



Andrew Chevallier, FNIMH



NASTURTIUM
tropaeolum majus
detoxifies the blood,
liver & kidneys



ENCYCLOPEDIA OF HERBAL MEDICINE



CALENDULA calendula useful for disinfecting & treating minor wounds



MINT
mentha
take for indigestion
or sore throat

550 HERBS and REMEDIES for COMMON AILMENTS

ENCYCLOPEDIA OF
HERBAL
MEDICINE





ENCYCLOPEDIA OF
HERBAL
MEDICINE



ANDREW CHEVALLIER
FNIMH





Penguin
Random
House

THIRD EDITION

DK UK

Editor Toby Mann **Senior Art Editor** Elaine Hewson
Design Assistant Rehan Abdul
US Consultant David Hoffman
US Editor Michelle Melani
Senior Jackets Creative Nicola Powling
Senior Pre-Production Producer Tony Phipps
Senior Producer Che Creasey
Creative Technical Support Sonia Charbonnier
Managing Editors Lisa Dyer, Angela Wilkes
Managing Art Editor Marianne Markham
US Managing Editor Lori Cates Hand
Art Director Maxine Pedliham
US Publisher Mike Sanders
Publishing Director Mary-Clare Jerram

DK INDIA

Project Editor Janashree Singha
Senior Art Editor Balwant Singh
Editors Sugandh Juneja, Seetha Natesh
Art Editors Sourabh Challariya, Jomin Johny
Assistant Art Editor Juhi Sheth
Picture Researchers Deepak Negi, Nishwan Rasool
Deputy Managing Editor Bushra Ahmed
Managing Art Editor Navidita Thapa
Pre-production Manager Sunil Sharma
DTP Designers Satish Chandra Gaur, Rajdeep Singh,
Anurag Trivedi

FIRST EDITION

Project Editor Penny Warren **Editors** Valerie Horn, Christa Weil
Senior Editor Rosie Pearson **Senior Art Editor** Spencer Holbrook
Designers Robert Ford, Jeremy Butcher, Rachana Devidayal
Picture Researcher Jo Walton **Illustrator** Gillie Newman
Main Photographers Andy Crawford, Steve Gorton
Managing Editor Susannah Marriott **Managing Art Editor** Toni Kay
DTP Designer Karen Ruane **Production** Antony Heller

IMPORTANT NOTICE

Do not try self-diagnosis or attempt self-treatment for serious or long-term problems without first consulting a qualified medical herbalist or medical practitioner as appropriate. Do not take any herb without first checking the cautions in the relevant herb entry (see pp. 56–283) and the Essential Information on pp. 298–299. Do not exceed any dosages recommended. Always consult a professional practitioner if symptoms persist. If taking prescribed medicines, seek professional medical advice before using herbal remedies. Take care to correctly identify plants and do not harvest restricted or banned species. So far as the author is aware, the information given is correct and up to date as of July 2016. Practice, laws, and regulations all change, and the reader should obtain up-to-date professional advice on any such issues. In addition, this book contains general information on growing cannabis, which is a controlled substance in North America and throughout much of the world. As the use and cultivation of cannabis and its derivative products can carry heavy penalties, you should research your local laws before using the information in this book. The author and the publisher expressly disclaim any liability, loss, or risk, personal or otherwise, which is incurred as a consequence, directly or indirectly, of the use and application of any of the contents of this book.

Third American Edition, 2016

First American Edition, 1996

This edition published in the United States in 2016 by
DK Publishing, 345 Hudson Street, New York, New York 10014

Copyright © 1996, 2001, 2016 Dorling Kindersley Limited

Text copyright © 1996, 2001, 2016 Andrew Chevallier

DK, a Division of Penguin Random House LLC

16 17 18 19 20 10 9 8 7 6 5 4 3 2 1

001–285452–July/2016

All rights reserved.

Without limiting the rights under the copyright reserved above, no part of this publication may be reproduced, stored in or introduced into a retrieval system, or transmitted, in any form, or by any means (electronic, mechanical, photocopying, recording, or otherwise), without the prior written permission of the copyright owner.

Published in Great Britain by Dorling Kindersley Limited.

A catalog record for this book is available from the Library of Congress.

ISBN: 978-1-4654-4981-8

DK books are available at special discounts when purchased in bulk for sales promotions, premiums, fund-raising, or educational use. For details, contact: DK Publishing Special Markets, 345 Hudson Street, New York, New York 10014
SpecialSales@dk.com

Printed and bound in China

A WORLD OF IDEAS:
SEE ALL THERE IS TO KNOW

www.dk.com



Contents

6 Introduction

8 THE DEVELOPMENT OF HERBAL MEDICINE

- 10 How Medicinal Plants Work
- 14 Active Constituents
- 17 Quality Control
- 18 Early Origins to the 19th Century
- 28 20th Century Onward
- 32 Herbal Traditions of the World
 - 32 Europe
 - 36 India and the Middle East
 - 40 China, Japan, and Southeast Asia
 - 44 Africa
 - 46 Australia and New Zealand
 - 48 North America
 - 52 South America

54 KEY MEDICINAL PLANTS

A visual guide to 100 key herbs from around the world with details of their habitat, constituents, actions, traditional and current uses, and information on the latest research. Also included are key preparations and practical self-help uses.

156 OTHER MEDICINAL PLANTS

450 other herbs from different herbal traditions with descriptions of their therapeutic properties and past and present uses.

284 HERBAL REMEDIES FOR HOME USE

- 286 Growing Medicinal Plants
- 288 Harvesting & Processing
- 290 Making Herbal Remedies
- 298 Using Herbal Remedies Safely
- 299 Remedies for Common Ailments
- 320 Consulting an Herbal Practitioner
- 321 Glossary
- 322 Bibliography
- 323 General Index
- 332 Index of Herbs by Ailment
- 336 Useful Addresses & Acknowledgments



Introduction

In the twenty years since the first edition of this encyclopedia in 1996, herbal medicine has gone through unprecedented change. Herbs, which have always been the principal form of medicine in developing countries, have again become popular in the developed world, as people strive to stay healthy in the face of chronic stress and pollution, and to treat illness with medicines that work in concert with the body's defenses. A quiet revolution has been taking place. Tens of millions of people now take herbs such as ginkgo (*Ginkgo biloba*, p. 100) to help maintain mental and physical health, and increasingly people consult trained herbal professionals and naturopaths for chronic or routine health problems. Increasingly too, scientific evidence is accumulating to show that herbal medicines can provide treatment that is as effective as conventional medicines but with few side effects. Sales of herbal medicines continue to grow year after year—by over 50 percent in the U.S. since 2000—and several mainstream pharmaceutical companies now manufacture and market herbal medicines.

Plant Medicines

The variety and sheer number of plants with therapeutic properties are quite astonishing. Some 50,000 to 70,000 plant species, from lichens to towering trees, have been used at one time or another for medicinal purposes. Today, Western herbal medicine still makes use of hundreds of native European plants, as well as many hundreds of species from other continents. In Ayurveda (traditional Indian medicine) about 2,000 plant species are considered to have medicinal value, while the Chinese *Pharmacopoeia* lists over 5,700 traditional medicines, mostly of plant origin.

About 500 herbs are still employed within conventional medicine, although whole plants are rarely used. In general, the herbs provide the starting material for the isolation or synthesis of conventional drugs. Digoxin, for example, which is used for heart failure, was isolated from common foxglove (*Digitalis purpurea*, p. 202), and the contraceptive pill was synthesized from constituents found in wild yam (*Dioscorea villosa*, p. 91).

Ecological Factors

The increased use of medicinal herbs has important environmental implications. Growing herbs as an organic crop offers new opportunities for farmers, and sometimes, especially in developing countries, opportunities for whole communities. In northeastern Brazil, for example, community-run herb gardens grow medicinal herbs that are sold to local hospitals. Doctors at the hospital then prescribe these medicines for their patients.

The rise in popularity of herbal medicines, however, also directly threatens the survival of some wild species. Demand for goldenseal (*Hydrastis canadensis*, p. 105) has become so great that it now fetches around \$140 a pound (£170 a kilo). It was a common plant in the woodlands of northern America two centuries ago, but is now an endangered species, with its survival in the wild threatened by overcollection. This example is by no means unique, and, sadly, many species are similarly threatened across the planet. The extinction of plant species as a result of over-intensive collecting is nothing new. The herb silphion, a member of the carrot family, was used extensively as a contraceptive by the women of ancient Rome.

Silphion proved difficult to cultivate and was gathered from the wild in such large quantities that it became extinct during the 3rd century CE.

Today, if herbal medicine continues to grow at its present rate, it is imperative that manufacturers, suppliers, practitioners, and the public use only produce that has been cultivated or wildcrafted in an ecologically sensitive manner.

About This Book

In the past, books on herbal medicine have tended to focus either on the traditional and folkloric use of plants or on their active constituents and pharmacology. *The Encyclopedia of Herbal Medicine*, which features over 550 plants, aims to cover both aspects. It discusses each plant's history, traditions, and folklore, and explains in simple terms what is known from scientific research about its active constituents, actions, and potential new uses.

It is easy when concentrating on the scientific aspect of herbal medicine to forget that much, in some cases *all*, that we currently know about a particular plant results from its traditional use. Moreover, even when a plant has been well researched, herbal medicines are so complex and variable that what is currently known is rarely definitive, but rather a sound pointer as to how it works. Sometimes the traditional use, insofar as it is based on the experience of practitioners, provides an insight into how best to use an herb that is missing from scientific knowledge alone. Herbal medicine is, after all, both a science *and* an art.

In choosing the plants profiled in the *Encyclopedia*, the aim has been to select herbs that are commonly used in different parts of the world and are considered to have particular health benefits. The index of key medicinal plants (pp. 54–155) contains many herbs that are readily available in health stores and pharmacies, for example St. John's wort (*Hypericum perforatum*, p. 106). It also includes herbs that are more commonly known as foods, such as lemon (*Citrus limon*, p. 82), but which, nonetheless, are valuable medicines. The index of other medicinal plants (pp. 156–283) contains some less commonly known but important medicinal herbs, such as andrographis (*Andrographis paniculata*, p. 167), a traditional Indian medicinal plant that stimulates recovery from infection and supports normal liver function.

A global overview of the history of herbal medicine puts the development of different herbal traditions from earliest origins to the present day into perspective. This is complemented with features on herbal medicine in Europe, India, China, Africa, Australia, and the Americas, providing a rounded picture of herbal medicine worldwide.

Herbal medicine is nothing if not practical in its approach, and the *Encyclopedia* has a detailed self-help section with advice on preparing and using herbal medicines to treat a range of common health problems.

If more people come to appreciate the immense richness of the world of herbal medicine and are able to benefit from the curative properties of medicinal herbs, this book will have achieved its aim.

Andrew Chevalle







THE DEVELOPMENT OF HERBAL MEDICINE

From the earliest times, herbs have been prized for their pain-relieving and healing abilities, and today we still rely on the curative properties of plants in about 75 percent of our medicines. Over the centuries, societies around the world have developed their own traditions to make sense of medicinal plants and their uses. Some of these traditions and medicinal practices may seem strange and magical, others appear rational and sensible, but all are attempts to overcome illness and suffering, and to enhance quality of life.

“A wise man ought
to realize that health
is his most valuable
possession.”

Hippocrates

How Medicinal Plants Work

Many of the thousands of plant species growing throughout the world have medicinal uses, containing active constituents that have a direct action on the body. They are used both in herbal and conventional medicine and offer benefits that pharmaceutical drugs often lack, helping to combat illness and support the body's efforts to regain good health.



There is no doubt that in extreme situations, the treatments devised by modern medicine can offer an unparalleled opportunity to relieve symptoms and save lives. A newspaper article in 1993 described the terrible conditions in a hospital in war-torn Sarajevo, the capital of Bosnia-Herzegovina. Deprived of conventional medical supplies and drugs, the doctors were forced to use a well-known European herb, valerian (*Valeriana officinalis*, p. 148), as a painkiller for the wounded and as an anesthetic. Valerian is an effective herbal medicine for anxiety and nervous tension, but it is woefully inadequate as an analgesic or anesthetic.

Orthodox pharmaceutical medicines sustain life and counter infections in situations where other types of treatment may have little to offer. Modern surgical techniques, such as keyhole surgery and plastic surgery, and the whole range of diagnostics and of life-support machinery now available, can all be used to improve the chances of recovery from serious illness or injury.

The Benefits of Herbal Medicine

Yet despite the dramatic advances and advantages of conventional medicine, or biomedicine as it is also known, it is clear that herbal medicine has much to offer. We tend to forget that in all but the past 70 years or so, humans have relied almost entirely on plants to treat all manner of illnesses, from minor problems such as coughs and colds to life-threatening diseases such as tuberculosis and malaria.



Opium poppy fields in Tasmania. Opium, derived from the seed capsules of the opium poppy, yields the narcotic alkaloids morphine and codeine, powerful painkillers that are widely used in conventional medicine.

Today, herbal remedies are coming back into prominence because the efficacy of conventional medicines such as antibiotics, which once had near-universal effectiveness against serious infections, is on the wane. Over the years, infectious organisms have developed resistance to synthesized drugs, and the herb sweet wormwood (*Artemisia annua*, p. 67) and its active constituent artemisinin, for example, are now the standard treatment for malaria in tropical areas where the protozoa causing the infection no longer respond to conventional treatment.

Herbal medicine often complements conventional treatments, providing safe, well-tolerated remedies for chronic illnesses. It is experiencing a dramatic renaissance in Western countries, partly because no effective conventional treatment as yet exists for many chronic illnesses, such as asthma, arthritis, and irritable bowel syndrome. In addition, concern over the side effects of biomedicine is encouraging people to look for more gentle forms of treatment. It is estimated that 10–20% of hospital patients in the West are there due to the side effects of conventional medical treatment.

Using Herbs Wisely

Most commonly used herbs are extremely safe to use. But some plants can produce side effects and, like all medicines, herbal remedies must be treated with respect. It is essential to take or use certain plants only under the guidance of a well-trained practitioner, to avoid adverse consequences. Ma huang (*Ephedra sinica*, p. 95), for example, can be extremely toxic at the wrong dosage, and comfrey (*Symphytum officinale*, p. 138), a very popular herb in the past, is thought to cause severe or even fatal liver damage in rare circumstances. When an herbal medicine is used correctly, however, the chances of developing a serious side effect are remote.

Potent Plant Chemicals

The ability of an herbal medicine to affect body systems depends on the chemical constituents that it contains. Scientists first started extracting and isolating chemicals from plants in the 18th century, and since that time we have grown accustomed to looking at herbs and their effects in terms of the active constituents they contain. This *Encyclopedia* is no exception, providing details of all the main active constituents of the medicinal herbs featured and explaining their actions.



Ginkgo, one of the oldest known plant species, improves the circulation of blood to the head.

Research into isolated plant constituents is of great importance, for it has given rise to many of the world's most useful drugs. Tubocurarine, the most powerful muscle relaxant in existence, is derived from pareira (*Chondrodendron tomentosum*, p. 189), and the strongest painkiller of all, morphine, comes from opium poppy (*Papaver somniferum*, p. 244). Many anesthetics are also derived from plants—for example cocaine comes from coca (*Erythroxylum coca*, p. 206).

Today, biomedicine still relies on plants rather than the laboratory for at least 25% of its medicines, and many of

these are among the most effective of all conventional drugs. It is hard to think of a world deprived of the antimalarial properties of quinine (derived from *Cinchona* spp., p. 80); or the heart remedy digoxin (from *Digitalis* spp., p. 202); or the cough-relieving properties of ephedrine (from *Ephedra sinica*, p. 95), which is present in many prescription and over-the-counter cold remedies. These and many other conventional medicines are all derived from isolated plant constituents.

Value of Whole Plants

Although it is important to understand the actions of individual active constituents, herbal medicine, unlike biomedicine, is ultimately about the use and actions of whole plants—medicines that are literally god- or goddess-given,



Cultivation of medicinal plants in Cameroon. Scientific research indicates that whole-plant preparations may often be gentler and more effective remedies than isolated plant chemicals.

rather than developed in a laboratory. In the same way that taking a watch apart and identifying its key parts will not show you how it works as a whole, dividing up a medicinal herb into its constituent parts cannot explain exactly how it works in its natural form. The whole herb is worth more than the sum of its parts, and scientific research is increasingly showing that the active constituents of many herbs, for example those in ginkgo (*Ginkgo biloba*, p. 100), interact in complex ways to produce the therapeutic effect of the remedy as a whole.

Plants contain hundreds, if not thousands, of different constituent chemicals that interact in complex ways. Frequently, we simply do not know in detail how a particular herb works—even though its medicinal benefit is well established. The pharmacological approach to understanding how whole herbs work is like working on a puzzle where only some of the pieces have been provided. Furthermore, although it is very useful to know that a plant contains certain active constituents, such information can be misleading on its own. For example, Chinese rhubarb (*Rheum palmatum*, p. 126) is a commonly used laxative, containing anthraquinones that irritate the gut wall and stimulate bowel movement. This laxative effect, however, occurs only when large quantities of the herb are used. At lower doses other constituents, notably tannins, which dry and tighten up mucous membranes in the gut, have greater effect. As a result, Chinese rhubarb works in two apparently opposite ways depending on the dosage: as a laxative at moderate to high doses; to treat diarrhea at a lower dose.

This example reveals a couple of fundamental truths about herbal medicine. Firstly, the experience of the herbal practitioner and of the patient often provide the most reliable guide to the medicinal effect of individual herbs. Secondly, the value of a medicinal herb cannot be reduced simply to a list of its active constituents.

Plants as Foods & Medicines

In general, the human body is much better suited to treatment with herbal remedies than with isolated chemical medicines. We have evolved side-by-side with plants over hundreds of thousands of years, and our digestive system and physiology as a whole are geared to digesting and utilizing plant-based foods, which often have a medicinal value as well as providing sustenance.

The dividing line between “foods” and “medicines” may not always be clear. Are lemons, papayas, onions, and oats foods or medicines? The answer, very simply, is that they are both. Lemon (*Citrus limon*, p. 82) improves resistance to infection; papaya (*Carica papaya*, p. 183) is taken in some parts of the world to expel worms; onion (*Allium cepa*, p. 164) relieves bronchial infections; and oats (*Avena sativa*, p. 175) support convalescence. Indeed, herbal medicine comes into its own when the distinctions between foods and medicines are removed.

Though we might eat a bowl of oatmeal oblivious to the medicinal benefits, it will, nonetheless, increase stamina, help the nervous system to function correctly, provide a good supply of B vitamins, and maintain regular bowel function. A similar range of benefits is provided by many of the other gentler-acting herbs listed in the *Encyclopedia*.

Herbal Treatments

The strategies that herbal practitioners adopt to prevent illness or restore health in their patients are different in the many and varied herbal traditions across the planet, but the effects that herbal medicines have within the body to improve health do not vary. There are many thousands of medicinal plants in use throughout the world, with a tremendous range of actions and degrees of potency. Most have a specific action on particular body systems and are known to be suitable for treating certain types of ailments. See p. 13 for specific actions.

Digestion, Respiration, & Circulation

Improving the quality of the diet is often an essential starting point in sustaining or regaining good health. The saying “You are what you eat” is by and large true, though herbalists prefer to qualify it, saying “You are what you *absorb* from what you eat.” Herbal medicines not only provide nutrients, but when needed they also strengthen and support the action of the digestive system, speeding up the rate of processing food and improving the absorption of nutrients.

The body requires another kind of “nutrient” to function—oxygen. The lungs and respiratory system can be helped with herbs that relax the bronchial muscles and stimulate respiration.

Once taken in by the body, nutrients and medicines are carried to the body’s estimated one hundred trillion cells. The circulatory system has a remarkable ability to adapt to an endlessly shifting pattern of demand. At rest, the flow of blood is mainly toward the center of the body, while when active, the muscles in the limbs make huge demands. Herbal medicines work to encourage circulation in particular ways. Some, for example, encourage blood to flow to the surface of the body; others stimulate the heart to pump more efficiently; while others relax the muscles of the arteries, lowering blood pressure.

Clearing Toxicity & Soothing Skin

After circulation has carried nutrients to the cells, waste matter must be removed. All too often in our polluted world, high levels of toxicity in the body are an underlying cause of ill health, and herbalists use a wide range of cleansing herbs that improve the body’s ability to remove toxins. Perhaps the finest example of a detoxifying herb is burdock (*Arctium lappa*, p. 65), which is used extensively in both Western and Chinese medicine. Once herbs such as this reduce the toxic

“load,” the body is able to invest greater resources in repairing and strengthening damaged tissue and weakened organs.

The skin also plays an important role in good health. Antiseptic plants fight infection, while vulnerary (wound-healing) herbs such as comfrey (*Symphytum officinale*, p. 138) encourage blood clotting and help speed the healing of wounds.

Nervous, Endocrine, & Immune Systems

Good health depends on having a healthy, balanced nervous system. In order to ensure long-term good health of the nervous system, it is important to adapt well to life’s daily demands, to avoid excessive anxiety, worry, or depression, and to get sufficient rest and exercise.

The latest research shows that the nervous system does not work in isolation but is complemented by the endocrine system, which controls the release of a whole symphony of hormones, including the sex hormones, which control fertility and often affect vitality and mood. The nervous system is also intimately linked with the immune system, which controls the ability to resist infection and to recover from illness and injury.

This incredible complex of systems—part electrical, part chemical, part mechanical—must function harmoniously if good health is to be maintained. In health, the body has a seemingly infinite capacity, via its controlling systems, to adjust and change to external pressures. This ability to adapt to the external world while the body’s internal workings remain constant is known as *homeostasis*. Many herbs work with the immune, nervous, and endocrine systems to help the body adapt more effectively to stresses and strains of all kinds: physical, mental, emotional, and even spiritual. They are effective because they work in tune with the body’s processes.

Some herbs are *adaptogenic*, meaning that they have an ability to help people to adapt, either by supporting the nervous system and easing nervous and emotional tension, or by working directly with the body’s own physiological processes to maintain health. The prime example of an adaptogenic herb is ginseng (*Panax ginseng*, p. 118), which is an effective remedy at times of great mental or physical stress, but in certain cases can also be taken when a relaxing effect is required, for example to relieve headaches, or to ensure a good night’s sleep.

Complex Natural Medicines

As can be seen, an herb is not a “magic bullet” with a single action, but a complex natural medicine composed of many active constituents that work on different body systems. By combining scientific research into active constituents with clinical observation and traditional knowledge of the whole plant, we can develop a rounded picture of each herb’s range of medicinal uses.

Herbs & Body Systems

One of the most common ways of classifying medicinal plants is to identify their actions, for example whether they are sedative, antiseptic, or diuretic, and the degree to which they affect different body systems. Herbs often have a pronounced action on a particular body system, for example a plant that is strongly antiseptic in the digestive tract may be less so in the respiratory tract. Examples of how herbs work on the body are given below.

Skin

Antiseptics, e.g., tea tree (*Melaleuca alternifolia*, p. 112), disinfect the skin. *Emollients*, e.g., marshmallow (*Althea officinalis*, p. 165), reduce itchiness, redness, and soreness. *Astringents*, e.g., witch hazel (*Hamamelis virginiana*, p. 102), tighten the skin. *Depuratives*, e.g., burdock (*Arctium lappa*, p. 65), encourage removal of waste products. *Healing and vulnerary herbs*, e.g., comfrey (*Symphytum officinale*, p. 138) and calendula (*Calendula officinalis*, p. 73), aid the healing of cuts, wounds, and abrasions.



Calendula
(*Calendula officinalis*)

Immune system

Immune modulators, e.g., echinacea (*Echinacea* spp. p. 92) and pau d'arco (*Tabebuia* spp., p. 139), encourage the immune system to ward off infection.



Echinacea
(*Echinacea* spp.)

Respiratory system

Antiseptics and antibiotics, e.g., garlic (*Allium sativum*, p. 59), help the lungs resist infection. *Expectorants*, e.g., elecampane (*Inula helenium*, p. 107), stimulate the coughing up of mucus. *Demulcents*, e.g., coltsfoot (*Tussilago farfara*, p. 278), soothe irritated membranes. *Spasmolytics*, e.g., visnaga (*Ammi visnaga*, p. 62), relax bronchial muscles.



Garlic
(*Allium sativum*)

Endocrine glands

Adaptogens, e.g., ginseng (*Panax ginseng*, p. 118), help the body adjust to external pressures and stress. *Hormonally active herbs*, e.g., chaste tree (*Vitex agnus-castus*, p. 151), stimulate production of sex and other hormones. *Emmenagogues*, e.g., black cohosh (*Cimicifuga racemosa*, p. 79), encourage or regulate menstruation.



Ginseng
(*Panax ginseng*)

Urinary system

Antiseptics, e.g., buchu (*Barosma betulina*, p. 71), disinfect the urinary tubules. *Astringents*, e.g., horsetail (*Equisetum arvense*, p. 205), tighten and protect the urinary tubules. *Diuretics*, e.g., cornsilk (*Zea mays*, p. 154), stimulate the flow of urine.



Cornsilk
(*Zea mays*)

Musculoskeletal system

Analgesics, e.g., yellow jasmine (*Gelsemium sempervirens*, p. 216), relieve joint and nerve pain. *Anti-inflammatory*s, e.g., white willow (*Salix alba*, p. 129), reduce swelling and pain in joints. *Antispasmodics*, e.g., cinchona (*Cinchona* spp., p. 80), relax tense and cramped muscles.



White Willow
(*Salix alba*)

Nervous system

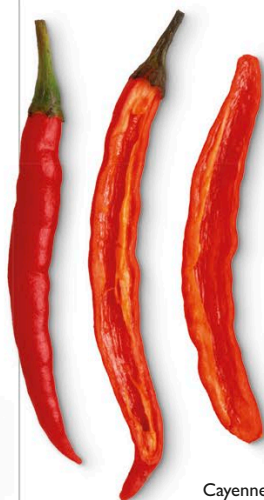
Nervines, e.g., rosemary (*Rosmarinus officinalis*, p. 128), support and strengthen the nervous system. *Relaxants*, e.g., lemon balm (*Melissa officinalis*, p. 113), relax the nervous system. *Sedatives*, e.g., mistletoe (*Viscum album*, p. 283), reduce nervous activity. *Stimulants*, e.g., kola nut (*Cola acuminata*, p. 192), increase nervous activity. *Tonics*, e.g., oats (*Avena sativa*, p. 175), improve nerve function and tone, and help to restore the nervous system as a whole.



Rosemary
(*Rosmarinus officinalis*)

Circulation & heart

Cardiotonics, e.g., dan shen (*Salvia miltiorrhiza*, p. 130), vary in action. Some slow heartbeat rate, while others increase it. Some improve the regularity and strength of the heart's contractions. *Circulatory stimulants*, e.g., cayenne (*Capsicum frutescens*, p. 74), improve the circulation of blood to the extremities. *Diaphoretics*, e.g., ju hua (*Chrysanthemum x morifolium*, p. 78), encourage blood flow to the surface of the body, promote sweating, and lower blood pressure. *Spasmolytics*, e.g., cramp bark (*Viburnum opulus*, p. 150), relax the muscles, helping to lower blood pressure.



Cayenne
(*Capsicum frutescens*)

Digestive organs

Antiseptics, e.g., ginger (*Zingiber officinale*, p. 155), protect against infection. *Astringents*, e.g., bistort (*Polygonum bistorta*, p. 253), tighten up the inner lining of the intestines and create a protective coating over them. *Bitters*, e.g., wormwood (*Artemisia absinthium*, p. 66), stimulate secretion of digestive juices by the stomach and intestines. *Carminatives*, e.g., sweet flag (*Acorus calamus*, p. 57), relieve gas and cramps. *Cholagogues*, e.g., fringe tree (*Chionanthus virginicus*, p. 188), improve the flow of bile into the intestines. *Choleretics*, e.g., artichoke (*Cynara scolymus*, p. 199), stimulate secretion of bile by the liver. *Demulcents*, e.g., psyllium (*Plantago* spp., p. 123), soothe the digestive system and protect against acidity and irritation. *Hepatics*, e.g., bupleurum (*Bupleurum chinense*, p. 72), prevent liver damage. *Laxatives*, e.g., senna (*Cassia senna*, p. 75), stimulate bowel movements. *Stomachics*, e.g., cardamom (*Elettaria cardamomum*, p. 93), protect and support the stomach.



Sweet Flag
(*Acorus calamus*)



Senna
(*Cassia senna*)

Active Constituents

The medicinal effects of certain plants are well known. German chamomile, for example, has been taken to soothe digestive problems for thousands of years, and aloe vera was known to Cleopatra as a healing skin remedy. It is only relatively recently, however, that active constituents responsible for the medicinal actions of plants have been isolated and observed. Knowing a little about the chemicals contained in plants helps you to understand how they work within the body.



Thyme
(*Thymus vulgaris*)

Phenols

Phenols are a very varied group of plant constituents ranging from salicylic acid, a molecule similar to aspirin (acetylsalicylic acid), to complex sugar-containing phenolic glycosides. Phenols are often anti-inflammatory and antiseptic, and are thought to be produced by plants to protect against infection and feeding by insects. Phenolic acids, such as rosmarinic acid, are strongly antioxidant and anti-inflammatory, and can also have antiviral properties. Wintergreen (*Gaultheria procumbens*, p. 215) and white willow (*Salix alba*, p. 129) both contain salicylates. Many mint family members contain phenols—for example, the strongly antiseptic thymol, found in thyme (*Thymus vulgaris*, p. 143).

Volatile Oils

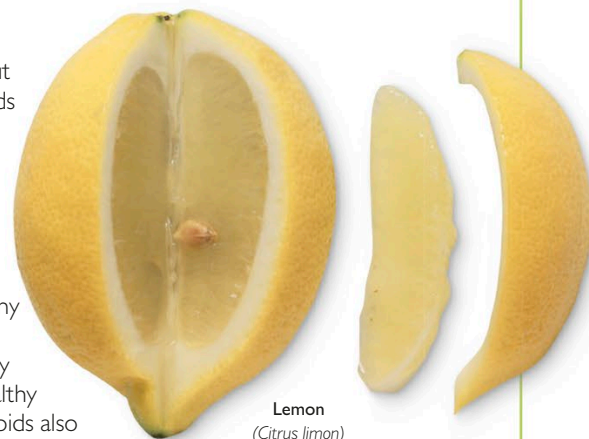
Volatile oils—which are extracted from plants to produce essential oils—are some of the most important medicinally active plant constituents, and are also used widely in perfumery. They are complex mixtures often of 100 or more compounds, mostly made up of monoterpenes—molecules containing 10 carbon atoms. Essential oils have many uses. Tea tree oil (*Melaleuca alternifolia*, p. 112) is strongly antiseptic, while sweet gale oil (*Myrica gale*, p. 238) is an effective insect repellent. On distillation, some essential oils contain compounds not found in the volatile oil—chamazulene, found in German chamomile (*Chamomilla recutita*, p. 77) essential oil, is anti-inflammatory and antiallergenic. Resins—sticky oily substances that seep from plants, for example from the bark of Scots pine (*Pinus sylvestris*, p. 249)—are often linked with essential oils (oleoresins) and gums (see Polysaccharides), though they are nonvolatile.



German Chamomile
(*Chamomilla recutita*)

Flavonoids

Found widely throughout the plant world, flavonoids are polyphenolic compounds that act as pigments, imparting color, often yellow or white, to flowers and fruits. They have a wide range of actions and many medicinal uses. They are antioxidant and especially useful in maintaining healthy circulation. Some flavonoids also have anti-inflammatory, antiviral, and liver-protective activity. Flavonoids such as hesperidin and rutin, found in many plants, notably buckwheat (*Fagopyrum esculentum*, p. 210) and lemon (*Citrus limon*, p. 82), strengthen capillaries and prevent leakage into surrounding tissues. Isoflavones, found for example in red clover (*Trifolium pratense*, p. 277), are estrogenic and valuable in treating menopausal symptoms.



Lemon
(*Citrus limon*)



Black Catechu
(*Acacia catechu*)

Tannins

Tannins are produced to a greater or lesser degree by all plants. The harsh, astringent taste of tannin-laden bark and leaves makes them unpalatable to insects and grazing animals. Tannins are polyphenolic compounds that contract and astringe tissues of the body by binding with and precipitating proteins—hence their use to “tan” leather. They also help to stop bleeding and to check infection. Tannin-containing herbs are used to tighten up over-relaxed tissues—as in varicose veins—to dry up excessive watery secretions—as in diarrhea—and to protect damaged tissue—such as skin problems resulting from eczema or a burn. Oak bark (*Quercus robur*, p. 260) and black catechu (*Acacia catechu*, p. 158) are both high in tannins.

Proanthocyanins

Closely related to tannins and flavonoids, these polyphenolic compounds are pigments that give flowers and fruits a blue, purple, or red hue. They are powerfully antioxidant and free-radical scavengers. They protect the circulation from damage, especially the circulation in the heart, hands, feet, and eyes. Blackberry (*Rubus fruticosus*, p. 264), red grapes (*Vitis vinifera*, p. 283), and hawthorn (*Crataegus oxycantha*, p. 87) all contain appreciable quantities of these proanthocyanins.



Blackberry
(*Rubus fruticosus*)

Coumarins

Coumarins of different kinds are found in many plant species and have widely divergent actions. The coumarins in melilot (*Melilotus officinalis*, p. 234) and horse chestnut (*Aesculus hippocastanum*, p. 58) help to keep the blood thin, while furanocoumarins such as bergapten, found in celery (*Apium graveolens*, p. 64), stimulate skin tanning, and khellin, found in visnaga (*Ammi visnaga*, p. 62), is a powerful smooth-muscle relaxant.



Celery
(*Apium graveolens*)

Saponins

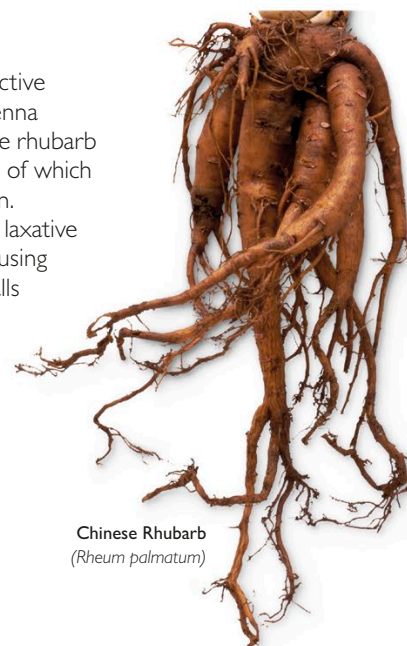
The main active constituents in many key medicinal plants, saponins gained their name because, like soap, they make a lather when placed in water. Saponins occur in two different forms—steroidal and triterpenoid. The chemical structure of steroidal saponins is similar to that of many of the body's hormones, for example estrogen and cortisol, and many plants containing them have a marked hormonal activity. Wild yam (*Dioscorea villosa*, p. 91), from which the contraceptive pill was first developed, contains steroidal saponins. Triterpenoid saponins occur more commonly—for example in licorice (*Glycyrrhiza glabra*, p. 101) and cowslip root (*Primula veris*, p. 256)—but have less hormonal activity. They are often expectorant and aid absorption of nutrients.



Licorice
(*Glycyrrhiza glabra*)

Anthraquinones

Anthraquinones are the main active constituents in herbs such as senna (*Cassia senna*, p. 75) and Chinese rhubarb (*Rheum palmatum*, p. 126), both of which are taken to relieve constipation. Anthraquinones have an irritant laxative effect on the large intestine, causing contractions of the intestinal walls and stimulating a bowel movement approximately 10 hours after being taken. They also make the stool more liquid, easing bowel movements.



Chinese Rhubarb
(*Rheum palmatum*)

Cardiac Glycosides

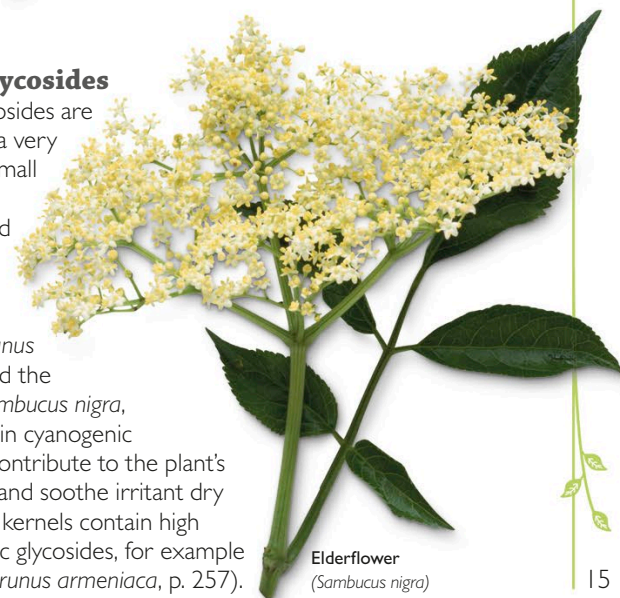
Found in various medicinal plants, notably in foxgloves (see common foxglove, *Digitalis purpurea*, p. 202) and in lily of the valley (*Convallaria majalis*, p. 194), cardiac glycosides such as digitoxin, digoxin, and convallotoxin have a strong, direct action on the heart, supporting its strength and rate of contraction when it is failing. Cardiac glycosides are also significantly diuretic. They help to stimulate urine production, thus increasing the removal of fluid from the tissues and circulatory system.



Common Foxglove
(*Digitalis purpurea*)

Cyanogenic glycosides

Though these glycosides are based on cyanide, a very potent poison, in small doses they have a helpful sedative and relaxant effect on the heart and muscles. The bark of wild cherry (*Prunus serotina*, p. 257) and the leaves of elder (*Sambucus nigra*, p. 132) both contain cyanogenic glycosides, which contribute to the plant's ability to suppress and soothe irritant dry coughs. Many fruit kernels contain high levels of cyanogenic glycosides, for example those of apricot (*Prunus armeniaca*, p. 257).



Elderflower
(*Sambucus nigra*)

Polysaccharides

Found in all plants, polysaccharides are multiple units of sugar molecules linked together. From an herbal point of view, the most important polysaccharides are the “sticky” mucilages and gums, which are commonly found in roots, bark, leaves, and seeds. Both mucilage and gum soak up large quantities of water, producing a sticky, jelly-like mass that can be used to soothe and protect irritated tissue, for example, dry irritated skin and sore or inflamed mucous membranes in the gut. Mucilaginous herbs, such as slippery elm (*Ulmus rubra*, p. 145) and linseed or flaxseed (*Linum usitatissimum*, p. 109), are best prepared by soaking (macerating) in plenty of cold water. Some polysaccharides stimulate the immune system, for example acemannan, which is found in the leaves of aloe vera (*Aloe vera*, p. 60).



Slippery Elm
(*Ulmus rubra*)



Radish
(*Raphanus sativus*)

Glucosilicates

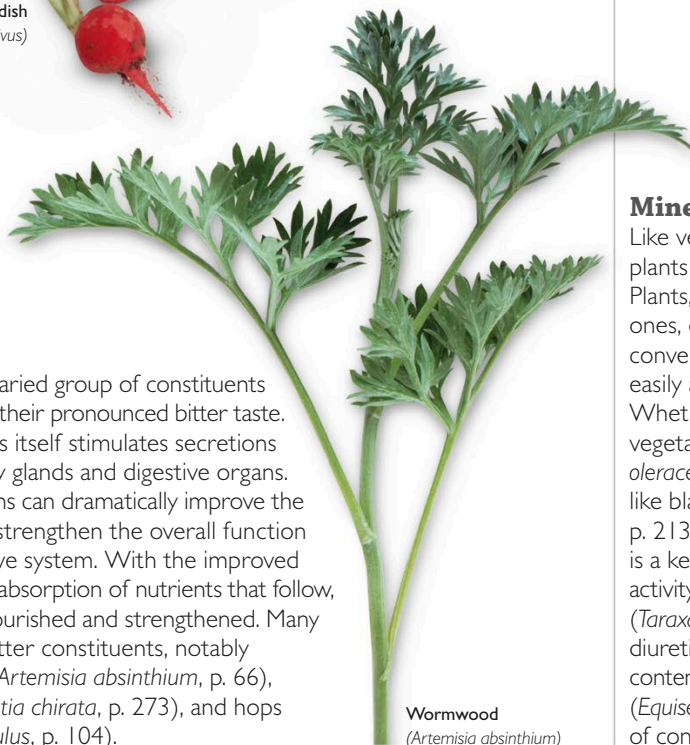
Found exclusively in species of the mustard and cabbage family, glucosilicates have an irritant effect on the skin, causing inflammation and blistering. Applied as poultices to painful or aching joints, they increase blood flow to the affected area, helping to remove the buildup of waste products (a contributory factor in many joint problems). On eating, glucosilicates are broken down and produce a strong, pungent taste. Radish (*Raphanus sativus*, p. 261) and watercress (*Nasturtium officinale*, p. 239) are typical glucosilicate-containing plants.



Dog Rose
(*Rosa canina*)

Bitters

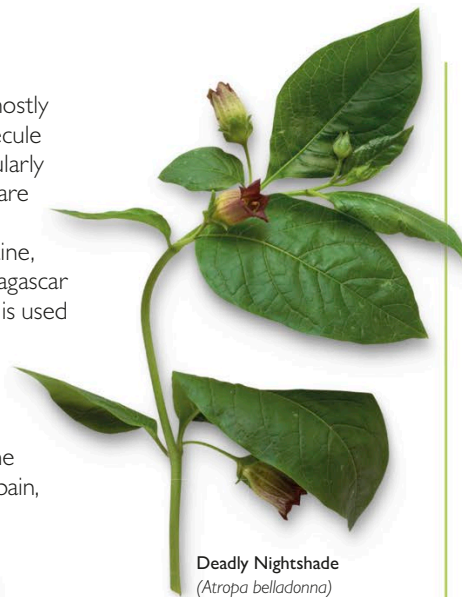
Bitters are a varied group of constituents linked only by their pronounced bitter taste. The bitterness itself stimulates secretions by the salivary glands and digestive organs. Such secretions can dramatically improve the appetite and strengthen the overall function of the digestive system. With the improved digestion and absorption of nutrients that follow, the body is nourished and strengthened. Many herbs have bitter constituents, notably wormwood (*Artemisia absinthium*, p. 66), chiretta (*Swertia chirata*, p. 273), and hops (*Humulus lupulus*, p. 104).



Wormwood
(*Artemisia absinthium*)

Alkaloids

A very mixed group, alkaloids mostly contain a nitrogen-bearing molecule ($-NH_2$) that makes them particularly pharmacologically active. Some are well-known drugs and have a recognized medical use. Vincristine, for example, derived from Madagascar periwinkle (*Vinca rosea*, p. 282), is used to treat some types of cancer. Other alkaloids, such as atropine, found in deadly nightshade (*Atropa belladonna*, p. 69), have a direct effect on the body, reducing spasms, relieving pain, and drying up bodily secretions.



Deadly Nightshade
(*Atropa belladonna*)

Vitamins

Though often overlooked, many medicinal plants contain useful levels of vitamins. Some are well known for their vitamin content, for example dog rose (*Rosa canina*, p. 263) has high levels of vitamin C, and carrot (*Daucus carota*, p. 201) is rich in beta-carotene (pro-vitamin A), but many are less well recognized.

Watercress (*Nasturtium officinale*, p. 239), for example, contains appreciable levels of vitamins B₁, B₂, C, and E as well as beta-carotene, while sea buckthorn (*Hippophae rhamnoides*, p. 220) can be regarded as a vitamin and mineral supplement in its own right.

Minerals

Like vegetable foods, many medicinal plants provide high levels of minerals. Plants, especially organically grown ones, draw minerals from the soil and convert them into a form that is more easily absorbed and used by the body. Whether plants are eaten as a vegetable, like cabbage (*Brassica oleracea*, p. 180), or taken as a medicine, like bladderwrack (*Fucus vesiculosus*, p. 213), in many cases the mineral content is a key factor in the plant's therapeutic activity within the body. Dandelion leaf (*Taraxacum officinale*, p. 141) is a potent diuretic, balanced by its high potassium content, while the high silica content of horsetail (*Equisetum arvense*, p. 205) supports the repair of connective tissue, making it useful in arthritis.



Dandelion
(*Taraxacum officinale*)

Quality control

Making the most of herbal medicine means ensuring that herbs and herbal products used are of good quality—properly grown, well dried, correctly processed, and within their sell-by date. Using poor-quality herbal produce is all too often a waste of money since there is the strong possibility that you will receive little benefit from it. When it comes to herbal medicine, quality is everything.



Quality is vital for herbal medicine. Without a guarantee that the correct herb of the right quality is being used, it is hard to be confident that the medicine will prove effective. In fact, one reason why the medical profession has generally preferred conventional medicines to herbal ones is the difficulty of guaranteeing quality in herbal remedies. Many herbal products on the market are of high quality but some can be very poor. A 2006 U.S. study of black cohosh (*Cimicifuga racemosa*, p. 79) found that only 7 out of 11 over-the-counter products tested contained what was stated on the label. Four contained a cheaper Chinese species instead. The adulteration of herbal products, particularly in Chinese and Indian herbs sold in the West is, regrettably, not unusual.

Herb quality may be affected not only by deliberate adulteration, but by the use of wrongly identified or poor-quality material. The herb may have been poorly harvested, dried, or stored, or it may be old or decayed. It may even be that the wrong herb was used. In each case, the lack of attention to quality results in a product with reduced medicinal value—or even none at all.

To try to ensure that only good-quality products are made, manufacturers of genuine herbal medicines use strict quality-

control procedures. Usually this involves comparing the dried herb material with listings in an herbal or national pharmacopeia (a standard reference work that gives the characteristics one would expect to find when analyzing a specific herb). Quality control involves making routine checks to establish that the herbal material is what it claims to be and that it meets a number of minimum requirements. The material is inspected with the naked eye, and assessed microscopically, to see if its botanical profile matches the standard. Other checks are made to see whether it contains appropriate levels of active constituents and to ensure that the material is free from contamination.

More sensitive quality-control methods, however, recognize that the quality of an herb does not depend simply on the presence of one or two key active constituents. Increasingly, people in the world of herbal medicine are focusing on the “fingerprint” of an herb—the unique chemical profile that represents the complex pattern of constituents found when good-quality dried herb material is analyzed by sensitive scientific machinery. By monitoring the sample and comparing it with this unique fingerprint, it is possible to make a much broader assessment of quality than when using only one or two constituents as a standard.

Buying Herbal Medicines

What should you look for when buying herbal medicines? It is usually most convenient to buy capsules, tablets, essential oils, pessaries, and perhaps tinctures, and to make up your own infusions, decoctions, and syrups (see p. 291 and p. 293).

- Buy from a reputable herb store, staffed by people knowledgeable about herbal medicines.
- Only buy herbs online from established herbal suppliers.
- Buy organic herbs and products where available.



Calendula

Buying Dried Herbs

Dried herbs are generally available from herbal suppliers. Buying from shops is preferable to buying online because the herbs can be examined before purchasing. However, it is possible some online companies may supply fresher herbs due to higher turnover. To gain the best medicinal effect, good-quality produce is essential. Shop around and bear in mind the following points before buying:

- Herbs should not be stored in clear glass jars or in direct sunlight, as this causes oxidation, which affects their efficacy.

- Good-quality aromatic herbs should have a distinct scent and taste.
- Check for signs of infestation due to poor drying techniques, or adulteration. This can sometimes be recognized by the presence of dried grass or other non-medicinal material in the jar.
- Herbs lose their color as they age. Look for bright material that has been well dried and stored, and that is not too old. Calendula flowers (*Calendula officinalis*, p. 73) that are a vivid yellow/orange color are likely to make good medicine. If they have been sitting on a shelf for 18 months, they will probably look drab and pale.

Buying Herbal Products

When buying products such as capsules, tablets, essential oils, pessaries, and tinctures, always check the label on the jar or packet. If it does not do the following, do not buy it:

- Name all constituents of the product
- State the recommended daily dosage
- State the weight of each capsule or tablet, or volume of bottle
- List the weight of each constituent of a capsule, tablet, etc.
- List the ratio of herb in the product (for example, 1:3, meaning 1 part herb to 3 parts liquid).



Early Origins to the 19th Century

In an age of medical specialization in which an expert in neurology will know little about the latest developments in medicine for the ear, nose, and throat, it is difficult to imagine the practices of an earlier time, when healing was holistic in nature and heavily reliant on magic, mysticism, and age-old oral traditions.

From the earliest times, medicinal plants have been crucial in sustaining the health and the well-being of mankind. Flaxseed (*Linum usitatissimum*, p. 109), for example, provided its harvesters with a nutritious food oil, fuel, a cosmetic balm for the skin, and fiber to make fabric. At the same time it was used to treat conditions such as bronchitis, respiratory congestion, boils, and a number of digestive problems. Given the life-enhancing benefits that this and so many other plants conferred, it is hardly surprising that most cultures believed them to have magical as well as medicinal abilities. It is reasonable to assume that for tens of thousands of years herbs were probably used as much for their ritual magical powers as for their medicinal qualities. A 60,000-year-old burial site excavated in Iraq, for instance, was found to



Mistletoe, which the Druids called “golden bough,” had a central place in their shamanistic religious and healing ceremonies. The Druids had a well-developed knowledge of medicinal plants.



contain eight different medicinal plants, including ephedra (*Ephedra sinica*, p. 95). The inclusion of the plants in the tomb suggests they had supernatural significance as well as medicinal value.

In some cultures, plants were considered to have souls. Even Aristotle, the 4th-century BCE Greek philosopher, thought that plants had a “psyche,” albeit of a lesser order than the human soul. In Hinduism, which dates back to at least 1500 BCE, many plants are sacred to specific divinities. For example, the bael tree (*Aegle marmelos*, p. 161) is said to shelter Shiva, the god of health, beneath its branches.

In medieval Europe, the Doctrine of Signatures stated there was a connection between how a plant looked—God’s “signature”—and how it might be used medicinally. For example, the mottled leaves of lungwort (*Pulmonaria officinalis*, p. 259) were thought to resemble lung tissue, and the plant is still used to treat ailments of the respiratory tract.

Even in Western cultures, beliefs in plant spirits linger: Until the first half of the 20th century, British farm workers would not cut down elder trees (*Sambucus nigra*, p. 132) for fear of arousing the anger of the Elder Mother, the spirit who lived in and protected the tree.

In a similar vein, native peoples of the Andes in South America believe that the coca plant (*Erythroxylum coca*, p. 206) is protected by Mama Coca, a spirit who must be respected and placated if the leaves are to be harvested and used.

Shamanistic Medicine

In many traditional societies today, the world is believed to be shaped by good and evil spirits. In these societies, illness is thought to stem from malignant forces or possession by evil spirits. If a member of the tribe falls ill, the shaman (the “medicine” man or woman) is expected to intercede with the spirit world to bring about a cure. Shamans often enter the spiritual realm with the aid of hallucinogenic plants or fungi, such as ayahuasca (*Banisteriopsis caapi*, p. 176), taken by Amazonian shamans, or fly agaric (*Amanita muscaria*), taken by traditional healers of the Siberian steppes.

At the same time, the shaman provides medical treatment for the physical needs of the patient—putting salves and compresses on wounds, boiling up decoctions and barks for internal treatment, stimulating sweating for fevers, and so



Shiva, the Hindu god who oversees health, is traditionally thought to live under the bael tree, an important medicinal plant in India.

on. Such treatment is based on a wealth of acutely observed plant lore and knowledge, handed down in an oral tradition from generation to generation.

The Development of Medicinal Lore

It is generally recognized that our ancestors had a wide range of medicinal plants at their disposal, and that they likewise possessed a profound understanding of plants' healing powers. In fact, up until the 20th century, every village and rural community had a wealth of herbal folklore. Tried and tested local plants were picked for a range of common health problems and taken as teas, applied as lotions, or even mixed with lard and rubbed in as an ointment.

But what were the origins of this herbal expertise? There are no definitive answers. Clearly, acute observation coupled with trial and error has played a predominant role. Human societies have had many thousands of years to observe the effects—both good and bad—of eating a particular root, leaf, or berry. Watching the behavior of animals after they have eaten or rubbed against certain plants has also added to medicinal lore. If one watches sheep or cattle, they almost unerringly steer a path past poisonous plants such as ragwort

(*Senecio jacobaea*) or oleander (*Nerium oleander*). Over and above such close observation, some people have speculated that human beings, like grazing animals, have an instinct that recognizes poisonous as opposed to medicinal plants.

Ancient Civilizations

As civilizations grew from 3000 BCE onward in Egypt, the Middle East, India, and China, so the use of herbs became more sophisticated, and the first written accounts of medicinal plants were made. The Egyptian Ebers papyrus of c. 1500 BCE is the earliest surviving example. It lists dozens of medicinal plants, their uses, and related spells and incantations. The herbs include myrrh (*Commiphora molmol*, p. 85), castor oil (*Ricinus communis*, p. 262), and garlic (*Allium sativum*, p. 59).



Castor oil plant has been used medicinally for about 4000 years.

In India, the *Vedas*, epic poems written c. 1500 BCE, also contain rich material on the herbal lore of that time. The *Vedas* were followed in about 400 BCE by the *Charaka Samhita*, written by the physician Charaka. This medical treatise includes details of around 350 herbal medicines. Among them are visnaga (*Ammi visnaga*, p. 62), an herb of Middle Eastern origin that has recently proven effective in the treatment of asthma, and gotu kola (*Centella asiatica*, p. 76), which has long been used to treat leprosy.

Medicine Breaks from its Mystical Origins

By about 500 BCE in developed cultures, medicine began to separate from the magical and spiritual world. Hippocrates (460–377 BCE), the Greek “father of medicine,” considered illness to be a natural rather than a supernatural phenomenon, and he felt that medicine should be given without ritual ceremonies or magic.

In the earliest Chinese medical text, the *Yellow Emperor's Classic of Internal Medicine* written in the 1st century BCE, the emphasis on rational medicine is equally clear: “In treating illness, it is necessary to examine the entire context, scrutinize the



The bump in the right cheek of this Peruvian figurine may represent coca, taken in that country to increase endurance.

symptoms, observe the emotions and attitudes. If one insists on the presence of ghosts and spirits one cannot speak of therapeutics.”

Foundation of Major Herbal Traditions

300 BCE–600 CE

Trade between Europe, the Middle East, India, and Asia was already well under way by the 2nd century BCE, and trade routes became established for many medicinal and culinary herbs. Cloves (*Eugenia caryophyllata*, p. 97), for example, which are native to the Philippines and the Molucca Islands near New Guinea, were imported into China in the 3rd century BCE, and first arrived in Egypt around 176 CE. As the centuries passed, the popularity of cloves grew, and by the 8th century CE, their strong aromatic flavor and powerfully antiseptic and analgesic properties were familiar throughout most of Europe.



Galen's "four humors," which he believed made up the human constitution.

As trade and interest in herbal medicines and spices flourished, various writers tried to make systematic records of plants with a known medicinal action and record their properties. In China, the *Divine Husbandman's Classic* (*Shen'ning Bencaojing*), written in the 1st century CE, has 364 entries, of which 252 are herbal medicines, including bupleurum (*Bupleurum chinense*, p. 72), coltsfoot (*Tussilago farfara*,

p. 278), and gan cao (*Glycyrrhiza uralensis*). This Daoist text laid the foundations for the continuous development and refinement of Chinese herbal medicine up to the present day.

In Europe, a 1st-century CE Greek physician named Dioscorides wrote the first European herbal, *De Materia Medica*. His intention was to produce an accurate and authoritative work on herbal medicines, and in this he was dramatically successful. Among the many plants mentioned are juniper (*Juniperus communis*, p. 224), elm (*Ulmus carpinifolia*), peony (*Paeonia officinalis*, p. 243), and burdock (*Arctium lappa*, p. 65). The text, listing about 600 herbs in all, was to have an astonishing influence on Western medicine, being the principal reference used in Europe until the 17th century. It was translated into languages as varied as Anglo-Saxon, Persian, and Hebrew. In 512 CE, *De Materia Medica* became the first herbal to feature pictures of the plants discussed. Made for Juliana Arnicia, the daughter of the Roman emperor Flavius Avicius Olybrius, it contained nearly 400 full-page color illustrations.



Frontispiece decoration for the first illustrated herbal, Dioscorides' *De Materia Medica*, produced in Constantinople in 512 CE.

Galen (131–200 CE), physician to the Roman emperor Marcus Aurelius, had an equally profound influence on the development of herbal medicine. Galen drew inspiration from Hippocrates and based his theories on the "theory of the four humors" (see p. 32). His ideas shaped and, some would say, distorted medical practice for the next 1,400 years.

In India and in China, elaborate medical systems somewhat resembling the theory of the four humors developed (see pp. 36–38 and pp. 40–41 respectively) that have endured to the present day.

Though European, Indian, and Chinese systems differ widely, they all consider that imbalance within the constituent elements of the body is the cause of illness, and that the aim of the healer is to restore balance, often with the aid of herbal remedies.

Folk Healing in the Middle Ages

The theories of Galenic, Ayurvedic (Indian), and Chinese traditional medicine, however, would have meant practically nothing to most of the world's population. As is still the case today for some indigenous peoples who have little access to conventional medicines, in the past most villages and communities relied on the services of local "wise" men and women for medical treatment. These healers were almost certainly ignorant of the conventions of scholastic medicine, yet through apprenticeship and practice in treating illness, attending childbirth, and making use of locally growing herbs as a natural pharmacy, they developed a high level of practical medical knowledge.