5

The Pharmacology of Sacred Plants, Herbs, and Roots

John Scarborough

Greek botany produced the landmark *Inquiry into Plants* by Theophrastus of Eresus (c. 370–288 B.C.),[1] and this work stands as one of the most remarkable documents of the Peripatetic school.[2] Along with his *Causes of Plants,*[3] Theophrastus' *Inquiry* set a pattern followed in Western botany until the invention of a sexual parts nomenclature by Linnaeus in the eighteenth century.[4] Yet, although morphology dominates Theophrastus' *Inquiry,* one finds at the end of the tract an account of herbal lore, the first such work on herbal pharmacy to survive in Greek.[5] The *Inquiry* was set down by about 300 B.C. and reflects the standards of Aristotle and his general ἱστορίαι, in which data were gathered and organized into particular subjects of knowledge, for instance, a history of medicine by Meno,[6] numerous histories of city constitutions (of which only one survives, the famous *Constitution of the Athenians*),[7] and so on.

Book IX of Theophrastus' *Inquiry* from time to time employs "facts" that come from folk medicine sources, generally labeled the ῥιζοτόμοι;[8] these were a semiprofessional class of "rootcutters" who had their own standards of knowledge and whose folklore about various roots and herbs mirror the deepest traditions of Greek "inquiry" on several, simultaneously applied levels from pure "magic" to utter rationalism. This mixture of assumptions about plants observed in book IX of the *Inquiry into Plants* has caused some modern scholars great discomfort as they attempt to "explain" the irrational elements, while preserving the basic format of Theophrastus' presumably "scientific" gathering of data about herbs and drugs made from plants.[9]

In some respects, this medley of approaches need not be dissected, since the multicombination of views—whether described as magical or religious or rational—had been characteristic of Greek thought since the days of Homer.[10] The amalgamation of the rational with the irrational regarding herbs and drugs received an initial form in the *Iliad* and *Odyssey,* a form that would remain rather typical of Greek thinking on drug lore from Homeric Greece through the later centuries when the *Papyri Graecae Magicae* were composed. Quite seriously, Herophilus could say that "drugs are the hands of the gods,"[11] a significant quotation when one considers that the man who reputedly made this statement was one of the famous medical researchers at the Ptolemaic Museum in the 270s and 260s B.C.;[12] moreover it is Galen of Pergamon (129–after 210 A.D.) who embeds Herophilus' phrase in a consideration of drugs, apparently with tacit approval. Thus the blend of the rational with the divine would also be characteristic of the so-called scientific levels of Greco-Roman pharmacy, while even such as Dioscorides (fl. c. 65 A.D.) and Galen sought to "explain" drug action within intellectual patterns of natural theory that evolved gradually from pre-Socratic philosophy.

THE INITIAL INTELLECTUAL CONTEXT: HOMER'S "ILIAD" AND "ODYSSEY"

Even though there is some evidence to suggest a carryover into Homeric times of Mycenaean practices in drug lore,[13] it is in the Homeric epics that one first discerns a clear idea of a "drug" among the Greeks, represented in its broadest meaning by φάρμακον. Standing alone, the word means "magic" or "charm" or "enchantment," but eight adjectives used by Homer divide φάρμακον into variations of effects, ranging from the extremely harmful (a poison) to very beneficial (a remedy).[14] The contrast in effects of φάρμακα is well illustrated in a single episode from the *Odyssey*.[15] Circe has agreed to change Odysseus' men back into their proper forms, and she administers φάρμακον ἄλλο for this purpose,[16] as contrasted to the φάρμακον οὐλόμενον that had changed them into swine.[17] The "other drug" (or "spell," here) is for benefit, whereas the "evil drug" previously given has turned men into pigs. Homer, of course, is not interested in speaking about the actual substances that might be part of either φάρμακον but only about their effects. Circe herself is one of the first figures in Western literature to represent a skilled sorceress, and her talents include manipulation of the poisons and remedies, known apparently from mythic and folk traditions.[18] Yet her craft is powerless against a φάρμακον that Homer calls μῶλυ,[19] described as having a black root and a "flower like milk,"[20] that protects the hero against Circe's wiles as she "prepared . . . a potion (κυκεών) in a cup of gold . . . and put in it a drug (φάρμακον) with evil intent in her heart."[21] Μῶλυ is a gift to Odysseus from Hermes, and the poet notes that this is what the gods call it,[22] but that the root is difficult for mortals to dig up.[23] Homer does not say *how* the herb (if that is what μῶλυ is)[24] protects Odysseus, and one learns neither whether the hero drank it in a countermeasure before his meeting with the sorceress or chewed the root nor anything substantive that might show how Odysseus' shield against Circe's φάρμακον in the κυκεών was achieved.

Although Homer does not specify the particulars of his drug lore, it would not be completely accurate to characterize these veiled lines about φάρμακα as simply magical.[25] Lloyd suggests that there is a combination of divine and nondivine assumption in the φύσις of the μῶλυ that Hermes showed Odysseus,[26] and another interpretation of this passage argues that this early use of φύσις means a thing's "appearance."[27] A further level of meaning may be gleaned if one also assumes a primary sense of *growth*, "the natural form being thought of as the result of growth."[28] These may be more sophisticated analyses than the poet ever intended, but coupled with the vague generalities about healing and harmful substances are clear indications of an ongoing inquiry into such matters, albeit rather muffled. In the *Odyssey* one reads of a drug that "quiets all pains and quarrels," a beneficial drug

that comes from Egypt, where the land brings forth many φάρμακα, both good and ill "when they are mixed."[29] The poet adds that Egypt is a country where every man is a physician, "learned above the rest of mankind."[30] The beneficial drug from Egypt is probably the opium poppy, mentioned in the *Iliad* as a plant that "bows its head to one side [and] in a garden is heavy with its fruit and the spring rains."[31] *Fruit* appears to be poetic license for the "poppy juice" as it drips from the head when harvested by slitting,[32] and the ripe opium poppies are indeed slit for their valuable exudations in the spring.[33] This is solid information interwoven by the poet into his episode about Gorgythion's death from an arrow shot by Teucer, and it can be argued that those who were listening to the poet's song[34] would have known what the pain-killing drug from Egypt actually might be. Poets and playwrights certainly must make allusions to substances with which their audiences would be familiar, and it seems reasonable to suppose that Greek listeners of the eighth or seventh centuries B.C. were acquainted with the powers and properties of the opium poppy (*Papaver somniferum* L.), which had already enjoyed a long history in ancient drug lore[35] and would continue to do so.

Homer couches his account of mixing opium with wine in a context of god-delivered and god-derived powers and knowledge,[36] and it is again a woman (Helen, daughter of Zeus) who possesses this specialized skill, making a link with the drug and sexual sorcery recorded of Circe.[37] Yet even though Homer emphasizes a mythological setting of treacherous females who "know" the plants and drugs, modern scholars are ill advised in presuming that the lore of drugs and poisons is used exclusively by women, in spite of the perpetuation by males of this quasi-mythology in texts ranging as widely as Sophocles, Seneca, and Petronius: anonymous gathering of pharmacological data, especially those of magical importance, has both male and female antecedents.[38] Moreover, Homer specifies a geographic origin for his drug, indicating something more than purely mythical explanation or a complete dependence upon the well-known tales he fused into the *Iliad* and *Odyssey*. Some modern scholars may be right as they connect the myths of Greek antiquity with a more generalized and universal mythology as revealed by sexual themes and similar motifs,[39] but Homer designates too many specific plants for one to assume a totally mythical context. Curiously enough, *Papaver somniferum* originated in Asia Minor,[40] so that the poet would be speaking of a "local" plant, even though the drug allegedly came from Egypt. Importantly, the episode of Hermes's gift of a φάρμακον to Odysseus is one of the rare examples of the appearance of magic in the Homeric poems.

In its broader setting, the "profession" of medicine is mentioned with some respect by Homer, and it is significant that those who are knowledgeable of matters medical and herbal were among the few traveling, skilled craftsmen (δημιουργοί) made welcome in the settlements of Homer's world, perhaps a reflection of a continuous and gradual infiltration of medical and herbal lore from the Near East and Egypt, as argued by Burkert.[41] If correct, Burkert's hypothesis may indicate why later Greek medicine—especially among the Hippocratic physicians—remained tied to a long-standing custom of being a "family trade," in which specifics of the medical craft descended through the generations by means of elders imparting skills to the youths of the family. Δημιουργός is the term for "physician" as late as Plato and the Hippocratic *Ancient Medicine*,[42] but δημιουργός had become the

word applied to a less-than-expert medical man if Aristotle's famous distinction between δημιουργοί and ἀρχιτεκτονικοί[43] records an aspect of this hoary tradition going back into Homeric Greece. The semilegendary Epimenides, a ῥιζοτόμος ("rootcutter") and traveling purifier a century before Socrates and Plato[44] is probably typical of the δημιουργοί in the sixth and fifth centuries B.C., and the common presence of such practitioners may have induced Plato to observe how Homeric medicine failed to consider internal diseases or ailments,[45] not to speak of the medical theories assumed for regimen and specific treatments. Later writers provide similar observations.[46] Celsus (*Med.*, proem. 3) gives a typical description of just what Homeric medicine and pharmacy was: "They only treated wounds with the knife and with drugs."[47] *Medicamenta* were part of this earliest form of medical care, as far as later Greek and Roman writers were concerned, but the aspect that Celsus terms (from his Greek sources) διαιτητική came only "after greater attention was paid to literary discipline,"[48] by which (he explains) he means the rise of Greek philosophy and philosophers. And since *vulneribus ferro mederi* was common in Homeric times, "the knowledge of anatomy evidenced in the poems is almost as sophisticated as that in the Hippocratic writings, and indeed anywhere before the serious study of anatomy in the Hellenistic period."[49]

One can conclude that Homer's warriors and the itinerant δημιουργοί might have reasonable knowledge of anatomy as it would be appropriate for the treatment of wounds, but there is something faulty in the "doxographical" approach to the Homeric poems. Searching for verbal carryovers that can be specified in later Greek literature falsifies the living quality of the Greek in Homer's poems, although the language of epic generally is conservative and archaic and tends to be dignified. Onians has aptly observed that early Greek was marvelously fluid in description of thought, intelligence, and consciousness,[50] and it becomes somewhat futile to chase identities of plants in the *Iliad* and *Odyssey*, unless there is particular evidence (internal or external) supporting special nomenclature. Reading, for example, "onion" or "garlic" or "snowdrop"[51] for Homer's μῶλυ is founded simply on the presumption that later Greek sources record an earlier meaning or that specific antidotes can be matched with specific poisons (snowdrop to counteract stramonium, for example) when there is no evidence in the texts that such identities were assumed. In fact, what Plato, Celsus, and Galen say about early medical and pharmacological thinking, as revealed in the Homeric epics, suggests a lack of concern regarding "naming" things except in association with deities, events, or repeated epithets. In later Greek botany and pharmacy, the characteristic use of particular nomenclatures would find full expression after the rise of philosophy and philosophers—to paraphrase Celsus.

All cultures have basic assumptions about health and disease,[52] so that one can presume Homer's Greek world had appropriate concepts that included "how drugs worked." In contrast to the exorcism displayed in many worldwide systems of treatment,[53] Homeric medicine and drug lore do not exhibit an "expelling" function, although occasional chants might be added after soothing medicines were applied to wounds.[54] One can argue that since the "causes" of the wounds and fractures mentioned by Homer are obvious, there would be little need to assume divine or pseudodivine forces to explain the nature of these manifest injuries; but commonly occurring fevers, headaches, and like "diseases" ("symptoms" in modern diagnos-

tics) probably required religious expertise to ascertain their causes and thereby to prescribe treatments. If Homeric medicines did not perform an "expelling" role, there must have been other fundamental actions assumed for drugs, explanations for "how drugs work." If Smith is correct, early Greek medicine and pharmacy combine theurgy (in its widest sense of supernatural or divine agencies in both diseases and their treatments) with the practical application of drugs,[55] foreshadowing later abstractions so common in medicophilosophical thought in later Greek medicine. Theurgy remained fundamental throughout Greek history even after the accession of Christianity,[56] and theurgy continued to exist side by side with other "medical intervention" systems. Early Greek theurgy and theurgic medicine and drug lore had no specific concepts about what a disease would be "in advance of an attack," unlike other theurgic approaches that supposed invading spirits (among a number of agents) against which theurgic medicine and pharmacy might be directed.[57] Homer's poems depict gods and goddesses acting on and through "natural" forces. Thus, on Smith's hypothesis, Homeric theurgic medicine and pharmacology would presume "natural causes" for illnesses but would also use supernatural powers as a portion of the "explanation" of how and why the disease came into being. Homeric similes give only the top layer of assumptions about how man is related to the life of other things generally, and Homer's comparisons between men and stalks of wheat, leaves, and animals are familiar. Underneath such similes is a series of primary concepts about man and his growth, maturity, and withering, processes analogous to those observed among plants and in an everyday manner in agriculture.

Homer's *Iliad* and *Odyssey* supply plain evidence, in early Greek intellectual contexts, of concepts about the workings of drugs; and by employing certain adjectives to focus these concepts[58] Homer "explains" how "good drugs" or "bad drugs" might function. Also there *is* an ideal environment, a place where good health is normal and where φάρμακα apparently would be neither feared nor used for cures: this is the Elysian Plain, where Menelaus will go instead of dying, and in this perfect setting there are no harsh weather patterns. To the Elysian Plain continually blows Zephyros' breeze, always "to revive men."[59] Weather magic and medical skills seem intimately joined by Homer, a connection also observed in the Homeric *Hymn to Pythian Apollo* (lines 189–94) and especially in Empedocles (Frag. 101 Wright = Frag. 111 DK): "You will learn drugs [φάρμακα] for ailments and for help against old age. . . . You will check the force of tireless winds, which sweep over the land destroying fields with their blasts, . . . you will bring back restorative breezes, . . . you will bring out of Hades the life-force of a dead man."[60] Homeric imagery (certainly echoed by Empedocles) suggests how drugs are compounded from elements of divinity—as is revealed in commonly known myths—and then are fused by means of an ever-present lore of agriculture, providing an essential context for hearers of the poems.

FROM HOMER TO THEOPHRASTUS

Even as one leaves the era of the Homeric epic, one notes that there is much disagreement about what *should* be accepted as knowledge of plants and herbs,

particularly in regard to basic farm lore itself. Hesiod most assuredly knows practical botany, but except for some carefully sarcastic lines about asphodel and mallow as foods available to the poorest of peasants,[61] the poet from Ascra (fl. c. 700 B.C.) has little to say about presumed properties of plants, being apparently far more concerned with customs and superstitions associated with sex and general purification.[62] Lloyd notices the diverse opinions held by experienced farmers,[63] and Hesiod grumbles about these contradictory notions as they apply to the planting season, when "one man praises one day, another another,"[64] in spite of the presumably objective evidence signaled by the rising and setting of various stars and constellations.

Murky as is the evidence for pre-Theophrastean concern about plants and their properties, some of the various bits of texts and traditions that do survive firmly indicate not only an interest but also a continual debate on several simultaneous and intertwined levels, which incorporated the wide swath of Greek thinking on magic and agriculture, plants and herbal remedies, religious customs and the world of nature. Argument began early about the "nature" of plants in relationship to other forms of life, and when Aristotle (*De An.* 410b22) mentions the faulty theories of the Orphics on how plants breathe ("Orpheus," Frag. 11 DK), he shows how very old this debate was. Speculation began quite early about the φάρμακον used by Medea to lull the guardian reptile of the golden fleece, and the lost poems of the semi-legendary, pre-Homeric Musaeus may have stated that Medea used a φάρμακον with ἄρκευθος (*Juniperus oxycedrus* L., the prickly juniper),[65] a tradition faithfully reproduced many centuries later in the *Argonautica* by Apollonius of Rhodes.[66] There are hints that Musaeus composed poems specifically on the healing properties of plants, suggested by Theophrastus' *Inquiry into Plants* (IX.19.2), where Musaeus[67] and Hesiod[68] are cited as authorities on the magical properties of τριπόλιον (probably *Aster tripolium* L., the sea aster or sea starwort):[69] "[It is] useful for every good treatment, [and] they dig it up at night, pitching a tent there." Pindar (*Pyth.* III.51–53) says that the traditional medical treatments of Asclepius consisted of incantations (ἐπῳδαί), surgery, soothing drinks or potions, and amuletic drugs (φάρμακα περιάπτειν), perhaps in reflection of medicine's venerated and dual methods (drugs and surgery), with the addition of magical herbs that could be hung or worn appropriately. The combination of incantations, potions, amulets of herbs, and surgery as the assumed ideal of medical practice in Pindar has no trace of discomfort or conflicting feelings; one can presume that all four approaches to medicine and the lore of herbs existed in the Greek world of Pindar's time (518–438 B.C.) without too much notice, even though there would be certain practioners who would argue against supernatural explanations for disease (as in the Hippocratic *Sacred Disease*) or against the excessive influence of philosophical theory in medicine (as in the Hippocratic *Ancient Medicine*).

Athenian playwrights have unwittingly left clear indications that there was an ordinarily accepted "common knowledge" of drugs and herbal remedies in the fifth century B.C. and that such pharmaceutical lore was generally accepted simultaneously in both magicolegendary and empirical-practical ways. Playwrights, whether of tragedy or comedy, must use allusions readily comprehended by their audiences, so that mentions of herbs or drugs in the plays can be presumed to be understood by Athenians who sat through the productions, staged in honor of Dionysus. Two

examples will be illustrative: a fragment from the lost *Rhizotomoi* (*Rootcutters*) by Sophocles, and puns and allusions made on particular herbal contraceptives by Aristophanes in his *Peace* and *Lysistrata*.

Among the many proofs adduced by Macrobius (fl. 430 A.D.)[70] in his *Saturnalia* to demonstrate Vergil as the complete rhetorician is Vergil's command of the details of Greek literature and the underpinnings of beliefs that produced Greek tragedy. Macrobius argues that Vergil's Dido is modeled after Sophocles' Medea in the *Rhizotomoi* (*Rootcutters*), and Macrobius quotes *Aeneid,* IV.513 to introduce his evidence for Vergil's borrowing of Sophoclean imagery:

> Herbs she had gathered, cut by moonlight with a bronze knife
> Poisonous herbs all rank with juices of black venom.[71]

Macrobius then writes that Medea in Sophocles' *Rhizotomoi* is presented "cutting poisonous herbs with her face turned away lest she perish from the strength of their noxious aromas, then pouring the herbs' juice into bronze jars, the herbs themselves being cut with bronze sickles."[72] Macrobius next quotes two passages from Sophocles' lost *Rhizotomoi:*

> [Medea] receives the juice whitely clouded, oozing from the cutting, while she averts her eyes from her hand; she receives the juice in bronze jars.
>
> These bark baskets shield and hide the ends of the roots that [Medea] cut with bronze sickles while she was naked, shrieking and wild-eyed.[73]

Apart from the ceremonial use of bronze implements and the fearful caution displayed in the gathering of this mysterious root sap, these opaque passages relate some important details: the sap is a milky or cloudy white, and the herb is particularly valued for its root. It is probable that these two quotations by Macrobius from Sophocles' *Rhizotomoi* are from the *parodos* of the play, introducing Medea in her "professional function" of harvesting herbs for magical purposes. Yet there is just enough information in these lines to suggest that the Athenian audience might be familiar with the plant and its poisonous odors, produced when its roots were severed. Local drugsellers (*φαρμακοπῶλαι*) and rootcutters (*ῥιζοτόμοι*) who plied their trades in Attica a century after Sophocles would relate *their* cautions when they cut the roots of *θαψία* (*Thapsia garganica* L., the so-called deadly carrot): one should not stand to the windward while cutting *θαψία* roots, and as a precaution one should anoint oneself with oil to prevent swelling and blistering from the *θαψία* odors and exudations.[74] *Θαψία*, with its black-barked root and white interior (the sap is milky),[75] was put in the "dangerous class" of roots,[76] alongside hemlock (*Conium maculatum* L.), as a matter of ordinary knowledge simply because it was so very common as a wild plant in Attica and particularly dangerous to cattle brought in from other disticts of Greece.[77] Perhaps Athenians sitting through the performance of Sophocles' *Rhizotomoi* would have nodded in recognition at the chorus of rootcutters and also sensed personal connections with Medea's roots and magical implements, connections in their turn interlocked with the legends of Circe and Medea as well as the farmers' lore about the "deadly carrot."

In the Homeric *Hymn to Demeter* (line 209), one reads that the goddess willingly drinks a potion (*κυκεών*) made by mixing meal, water, and pennyroyal (*γλήχων* [also *βλήχων*]-*Mentha pulegium* L.). Pennyroyal apparently retained its quasi-mythical associations with the functions of birthing and nursing the newborn for many centuries, as attested by Soranus' recommendation of its strong, sweetish odor (somewhere between peppermint and camphor) in the delivery chamber.[78] Yet this tight link between pennyroyal and "female functions" has another aspect than the simply magical or legendary, neatly given precision by puns in Aristophanes' *Lysistrata* (line 89) and *Peace* (line 712). In *Lysistrata,* one chuckles at the nicely obscene pun on *βλήχων*,[79] but the *Peace* line provides a vivid allusion to a woman's sexual attractiveness, with the suggestion of *κυκεῶνα βληχωνίαν* ("pennyroyal potion") as a remedy for too "much fruit."[80] Aristophanes is not emphasizing pennyroyal's venerated associations with Demeter (although Athenians would certainly appreciate those traditions) but rather the well-known fact that pennyroyal quaffed in solution prevented pregnancies—a most useful detail in the folk traditions of the day, since a prostitute, or "flute girl," stayed in business only as long as she did not become pregnant.[81] The playwright assumes that everyone in the audience (both men and women) would know pennyroyal by sight in the fields and also would know the "ordinary use" for the "pennyroyal potion" by women—or the allusions and puns on the name of the herb would not have gained laughter from the mixed audience.

Pennyroyal's reputation as a female contraceptive and abortifacient is verified in the Hippocratic writers,[82] Dioscorides,[83] and Galen.[84] One may presume that the pharmaceutical details on the effects of pennyroyal solutions or pessaries, as they are listed in Hippocratic writings, are extracts gathered from midwives' oral traditions or (perhaps more relevantly) from an ever-present prostitutes' lore. Aside from folkloristic connections with aphrodisiacs generally,[85] pennyroyal's pharmaceutical properties (as understood by modern pharmacognosy) confirm antiquity's basic empirical observations.[86] Until quite recently pennyroyal and its extract, the ketone pulegone, was commonly employed as an emmenagogue and as an abortifacient. Generally called "pennyroyal oil" or "*pulegium* oil," this extract acts as a mild irritant to the kidneys and bladder in excretion and reflexly stimulates uterine contractions. Contrasted to the "pennyroyal potion" of Greek antiquity, with its aparently nontoxic action, the modern extract of pennyroyal oil exhibits very poisonous effects. Convulsions result from as little as four milliliters.[87] Pennyroyal oil contains not less than 85 percent pulegone, while the natural extract gained from the dried leaves and flowering tops of *Mentha pulegium, Mentha longifolia* (L.) and *Hedeoma pulegioides* (L.) Pers. (US sp.) has about 1 percent of the volatile oil, along with tannin and bitter principles.[88] The ancient preparation apparently served well in its intended use, and its urinary effects were observed in conjunction with the action of *κανθαρίς* (the aphrodisiac today called "Spanish fly").[89] Aristophanes' puns certainly reflect a "common knowledge" of pennyroyal among the citizens of fifth-century-B.C. Athens, and one also receives a brief glimpse of the technical expertise of midwives and call girls as they plied their trades in the same era. That men as well as women would be presumed aware of what the "pennyroyal potion" was supposed to do suggests how common this particular herb was and also that the use of "sexual drugs" (whether magical or not) was not the particular knowledge of women alone.

THEOPHRASTUS AND BOTANICAL FOLKLORE

Homer's μῶλυ was to later Greeks an averter of drugs and witchcraft,[90] something that had the power to ward off noxious effects, a substance termed an ἀλεξιφάρμακον. In his *Inquiry into Plants,* Theophrastus offers an opinion as to why squill (*Urginea maritima* Baker) should be a good ἀλεξητήριον (averter): he suggests that because plants that grow from bulbs are very long-lived (his phrase can be rendered as something like "tenacious of life"), they are thus suited to be planted in front of the entrance to a house where the squill "fends off trouble (δήλησις) that threatens the dwelling."[91] Theophrastus is *not* saying squill actually does what "it is said" (λέγεται) to do (ward off spells from a house), but he is attempting to explain why many in his culture might believe squill has such powers and properties, carefully linked by Theophrastus to its property in being able (δύναται) to aid the storage of other fruits and vegetables: "If the stalk of the fruit of the pomegranate [ῥόα-*Punica granatum* L.] is set in squill," it will keep for a long time; and even when hung, squill bulbs 'live' for a long period, as do many bulbous plants. Elsewhere, Theophrastus records instances in which squill becomes part of a purification ritual. A superstitious man has chanced to see a statue of Hecate wreathed in garlic at one of the countryside altars set at forks in the road, and he rushes home to hire priestesses, who carry squill (bulbs?) around to cleanse him.[92] Parker believes this is part of an ancient tradition of "blood purification,"[93] and one notes how the stereotypical superstitious person employs several plants in an ordinary day, using a leaf of the δάφνη (the sweet bay, *Laurus nobilis* L.) carefully chewed in the early morning (a "sacred bay"),[94] and how he will purchase myrtle (μύρσινη-*Myrtus communis* L.) and frankincense (λιβανωτός-*Boswellia* spp.) every fourth and seventh day of the month for sacrifices to the Hermaphrodites.[95] Again, Theophrastus carefully depicts folkloristic practices without necessarily condemning them (although the stereotypes in his *Characters* generally bring laughter at the extreme antics portrayed), and the underlying questions posed by the skilled botanist are significant: Why are *these* particular plants associated with religious or magical practices and how can they be related to known properties (δυνάμεις) of herbs and herbal drugs, especially as understood in agricultural lore?

Squill is a particularly apt example of the mixture in the Greek mind of practical botany, magicoreligious rituals of great antiquity, and precise knowledge of pharmacological and medical utility.[96] The first-known mention of squill is in a fragment of an elegiac poem by Theognis (fl. c. 544 B.C.), and this small bit establishes that squill was widely understood in its botanical and agricultural context for its pungent properties: "Neither a rose nor a hyacinth grows on a squill."[97] A close second, in terms of earliest mention of squill in Greek, is in one of the scrappy remnants of the poems of Hipponax (fl. 540–537 B.C.), and the two lines show immediately a close link between the use of squill and the religious practice of expelling a scapegoat (φαρμακός) to cleanse a community of perceived impurities or pollution: "Pelting him in the meadow and beating / With twigs and squills like unto a scapegoat."[98] The brutality of this use of a φαρμακός to cleanse a diseased city is summarized by a late Byzantine polymath, John Tzetzes (fl. c. 1130), who describes how a φαρμακός was selected and sacrificed in "ancient times."[99] Significantly, Tzetzes cites Hipponax as "describing the custom best,"[100] although most of the data in Tzetzes' account are unattributed: "After hitting [the φαρμακός] seven times on the penis with squills and [branches] of wild figs and other uncultivated [plants], in the end they [sacrificed the φαρμακός] in a fire burning wood of wild trees."[101]

Squill and certain other herbs (for example, the so-called chaste tree [*Vitex agnus castus* L.])[102] are given special significance in the Greek custom of choosing a φαρμακός to rid a community of plague or pestilence or a household of its sense of hunger (perhaps a carryover from the hoary fear of famine as suggested by the term βούλιμος). Tzetzes labels his account as one of κάθαρμα (ritual cleansing); but squill as an acrid cultivar and widely known herbal remedy for coughs, asthma, and ἀλεξιφάρμακον when "hung whole in front of entrances [to houses]"[103] is closely intertwined with the concept of the φαρμακός, an obvious analogue of φάρμακον, first noted as a "poison" or "beneficial drug" or "spell" in the Homeric epics. It is, however, not until hellenistic Greek, that the ancient φαρμακός "scapegoat," (accented on the final syllable) was wedded to a second meaning, namely, "poisoner," "sorceror," or "magician" (accented on the initial syllable),[104] quite probably a revival of the Homeric sense, much as Theophrastus wrestles with defining plants with "medicinal properties,"[105] as contrasted to ordinary plants.[106] Squill, as Theophrastus acknowledges, has peculiar properties (δυνάμεις) that span the range from the purely pharmacologic to venerated folkloristic practices, mirrored partially in his spoof of the superstitious man in *The Characters*. As Stannard has noted, squill attained such widespread use that there was a variety called "squill of Epimenides,"[107] identified as French sparrow grass (*Ornithogalum pyrenaicum* L.) by Hort and his sources.[108] If the tradition preserved in Apuleius reflects historical fact,[109] Epimenides was a magician or student of magic (a magus), and according to Theophrastus' normal custom of not naming living authorities,[110] Epimenides probably lived and "gathered roots and herbs"[111] quite some time before Theophrastus' century.[112] Epimenides' "cleansing" activities were intimately associated with "squill," although several herbs were called by that name in Greek.[113] One may also note the reappearance of the very ancient and very muted Near Eastern ties with the magicoreligious association of squill, as Lucian pokes fun at the "Chaldean" practice of "cleansing with torches and squills."[114] One ascertains the survival of various forms of purification rites employing squill at least as late as the second century A.D. in the eastern Roman Empire, and the unattributed sources among John Tzetzes' "the ancients" may include texts from Roman and Byzantine times,[115] as well as his cited names and quoted lines from Hipponax and Lycophron of much earlier Greek centuries. The properties of squill were highly esteemed for their powers of κάθαρμα throughout a millennium among Greeks and Romans. "It is tempting," writes Parker, ". . . to see [squill] as the vegetable equivalent of an animal, the impure puppy, a dishonourable plant appropriately used in a ritual applied to polluted persons."[116] Parker, however, admits difficulty with such an interpretation of the symbolism of a plant like squill, because there were so many possible uses,[117] from pure rituals in magicoreligious observances to straightforward herbal lore and pharmacology.

Theophrastus is well aware of the quandary in describing a plant that had both

traditional and sacred uses and also a history of employment as a drug among herbalists and physicians. His morphological botany could be secured by close and patient observation,[118] but some other method than either pharmacology or botany was necessary to depict squill—and similar plants—as they were comprehended by the varying practitioners in the Greek world of c. 300 B.C. Not surprisingly, Theophrastus meets this problem within the structure and format of book IX of his *Inquiry into Plants*, the part of the treatise that considers plants of "medical utility," as well as important questions as to sources of information about such plants.[119]

Theophrastus begins his *Inquiry* (IX.18) by writing, "As has been noted, there are roots and shrubs that have many powers (*δυνάμεις*) affecting not only living bodies but also bodies without life (*τὰ ἄψυχα*)," and his first example is an *ἄκανθα* (probably gum arabic), which, "as they say" (*λέγουσι*), thickens water when put into it. His second example is the root of marsh mallow (*ἄλθαια-Althaea officinalis* L.), which has the same property if it is shredded into a container of water and allowed to stand in open air; but one identifies marsh mallow by its similarity with mallow (*μαλάχη*-either *Malva rotundifolia* L., or *Malva sylvestris* L.), and Theophrastus describes differences between the two species in terms of their leaves, stalks, flowers, seeds, and roots. Then follows the medical employment of *ἄλθαια*: "They employ (*χρῶνται*) marsh mallow for fractures, and in sweet wine for coughs, and in olive oil for open ulcers [or wounds]." The pharmacology implied by Theophrastus is the property of marsh mallow to make a glue when mixed with water (similar to the gum arabic), a property acting on a "lifeless body," in turn rendering it useful in the treatment of fractures.[120] The choice of marsh mallow seems deliberate, rather than simply one gum-producing plant selected from many examples: *ἀλθαίνω* is a common verb (heal),[121] and the noun *ἄλθεξις* as "healing" or "cure" appears in both the Hippocratic *Fractures* and Nicander's coinage as *ἀλθεστήρια* (healing remedies).[122] Theophrastus' deft connection of medicinally useful plants with their effects on nonliving things has thus been precisely laid down, beginning with roots and shrubs that have various properties, spanning a range from straightforward drugs that act in living patients to the plants that have powers to affect nonliving matter. By this simple technique of association Theophrastus is able to proceed from herbal remedies to plants that have other effects and uses, including those of magicoreligious and sacred importance. His manner of consideration, however, is carefully paced step by step as he advances from plants affecting nonliving matter through plants that act in or on animals other than human beings[123] to those that affect both "body and intellect [or soul]."[124] Parenthetically, Theophrastus precedes his "body and intellect" plants with, "And legends are concocted not without reason."

Inquiry into Plants IX.18.3–11, takes up the subject of fertility and antifertility herbs, the curiosa of aphrodisiacs and anaphrodisiacs. Most importantly, however, Theophrastus notes that his first instance of a plant that has *both* aphrodisiac properties (*ὄρχις*, lit. "testicle," probably early purple orchid, *Orchis mascula* [L.] L., from which a drink called salep is made from the macerated tubers[125]) has "leaves like a squill,"[126] indicating immediately how the botanist is investigating such plants, which are firmly linked to sacred ceremonies well known to his readers. *Ὄρχις* is also an excellent example of the intermeshing of a common "doctrine of

sympathy" or—more loosely—the "doctrine of signatures,"[127] which Greek and Roman herbal lore continually interwove with more empirical pharmacological observations. Much as Theophrastus employs the ordinary name *testicle* for the double-propertied *Orchis mascula* (and he does so without any hint of self-contradiction or of the insertion of dissonant facts), so also one recalls Theophrastus' connections between the quasi-religious practice of planting squill to avert spells on a house and his concept of long-lived squill bulbs (VII.13.4), and one can thereby sense also the numerous but unstated folkloristic and magicoreligious customs that hover in the shadows of *Inquiry* IX.18.3–11. Preus argues that any effect such plants would have regarding conception or contraception would be expressed by the modern term *psychosomatic,*[128] but the application of any modernisms to Theophrastus' delicately skilled arguments and attempts to document pharmacological properties of sacred plants and herbs does the injustice of inserting presentism. Moreover, except for a direct reference to an otherwise unknown Aristophilus of Plataea (called a "drugseller," *φαρμακοπώλης*), who said he "had some [drugs] that could engender greater potency as well as eliminating it completely,"[129] almost all of the data in *Inquiry* IX.18.3–11 are qualified by "it is claimed," "are said," "it is said," "if this account is true," and "they say," phrases that delineate Theophrastus' manner of simply recording what he has heard, without necessarily approving or denying the purported facts. He does state his basic acceptance, however, that such things and effects are quite possible, with "It is paradoxical, as I have said, that opposite effects result from a single nature [*φύσις*]; but it is not paradoxical that such properties [*δυνάμεις*] exist."[130] Implicitly he has admitted the possibility of traditional claims for sacred plants like squill, but Theophrastus firmly rejects generally (*ὅλως*) the assertions made for *ἀλεξιφάρμακα* that might be worn as charms or attached to a house.[131] Exceptions could perhaps be allowed for sacred herbs; but if they are unsanctioned by hallowed magicoreligious traditions of either a public or private nature, Theophrastus is unwilling to entertain possible effects from herbs simply said to be powerful.[132]

The majority of *Inquiry* IX is taken up not with considerations of claims for plants that are magical, semioccult, or plants that have religious connections, but with a careful analysis of medicinal properties of somewhat less than sixty major herbs and herbal remedies.[133] Yet Theophrastus' main source of information for such plants are the *ῥιζοτόμοι*, a professional group of herbalists who collected medicinal roots and herbs, selling them at country fairs, hawking their virtues for pains and ailments of many kinds; added to the *ῥιζοτόμοι* as sources of data on herbs are the *φαρμακοπῶλαι* (drug vendors), who also touted their products in the venerated manner of folk medicine to country and city dwellers alike.[134] *Inquiry* IX.8.5–8 shows rather vividly these sources of Theophrastus' data and how he sorted out useful facts from the merely mythical: the drug vendors and rootcutters suggest that one should cut roots only while standing to the windward, especially in the case of *θαψία* (the deadly carrot, *Thapsia garganica* L.),[135] and that one should coat one's body with oil before trying to dig up or cut the roots. Furthermore, the herbalist has to exercise caution while gathering the fruit of the wild rose (probably the rose hips): these must be collected while the individual stands to the windward, because picking the rose hips could harm one's eyes. Theophrastus does not dismiss these

assertions as "old wives' tales," but comments that there is some credence to be placed in them because of the properties (δυνάμεις) of these plants, which tend to be harmful, seizing "as they say" like a fire and burning. Digging hellebore[136] for a long time causes dizziness, and the ῥιζοτόμοι advise one to eat garlic beforehand and to quaff some undiluted wine. Theophrastus honors such reports from the rootcutters, but he derides other procedures espoused by the rootcutters as "far-fetched and irrelevant," including the practice of digging up peonies at night to avoid being seen by woodpeckers (this may cause the loss of an herbalist's eyesight) or the stipulation that one should beware of the buzzard (*Buteo* spp.) while cutting a κενταυρίς (probably *Centarium umbellatum* Gilib., the feverwort or centaury) or that while cutting the All-Heal (πάνακες) of Asclepius, one should make an offering "in its place" of fruits and baked meal. Theophrastus writes that "praying while cutting is perhaps reasonable, but the additions to this caution are ridiculous," showing he is carefully separating the patently superstitious from the empirically reasonable or from particular customs that have long-standing magicoreligious associations. One should not, however, be misled into thinking that Theophrastus advocates a medical botany bereft of magic and religion or an herbalism forsaking its ancient agricultural and sacred heritages: he says to accept rootcutters' and farmers' tales at face value and then to test them both with the logic of empiricism as well as field collection of plants, ascertaining those practices that, in effect, "make sense."

Theophrastus' grudging ambivalence about hoary rituals and his apparently reluctant piety suggest how murky are the differences in Greek antiquity between magic and religion as well as between the presumably "objective" observations gathered by farmers and those customary deferences of homage to the venerated powers of certain plants. Edelstein rightly recognizes the "specific problem of pharmacology in connection with the efficacy of plants"[137] but then proceeds to argue that Greek and Roman views are neatly categorized into a tripartite division. First the properties of medicinal plants (and by logical extension, the causes of diseases) are marked by purely "scientific" and empirical observations, seeing "in plants nothing but natural powers."[138] Second, since Nature is divine, plants and drugs derived from them are divine, which can be fitted within a class of traditional religion of a deistic character, an "interpretation which accepts the divinity of the plants because of the divinity of the intellect in the human being who applies them."[139] Third, Edelstein scornfully derides "magical belief . . . sorcery and such nonsense. . . . All the great pharmacologists rejected those things. Andreas and Pamphylus [*sic*] and [those who accepted magic] constituted a small minority; they were scholars rather than physicians; they were antiquaries. These men were isolated as were those who believed in the demonic character of diseases."[140] Somehow Edelstein has chosen to ignore the grand and opaque jumble of opinions characteristic of his "great pharmacologists," including many authors represented in the Hippocratic corpus, Theophrastus, Dioscorides, Soranus, Rufus, and Galen. Edelstein seems to be aware of the artificial and imposed manner of his precise categories of "pharmacological thinking" in classical antiquity, since he slithers into a supporting argument that begins, "But all the pharmacologists, nay almost all the physicians, believed in sympathetic remedies."[141] In turn this "proves" the rarity of pure empiricism and

pure magic in ancient pharmacy, proof that collapses when one reads the admixture of scorn and praise by Galen for amulets and medical astrology,[142] the quotation of local customs attached to various herbs by Dioscorides,[143] or the painstaking evidence of botanical lore sandwiched with magicoreligious observances as assembled by Theophrastus. One cannot—as Edelstein does—dismiss medical magic as "found only in the magical papyri which contain not the knowledge of physicians but prescriptions of folklore"[144] any more than one can assert truthfully that Pliny the Elder is a "superstitious layman"[145] without carefully qualifying what this might mean among Roman aristocrats in the early Roman Empire.

Edelstein's "rationalistic supernaturalism"[146] unwittingly signals why almost all pharmaceutical texts in classical antiquity—from Homer and Theophrastus to Galen and the *Papyri Graecae Magicae*—encompass aspects of magic, empiricism in its strictest sense, religion as understood in its context of historical observation, and the constant shifting and mingling with one another of these three broad approaches. Sometimes there is the clear imprint of philosophy as *it* wrestled with definitions and attempted clarity, and sometimes witchcraft is incorporated as a meaningful part of man's investigation into the world of nature and its mysteries. To call some drugs "divine remedies" or "sacred stuff,"[147] as does Galen in his *Compound Drugs according to Place in the Body,* says no more and no less than that this particular substance acts in a godlike manner. Quite openly, Galen (quoting Asclepiades) can write that certain drugs have the "property (δύναμις) of Asclepius,"[148] not too distant from common, modern perceptions of aspirin and sulfonamides as "wonder drugs." Not comprehending molecular chemistry or the physiology of drug action does not make one a "superstitious layman."

DEFINITIONS, HERBS, AND THEIR PROPERTIES: GRECO-ROMAN INTERPRETATIONS

Theophrastus urges his readers to honor only certain of the magicoreligious traditions attached to a few plants, but once he has discarded fully rank superstitions as explanations for how some plants "work" as drugs, he attempts to fuse the data of the ῥιζοτόμοι with a curiously muddled definition of an "herb." He is clearly uneasy regarding the specifics of an "herb" or an "herbal remedy" as provided by his oral and written sources, and the description of πόαι (herbs) includes substances that have "medicinal powers" (φαρμακώδεις δυνάμεις), comprising "juice" (χυλισμός), "fruits" (καρποί), "leaves" (φύλλα), and "roots" (ῥίζα), because the "rootcutters term an 'herb' certain of the medicinals,"[149] and an "herb" consists of one or all of these parts. Theophrastus' hesitant definition of *herb* may have been borrowed directly from the ῥιζοτόμοι, or perhaps from the medicobotanical works of Diocles of Carystos,[150] or Theophrastus may have invented it himself. The ῥιζοτόμοι certainly had given him a basis for this definition, because they did not call all roots "herbs" but only roots from a group of medicinal plants or healing parts of certain plants.[151] Theophrastus continues to display his uncertainty as he writes that such δυνάμεις (probably now a mix of "powers" and "properties") of medicinal roots are distinguished from the δυνάμεις of roots generally. Thereby

the "roots" that are medicinal include all four parts of the plant, especially the leaves, as the ῥιζοτόμοι themselves say. Consequently, "herbs" are all four parts, not merely the roots.[152]

By attempting to impose the morphological approach as he struggles with the basic question of how one distinguishes an "herb" from other plants, Theophrastus has provided a particularly unsatisfactory substitute for the answer to the question of "how drugs work," especially in view of the firm answers given in traditional superstitions and some religious connotations. In his listing of the herbs that follows in *Inquiry* IX one must link his brief descriptions of drug action with previous morphologies of plants that form almost all of *Inquiry* I–VIII. It is significant that Theophrastus does not employ the theory of elements and qualities to explain "how drugs work," as does the Pseudo-Aristotelian *Problems:* "The [substance] that according to its own nature, is not overcome by the body's heat and that enters the veins, and because of its excess heat or cold [is not concocted]: this is the φύσις of a drug."[153] The unknown author has grappled rather well with the basic questions of delineating a theory to explain drugs and their actions, as contrasted to foods or plant derivatives without noted pharmacological properties. There seems, oddly enough, a better awareness in the philosophical speculation regarding plants by the author of *Problems* than in the murky groping toward a morphological definition of *herb* by Theophrastus. It is not surprising that many scholars have assumed that book IX of *Inquiry into Plants* is a later addition by unknown medical botanists, a hypothesis disproven by the manuscripts.[154]

Toxic substances were reasonably understood by the second century B.C., as suggested by the difficult poems of Nicander of Colophon (fl. c. 140 B.C.), the *Theriaca* and *Alexipharmaca*.[155] Nicander borrowed heavily from an earlier Greek toxicologist named Apollodorus,[156] who, in turn, may have inherited his concepts from Diocles of Carystos. Again agricultural lore shows vividly in Nicander's semiplagiarism of details on the black widow spider, various cobras, wasps, large centipedes, and millipedes,[157] as well as in his description of what one did to administer an antidote for an excessive consumption of the famous aphrodisiac made from blister beetles.[158] Greek pharmacy had a good botanical morphology from Theophrastus, a rough taxonomy of plants derived from folklore, some medical entomology and toxicology as recorded by Nicander, and a mass of details on herbs and herbal concoctions as revealed in the Hippocratic tracts on women's ailments.[159] An organizing principle, however, appeared in none of these authors regarding "how drugs worked," even though Theophrastus' basic botany was superb. In classical antiquity, pharmacy and toxicology remained aspects of medical practice that occasionally purloined venerated superstitions or religious customs or that with leaps of uncertainty adapted and adopted facets of philosophical physical theory (especially the concepts of elements, qualities, and humors) to account for observed actions of drugs. As Riddle has remarked, at the very least Greco-Roman pharmaceutical theory included the firm notion of a "drug poison,"[160] first discerned in Homer's poems. Most physicians and pharmacologists, however, sought to reject divine explanations for drugs and their effectiveness, and those of the so-called Hippocratic persuasion were sometimes emphatic in dismissing *both* the magicoreligious and philosophic interpretations,[161] leaving either a jumble of empirical

observations or a strange and quixotic denial of the efficacy of any drugs. Folk medicine, however, continued to carry on with its venerated assumptions, and even when Dioscorides of Anazarbus (fl. c. 65 A.D.) was able to produce his magnificent summary of drugs in the famous *Materia Medica,*[162] he acknowledges quite frequently the staying power of numerous folk traditions linked with particular pharmaceuticals.

Dioscorides is a watershed in the development of Greco-Roman pharmacy, and his masterpiece of compression, *Materia Medica,* brilliantly demonstrates the efforts of a skilled physician and astute medical botanist to bring order out of the chaos that characterized drug lore up to his own day. As a young man, Dioscorides probably studied herbs and herbal pharmacology with resident experts in Tarsus,[163] and there is just sufficient evidence to indicate that he spent a portion of his mature medical practice in the context of a Roman legion.[164] Most importantly, however, Dioscorides went about the business of testing herbs and drugs with a precision that would be noteworthy in any century[165] and invented an entirely fresh method of classifying drugs by what they did or did not do when given to a patient—a system called by Riddle, "drug affinity."[166] The prevailing medical theories in the early Roman Empire were generally linked in some way with a debased form of "medical atomism,"[167] and in the remarkable preface to his *Materia Medica* Dioscorides flatly rejects this and all other philosophic explanations of drugs when he writes, "They have not measured the activities of drugs experimentally, and in their vain prating about causation they have explained the action of an individual drug by differences among particles, as well as confusing one drug for another."[168] At the same time, he says he has checked "what was universally accepted in the written records and [made] inquiries of natives in each botanical region."[169]

At the conclusion of his discussion of black hellebore (*Helleborus niger* L.),[170] Dioscorides furnishes a typical example of how he treats long-lived religious or quasi-superstitious customs connected to herbs. His farmer-informants have told him that if one plants vines close to the root of the hellebore, the wine from such grapes will make an excellent purgative, and Dioscorides adds, "they sprinkle it [the wine] around houses thinking it to be a purification (καθάρσιος) from defilement [in a religious sense]"; moreover, when his informants dig up the hellebore, they stand facing the sunrise and pray to Apollo and Asclepius, watching all the while for an eagle (ἀετός) in flight as an evil omen, since "the bird engenders death should it see the digging of the hellebore; at any rate, it has to be dug up very quickly, since drowsiness is caused from its exuded vapors." Dioscorides merely acknowledges the belief that black hellebore was sacred to a god[171] by describing a series of steps taken by his informants when they dig up the root, passing rapidly to a clear, natural reason why such religious customs and precautions became accretions upon this particular medicinal root. Since Dioscorides mentions hellebore's association with an apparently ancient rite of purification, it is probable that the plant had some local history of use in such rituals (no locale is specified), quite reminiscent of the widespread employment of squill.[172] Perhaps herbs like squill and the hellebores were early considered sacred plants due to their heavy pungency, especially when they were cut or bruised, much as Dioscorides notes the "exuded vapors" (ἀποφοραί) from the cut hellebore roots. Parker's comments on the corollaries of using the

hellebores (there are two main types: a "white" and a "black") in the medical and mythological treatment of madness,[173] said to have been invented by Melampus for the daughters of Proetus, are pointed and relevant,[174] although Hippocratic physicians strove to perceive insanity quite apart from divine causes, as one reads in the eloquent presentation by the author of the Hippocratic *Sacred Disease*,[175] very often cited as *the* Greek medical work that provided the seedbed for medical approaches in the West. Dioscorides, however, carefully limits his account of black hellebore to verified uses in terms of his "drug affinity" system, uses that are pharmacological and classed by pharmacognostic means.[176]

As brilliant as was Dioscorides' new classification method for drugs, later writers on pharmacology chose to revert to other systems, alphabetizing plants and drugs in place of Dioscorides' precise groupings according to physiological action. Although Dioscorides' collected data were incorporated into almost all future tracts on pharmacy in the West until the Renaissance, those data were rearranged according to the predilections of later writers, including the polymathic and enormously influential Galen of Pergamon (129–after 210 A.D.).[177] Galen's drug lore is a gigantic potpourri of herbs, animal products, written sources quoted verbatim, and quasi-legendary and pseudofolkloristic facts all compacted into three separate systems of organization, as he attempted to bring some sort of harmony into the chaos of pharmaceutical data as he found them in the second century.[178] In spite of some oddly informal sources of pharmaceutical information, such as one Orion the Groom,[179] Galen's drug lore became a model for later Byzantine encyclopedists,[180] who took the explicit humoral theory (borrowed directly from the Hippocratic *Nature of Man*)[181] as the major explanation of "how drugs worked." Except for certain compound recipes, which had their own venerated pedigrees,[182] the "drugs-by-degrees" classification, as evolved from Galen through successive Byzantine medical writers to Paul of Aegina (fl. c. 640 A.D. in Egypt), was based on the ancient notions of humors and qualities, an outlook that dominated Western pharmacy until the mid-nineteenth century. Later Roman and Byzantine pharmacy and pharmacology refined Greco-Roman theory on drugs and occasionally added new substances, but there was always a powerful undercurrent of folk medicine displayed in cults to the saints in the Byzantine Empire,[183] as well as a tenacious survival of nonlearned conceptions about drugs.[184] Two aspects of how pharmacology was perceived for sacred plants are illustrated by pharmacological astrology and the widespread acceptance of magical properties exemplified by the formulas and doctrines of Thessalus of Tralles and the collection of texts in Greek, Coptic, and demotic known as the *Papyri Graecae Magicae*.

"HERMETIC" MEDICAL ASTROLOGY AND HERBAL PHARMACOLOGY

An important and often ignored facet of late hellenistic and Roman religion are the so-called Hermetic texts.[185] Having purported origins in particular revelations by a Hermes Trismegistus, Asclepius, and other pagan gods of Greco-Egyptian background, "Hermetic" medical revelations assume multiple aspects that attempt to

reconcile several competing concepts of medicine and pharmacy, employing the device of an "archetypal" beginning. The "Hermetic" manner of medicine and pharmacology is sharply defined in an astrological-pharmaceutical text by a Thessalus, called *Powers of Herbs*.[186] The preface to Thessalus' *Powers of Herbs* was first published in the *Catalogus Codicum Astrologorum Graecorum*[187] and was simply called Thessalus' *Letter to Claudius* (or *Nero*). Publication of the full *Powers of Herbs* awaited proper collation of several Greek and Latin manuscripts, and the complete (and dual) texts were eventually published by Friedrich in 1968. In the preface (= *Letter*), Thessalus of Tralles informs the emperor about a revelation by Asclepius, earlier revealed to him by Hermes Trismegistus,[188] naming the herbs truly associated with the planets[189] and the signs of the zodiac.[190] The *Powers of Herbs* and its preface date to the reigns of Claudius and Nero (sometime between 41 and 68 A.D.),[191] and the preface precedes (in the *Catalogus* texts,) a tract on twelve plants linked to the twelve signs of the zodiac,[192] an exposition of seven planets associated with seven plants attributed to Thessalus of Tralles,[193] and a clipped treatise attributed to an "Alexander" that surveys the same seven plants. The *Catalogus* texts indicate the wealth of ancient works discussing plants and herbs and their relationships to the planets, the signs of the zodiac and the traditional three decans (10-degree units) into which each was divided, and plants linked with the "fifteen fixed stars."[194] Thessalus' preface (*Letter*) and the full text of his *Powers of Herbs* represent medical astrology and pharmacology, and there are many instances of Roman physicians and scientists who believed astrology was an important diagnostic tool: Galen's *Crisis Days* (III. 5–6)[195] indicates how astrology pinpoints both diagnosis and prognosis in diseases,[196] although his account is bereft of the mysticism permeating corollary "Hermetic" works.[197] If Galen thinks of medical astrology as a diagnostic technique, the so-called Hermetic writers believe that herbal and medical astrology are revelations, explaining why certain plants have healing powers and properties.

In place of Theophrastus' confusion, Dioscorides' brilliant but inapplicable "drug affinity" system, and Galen's basic uncertainty about classifications of drugs, authors in the Hermetic traditions could claim that their acceptance of divine power was an active manner of receiving it that thereby increased its strength, much as a person instructed by Poimandres can say he "has been invested with the power and instructed in the Nature of the Whole and in the Greatest Divinity."[198] Such herbal astrology is marked by a simplicity—a deceptive simplicity from the standpoint of modern pharmacology—illustrated by "A Plant of the Sun: Chicory," from Thessalus' *Powers of Herbs*:[199]

> A Plant of the Sun: Chicory (κιχώριον)[200]
>
> (1) First named among the plants of the sun is "heliotrope"; yet there are many kinds of "heliotropes," and of all these most efficacious[201] is the one called chicory. (2) Its juice mixed with oil of roses is an ointment.[202] (3) It is suitable for relieving heartburns,[203] and it releases tertians,[204] quartans, and intermittent fevers,[205] and mixed with an equal part of the oil of unripe olives, it stops headaches. (4) If someone looking toward the sunrise smears on the juice of the chicory, invoking the presence of the [god] Helios, and begs to give him praise, he will be most favored among all men on that day. (5) One prepares from the chicory's root little pills (καταπότια) for heartburns and disorders of the stomach, in

which the stomach is afflicted and will not accept foods, and for disorders of the stomach in which the stomach receives nourishment but does not promote digestion: downy woundwort,[206] 8 drachmas; saffron crocus,[207] 2 drachmas; Pontic honey, 14 drachmas; mastic flower,[208] 6 drachmas; ginger[root],[209] 4 drachmas; pepper,[210] 4 drachmas; Dead Sea bitumen/mineral pitch,[211] 2 drachmas; anise,[212] 4 drachmas; mastic gum/resin,[213] 4 drachmas; the root of the chicory, 24 drachmas; pound these ingredients in a mortar with very old mead (honey plus wine, *οἰνομέλι*)[214] and make lozenges of 1 drachma. Drink one with water for heartburns; drink one with the best wine for stomach ailments.

Parallels to Thessalus' recipe occur in Pliny, Columella, Dioscorides, Galen, the *Papyri Graecae Magicae,* and the Byzantine *Geoponica,*[215] but Thessalus' "chicory stimulant" seems unique among Roman prescriptions. Initially, the botany appears poor, with the "heliotrope" including the chicory; Thessalus, however, is not saying this is *the* heliotrope but rather that it belongs to a broad class of herbs "attracted to the sun," the literal meaning of the word. And excepting the self-anointing with chicory juice while invoking Helios, the recipe is a fairly straightforward listing of ingredients and preparation methods frequently encountered in the drug books of Galen and later Byzantine pharmacy. Moreover, folk medicine retains employment of mastic, anise, and chicory as stomach calmers, traditions backed to some extent by the physiological chemistry of the herbs. Thessalus' *Power of Herbs* encompasses a number of Greco-Roman pharmacological traditions, including the technical approaches seen in Dioscorides and Galen, as well as specifics of drugs and herbs found in the magical papyri. Hermetic astrological herb lore could claim it knew *why* such plants had pharmaceutical properties by their clear linkages to the divinities represented by constellations and planets (including the sun and moon) at various points in the zodiac. Festugière classes some of these texts of astrological herbalism according to which plants were associated with the sun, and he gives these plants separate status by means of determination of the contents of the list (categories labeled A, B, C, etc.).[216] For example Chicory is Festugière's type B, with a special listing of herbs for the moon, Saturn, Jupiter, Mars, Venus, and Mercury.[217]

The presence of pepper and ginger in Thessalus' *Powers of Herbs* shows that the text dates from the first half of the first century, on grounds independent of manuscript attribution. In full revival was a flourishing trade with Far Eastern markets,[218] and Dioscorides' *Materia Medica* shows fresh incorporation into the Roman pharmacopoeia of Indian, Malayan, and some Chinese spices.[219] Thessalus is well aware of good ingredients for his recipes, and there is a sophistication in *Powers of Herbs* reflecting formal drug lore of the day infused with the "Hermetic" assertions of special knowledge about herbal medicine. Such a pharmacology of sacred plants, organized along astrological lines, received a patina of acceptable "science" in the Roman Empire, although Roman law frowned upon the application of astrology to political ends.[220]

SACRED PLANTS IN THE MAGICAL PAPYRI

The Greek, Coptic, and demotic texts known as the *Papyri Graecae Magicae* mention over 450 plants, minerals, animal products, herbs, and other substances as

presumably "pharmaceutically active" in the recorded spells, incantations, formulas, and imprecations. The texts in the collection are dated generally to Roman and Byzantine Egypt (c. 30 B.C.–c. 600 A.D.), but several instances of drug lore (e.g., the multiingredient incense called *κῦφι*) indicate a heritage going back many centuries, probably to dynastic Egypt. One cannot dismiss the documents contained in the *Papyri Graecae Magicae* as simply written forms of jumbled superstitions with a pseudopatina of Egyptian learning;[221] the *Papyri Graecae Magicae* have yielded a trove of insights on how Jew, Christian, and pagan perceived their world; and an important facet of our fresh understanding of these precious documents that emerge from beliefs of "common people" is the pharmacology of magical and sacred plants and drugs.

Ritual is essential for the Greco-Egyptian *ῥιζοτόμος* (here generally "herbalist"), much as suggested by Pfister in his basic essay on magical conceptions of plants,[222] a suggestion nicely illustrated by the following from the *Papyri Graecae Magicae:* "**Spell for picking a plant:** Use it before sunrise. *The spell to be spoken:* I am picking you, such and such a plant, with my five-fingered hand, I, NN, and I am bringing you home so that you may work for me for a certain purpose. I adjure you by the undefiled name of the god: if you pay no heed to me, the earth which produced you will no longer be watered as far as you are concerned—ever in life again, if I fail in this operation [then follow magical words]; fulfil for me the perfect charm."[223] One presumes the herbalist recited this spell as he went out to gather plants, and his work began before dawn, much as suggested in context by Thessalus of Tralles in *Powers of Herbs* and by Dioscorides when he mentions folk customs concerning certain powerful roots and their collection. Specifics followed by an herbalist come a little later in the magical papyri: "Among the Egyptians herbs are always obtained like this: the herbalist first purifies his own body, then sprinkles with natron and fumigates the herb with resin from a pine tree after carrying it around the place 3 times. Then after burning *κῦφι* and pouring the libation of milk as he prays, he pulls up the plant while invoking by name the daimon to whom the herb is being dedicated and calling upon him to be more effective for the use for which it is being acquired."[224] Natron and its use is very ancient, indeed,[225] and the full ritual includes burning pine resin and *κῦφι* and an offering of milk, each an aspect of hoary religious observances in many cultures, not only ancient Greek and Egyptian.[226] And, as the papyrus text continues, one soon comprehends that *all* herbs are sacred, since the invocation uttered at the moment of picking the plant is as follows: "You were sown by Kronos, you were conceived by Hera, you were maintained by Ammon, you were given birth by Isis, you were nourished by Zeus the god of rain, you were given growth by Helios and dew. You [are] the dew of all the gods, you [are] the heart of Hermes, you are the seed of all the primordial gods, you are the eye of Helios, you are the light of Selene, you are the zeal of Osiris, you are the beauty and glory of Ouranos, you are the soul of Osiris' daimon which revels in every place, you are the spirit of Ammon."[227] The invocation proceeds by naming a number of gods, goddesses, powers, and properties, thus assuring the herbalist of his sacred function as well as the primary acknowledgement of awe regarding the god-given properties of such plants. In many respects the act of collecting herbs is an act of worship, and the herbalist understands that the powers contained in these plants emerge from the divinity within each part collected (this is perhaps similar to

the ῥιζοτόμοι and their definition of *herb* as recounted by Theophrastus) and that the plants conversion into "drugs" simply extends their powers for the kindly benefit of man.

With the natural awe in mind, as well as Betz's thought that "magic is the art that makes people who practice it feel better rather than worse,"[228] one may contemplate the pharmacology of a few representative texts from the magical papyri, for instance, this contraceptive recipe:

> **A contraceptive, the only one in the world:** take as many bittervetch seeds as you want for the number of years you wish to remain sterile. Steep them in the blood of a menstruating woman. Let them steep in her own genitals. And take a frog that is alive and throw the bittervetch seeds into its mouth so that the frog swallows them, and release the frog alive at the place where you captured him. And take a seed of henbane, steep it in mare's milk; and take the nasal mucus of a cow with grains of barley, put these into a [piece of] leather skin made from a fawn and on the outside bind it up with a mulehide skin, and attach it as an amulet during the waning of the moon [which is] in a female sign of the zodiac on a day of Kronos or Hermes. Mix in also with the barley grains cerumen from the ear of a mule.[229]

This contraceptive recipe certainly displays the typical ingredients expected in magical concoctions (nasal mucus, a mule's earwax, menstrual blood, etc.), but sandwiched within are two pharmacologically potent herbs, bittervetch (ὄροβος = *Vicia ervilia* [L.] Willd.) and henbane (the papyrus has ὑοσκύεμος as contrasted to the usual ὑοσκύαμος,[230] *Hyoscyamus niger*), both widely known in Greco-Roman pharmacy and in modern folk medicine and pharmacognosy. Dioscorides notes the use of the vetch in the treatment of skin diseases of several kinds[231] and gives warning regarding its ingestion since it engenders headaches, disturbs the bowels, and draws down blood in the urine. As Riddle notes,[232] vetch was used to treat cancer until the early nineteenth century, and active principles isolated from the herb include vicianin (a cyanogenetic glycoside), guanidine, and xanthine. Overdosage would resemble cyanide poisoning, much as Dioscorides suggests. Henbane is a rather poisonous plant from which hyoscyamine is obtained and was well known in classical antiquity as a drug that could cause madness or—as Dioscorides writes—"frenzies."[233] Preparations made from the henbane have atropinelike effects[234] and have some limited utility in modern therapeutics in the relief of spasms in the urinary tract. The scribe may indicate that the concoction is to be swallowed through the device of having the frog ingest the seeds (frogs and fertility were intimately linked in Egyptian and Greek lore),[235] but the basic function of the recipe is in its amuletic powers, a common approach as seen in the following text from the magical papyri. Yet muffled among the earwax, blood, milk, and nasal mucus is a record of the potency of two drugs, fully understood in the formal pharmacy of classical antiquity.

Even a short text from the magical papyri will yield numerous insights:

> Carried [with a magnetic] stone, or even spoken, [this verse] serves as a *contraceptive:* "Would that you be fated to be unborn and to die unmarried." Write this on a piece of new [papyrus] and tie it up with hairs of a mule.[236]

Apart from the quotation of Homer (*Il.* III.40), this small bit from late Roman or Byzantine Egypt does not appear to contain anything of particular interest until one

checks the ancient references on the "lodestone" in the context of obstetrics and gynecology. The scribe has compacted an enormous lore on magnetic stones and "women's problems" into a single line recommending the lodestone as an amulet, although the use of quasi-Homeric lines as spells is also very common in the magical papyri. The lodestone charm appears in the writings of Soranus of Ephesus (fl. c. 98–117 A.D.), whose *Gynecology* was the finest tract of its kind before the European Enlightenment. Soranus' mention of the lodestone amulet suggests how common such charms must have been in the first and second centuries, and he writes that some individuals believe "some things" are useful according to their "antipathy," for example the lodestone, the "Stone of Assius," the stomach curd from a rabbit, and "some other amulets to which we ourselves pay no heed. But one must not forbid their use: even if the amulet has no real effect, it will possibly gain a cheerful attitude in the woman"[237] being treated for uterine hemorrhage. Soranus thus provides a listing of some charm ingredients while disapproving them, even though his patients obviously valued them all. Moreover, the lodestone was deemed very useful in ancient medicine as a "blood assimilator," as recorded by Dioscorides,[238] Galen,[239] Pliny the Elder,[240] and the Byzantine compilation of farm lore, the *Geoponica.*[241] Similar in properties was the "Stone of Assius" (probably some kind of pumice), which was an effective styptic esteemed by Dioscorides and other Roman medical writers.[242] Physicians and pharmacologists thought the lodestone was useful in treatment for uterine bleeding and other similar ailments, and it appears the magical papyrus records a logical assumption by the common folk: one could, indeed, wear the saying on a lodestone, since the magnetite already had styptic and presumably divine powers to prevent bleeding; such logic would also proceed to the next step, which meant that a contraceptive power was likewise provided in the stone.

Herbs, drugs, medicinal minerals, animal products used as medicines, and insects appear frequently in varying contexts in the magical papyri.[243] Particularly fascinating is a "substitution list" of names of herbs and other substances given as "code names," as explained by the scribes:

> **Interpretations** which the temple scribes employed, from the holy writings, in translation. Because of the curiosity of the masses they [i.e., the scribes] inscribed the names of the herbs and other things which they employed on the statues of the gods, so that they [i.e., the masses], since they do not take precaution, might not practice magic, [being prevented] by the consequence of their misunderstanding. But we have collected the explanations [of these names] from many copies [of the sacred writings], all of them secret. *Here they are:*
>
> A snake's head: a leech
> A snake's "ball of thread": this means soapstone
> Blood of a snake: hematite
> A bone of an ibis: this is buckthorn
> Blood of a hyrax: truly of a hyrax
> "Tears" of a Hamadryas baboon: dill juice
> Crocodile dung: Ethiopian soil
> Blood of a Hamadryas baboon: blood of a spotted gecko
> Lion semen: human semen
> Blood of Hephaistos: wormwood
> Hairs of a Hamadryas baboon: dill seed

Semen of Hermes: dill
Blood of Ares: purslane
Blood of an eye: tamarisk gall
Blood from a shoulder: bear's breach
From the loins: camomile
A man's bile: turnip sap
A pig's tail: leopard's bane
A physician's bone: sandstone
Blood of Hestia: camomile
An eagle: wild garlic(?)
Blood of a goose: a mulberry tree's "milk"
Kronos' spice: piglet's milk
A lion's hairs: "tongue" of a turnip
Kronos' blood: . . . of cedar
Semen of Helios: white hellebore
Semen of Herakles: this is mustard-rocket
[A Titan's] blood: wild lettuce
Blood from a head: lupine
A bull's semen: egg of a blister beetle
A hawk's heart: heart of wormwood
Semen of Hephaistos: this is fleabane
Semen of Ammon: houseleek
Semen of Ares: clover
Fat from a head: spurge
From the belly: earth-apple
From the foot: houseleek.[244]

This list of "interpretations" is striking in what it tells us about divine names given to ordinary herbs—divine names that the scribes insist are not understood by "the masses." The preface to the listing also shows a professional pride by the unknown priests who "know the codes" and suggests that the practice of magic had adopted as part of its skills and techniques the lore of herbalism.

If the "interpretations" of *PGM* XII. 401–44, are intended to explain code names taken for granted by priests, scribes, and probably the common people, there are many more instances in the magical papyri in which substances are merely named without further ado, and some of these terms disguise multiingredient drugs. In four (probably five) different passages of the *Papyri Graecae Magicae* one reads of the use of something called κῦφι,[245] which is a very ancient Egyptian incense, ointment, and edible drug,[246] containing up to thirty-six ingredients, all pharmacologically active.[247] If formal sources in ancient and Byzantine pharmacy—for instance, Dioscorides, Oribasius, and Paul of Aegina—did not specify ingredients in the various formulas for κῦφι, we would be reduced to learned speculation regarding just what this "sacred incense of Egypt" *was*. The κῦφι recipes show a sophistication of drug compounding among the common folk and a close study of the historical evolution of κῦφι indicates a slow "improvement of the product" from dynastic Egypt through the seventh-century texts of Paul of Aegina. In itself, the history of κῦφι destroys an accepted mythology of modern medical historians, who assume ancient medicine and pharmacy developed to a certain point, then remained utterly static for countless centuries. If κῦφι originated from the magicomedicine

and pharmaceutics of dynastic Egypt, it became not only a substance that would be part of a magical tradition but also a drug adapted into the pharmaceutics of learned medicine, suggested by the ten-ingredient κῦφι given by Dioscorides.[248] The magical papyri certainly take κῦφι "for granted," offering no detailed explanation of either the ingredients or its significance other than to imply its importance in such procedures as *The Bear-charm which accomplishes everything*,[249] in which κῦφι is one item in a list offered to the "Bear" (constellation).

The cacophony of competing claims, apologies, and vitriolic criticism of magicians and magic (including purported drug lore) in the second century is dramatically illustrated by a masterful diatribe of Hippolytus of Rome (c. 170–c. 236 A.D.). As part of an ongoing and antagonistic free-for-all among Christians and non-Christians alike, Hippolytus' rhetorical fury is directed, in part, at the blatant charlatanism displayed by the practitioners of magic who "offer the Egyptian magicians' incense called κῦφι,"[250] accompanied by loud and noisy manipulation of gawking crowds. Hippolytus knows his drugs and simulates deep anger at the degradation of herbalism he has observed, remarking that all of the hocus-pocus of invisible writing produced by the magicians of Rome is easily understood with the use of malachite, powdered galls, milk, fish sauce (*garum*), spurge (τιθύμαλος), and fig juice.[251] Hippolytus' feigned tirade against practicing magicians delineates how popular such professionals were in the early Roman Empire.

PHARMACOLOGY AND MAGICORELIGIOUS ASSUMPTIONS: SOME CONCLUSIONS

Recent research on occult doctrines and texts in the Renaissance has convincingly demonstrated that underneath the bland labels of *Hermeticism, magic, astrology, witchcraft,* and similar terms, there is an enormous mélange of views and practices, a hodgepodge of concepts often in open conflict with one another. Vickers writes that "the influence of the hermetic texts was small in comparison with that of the main occult sciences, and their presence in the Renaissance . . . makes for just one more syncretic ingredient in an already syncretic mixture."[252] A comparable pasticcio characterized Greco-Egyptian "Hermeticism," as indicated by Fowden in *The Egyptian Hermes;* and once Fowden has led us through the curiously interwoven, yet conflicting, documents of this ancient Hermeticism, a clear awareness emerges of the patchwork quality in thinking, even with such presumably unified subjects like herbalism.[253] An analogous miscellany characterizes the data in the magical papyri, the erudite authors on matters pharmacognostic like Dioscorides, and almost all other extant Greek and Roman texts—from poetry to philosophy—that take up or mention the myriad of different facts gleaned from folk customs presuming divine or magicomedical properties in plants and herbs.

Even with the evidence of continually shifting and fluctuating hybrids of assumptions about φάρμακα, which seem to wax and then fade into composite forms through the centuries, a few limited conclusions can be drawn. At first glance, the presence of women as "experts" in drug lore, as seen first in Homer, might suggest that such expertise emerged solely from the arcane knowledge of sex and birthing,

perhaps guarded, if not hoarded, by females. To be sure, many of the rituals that festoon rootcutting and the gathering of herbs do traditionally incorporate women as the "main characters," but the generally cited evidence of poetry ignores the plentiful and contrary evidence of male expertise in aphrodisiacs and matters obstetric as found in such authors as Theophrastus. In certain respects, Greek and Roman men were as fond of creating fantasies about women as are modern males, so that when one notes the listing of men who were learned in sexual and erotic magic, as provided by Galen, one is also reminded of the male practioners of erotic bewitchments as they appear in the *Papyri Graecae Magicae*. Modern psychology also has demonstrated the strong presence of a generalized masculine fear of women, particularly in the basic consideration of sex, so that the student of ancient erotic magic may be forewarned not to accept the notion of a special feminine expertise in drugs.

Magicoreligious concepts about drugs may probably be linked with very old traditions ultimately stemming from the civilizations of the ancient Near East. The curious presence of the δημιουργός in the pages of Greek literature, from Homer to Aristotle, may indicate a survival, if not an infusion, of Assyrian or Babylonian medical customs; and further study of Egyptian texts of magicopharmacy and rituals associated with the prescribing of drugs most likely will demonstrate further links with the later practices of Greek medicine. At the very least, one must conclude that the magicoreligious documents of the Greeks, which contain data on potent herbs, have very apparent links with cultures and religions of the ancient Near East.

Greek and Roman perceptions of the basic causes of pharmaceutical properties—in particular those of plants—continually fused religious and empirical data; and the pattern of thought in its multiple levels on the actions of drugs, first enunciated by Homer, remained fairly consistent throughout the centuries of Greek, Roman, and Byzantine pharmacology. This pattern combined the conviction of divine powers of drugs—whether beneficial or deleterious—with deeply rooted observations gathered by farmers over hundreds of generations; and properties (δυνάμεις) attributed to varying φάρμακα quite frequently were amalgams of venerated rituals fused with carefully deduced pharmaceutical effects, for instance, the association of squill with purification ceremonies and its treatment in the *Materia Medica* of Dioscorides. The δυνάμεις of herbs and drugs could be viewed "rationally" through magicoreligious means, by one who also assumed the basic divinity of the world at large (and therefore of the men and the plants that lived in that world) or accepted explanations of botanical astrology. All these and other approaches touched on above were quite acceptable to most thinkers in classical antiquity so that Edelstein is almost certainly incorrect to argue the utter rarity of pure magic or pure empiricism in ancient pharmacy and medicine. Even as Theophrastus muddles his definition of "herb" thanks to the folk customs of his oral sources, the ῥιζοτόμοι, he not only applies the precepts of Aristotelian morphology to his herbal botany but also acknowledges the prevalence of a belief in sympathetic pharmacology, a "doctrine of signatures" applied to orchid bulbs, a belief paralleled in spells of the *Papyri Graecae Magicae* that note the efficacy of "mule products" as contraceptives.

Theophrastus' painstaking considerations of religious and folkloristic practices concerning plants and herbal preparations provide priceless details about the so-called unlettered levels of Greek society as they conceived herbal medicine and its

functions. The magical papyri, in spite of priestly attempts to restrict knowledge of herbal lore, show quite vividly the ordinary and sophisticated command of drug compounding by the common people, a command not surprising in view of their usual rural upbringing. They would know the plants from childhood, and they would also know the appropriate magicoreligious connotations and their proper interpretations. Drugs were indeed "the hands of the gods."

Notes

1. O. Regenbogen, "Theophrastos," in *RE* Suppl. VII (1940), 1354–1562 (esp. 1453–79: botany). John Scarborough, "Theophrastus on Herbals and Herbal Remedies," *Journal of the History of Biology* 11 (1978): 353–85. G. E. R. Lloyd, "Theophrastus, the Hippocratics, and the Root-Cutters," in *Science, Folklore and Ideology: Studies in the Life Sciences in Ancient Greece* (Cambridge, 1983), 119–35. Almost all plants are identified according to international systematics in botany, with the usual abbreviations of authors' names (e.g., L. for Carl von Linnaeus [1707–1778]). The Latin binomials employed sometimes also contain indications of priorities. For instance "L" sometimes appears as "[L]," indicating that Linnaeus was the original author of a name, revised by some more modern botanist, whose naming had been accepted by the international community of botanists, who, in turn, wished to retain Linnaeus' priority, even with the "new" name. One can gain insight into the formation of modern botanical names by consulting William T. Stearn, *Botanical Latin,* 2d ed. (Newton Abbot, England, 1973). A standard listing of priorities and author's names for plants is the *Draft Index of Author Abbreviations Compiled at the Herbarium, Royal Botanic Gardens Kew* (London, 1984), followed faithfully by D. J. Mabberley, *The Plant-Book* (Cambridge, 1987). Numerous botanical equivalents are conveniently provided in George Usher's *Dictionary of Plants Used by Man* (London, 1974) and Oleg Polunin's *Flowers of Europe* (London, 1969) and *Flowers of Greece and the Balkans* (Oxford, 1980). Various "flora," however, differ as to which binomials are listed for particular genera and species, so that nonbotanists often become confused regarding the "real" name. See the lists "Floras and Handbooks" and "Periodicals" in Mabberley, *Plant-Book,* pp. 637–49.

2. Theophrastus' *Inquiry into Plants* is frequently cited by its Latinized title, *Historia plantarum* or simply *HP;* the most commonly used Greek text of *Inquiry* is that edited and translated in two volumes by Arthur Hort in the Loeb Classical Library (London, 1916). Victorian prudery, however, caused Hort to omit certain passages from both the Greek text and English translation (viz., *Inquiry,* IX.18.3–11 on ὄρχις as an aphrodisiac and other plants as anaphrodisiacs; see also nn. 124–32 below), so that one must still employ F. Wimmer, ed., *Theophrasti Eresii Opera* (Paris, 1866; rpt. Frankfurt, 1964) for the complete Greek text. (*Inquiry,* IX.18.3–11 = Wimmer, pp. 159–61, with Latin translation). An English translation of these "missing lines" was published as Chalmers L. Gemmil, "The Missing Passage in Hort's Translation of Theophrastus," *Bulletin of the New York Academy of Medicine* 49 (1973): 127–29 (a spare translation with no commentary). One must also be extremely wary of accepting many of the proposed nomenclatures for plants as listed in the "Index of Plants" of the Hort edition. The identifications and binomial names were provided by William Thiselton-Dyer, and many are no more than wildly inappropriate guesses. Unfortunately, many of these false nomenclatures have entered *LSJ,* where they mislead novitiates unacquainted with Thiselton-Dyer's less-than-skilled botany. Far better are the nomenclatures in the *Oxford Latin Dictionary,* and best are listings in Jacques André, *Les noms de plantes dans la Rome antique* (Paris, 1985); useful among older lexicons are A. Carnoy, *Dictionnaire*

étymologique des noms grecs de plantes (Louvain, 1959) and R. Strömberg, *Griechische Pflanzennamen* (Göteborg, 1940). Had John Raven of Cambridge been able to complete and publish his projected *History of Botany in Ancient Greece* before his death in 1980, we might, indeed, have a reliable guide to the plant lore in English. Colleagues were treated to a foretaste of the study in Raven's 1976 Gray Lectures, with the subject on "Plants and Plant Lore in Ancient Greece." Nick Jardine, "Ancient Greek Botany," in *John Raven by his Friends* ed. John Lipscomb and R. W. David [Bath, 1981; privately printed], 88–90) writes the following about one aspect of the 1976 Gray Lectures: "Throughout the lectures John succeeded in communicating a specific enthusiasm, an enthusiasm which gave life to all his interests, classical, philosophical and botanical, the enthusiasm of the hunt. Sometimes the quarry was a person. In the opening lecture the hapless Sir William Thiselton-Dyer, F. R. S., successor to Hooker in the directorate of Kew, and author of the diagnoses of plant names that enliven the standard Greek dictionary, Liddell and Scott, is hunted down. With unholy glee the superficiality of his scholarship and the absurdity of his diagnoses are gently but remorselessly exposed" (p. 89).

3. Books I and II only of *Causes* have appeared in the Loeb series: *Theophrastus "De Causis Plantarum"* ed. and trans. Benedict Einarson and G. K. K. Link (Cambridge, Mass., 1976); for the remainder (*Causes,* III-VI) cf. Wimmer (see n. 2), 218–319.

4. On Theophrastus as a botanist, see Ernst H. F. Meyer, *Geschichte der Botanik,* (Königsberg, 1854–57; rpt. Amsterdam, 1965), I:146–88; A. G. Morton, *History of Botanical Science* (London, 1981), 29–43; and Edward Lee Greene, *Landmarks of Botanical History,* ed. Frank N. Egerton (Stanford, 1983) I:128–211.

5. Scarborough, "Theophrastus" (see n. 1), 353–55.

6. W. H. S. Jones, *The Medical Writings of Anonymus Londinensis* (Cambridge, 1947; rpt. Amsterdam, 1968), 5–8.

7. Exhaustively, P. J. Rhodes, *A Commentary on the Aristotelian Athenaion Politeia* (Oxford, 1981).

8. Scarborough, "Theophrastus" (see n. 1), 354–55, 359–60. Lloyd, *Ideology* (see n. 1), 120–22. Greene (see n. 4), I.120–27.

9. Very common in the modern literature is the use of some "school" of psychology or psychiatry, and studies are replete with "psychosexual" or "psychosomatic" explanations—as if the ancient Greeks thought in terms identical to those of modern Freudians, Jungians, Piaget, or even Eric Berne. Sometimes, however, ancient Greek drug lore becomes part of a debased structural anthropology in modern scholarship, especially prominent in works by followers of Claude Lévi-Strauss, e.g., Marcel Detienne, *The Gardens of Adonis: Spices in Greek Mythology,* trans. Janet Lloyd (London, 1977). See my review and comments on Detienne's book in *Classical Journal* 76 (1981): 175–78.

10. Two books stand out in this respect, whose authors attempt to interpret early Greek thinking in ancient terms, not modern ones: Richard Broxton Onians, *The Origins of European Thought* (Cambridge, 1951) and Robert Parker, *Miasma: Pollution and Purification in Early Greek Religion* (Oxford, 1983).

11. Quoted in Galen, *Compound Drugs According to Place of Ailment* VI.8 (in C. G. Kühn, ed., *Galeni Opera Omnia* [Leipzig, 1821–33], XII:966).

12. P. M. Fraser, *Ptolemaic Alexandria* (Oxford, 1972), I:348–57.

13. Cynthia Wright Shelmerdine, *The Perfume Industry of Mycenaean Pylos* (Göteborg, 1985), 123–30.

14. *Od.* X.394, *οὐλόμενον*; II.329, *θυμοφθόρον*; I.261, *ἀνδροφόνον* (viz. *φάρμακον ἀνδροφόνον διζήμενος, ὄφρα οἱ εἴη / ἰοὺς χρεχρίεσθαι*); *Il.* XXII.94 and *Od.*X.213, *κακόν*; *Od.* IV.230, *λυγρόν* [cf. X.236]; IV.229 and X.287, *ἐσθλόν*; *Il.* V.401 and 900, *ὀδυνήφατα φάρμακα*; and IV.218, *ἤπιον*.

15. X.391–94.

16. *Od.* X.392.

17. *Od.* X.394.

18. One may observe how these stories degenerated as they were passed along over the centuries, e.g. Pliny, (*HN* XXV.10–12) says that the "origin of botany" was closely aligned with pure magic, and he notes that Medea and Circe were early investigators of plants—and that Orpheus was the first writer on the subject of botany. His reflections on the topic, from the vantage point of the "enlightened" first century, are instructive of the differences between Homeric Greece and Pliny's Roman intellectual world eight hundred years later: *Durat tamen tradita persuasio in magna parte vulgi veneficiis et herbis id cogi eamque unam feminarum scientiam praevalere* (XXV.10). The old "folk traditions" remained strong. Further degeneration of the Circe legend appears in Ael. *On Animals* I.54, in which the sorceress kills merely by touch. By the time Augustine wrote his *City of God,* folklore was current in Italy that women (esp. women who ran inns) gave drugs along with cheese to travelers and thereby changed their guests into beasts of burden; August., *City of God,* XVIII.18; cf. Apul., *Golden Ass* (*Metamorphoses*) III.24, and *Apologia* (*De Magia*), 31 (*Apuleius,* ed. R. Helm, vol. II. [Leipzig, 1972], 36–37).

19. *Od.* X.305.

20. *Od.* X.304: *ῥίζῃ μὲν μέλαν ἔσκε, γάλακτι δὲ εἴκελον ἄνθος.*

21. *Od.* X.316–17.

22. *Od.* X.305.

23. *Od.* X.305–06.

24. In some later Greek texts, *μῶλυ* means "garlic," viz., *Allium sativum.*, e.g., Theophr., *Inquiry into Plants,* IX.15.7; the Hippocratic *Nature of Women* 85 (*Oeuvres complètes d'Hippocrate* ed. E. Littré [Paris, 1839–61], VII:406); and Diosc. *Mat. Med.* III.47 (*Pedanii Dioscuridis Anazarbei "De Materia Medica,"* ed. M. Wellmann, [Berlin, 1906–14], II:60). E. Steier, "Moly," *RE,* vol. XVI (Stuttgart, 1933), cols. 29–33. Jerry Stannard, "The Plant Called Moly," *Osiris* 14 (1962): 254–307, esp. 255–56. G. M. Germani, "Ulisee, Circe, e l'erba moly nella tradizione Omerica e nella realità poetica," *Rassegna di clinica, terapia, e scienze affini* 14 [1934]: 168–172) offers mandrake (*Mandragora officinarum*), which can be rejected; likewise the identification of Homer's *μῶλυ* as black hellebore (*Helleborus niger*) is merely fanciful, e.g., in Oswald Schmiedeberg, *Über die Pharmaka in der Ilias und Odyssee* (Strassburg, 1918), 25–29, esp. 27. Cf. Carnoy, *Dictionnaire* (see n. 2), 180. Robert Graves (*The Greek Myths* [Harmondsworth, 1955], II:367) offers "wild cyclamen" after rejecting John Tzetzes' guess of "wild rue."

25. As does Walter Artelt, *Studien zur Geschichte der Begriffe, "Heilmittel," und "Gift"* (Leipzig, 1937; rpt. Darmstadt, 1966), 38–46, with minor modifications.

26. G. E. R. Lloyd, *Magic Reason and Experience: Studies in the Origins and Development of Greek Science* (Cambridge, 1979), 31.

27. D. Holwerda, ΦΥΣΙΣ (Groningen, 1955), 63.

28. Lloyd, *Magic* (see n. 26), 31, n. 106.

29. *Od.* IV.220–30. This seems to be the earliest reference to compound *φάρμακα* in the Greek world.

30. *Od.* IV.231–32; cf. Hdt. II.84.

31. *Il.* VIII.306–7.

32. Diosc. *Mat. Med.* IV.64.1 (Wellmann [see n. 24], II:218–19) and IV.64.7 (ibid., p. 221).

33. George Edward Trease and William Charles Evans, *Pharmacognosy,* 11th ed. (London, 1978), 570; Albert F. Hill, *Economic Botany,* 2d ed. (New York, 1952), 260; Varro E. Tyler, Lynn R. Brady, and James E. Robbers, *Pharmacognosy,* 8th ed. (Philadelphia, 1981), 226–27.

34. viz., *Od.* IV.220–32.

35. Guido Majno, *The Healing Hand: Man and Wound in the Ancient World* (Cambridge, Mass., 1975), 108–11; and A. Lucas, *Ancient Egyptian Materials and Industries*, 3d ed. (London, 1948), 401 (on poppy seed oil).

36. *Od.* IV.219–34.

37. *Od.* X.391–94; cf. *Il.*, XI.638–41 (and slightly earlier in line 623): Hecamede mixes a potion (κυκεών) for Nestor and his companions; the potion consisted of Pramnian wine, grated goat's cheese, and white barley meal. Delatte argues that this name was attached to the ritual drinking and initiations at Eleusis; see Armand Delatte, *Le Cycéon: Breuvage rituel des mystères d'Éleusis* (Paris, 1955); see also A. Delatte, *Herbarius* (Liège, 1938), 1–6 for women in legendary roles as drug compounders.

38. Macrob. *Sat.* V.19.9–10 (quotations from Sophocles' lost play, *Rootcutters*); Sen. *Medea*, passim, but esp. 705–70; Petron. *Sat.* 137–38; and Lloyd, *Science* (see n. 1), 76–79 for women as sources of medical information. But almost all of the names of "herbalists" and experts on folk medicines (including matters of sexual nature), as given by Theophrastus, Pliny, Galen, and Athenaeus are those of men, not women. Friedrich Pfister, in "Pflanzenaberglaube," *RE*, XIX, pt. 2 (1938), 1446–56, esp. 1448–49.

39. E.g., C. G. Jung, "Commentary on the Visions of Zosimus," in *Alchemical Studies*, trans. R. F. C. Hull (Princeton, 1967), 66–108, esp. 99 on Circe; Jolande Jacobi, "Symbols in an Individual Analysis" in *Man and His Symbols*, ed. C. G. Jung (London, 1964), 272–303, esp. 283: ("The pig is closely associated with dirty sexuality [Circe . . . changed the men who desired her into swine]"); Wolfgang Lederer, *The Fear of Women* (New York, 1968), 35 ("Odysseus . . . refused to yield to Circe's advances on the grounds that his vigor would be impaired"), 57 ("Passive innocence of the dangerous woman is far less common than her active destructiveness" [with the example of Circe]), and 126 (Circe as a death goddess). Cf. Robert Graves, *The White Goddess* (New York, 1966), 448–49; idem, *Greek Myths* (see n. 24), I.177, with sources. Lederer and Graves provide a full panoply of references to the vast literature in comparative mythology, anthropology, and psychoanalytic theory.

40. Trease and Evans, *Pharmacognosy* (see n. 33), 569; Tyler et al., *Pharmacognosy* (see n. 33), 225–26.

41. W. Burkert, "Itinerant Diviners and Magicians: A Neglected Element in Cultural Contacts," in *The Greek Renaissance in the Eighth Century* B.C., ed. R. Hägg (Stockholm, 1983), 115–20 and idem; *Die orientalisierende Epoche in der griechischen Religion und Literatur*, SBHeidelberg (Heidelberg, 1984), no. 1, 43–48. One may argue that a "familial control" over sacred drug lore could explain why Polydamnia is called the daughter of Thon, but Theophrastus (*Inquiry into Plants*, IX.15.1) expresses his basic skepticism regarding these tales.

42. Pl. *Symp.* 186d. The Hippocratic *Ancient Medicine*, I.11 (*Hippocrates*, ed. W. H. S. Jones [London, 1923–31], I:12).

43. Arist. *Pol.* 1282a3: "'Physician' [ἰατρός] is both the ordinary practitioner [δημιουργός] and the master of the art of medicine [ἀρχιτεκτονικός]."

44. See nn. 107–13.

45. esp. Pl. *Resp.* 406a, 408a and *Ion* 538c.

46. E.g., esp., Celsus, *Med.* proem 3 and Galen, *Thrasyb.* 33 (ed. G. Helmreich, in *Claudii Galeni Pergameni Scripta Minora* [Leipzig, 1884–93], III:78) after quoting *Od.* IV.230–31.

47. *Sed vulneribus tantummodo ferro et medicamentis mederi.*

48. Celsus, *Med.* proem 9, with 6.

49. Wesley D. Smith, "Physiology in the Homeric Poems," *TAPA* 97 (1966): 547–56, esp. 547.

50. Onians, *Origins* (see n. 10), 13–65.

51. Andreas Plaitakis and Roger C. Duvoisin, "Homer's Moly Identified As *Galanthus nivalis* L.: Physiologic Antidote to Stramonium Poisoning," *Clinical Neuropharmacology* 6 (1983): 1–5. Cf. suggestions in the references in n. 24 above.

52. See, e.g., Clifford Geertz, "Curing, Sorcery, and Magic in a Javanese Town" in *Culture, Disease, and Healing*, ed. David Landy (New York, 1977), 146–54.

53. E.g., Melford E. Spiro, "The Exorcist," in *Burmese Supernaturalism* (Englewood Cliffs, N.J., 1967), 230–45.

54. *Il.* IV.189–219; V.401–2, 889–90; XI.828–47; *Od.* XIX.457.

55. Wesley D. Smith, "So-Called Possession in Pre-Christian Greece," *TAPA* 96 (1965): 403–26.

56. Onians, *Origins* (see n. 10), 489–90.

57. Among many examples, see Klaus Stopp, "Medicinal Plants of the Mt. Hagen People (Mbowamb) in New Guinea," *Economic Botany* 17 (1963): 16–22 and, generally, John Mitchell Watt, "Magic and Witchcraft in Relation to Plants and Folk Medicine," in *Plants in the Development of Modern Medicine*, ed. Tony Swain (Cambridge, Mass., 1972), 67–102.

58. See n. 14.

59. *Od.* IV.568. Cf. *Il.* V.795, X.575, and XIII.84.

60. M. R. Wright, *Empedocles: The Extant Fragments* (New Haven, 1981), 261, frag. 101 (= frag. 111 DK), as adapted and slightly altered from Wright's translation. The text (apud Diog. Laert. VIII.59), as edited by Wright (p. 133), is basically identical to that provided by Diels-Kranz, *Fragmente* I:353–54. "Drugs" as a translation of φάρμακα is more fitting than Wright's "remedies" and certainly less restrictive than the "Gifte" of Diels-Kranz.

61. Hes. *Works and Days* 41. (*Hesiod: Works and Days*, ed. M. L. West [Oxford, 1978], 153, commentary).

62. West on *Hesiod, Works and Days* 733–734. Cf. Plut. *Mor., Dinner of the Seven Wise Men*, 157D–158B for Hesiod as learned in medicine. The debate over the "magic food," ἄλιμον, occupied much learned discussion in antiquity: Walter Burkert, *Lore and Science in Ancient Pythagoreanism*, trans. Edwin L. Minar, Jr. (Cambridge, Mass., 1972), 151 with n. 174; to Burkert's list of refs. on ἄλιμον one can add Porph., *Life of Pythagoras* 34 (*Porphyre: Vie de Pythagore. Lettre à Marcella*, ed. Edouard des Places [Paris, 1982], 52), which gives a twelve-ingredient formula for ἄλιμον, including poppy seeds, squill, asphodel, and honey.

63. Lloyd, *Ideology* (see n. 1), 119–20.

64. Hesiod, *Works and Days* 824.

65. *Scholia to Apollonius of Rhodes* IV.156 (= Musaeus frag. 2 DK). *Juniperus oxycedrus* yields a distillation of the heartwood, an oil called Oil of Cade, used in the Middle East as an antiseptic and as an external parasite killer; see George Usher, *Dictionary of Plants Used by Man* (London, 1974), 329.

66. Apollonius of Rhodes, *Voyage of the Argo*, IV.156–58.

67. Musaeus frag. 19 DK.

68. R. Merkelbach and M. L. West, eds., *Fragmenta Hesiodea* (Oxford, 1967), p. 173, frag. 349 in "Fragmenta dubia."

69. Dioscorides IV.132 (Wellmann [see n. 24], II:277) not surprisingly retains some of the folklore about τριπόλιον, writing that "it is written that the flower changes its color three times a day." Dioscorides recommends its white root, mixed in two drachmas of wine, as a diuretic and that the root is "cut into antidotes." In southern European folk medicine, the root of *Aster tripolium* has been used to cure eye diseases. Oleg Polunin, *Flowers of Europe* (Oxford, 1969), no. 1365 (p. 427 with plate 142).

70. Alan Cameron, "The Date and Identity of Macrobius," *JRS* 56 (1966): 25–38.

71. Verg. *Aen.* IV.513–14; trans. C. Day Lewis, *The Aeneid of Virgil* (Oxford, 1952), 96.

72. Macrob. *Sat.* V.19.9 (*Macrobius*, ed. J. Willis [Leipzig, 1970], I:326).

73. Macrob. *Sat.* V.19.10 (= Soph. frag. 534 Pearson).

74. Theophr., *Inquiry into Plants* IX.8.5; Scarborough, "Theophrastus" (see n. 1), 359. Dioscorides IV.153.2 (Wellmann [see n. 24], II:298–99).

75. John Gerarde, *The Herball or Generall Historie of Plantes,* vol. 2 (London, 1633), p. 1030.

76. Theophr., *Inquiry into Plants,* IX.8.3.

77. Theophr., *Inquiry into Plants* IX.20.3. Apparently, Athenian cows were immune to its poisonous properties.

78. Soranus, *Gynecology,* II.2.2 (*Sorani Gynaeciorum,* ed. J. Ilberg Corpus Medicorum Graecorum [Leipzig, 1927], p. 51). Soranus flourished in the reign of Trajan (98–117 A.D.).

79. Jeffrey Henderson, *The Maculate Muse* (New Haven, 1975), 135: "Pubic hair is almost always conceived in agricultural terms as a flowering growth . . . . Pennyroyal is jokingly used by Lysistrata . . . to refer to the Boeotian girl's neatly dipilitated campus muliebris, with a clever reference to the smooth, fertile plains of that region . . . with neatly trimmed pennyroyal plots."

80. Ibid., 186 with n. 137. The pennyroyal potion is prescribed for too much ὀπώρα (fruit or sex). Apparently, pennyroyal was hawked in the city along with reed mats, eels, and the like. Aristoph. *Ach.* 861, 869, and 874.

81. John Scarborough, *Facets of Hellenic Life* (Boston, 1976), 179–85; idem, "Nicander's Toxicology," pt. II, "Spiders, Scorpions, Insects, and Myriapods," *Pharmacy in History* 21 (1979): 3–34 and 73–92 (esp. 74–75 with nn. 240–246 and 249–254).

82. E.g., *Nature of Woman* 32 (*Oeuvres complètes d'Hippocrate,* ed. E. Littré [Paris, 1839–61], 8:364) among many refs; see X:751 for index entries for *pouliot.*

83. Dioscorides III,31.1 (Wellmann [see n. 24], II:40).

84. Gal. *Properties and Mixtures of Simples* VI.3.7 (Kühn [see n. 11] 11:857). Cf. Gal. *Treatment by Venesection* 18 (Kühn, 11:304); trans. Peter Brain, *Galen on Bloodletting* (Cambridge, 1986), p. 93.

85. E. Steier, "Minze," *RE, XV.*2 (1931), 2020–28, esp. 2027–28. Nic. *Alex.* 128–29, links pennyroyal with the infamous aphrodisiac called "Spanish fly," made from the elytra (wing covers) of blister beetles; see Scarborough, "Nicander's Toxicology," pt. II (see n. 81), 73–74.

86. A. Tschirch (*Handbuch der Pharmakognosie,* vol. II, pt. 2 [Leipzig, 1917], 1107–08) summarizes the literature to the early twentieth century.

87. R. G. Todd, ed., *Extra Pharmacopoeia Martindale,* 25th ed. (London, 1967), 1544.

88. Malcolm Stuart, ed., *The Encyclopedia of Herbs and Herbalism* (London, 1979), 223–24. Cf. Trease and Evans, *Pharmacognosy* (see n. 33), 412–14 and R. D. Mann, *Modern Drug Use* (Boston, 1984), 138.

89. Gal. *Properties and Mixtures of Simples* III.23 (Kühn [see n. 11], XI:609); John Scarborough, "Some Beetles in Pliny's *Natural History,*" *Coleopterists Bulletin* 31 (1977): 293–96.

90. E. Rohde, *Psyche,* 2d ed., trans. W. B. Hillis (London, 1925), 198, n. 95; J. Murr, *Die Pflanzenwelt in der griechischen Mythologie* (Innsbruck, 1890), 31–35 and 104–6.

91. Theophr., *Inquiry into Plants* VII.13.4.

92. Theophr., *Characters* XVI.14.

93. Parker, *Miasma* (see n. 10), 307.

94. Theophr., *Characters* XVI.2.

95. Theophr., *Characters* XVI.10.

96. Jerry Stannard, "Squill in Ancient and Medieval Materia Medica, with Special Reference to its Employment for Dropsy," *Bulletin of the New York Academy of Medicine* 50 (1974): 684–713.

97. Theogn. 537 (in *Elegy and Iambus,* ed. J. M. Edmonds [London, 1931], I:292).

98. Hipponax frag. 48 in *Herodes, Cercidas, and the Greek Choliambic Poets,* ed. A. D. Knox (London, 1961; pt. 2 of vol. entitled *Theophrastus: Characters,* ed. J. M. Edmonds) 34) as translated by Knox.

99. John Tzetzes, *Chiliades* V.726–61 (*Ioannis Tzetzes Historiarum variarum Chiliades,* ed. T. Kiessling, [Leipzig, 1826], 185–86).

100. John Tzetzes, *Chiliades* 5.743 (Kiessling, p. 185). Although modern scholars debate the reliability of later compilations regarding the φαρμακός rituals, one may certainly trust the main lines (squill and its importance) in summaries by such as John Tzetzes. See Jan Bremmer, "Scapegoat Rituals in Ancient Greece," *HSCP* 87 (1983): 299–320. Bremmer's arguments, however, that all such plants are symbolic (e.g., esp. 302–13: such herbs had no "fruit," and thereby justified the brutal treatment of "nonfruitful" or "marginal" persons) ignores the plentiful evidence of squills and their use in medicine and herbal remedies.

101. John Tzetzes, *Chiliades* 734–36 (Kiessling, p. 185).

102. Ἄγνος, as in Plut. *Mor., Table Talk* 693F, in which we learn that at Chaeronea a slave is beaten with branches of the *Vitex agnus castus* to drive away a "great hunger" termed βούλιμος. The "honey" of *Vitex agnus castus* was famed in antiquity for its use as a wound healer (Arist., *HA* 627a7–9), and the fruit of the "tree" (*Vitex agnus castus* is more of a bush) was valued as an emmenagogue, contraceptive, and sedative; see Diosc. *Mat. Med.* I.103.1–2 (Wellmann [see n. 24], 1:95). Traditionally, the leaves and fruit ("Monks' peppers") are sexual suppressants. Usher (see n. 65), 602. Stuart, *Herbs* (see n. 88), 282–83. Walter H. Lewis and Memory P. F. Elvin-Lewis, *Medical Botany* (New York, 1977), 322.

103. Diosc. *Mat. Med.* II.171.3 (Wellmann [see n. 24], I:239).

104. *Septuagint: Exod.* VII.11 and *Malach.* III:5.

105. Theophr., *Inquiry into Plants,* VIII.1.

106. Scarborough, "Theophrastus" (see n. 1), 356–57.

107. Stannard, "Squill" (see n. 96), 689.

108. Theophr. *Inquiry into Plants* VII.12.1; Hort (see n. 2), II:477 s.v.

109. Apul., *Apol.* 27 (Helm [see n. 18], 31).

110. Einarson, Introduction to *De Causis Plantarum* (see n. 3), xix-xx.

111. Diog. Laert. *Lives of the Eminent Philosophers: Epimenides* I.112.

112. The texts give contradictory evidence: Pl., *Laws* I.642d4 indicates a floruit of c. 500 B.C.; Arist., *Constitution of the Athenians* 1 points to a floruit of c. 600 B.C.. See commentary by Rhodes (see n. 7), 81–82.

113. Stannard, "Squill" (see n. 96), 687–89.

114. Lucian, *Menippus, or Descent into Hell* 7. Cf. E. Steier, "Skilla," *RE* Suppl. III.1 (1927), 522–26, esp. 524.

115. E.g., *Geoponica* XV.1.6–7 (*Geoponica,* ed. H. Beckh [Leipzig, 1895], 432).

116. Parker, *Miasma* (see n. 10), 231–32.

117. Ibid., 232.

118. Theophr., *Inquiry into Plants* I.6.7–9; I.10.7; II.5.5; VII.2.2; VII.4.12; VII.9.4; and VII.13.1–7.

119. Scarborough, "Theophrastus" (see n. 1), 355–60.

120. In folk medicine, both the common mallow, *Malva rotundifolia* L., and high mallow, *Malva sylvestris* L., retain their usefulness; the dried leaves of both species contain mucilage and tannin, making them quite suitable for preparations to treat inflamed tissues and coughs. A decoction of the flowers (*Flores malvae*) is employed for gargling and as a mouthwash. Usher (see n. 65), 375; Todd, *Martindale* (see n. 87), 1533.

121. Lycoph. *Alex.* 582. Nic. *Ther.* 496 and 587; Nic. *Alex.* 112.

122. The Hippocratic *Fractures,* X.3 (*Hippocrates,* ed. E. T. Withington [see n. 42], III.120–21); Nic. *Ther.* 493.

123. Theophr., *Inquiry into Plants* IX.18.2.

124. Ibid. 3. With *οὐ μόνον τῶν σωματικῶν ἀλλὰ καὶ τῶν τῆς ψυχῆς*, the Greek text in Hort's edition breaks off, presumably due to its offensive content—offensive to a squeakily prudish mind of the late Victorian era (the omitted passages contain only the mildest references to aphrodisiacs and a single, rather bland notice of an "Indian drug" that promotes multiple erections in the male). Sarton rightly comments that "Such prudishness in a scientific book is truly shocking." George Sarton, *A History of Science,* vol. I (Cambridge, Mass., 1959), 555, n. 96. See also above, n. 2.

125. Polunin, *Flowers of Europe* (see n. 69), 577 no. 1894. Todd, *Martindale* (see n. 87), 81.

126. Theophr., *Inquiry into Plants* IX.18.3 (Wimmer [see n. 2], 160).

127. Jerry Stannard, "Medicinal Plants and Folk Remedies in Pliny, *Historia Naturalis,*" *History and Philosophy of the Life Sciences* 4 (1982): 3–23, esp. 14–15, with refs. to sources and secondary works.

128. Anthony Preus, "Drugs and Psychic States in Theophrastus' *Historia Plantarum* 9.8–20," in *Theophrastean Studies,* ed. W. W. Fortenbaugh and R. W. Sharples, Rutgers University Studies in Classical Humanities 3 (New Brunswick, 1988), 76–99.

129. Theophr., *Inquiry* IX.18.4 (Wimmer [see n. 2], 160).

130. Ibid.

131. Theophr., *Inquiry* IX.19.2–4.

132. The pharmacological effects of squill (*Urginea maritima* Baker) are fairly well understood. It has a digitalislike action on the heart, and in small amounts is employed occasionally as an expectorant. The outer scales are removed from the bulb. In Europe, a powdered form of rat poison is manufactured from squill. It contains not less than 70 percent alcohol[60%]-soluble extractive, as well as goodly percentages of scillarin A and scillarin B (A is a pure crystalline glycoside; B a mixture of glycosides). Todd, *Martindale* (see n. 87), 692. Trease and Evans, *Pharmacognosy* (see n. 33), 504–6. G. Baumgarten and W. Förster, *Die Herzwiksamen Glykoside* (Leipzig, 1963), 70–75.

133. John Scarborough, *Pharmacy's Ancient Heritage: Theophrastus, Nicander and Dioscorides* (Lexington, Ky., 1985), 19–20.

134. Ibid., 6, and Scarborough, "Theophrastus" (see n. 1), 355–59.

135. See nn. 74–77.

136. Theophr., *Inquiry into Plants* IX.8.6. The particular hellebore (white or black) is not distinguished.

137. Ludwig Edelstein, "Greek Medicine in Its Relation to Religion and Magic," in Owsei Temkin and C. Lilian Temkin, eds., *Ancient Medicine: Selected Papers of Ludwig Edelstein* (Baltimore, 1967), 205–46 (quotation from p. 230); orig. *Bulletin of the History of Medicine* 5 (1937): 201–46.

138. Ibid.

139. Ibid., 231.

140. Ibid., 231–32.

141. Ibid., 232.

142. John Scarborough, *Roman Medicine* (London, 1969), 119–20.

143. John M. Riddle, *Dioscorides on Pharmacy and Medicine* (Austin, 1985): 14–24.

144. Edelstein, "Magic," in *Ancient Medicine* (see n. 137), 232, n. 88.

145. Ibid., 230.

146. Ibid., 231.

147. Gal., *Compound Drugs According to Place in the Body* VIII.2 (Kühn [see n. 11], 13:126), quoting from the works of Andromachus on remedies for upset stomach.

148. Gal., *Compound Drugs According to Kind* VII.6 (Kühn, XIII:986).

149. Theophr., *Inquiry into Plants* IX.8.1.

150. Scarborough, "Theophrastus" (see n. 1), 355–56 with nn. 10–17.

151. Theophr., *Inquiry into Plants* IX.8.2.

152. Scarborough, "Theophrastus" (see n. 1), 356–57 with texts.

153. Pseudo-Aristotle, *Problems,* 864b9–12; John Scarborough, "Theoretical Assumptions in Hippocratic Pharmacology," in *Formes de pensées dans la collection hippocratique: Actes du IVe Colloque international hippocratique Lausanne . . . 1981,* ed. F. Lasserre and P. Mudry (Geneva, 1983), 307–25, esp. the section 'Aristotelian Drug Theory' with nn. 7–28.

154. Benedict Einarson, "The Manuscripts of Theophrastus' *Historia Plantarum,*" *CP* 71 (1976): 67–76, esp. 68–69 with the readings from manuscript U*; Scarborough, "Theophrastus" (see n. 1), 353–54, with summary of contrary views.

155. John Scarborough, "Nicander's Toxicology", pt. I, "Snakes," *Pharmacy in History* 19 (1977): 3–23 and pt. 2, "Spiders, Scorpions, Insects, and Myriapods," 21 (1979): 3–34, 73–92.

156. Max Wellmann, "Das älteste Kräuterbuch der Griechen," in *Festgabe für Franz Susemihl* (Leipzig, 1898): 1–31 and idem, "Apollodoros" [no. 69], in *RE,* I.2 (1894), 2895.

157. John Scarborough, "Nicander, *Theriaca,* 811," *CP* 75 (1980): 138–40.

158. Scarborough, "Beetles" (see n. 89), 293–96; idem, "Nicander's Toxicology", pt. II (see n. 81), 73–78.

159. See, e.g., the Hippocratic *Diseases of Women* I.75–79 (Littré [see n. 24], VIII:162–99).

160. Riddle, *Dioscorides* (see n. 143), 137–38.

161. See esp. the Hippocratic *Ancient Medicine* as contrasted with the Hippocratic *Nature of Man.*

162. See n. 24.

163. John Scarborough and Vivian Nutton, "The *Preface* of Dioscorides' *Materia Medica:* Introduction, Translation, Commentary," *Transactions and Studies of the College of Physicians of Philadelphia* n.s. 4 (1982): 187–227 (esp. 192–194).

164. Ibid., 213–17; Riddle, *Dioscorides* (see n. 143), 2–4.

165. Scarborough, *Pharmacy's Ancient Heritage* (see n. 133), 63–65, 72–76 on silphium; Scarborough and Nutton, "*Preface*" (see n. 163), 199–202.

166. Riddle, *Dioscorides* (see n. 143), 94–131.

167. John Scarborough, "The Drug Lore of Asclepiades of Bithynia," *Pharmacy in History* 17 (1975): 43–57; Scarborough and Nutton, "*Preface*" (see n. 163): 206–8.

168. Dios. *Mat. Med.* 2, Preface (Wellmann [see n. 24], 1:2); translation from Scarborough and Nutton, "*Preface*" (see n. 163), 196.

169. Ibid., 5 (Wellmann [see n. 24], 1:3); translation from Scarborough and Nutton, "*Preface*" (see n. 163), 196.

170. Diosc. *Mat. Med.* IV.162.4 (Wellman [see n. 24], II:308–9).

171. Most likely to Zeus, through the eagle, but "the mythology of the eagle baffles analysis"; D'Arcy W. Thompson, *A Glossary of Greek Birds* (Oxford, 1936), 12.

172. See above pp. 348–52 with notes 91–117.

173. Parker, *Miasma* (see n. 10), 215–216.

174. But cf. Bennett Simon, *Mind and Madness in Ancient Greece* (Ithaca, N.Y., 1978), 218–19, 226, and 229.

175. See esp. *Sacred Disease,* II-IV (Jones, *Hippocrates* [see n. 42], III:140–51). One passage suggests the tone and approach of the writer: "My own view is that those who first attributed a sacred character to this malady were like the magicians, purifiers, charlatans and quacks of our own day, men who claim great piety and superior knowledge" (*Sacred Disease* II.1–5; trans. Jones, p. 141). Black hellebore is specifically prescribed by a Hippocratic physician in treatment of delirium accompanied by visual hallucinations in the *On Internal Diseases* 48 (Littré [see n. 24], VII:284–89, esp. 286–87). See also Owsei Temkin, *The*

Falling Sickness, 2d ed. (Baltimore, 1971), 68, 73, 76, 79, and 162 on later uses of hellebores in treatment of epilepsies.

176. Riddle, *Dioscorides* (see n. 143), 124, no. 162 in table 8, with refs. Cf. Scarborough, "Theophrastus" (see n. 1), 361–62.

177. The research of Vivian Nutton has proven the traditional dates for Galen (130–200 A.D.) wrong. Vivian Nutton, "The Chronology of Galen's Early Career," *CQ* 23 (1973): 158–71; idem, "Galen in the Eyes of His Contemporaries," *Bulletin of the History of Medicine* 58 (1984): 315–24.

178. John Scarborough, "Early Byzantine Pharmacology," in *Symposium on Byzantine Medicine,* ed. John Scarborough, Dumbarton Oaks Papers 38 (Washington, D.C., 1985), 213–32 (esp. the section "Galen's Pharmacy," 215–21).

179. Vivian Nutton, "The Drug Trade in Antiquity," *Journal of the Royal Society of Medicine* 78 (1985): 138–45 (see esp. 145). A similar characteristic is observed in the drug recipes of Criton, a major source for Galen's drug lore. John Scarborough, "Criton, Physician to Trajan: Historian and Pharmacist," in *The Craft of the Ancient Historian: Essays in Honor of Chester G. Starr,* ed. John W. Eadie and Josiah Ober (Lanham, Md., 1985), 387–405 (see esp. 394–97).

180. Scarborough, "Byzantine Pharmacology" (see n. 178), 215–16.

181. See, esp., *Nature of Man* IV–V (Jones, *Hippocrates* [see n. 42], IV:10–15).

182. E.g., the Egyptian compound-ingredient incense called κῦφι; Scarborough, "Byzantine Pharmacology" (see n. 178), 229–32.

183. See, e.g., Michael J. Harstad, "Saints, Drugs, and Surgery: Byzantine Therapeutics for Breast Diseases," *Pharmacy in History* 28 (1986): 175–80.

184. Gary Vikan, "Art, Medicine, and Magic in Early Byzantium," in *Byzantine Medicine,* ed. Scarborough (see n. 178), 65–86.

185. John Scarborough, "Hermetic and Related Texts in Classical Antiquity," in I. Merkal and A. G. Debus, eds., *Hermeticism and the Renaissance: Intellectual History and the Occult in Early Modern Europe* (Cranbury, N.J., 1988), 19–44.

186. Hans-Viet Friedrich, ed., *Thessalos von Tralles: griechisch und lateinisch* (Meisenheim am Glan, 1968). The most recent discussion of Thessalus in his "Egyptian" and "Hermetic" setting is Garth Fowden, *The Egyptian Hermes* (Cambridge, 1986), 161–65.

187. P. Boudreaux, ed., *Catalogus Codicum Astrologorum Graecorum,* vol. VIII, *Codicum Parisinorum,* pt. 3 (Brussels, 1912), 132–65 ("Excerpta ex codice 41" [Paris. gr. 2256]).

188. A. J. Festugière, *Hermétisme et mystique païenne* (Paris, 1967) for a French translation of parts of the *Letter.*

189. A. J. Festugière, *La Révélation d'Hermès Trismégiste,* vol. I, *L'Astrologie et les sciences occultes* (Paris, 1950), 150.

190. Friedrich, *Thessalos* (see n. 186), 43.

191. R. Reitzenstein, *Die hellenistischen Mysterienreligionen,* 3d ed. (Leipzig, 1927), 127–28.

192. Boudreaux, *Catalogus* (see n. 187), 139–51.

193. Ibid., 153–63; but cf. Pfister, "Pflanzenaberglaube" (see n. 38), 1452.

194. Festugière, *Révélation* (see n. 189), 137–86.

195. Galen (Kühn [see n. 11]), IX:903–13.

196. Scarborough, *Roman Medicine* (see n. 142), 120.

197. Cf. Ptol. *Tetrab.* III.12 (*Ptolemy: Tetrabiblos,* ed. and trans. F. E. Robbins [London, 1940], 316–33).

198. *Poimandres* I.27 (*Corpus Hermeticum,* ed. A. D. Nock and A.-J. Festugière, vol. I [Paris, 1946], 16).

199. *Powers of Herbs* II.1 (Friedrich [see n. 186], 199 and 203.

200. *Cichorium intybus* Cf. Theophr., *Inquiry into Plants* VII.7.1; Diosc. *Mat. Med.*

II.132 (Wellmann [see n. 24], 1:205–6); Pliny, *
XXI.88; *Geoponica* XII.28 (Beckh [see n. 115], *
culture, XI.3.27 and XII.9.2.

201. Apparently "as a drug." Diosc. *Mat*

202. Cf. Diosc. *Mat. Med.* I.99 (Wellr

203. Cf. Galen (Kühn [see n. 11]), VI:60

204. Cf. *PGM* XXXIII.

205. Ibid., and *PGM* VII.211–12.

206. *Stachys germanica L.;* Diosc. *Mat. Med.* III.
Pliny, *Natural History* XXIV.136.

207. *Crocus sativus L.;* Diosc. *Mat. Med.* I.26 (Wellmann

208. *Pistacia lentiscus L.;* Theophrastus, *Inquiry into Plants* I

209. *Zingiber officinale* Rosc.; Diosc. *Mat. Med.* II.160 (Wellmann

210. *Piper nigrum L.;* Diosc. *Mat. Med.* II.159 (Wellmann [see n. 24],

211. This is the famous ἄσφαλτος; Diosc.*Mat. Med.* I.73 (Wellmann
I:72–73).

212. Here γλυκάνισον = ἄννησον, which is *Pimpinella anisum L.; Scholia o*
critus, VII.63d (*Scholia in Theocritum Vetera* , ed. C. Wendel [Leipzig, 1914; rpt. Stutt
1967], 95).

213. Made from *Pistacia lentiscus L.;* (see n. 208).

214. Cf. Diosc. *Mat. Med.* V.8 (Wellmann [see n. 24], III:12).

215. Parallel texts listed in n. 200.

216. Festugière, *Révélation* (see n. 189), 146–60.

217. Ibid., 150–52.

218. John Scarborough, "Roman Pharmacy and the Eastern Drug Trade," *Pharmacy in History* 24 (1982): 135–43.

219. Ibid., 137, with nn. 20–31.

220. Frederick H. Cramer, *Astrology in Roman Law and Politics* (Philadelphia, 1954), 232–83 (on drugs and magic, see pp. 276–78). See also the chapter "Astrologers, Diviners, and Prophets," in R. MacMullen, *Enemies of the Roman Order* (Cambridge, Mass., 1967), 128–162.

221. See *PGM.* The magical tracts in Greek and Coptic (with occasional and clipped commentary) of the Preisendanz texts, have recently been restudied and translated into English by a team of scholars under the general direction of Hans Dieter Betz; added to the Greek and Coptic texts of the Preisendanz collection are important translations (by Janet H. Johnson) of demotic magical papyri; the first volume of translations of the *PGM* has been published as Hans Dieter Betz, ed., *The Greek Magical Papyri in Translation,* vol. I, *Texts* (Chicago, 1986) [= *GMPT*]. Volume II will be indexes to the English translations as well as the Greek and Coptic texts.

222. Pfister, "Pflanzenaberglaube" (see n. 38).

223. *PGM* IV.286–95, trans. E. N. O'Neil in *GMPT* (see n. 221), 1:43.

224. *PGM* IV.2967–75, trans. E. N. O'Neil in *GMPT* (see n. 221), 1:95.

225. Packets of natron were placed in Egyptian mummies from about 2000 B.C. "Natron" is a compound of sodium carbonate and sodium bicarbonate and, mixed with fats, forms sodium soaps; Majno, *Healing Hand* (see n. 35), 131–36. Resins were also essential in Egyptian mummification; ibid., 137–38.

226. J. G. Frazer, *The Golden Bough,* vol. IV, *Adonis Attis Osiris,* 2nd ed. (London, 1907), 74–75 on milk, 221–22, 231–33, and 340–43 on pine cones, etc.

227. *PGM* IV.2979–89, trans. E. N. O'Neil (with some clipped commentary) in *GMPT* (see n. 221), 1:95.

228. Betz, Introduction to *GMPT* (see n. 221) 1:xlviii.

Falling Sickness, 2d ed. (Baltimore, 1971), 68, 73, 76, 79, and 162 on later uses of hellebores in treatment of epilepsies.

176. Riddle, *Dioscorides* (see n. 143), 124, no. 162 in table 8, with refs. Cf. Scarborough, "Theophrastus" (see n. 1), 361–62.

177. The research of Vivian Nutton has proven the traditional dates for Galen (130–200 A.D.) wrong. Vivian Nutton, "The Chronology of Galen's Early Career," *CQ* 23 (1973): 158–71; idem, "Galen in the Eyes of His Contemporaries," *Bulletin of the History of Medicine* 58 (1984): 315–24.

178. John Scarborough, "Early Byzantine Pharmacology," in *Symposium on Byzantine Medicine,* ed. John Scarborough, Dumbarton Oaks Papers 38 (Washington, D.C., 1985), 213–32 (esp. the section "Galen's Pharmacy," 215–21).

179. Vivian Nutton, "The Drug Trade in Antiquity," *Journal of the Royal Society of Medicine* 78 (1985): 138–45 (see esp. 145). A similar characteristic is observed in the drug recipes of Criton, a major source for Galen's drug lore. John Scarborough, "Criton, Physician to Trajan: Historian and Pharmacist," in *The Craft of the Ancient Historian: Essays in Honor of Chester G. Starr,* ed. John W. Eadie and Josiah Ober (Lanham, Md., 1985), 387–405 (see esp. 394–97).

180. Scarborough, "Byzantine Pharmacology" (see n. 178), 215–16.

181. See, esp., *Nature of Man* IV–V (Jones, *Hippocrates* [see n. 42], IV:10–15).

182. E.g., the Egyptian compound-ingredient incense called κῦφι; Scarborough, "Byzantine Pharmacology" (see n. 178), 229–32.

183. See, e.g., Michael J. Harstad, "Saints, Drugs, and Surgery: Byzantine Therapeutics for Breast Diseases," *Pharmacy in History* 28 (1986): 175–80.

184. Gary Vikan, "Art, Medicine, and Magic in Early Byzantium," in *Byzantine Medicine,* ed. Scarborough (see n. 178), 65–86.

185. John Scarborough, "Hermetic and Related Texts in Classical Antiquity," in I. Merkal and A. G. Debus, eds., *Hermeticism and the Renaissance: Intellectual History and the Occult in Early Modern Europe* (Cranbury, N.J., 1988), 19–44.

186. Hans-Viet Friedrich, ed., *Thessalos von Tralles: griechisch und lateinisch* (Meisenheim am Glan, 1968). The most recent discussion of Thessalus in his "Egyptian" and "Hermetic" setting is Garth Fowden, *The Egyptian Hermes* (Cambridge, 1986), 161–65.

187. P. Boudreaux, ed., *Catalogus Codicum Astrologorum Graecorum,* vol. VIII, *Codicum Parisinorum,* pt. 3 (Brussels, 1912), 132–65 ("Excerpta ex codice 41" [Paris. gr. 2256]).

188. A. J. Festugière, *Hermétisme et mystique païenne* (Paris, 1967) for a French translation of parts of the *Letter.*

189. A. J. Festugière, *La Révélation d'Hermès Trismégiste,* vol. I, *L'Astrologie et les sciences occultes* (Paris, 1950), 150.

190. Friedrich, *Thessalos* (see n. 186), 43.

191. R. Reitzenstein, *Die hellenistischen Mysterienreligionen,* 3d ed. (Leipzig, 1927), 127–28.

192. Boudreaux, *Catalogus* (see n. 187), 139–51.

193. Ibid., 153–63; but cf. Pfister, "Pflanzenaberglaube" (see n. 38), 1452.

194. Festugière, *Révélation* (see n. 189), 137–86.

195. Galen (Kühn [see n. 11]), IX:903–13.

196. Scarborough, *Roman Medicine* (see n. 142), 120.

197. Cf. Ptol. *Tetrab.* III.12 (*Ptolemy: Tetrabiblos,* ed. and trans. F. E. Robbins [London, 1940], 316–33).

198. *Poimandres* I.27 (*Corpus Hermeticum,* ed. A. D. Nock and A.-J. Festugière, vol. I [Paris, 1946], 16).

199. *Powers of Herbs* II.1 (Friedrich [see n. 186], 199 and 203.

200. *Cichorium intybus* Cf. Theophr., *Inquiry into Plants* VII.7.1; Diosc. *Mat. Med.* II.132 (Wellmann [see n. 24], 1:205–6); Pliny, *Natural History* XIX.129, XX.73, and XXI.88; *Geoponica* XII.28 (Beckh [see n. 115], 375–76): from Didymus; Columella, *Agriculture,* XI.3.27 and XII.9.2.

201. Apparently "as a drug." Diosc. *Mat. Med.* I.98 (Wellmann [see n. 24], 1:89).

202. Cf. Diosc. *Mat. Med.* I.99 (Wellmann [see n. 24], 1:90–91).

203. Cf. Galen (Kühn [see n. 11]), VI:604 VIII:343.

204. Cf. *PGM* XXXIII.

205. Ibid., and *PGM* VII.211–12.

206. *Stachys germanica L.;* Diosc. *Mat. Med.* III.106 (Wellmann [see n. 24], II:118); Pliny, *Natural History* XXIV.136.

207. *Crocus sativus L.;* Diosc. *Mat. Med.* I.26 (Wellmann [see n. 24], I:29–31).

208. *Pistacia lentiscus L.;* Theophrastus, *Inquiry into Plants* IX.1.2.

209. *Zingiber officinale* Rosc.; Diosc. *Mat. Med.* II.160 (Wellmann [see n. 24], I:226).

210. *Piper nigrum L.;* Diosc. *Mat. Med.* II.159 (Wellmann [see n. 24], I:224–26).

211. This is the famous ἄσφαλτος; Diosc.*Mat. Med.* I.73 (Wellmann [see n. 24], I:72–73).

212. Here γλυκάνισον = ἄννησον, which is *Pimpinella anisum L.; Scholia on Theocritus,* VII.63d (*Scholia in Theocritum Vetera* , ed. C. Wendel [Leipzig, 1914; rpt. Stuttgart, 1967], 95).

213. Made from *Pistacia lentiscus L.;* (see n. 208).

214. Cf. Diosc. *Mat. Med.* V.8 (Wellmann [see n. 24], III:12).

215. Parallel texts listed in n. 200.

216. Festugière, *Révélation* (see n. 189), 146–60.

217. Ibid., 150–52.

218. John Scarborough, "Roman Pharmacy and the Eastern Drug Trade," *Pharmacy in History* 24 (1982): 135–43.

219. Ibid., 137, with nn. 20–31.

220. Frederick H. Cramer, *Astrology in Roman Law and Politics* (Philadelphia, 1954), 232–83 (on drugs and magic, see pp. 276–78). See also the chapter "Astrologers, Diviners, and Prophets," in R. MacMullen, *Enemies of the Roman Order* (Cambridge, Mass., 1967), 128–162.

221. See *PGM.* The magical tracts in Greek and Coptic (with occasional and clipped commentary) of the Preisendanz texts have recently been restudied and translated into English by a team of scholars under the general direction of Hans Dieter Betz; added to the Greek and Coptic texts of the Preisendanz collection are important translations (by Janet H. Johnson) of demotic magical papyri; the first volume of translations of the *PGM* has been published as Hans Dieter Betz, ed., *The Greek Magical Papyri in Translation,* vol. I, *Texts* (Chicago, 1986) [= *GMPT*]. Volume II will be indexes to the English translations as well as the Greek and Coptic texts.

222. Pfister, "Pflanzenaberglaube" (see n. 38).

223. *PGM* IV.286–95, trans. E. N. O'Neil in *GMPT* (see n. 221), 1:43.

224. *PGM* IV.2967–75, trans. E. N. O'Neil in *GMPT* (see n. 221), 1:95.

225. Packets of natron were placed in Egyptian mummies from about 2000 B.C. "Natron" is a compound of sodium carbonate and sodium bicarbonate and, mixed with fats, forms sodium soaps; Majno, *Healing Hand* (see n. 35), 131–36. Resins were also essential in Egyptian mummification; ibid., 137–38.

226. J. G. Frazer, *The Golden Bough,* vol. IV, *Adonis Attis Osiris,* 2nd ed. (London, 1907), 74–75 on milk, 221–22, 231–33, and 340–43 on pine cones, etc.

227. *PGM* IV.2979–89, trans. E. N. O'Neil (with some clipped commentary) in *GMPT* (see n. 221), 1:95.

228. Betz, Introduction to *GMPT* (see n. 221) 1:xlviii.

229. *PGM* XXXVI.320–32, trans. John Scarborough in *GMPT* (see n. 221) 1:277.
230. Diosc. *Mat. Med.* IV.68 (Wellmann [see n. 24], II:224).
231. Diosc. *Mat. Med.* II.108 (Wellmann [see n. 24], I:182).
232. Riddle, *Dioscorides* (see n. 143), 57.
233. Diosc. *Mat. Med.* IV.68.2 (Wellmann [see n. 24], II:225).
234. Todd, *Martindale* (see n. 87), 170–71.
235. *PGM* XXXVI.324, n. 40 in *GMPT* (see n.221) 1: 277.
236. *PGM* XXIIa.11–14, trans. John Scarborough in *GMPT* (see n. 221) 1:260.
237. Soranus, *Gynecology*, III.42.3 (Ilberg [see n.78], 121).
238. Diosc. *Mat. Med.* V.126 and 130 (Wellmann [see n. 24], III:94–95 and 96–97).
239. Gal., *Mixtures and Properties of Simples* IX.11 (Kühn [see n.11], XII:204).
240. Pliny, *Natural History* XXVI.127.
241. *Geoponica* XV.1.28 (Beckh [see n.115] 435).
242. Dioscorides V.124 (Wellmann [see n. 24], III:92); Gal., *Mixtures and Properties of Simples* IX.9 (Kühn [see n. 11], XII:202); Celsus, *Med.* V.7. Pliny, *Natural History*, XXXVI.131.
243. When published, *GMPT* vol. II (see n. 221) will contain separate indexes of plants, animals, etc.
244. *PGM* XII.401–44, trans. H. D. Betz and John Scarborough (with some clipped commentary) in *GMPT*, (see n. 221), 1:167–69.
245. *PGM* IV.1313 ("priestly Egyptian incense" as trans. W. C. Grese in *GMPT* [see n. 221], 1:63); as *PGM* IV.2971 (see n. 224); *PGM* V.221 (transliterated by E. N. O'Neil as *kyphi* [*GMPT* I:204]); *PGM* VII.538 ("sacred incense" as trans. R. F. Hock [*GMPT* I:133]); and *PGM* VII.873 ("lunar ointment" as trans. E. N. O'Neil [*GMPT* I:141]).
246. G. Ebers, "Ein Kyphirecept aus dem Papyros Ebers," *Zeitschrift für ägyptische Sprache und Altertumskunde* 12 (1874): 106–11. Scarborough, "Byzantine Pharmacology" (see n. 178), 231.
247. Full discussion and identification of ingredients in a twenty-eight-substance formula in Scarborough, "Byzantine Pharmacology" (see n. 178), 230–32.
248. Diosc. *Mat. Med.* I.25 (Wellmann [see n. 24], I:28–29); translated, with ingredients identified, in Scarborough, "Byzantine Pharmacology" (see n. 178), 230.
249. *PGM* IV.1275–1322, trans. W. C. Grese in *GMPT* [see n.221], 62–63).
250. Hippol. *Refutation of all Heresies* IV.28 (*Origenis Philosophumena sive Omnium Haeresium Refutatio*, ed. E. Miller, Patrologiae Graecae, vol. XVI, pt. 3 [Paris, 1863], col. 3090). The *Refutation*, formerly attributed to Origen, is now firmly among the works of Hippolytus; F. L. Cross, ed., *Oxford Dictionary of the Christian Church* (London, 1957), 641–42.
251. Hippol. *Refutation* IV.28 (Miller, cols. 3090–91).
252. Brian Vickers, Introduction to *Occult and Scientific Mentalities in the Renaissance*, ed. Brian Vickers (Cambridge, 1984), 1–55, esp. 3, following Charles Schmitt.
253. Fowden, *Egyptian Hermes* (see n. 186), 79 with n. 19, 162–65, 168.

6

Dreams and Divination in Magical Ritual

† *Samson Eitrem*

When he died at age ninety-three on July 8, 1966, Samson Eitrem, professor emeritus of classical philology at Oslo University, left an unfinished manuscript of over seven hundred pages entitled *Magie und Mantik der Griechen und Römer*, written for the renowned *Handbuch der Altertumswissenschaft*.[1] Its intention was to give an exhaustive treatment of both magic and divination, topics that Martin P. Nilsson, Eitrem's contemporary (1874–1967), had touched upon in much shorter form in his *Geschichte der griechischen Religion* in the same *Handbuch* (3d ed., vol. 1 [1967]; 2d ed., vol. 2 [1961]). Eitrem was ideally suited for this task. Being a general classical philologist with an interest in, and knowledge of, archaeology as well, his scholarly activities were concerned especially with two fields: papyrology and the history of religion. The first manifested itself already in his first publication, an article on Bacchylides in the Oslo newspaper *Morgenbladet* in 1898 (a year after Kenyon had published his fundamental edition of the fragments); the second flourished early in the still-valuable monograph *Opferriten und Voropfer der Griechen und Römer* of 1915. The two fields merged in the study of ancient magic. From a trip to Egypt in 1920, Eitrem had brought back several papyri, among them magical ones, purchased from his own funds and donated to the Oslo University Library. After a thorough study of the major extant magical papyri in Paris, Berlin, and London, which yielded new readings and interpretations (1923), Eitrem edited the four Oslo magical papyri with translation and commentary (1925 and again for Preisendanz' *Papyri Graecae Magicae*, to which Eitrem was recruited as a collaborator shortly after World War I).

Eitrem's interest in the magical papyri stemmed from the same sources as his general interest in Greek and Roman religion—the tradition of German *Religionswissenschaft* as founded by Herman Usener (1834–1905) and continued by his pupil and son-in-law Albrecht Dieterich (1866–1904)—although Eitrem had never studied in Bonn (where Usener had taught) or in Heidelberg (where Dieterich taught) but in Berlin, Halle, and Göttingen with, among others, Wilamowitz, Diels, and Carl Robert (he dedicated *Opferriten* to Diels). Wilamowitz, for one, abhorred the "horrible superstitions of the magical papyri" as a sign of the decay of an old religion ("wenn die alte Religion in Verwesung ist und der wüste Aberglaube der Zauberpapyri sich an ihre Stelle drängt" [*Der Glaube der Hellenen*, vol. 1 , p. 10]). Albrecht Dieterich had not only edited one of the Leyden Papyri (*PGM* XII), he had demonstrated the relevance the papyri could and did have for the history of ancient

Magika Hiera

Ancient Greek Magic and Religion

EDITED BY
Christopher A. Faraone
Dirk Obbink

New York Oxford
OXFORD UNIVERSITY PRESS
1991