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## Drugs and Psychic States in Theophrastus' *Historia plantarum* 9.8-20

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The botanical work of Theophrastus has received very little attention from historians of philosophy, much less even than Aristotle's zoological works. Why has this been the case? Perhaps philosophers have not thought so highly of Theophrastus as of Aristotle, so not even the philosophical works of Theophrastus have received much attention; many of those who look at Aristotle's biology were first enticed by his metaphysical or logical works. And the botanical writings of Theophrastus contain even fewer passages readily construed as philosophical than do Aristotle's zoological books. Furthermore, botany is perhaps initially more obscure to most people lacking extensive scientific training than is zoology.

We all begin with considerable interest in the structure and function of our own bodies, then we extend whatever we have learned there to other animals in proportion to their resemblance to us. That anthropocentrism is, incidentally, a primary guideline to the understanding of Aristotle's zoological works. But in botany, whatever self-understanding we may have gained rapidly fails us. Plants seem quite other than ourselves; they are present in the world as entities as alien to our understanding as they are intimately and constantly entwined with our lives. Aristotle may have had some difficulty coming to terms with plants, for he depicts the plant as a strange sort of animal with its mouth buried in the ground, and its reproductive and excretory organs up in the air. Of human functions, the plant shares only in nutrition and regeneration of its kind, and thus we gather from his comments, it is a relatively uninteresting sort of entity for a philosopher to be examining.<sup>1</sup>

But human and indeed all animal life depends upon the life of plants: the vegetable kingdom is the ultimate source of all our food and most of our clothing, shelter, and transportable energy. And this is the road toward the

common understanding of plants—their utility. There was in antiquity, and continues today, a tendency to classify plants according to the use made of them, giving rise to disputes over whether the tomato is a fruit or a vegetable, whether a poinsettia is a flower or a tree. In any case, the most useful information about the structure and life of plants almost inevitably comes from those who cultivate them for human utility, or who have learned from practical experience the uses—and the dangers—of wild varieties.

Unquestionably, Theophrastus has gathered a great deal of information from those who cultivated or gathered plants for practical uses. Even the gross organization of his treatises reflects his understanding of the character of his sources; for example, the *Causae plantarum* (*CP*) uses as a major distinction that between the consequences of human intervention and natural, or nonartificial, effects observed in plants.

But Theophrastus is more than simply a mirror of his sources. He has in fact philosophical motivations for his research, motivations that are similar to those that brought Aristotle to zoological investigation. Indeed, we can see those motivations clearly enough in the general project of the *Historia Plantarum* (*HP*), since the entire work is primarily concerned with the study of the *parts* of plants, just as Aristotle's *History of Animals* is primarily concerned with the parts of *animals*. Theophrastus is investigating "natures," and those natures are the functional parts of the entities that he investigates quite as much, sometimes more than, the entity as a whole. Even in the *HP*, his main concern is "causal" in the Aristotelian sense; on the one hand, he gathers information that tends to explain in terms of matter, mover, form, and end why the parts of plants are as they are, and on the other, what the effects of the parts of plants may be upon the rest of the world. The latter is the major theme of book 9.

Since the natures of roots, fruits, and juices have many and varied powers, some having the same power and being causes of the same effects, others the opposite, we might wonder about something that is also a common problem in other puzzles, whether those that cause the same effect do so in virtue of one power, or whether they can cause the same thing with different causes. (9.9.4) This clearly *explanatory* puzzle guides the gathering of information; while we cannot say that *HP* 9 actually answers this most interesting question, we can agree that asking it places the investigation clearly within the Aristotelian scientific tradition.

*HP* 9, starting at chapter 8, is concerned with the parts of plants as *pharmaka*, as bringing about health, disease, or death (9.18.3 lists the effects studied thus); at 9.8.1 Theophrastus tells us that he is going to talk about "juices" (*opoi*) that have "powers as drugs" (*pharmakabates* . . . *anamnasi*), and about "roots" (*rhizai*) and all the other parts with pharmacological properties, including fruits, derived juice (*chulismos*), leaves, and "herbs" (*phoi*). He does

not say that he is going to talk about *species as pharmaka*, when we read his text in that way, it is an imposition of our way of thinking on his text. This is another way in which Theophrastus' work in this book is clearly a successor of Aristotle's zoological studies.<sup>2</sup>

My initial motivation in studying these chapters was to attempt to find in them whatever indications there might be of the existence in Theophrastus' day of psychotherapeutic uses of drugs, of "psychopharmacology," properly so-called. Although there are no perfectly clear examples of drug therapy for psychological maladies in these chapters, two sorts of evidence bear on the question: one sort of evidence is the large collection of stories, largely of folk origin, surrounding some of the drugs that are discussed. Those stories reflect psychological attitudes toward the plants in question, and those belief systems may have been relied upon for therapeutic (or nontherapeutic) ends by their users. The other sort of evidence is of several herbal medicines that are in fact chemically psychoactive, and in at least two instances, that psychological activity is noted by Theophrastus, not necessarily with therapeutic goals in mind, however. My general goal in this paper is to suggest ways of placing these chapters of *HP 9* into the context of the history of ancient psychotherapy.

### FOLKLORE IN *HP 9*: SOME PSYCHOLOGY OF DRUGS

Everyone who reads *HP 9* is fascinated by the many elements of folklore that have found their way into Theophrastus' account, most of them apparently from the stories of the "drug-sellers and root-cutters" upon whom he has relied for so much of his information. Theophrastus, like Aristotle before him, readily gathered information from anyone who appeared to have knowledge of which he could make use.<sup>3</sup> Those sources preserved a great deal of the wisdom of the people and reflect explanatory systems that are certainly not what we would call peripatetic; Theophrastus was both fascinated and puzzled by the claims, and the explanations, offered by these sources. *Pharmaka*, "medicines" in the sense in which that term is used in connection with folk "medicine-men," cannot readily be separated from the belief structure within which they are administered. The "medicine-man" surrounds the "medicine" with a mystique, starting from the way in which it is gathered, and continuing to the way in which it is given to the patient—or victim. The digging of a powerful root is dangerous, and the tapping of a powerful sap is also perilous, for the birds, or unnamed powers in the world, are observing this interference with the continuity of nature.<sup>4</sup> And the continuities in the world are, for the medicine man, discovered in the resemblance of the part of the plant, the "herbal," to what is to be cured, prevented, or caused, so the root that looks like a scorpion is thought to be good for scorpion bites, and the root that

looks like testicles influences male fertility. These notions do not fit readily into the peripatetic causal system, but Theophrastus does not spurn them. He preserves those stories in his text, and he worries about them.

The mystique surrounding the *pharmakon* does help preserve the monopoly of the root digger or drug seller: if gathering the plant requires a complicated ritual to avoid coming to harm, the layman is the more likely to keep away from it. Likewise in our own day, the knowledge that some mushrooms are deadly poisonous helps prevent amateurs from gathering even the readily recognizable of the edible varieties. Not only does this help to protect the supply, but the stories of danger surrounding the gathering of the plant help to raise the price at point of sale. The mystique also contributes greatly to the efficacy of the medicine when administered, for the belief that the agent will bring about the effect often is sufficient of itself to bring about the effect. The hopes and fears surrounding herbal medicines constitute the first group of "psychic states" to which I want to call attention in this essay. The second group of "psychic states" are those that are in fact caused by the pharmacological properties of the plants administered, for some of the parts of plants used as *pharmaka* by the ancients were in fact chemically active; their effects did not depend solely upon a belief structure, but could readily be attributed to biochemical effects.<sup>5</sup> Later, we will return to a discussion of two clear examples of psychoactive drugs in *HP 9*. For now, we should look at some examples of the close relationship between beliefs and expected effects of *pharmaka*.

For example, in 9.8.5-6, Theophrastus reports that he has been told that when you cut *thapsia* you should put on oil and stand to windward, or your body will swell up, or if you dig hellebore, have some garlic and unmixed wine first.<sup>6</sup> He seems more or less prepared to believe these stories, because he thinks that the plants may well have what we would call chemical properties that might require such protection. Theophrastus does not, however, believe the story that you must dig up the *glukusidê* peony at night,<sup>7</sup> because if you gather the fruit in the daytime and the woodpecker sees you, you will go blind, and if you are digging the root, you will suffer a prolapsed anus. While he thinks it not unreasonable to offer a prayer while cutting a plant (9.8.7), he finds the offerings to be given and the rituals to be performed "absurd" (*atopon*). Mandrake and black hellebore are thought particularly powerful medicine by the tradition,<sup>8</sup> for to cut mandrake root "it is said that one should draw three circles around it with a sword, and cut it facing west; at the cutting of the second piece one should dance around the plant and say as much as possible about sexual intercourse" (9.8.7). Black hellebore too is cut when a circle has first been drawn around it, but facing east, and saying prayers, and besides watching out for an eagle both from right and left, since if an eagle approaches, the cutter will die within the year. Needless to say, Theophrastus

does not believe these stories, but his sources believed them, or very much wanted their clients to believe them. Later, in 9.16.4, Theophrastus preserves at least two different traditions concerning *akoniton*,<sup>9</sup> one of them a rather carefree folk tradition, which ignores the law forbidding its possession and is ready to try antidotes like honey and wine.<sup>10</sup> A last example, for now, in 9.19.2-3—Theophrastus finds "foolish and incredible" what people say about amulets and charms for the body or for the house. The idea that *triphosion* is "useful for every good purpose,"<sup>11</sup> or that snapdragon can give you a good reputation, and the like, "comes from people who want to brag about their own arts."<sup>12</sup>

#### A COMMENT ON LLOYD

G. E. R. Lloyd, in *Science, Folklore and Ideology*, largely compares *HP 9* with the Hippocratic medical texts. He finds that Theophrastus is really quite different from the Hippocratics in that he reports, and partially credits, the stories he has gleaned from the drug vendors and root cutters. Lloyd also shows that Theophrastus is considerably more careful than the Hippocratics about designating the particular varieties or identifications of the medicinal plants named. The Hippocratic writers seem to assume that the reader knows the precise identification or variety. Further, Theophrastus includes some *pharmaka* which seem not to be mentioned in the Hippocratic texts. There is also a difference in emphasis between Theophrastus and the Hippocratics, but Lloyd does not mention it here: The Hippocratic physicians typically propose *dietary* remedies, relying first on a selection among the normal foods consumed by their clients. If we look at *Regimen in Acute Diseases*,<sup>12</sup> we notice frequent mention of various preparations of barley, honey, and wine. Theophrastus has relatively little to say about those sorts of remedies. To be sure, in chapter 23, the author of *Regimen in Acute Diseases* lists as purges black hellebore and *peplon* (identified by means of Dioscorides IV.169 as *Euphorbia peplos*); Theophrastus lists as purges hellebore in 9.9-10, and a plant related to *peplon*, *tithymallos* (identified as *Euphorbia pilosa*), in 9.11. More typically, chapter 64 of *Acute* mentions "drinks made from barley, herbs, raisins or the second pressing of grapes, from wheat, thistle or myrtle, pomegranates and the rest."<sup>13</sup> The context indicates that these preparations are meant to be medicinal rather than nutritional.

Lloyd recognizes that Theophrastus and the Hippocratics are "largely independent" of each other (p. 120), but he thinks that they both relied upon the root cutters and drug sellers (p. 121). Indeed, it seems impossible that Theophrastus used the Hippocratics as an important source for his information about plants, for he reports that his sources seem to be in agreement that ritual is required for the taking of "roots" (*HP 9.8.8*), while the Hippocratics,

as Lloyd points out, breathe scarcely a word of any such thing. So Lloyd claims that the milieu within which the Hippocratics practiced was influenced by the sorts of stories recounted by Theophrastus: "even though the Hippocratic writers do not refer to folk beliefs, their existence may well have made a difference to the expectations of their patients and to the popularity of certain drugs" (p. 131). He thinks that there were two parallel traditions, that of the rationalistic Hippocratics, and that of the "supernaturalistic" temple physicians and folk healers, so that the Hippocratics are assumed to have known the stories recounted by Theophrastus, but not to have been interested. We may find some slight evidence in favor of this interpretation in the texts of Plato and Aristotle.<sup>14</sup> More importantly, a look at the works of the teachers of Theophrastus might help us understand both his general approach and some of the details he recounts.

#### PHARMACOLOGY IN PLATO AND ARISTOTLE

Theophrastus certainly ought to have known the writings of both Plato and Aristotle—he was a student of Plato, and a colleague of Aristotle, and he must have participated in many discussions with both. We do find many parallels between the ideas of Theophrastus and those of the masters of the Academy and Lyceum in the botanical works as elsewhere.

For the ancients, Plato's theory of medicine was contained in the *Timaeus*, but the theory of diseases in that dialogue (81 ff.) does not include much information about possible medicaments:

Diseases unless they are very dangerous should not be irritated by medicines, since every form of disease is in a manner akin to a living being, whose complex frame has an appointed term of life. . . . If anyone regardless of the appointed time tries to subdue them by medicine, he only aggravates and multiplies them. Wherefore we ought always to manage them by regimen, as far as a man can spare the time, and not provoke a disagreeable enemy by medicines (89B-D).

In this Plato was, as Galen argues in *The Doctrines of Plato and Hippocrates*, a good deal closer to the Hippocratic tradition than we often think. Occasionally, when he is attacking newfangled regimens that enable men like Herodicus to stretch out their useless lives, he becomes more conservative than the Hippocratics, and praises the old-time remedies, like the cup of Pramnian wine sprinkled with barley and grated cheese mentioned in *Resp.* III.405E, referring to *Iliad* XI.638-641.

One charming bit of medical practice depicted by Plato is clearly psychosomatic in character, relying on the power of suggestion, or the placebo effect: in the *Charmides*, Socrates proposes to cure Charmides' headache with the use of a leaf, and a charm of *kaloi logoi* (155E ff.); the plant from which the leaf is

taken is not mentioned, nor is it important. What is important and relevant in the present context is that Socrates gains the attention of the young Charmides by telling him that he learned how to administer it "from one of the physicians of the Thracian king Zalmoxis who are said to be able even to give immortality" (156D). Magical remedies obviously have a certain popularity for the generation of Charmides, if Socrates gains the confidence of the young man by suggesting that he has a ritual (the "charm") for the giving of this "medicine."

Remembering that *pharmaka* are as likely to be used to cause negative effects as positive, we are reminded of the passage in the *Republic* (VI.488C) in which mutineers "stupefy the worthy shipmaster with mandrake," *manadrhgora*. This was, as we have already noticed, regarded as powerful medicine requiring special rituals for its collection in the time of Theophrastus. The same mandrake is mentioned, along with others, as sleep-inducing (*bupnotikon*) by Aristotle at *PN* (*Somm.*) 456b31; Theophrastus too mentions its use *pros bupnon* (9.9.1). Neither Scarborough nor Lloyd refers to these passages in Plato and Aristotle, incidentally. Lloyd's account of mandrake's pharmacological activity (p. 132) is not entirely clear; Scarborough tells us that its chemical components make it similar to stramonium and belladonna in producing lethargy.<sup>15</sup>

And of course there is the *pharmakon*, taken to be hemlock (*kânion*, *Conium maculatum*), with which Socrates was executed. Scarborough does discuss the parallel between Theophrastus' recipe for a fatal dose in *HP* 9.16.8-9 and the information contained in *Phaen.* 63D5-E5 and 117B6-9 (p. 379).<sup>16</sup> His discussion of this issue is quite adequate.

In a more mellow mood, Plato tells how good singing can be encouraged in *Laws* II.666A-C: boys under eighteen will be forbidden to taste wine; until thirty, men may make moderate use of wine, "but no carousing!"

But when a man is verging on the forties (he may) ask the presence . . . of wine, *pharmakon* against the austerity of age, so that we may rejuvenate, and the *dusburnia* be melted to softness by forgetfulness of our heaviness.

I think that Plato is recommending wine as a remedy against the cares of maturity.

More can be found in Aristotle. For example, poppy, mandrake, wine, and dandel, are mentioned as *bupnotika* in *PN* (*Somm.*) 456b29 ff; Aristotle does not specify which poppy he has in mind, but I imagine that he is thinking of the opium poppy. Theophrastus, in *HP* 9.13.3-5, compares several varieties of wild poppy, and says of none that it is soporific; Scarborough draws the consequence (p. 372) that Theophrastus was relatively unfamiliar with the medicinal uses of the opium poppy, that the opium poppy may not have been widely known in those days. I believe, however, that Aristotle's listing of

poppy first in an account of "hypnotics" would tend to indicate that he thought of the poppy as a strong somnifer, and that in turn increases the probability that he knew *Papaver somniferum*. If Scarborough is right in thinking that the cultivated and the opium poppy were, in antiquity, identical, then an additional indication that Aristotle knew the opium poppy is its mention in *HA* IX.40, 627b17, as a plant which beekeepers should plant around their hives, along with pear trees, beans, Median grass, Syrian grass, yellow pulse, myrtle, creeping thyme, and almond trees. It is just possible that Aristotle's *mêkon* is *Papaver rhoeas*; Scarborough takes this to be the poppy to which Celsus refers as a somnifer and which Theophrastus lists as a bowel purge (9.12.4).

Some have thought that the *nepenthes* that Helen uses in *Od.* IV.221 ff. to reduce the sorrow of the assembled company was a preparation from opium poppy, but Theophrastus does not identify that drug with a specific plant. At *HP* 9.15.1, he paraphrases the passage in Homer, and simply says that *nepenthes* was something Helen had brought with her from Egypt. Pliny, *NH* 20.199, clearly did know the opium poppy; he describes how the juice is extracted and says that the dried sap can be so strong that it can kill. He mentions several unbearably ill persons who did away with themselves with its aid. This brings us back to the text of Theophrastus, 9.16.8: Thrasyas of Mantinea (as Scarborough notes), discovered a drug for a swift and easy death, which included hemlock (*kânion*), poppy (*mêkon*), and others of the sort. This placement of poppy beside hemlock in a fatal poison certainly weakens Scarborough's claim that Theophrastus did not know the opium poppy; at least it is very likely that Thrasyas of Mantinea, one of Theophrastus' root-cutting sources, knew the opium poppy.<sup>17</sup>

Omitting, for the moment, Aristotle's mention of wine as a soporific, I must say something about "dandel." *Airai*, taken to be *Lolium temulentum*, is also mentioned as "sleep-inducing" (*bupnotika*, *PN* 456b31). This is a rye grass, whose seeds could be ground for meal; certainly it was regarded as toxic by some later authors, but it is not entirely clear just how and in what circumstances it proves toxic. Some studies have argued that the grain itself is toxic, others that the grain is toxic when ergotized.<sup>18</sup> Theophrastus mentions the plant (*HP* 1.5.2, *et al.*) as a weed found with food grains; he says nothing about any pharmaceutical properties.

Another place where Aristotle lists several pharmaceutical properties of plants is in *HA* IX.5-6, 611b-612b. The passage is actually about the intelligence of animals, but I take it that the stories are meant to show that animals seek herbal remedies just as human beings would, or even (in some cases) more intelligently than the average person. The entire section is a real jumble of animal lore; in many ways the passage is comparable to passages in *HP* 9, both in its presentation of folklore stories, and in its themes. In fact, we

may say that *HA* IX seems particularly "Theophrastean" in comparison with other parts of the biological works.<sup>19</sup>

One of the stories is about an animal acting to prevent human beings from acquiring something medicinal—the doe eats the afterbirth so quickly that one cannot get it, but it is "supposed to have medicinal properties."<sup>20</sup> Just previously, Aristotle reports that "when a stag is stung by a tarantula or similar insect, it gathers crabs (?) and eats them; it is said to be a good thing for man to drink the juice, but the taste is disagreeable."<sup>21</sup> The word "crabs" is obviously wrong; probably Aristotle had some word for *dittany* in this place, since he goes on to tell (more) about the uses to which animals put dittany in what follows, and the claim that "dittany juice is good for man" is supported by the tradition (cf. Dioscorides III.37). Theophrastus says (9.16.1) that "dittany is peculiar to Crete," and scarce even there. He says it is especially useful in childbirth, and then goes on to say that "the story of the arrows is also said to be true,—that if goats eat it when they have been shot, it rids them of the arrow."<sup>22</sup> Where has he gotten the story? Quite possibly from the very passage of Aristotle which we have been discussing, and which continues: "Wild goats in Crete are said, when wounded by arrows, to go in search of dittany, which is supposed to have the property of ejecting arrows from the body."<sup>22</sup>

Aristotle, in the same chapter, goes on to tell of the habit of dogs eating grass when they are ill to induce vomiting (also told again, in slightly different words, or near enough, at 612a30, and at VIII.5, 594a28); later in the chapter, he tells of several animals that treat themselves by eating *origanum* (majoram) or by putting it on a wound.<sup>23</sup> Theophrastus writes of the cultivation of *origanum* several times but does not seem to mention the plant under this name in his pharmacological section.

Aristotle also tells of *parthianches*, which means "panther-killer" (it kills lions too). Apparently hunters would put out some of this poison where the leopard would find it; the leopard, having eaten some, would seek human excrement, because it is an antidote. So the hunters put a container of excrement up in a tree and wait till the panther comes along to kill it.<sup>24</sup> The translators of *HA* seem to be in agreement in identifying the "panther-killer" with aconite. This herbal drug is discussed in a somewhat jumbled passage in Theophrastus, 9.16.4–7, where Hort identifies it as "wolf's bane," or *Aconitum napellus* L. Theophrastus says that because the doctors don't know how to prepare it, they use it mainly as a "septic and so on," but of course those who know can make a deadly poison of it.<sup>25</sup> Indeed, Theophrastus reports that aconite, when properly prepared, can cause a very painful, lingering death at a calculated time in the future. Scarborough speculates (pp. 377–8) that Theophrastus may have heard about the most powerful of the aconites, *Aconitum Ferax*, or Indian aconite, used in India as an arrow poison to kill

large animals, but seems puzzled about the source of the information. But if Aristotle's "panther-killer" would have to be some "Oriental" form of aconite, we do not need to seek very far for a possible origin for some of Theophrastus' understanding of this herbal poison, even though the stories told by Aristotle and Theophrastus are quite different. On the other hand, *Aconitum napellus* is poisonous enough to kill large animals effectively.

Before we leave the chapter in *HA*, we might mention the use that the weasel makes of wild rue (*peganum*). It eats some of this plant because the smell is "noxious to the snake" (612a28). Theophrastus says much about wild rue in other parts of the *HP*, but nothing about its use as a snake chaser. Aristotle also speaks of a *drakon* which, when it eats fruit, has some juice of the *pitris*, translated by Thompson as "endive" and by Louis as "bitter lettuce."<sup>26</sup> Theophrastus does say that the *pitris* is bitter to the taste and has flowers most of the year. Hort does not identify it *ad loc.*, *HP* 7.11.4.

There is a curious passage in Scarborough's essay in which he argues that *HP* 9 "stands solidly within Aristotelianism" (p. 364) on the strength of a reference to the use of seal rennet as a remedy for epilepsy (9.11.3). To be sure, as Scarborough says, Aristotle found the seal a quite interesting animal, but the passage in the *Corpus Aristotelicum* that says essentially the same thing as Theophrastus says here is *De mirabilibus* 77 835b32, a treatise surely not by Aristotle himself. However, the Photius summary of "On Animals Said to be Grudging," 19 Fortenbaugh, tells the same story about the seal (lines 6–8, 14–15). We might argue that the *De mirabilibus* could be traced to Theophrastus, or his influence.

If we wanted to argue that Theophrastus did not use Aristotle's biological works directly, I suppose that it would be possible to defend that claim by ascribing to a joint source, possibly Diocles, the stories that they share, but it seems to me much more reasonable to accept the obvious truth that Theophrastus does stand solidly within Aristotelianism, and to accept the evidence above as additional grounds for believing that truism. It would not, I think, have been necessary to argue the case had not the two most recent commentators on *HP* 9 called it into question by omission.

The Aristotelianism of Theophrastus bears on our understanding of Theophrastus' conception of the psychological element in the uses of drugs, for his reasons for recounting so many of the "folklore" stories told to him certainly included the motivation that brought Aristotle to tell quite a few himself, especially in *HA*, and throughout the biological works: both Aristotle and Theophrastus believed that to reach the truth one must *trihēmi ta phainomena*, which means to set down the common accepted opinions on the subject at hand. By doing so, they may preserve many elements of superstition, but they also preserve bits of accurate observation to which a more dogmatic investigator might have been blinded by a preconceived theory. The

rationalism (or professionalism, if you prefer) of the Hippocratic is in danger of shutting out some truth, along with much error.

### PSYCHOACTIVE DRUGS IN HP 9

A good place to start our discussion of the several psychoactive drugs in HP 9 would be with 9.11.5, and the discussion of the plants called *struchnoi*: "one causes sleep, the other madness." Leaving aside the sleep inducer, let us turn to the discussion of the *manikos* in 9.11.6. Theophrastus tells us that this is also called *thynoron* or *periton*, and has a white hollow root about a cubit long. This *strychnos* is identified with the thorn apple, *Datura stramonium*; its leaves and seeds contain atropine, hyoscyamine, and scopolamine.<sup>26</sup> Modern pharmacologists make an extract of this plant for use as an anticholinergic and antispasmodic. Before Leva-Dopa, this extract was used in the treatment of Parkinson's disease. The chemical components, atropine, hyoscyamine, and scopolamine, are also used individually in modern pharmacology; atropine sulfate is used particularly as an antispasmodic, and large doses are given as an antidote to certain insecticides and "nerve gases."<sup>27</sup>

The accuracy of the observations reported by Theophrastus may be measured by a comparison of what he says about *strychnos manikas* with what the *Physicians' Desk Reference (PDR)* says about atropine, one of its active ingredients.<sup>27</sup> Theophrastus says that with one drachma ( $\frac{3}{160}$  of an ounce) in weight, the victim (Hort says "patient") becomes playful and thinks himself marvelous; "twice this dose (is given) if he is to go mad outright and have delusions; thrice the dose, if he is to be permanently insane; (and then they say that the juice of centaury is mixed with it); four times the dose is given, if the man is to be killed" (trans. Hort). The *PDR* says, "Doses of 0.5 to 1 mg of atropine are mildly stimulating to the central nervous system. Larger doses may produce mental disturbances; still larger doses are depressing. Death from atropine poisoning, though rare, is usually due to paralysis of the medullary centers." Those descriptions are remarkably similar.

More generally, we may note that the series of effects, from mood elevation, through hallucinogenic and permanently psychogenic, to fatal, is one which is familiar from psychotropic drugs in our own day; however, Theophrastus envisages someone inflicting these effects on someone else, while we have seen many cases of self-inflicted psychotropism. Kingsbury (p. 281) says that *Datura* has been used for its hallucinogenic properties, and notes that its common American name, jimsonweed, derives from the mass poisoning of soldiers sent to Jamestown, Virginia, to quell the Bacon rebellion in 1676.

We do not find, I believe, indications in Theophrastus' text that *strychnos manikas* was used with psychiatric intent. Despite Hort's translation, the clear notion is that the plant is a *poison*, to be inflicted on others. A somewhat closer

approach to a psychiatric use of one of the plants called *strychnos* (quite possibly the "hypnotic" rather than the "manic") may be found in the Hippocratic texts. Lloyd (p. 128) cites in *On Internal Affections* the prescription of half a corybe (about  $\frac{1}{10}$  litre) of the juice of *strychnos* with half that of *melikreton*, in water, with the yolk of a boiled chicken's egg, as a painkiller to be taken daily. Lloyd remarks that if *strychnos manikas* were used, that quantity would kill more than the pain. Possibly the Hippocratic author refers to the "hypnotic" kind of *strychnos*; Theophrastus says that this one, soaked in wine, is given as a drink to induce sleep. Scarborough identifies this *strychnos* as *Atropa belladonna* (confusingly enough, sometimes identified as a kind of mandrake). Belladonna also contains atropine; if Scarborough's identifications are correct, possibly the dosages tended to be higher in preparations from the *Datura stramonium* than from the *Atropa belladonna*. Incidentally, we may remark there are several belladonna preparations on the market even today. One of them ("Trydon Spansule" capsules, put out by Smith Kline & French) is used as an antispasmodic and antisecretory agent in cases of peptic ulcer.

At 9.13.4 Theophrastus, discussing "sweet-tasting roots," tells us that "there are some that cause mental derangement (*ekrattikas*), as the plant like the golden thistle (*skolimos*) which grows near Tegea: of this Pandemis the sculptor ate, and went mad (*exersei*) while he was working in the temple" (trans. Hort). The information which Theophrastus gives is insufficient to identify the plant, and Scarborough does not, I think, discuss it at all.<sup>28</sup> Still, we have here evidence of drug self-abuse; *ekrattikai* and *exersei* have connotations of a state of mind which might well be sought by a sculptor while working on a big project. The implications of the words is, I think, toward the *mania*, which might be temporarily advantageous if the sculptor had a deadline for completion.<sup>29</sup> At 9.19.1, Theophrastus turns to *pharmakia pros the ten psychen*, having recalled the earlier discussion of *strychnos*, he adds only one more, the root of the *mothēras* or oleanther, which "administered in wine makes the temper gentler and more cheerful." He describes the plant: it "has a leaf like the almond, but smaller, and the flower is red like a rose. It is a large bush; the root is red and large, and exudes a fragrance like wine; it loves mountainous places." That it smells like wine does not seem strange, since it has the "power" of wine, *dynamis*. . . *oinōs*. Scarborough tells us that the plant is *nerium oleander*, and that from it is derived oleandrin (foincriin), used in modern medical practice for cardiac insufficiency. It is also a powerful diuretic. Scarborough does not pursue the psychotropic faculties of the plant, nor have I found any indication of those faculties in the modern literature.<sup>30</sup> Still, we have here a definite indication of a positive psychotropism in the text of Theophrastus; on the strength of this reference at least, we may say that he was aware of the possibility of a pharmacological psychotherapy, at least in its earliest stages.

Many medical writers in antiquity recommended the use of black hellebore as a purge for melancholics; some such authors thought of this use in a way which we would recognize as "psychiatric." Such a use is at least suggested by the opening chapters of the Hippocratic *Aphorisms* book IV, and made much of in Dioscorides IV.151 and Celsus III.18.20, where too the use of white hellebore is recommended for cases of "hilarity." Theophrastus does not, however, suggest a psychiatric use for either sort of hellebore. Possibly Theophrastus did not hear of a use of hellebore against melancholy; we should notice too that the Aristotelian *Problemata* XXX.1 discusses melancholy at considerable length without mentioning hellebore for its treatment. Another possibility is that Theophrastus saw this use simply as a purge, and the fact that melancholics are given purges perhaps does not seem to him a direct psychological effect of the purging agent.

The mention of melancholy brings us, at last, to the question of the therapeutic uses of wine. In *Probl.* XXX.1, wine is mentioned as both cause and cure of melancholy, and Plato is listed among the famous creative melancholics, which may help to explain the mention of wine as a mood elevator in *Laws* II, already noticed above. Theophrastus mentions wine as a mood changer only by implication, in *HP 9*, when he says that the power of olander resembles that of wine. In the fragments of his work *On Drunkenness*, however, he echoes Plato's *Laws*, saying that wine is a remedy for the *dysθυμία* of old age.<sup>31</sup> In *HP 9*, Theophrastus does discuss the paradoxical effects of certain wines upon fertility, in the passage omitted by Hort. It seems appropriate to include here a translation of that passage, with a few brief comments.

### DRUGS AND SEX IN *HP 9*

#### A Translation of *Theophrastus HP 9.18.3-11*

(3) And in relation to our own bodies, apart from powers for health and disease and death, they say that herbs have other powers not only on bodily things but also on those of the soul [here Hort ends]. I mean by 'bodily' those concerned with generation and fertility. In fact some (plants) do both from the same part, for example the so-called *arthis* [testicle];<sup>32</sup> for as there are two < roots >, a large and a small, the large root, if given in milk of a mountain goat, makes one more functional for intercourse; the small one harms and prevents. This plant has a leaf like the squill but smoother and smaller; the stem is very like that of the euphorbia used in unburnt offerings<sup>33</sup> or that of the *akantha*.

(4) It is absurd, as I have said, that both effects should be caused by one and the same nature, but it is not absurd that there should be such powers. Even Aristophanes the drug-dealer from Plataea said that for both effects he had certain powers; one which results in increased potency, the other which results in complete impotency. The impotency from it can be either total or temporarily delimited as, for example, two months or three months, so that it can be used on servants when one wants to punish and discipline someone.

(5) Some are effective for the generation of males or females, for which reason they call *phyllos*<sup>34</sup> either 'male-maker' or 'female-maker'; both have a form similar to that of the basil; the fruit of the female-maker is like the blossom (*brachyion*) of the olive but greener; that of the male-maker very like the olive when it has just grown from the blossom, but double like human testicles. To make sperm infertile [i.e., as a contraceptive] they say to give the fruit of the white-berryed ivy;<sup>36</sup> to make it fertile, give the fruit of the willow-weed<sup>36</sup> in water.

(6) This grows like 'flame-flax'<sup>37</sup> but the fruit is like millet. And they say that one will be unable to generate also if one drinks the fruit of the honeysuckle<sup>38</sup> in white wine continually for thirty days, having gathered the equivalent of a *choinix*<sup>39</sup> each day. If one finishes the course of drinks one will be entirely infertile.

(7) The leaf of the 'mule' plant<sup>40</sup> makes women infertile; they say to mix in some hoof and skin of mule. This leaf is like the skolopendro<sup>41</sup> leaf, but the roots are slender; it loves mountainous and rocky places; besides, mules like it very much; it is also used for the spleen as is the honeysuckle.

(8) Lady fern (*thypharias*)<sup>42</sup> is useful for the flatworms and hairworms; for the flatworm soaked in honey, for the hairworm given in sweet wine with barley. They say that if it is given to a woman it will abort the fetus, if not make her infertile forever. The lady fern differs from male fern (*pteris*)<sup>43</sup> in that male fern has the leaf on a single stem, and a great long black root. The powers, then, of these parts relate to generation.

(9) Most marvelous is the plant which Indos<sup>44</sup> had; they said that it keeps the penis hard, not by ingesting the plant, but using it for anointing; the power of this plant is so great that one can have sex with as many women as one likes—those who use it say as many as twelve. Indos himself—he was big and strong—actually said that he once had sex seventy times, but his semen came out drop by drop, and finally he drew out blood. Besides women are considerably more eager when they use this drug. This power, if it is true, is excessive.

(10) But in general that there should be some such natures which make people more sexually excited is not absurd, for we see such natures in the nutritive juices contained in both moist and dry foods, and they can also bring about other effects. For example, they say that in some places the water makes women more likely to have children, as in Thespia, some places it makes them infertile, as in Pyrrha; that's the explanation the doctors gave.<sup>45</sup> In Heracleia of Arcadia they say there is a wine which drives men out of their wits when they drink it, and it makes the women infertile;

(11) also in Achaea, and especially around Kerynia, there is a kind of vine whose wine makes pregnant women abort; if bitches eat the grapes they too abort. As far as taste is concerned, neither the grape nor the wine causes any peculiar sensation in comparison with others. In Troezen the wine makes those who drink it infertile; in Thasos they make a certain wine which causes sleep, and another which causes wakefulness in those who drink it. These are the powers in relation to the body and bodily functions. [end ch. 18, return to Hort]

#### Comments

Theophrastus brings together most of his comments on the relationships between herbals and sex in this section. Elsewhere in book 9, there may be mention of at least two 'love potions,' mandrake (9.9.1) and cyclamen



(9.9.3), if that is how we interpret *pros (is) phyllon*. But in neither instance do we have any information about *how* these herbals were used to enhance one's love life. The information provided in 9.18.3-11 is much more detailed and open to verification.

The first herbal is a root, that of the *orthis*; indeed, the story goes that the *orthis* has two roots, resembling testicles, and one is large, the other small; if one has some of the large one mixed with mountain-goat milk, one's sexual powers are improved. On the other hand, if one has some of the smaller, it causes decreased functioning. This story is a good example of the doctrine of "signatures" which was to have a great history in subsequent centuries. Theophrastus seems not overly impressed with the signature argument, but is genuinely puzzled about the possibility of the same "nature" having opposite effects. Immediately prior to this passage, in 9.8.2, Theophrastus says that the *thiaphonon*, "which some call 'scorpion-plant because it has a root like a scorpion, kills that animal if it is shredded over him. . . . and it is useful as a drink against a scorpion's sting." Theophrastus, noting what we call the signature argument, comments, "Now if what has been told about the scorpion be true, then other similar stories are not incredible. Indeed stories are not composed without a reason." Similarly, after the story about the *orthis*, Theophrastus goes on, "It is absurd that both effects should be caused by one and the same nature, but it is not absurd that there be such effects." Yet he is willing to credit the story of Aristophilos who claimed that one of his drugs could either improve or destroy a person's sexual capacity, and he tells of an herb, the *phyllon*, which seems to have two varieties, one of which encourages the generation of male children, the other, female children. One may imagine that the doctrine of signatures has played a role in this notion, since the bud (fruit?) of the "male-maker" *phyllon* is described as resembling testicles.

The so-called mule plant is also an example of the signature theory at work, for this plant, beloved of the infertile mule, makes women infertile—especially if mixed with hoof and skin of a mule.

I have no comment at this time concerning the other contraceptive and aphrodisiac plants, except to note that the description of the effects of Indos' erection-maintaining plant is verifiable to the extent that the Indos' description of his own experience certainly does indicate that he had engaged too often in the lists of love.

In this section, Theophrastus is quite concerned about a single nature causing opposite effects; in order to deal more effectively with the question, he includes discussion of essentially nutritive materials in order to mention, for example, the reputation of various waters for influencing fertility both positively and negatively. Here Theophrastus arguably refers to a known Hippocratic text—*Airs, Waters, Places*. Theophrastus also discusses the virtues of various wines, in order to cite those which have one effect on men, another on

women, and also to mention other sex-related effects of wine. From his point of view, it is at least odd that the same natural substance should affect different people differently.

We may discern in this passage several phases of the struggle which Theophrastus had with the concept of *physis*, nature. If a part of a plant, or some other natural substance, has paradoxical or opposed effects, then Theophrastus seems to suppose that we should expect to find within that plant or substance two opposed natures, each bringing about its characteristic effects only when presented with the appropriate material.

#### A COMMENT ON THEOPHRASTUS AND TAXONOMY<sup>49</sup>

G. E. R. Lloyd suggests that plant taxonomy was one of Theophrastus' objectives (*Science, Folklore, and Ideology* p. 121), and in this he was anticipated by the translators of Theophrastus' botanical writings, in the Loeb series. In view of the argument presented by Pierre Pellegrin, in *La Classification des Animaux chez Aristote*, that *Aristotle* was not aiming at a consistent taxonomy, did Theophrastus break with *Aristotle* on this point, and join the eighteenth century, or not? Benedict Einarson writes:<sup>46</sup>

Aristotle first classified animals and gathered information about them in the *History of Animals*; he then proceeds to explain certain common or distinctive characters in (his other biological) treatises. . . . So Theophrastus first classifies and identifies plants and gathers information about them in the *Historia Plantarum*, then proceeds to account for certain common or distinctive characters in the *De Causis Plantarum*.

Einarson also asserts that as a taxonomist, Theophrastus falls short of modern standards:

Theophrastus does not have the taxonomic terms of modern botany, such as class, genus, species, variety. He uses *genos* ("kind") or *thiaphonon* ("difference") of the different kinds of vine and also of the great classes "terrestrial" and "aquatic."<sup>47</sup> This is because the *genos* is of the nature or essence of a plant.<sup>47</sup>

Pellegrin has amply shown that *Aristotle* a) did not aim at the development of a taxonomy of animals; b) did not use the words *genos* and *eidos*, or any others, for classes of animals of set levels in such a way that those designations could lead in any straightforward way to any later taxonomy; c) did not fail or fall short of modern taxonomy because he was not aiming at taxonomy. If we look at what Einarson says about Theophrastus, we find that a similar debunking is called for: he says that Theophrastus had a taxonomic project, but that Theophrastus deliberately used the Greek words which *might* have designated fixed classes of plants in ways which immediately preclude that

interpretation—*genus* and *diaphora* are both used in talking about different kinds of grapevines, and also to distinguish land plants from water plants, just as Aristotle uses the word *genus* both at the level of what we would call a variety of subspecies of bird, and to distinguish not only between animals with blood and those without, but even between living and nonliving entities.

Sir Arthur Hort does not deserve quite as much tar from the same brush, largely because his introductory comments are not so precise on the subject of Theophrastus' possible taxonomic project that we can immediately see where or even whether he has gone wrong,<sup>48</sup> Hort wonders whether Theophrastus first learned his "principle of classification" from Plato or from Aristotle, but thinks that the principle was

for the first time systematically applied to the vegetable world. Throughout his botanical works the constant implied question is, 'What is its *difference*? what is its essential nature?' viz., 'what are the characteristic features in virtue of which a plant may be distinguished from other plants, and which make up its own nature' or essential character?<sup>49</sup>

That is close enough to the truth, if we do not read in more than what he says. On the other hand, the headings he supplies in the translation can be quite misleading, since they indicate that the first two chapters of *HP* are about how plants should be classified, when they really are about the differences among the parts of plants, and not about classifying at all. In 1.3.1 Theophrastus (much like Aristotle in *HA*) tells us that our study will be more illuminating if we "divide according to *eide*," and then he gives as *prōta kai megista* the three classes, shrub, "phryganon," and herb. He soon (1.3.5) gives a list of binary distinctions: wild/cultivated, fruitbearing/fruitless, flowering/flowerless, evergreen/deciduous. But these distinctions all cut across the "first and largest" classes, and each other, and are immediately asserted to hold inconsistently. We may say that Theophrastus is constantly classifying, but most often he is classifying *parts* of plants, rather than what we would call *species* of plants, and it is practically impossible to find any consistent hierarchical arrangement of plants in his botanical writings.

Theophrastus does not aim at what we would call a taxonomy of plants, a classification of plants into genera and species; rather, in the *HP* he aims at discovering the differences, *diaphorai*, between plants, and in particular the differences between their parts, on the model of Aristotle's *History of Animals*, in the *CP* he aims at understanding how plants function and reproduce, much as Aristotle's *Parts and Generation of Animals* are aimed at that sort of understanding of their objects. Pellegrin's analysis of Aristotle's classifications of animals would also work on the orderings of plants presented to us in Theophrastus' botanical writings. In particular, the word *genus* seems to be consistently related to the generative ancestry of the plant—members of a

*genus* are all thought of as possibly descended from the same original plant, at least as a first approximation. *Eides*, as in Aristotle, normally refers primarily to the *appearance* of the plant, and is much rarer; Theophrastus, unlike Aristotle, uses the word *idea* for naming subdivisions, and as we have already noticed, at least in a methodological passage, he does not seem reluctant to use negative characterizations, a practice discouraged by Aristotle in *PA* I and on the whole avoided by him. The most common word for a group of plants is *diaphora*; the *diaphorai* presented by Theophrastus are both numerous and crucial for the execution of his project, that of *defining*, or setting out the essence of, each kind of plant. But there is no hierarchical arrangement, and consequently no true taxonomical project in Theophrastus' botanical writings; we should not interpret Theophrastus as having attempted to accomplish the work of Linnaeus, but failing (as Einarson seems to assert); rather, we should attempt to discern what Theophrastus was aiming at, and then to judge his successes and failure according to those goals.

#### SOME CONCLUSIONS

This essay has ranged rather far afield; we began by posing to ourselves essentially two questions: does Theophrastus discern some psychotherapeutic uses of drugs, and does he discern some effect of psychological states upon the action of drugs? In other words, we were seeking the relationship of *HP* 9 to the history of psychiatry. In response to those questions, we may notice that Theophrastus indeed reports stories that might have been in part calculated to create expectations of the working of drugs, but he does not analyse the extent to which the working of drugs depends upon the expectations of the patient (or victim) in comparison with the extent to which the "nature itself," as he would put it, brings about the effects. Theophrastus rather more seriously looks for "real" or pharmacological effects of the herbals he studies, and does note a few cases of psychological effects; whether therapeutic or malicious is another matter. His interest is not that of a medical person, as Lloyd already noted, but that of a scientist, concerned with discovering the natures present in the living world of plants.<sup>50</sup>

#### NOTES

1. Some passages in which Aristotle compares plants and animals are: *PA* IV.10, 686b36, II.3, 650a21; IV.4, 678a10; *IA* 4, 705a28; *GA* II.3, 736b13; II.7, 745b26; IV.67, 774b26. Scattered through his writings are a great many comments on plants; the general tenor of those comments are first, that the characteristics of plants are continuous with those of animals (the lower animals hardly differ from plants, *PA* IV.5, 680b10ff), and plants differ from animals in that they have fewer soul-powers than animals (*de An. passim*, e.g. II.12, 424a23). There are

references in his works to a work *On Plants*, but the *De plantis* which is included in the Corpus was written long after his death.

- Neither John Scarborough nor G. E. R. Lloyd has adequately emphasized the Peripatetic character of HP 9 in their essays on this book, even though both have considerably advanced the study of this work in other respects.

John Scarborough, "Theophrastus on Herbs and Herbal Remedies," *Journal of the History of Biology*, XII 2 (1978), 353-85, argues convincingly for the authenticity of HP 9. Following Max Wellmann, he claims that Theophrastus relied largely upon the work of Dioscorides of Carystos in book 9, in addition to the "drug-sellers" and "root-cutters" to whom Theophrastus refers explicitly (cf. Max Wellmann, "Das älteste Kräuterbuch der Griechen," in *Festschrift für Franz Sassenhilf* [Leipzig, 1898], esp. 22-31; and *Die Fragmente der sikelischen Ärzte* [Berlin, 1901]). In fact Scarborough does not single out specific bits of information which he takes to be derived from Dioscorides; he generally compares the account in Theophrastus with those to be found in Dioscorides, Galen, Orbasius, Nicander, Celsus and Pliny. Scarborough also tries to identify the plant-names with modern species and to give the pharmacological actions, as determined by modern pharmacology, of the herbs discussed. For all of that, and much more, I refer the reader to his essay. On the matter of Dioscorides, it is worth mentioning that Wellmann took Dioscorides to be rather early, older than Aristotle; Jaeger took up the matter again and actually gave two different dates for Dioscorides, both closer to the time of Theophrastus. But Theophrastus could have used Dioscorides no matter which date is correct. W. Jaeger, *Diosklos von Karystos*, Berlin, 1938; see also his article, "Diosklos of Carystos," *Phlas. Rev.* 49 (1940) 393ff, and I. Edelstein's review, reprinted in his *Ancient Medicine*, Baltimore 1967.

G. E. R. Lloyd, *Science, Folklore and Ideology*, Cambridge UP, 1983, pp. 119-35: "Theophrastus, The Hippocratics and the Root-Cutters: Science and the Folklore of Plants and their Use." The major emphasis in his essay is upon a comparison between Theophrastus and the Hippocratic medical texts, largely with an eye to finding what sorts of things Theophrastus must have picked up from the drug-sellers and root-cutters. While there is nothing shocking in the idea that Theophrastus might have made use of the Hippocratic texts, just as Aristotle did in writing his *Generation of Animals* (see my "Aristotle and Hippocratic Gynecology" in *Aristoteles als Wissenschaftstheoretiker*, ed. J. Irmscher & R. Müller, Berlin, 1983), in fact Lloyd's evidence points rather strongly against Theophrastus having much use of those books for the writing of HP 9.

- For Aristotle's use of various sources, see e. g. my *Science and Philosophy in Aristotle's Biological Works*, Hildesheim 1975, pp. 21-42. Aristotle relies upon drug-sellers for information in HA VI.18, 572a22, b22, 577a13, and probably again in IX.5, 611b26, at the least. He also relies upon sects and prophets, in addition to hunters, fishermen, shepherds, and so on.
- Marlein van Raalte claims in her essay in this volume that Theophrastus differs from Aristotle in putting more emphasis upon such continuities in nature, and correspondingly less upon teleological explanations.
- Lloyd emphasizes folklore and ideology in his essay, while Scarborough emphasizes pharmaceutical implications.
- Thapsia* is identified by Dioscorides (*The Greek Herbal of Dioscorides*, trans. John Goodyer, 1655; ed. R. T. Gunter [1934] New York 1959; subsequent references to "Dioscorides" are to this "edited translation") and Hort (Sir Arthur Hort, *Theophrastus, Historia Plantarum*, Loeb, London, 1916; subsequent references to

"Hort" are to this work) as *Thapsia gongynia*; according to Dioscorides (in the 1655 Goodyer translation), "it behaves him that takes ye liquor not to stand against ye wind, but rather to doe it in still weather. For it puffs up ye face mightily, & ye naked parts are blistered by the sharpness of ye exhalation." According to G. B. Wood & F. Bache, *The Dispensatory of the United States* (Philadelphia 1882) (subsequently referred to as "*Dispensatory*"), "great care is necessary, in removing the roots from the bales [in which it was shipped in the nineteenth century], not to be injured by the powder which escapes, and which causes itchings and swellings of the face and hands." *Thapsia* was, according to *Dispensatory*, used as a "local irritant and revulsive."

Hellebore, *Helleborus niger*, or "Christmas rose", according to W. C. Muenstler, *Poisonous Plants of the United States* (New York 1947), its rootstocks and leaves contain helleborein and helleborein, and are poisonous on contact. "Bruised parts may produce a severe dermatitis in susceptible persons." According to *Dispensatory*, hellebore is a drastic hydragogic cathartic. There is another plant called hellebore in Dioscorides, *Vernonia alba*. Dioscorides ascribes abortive powers to both plants, incidentally.

Garlic and onions are two pharmaceutically interesting plants which Theophrastus does not otherwise discuss in HP 9, although the Hippocratics made frequent use of them both; see also *Problemata XX passim*, and Eric Block, "The Chemistry of Garlic and Onions," *Scientific American* March 1985, pp. 114-19. Theophrastus here perhaps thinks of garlic and strong wine as fortifying, rather than as *pharmaka*. Gloves would be more to the point.

- Pasonia officinalis*, according to Hort. See also Dioscorides III.157; *Dispensatory* recounts its use as an antispasmodic and anti-epileptic agent.

- Mandragora* is identified as *Podophyllum peltatum*, or "May-apple," by Muenstler; he says that the rootstocks may cause severe dermatitis. John Kingsbury, *Poisonous Plants of the United States and Canada* (Englewood Cliffs NJ 1964) (subsequently identified as "Kingsbury") follows the same identification and points out that the cytotoxic properties of this plant (especially the root) have led to research study of its chemical components as therapeutic agents in cancer. Hort, in his index, indicates that the *mandragora* refers to two different species, *Mandragora officinarum*, and *Atropa belladonna*. Scarborough, p. 360, seems to take *Atropa mandragora*, *M. officinalis*, and *Podophyllum peltatum* to be identical, but I am assured by my botanist consultant, Professor George Schnmacher, that they are not at all the same plant. *Atropa mandragora* and *Atropa belladonna* are indeed closely related, and probably account for the references to *mandragora* in Theophrastus, as Hort says. Dioscorides, IV.76, identifies *mandragora* as *Atropa mandragora*, and adds many interesting stories to those told by Theophrastus.

- "Aconite" is discussed below, under "panther-bane." Cf. Scarborough, *op. cit.* pp. 375-7.

- Here we have a mention, without discussion, of what I will call "nutritional" remedies; Theophrastus does not here attempt to examine the claims of honey and wine to be *pharmaka*, though both often appear in the Hippocratic prescriptions.

- Aster triphorum*, according to Hort.
- Included in G. E. R. Lloyd, ed., *Hippocratic Writings*, Penguin, 1978.
- Ibid.* p. 203, tr. Chadwick & Mann.
- Ludwig Edelstein, in "Greek Medicine in its Relation to Religion and Magic," (*Bull. Hist. Med.* 5 (1937) 201-46, reprinted in *Ancient Medicine*, ed. Tenkin & Temkin, Baltimore, 1967) took HP 9 as evidence for his general thesis that

- pharmaka* had largely lost their pre-classical "magical" character in about 700 B.C., and regained it in the days of Theophrastus (cf. Scarborough p. 359). Incidentally, Edelstein also argues that it is plausible for Theophrastus to have accepted the doctrine of sympathies, and thus that Hort was wrong to have omitted 9.18.3-11; I believe that Hort left it out because either he or his editor was offended by the sexual references, or possibly by the references to abortifacients. See below for my translation of the passage in question.
15. Scarborough, pp. 360-1, assuming that mandrake is *Atropa mandragora*. According to *Dispensatory*, mandrake is considered a *narotic*.
  16. See also Scarborough's note 131, and especially Christopher Gill, "The Death of Socrates," *Class. Quart.* 67, no. 23 (1973). Kingsbury, pp. 379ff, discusses especially the veterinarian consequences of *Conium maculatum*.
  17. Opium poppy seems to have been known in the Hellenic world from quite early times; Robert Temple, *Conversations with Eternity*, London, 1984, pp. 49-59, prints photographs of both Minoan and early classical pots clearly depicting the unique seed pod of the opium poppy, held in the hands of a goddess or priestess. Kingsbury, pp. 485-6. "Classic dandel poisoning was only occasionally fatal. Symptoms in man consisted of apathy, giddiness, or a feeling of intoxication, accompanied by ataxia, various abnormal sensations, mydriasis, nausea, vomiting, gastric pain, and diarrhea" (p. 486). If ergot is the agent, see Kingsbury pp. 79-86; intentionally or unintentionally ergotized rye breads have been claimed as the cause of all sorts of medieval oddities from Joan of Arc's visions to the nutcracker Crusades, and various compounds of the chemical derivatives of ergot have pharmaceutical uses even today. See S. W. Jackson, "Unusual Mental States in the Medieval Europe," *Journal of the History of Medicine and Allied Sciences* 27 (1972) 262-97. For modern uses, see *Physician's Desk Reference (PDR)* under Ergotrate Maleate, for example.
  19. This resemblance has led some to believe that HA IX was not written by Aristotle at all, but perhaps by Theophrastus, or another member of the Lyceum. Work by David Balme and Allan Gotthelf has tended to support the genuineness of all the HA, through book IX. Photius summarized a minor treatise by Theophrastus which had the title, *On Creatures that are Said to be Grudging*; material in both HA IX and HP 9 could have been included as well in a treatise of that name; see R. W. Sharples' essay in this volume, sections V and VII, and especially W. W. Fortenbaugh, *Quellen zur Ethik Theophrasts*, Amsterdam, 1984, pp. 18-19 for the Photius summary, 159ff for comments.
  20. HA IX.5, 611b25-6; cf. Fortenbaugh, *op. cit.*, L9, line 17.
  21. Aristotle HA IX.6, 611b21. I haven't seen the Peck/Balme Loeb HA vol. III, so I do not know what they do with the word "crab", *karkinos*. That must have been the reading in antiquity, because it is followed thus by Pliny and Aelian (cf. Thompson *ad loc.*), but Pliny and others also tell a related story inserting "ditrany" (*aittanon*), which would make some sense. Louis proposes *origanum* with the idea of identifying it as *Origanum dictamnus*, or Cretan ditrany. According to *Dispensatory*, ditrany was used in the 19th century as a vermifuge.
  22. HA IX.6, 612a1. The same story is told in *De mirabilibus* 4, 830b20. Scarborough, commenting on Theophrastus' discussion of ditrany, cites neither parallel passage (pp. 374-6).
  23. *Origanum vitale*, most likely.
  24. There is a slightly different version of the story in *De mirabilibus* 6, 831a3ff. "Men say that in Armenia a certain poison grows, which is called leopard's bane. So, when a leopard is seen, they anoint a victim with this, and let it go. When the leopard touches it, she goes, it would appear, in quest of human excrement. Therefore the hunters put it in a vessel, and suspend it from a tree, so that the leopard, by leaping up towards it and becoming exhausted, may be paralysed by it and fall into their power."
  25. Lloyd seems to have missed this chance to comment on the echo of professional competition between the root-cutter and the physician; I have not been able to find a place in the Hippocratic texts which corresponds with what Theophrastus says here, and it is possible that he is only echoing the claim of the "medicine-man." According to Kingsbury, p. 127, *Aconitum napellus* is extremely toxic, and can kill within hours; he mentions, but does not discuss, therapeutic uses of aconite extract discussed in older literature. Dioscorides mentions only the uses as animal poisons (IV.77, 78).
  26. See Scarborough (p. 367) for the identification and analysis. Scarborough omits any discussion of the psychological effects of the *Datura stramonium*, which is a pity, since those effects are prominently emphasized by Theophrastus in this place. Kingsbury, p. 280-1, says that "hyperirritability of the central nervous system is noted. Subjects become delirious, incoherent, and perform insensible motions commonly picking at imaginary objects on themselves or in the air. . . . Subjects may become violent and dangerous to themselves and others." He refers to H. Jacobziner & H. R. Rabin in *NTJSMed* 1960 and 1961 for further information.
  27. Atropine Sulfate (Lilly), Injection.
  28. LSJ take the *skolymos* to be *Sclerophorus hispanicus*; E. S. Forster translates *skolymos* as "artichoke" in a verse of Hesiod (*Op.* 582, 586) quoted at *Problemata* IV.25, 879a27. I have not found artichokes to be *skolyma*.
  29. Cf. Aristotle, *Dir. Somn.* 464a25, which says that *skolymoi* are "very sensitive to outside influences" and consequently have prophetic dreams. And perhaps they might be more creative artistically. See also *Cartagoria* 10a1 and *Pa* II.4, 650a34, which says that bulls and boars are *skolymoi* because their blood has a lot of fibers in it.
  30. To be sure, *Dispensatory* mentions "narcotic symptoms" in relation to *Oenothera*; the plant includes chemicals resembling digitalis (see Kingsbury, p. 31, for the chemical structure of oleandrin; he mentions the "cardiac glykosides" of oleander elsewhere in his book). In Dioscorides, IV.118, this plant is identified as *Oenothera biennis*, or evening primrose. A botanist friend called my attention to a Hoagy Carmichael tune which has the line, "New Orleans in June, Oleander in bloom," a reference to the heady odor.
  31. See Fortenbaugh, *op. cit.*, L129 ff. The citation of the *Laws* is quoted by Athenaeus, *Deipnosophistae* I, 463c.
  32. Dioscorides: identified as *Orchis rubra*, *O. papilionacea*. "And of this it is said that if the greater root is eaten by men, it makes them bigger males, and the lesser, being eaten by women, to conceive females: It is further storied that ye women in Thessalia do give to drink with goats milk ye tenderer root to provoke Venetic, & the dry root for ye suppressing, dissolving of Venetic. And it being drank, ye one is dissolved by the other." Hort in his index identifies the larger *orchis* as *O. papilionacea*, the smaller as *O. longiorrhiza*. I think that Hort's interpretation is mistaken and that Dioscorides is right in thinking that the theory is that *O. papilionacea* has two roots, a large and a small. LSJ make clear that the plant is called "orchis" because of the similarity of the root to testicles; no doubt the root was used for the preparation, as Dioscorides says, and thus my translation of some

- rather vague Greek. *Dispensatory* says that *Ornithi macula* indeed has two bulbs, resembling testicles, but that the supposed aphrodisiac qualities are "illusory." Very possibly Hort relied upon the grammar of the sentence for his interpretation, if the suppressed reference is to root, *rhiza*, one should expect *magalis* and *miktas* instead of *magalon* and *mikron*. One solution would be to supply the neuter diminutive *rhizion*.
33. Dioscorides IV.177: *Euphorbia spina*; this plant is cited in *Dispensatory* as a severely acting emetic and cathartic. For more on various *Euphorbias*, see Kingsley, pp. 185–90. "Squill" translates *skilla*, and "akantha" translates *akantha*, of which Theophrastus lists at least a half dozen varieties, in various parts of the *HP*.
34. Dioscorides: *Mercurialis annua*. "Phyllon, some call it Elaeophyllon, some Bryonia, it grows on rocks. That which is called Thelygonon having as it were moss, the leaf greener than ye Olive, a thin short stalk, a slender root, a white flower, a greater seed, as it were of Poppy. But Arrhenogonon in other things is like to yet afore-spoken but differs, having ye seed, like Olives coming in a cluster out of the flower. It is said that Arrhenogonon being drank bringeth males but ye Thelygonon causeth females. Crateus relates this concerning these, but he seems to me, to relate these things, according to ye report of them." *Dispensatory* cites *Mercurialis annua* as a purgative and emmenogogue; Kingsley says that consuming it can cause anemia.
35. Identification by Hort: *Hedera Helix*, or English ivy. (Hort's index of Greek plant names to *HP* includes the section omitted in text and translation.) See Dioscorides II.210: "... the juice, and the clusters being drack doe cause sterilitie, and being taken in too great a quantitie doe trouble the minde." Kingsley notes that in smaller doses it is a purgative, in larger doses there are symptoms of excitation of the nervous system: labored respiration, and ultimately coma and death may result.
36. Hort: Polygonum Persicaria; cf. Dioscorides III.139, where the "willow-weed" is said to have leaves like those of the "Melampyrum . . . but seed like Milium," but I find no entry for Melampyrum. *Dispensatory* considers this plant an antiseptic.
37. Literal translation of *linon pyrrion*, not identified by Hort.
38. *Klammion*, *Lonicera erysica*, identification by Hort, LSI; in 9.8.5, Theophrastus says that it should be gathered early in the morning, before the sun strikes it. I can attest that the flowers of the honeysuckle smell sweetest then. In Dioscorides IV.14 *klammion* is identified as *Comarubus arvensis*, or Morning Glory, with the contraceptive quality included among its virtues. I recall people eating morning glory seeds for supposed psychedelic properties.
39. A *choenix* measures approximately a pint, dry measure.
40. Hort, LSI: "milt waste", *Asplenium ceterach*. This is a fern; several ferns have definite chemical effects.
41. Literally, "catpillar", Hort and LSI identify it as "hart's tongue," *Skolopendrium vulgare*, which would be *Asplenium skolopendrium*, noted in *Dispensatory* as an astringent, but not very strong.
42. Literally, "female pretis," identified by Hort and LSI, following Dioscorides III.187, as Bracken, *Pteris aquilina*, the common name is "Lady Fern." The *Dispensatory* says that it was used as a vermifuge. Kingsbury, p. 106, says that it poisons animals through action of a thiaminase (it destroys the thiamine in the body of several species of animals which may eat it.)
43. Identification as "male fern" or *Aspidium filix-mas* by LSI; see also Dioscorides IV.186. Kingsbury notes that this fern too is the source of a vermifuge, and that it too contains a thiaminase (p. 101).

44. The Greek would also support the translation "The Indian."
45. This could be taken to be fairly clear reference to *Airs, Waters, Places* 7–9; Lloyd does not notice this single reference to a Hippocratic text in the course of his discussion.
46. B. Einarsen, *Theophrastus: De Causis Plantarum*, Loeb, Introduction p. ix, Pierre Pellegrin, *La classification des animaux chez Aristote*, (Paris: Paris Press, 1982; English translation, by Preus, University of California Press, 1986.)
47. Einarsen, op. cit., p. xvii.
48. Hort: Introduction pp. xxi–xxii.
49. On this topic see also the paper of Allan Gortheif in this volume.
50. I thank George Schunacker and Dennis Schmidt, who read and gave important comments on an earlier version, and I am very grateful to W. W. Fortenbaugh for his many detailed comments, as well as to my commentator at the London Theophrastus Conference, James Longrigg, and to several others who suggested important improvements. Finally, I thank Meredith Pell, who has saved me from several remaining errors.