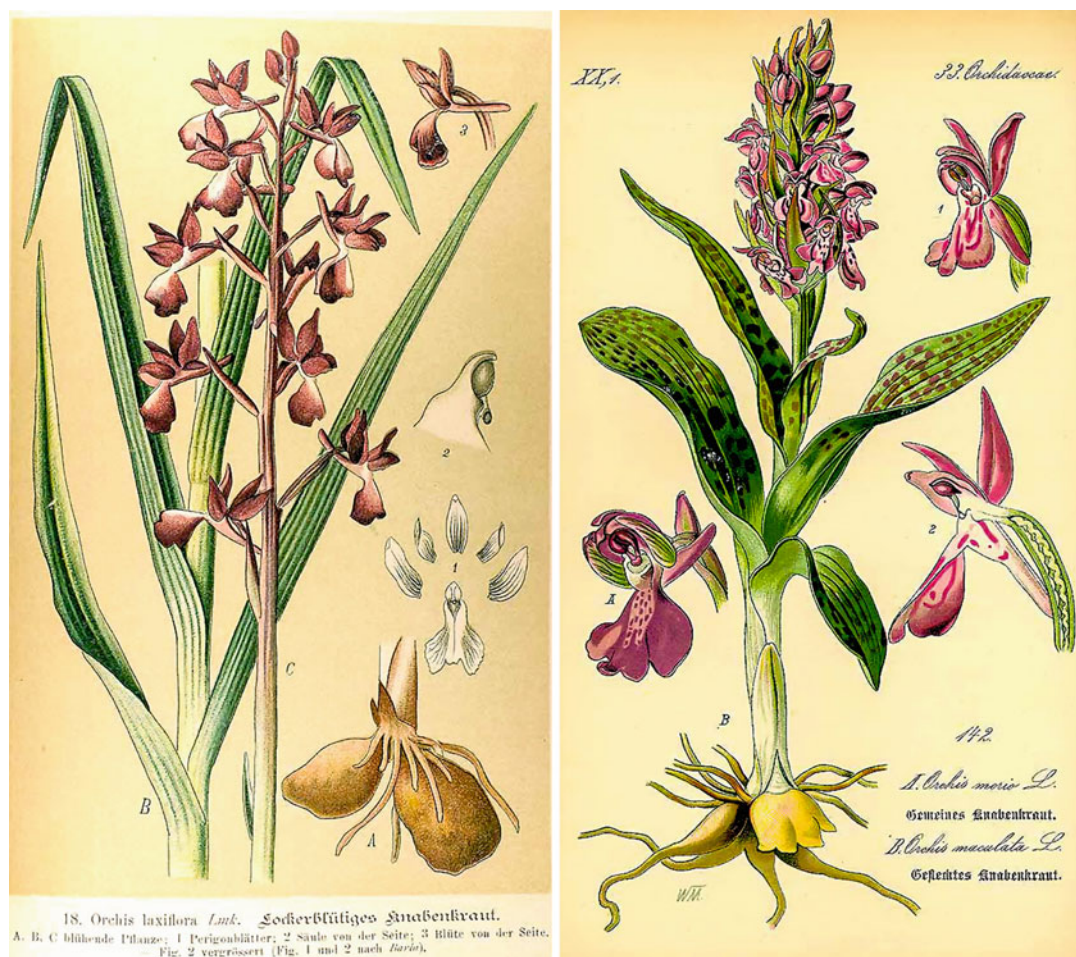
for Phaik Khuan, John, Kristine, Chrissie and Ning

Preface

Orchids are more than pretty exotic flowers. For thousands of years, some orchid species have played an important role in traditional herbal medicine in China, India and Europe. Even today several hundred orchid species are employed medicinally to treat injuries and disease or as food and delicacies all over the world. Vanilla, a favourite flavour with the Aztecs and now ubiquitous in Western confectionary, is derived from an orchid fruit.

Recently, the modernization of China has wrought a paradigm shift in the development and practice of Traditional Chinese Medicine. Not only are new modalities being employed for diagnosis and treatment, scientists are scrutinizing ancient remedies at the molecular level to determine whether they actually contain useful compounds and, if they do, their modes of action. In the process, new potential uses are being discovered. Numerous compounds present in orchids act against viruses, bacteria, fungi, protozoa and worms. Other compounds are toxic to cancer cells, causing programmed cell death (apoptosis); depriving malignant cells of their blood supply; or preventing their spread. Some orchid phytochemicals protect against liver damage, brain damage and ultraviolet damage to skin; lower blood sugar; promote fetal lung maturation; and prevent osteoporosis. Every week, new information is appearing in scientific journals. However, most of the excitement is confined within the laboratory. Clinical trials are few and far between. They need to be properly designed and performed.

Globalization, rapid communication and a fast pace of life are rapidly eliminating distinctive cultures and creating homogenous stereotypic communities. Whether in cities or in tribal settlements, people no longer receive detailed knowledge of their past and sometimes they do not make an effort to look after and preserve nature's bounty. Knowledge of ethnomedicine is fast disappearing. Thus, there is a need to discover and record all that was known in the past about medicinal orchid usage before orchids become mere toys for gardening hobbyists or flowers for decoration. I do not deny the importance of the latter, being a fancier of orchids myself, but we should always look beyond horticulture and attempt to realize every potential in the orchids. This transitional period when traditional practices meet science offers many opportunities to the scientist and to traditional healers.



Three Mediterranean terrestrial orchids with tubers that were touted as aphrodisiacs for nearly two millennia. Left: *Anacamptis laxiflora*. From: Schultze M, *Die Orchidaceen Deutschlands, Deutsch-Oesterreichs und der Schweiz*, t. 18 (1894). Right: *Anacamptis morio* [as

Orchis morio, Fig. A]; and *Dactylorhiza maculata* [as *Orchis maculata*, Fig. B]. From: Thome OW, *Flora von Deutschland Österreich und der Schweiz, Tafeln*, vol. 1: t.142 (1885)

Five groups of herbal orchids that are of the greatest economic importance and with the longest recorded history of usage are individually described in separate chapters to demonstrate how studies should be conducted on the remaining 800 medicinal orchid species. These five items are *Tianma*, *Shihu*, *Baiji*, *Salep* and *Vanilla*.

Whereas an effort is made to provide an overview of medicinal orchids throughout the world, more comprehensive information about such usage in Meso and South America might only be available from Spanish and Portuguese sources which are not accessible to the author. Other than South Africa, tribal usage in many parts of that continent has not been properly studied and records of usage in much of Indonesia, Papua New Guinea and Australia are not as extensive as those of continental Asia. The approximately

200 medicinal orchid species with localized provincial usage in China are not discussed in this book. Interested readers may refer to my *Medicinal Orchids of Asia* (Springer 2016) where they are individually described in detail.

I made an exception with Xizang Province (Tibet) because *bcud len* is unique in its original application by hermits striving for spiritual advancement and survival while dwelling in remote caves. I am grateful to Charles Oliphant, PhD, for introducing me to this secret Tibetan practice of *bcud len* and the opportunity to read his thesis which revealed another unique aspect of medicinal orchid usage. This is discussed in Chap. 5.

Grateful thanks are due to Henry Oakeley, MD, FRCP, for valuable advice on my first few chapters and his photographs of European orchid species; Professor Ong Siew Chey, MD, Wu Dongyun, MD, Janet Loh and Sohjardto Wibowo, MD, for assistance with the translations of Chinese and Dutch texts; Joseph Arditti, PhD, Tan Wee Kiat, PhD, Tim Yam, PhD, Hew Choy Sin, PhD, and Chang Yoon Ching, PhD, and numerous research scientists whose papers we have quoted for making available resource materials; and also the library staff of the Singapore Botanic Gardens, in particular Christina Loh and Zakiah bte Agil. I also wish to thank Bhakta Bahadur Raskoti, PhD, and Professor Lokesh Shakya and Professor S.K. Ghimire for supplying me with photographs of some Nepali medicinal orchids; Professor Luo Yibo, PhD, for photos of cultivation and conservation of *Dendrobium* in China; Professor Huang Weichang for photographs of *Bletilla* species; the late Peter O'Byrne for rare southeast Asian species; Seol-Jong Kim for his photos of *chikanda*; Todd Boland for the photographs of Canadian *Cypripedium*; Nima Gyeltshen for photographs of Bhutanese *Cypripediums*; Mak Chin On; the late Professor Rapee Sagarik, Apichart, Nantiya Vaddhanaphuti, PhD, Santi Watthana, PhD, Suyanee Vessabutr, PhD, and Peter Williams for showing me Thai native orchids; Irawati, PhD, for orchids at Bogor; Michael Ooi for the orchids at Gunong Jerai; Cheah Wah Sang, Tan Eng Khoon, Robert Ang, Tony Tan and many friends in Peninsular Malaysia; Rajendra Yonzon, PhD, for the orchids of Sikkim; Udai Pradhan and Ganesh Pradhan for orchids in Kalimpong; Ngawang Gyeltshen and Nima Gyeltshen for the orchids of Bhutan; and Teo Peng Seng, Phua Gik Song, Neo Tuan Hong, Christopher Teo, John Elliott, PhD, and other members of the Orchid Society of Southeast Asia for access to their flowering plants. Publications by researchers in Africa, the Americas and Australia are primary sources of my chapters on medicinal orchids from these regions, and I am thankful to their authors for the opportunity to study their material. In keeping with the historical perspective of this book, I made extensive use of classic botanical illustrations, and I am grateful to Plant Illustrations Organization and Missouri Botanic Gardens for access to their rich resources.

I hope this book will expand the interest of nature lovers in orchids and provide material for students of ethnobotany. It is not to be regarded as a text of complementary medicine. The great majority of reports on medicinal orchid usage are based on interviews with village elders, herbalists and traders and should therefore be regarded as hearsay or anecdotes: few researchers

witnessed actual treatments and followed the results. There is a dearth of sound scientific and clinical studies or population surveys on the actual effects of orchids on humans.

In the absence of such evidence, I do not endorse the use of orchids as aphrodisiac or medicine.

Singapore
2019

Eng Soon Teoh, MD

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About the Author



Eng Soon Teoh is a gynaecologist practising in Singapore and a past president of the Orchid Society of Southeast Asia. A long involvement in laboratory and clinical research and a 50-year experience in growing orchids provided him with the necessary knowledge and experience to review the topic of medicinal orchids. Dr. Teoh has published numerous papers in peer-reviewed medical journals and was a recipient of several local and international medical awards. He also wrote books on Pregnancy, Infertility and Menopause for the general public. Pregnancy went into eight reprints and Menopause received the top award for Non-Fiction in Singapore. Another best-selling book was *Orchids of Asia* which sold 25,000 copies. His latest book, *Medicinal Orchids of Asia* published by Springer in 2016 has been well received. Orchids as Aphrodisiac, Medicine or Food is a companion to the former, more technical book.

Orchids as Medicine: A Historical Overview

It was not so long ago that modern pharmacopoeia, such as the British Pharmacopoeia (BP), United States Pharmacopoeia (USP), German and Russian Pharmacopoeia and other European Pharmacopoeia, contained prescriptions which specified the use of orchids to treat various medical conditions, for instance, extract of *Cypripedium* for nerve disorders and salep (terrestrial orchid tubers) as nutrient for the infirm (Fig. 1.1).

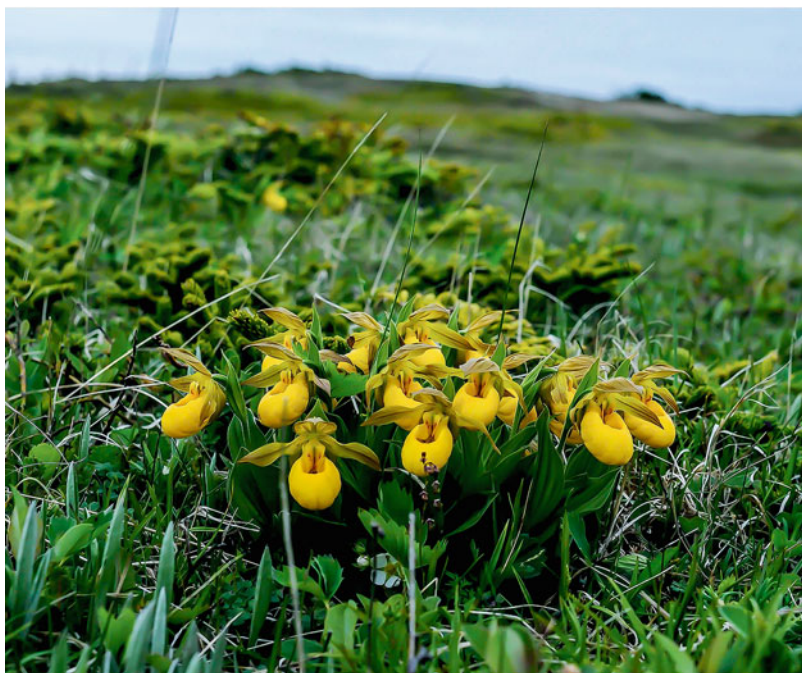
Egyptian medical papyri are the oldest medical text still extant. They are from the early days of the Second Millennium BCE and predate the Exodus. Ancient Egyptians believed, as many cultures did, that diseases were caused by demons and rituals were required to obtain a cure. The taking or application of medicines was supplementary; nevertheless, hundreds of herbs and minerals were employed. The presence of an orchid among these drugs has not been suggested. The Bible also failed to mention an orchid.

Shen Nong Bencao Jing, the oldest Chinese herbal (or *Materia Medica*), is attributed to the Chinese father of agriculture and herbalist who promoted the cultivation of various cereals according to climate and soil and the necessity to include soya. It was alleged that he personally tasted every single herb before recommending its use. Of the herbs mentioned in *Shen Nong Bencao Jing*, there are four orchids, *Chih Jian*

(*Gastrodia elata*), *Baiji* (*Bletilla striata*) and *Shih Hu*, the last consisting of two orchids, *Dendrobium officinale* (syn. *Dendrobium catenatum*) and *Dendrobium moniliforme*. The earliest copy of this *Herbal* dates back to the first century CE (Han Dynasty), but it still influences the practice of Traditional Chinese Medicine (TCM). In his vastly expanded Chinese pharmacopoeia, *Bencao Gangmu*, compiled during the Ming Dynasty (1368–1644), Li Shizhen (1518–1593) included *Dendrobium nobile* and other *Dendrobium* species for use as *Shih Hu* (Figs. 1.2 and 1.3).

The wisdom of *Shen Nong Bencao Jing* is demonstrated in its description of the five divine crops, four cereals which are individually suited to separate geographic locations in China: rice which grows in the warm, wet south; wheat suited for a cooler climate; millet which requires very little water and barley which completes its life cycle in 3 months and is thus eminently suitable for places like Tibet; and finally, soya bean, a non-cereal. What was not known before the discovery by modern science was that of the eight essential amino acids that form the protein matrix in human and which humans cannot manufacture, rice contains only seven. But soya bean provides the missing essential amino acid. Whether similar wisdom exists in the medicinal herbs enumerated remains to be investigated. TCM claims that *Chih Jian* is neuro-protective, whereas *Baiji* stops bleeding and heals wounds. Among its several

Fig. 1.1 *Cypripedium parviflorum* (yellow moccasin orchid) was used by North American Indians to treat disorders of the nervous system. It was also employed by early European settlers in North America and eventually found its way into the official pharmacopoeia of the United States, Great Britain, several European countries and even India. (Photo: Todd Boland)



properties, *Shih Hu* restores kidney *yin*, which one could interpret as a euphemism for having aphrodisiac properties. Scientists in China are actively studying the four medicinal orchids.

Mankind has always been interested in aphrodisiacs. According to the *Theory of Signatures* propounded by ancient Greek Medicine, the appearance of a herb determines its properties. Tubers of many Mediterranean orchids resemble testicles. The word ‘orchid’ itself is derived from the Greek word *orchis* (testicle). Alluding to its aphrodisiacal property, another name for orchids was *Satyrion* (Latin *Satyr* and *ion*, resulting in the state of a Satyr). Greek, Roman and Arab herbalists and a historian of great repute reinforced this belief in their publications, sometimes with lurid anecdotes. Salep bars flourished in European towns and villages until the new trade routes brought in tea, coffee and chocolate from far-flung countries, and science disproved the value of salep (Figs. 1.4 and 1.5).

Meanwhile, cities along the ancient Eurasian trade routes, such as Samarkand, Constantinople, Genoa and Venice, grew rich by trading in spices, silk and other exotic luxuries and by taxing merchants during their passage. Venice was the entry point for spices to Europe: it controlled the trade from the eight to the fifteenth century.

The maritime route was faster and reduced the burden of taxes that traders had to pay at overland city stops. However, this route was initially controlled by Arabs and later by Ottoman Turks. It brought great wealth to the Abbasid Caliphate. The need to pay heavy duty to a Muslim nation was resented by Catholic Europe, but only Spain and Portugal made attempts to bypass the established trade route.

When Christopher Columbus proposed sailing west across the uncharted Atlantic Ocean, nobody in Portugal, Venice or Genoa agreed to support him. Spain’s Isabella did. Spain was rewarded by the Pope with all the land in the west, but in a later treaty, Brazil was given to Portugal. This appears



Fig. 1.2 Shen Nong as the Father of Agriculture. Chinese woodcut

to be a family matter because King Manuel I of Portugal was the son-in-law of Ferdinand and Isabella of Spain.

The Aztec, Mayan and Inca civilizations in the New World were annihilated by Spanish conquistadors who apparently became psychotic when they saw the abundance of gold: that and the introduction of old-world diseases to which new world natives were not immune. Moctezuma offered Cortez chocolate flavoured with vanilla, but he was told that the Spaniards ‘suffered from a disease of the heart that could only be eliminated by gold’. Brought to Europe, vanilla was promoted as an aphrodisiac. Elizabeth I loved it. Her physician told her it could be added to any food. Today vanilla is ubiquitous in confectionery and other foods (Fig. 1.6).



Fig. 1.3 Shen Nong. The legendary herbalist tasted so many poisonous herbs daily that bumps appeared on his head

Francisco Hernandez de Toledo, naturalist and physician to Philip II of Spain, led a scientific expedition to investigate the medicinal plants of the New World from 1570 to 1577. He returned with vanilla, pineapple, cocoa, maize, passion-fruit, hallucinogenic plants and seeds. A 1628 Latin redaction of his writings entitled *Rerum medicarum Novae Hispaniae thesaurus* published in Rome is regarded as the first botanical work from the Americas. It was originally published in Mexico in 1615. But, in fact, two native Mexican Catholic monks, Martinus de la Cruz and Johannus Badanius, had brought out an illustrated *Herbal* in Latin very much earlier in 1558. This Codex de la Cruz-Badanius was given to King Charles V (reigned as Holy Roman Emperor 1519–1556) and later to Cardinal Francesco Barberini when he visited the king. Bias against native efforts at that time probably caused the book to remain unknown and hidden in the Vatican Library until it was discovered by



Fig. 1.4 Page from Dioscorides, *Materia Medica* illustrating *Anacamptis morio*, one of many aphrodisiac orchids

Charles Upson Clark, a history professor from Columbia University in 1929. Similar works recording medicinal knowledge of Mayan and Inca civilizations do not exist. Most of the Mayan Codices were consecrated to fire by a bigoted Franciscan bishop in 1562, and fragments that remain do not contain any botanical information of value. In remote Central and South

American villages today, people still believe that disease is caused by spirits and herbal cures usually involve magic and shamans. Around 65 to 70 species of orchids are recorded to have medicinal usage in Meso and South America.

North American Indians also employed orchids for healing. Various *Cypripedium* species were used to treat anxiety, hysteria, fits, spasms

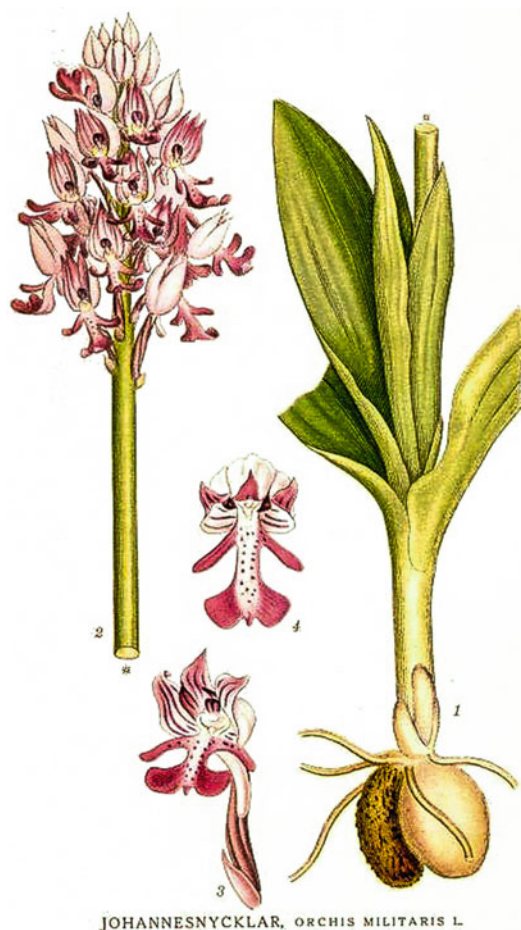


Fig. 1.5 *Orchis militaris*. From: Lindman GAM, *Bilder ur Nordens Flora*, vol. 2, t. 402 (1922–1928)

and other disorders affecting the nerves. Early European settlers relied on such Indian remedies because they seldom had enough medicinal supplies from Europe. Orchid remedies were included in the official *Pharmacopoeia of the United States* until the twentieth century. *Cypripedium parviflorum* and *Cypripedium pubescens* were also included as a nerve medicine in British and several European pharmacopoeia. Depending on where they lived, North American Indians would be familiar with different orchid species, and accordingly, different plants were employed by widely separated tribes. Altogether, about two dozen North American orchids are employed in native tribal medicine (Fig. 1.7).

Portugal was also a sea-faring nation. King Manuel was the son-in-law of Spain's Ferdinand and Isabella. Not wanting to be outdone by his in-laws, he sponsored an effort to discover a new route to India by going round Africa. Vasco de Gama managed to round the Cape of Good Hope and reach Calicut in 1498. At Calicut, de Gama treated the natives with appalling cruelty, in one instance, setting fire to a pilgrim boat and watching women and children set ablaze or drown. In this manner, he managed take over control of the spice trade in this trading centre.

In 1581 the provinces of the Netherlands declared independence from Spain. The Dutch were a hardworking, innovative, entrepreneurial and sea-faring people. Following the formation of the Dutch East India Company (VOC) in 1602, the militant Dutch navy rapidly expelled the Portuguese from the Malay Archipelago and the Malabar Coast, leaving Portugal with small enclaves like Malacca and Goa. During her occupation of the East Indies and Malabar, VOC produced a doctor, a unique biologist with no formal training in science and a military administrator, all turned naturalists who made immortal contributions to botany and medicine.

A few years after being dispatched as midshipman and ensign to Amboin in 1654, Rumphius (Georg Eberhard Rumpf, 1627–1702) was given dispensation by the Governor-General in Batavia that enabled him to study the flora and fauna of the region. Despite going blind because of glaucoma, losing his wife and daughter in an earthquake, having part of his library destroyed by fire and losing the first version of his manuscript when the ship carrying it was sunk by the French navy, Rumphius managed to produce a second version of the *Herbarium Amboinense* which contained descriptions of 1200 species accompanied by line drawings of 350 plants. Rumphius described 35 orchids. (When Karel Heyne sent collectors to search for useful Indonesian plants during the 1900s, he only managed to add seven orchid species to the list.) Rumphius had help from many people, including his wife Susanna and his son Paul August who was an artist. For economic reasons, the VOC did not immediately set about to publish the work.

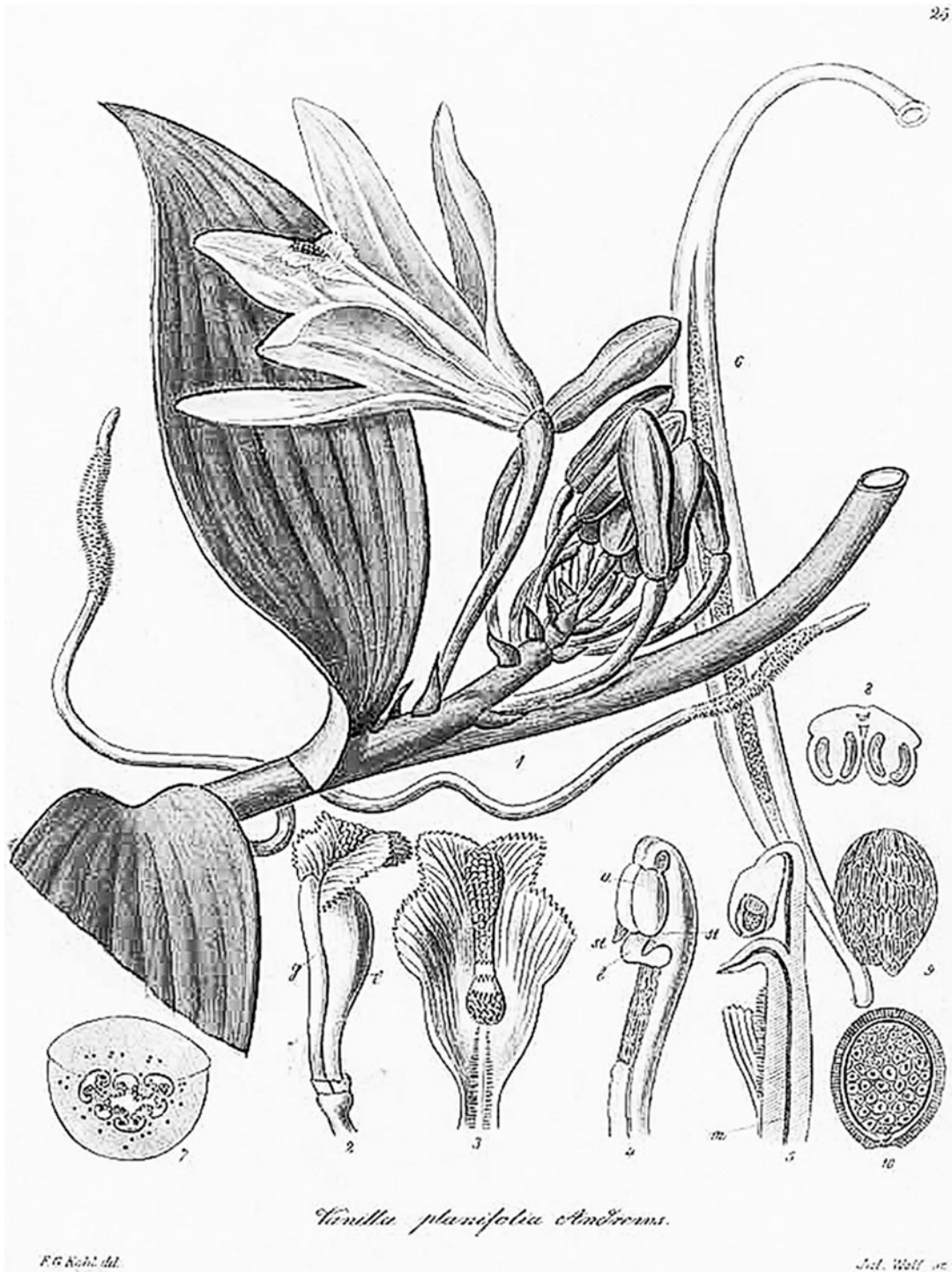


Fig. 1.6 *Vanilla planifolia*. From: Kohl FG, *Die officinellen Pflanzen, Pharmacopoeia Germanica*, t. 25 (1891–1895) [artist: Kohl FG]. Courtesy of Universitäts und Landesbibliothek, Dusseldorf, Germany

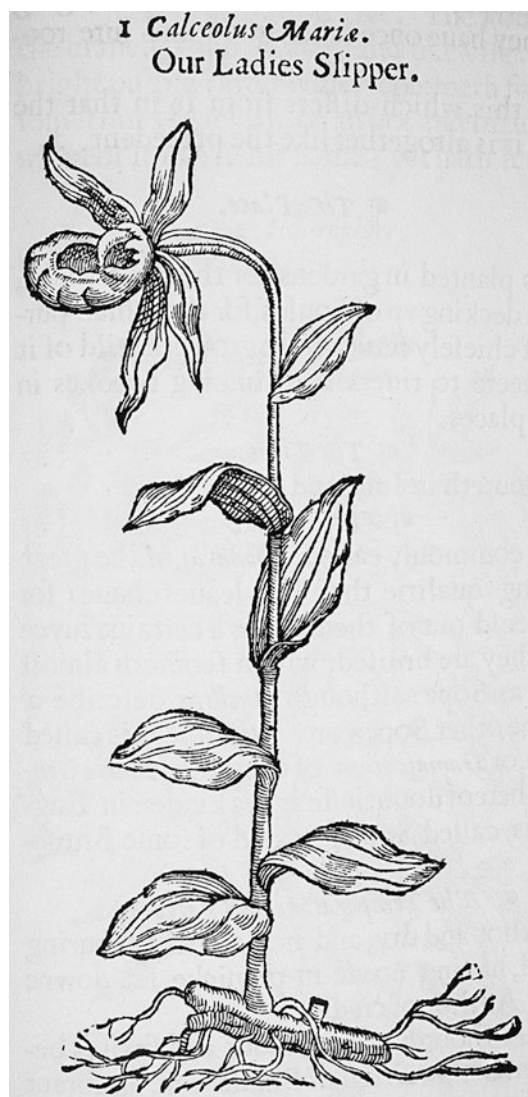


Fig. 1.7 *Cypripedium calceolus* (as *Calceolus Mariae*. Our Ladies Slipper). From: Gerard J, *Herball*, (1597). Whereas many authors mentioned that American Indians employed *Cypripedium calceolus*, the orchid they used was actually *Cypripedium parvifolium* because *Cypripedium calceolus* is a Eurasian and not an American species

Herbarium Amboinense was finally published posthumously in 1741, in six folio volumes. It is a classic in botanical literature (Fig. 1.8).

Shortly after Hendrik van Rheede (1714–1773) arrived in southern India in 1669 to take over as Administrator of Dutch Malabar for the next 8 years, he assembled a team of

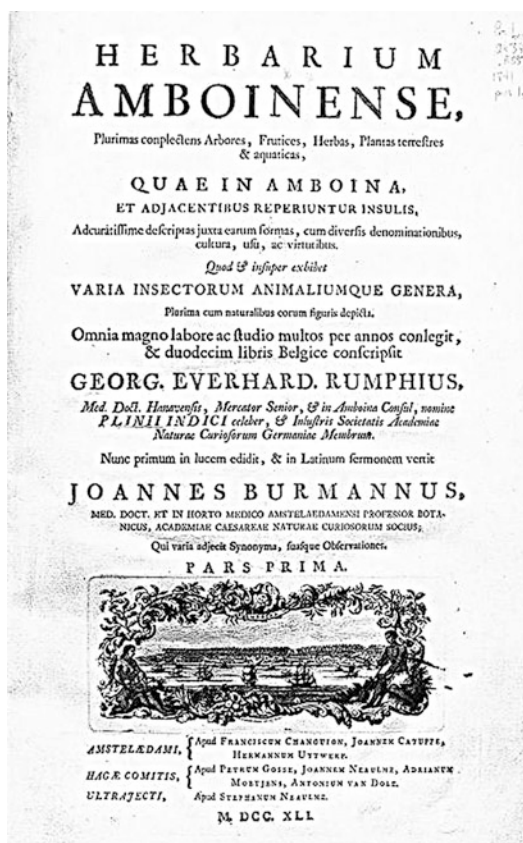


Fig. 1.8 *Herbarium Amboinense* vol. 5 by Georg Eberhard Rumphius (1741), title page

nearly 100 scholars, botanists, physicians, native healers, professors of medicine, clergymen, translators, illustrators and engravers, both Indian and foreign, to work on the flora of the Malabar coast. The first draft of *Hortus Indicus Malabaricus* was completed in 1675, but it took 30 years to complete the publication. Originally rendered in Latin, it was subsequently translated into Sanskrit, Arabic, Malayalam and English. The 12 volumes describing 742 plants were accompanied by 794 beautiful copper-plate illustrations. Another classic of botanical literature, *Hortus Indicus Malabaricus*, was praised by Carl Linnaeus for its accuracy (Figs. 1.9 and 1.10).

van Rheede was probably inspired by the work of Jacobus Bontius (1592–1631), a Dutch physician of Jewish descent who had earlier studied the flora of Batavia. Bontius recruited the help of



Fig. 1.9 Illustration of two orchids (*Dendrobium* and *Vanda*) in Rumphius GE, *Herbarium Amboinense* (1741)

friendly natives to obtain his source materials because it was unsafe for him to wander more than 3 km beyond Batavia. He included descriptions of food plants, spices and other natural products with commercial possibilities in his four volume *De medicina Indorum*, a seminal text in tropical medicine that contained the first descriptions of beriberi, cholera, dysentery and the *Orang hutan*.

However, it was for different reasons that van Rheedee also recruited the help of friendly natives. Being neither naturalist nor physician, and certainly not an artist himself, he resorted to his position of authority to recruit the best talents for his work. By so doing, van Rheedee produced a work that matched the contributions of the observant Bontius and the indomitable Rumphius in the field of natural studies.



Fig. 1.10 *Hortus Indicus Malabaricus* by van Rheedee HV, tot Drakenstein (1678), title page

Although the British were late in extending their maritime influence to Asia, by 1765, the British East India Company (founded in 1600) managed to control the vast subcontinent of India, then wrested Batavia from the Dutch, established the Straits Settlements by 1819 and exerted political dominance over the sultanates of Malaya and British Borneo soon after. Meanwhile in London, Joseph Banks was elected president of the Royal Society in 1778, a position he held for 42 years during which time he promoted British interest in economic and beautiful plants. Shortly after graduating from Oxford, Banks accompanied James Cook on the first voyage of the *Endeavour*. Impressed by the varied flora of the lands he visited, Banks dispatched botanists to collect plants from many parts of the world and to

have them established at Kew Botanic Gardens, thereby laying the foundation for Kew to be the leading Botanical Garden in the world. Half a century later, another botanist and explorer, Joseph Dalton Hooker (1817–1911), became president of the Royal Society. Hooker visited Indian Himalaya in 1847–1851, and subsequently, he published a seven-volume *Flora of India*. He is well known as a taxonomist. He was a close friend of Charles Darwin and was Director of Kew Botanic Gardens for 20 years. His name is attached to numerous orchids: best known in Singapore as *Papilionanthe hookeriana*, the parent of many hybrids that initiated the tropical orchid cut-flower industry. Some people regard William Roxburgh (1751–1815) as the father of Indian botany. Joining the Indian Medical Service as a surgeon in 1776, Roxburgh displayed such an interest and knowledge of plants that he was invited to take charge of the Calcutta Botanic Gardens in 1793. Roxburgh's descriptions of Indian orchids were usually accompanied by drawings prepared by Indian artists. His two-volume *Flora Indica: or Descriptions of Indian Plants* was published post-humously in Serampore in 1820 and 1824.

During the nineteenth century 'consumption of the exotic spread through the gardens and libraries of the wealthy and the well-to-do, amidst a growing vogue in natural history. . . the Shows of London brought the exotic and fantastic to a still wider audience' (Millar 2011). Growing affluence and interest in beautiful orchids and exotica supported two large British nurseries, Veitch and Sanders, veritable institutions that were responsible for making the orchid-growing hobby what it is today. Veitch financed many plant collectors, William and Thomas Lobb being the two most famous. By 1914, Veitch Nurseries had introduced 1281 new plants to Europe. The first man-made orchid hybrid, *Calanthe Dominii* raised by John Dominy at Veitch nursery in Exeter flowered in 1856; presently, there are well over a hundred thousand registered hybrids. Veitch's competitor was Frederick Sander of St Albans who employed 23 plant collectors working in South America and Asia. During the 1880s and 1890s, Sanders

handled 2 million orchid plants. One might be appalled by the callousness of some collectors and by the disregard of their patron, but that was how the orchid industry originated (Fig. 1.11).

The classical studies of Bontius, Rumphius, van Rheede and Hooker were tough acts to follow. Later works from the region never matched the intensity of the early efforts, but nevertheless, they contained new and useful information. In 1933, Jesuit chemist J F Caius described 20 species of medicinal orchids in 14 genera employed in Malabar. He conducted tests on 300 herbs employed to treat snakebites. Two orchid species and all the remaining 298 herbs failed the tests. Caius reported that wealthy Orientals were



Fig. 1.11 *Cattleya labiata*, the orchid that launched the orchid mania of the Victorian era. From: Houtte L van, *Flore des serres et des jardins de l'Europe*, vol. 7: t. 660 (1852)

known to have paid handsome prices for pounded potatoes and gum because salep enjoyed an immense reputation as aphrodisiac, restorative and fattener. Substitution was as prevalent in the herb markets in 1933 as it is today.

After Indian independence, numerous studies were conducted on tribal medicine practiced by remote, isolated hill tribes. Generally the tribes employed few orchids for treatment. Many studies did not report orchids being employed medicinally. Nevertheless, India is a big country, and the total number of orchid species that have been employed medicinally total 112.

Following the establishment of the Straits Settlements between 1786 and 1819, many British botanists worked in the Far East. Charles Curtis (1853–1928) was one of the collectors sent to the Far East by Veitch to collect orchids and other interesting plants. Later appointed as superintendent of Penang Botanic Garden, Curtis managed to convert a disused granite quarry into the beautifully landscaped garden. He was a contemporary of Henry Ridley, and both men played a role in establishing the Malayan rubber industry (Reinikka 1972), but Ridley is better known for his contribution. Appointed director of the Gardens and Forests of the Straits Settlements in 1888, Ridley made a detailed study of the plants in the region and sent thousands of herbarium specimens to Kew. He wrote a five-volume *Flora of the Malay Peninsula* and commented on the medicinal usage of several orchid plants. In 1930, IH Burkill and Mohamed Haniff described their observations on 17 species of medicinal orchids in their publication, *Malay Village Medicine*. There was much similarity with traditional Indian or Indonesian medicinal practices. This was not the case with Thai herbal medicine which employed 42 orchid species.

Tubers of many Australian orchids are eaten as food, but Australian aborigines employ only four species to treat skin disease or dysentery or to be used as contraceptive. *Chikanda*, a cake made with orchid tubers, is a popular delicacy in Central Africa, and there is a belief in Malawi that eating orchids protects one against illnesses. Transnational trade of orchids in Central Africa is worrying conservationists. The Royal Botanic

Gardens at Kew has launched a project sponsored by the Darwin Initiative to promote sustainable harvest in the region. In Central and South Africa, 46 orchid species are commonly used as protective or love charms; 65 medicinal species have been identified.

It was not scientific curiosity which led to the identification of hundreds of medicinal orchid species in China. Between the founding of the People's Republic of China in 1949 and Richard Nixon's visit in 1972, the 'Bamboo Curtain' isolated China from the rest of the world. The country was devastated by decades of war, foreign and warlord pillage and exploitation, and even if she had access, China was too poor to afford modern drugs. The country had to rely on its home-grown herbal remedies. Knowledge of all provincial remedies was soon collected and compiled in a new *Materia Medica* which vastly expanded the knowledge on the use of hundreds of medicinal orchid species.

The outward-looking policy responsible for China's spectacular economic advancement in the last 30 years also provided opportunities for great innovations in the technological and scientific arena. Medicinal plants are now examined at the molecular level. DNA studies permit accurate identification of species. Many phytochemicals have been isolated and their properties elucidated. New findings are announced almost on a weekly basis. Several difficulties have to be overcome before proper clinical studies can be performed on herbal remedies, but it is to be hoped that these can be resolved. Clinical studies on pure compounds should be more meaningful.

Some medicinal orchids are now cultivated on a massive scale in China, but still this does not prevent stripping of medicinal species from the wild. CITIES has drawn up rules to prevent collection of endangered plants from the wild and cross-border trade in wild orchids, but these need universal enforcement which is not forthcoming. In Indian Himalaya and Central Africa, underprivileged families living in rural communities depend on herb collection for their livelihood. The practice is not sustainable in the long run unless these people are taught to care for young plants, not over-collect, and vast expanse of land

be constantly seeded with orchids. There is an on-going experiment to cultivate *Dendrobium officinale* on rocks in China because rock-grown *shihu* being preferred over the nursery grown herb can fetch a fourfold higher price.

Cosmetics are employed by women, and nowadays sometimes also by men, to improve their attractiveness and to reduce the ravages of time on skin. Since this boosts one's sense of well-being, it can be construed as a health benefit, so I take the liberty, only here, of briefly mentioning the use of orchids in cosmetics.

Over 20 cosmetic products in the market include orchid extracts among their constituents. The orchids employed are *Bletilla striata*, *Brassocattleya* Marcella, *Calanthe discolor*, *Cattleya*, *Cymbidium goeringii*, *Cymbidium* Great Flower Marie, *Cymbidium kanran*, *Cycnoches cooperi*, *Cypripedium pubescens*, *Dendrobium bigibbum* (syn. *Dendrobium phalaenopsis*), *Dendrobium chrysotoxum*, *Dendrobium*

moniliforme, *Dendrobium nobile*, *Gastrodia elata*, *Orchis maculata*, *Orchis mascula*, *Orchis morio*, *Paphiopedilum Maudiae*, *Phalaenopsis amabilis*, *Phalaenopsis javanica*, *Phalaenopsis lobbii*, *Vanda coerulea*, *Vanda falcata* (syn. *Neofinetia falcata*) and *Vanda tessellata*. The orchid extract contributes to skin conditioning (cleanser, face mask, moisturizer, emollient), UV protection, whitening of skin and hair care. One product claims to promote hair growth. During the Tokugawa Period (1603–1867), Japanese nobility hung flowering *Vanda falcata* in their palanquins to enjoy the penetrating fragrance during their travels (Teoh 1982, 2011, 2016; Singh et al. 2016) (Figs. 1.12 and 1.13).

Orchids, indeed plants in general, were valued as food or medicine long before they became horticultural darlings. The fact that Confucius (551–479 BCE) could refer to a room pervaded with the fragrance of *Cymbidium* suggests that the orchid was cultivated in the sixth-century BCE.

Fig. 1.12 *Vanda coerulea*, a pink form (©Teoh Eng Soon 2019. All Rights Reserved)



Fig. 1.13 *Vanda falcata*
(syn. *Neofinetia falcata*)
(©Teoh Eng Soon 2019.
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Orchid cultivation was popularized during the Tang Dynasty (618–907). *Cymbidium ensifolium* and *Dendrobium moniliforme* were described by Ji Han in *Nan Fang Cao Mu Zhuang* (南方草木状), a Chinese botanical work in three volumes published during the Jin Dynasty (290–307) that described the morphology of more than 80 plants originating in southern China. The former species was ornamental, the latter ornamental and medicinal. Chinese tradition maintains that orchids were already included among the medicinal herbs since the dawn of Chinese history. That being said, a discussion of medicinal orchids brings us right back to the beginning of human interest in orchids.

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An Ancient Fantasy: Salep as Aphrodisiac

2

Once a fashionable drink touted to boost one's libido and performance, salep only fell into disrepute when physicians demanded proof before advocating any medicine. Salep, *saloop* or *salepi* is still being sold in Turkey and Greece by street vendors who push mobile carts holding pots of the liquid in busy city squares; but they are not as ubiquitous as they were a century or two ago. Business is not brisk because only old folk drink *salepi*, youngsters preferring to sip coffee in roadside cafes instead. Another reason is that the orchid species which provide the tubers for the drink have become so threatened with extinction that Turkey, their principal source, has banned their harvesting and export. Traders have now turned their attention to northern Iran and the orchids in that area are currently under threat. Over-collection was the reason the orchids became scarce, the belief that they were aphrodisiacs the culprit.

Although salep drinking boomed during the Ottoman Empire, its reputation dates from a much earlier period. Theophrastus (371–287 BC), Dioscorides (40–90 CE), Pliny the Elder (23–79 CE), Avicenna (980–1037), Maimonides (1135–1204) and botanists of the Renaissance period, these were the learned people who endowed salep with its undeserved reputation through the ages. Ancient Greek medicine subscribed to the *Doctrine of Signatures* which proclaimed that the usage of a medicinal plant may be gleaned by its resemblance to a body

part. Since the paired tubers of many Mediterranean orchids resemble testes, their functions were linked to sex and procreation (Fig. 2.1). *Salab* (*sahlab*) is an Arabic word which means *fox's testicle*, whereas *orchis* in Greek means simply *testicle*. Middle Eastern herbals refer to the drug prepared from orchid tubers as *Khus yatu's salab* (fox's testicle) or *Khus yaty'l klab* (dog's testicle). It was stated that the odour of fresh tubers was similar to the smell of human semen and tubers could even induce 'an aphrodisiac effect if clasped in the hand' (Dymock et al. 1893). The association between orchid and sex was reaffirmed again and again in such old common names for the orchid species that constituted salep, for instance, *Satyrium*, goat's testicles, dog's testicles, hare's testicles. In Greek legend, these orchid plants arose from spilled semen of cavorting satyrs. The famous Flemish physician, Mathias de l'Obel (1538–1616) used the term *Testiculus vulpinus* (fox testicle) to describe an orchid species. During the fifteenth century, Jerome Bock (Hieronymus Tragus, 1489–1554), also alluding to the *Doctrine of Signatures*, concluded that since the flowers of some European terrestrial orchids resembled bees and other insects, they were begot by winged arthropods (Emboden 1974) (Figs. 2.2 and 2.3).

European fascination with *Orchis* and *salep* vastly exaggerated the potency of this group of orchids. It all started with the description by Theophrastus (271–287 BC) who stated in the

Fig. 2.1 Dioscorides and Heuresis, the latter holding a mandrake root. From the *Vienna Dioscorides Materia Medica* or *Juliana Anicia Codex* (sixth century)



seminal botanical work, *Historia Plantarum* or *Enquiry into Plants* that

This is the so-called salep (Mediterranean terrestrial orchids) which has a double bulb, one large and one small. The larger, given in the milk of a mountain goat, produces more vigour in sexual intercourse: the smaller inhibits and forestalls. . . . It is odd, certainly that both powers should be found in the same plant: but that a plant should have one or other power need not surprise us. We may remember Aristophilus, the druggist from Plataea, used to say that he had drugs with exactly these effects, one to improve sexual powers, one to inhibit: and that the impotence produced by the latter is general and lasts for a limited time, say 2–3 months, so that it can be used on slaves who require to be restrained and corrected (Dalby 2013).

Gaius Plinius Secundus (23–79 CE), or Pliny the Elder, described both aphrodisiacs and

antiaphrodisiacs in *Naturalis Historiae* (c. 77 C. E.): to *Orchis* and *Serapias* (now classified under *Epipactis*), he attributed the former property; to the larger ‘or some say, the harder bulb of *Orchis* when drunk in water’. The lesser or softer bulb taken in goat’s milk repressed the sexual appetite. Furthermore, ‘the root of the former *orchis* given to drink in the milk of an ewe bred up at home of a cade lamb, causeth a man’s member to rise and stand; but the same taken in water, maketh it go down again and lie’. Thus it would seem that both the choice of orchid bulb and solvent had to be correct! Such orchids were reported to be equally effective when fed to goats, rams and stallions. Pliny offered mead or the juice of lettuce as an antidote when one became excessively lusty after consuming the orchids (Figs. 2.4, 2.5 and 2.6).



Fig. 2.2 Hieronymus Tragus Bock at 46. From: *New Kreutterbuch* (1546). Artist: David Kandel



Fig. 2.4 Pedanius Dioscorides. From: Jean Antoine Sarrasin, *Dioscorides* (1598), title page

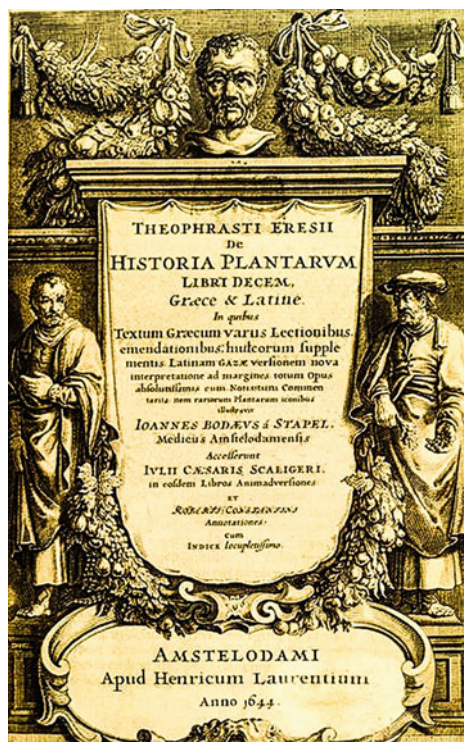


Fig. 2.3 Theophrastus *Historia Plantarum*. Title page of a 1644 edition

Salep orchids had other medicinal uses. The Roman historian, Pliny the Elder, reported that the roots of *Orchis* healed mouth sores and it was used to clear phlegm from the chest (Turner 1962). When ‘bruised and applied to the place’, they healed the king’s evil (scrofula, swollen lymph nodes in the neck caused by spread of tuberculosis) (Grieve 1971).

Pedanius Dioscorides (40–90 CE) alleged that the consumption of *Satyrium* not only stirred the fleshy lust but, additionally, ‘if men ate the fat tubers they would beget male children, whereas if women ate the lesser, dry or barren root which was withered and shriveled, they would bring forth girls’ (quoted by Leonhard Fuchs in 1542).

The *Materia Medica* of Dioscorides became the authoritative herbal text almost immediately after its composition around 50–70 C.E. For the next 1500 years, it enjoyed wide circulation in Greek, Latin and Arabic, supplemented by commentaries by Persian and Arab physicians. In his *al-Qanun fi al-Tibb* (Canon of Healing),



Fig. 2.5 *Ophrys* species. From Dioscorides *Erbario Greco* (*Materia Medica*), t. 133, Fig. 2 (487–580)

Avicenna (Ibn Sina) (980–1037) stated that orchid tubers were employed as aphrodisiac or appetite stimulant, but in addition it encouraged mucus production and promoted recovery from stroke. He mentioned an orchid species *Alisma*

sive (or) *Damasonia* which served to relive cough and asthma. Early European pharmacopoeia were largely based on Dioscorides and secondarily on Avicenna. *Historia Plantarum* or *Enquiry into Plants* by Theophrastus was not available in



Fig. 2.6 Gaius Plinius Secundus (Pliny the Elder) (23–79 C.E.)

Latin until 1483 when it was translated into that language from Greek by Theodorus Gaza (c. 1398–1475) (Figs. 2.7 and 2.8).

Botanical Renaissance

The attitude of inquiry promoted by the Renaissance (fourteenth to seventeenth century) saw the emergence of Natural Sciences which initially focused on the restoration of the knowledge of the ancients, much of which focused on plants and herbal remedies. European botanists or naturalists during the fifteenth to seventeenth century were usually physicians, later, joined by several apothecaries, whose curiosity of herbal remedies led them to study the plants themselves, eventually leading to botany for its own sake. The development of printing from the mid-fifteenth century witnessed the authorship of several

Fig. 2.7 Dioscorides as featured in an Arabic *Materia Medica*





Fig. 2.8 Avicenna, portrait on a silver vase. Museum at BuAli Mausoleum, Hamadan, Iran

classical botanical compendiums that sought to promote wider knowledge of medicinal herbs and especially the *Materia Medica* of *Dioscorides*, with some enlarging their *Herbals* by including the knowledge of local plants and those introduced from distant lands (Figs. 2.9, 2.10 and 2.11).

Jean Ruel (1474–1537), the French physician who taught at the University of Paris, showed special interest in *Dioscorides*. He published a Latin translation of *Dioscorides' Materia Medica* in 1516. His own work, *De Natura Stirpium* published in 1536 was devoid of illustrations. He was the first European after *Theophrastus* to compose a general treatise on botany. His translation was used by *Pietro Matthioli* (1501–1577) to produce numerous editions of the translation heavily illustrated with accurate woodcuts, with associated commentaries that made *Matthioli* the foremost publisher of *Dioscorides' work*.

Afterwards Germany took the lead in fostering this interest with illustrious physicians like *Otto Brunfels* (1488–1534), *Hieronymus Bock*

(1498–1554) and *Leonhart Fuchs* (1501–1566) (Table 2.1) (Figs. 2.12, 2.13, 2.14 and 2.15).

In the mid-fifteenth century, the German goldsmith, *Johannes Gutenberg* invented the casting of individual letters that enabled these letters to be fitted into words and to be reused repeatedly. This simplified printing in Europe and provided the opportunity for physicians to publish. The work of the four illustrious German physicians, published in Latin, consisted of descriptions of hundreds of plants and their usage, accompanied by woodblock illustrations that were occasionally hand-coloured. *Leonhart Fuchs's De historia stirpium commentarii insignes maximis impensis et vigiliis elaborati adiectis earundem vivis plusquam quingentis imaginibus, nunquam antea ad naturae imitationem artificiosius effictis & expressis* (Notable commentaries on the history of plants prepared with great expense and care adorned with more than 500 lifelike pictures in imitation of nature, never hitherto drawn and printed with greater care) was illustrated with 512 woodcuts that accompanied the description of various plants.

Otto Brunfels' Herbarum Vivae Eicones (Living Portraits of Plants) published between 1530 and 1536 featured more than 120 outstanding woodcuts by *Hans Weiditz* (1495–1537) that established a standard for botanical illustration which required plants to be represented realistically as they appear seasonally in nature. The *Kreutterbuch* (plant book) by *Hieronymus Bock* (1539) was illustrated in a later edition of 1546 by *David Kandel* (1520–1592). The *Materia Medica of Dioscorides* being the standard reference at this time, it was natural that several German botanical publications attributed aphrodisiac properties to many terrestrial orchids.

In *De Historia Stirpium*, *Fuchs* described and illustrated three species of orchids that had the property of *ad venereum excitare* (to excite lust): (1) *Satyrium basilicum mas* (the 'male' *Satyrium basilicum*, *Gymnadenia conopsea*, known to *Avicenna* as *digiti citrine*, a reference to the finger-shaped roots that resembled the fruit of *Citrus medica* var. *sarcodactylis*); in German as *Kreutzbluomen*; and in Latin as *Satyrium regium* and *Palma Christi* (the Hand of Christ);