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SCIENCE AND MAGIC IN GALEN'S RECIPES
(SYMPATHY AND EFFICACY)

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Introduction

Magic may be usefully defined as 'excluded practices depending for their effect on forces or powers in the world beyond human understanding'. The contrast is at once with technology : 'accepted practices based on powers within human understanding', and with religion : 'accepted practices depending on powers beyond human understanding'. What we label as magic are those acts which lie outside : outside our ken and outside the pale ~~that~~ which is both taboo *and* mystery.¹ What is labelled magic will therefore depend on who is labelling (Roman Catholics do not consider Transubstantiation to be magic, parapsychologists do not consider Extra-Sensory Perception to be magic). There is thus an opening for cognitive dissonance in studying early medical practices. Modern readers of Pliny, e.g., are struck by his firm rejection of magic (*H.N.* 30.1-20) coupled with his approval of (or at least failure to exclude) practices we would regard as clearly magical (*H.N.* 20-27).² Moreover, Pliny himself reports native Roman magic with approval (*H.N.* 28.10-34). Thus the same sort of cognitive dissonance exists not only between ancient and modern, but within a single ancient author.

¹ Cp. Nachman Ben-Yehuda, 'Witchcraft and the Occult as Boundary Maintenance Devices', in Jacob Neusner, E. S. Frerichs, and P. V. McG. Fletcher (eds.), *Religion, Science, and Magic : In Concert and Conflict*, New York/ Oxford, Oxford U. Press, 1989, 229-60, summarizing the results in Nachman Ben-Yehuda, *Deviance and Moral Boundaries : Witchcraft, the Occult, Science Fiction, Deviant Sciences and Scientists*, Chicago, Chicago U. Press, 1985.

² E.g. : *HN* 20.29 (ritual for the use of the marsh-mallow), 20.171 (charm against cockroaches and scorpions), 20.254 (ointment for blindness), 22.39 (scorpion plant as a charm against scorpions), 22.52 (spitting the bugloss plant at serpents slays them), 22.135 (ritual to cure carbuncles), 23.103 and 26.26 (amulets for scrofula), 23.110 (ritual against eye-trouble), 24.12 (gathering mistletoe), 24.63 (charm against chafing), 25.164 (amulet of purslane prevents scorpion stings), 26.112-9 (the magical plant *nettonica* [betony]), and 26.150 (amulet of artemisia averts fatigue).

In fact, both Pliny and Galen claimed that they were recording rational recipes, and based that claim, at least in part, on allegedly experimental validations of efficacy. Yet to most readers, Pliny seems an uncritical compiler of stuff and nonsense, while his co-eval Dioscorides, and Galen as well, seem distinctly more rational. Indeed there is a tendency to view Greek medicine as wholly rational and free of all such contaminants as magic.³ In fact the picture is considerably more complex than that, and even Galen can be found agreeing that at least one amulet he has observed did work (*De simpl. med. fac.* 6.10 [11.859-60 K.]).⁴ Already in the Hippocratic corpus μάγος/μαγία is used not of a fixed set of practices, but of what the writer disapproves – the foreign connotations no doubt were part of the attack (*Morb. Sacr.* 2-4 [6.354-64 L.]). And although the author of *Sacred Disease* inveighs against his opponents' medical practices as being ineffective, his own dietary 'cure' for epilepsy is just as spurious. And what he excludes as not possibly useful against any disease, ablutions, are of course in fact effective preventative measures against a host of infectious diseases. (Ironically, he is thus hoist by his own petard.)

And Galen himself makes the claim of a rational, 'scientific' method with respect to his general method of enquiry in several places. Early in his oeuvre, in *On Medical Experience* 1 and 31 (85-6 and 153-4 Walzer), also in *De meth. med.* 1.3.14-15 (10.28-30 K.), and in the later *On Errors of the Soul* 5 (*De pecc. dignot.* 5 [CMG V 4.1.1, pp. 54-62 = 5.80-93 K.]), he repeats this claim. In the early passage, he is primarily concerned with validating the role of experience in medical practice, without eliminating a corresponding crucial role for reason. In the *Method of Healing*, he is in the first instance attacking the 'Methodist' followers of Thessalos, but as he does so, he advocates also his own position, that either reason or experience must be a criterion of truth. And lastly, in *On Errors*, he is of course propounding a rational approach to questions in philosophy, especially those regarding ethics. However, in giving examples he insists that the results of any theoretical enquiry be confirmed by experi-

³ Ludwig Edelstein, 'Greek Medicine in its Relation to Religion and Magic', *Bulletin of the Institute of the History of Medicine* 5 (1937) 201-46, repr. in O. Temkin and C. L. Temkin (eds.), *Ancient Medicine: Selected papers of Ludwig Edelstein*, Baltimore/London, Johns Hopkins U. Press, 1967, pp. 205-246.

⁴ G. E. R. Lloyd, *Magic, Reason, and Experience: Studies in the Origin and Development of Greek Science*, Cambridge, Cambridge U. Press, 1979, pp. 10-58.

ence. (The example he gives there concerns the design and testing of a sundial.)

The same sorts of claims are advanced by Galen specifically of his pharmacy in the three works to be considered here (in chronological order: *Mixing and Powers of Simples* = *De simpl. med. fac.*, *Composition of Medicines According to Types* = *De comp. med. per gen.*, and *Composition of Medicines According to Places* = *De comp. med. sec. loc.*). First, in *De simpl. med. fac.* 1.1-2 (11.379-84 K.), Galen claims that each drug has within it some natural faculty or power (δύναμις), whether of cooling or heating, or whatever it might be, and that this power can be known through the senses.⁵ [As he turns to the alphabetical list of simples, he rejects incantations, amulets, and all that magical apparatus as ineffective, foolish, and to be excluded (*De simpl. med. fac.* 6 pr. [11.792-3 K.]).] He repeats his insistence that either reason or experience are sufficient to learn about the regularities of nature as seen in the use of plants as medicines (*De comp. med. per gen.* 6.7 [13.886-7 K.]). As he moves on to medicines for specific body parts (*De comp. med. sec. loc.* 1.1 [12.378-9 K.]), he insists that the affected part and the nature of the disease itself indicate sufficiently the remedy to be applied.⁶ Finally, it is nature herself who gives us reason and experience, the necessary and sufficient instruments of judgment (*De comp. med. sec. loc.* 8.1 [13.116-7 K.]).

Despite that however, there is an important core or residuum of practice and assumptions which Galen will (of course) not call magical, since he includes it, but which we may fairly connect with what he does call magic. That connection may be made for two reasons – that to us the ideas in question are in fact excluded from science, and that for Galen's contemporaries, the ideas in question were considered as part of magic. This is the complex of ideas gathered under the heading συμπαθεια, an important concept for Pliny, e.g. (*H.N.* 24.1-5). Moreover, like the Hippocratic writer of *Sacred Disease*, who does not reject all traditional beliefs,⁷ Galen adopts the bulk of his recipes from numerous earlier writers.⁸ This is because they

⁵ Cp. also *De comp. med. per gen.* 1.2 (13.367-71 K.).

⁶ Cp. *De comp. med. sec. loc.* 2.1 (12.501 K.): τὸν μὲν γὰρ καθόλου τῆς ἰάσεως σκοπὸν ἐκάστου τῶν παθῶν ὁ λόγος ἡμᾶς διδάσκει, τὰς δὲ τῆς ὑλῆς δυνάμεις ἡ πείρα.

⁷ Cp. Lloyd (*supra*, n. 4) pp. 29-32 on Herodotos, 39-40 on *Sacred Disease* itself, and 41-6 on other Hippocratic authors.

⁸ Cajus Fabricius, *Galens Exzerpte aus älteren Pharmakologen*, *Ars Medica* II, 2, Berlin-New York, de Gruyter, 1972, pp. 41-55.

amount to accumulated πείρα, as he notes, *De comp. med. sec. loc.* 7.4 (13.75K.).⁹ Certain earlier writers known to Galen, such as Mantias, Heraclides of Taras, Heras, and Andromachos, were guarantors of the experience that their recipes worked: *De comp. med. per gen.* 2.5 (13.502-3 K.).

Deep Backgrounds

The backgrounds of Galen's attitude and of his practice are very deep. It is important to review these in order better to see just where Galen stands, and how that stance can be both magical and rational.

Even animals make use of herbal remedies – there is the famous tale in Theophrastus about goats eating dittany to expel arrows (*HP* 9.16), which perhaps only Pliny (*H.N.* 25.92) ever believed. But in fact another species of our genus *homo*, the chimpanzee,¹⁰ does medicate itself herbally for diarrhea, at least (using a species of *Vernonia*),¹¹ and for other illnesses with species of *Aspilia*.¹²

We know that the Neanderthals living in Northern Iraq at Shanidar Cave, about 60,000 years ago, made use of *Achillea* sp., *Centaurea* sp., *Ephedra* sp., etc. Large quantities of their pollens were discovered in a burial, and the flowers had clearly been placed there deliberately at that time.¹³ The particular species found include some with small bright flowers and others whose flowers are not to our eyes especially inviting: beauty of sight or scent may or may not have been the motivation. Many of the plants represented have however a medicinal use in the local traditions. The *Achillea* is widely used, and is known in English as yarrow; the *Centaurea* is com-

⁹ Cp. also *De comp. med. per gen.* 2.5 (13.502 K.).

¹⁰ For that characterization, see Jared M. Diamond, 'The Third Chimpanzee', New York, Harper-Collins, 1992, pp. 15-31.

¹¹ Michael A. Huffman and Mohamedi Seifu, 'Observations on the Illness and Consumption of a Possibly Medicinal Plant *Vernonia amygdalina* (Del.), by a Wild Chimpanzee in the Mahale Mountains National Park, Tanzania', *Primates* 30 (1989) 51-63.

¹² R. W. Wrangham and T. Nishida, '*Aspilia* spp. Leaves: A Puzzle in the Feeding Behavior of Wild Chimpanzees', *Primates* 24 (1983) 276-82.

¹³ Arlette Leroi-Gourhan, 'Le Néanderthalien IV de Shanidar', *Bulletin de la Société Préhistorique Française: Comptes rendus des séances mensuelles* 65 (1968) 79-83. They were present in very large quantities and in clusters: not consistent with wind-blown deposition. (Such species do not grow in caves either, as some have suggested.)

monly known as St. Barnaby's-thistle (in the American West as 'yucca') and the stalks are eaten boiled while the flowers are used medicinally; the *Ephedra* is of course the woody horse-tail, and the source of ephedrine (now produced artificially as pseudophedrine).¹⁴

Every literate culture region provides evidence for herbals from the earliest literate times. Three examples will suffice for all. In Mesopotamia, by the early Sumerian period, herbal recipes are recorded as remedies.¹⁵ The remedies are drunk (the herbs being brayed into beer), applied as poultices, or even rubbed onto the skin at the affected spot. This Sumerian practice, like so many others, was taken over by the Semitic peoples of Mesopotamia, who continued to use many of the same ingredients and mixtures.¹⁶ For Egypt we are not as well provided with pharmaceutical information, but it is clear from the data available that there too drugs were sought and used. Late in Egyptian history Homer records the fame of Egyptian ηπενθής (*Od.* 4.221). The few surviving Egyptian medical papyri include the Ebers papyrus which offers a large number of recipes, the principle of whose composition escapes us.¹⁷ The text (dating to ca. 1500 B.C.) contains recipes side by side with incantations and charms, sometimes prefaced with diagnoses (a list of symptoms followed by a statement of cause or at least name).¹⁸ Often the plants cannot now be identified. For China, the earliest herbal is much later, the Pen-Ts'ao (herbal) attributed to Shennung (a legendary ideal bucolic of the fourth century B.C.); the earliest

¹⁴ Ralph Solecki, Shanidar: The Humanity of Neanderthal Man, London, The Penguin Press, 1971, pp. 173-8, pl. 19. *Althea* sp. pollen was also found in large quantities, but not in clusters; as hollyhock it is widely used as an analgesic. On the medicinal uses of *Achillea*, *Althea*, and *Ephedra* (listed as *Equisetum*), see Richard LeStrange, A History of Herbal Plants, London, Angus and Robertson, 1977, pp. 4-6, 16-18, and 109-10.

¹⁵ Michel Civil, 'Précriptions médicales Sumériennes', *Revue d'Assyriologie* 54 (1960) 57-72; Samuel Noah Kramer, 'The World's Oldest Known Prescriptions', *CIBA Journal* 12 (1959) 16-21; Samuel Noah Kramer, 'First Pharmacopeia in man's recorded history', *American Journal of Pharmacy* 126 (1954) 76-84.

¹⁶ R. Campbell Thompson, The Assyrian Herbal, London, Luzac and Co., 1924; Martin Levey, 'Some objective factors of Babylonian medicine in the light of new evidence', *Bulletin of the History of Medicine* 35 (1961) 61-70.

¹⁷ E. A. Wallis Budge, Divine Origin of the Craft of the Herbalist, London, Society of Herbalists, 1928, pp. 26-35.

¹⁸ The text is transliterated, translated, and commented by H. Grapow, Grundriss der Medizin der Alten Ägypter, vol. 4 and 5, Berlin, Akademie-Verlag, 1958. Grapow rearranges the text by modern medical categories (all recipes dealing with worms, e.g., from P. Ebers and the other medical texts, are gathered). For the Ebers papyrus itself, simply translated, see Bendix Ebbell, The Papyrus Ebers, the Greatest Egyptian Medical Document, Copenhagen, Munksgaard, 1937.

extant herbal is that from the third century B.C., a fragmentary text on silk recording 170 prescriptions for 52 illnesses.¹⁹ The earliest extant complete herbals date from ca. A.D. 225, and employ a principle of cosmic harmony to specify drugs. There are 365 drugs corresponding to the days of the year, divided into *yin* and *yang*, and reacting with one another according to one of seven emotions: their combination must conform strictly to these principles.²⁰ Drugs possess one of the five tastes and one of the four degrees of temperature. In common with the Egyptian and Mesopotamian traditions, diseases were imagined to be caused by evil spirits, who could be driven out with certain drugs. Later, drug-lore was integrated firmly into the Five Phases cycle (analogous to the Greek Empedoklean Four Roots or Elements).²¹

One may note in these three traditions some features parallel to the Greek herbal tradition. The efficacy of many Egyptian and Mesopotamian drugs seems to derive from their names – that is, efficacy derived from puns (as in Plato's *Cratylus*).²² This is of course not surprising in languages ordinarily written with puns (recall that Sumerian and Egyptian were originally pictographic, later writing unpicturable words using puns).²³ The divine source or origin of drugs seems to be, as Budge long ago noted, a theme of early medicine in Egypt,²⁴ but is also found in Mesopotamia,²⁵ and even China (where the 'divine' discoverers are usually interpreted as divinized ancestors).²⁶ This is paralleled in the legend in Homer that Hermes gave Odysseus the *μῶλυ* plant (*Od.* 10.302-6), as well as in Pliny's paeon on the divinely providential origin of herbal medicines (*H.N.* 27.1-3). In the third place, one ought to note the scientific practice of testing drugs (on slaves) employed already in the seventh century B.C. by the Assyrian king Esarhaddon,²⁷ and for Egypt at

¹⁹ Paul U. Unschuld, *Medicine in China: A History of Pharmaceutics*, Berkeley, U. of California Press, 1986, pp. 11-16.

²⁰ Unschuld (*supra*, n. 19) 17, 19.

²¹ Unschuld (*supra*, n. 19) 25-7.

²² Georges Contenau, *La Magie chez les Assyriens et les Babyloniens*, Paris, Payot, 1947, pp. 127-40, 209-223. Paul Ghalioungui, *Magic and Medical Science in Ancient Egypt*, London, Hodder and Stoughton, 1963, pp. 22-5, 35, 142-4 (sec. ed. Amsterdam, Israël, 1973, pp. 5-8, 18, 140-1).

²³ In English one might write 'belief' using pictures of a bee and of a leaf.

²⁴ Budge (*supra*, n. 17) 24-5.

²⁵ Cp. the tree-of-life plant given by the gods to Gilgamesh and stolen by the serpent: Contenau (*supra*, n. 22) 190-1.

²⁶ Unschuld (*supra*, n. 19) 11-13.

²⁷ Ruled 681 to 668 B.C.; his tests are recorded in a letter to Esarhaddon from

least the scientific practice of giving numerical proportions in the drug compositions.²⁸

No doubt all such practices were traditional in the sense that they had evolved slowly – an evolution accelerated and amplified by observation. Natural selection must have played her usual role, midwifing the survival of drug-uses which worked, or at least did no harm, and the co-eval passing away of deleterious drug-uses. At this stage, theory seems an epiphenomenon – practice a chaotic pragmatism.

Greek Background

The earliest Greek records show a similar use of herbal drugs: *Il.* 4.191, 218, 5.900, 11.844-8, etc. The locus of the knowledge was the famous *ρίζοτόμοι*.²⁹ The earliest Greek writer on plants known to us is Menestor of Sybaris, a Pythagorean (DK⁶ 32), who seems to have had a theory that plant properties derive from their degree of heat/cold (Theophrastos, *CP* 1.21.5-7 preserves the only significant fragment). The Hippocratic corpus (better: cycle) prefers diet to drugs, and such drugs as are used are mainly evacuants of one exit or the other.³⁰ Although no Hippocratic herbal as such exists (and probably never existed), over two hundred different plants are mentioned in the corpus as having medicinal use.³¹ Drugs are rarely mentioned in the case books (*Epidemics*), probably because they formed part of the diet for the most part,³² but one must keep in mind that the *Epidemics* are clearly *selected* cases (and the criteria of selection may have included such statements as 'diseases so severe that drugs mattered not'). The various writers specify plants without description, in contrast to, say, Theophrastos' specifications; they also never mention any of the 'magical' practices associated with many herbs, which Theophrastos records.³³

Adad-shum-usur: Robert H. Pfeiffer, *State Letters of Assyria*, American Oriental Series, vol. 6, New Haven, American Oriental Society, 1935, p. 204 (# 294).

²⁸ John F. Nunn, *Ancient Egyptian Medicine*, Norman OK, U. of Oklahoma Press, 1996, pp. 140-3.

²⁹ G. E. R. Lloyd, *Science, Folklore, and Ideology: Studies in the Life Sciences in Ancient Greece*, Cambridge, Cambridge U. Press, 1983, pp. 120-35.

³⁰ Jerry Stannard, 'Hippocratic Pharmacology', *Bulletin of the History of Medicine* 35 (1961) 497-518; Peter Brain, 'The Hippocratic Physician and his Drugs', *CP* 77 (1982) 48-51.

³¹ Collected by J. H. Dierbach, *Die Arzneimittel des Hippokrates*, Heidelberg, Groos, 1824. He lists 213 plants (of which ca. 50 to 70 are 'food' items of one sort or another), plus 68 resins, minerals, etc. (also water, milk, and honey).

³² As Stannard (*supra*, n. 30) 510-3 argues.

³³ Lloyd (*supra*, n. 29) 126-35.

Hippocratic and other Greek medicine included treatments by three sorts of healers. There were the naturalistic *ἰητροί* of the Hippocratic treatises, who emphasized regimen and resorted when necessary to drugs and surgery. There were the priests of Asklepios who seem to have used similar means, validated by visions.³⁴ And third, although often denied, it is clear that there existed healers who made use of what Edelstein portrays as religious rationalism or rationalistic supernaturalism,³⁵ and who made use of charms (*ἐπαοιδαί*) and purifications (*καθαρμοί*) in addition to dietary regimen.³⁶ The boundaries between these practices were porous, and the same patient might consult one of each; the same drug might be prescribed by each.

The earliest Greek herbal known is the now lost work of Diocles (ca. 340 B.C.).³⁷ The earliest work of which we can form any impression is by Theophrastos (*HP* 9, ca. 297 B.C.).³⁸ This includes a number of herbal drugs which would have effects more or less as claimed, plus a number of euthanasic potions, and some extraordinary tales. Theophrastos recognized that herbal effects could vary with the part of the plant, season of collection, and the particular patient.³⁹ As noted, he provides (in the earlier books of the *HP*) careful descriptions and distinctions of the plants (in contrast to the relatively off-hand references in Hippocrates). On the other hand, in *Characters* 16.2, 10, 14, Theophrastos describes the magico-religious use of plants by the superstitious man.

A few summary remarks on the pharmacy of this period of Greek medicine are possible. One notes first the use by preference for simples, that is, the relative avoidance of complex mixtures (in contrast to Egyptian, Mesopotamian, and Chinese practice). Nonetheless, when mixtures are prescribed, proportions are given (as in the Egyptian recipes). Drugs seemed to have been used to a

³⁴ Pindar, *Pyth.* 3.51-3 refers to Asklepiian treatment by drugs and surgery, and by charms and amulets. Cp. the scene in Aristophanes, *Plutus* 653-747. See Lloyd (*supra*, n. 29) 40-1.

³⁵ Edelstein (*supra*, n. 3) (1967) 208-19.

³⁶ Cp. even Sophokles, *Rhizotomoi* as preserved in Macrobius, *Saturnalia* 5.19.9-10. See Lloyd (*supra*, n. 29) 40, 44.

³⁷ Max Wellmann, 'Die älteste Kräuterbuch der Griechen', in Festgabe für Franz Susenhihl, Leipzig, Teubner, 1898, repr. Aalen, Scientia, 1985, pp. 1-31.

³⁸ John Scarborough, 'Theophrastus on Herbs and Herbal Remedies', *Journal of the History of Biology* 11 (1978) 353-85.

³⁹ Lloyd (*supra*, n. 29) 125.

relatively lesser degree than dietetic methods, but no rigid distinction can be drawn, as so many of the herbal remedies were to some degree food plants. And finally, in Hippocrates and Theophrastos one notes a tendency to reject or avoid folkloristic practices (collection rituals, etc.), while relying on the folkloristic data about drugs' effects.⁴⁰

Herophilos of Chalcedon, the bold provincial famed for vivisection, is also known for his aphorism that 'drugs are the hands of the gods'.⁴¹ (Galen approves, so long as they are properly used: *De comp. med. sec. loc.* 6.8 [12.965-7 K].) Drugs were, according to Herophilos, to be tested by use and experience; most of his prescriptions were still simples, though compounds play a larger role than formerly. His followers, the Herophilicans, preserved this interest of his from the middle of the third century B.C. to the middle of the first century A.D.⁴²

The neopythagorean Bólos of Mendes, writing as 'Demokritos', composed the earliest book of alchemy around 200 B.C.; he also wrote a book on plants in which he claimed to find evidence of a *συμπάθεια* between different plants, and between certain plants and other parts of nature.⁴³ This doctrine was used to justify claims of efficacy for which there could be no simple or physical explanation - plant and animal substances had powers in medicine (and elsewhere) which could be deduced from this totalizing principle, rather than from experience. Pliny 24.160-6 lists a number of Bólos' plants and their magic.

The next stage in the development of Greek pharmacy was the polypharmacy of 'theriac', known especially from the poems of Nicander of Colophon (ca. 180 to ca. 136 B.C.).⁴⁴ No doubt

⁴⁰ John M. Riddle, 'Folk Tradition and Folk Medicine: Recognition of Drugs in Classical Antiquity', in John Scarborough (ed.), *Folklore and Folk Medicines*, Madison, American Institute of the History of Pharmacy, 1987, pp. 33-61 (repr. as # XIV in *Quid pro Quo: Studies in the history of drugs*, Brookfield, VT, Ashgate, and Hampshire, Variorum, 1992).

⁴¹ T248-9 in Heinrich von Staden, *Herophilus of Chalcedon*, Cambridge, Cambridge U. Press, 1989. See also the preface of Scribonius Largus.

⁴² von Staden (*supra*, n. 41) 400-1, 450-1.

⁴³ Max Wellmann, *Die Georgika des Demokritos*, Abhandlungen der Preussischen Akademie der Wissenschaften, Philologisch-Historische Klasse, 1921, no. 4, see esp. pp. 21-22; J. H. Waszink, 'Bólos', *RAC* 2 (1954) 502-8; W. Burkert, 'Hellenistische pseudo-pythagorica', *Philologus* 105 (1961) 16-43, 226-46.

⁴⁴ See A. S. F. Gow and A. F. Scholfield, *Nicander: The Poems and Poetical Fragments*, Cambridge, 1953; and Peter K. Knoefel and Madeline C. Covi, *A Hellenistic Treatise on Poisonous Animals*, Lewiston, Mellen Press, 1991.

Nicander had sources and forebears – these are lost and scholars debate whether to blame a shadowy follower of Bôlos, one Apollodoros of Alexandria (fl. ca. 180 to ca. 150 B.C.),⁴⁵ or the obscure physician Numenius of Herakleia.⁴⁶ Nicander records rhythmic recipes for use in case of snake bite (as none were serum anti-venom, they would have had at best a stimulant effect), making use of dozens of herbs. He assumes knowledge of the plants (since he does not describe any), lavishing his metaphors rather on the beasts and their bites.⁴⁷ Why polypharmacy? Perhaps the implicit theory was again sympathetic – each plant had some antipathy to the poison of the beast – mix them all for greater power. In magic as in law, repetition and composition increase efficacy.

Theriac engendered acceptance of polypharmacy; Mantias the Herophilean (ca. 165 to 90 B.C.) advanced polypharmacy from theriac to therapy.⁴⁸ Galen records that he was the first to emphasize strongly the use of compound drugs (*De comp. med. per gen.* 2.1 [13.462 K.]). This was *not* the price of uncertainty; rather it was I believe a consequence of the theory of magical sympathy and a typically Hellenistic trend towards the complex and the manifold. He was also the first to write on pharmacy according to the affected places (Galen, *De simpl. med. fac.* 6 pr. [11.794-5 K.]), and seems to have focussed more on the recipes than the etiologies. One might note that it was in this era of polypharmacy, the era of Nicander and Mantias, that Attalos III of Pergamon is recorded as using

⁴⁵ M. Wellmann, 'Apollodoros (69)', *RE* 1.2 (1894) 2895 claims him as the source for all later 'iologues'; cp. Pliny 24.167 (Apollodoros a follower of 'Demokritos') and Aelian, *HA* 8.7.12. I place him ca. 180 to 150 B.C. as being between Bôlos and Nicander.

⁴⁶ Hans Diller, 'Numenius (7a)', *RES.* 7 (1940) 663-4 makes Numenius' *Theriaka* the source of Nicander. Numenius' date is a problem: he is the student of Dieuches the 'dogmatic' dietician – see M. Wellmann, 'Dieuches (3)', *RE* 5.1 (1905) 480 – who is himself conventionally dated by his position in two lists given by Galen, *De simpl. med. fac.* 6 pr. (11.795 K.) and *Comm. in Hipp. Nat. Hom.* (15.136 K.). But the lists are inconsistent with one another, and are clearly *not* meant to be chronological (cp. 11.795-6 K.). Pliny, *HN* 23.60 (cp. Diosc., *MM* 5.14) has Dieuches refer to Hippocrates and his successors as *antiqui*, which suggests a later rather than an earlier date. Even if Dieuches' date were established, calling Numenius his student proves little: in his MSS, Heron of Alexandria, fl. 55 to 68 C.E., is called the student of Kresibios (fl. 260 B.C.).

⁴⁷ John Scarborough, 'Nicander's toxicology, I: snakes', *Pharmacy in History* 19 (1977) 3-23; *idem*, 'Nicander's toxicology, II: spiders, scorpions, insects, and myriapods', *Pharmacy in History* 21 (1979) 3-34, 73-94; Jean-Marie Jacques, 'Nicandre de Colophon, poète et médecin', *Ktema* 4 (1979) 133-49.

⁴⁸ von Staden (*supra*, n. 41) 515-8.

criminals to test his recipes (Galen, *De comp. med. per gen.* 1.13 [13.164 K.]), just as Esarhaddon had, some five centuries prior. Moreover, it is clear that polypharmacy was not solely the province of sectarians and sycophants. Mantias' pupil Heraclides of Taras (fl. 75 B.C.) who became an empiric, had absorbed the flavor of the age and retained its polypharmacy.⁴⁹

The later herbals of the Hellenistic era are mainly lost, but represented for us by Scribonius (under Tiberius), Thessalos of Tralles (Claudius or Nero), Dioscorides (under Nero), and Pliny (A.D. 77). Dioscorides arranged his herbal according to the plants' properties, i.e., their *dunamis* in the body (Diosc. *MM* pr.3, 5).⁵⁰ For example, 'drying' substances are collected together, as again are those 'heating' (cp. Galen, *De simpl. med. fac.* 1.2-20 [11.382-416 K.]).⁵¹ This is system in the service of sympathy, magic made methodical. Pliny, on the other hand, is so catholic as to be deceptive, and so epitomized as to be befuddling. Consider for example the rendering (or rather rending) of Theophrastos, *H.P.* 9.16, in Pliny *H.N.* 25.92 – the source is clear but the method is not.⁵² Pliny depends almost wholly on literary sources (contrast Dioscorides); *auctoritas* and the magnitude of his task have overwhelmed autopsy. Like Theophrastos, he acknowledges the value of data gathered from folk wisdom. He also, as noted above, includes much from the realms of magic and sympathy. This is all in stark contrast to the sober and rational Scribonius who smoothly melds book-learning with practical experience.⁵³ Thessalos is the most magical – he writes about the astrologic *συνάθροια* of 12 zodiacal herbs and 7 planetary plants.⁵⁴

⁴⁹ Karl Deichgräber, *Die Griechische Empirikerschule*, Berlin, Weidmann, 1930, pp. 186-7 (irr. 193-202); see esp. Galen, *De comp. med. per gen.* 2.5 (13.502 K.), *De comp. med. sec. loc.* 6.9 (12.989 K.). See also H. Gossen, 'Herakleides (54)', *RE* 8.1 (1913) 493-6.

⁵⁰ John Scarborough and Vivian Nutton, 'The Preface of Dioscorides' *Materia Medica*: Introduction, Translation, and Commentary', *Transactions and Studies of the College of Physicians of Philadelphia* ser. 5, vol. 4 (1982) 187-227.

⁵¹ John M. Riddle, *Dioscorides on Pharmacy and Medicine*, Austin, U. of Texas Press, 1985, pp. 168-76.

⁵² Lloyd (*supra*, n. 29) 143-4.

⁵³ Cp. John Scarborough, 'Pharmacy in Pliny's Natural History: Some observations on substances and sources', in Roger French and Frank Greenaway (ed.), *Science in the Early Roman Empire: Pliny the Elder, his Sources and Influence*, Totowa, NJ, Barnes and Noble, 1986, pp. 59-85.

⁵⁴ Hans-Veit Friedrich, *Thessalos von Tralles: griechisch und lateinisch*, Beiträge zur klassischen Philologie, 28, Meisenheim am Glan, Anton Hein, 1967. See also John Scarborough, 'The Pharmacology of Sacred Plants, Herbs, and Roots', in C. A. Faraone and Dirk Obbink (eds.), *Magika Hiera: Ancient Greek Magic and Religion*, New York/Oxford, Oxford U. Press, 1991, pp. 138-74.

Galen's Context and Contribution

In the second century A.D., the related issues of authority and transcendence came gradually to dominate most intellects. Men from M. Aurelius to Montanus saw the real world as petty and horrid, and turned instead to the divine, resignedly or enthusiastically as the case may be. Galen too was afflicted, though his case was mild. His authorities were Plato and Hippocrates in harmony – his transcendent was the demiurge who created all things 'for the best' (a teleologic Zeus). [That Galen's case was mild may be seen from remarks he makes against those who irrationally accept claims based solely on tradition (e.g., *Puls. Diff.* 2.4 [8.579 K.], 3.3 [8.657 K.]) and from the fact that he refuses to accept an arbitrary supreme being (*Us. Part.* 11.14 [3.905K.]).]

Galen, in seeking an authority in medicine, sought one who would seem an outstanding doctor, yet no mere doctor. Plato, who in the second century A.D. was the most admired philosopher of antiquity, had praised Hippocrates. And just as Galen was (or thought he was) both doctor and philosopher, so he could see Hippocrates in a like light. Galen seems to have felt that by investigation he had established that indeed Hippocrates was reliable.⁵⁵ But as a result, Galen was forced to examine the Hippocratic corpus rather critically, to excise portions providing contrary data. On the other hand, his interpretation of the portions he did include is rather like the Stoic reading of Homer: less *exegesis* than *eisegesis*. (That is, just as the Stoic allegorizers insisted on reading their pneumatic and perfect divinity into the deeds and misdeeds of Zeus and family in the epic cycle, so Galen read his philosophic and Platonic father-doctor into the polyphony of the Hippocratic cycle.)

In his own pharmaceutical work, Galen betrays little that is explicitly Hippocratic, much that is steeped in notions of sympathy. Yet his presentation may readily mislead readers of a more materialistic age (or at least one less pneumatic and less sympathetic). If we examine his theories, and a few of his prescriptions, we can however see clearly his debt to his age and his predecessors.

⁵⁵ G. E. R. Lloyd, 'Galen on Hellenistics and Hippocrateans: Contemporary Battles and Past Authorities', *Galen und das hellenistische Erbe*, *Sudhoff's Archiv: Beihefte*, 32, Stuttgart, Steiner, 1993, pp. 125-43 (repr. in G. E. R. Lloyd, *Methods and Problems in Greek Science*, Cambridge, Cambridge U. Press, 1991, pp. 398-416).

First, in *De simpl. med. fac.* ('On the Mixing and Powers of Simples'), Galen advances three interlocking theories. First, the four main alterations (*ἀλλοιώσεις*) are the familiar heating/cooling and wetting/drying pairs. All others, such as softening/hardening, are to be explained in terms of these basic four: *De simpl. med. fac.* 5.26 (11.784-6 K.), and all of Book 4 (11.619-703 K.). Second, each plant or other medicinal material has a degree of effect (which he calls a *τάξις* or *ἀπόστασις*), from zero to four or five (the greatest): *De simpl. med. fac.* 1.27 (11.428-30 K.), 3.10 (11.560-1 K.), and 5.27 (11.786-8 K.); also *De comp. med. per gen.* 1.2 (13.367-9 K.).⁵⁶ For example, water is cooling degree zero (neutral), while rose-water is first-degree cooling; alum is third-degree drying; opium is fourth-degree cooling. Mixtures, he hints in *De simpl. med. fac.*, will have intermediate degrees: *De simpl. med. fac.* 1.4-8 (11.385-97 K.) of different sorts of water, 1.29 (11.433 K.), and 3.12 (11.565-70 K.).⁵⁷ Third, these degrees of affect of the four primary *ἀλλοιώσεις* are to be measured by human measure: *De simpl. med. fac.* 3.9 (11.557-60 K.), 3.13 (11.570-3 K.). This measure is by preference and ideally to be taken first by an unbiased and healthy observer and then by a sick one: *De simpl. med. fac.* 1.21 (11.416-9 K.).

These theories are fitted with (not really proven by) a heterogeneous collection of data in *De simpl. med. fac.* 6-11 (11.789-12.377 K.). These amount to Galen's *materia medica*. Books 6 to 8 are the herbal, Book 9 the mineral, and Books 10 and 11 the animal *materia medica*. It is in the last two that one sees most clearly Galen's tendency to accept certain remedies of magical or quasi-magical character. He speaks against *γοητεία*, quite firmly, but he often accepts magical remedies from authoritative predecessors, while interpreting them according to his system.

In writing against the use of magical remedies, Galen singles out two authors for especial execration: Xenocrates and Apollonios. These will be Xenocrates of Aphrodisias, who around the time of Nero wrote a book *On Useful Things from Living Beings* (extracts of which survive in *De simpl. med. fac.* 10.1-2),⁵⁸ and the Herophilean

⁵⁶ Georg Harig, *Bestimmung der Intensität in Medizinischen System Galens*, Akademie der Wissenschaften der DDR: ZIAGA, Schriften zur Geschichte und Kultur der Antike, 11, Berlin, Akademie-Verlag, 1974, pp. 117-33.

⁵⁷ One is reminded of the slightly later Chinese theory of herbal mixtures (*supra* nn. 20-21), according to which they have degrees of taste and temperature, and must agree in terms of the seven emotions.

⁵⁸ Fridolf Kudlien, 'Xenokrates (8)', *RE* 9A.2 (1967) 1529-31. The only verbatim extract is *De simpl. med. fac.* 10.2 (12.261K.).

Apollonios Mys, of the late first century B.C.⁵⁹ Xenocrates prescribed eating certain parts of people – that is horrid. Galen exclaims, as are his prescriptions of drinks of sweat, urine, menses, and earwax.⁶⁰ Xenocrates claims absurd efficacies, such as being able to win in court, or literally steal your opponent's voice, or cause an abortion, or prevent conception, etc. (*De simpl. med. fac.* 10.1 [12.251-2 K.]): these are among the claims of magicians. The implicit theory of Xenocrates, which Galen does not bother to explain, must be that such materials carry, as does blood, some part of the life-force of the person. Galen rejects the use of various effluvia, such as urine and sweat (*De simpl. med. fac.* 10.2.14 [12.283 K.]), bladderstones and pus (*De simpl. med. fac.* 10.2.17 [12.290 K.]). In each case, there are more efficacious (ordinary) remedies to hand, and the fluids (sweat and pus, at least) are described as materials fit only for magic (γοητεία). The same is said of such matters as crocodile blood (*De simpl. med. fac.* 10.2.6 [12.263 K.]) and mouse feces (*De simpl. med. fac.* 10.2.28 [12.307 K.]). Apollonios Mys is elsewhere quoted without opprobrium (e.g. *De comp. med. sec. loc.* 2.1 [12.510 K.] of castor oil, 3.1 [12.614-5 K.] remedies for caraches). But his prescription for dandruff (ἄχωρ), involving having bull or camel urine poured over the head, is unendurable to a pure person (καθάρτος ἄνθρωπος): *De comp. med. sec. loc.* 1.8 (12.476-7). And for inflammations of the uvula (γαργαρεῶν), Apollonios prescribes drinking donkey-urine, but Galen is sure that almost all would sooner die than drink donkey urine: *De comp. med. sec. loc.* 6.8 (12.983).

On the other hand, Galen frequently quotes such remedies himself, fitting them to his theory, and excusing their presence by claiming they are not βδελυρός (disgusting). He speaks this way of urine and feces; he also records a magical charm using spit against scorpions, and one using crayfish against rabies, each of whose efficacy he explains.

In *De simpl. med. fac.* 10.2.15 (12.284-8 K.), Galen discourses on urine. One can tell by their smell that human urine is the weakest

⁵⁹ M. Wellmann, 'Apollonios (103)', *RE* 2.1 (1895) 149-50; von Staden (*supra* n. 41) 540-554.

⁶⁰ Galen, *De simpl. med. fac.* 10.1 (12.248-50). In fact, for Galen, eating feces and drinking menses are even worse (μείζον ὄνειδος) than homosexuality, and just as φοινικίζειν is worse than λεσβιάζειν, so coprophagy is worse than menses-drinking.

of them all (save that of castrated pigs), while that of wild boars is strongest of all (284-5 K.). To drink such urine is horrid, as is shown by an anecdote about a certain worthy man (τις ἀνὴρ ἀξιόλογος ἦθει καὶ βίω). While in Syria and suffering from the plague, he wouldn't even drink boys' urine, which many others drank and claimed had saved them (285 K.). It does have a cleansing power, as one can tell by its use among the fullers (γναφεῖς). In fact doctors smear it on skin diseases (ψώρα and λέπρα) and pour it on suppurating sores; they cure dandruff (ἄχωρ and πίτυρον) and infected ears with it. Galen rejects most of this as there are better medicines to hand. But even Galen has often cured sores on the toes, and even on the lower body (but never higher), by prescribing that the sufferer urinate on the sore (285-6 K.). Galen claims that the medicine called χρυσόλλα, made from boys' urine, and for which he gives a precise and full recipe, is the best cure for resistant sores. It works well he claims, and has no βδελυρία (286-7 K.). The white matter settling out of urine is said by some to be good for ἐρυσίτελας, which is wrong since both urine and ἐρυσίτελας are hot in nature; likewise it is not necessary to drink boys' urine for ὀρθόπνοια: it does not work, and there are other medicines which do work (286-7 K.).⁶¹

Galen's use of feces is likewise ambiguous: he devotes over a quarter of book 10 to this material, yet either denies its efficacy, or damns it with faint praise. Feces has a most powerful expulsive force, though human feces is disgusting (βδελυρά) due to its smell. The feces of cows, goats, ground-crocodiles, and dogs (fed on bones) does not stink, and has been proven useful by Galen and others (*De simpl. med. fac.* 10.2.18 [12.290-1 K.]). He knows about the use of dog feces from one of his teachers, who fed the dogs only bones for two days straight, and thus obtained feces which were hard, white, and not stinking. It is used after drying for severe sore throat (συνάγχη), δυσεντερία, and the oldest sores. Galen again gives full and precise recipes (*De simpl. med. fac.* 10.2.19 [12.291-2 K.]). Even human feces can be used successfully; Galen records a case in which a boy, fed a restricted diet of lupines and mildly-salted, leavened pan-bread, produced feces useable just as dog-feces are (*De simpl. med. fac.* 10.2.20 [12.293-5 K.]).⁶²

⁶¹ Cp. also *De simpl. med. fac.* 10.2.14 (12.283-4 K.) where Galen prescribes the mixture of sweat and dirt called κονίσσαλον for curing unnatural tumors. Diosc. 2.81.2 gives recipes using boys' urine as a cure for skin diseases, dandruff, sores, etc.

⁶² Cp. also Archigenes' use of canine and human feces for scabs in the mouth:

Galen provides a few charms. In *De simpl. med. fac.* 10.16 (12.288-90 K.), he records the observation that nurses use their saliva to treat the λειχήν (apparently a dry rough redness) on their little charges, and Nicander's observation that saliva kills poisonous beasts (evidently saliva is cold and wet, while poison – and λειχήν – is hot and dry). [Someone once showed Galen an incantation (ἐπωδή), which he said thrice, spitting each time, and so killed a scorpion. But Galen later saw the same thing done without the incantation; and the spat-upon scorpions died more quickly from the saliva of thirsty or hungry people.] The saliva itself must have some anti-venom force. Likewise, Galen records the magical recipe of his teacher, Aischrion of Pergamon, which Pelops (another teacher) did not refute but explained (*De simpl. med. fac.* 11.24 [12.356-9 K.]). This involved the use of crayfish (ποταμῖος καρκίνος) as a remedy for rabid-dog bites.⁶³ One ashes the living crayfish in a red copper bowl, which Aischrion always did after the rising of Sirius, when the sun was in Leo, and the moon on her eighteenth day. Used for forty days, it always worked. Pelops explained this by saying that the crayfish, being aquatic, works in this recipe against rabies, since those afflicted fear water (a clear principle of ἀντιπάθεια). One does not use saltwater crayfish, as saltwater contains salt, a very drying substance. Therefore, the freshwater crayfish ashes absorb and expel the poison. So says Pelops, but Galen does not accept this; rather he believes that the crayfish in its own unique nature confers a benefit; in any case, he has seen it work.⁶⁴

Throughout these sections of *De simpl. med. fac.*, one is reminded of the widespread magical belief in the power of ordure and other

De comp. med. sec. loc. 6.7 (12.954-6 K.). Other feces are also useable – that of doves is quite useful, *De simpl. med. fac.* 10.25 (12.302-3), and that of the ground-crocodile is used by women for the face (!) and is good for ἑφηλῖς (freckles?), ἀλφός (white leprosy?), and λειχήν (mentagra?): 10.29 (12.207-8 K.).

⁶³ The same efficacy is claimed for the same animal, but without the magic, by Diosk. 2.12.

⁶⁴ Two other clear examples of sympathetic magic should be mentioned. In *De simpl. med. fac.* 11.1.1 (12.311-20 K.) on viper meat, Galen remarks that it is efficacious against ἐλεφάς (true leprosy?), an efficacy proven by several anecdotes and experiences which Galen details. And in *De simpl. med. fac.* 11.1.10 (12.335 K.), Galen rejects the eating of cooked liver of a rabid dog as a cure for their bite – those on whom this worked had used other medicines, while some of those who used only this died.

bodily effluvia.⁶⁵ Galen supports his practices by appeals to experience and suppresses (for the most part) the explicitly magical theory. But he does retain the traditional magical practices in not a few cases.

In his second pharmaceutical work, *De comp. med. per gen.*, Galen explains why polypharmacy is appropriate within his system, and recognizes the importance in polypharmacy of getting the proportions right. Any system in which mixtures are held efficacious in virtue of their being a certain mixture, and which bases that claim on some rational theory, will require that proportions be indicated. As noted above, the Egyptians had long ago begun to give proportions (though in their case, it is not clear on what basis). Galen notes the contribution of Menekrates (A.D. 25 ± 25) who wrote out his numerals to preserve them, but his manuscripts were afflicted with copyists all the same.⁶⁶ Damocrates (fl. 65 ± 10 A.D.) wrote his prescriptions, as had Nicander, in verse. Galen approves the use of hexameters to preserve the written-out numerals, and quotes many of Damocrates' verse-prescriptions (but Galen does not give his own recipes in verse): *De comp. med. per gen.* 7.9 (13.991-6).⁶⁷

There are many prescriptions by Galen (and even more by predecessors) in *De comp. med. per gen.* An example of a prescription by Galen will illustrate his procedure and method in justifying polypharmacy: *De comp. med. per gen.* 1.4 (13.375-94). Here Galen gives the recipe for his tested multi-use plaster, which draws together, and forms scabs on, wounds and sores, and is used even by Empirics. First, the best drugs found by doctors are those mixed of opposing powers (375.7-8 K.), and second, 'reason discovers the mixture while experience judges its virtue' (376.2-3 K.). The basis is alum and palm juice (in which there is a dispelling and a styptic power) and old oil or fat (in which there is a sweat-raising power); to these one adds a bit of litharge (for drying), a bit of wine or vinegar (cooling and astringent), and a bit of myrtle or apple or quince (375-6 K.). It turns out that in fact the palm is to be added by stirring the mixture with a fresh palm branch (378 K.).⁶⁸ To kill pain,

⁶⁵ On which cp. Walton Brooks McDaniel, 'The Medical and Magical Significance in Ancient Medicine of Things Connected with Reproduction and Its Organs', *Journal of the History of Medicine and Allied Sciences* 3 (1948) 525-46.

⁶⁶ Hans Raeder, 'Menekrates (28)', *RE* 15.1 (1931) 801.

⁶⁷ Max Wellman, 'Damocrates (8)', *RE* 4.2 (1901) 2069-70.

⁶⁸ This seems rather like a traditional magical procedure, rationalized by Galen.

one adds mandrake, henbane, or opium (385-7 K.). The mixture is to be altered as needed for use with those of a weaker constitution (391 K.). Thus one sees that despite (later) rightly advocating precision in recipes, Galen here in practice allows the attending physician to compound the plaster almost entirely *ad hoc*. The principle of the composition is maintained: the simples (here alum, palm juice, etc.) have each their characteristic powers, and the compound is made simply to have all those powers present in a single substance.

His system becomes clearer from the recipes in his third book, *De comp. med. sec. loc.*, in which he gives prescriptions for medicines categorized by their application to specific places, i.e., affected parts. He begins with the head, and particularly with the bald head, giving a recipe for ἀλωπεκία in a lengthy pair of chapters: *De comp. med. sec. loc.* 1.1-2 (12.379-421 K.). Most of the section is taken up with old recipes from such worthies as Heras, Criton, Heraclides of Taras, Cleopatra, Archigenes, Asklepiades, and Soranos (398-420 K.). These are implicitly held to be validated by experience (i.e., the experience of the trusted authorities from whom they are quoted), so that none of Galen's theory could be seen in them. Again, he allows the attending physician to alter the dosage in response to the effect (395-7 K.). His basic principle is one of συμπάθεια: the hair on the head is like a field of grain, so that treating the scalp as one does the soil should make the hair grow. The ingredients he gives (*De comp. med. sec. loc.* 1.2 [12.393 K.]) are listed in Table I.⁶⁹ It is clear that the theory here is the same: the various powers add up, probably according to their degrees, to produce a compound of the desired effect. Note that the wetting of *thapsia* is counteracted by the drying of *daphninos*; the others produce heat to warm the blood to nourish the scalp and hence grow the hair. Given the fundamental sympathetic-magic assumption (hair is like grass), the rest follows logically.

⁶⁹ For compactness, I use in the table the abbreviation *SM* for *De simpl. med. fac.*

Table I
Galen's treatment for alopecia

cuphorbios : see <i>SM</i> 6.5.24 [11.879] = gum thistle (spurge)
<i>euphorbia resinifera</i> (cp. Diosc. 3.82) ⁷⁰
burning
thapsia : see <i>SM</i> 6.8.2 [11.885] = deadly carrot
<i>thapsia garganica</i> (cp. Diosc. 4.153)
heating and wetting
For the <i>thapsia</i> one may substitute :
kardamos : see <i>SM</i> 7.10.8 [12.11-12] = cress
<i>lepidium sativum</i> (cp. Diosc. 2.155)
burning
euzōmos : = rocket
<i>eruca sativa</i> (cp. Diosc. 2.140)
????
daphninos : see <i>SM</i> 6.4.4 [11.863] = bay laurel
<i>laurus nobilis</i> (cp. Diosc. 1.140) ⁷¹
drying and heating
theion apuron : see <i>SM</i> 9.3.9 [12.217-8] = sulfur
drawing and heating
helleboros : see <i>SM</i> 6.5.9 [11.874] = Christmas rose
<i>helleborus niger</i> (cp. Diosc. 4.162) ⁷²
cleaning and heating
lion fat ; bear fat : see <i>SM</i> 11.1.2 [12.327 ; 331]
hottest ; good for alopecia

⁷⁰ See LeStrange (*supra* n. 14) 117-8.

⁷¹ See James A. Duke, *Handbook of Medicinal Herbs*, Boca Raton FL, CRC Press, 1985, pp. 271-2.

⁷² See Duke (*supra* n. 71) 227, LeStrange (*supra* n. 14) 134-6.

Another recipe from the same work, for toothpaste, shows the same rationalized magical theory at work : *De comp. med. sec. loc.* 5.5 (12.884-6 K.) The ingredients are listed in Table II. Here the styptic and drying powers add, to produce the sympathetically proper effect on teeth, hard and dry. (Note that the drying and heating *honey* cancels the effect of the moistening and cooling *sidêritis* and *perdikias*.) There is also a net cleansing effect from the *sidêritis* and the salt. Galen concludes by noting that as it is altogether drying, one should avoid applying it to the gums.

Table II
Galen's toothpaste

sidêritis : see *SM* 8.18.13 [12.121] = ironwort
sidêritis romana (cp. Diosc. 4.33-5)
cleansing, a bit styptic, mainly moistening, moderately cooling

perdikias : see *SM* 6.5.10 [11.874-5] = helxinê
polygonum maritimum (cp. Diosc. 4.85)
cleansing, lightly styptic, with somewhat cool wetness

salt : see *SM* 9.3.2 [12.210-1]
cleansing and styptic

alum : see *SM* 9.3.30 [12.236-7]
strongest styptic

honey : see *SM* 7.12.9 [12.70-1]
drying, heating

A third point from the same work should be noted. Galen rejects amulets (περίαιτα), since, although proffered by Archigenes the Pneumaticist for headache, they have no medical *logos* to those who have judged by experience. Archigenes claimed that they worked by a 'certain astonishing (θαυμαστή) antipathy unknown to humankind' (*De comp. med. sec. loc.* 2.2 [12.573-6 K.]).

Conclusion

Magic readily entered medicine – remedies from foreigners would easily be seen to be working by magic, if magic be defined (as I would prefer) as 'excluded practices depending for their efficacy on powers in the world beyond human understanding'. Moreover, when we view ancient medicine, many practices not excluded (say by Pliny) strike us as magical, because we would exclude them (amulets and charms, e.g.). Galen seems more in tune with our view, as he rejects amulets, and accepts only those charms or magical practices which he can prove by experience and explain according to his theory of humours and natural powers. Thus spitting on scorpions to kill them works not because of the chant, but because of the medicinal power of saliva, especially that of fasting persons. The crayfish roasting ritual involving astrology Galen explains as efficacious due to the innate nature of crayfish which somehow cures rabies. In particular, his theory is based on the notion that all things have natural powers (by which they live and move), and that these can be used medicinally. The basic powers are Hot/Cold and Wet/Dry (so far Hippocratic), which may be blended by degrees to produce a compound of desired effect. This is essentially a theory of συμπάθεια, and even if not in Galen tricked out with any permeating *pneuma*, is a theory he called rational and which seems magical to us. Surely it is as rational and as magical as the theories of sympathy (based on *pneuma*) according to which astrology works or according to which Thessalos of Tralles prescribed 12 zodiacal herbs and 7 planetary plants.

Within the framework of that theory, Galen proceeds systematically, save when authority intrudes. Feces may have an expulsive force (according to which they are expelled), but no-one need use them, disgusting as they are, since other medicines are available. But, Galen allows the use of the feces of dogs which have been fed only on bones, and claims that their feces is not disgusting. The basis is not his rationalized magical theory of sympathy of powers (Hot/Cold, etc.), but rather his basis for prescribing is the authority of one of his teachers. And urine for sores on the lower body is prescribed on Galen's own authority and experience (yet behind that is the authority of the frequently-cited Apollonios Mys).

His own recipes, as exemplified in the cures quoted for *alopekia* and for teeth, compounded drugs assuming their various sympa-

thetic properties. Yet he also quotes numerous earlier recipes (which do not necessarily follow his theory) – on the basis that authoritative doctors used them.

The tradition of magical thinking, of using charms, amulets, and incomprehensible powers of plants, which began long before Hippocrates, and which reentered Greek medical writing via Bólos, Mantias, and others, continues to flow through Galen. He cleared the muddled waters by filtering out such excluded practices as charms and amulets, for the most part. But he retained the essential notion of the sympathy of plant powers as an irreducible and therefore inherently incomprehensible 'brute fact'. To us, and rightly so, magic ; to Galen, and rightly so, science.

Bibliography

- N. Ben-Yehuda, 'Witchcraft and the Occult as Boundary Maintenance Devices', in Jacob Neusner, E. S. Frerichs, and P. V. McC. Flesher (eds.), *Religion, Science, and Magic: In Concert and Conflict*, New York/ Oxford, Oxford U. Press, 1989, 229-60.
- N. Ben-Yehuda, *Deviance and Moral Boundaries: Witchcraft, the Occult, Science Fiction, Deviant Sciences and Scientists*, Chicago, Chicago U. Press, 1985.
- P. Brain, 'The Hippocratic Physician and his Drugs', *CP* 77 (1982) 48-51.
- E. A. W. Budge, *Divine Origin of the Craft of the Herbalist*, London, Society of Herbalists, 1928.
- W. Burkert, 'Hellenistische pseudo-pythagorica', *Philologus* 105 (1961) 16-43, 226-46.
- M. Civil, 'Prescriptions médicales sumériennes', *Revue d'Assyriologie* 54 (1960) 57-72.
- G. Contenau, *La Magie chez les Assyriens et les Babyloniens*, Paris, Payot, 1947.
- K. Deichgräber, *Die Griechische Empirikerschule*, Berlin, Weidmann, 1930.
- J. M. Diamond, *The Third Chimpanzee*, New York, Harper-Collins, 1992.
- J. H. Dierbach, *Die Arzneimittel des Hippokrates*, Heidelberg, Groos, 1824.
- H. Diller, Numenios (7a), *RE* S. 7 (1940) 663-4.
- J. A. Duke, *Handbook of Medicinal Herbs*, Boca Raton FL, CRC Press, 1985.
- B. Ebbell, *The Papyrus Ebers, the Greatest Egyptian Medical Document*, Copenhagen, Munksgaard, 1937.
- L. Edelstein, 'Greek Medicine in its Relation to Religion and Magic', *Bulletin of the Institute of the History of Medicine* 5 (1937) 201-46, repr. in O. Temkin and C. L. Temkin (eds.), *Ancient Medicine: Selected papers of Ludwig Edelstein*, Baltimore/ London, Johns Hopkins U. Press, 1967, pp. 205-246.
- C. Fabricius, *Galens Exzerpte aus älteren Pharmakologen*, *Ars Medica: Zweite Abteilung: Griechisch-lateinische Medizin*, 2, Berlin/ New York, de Gruyter 1972.
- H.-V. Friedrich, *Thessalos von Tralles: griechisch und lateinisch, Beiträge zur klassischen Philologie*, 28, Meisenheim am Glan, Anton Hein, 1967.
- P. Ghalioungui, *Magic and Medical Science in Ancient Egypt*, London, Hodder and Stoughton, 1963 (2nd. ed., Amsterdam, Israël, 1973).
- H. Gossen, Herakleides (54), *RE* 8.1 (1913) 493-6.
- A. S. F. Gow and A.F. Scholfield, *Nicander: The Poems and Poetical Fragments*, Cambridge, 1953.
- H. Grapow, *Grundriss der Medizin der Alten Ägypter*, vol. 4 and 5, Berlin, Akademie-Verlag, 1958.
- G. Harig, *Bestimmung der Intensität in Medizinischen System Galens*, Akademie der Wissenschaften der DDR: ZIAGA, Schriften zur Geschichte und Kultur der Antike, 11, Berlin, Akademie-Verlag, 1974.
- M. A. Huffman and Mohamedi Seifu, 'Observations on the Illness and Consumption of a Possibly Medicinal Plant *Vernonia amygdalina* (Del.), by a Wild Chimpanzee in the Mahale Mountains National Park, Tanzania', *Primates* 30 (1989) 51-63.
- J.-M. Jacques, 'Nicandre de Colophon, poète et médecin', *Ktema* 4 (1979) 133-49.
- Peter K. Knoefel and Madeline C. Covi, *A Hellenistic Treatise on Poisonous Animals*, Lewiston, Mellen Press, 1991.
- S. N. Kramer, 'The World's Oldest Known Prescriptions', *CIBA Journal* 12 (1959) 16-21.
- S. N. Kramer, 'First Pharmacopeia in man's recorded history', *American Journal of Pharmacy* 126 (1954) 76-84.
- F. Kudlien, Xenokrates (8), *RE* 9A.2 (1967) 1529-31.
- A. Leroi-Gourhan, 'Le Néanderthalien IV de Shanidar', *Bulletin de la Société préhistorique Française: Comptes rendus des Séances mensuelles* 65 (1968) 79-83.
- R. LeStrange, *A History of Herbal Plants*, London, Angus and Robertson, 1977.
- M. Levey, 'Some objective factors of Babylonian medicine in the light of new evidence', *Bulletin of the History of Medicine* 35 (1961) 61-70.
- G. E. R. Lloyd, *Magic, Reason, and Experience: Studies in the Origin and Development of Greek Science*, Cambridge, Cambridge U. Press, 1979.
- G. E. R. Lloyd, *Science, Folklore, and Ideology: Studies in the Life Sciences in Ancient Greece*, Cambridge, Cambridge U. Press, 1983.
- G. E. R. Lloyd, 'Galen on Hellenistics and Hippocrateans: Contemporary Battles and Past Authorities', *Galen und das hellenistische Erbe*, Sudhoff's Archiv: Beihefte, 32, Stuttgart, Steiner, 1993, pp. 125-43 (repr. in G. E. R. Lloyd, *Methods and Problems in Greek Science*, Cambridge, Cambridge U. Press, 1991, pp. 398-416).
- W.B. McDaniel, 'The Medical and Magical Significance in Ancient Medicine of Things Connected with Reproduction and Its Organs', *Journal of the History of Medicine and Allied Sciences* 3 (1948) 525-46.
- John F. Nunn, *Ancient Egyptian Medicine*, Norman OK, U. of Oklahoma Press, 1996.

- R.H. Pfeiffer, *State Letters of Assyria*, American Oriental Series, vol. 6, New Haven, American Oriental Society, 1935.
- H. Raeder, Menekrates (28), *RE* 15.1 (1931) 801.
- J.M. Riddle, *Dioscorides on Pharmacy and Medicine*, Austin TX, U. of Texas Press, 1985.
- J.M. Riddle, 'Folk Tradition and Folk Medicine: Recognition of Drugs in Classical Antiquity', in John Scarborough (ed.), *Folklore and Folk Medicines*, Madison, American Institute of the History of Pharmacy, 1987, pp. 33-61 (repr. as XIV in *Quid pro Quo: Studies in the history of drugs*, Brookfield, VT, Ashgate, and Hampshire, Variorum, 1992).
- J. Scarborough, 'Theophrastus on Herbals and Herbal Remedies', *Journal of the History of Biology* 11 (1978) 353-85.
- J. Scarborough, 'Nicander's toxicology, I: snakes', *Pharmacy in History* 19 (1977) 3-23.
- J. Scarborough, 'Nicander's toxicology, II: spiders, scorpions, insects, and myriapods', *Pharmacy in History* 21 (1979) 3-34, 73-94.
- J. Scarborough and V. Nutton, 'The Preface of Dioscorides' *Materia Medica*: Introduction, Translation, and Commentary', *Transactions and Studies of the College of Physicians of Philadelphia* ser. 5, vol. 4 (1982) 187-227.
- J. Scarborough, 'Pharmacy in Pliny's Natural History: Some observations on substances and sources', in R. French and F. Greenaway (ed.), *Science in the Early Roman Empire: Pliny the Elder, his Sources and Influence*, Totowa, NJ, Barnes and Noble, 1986, pp. 59-85.
- J. Scarborough, 'The Pharmacology of Sacred Plants, Herbs, and Roots', in C. A. Faraone and Dirk Obbink (eds.), *Magika Hiera: Ancient Greek Magic and Religion*, New York/ Oxford, Oxford U. Press, 1991, pp. 138-74.
- R. Solecki, *Shanidar: The Humanity of Neanderthal Man*, London, The Penguin Press, 1971.
- J. Stannard, 'Hippocratic Pharmacology', *Bulletin of the History of Medicine* 35 (1961) 497-518.
- R.C. Thompson, *The Assyrian Herbal*, London, Luzac and Co., 1924.
- P.U. Unschuld, *Medicine in China: A History of Pharmaceutics*, Berkeley, U. of California, 1986.
- H. von Staden, *Herophilus of Chalcedon*, Cambridge, Cambridge U. Press, 1989.
- J. H. Waszink, 'Bolos', *RAC* 2 (1954) 502-8.
- M. Wellmann, 'Apollodoros (69)', *RE* 1.2 (1894) 2895.
- M. Wellmann, 'Apollonios (103)', *RE* 2.1 (1895) 149-50.
- M. Wellmann, 'Die älteste Kräuterbuch der Griechen', in *Festgabe für Franz Susemihl*, Leipzig, Teubner, 1898, repr. Aalen, Scientia, 1985, pp. 1-31.
- M. Wellman, 'Damokrates (8)', *RE* 4.2 (1901) 2069-70.
- M. Wellmann, 'Dieuches (3)', *RE* 5.1 (1905) 480.
- M. Wellmann, *Die Georgika des Demokritos*, Abhandlungen der Preussischen Akademie der Wissenschaften, Philologisch-Historische Klasse, 1921, no. 4.
- R. W. Wrangham and T. Nishida, 'Aspilid spp. Leaves: A Puzzle in the Feeding Behavior of Wild Chimpanzees', *Primates* 24 (1983) 276-82.

IN: GALEN ON PHARMACOLOGY

LA THÉRIAQUE CHEZ GALIEN : SA PRÉPARATION ET SON USAGE THÉRAPEUTIQUE

MICHAEL STEIN

De nos jours, en Europe, il est peu probable que l'on meure à la suite d'une morsure de serpent. Néanmoins, pour cinquante personnes par an, même aujourd'hui les premiers soins arrivent trop tard. Les victimes meurent d'une crise circulatoire générale après la morsure. La situation est différente dans les pays tropicaux où les serpents venimeux constituent une menace importante. Au niveau international, on estime le nombre de morts à la suite d'une morsure de serpent à quarante mille, pour un total d'un million sept cent mille morsures – cela fait un taux moyen de mortalité de deux pour cent environ. En outre, la venimosité varie selon l'espèce de serpent : d'un pour cent pour une morsure de péliade à trente deux pour cent pour le cobra et cent pour cent pour le mamba noir.¹

En Europe, ce sont surtout les vipéridés qui peuvent mordre les gens – notamment pendant la nuit, quand elles se sentent agressées.² Après la morsure d'une vipère, qui se produit surtout aux doigts, à la main ou au bras, la peau autour de la morsure devient rouge. La victime souffre de fortes douleurs. Au bout de trente six à soixante douze heures, autour de la morsure, apparaît un œdème qui est sensible à la pression et qui peut durer plusieurs semaines. Dans de rares cas, un membre doit être amputé. Des microbes et d'autres micro-organismes peuvent infecter la plaie et entraîner des complications. Le venin du serpent ne se contente pas d'agir à l'endroit de la morsure en provoquant une inflammation du tissu ; il peut entrer dans le sang et attaquer l'ensemble des organes humains. Dans le

¹ Voir H. Marquardt, S. G. Schäfer, *Lehrbuch der Toxikologie*, 1. Aufl., Mannheim, Leipzig, Wien, Zürich, Bibliographisches Institut, 1994, pp. 659-60 ainsi que F. W. Oehme, J. F. Brown, M. E. Fowler, 'Toxins of Animal Origin', in L. J. Casarett (ed), Casarett and Doull's *Toxicology: The Basic Science of Poisons*, New York, London, McGraw-Hill, 1980, 557-577.

² Un très bon aperçu, comportant des bibliographies détaillées, se trouve dans D. González, 'Snakebite Problems in Europa', in A. T. Tu (ed), *Reptile Venoms and toxins* (= *Handbook of Natural Toxins*, Vol. 5), New York, Basel, Hong Kong, Marcel Dekker, 1991, 687-751.