The Greek Sense of Smell:

Olfactory Perception and the Sociocultural Roles of Perfume in Antiquity

Submitted as a thesis by Grainne Louise Grant to the University of Exeter for the degree of Doctor of Philosophy in Classics in June of 2014.

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Abstract

Olfactory perception is as sociocultural a phenomenon as it is a physiological one. Scents of all types and the meanings assigned to them contribute to and shape human cultures, and humans have deliberately manipulated smells to sway the opinions and value judgements of others since, at the very least, the dawn of agriculture. 'Smellscapes' define our environments. *How* we smell what we smell and *why* we interpret what we smell the way we do are inextricably intertwined, and this was no less true in the Classical world.

When we study how people in antiquity examined the sense of smell in general and the corresponding roles of perfume in particular, we see many of the same issues and questions being raised as concern scientists today. Applying modern models to ancient practices can enhance insight into Greek and Roman cultures.

This paper will discuss physiological olfactory perception as the authors in the Classical and Hellenistic periods defined and described that, and will examine the primary literature regarding perfume in order to provide a specific example of one way in which we can be initiated into the mysteries of a different and long-gone cultural sensorium through the written word.

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Current Research

In time, as the History of the Senses becomes more prominent among researchers, more work will be done in the field of smell in antiquity and perfume will take its place as the crown jewel of olfactory stimuli. Until then, the relevant data forms more of a patchwork quilt than a straightforward study of the subject. While olfaction in general has engendered a fair amount of interest since the 1900s, and perfume in particular has inspired historians since the late 1890s, scent in a sociocultural context has only recently become of interest to cultural anthropologists and archaeologists, and is still sparsely addressed in modern commentary. Even more rarely is the ancient world ever mentioned in connection with smell.

The definitive work on the subject of smell in the ancient world is a 37-page chapter entitled “The Aromas of Antiquity” in *Aroma: The Cultural History of Smell* (1994) by Constance Classen, David Howes, and Anthony Synnott, in which the authors look at both perfume and other social scents, such as those of the gymnasium, the markets, and the temples in a cultural context. Even the latest historiography of smell from ancient to modern times, *Past Scents: Historical Perspectives on Smell* (2014) by Jonathan Reinarz, ignores the role of scent in Greek and Roman civilization altogether, as the author writes that this “has been efficiently summarized elsewhere” and cites Classen et. al. Sadly, this is the current state of research in this field at this time.

Since 2004, when the Nobel prize in Physiology or Medicine was awarded for discoveries related to odorant receptors and the organization of the olfactory system, olfaction has enjoyed increasing popularity among research scientists. Several recent works have been published in this field, including *Olfaction and the Brain* (2012) edited by Warrick J. Brewer and David Castle, and *Science of Olfaction*

(2011) edited by Michael J. Serby and Karen L. Chobor. Most of these studies are outside the scope of this paper, however. For my purposes here, the work of Trygg Engen, author of *Odor Sensation and Memory* (1991) and *The Perception of Odors* (1982) is particularly valuable, as is a new olfactory model of "memory-based object recognition" proposed by Donald Wilson and Richard Stevenson in *Learning to Smell: Olfactory Perception from Neurobiology to Behavior* (2006). Julius Rocca's investigation of olfaction in Galen in *The Cambridge Companion to Galen* (2008) and Thomas Johansen's work on olfaction in Aristotle in *Aristotle and the Sense Organs* (1998) are vital sources as well, as the olfaction studies of antiquity are more or less ignored by modern research scientists.

'Histories of perfume abound,' according to Jonathan Reinarz, yet these histories generally fail to address the sociocultural role of perfumes in an anthropological context.[1] One excellent source which does this and more is *Perfumery: the Psychology and Biology of Fragrance* (1988), edited by Steve Van Toller and George Dodd, which contains 13 chapters written by the current leaders in olfactory research. For what is happening in perfumery today from a chemical standpoint, *The Secret of Scent: Adventures in Perfume and the Science of Smell* (2006) by Luca Turin is a brilliant insight into the modern industry.

In the field of sensory anthropology, groundbreaking work has been done by biologist D. Michael Stoddart, author of *The Scented Ape* (1990) and various articles regarding scent and the human body, as well as by the 36 authors whose papers make up *The Smell Culture Reader* (2006) edited by Jim Drobnick. Smell anthropology looks at smell as a social phenomenon, not only in terms of cultural perception of odor, but in terms of emotions and experiences associated with smells

as well. These ideas have been extrapolated by the archaeological community, and contemporary sensory research specifically related to smell in the ancient world is being undertaken by archaeologists like Jo Day and Joanne Murphy, whose papers appear in *Making Senses of the Past: Toward a Sensory Archaeology* (2013). These authors look at perfume as an environmental smell and the "imagined aromas" inspired by pots shaped as artificial flowers respectively.

Archaeologists have a unique perspective on perfume through its material culture. Again, this is for the most part outside the scope of this paper, but *unguentaria*, perfume-specific presses and even frescoes tell the stories of perfumeries in antiquity and give us insight into the daily tasks of the professional perfumer. Jean-Pierre Brun's excavations in Paestum and Delos (2000) are particularly relevant here.

At first glance, this variety of fields of research may not seem like pieces to the same puzzle, but as we shall see, all of this disparate information can be brought together to tell a story about both olfaction and the sociocultural role of perfume in antiquity.

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[1] Reinarz, 53.

The Sense of Smell and the Power of Perfume

Of the five senses, the sense of smell has traditionally been the most neglected over time. The marginalisation of olfaction in both physiological and sociological analytical studies is understandable; until recently, no one had more than a vague understanding of exactly how the olfactory process works, and there is still a great deal of debate regarding how humans detect and interpret smells. Additionally, smells are nearly impossible to classify scientifically, defy measurement, are difficult to preserve for any length of time, cannot be transmitted through electronic media, and worse, they translate poorly into words.

All of these considerations have posed problems for researchers since humans have been asking questions about the senses. As a result, smells have been, as anthropologist Anthony Synnott puts it, 'often "overlooked", a phrase which describes the hegemony of sight, and which is part of the problem of olfaction.'[2] And yet, smells are everywhere, even in our post-industrial deodorant-driven Western world.[3] How much truer this must have been in ancient times! In addition to the difficulties outlined above, the most common explanation for the dearth of formal academic investigation prior to the 1970s was that the sense of smell is of little value to modern humans, far less useful to agriculturalists than it was to hunters and therefore relatively unnecessary, biologically speaking. However, this proposition completely conflicts with the data collected by contemporary physical and social scientists alike, as well as with the preponderance of evidence that smells and the meanings socially assigned to them contribute to and shape human cultures.

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[2] Synnott, 1993, 183.

[3] For the purposes of this paper, the terms 'Western', and 'West' will be used in their modern contexts to describe those European countries descended from Greco-Roman culture and the Judeo-Christian tradition, as well as those countries later significantly influenced by Western European immigration (primarily the Americas, Australia, and New Zealand).

Biologist D. Michael Stoddart retorts,

> If the human nose is vestigial, with powers only a fraction of what they were in our distant ancestry, why are humans so concerned about odours? Why is the nose not treated like the appendix – accepted for what it is and let alone? Many poets regularly pay homage to the pleasures gained from the sense of smell but I know of none who writes moving verses about the coccyx…[4]

Stoddart's meaning is well taken. There is no evidence at any point in history that the sense of smell was or is of little value to humans, whether or not it has contributed significantly to their chances for survival, nor is our sense of smell any less acute today than was that of our forebears, although it may be less developed depending on our individual backgrounds. However, as researchers have known for quite some time, 'nose' and 'sense of smell' are not necessarily physiologically synonymous; some 95% of the nasal cavity has nothing to do with the sense of smell.

> The nose is normally mistakenly assumed to be the organ of smell reception. It is not. The primary function of the nose is to regulate the temperature and humidity of inspired air, thereby protecting the delicate linings of the lungs. This is achieved by the breathed air passing through narrow passageways formed by three nasal turbinates in each nostril. The turbinates are covered by spongy vascular cells which can expand or contract to open or close the nasal pathways. The olfactory receptors, innervated by the 1st cranial nerve, are located at the top of the nose…[5]

One could, in other words, lose much of the gross outward physical feature we call a nose, and yet retain some sense of smell. Nevertheless, for most humans, as

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[4] Stoddart, 1990, 8.

[5] Van Toller and Dodd, xii. They are not the first to propose this idea; in the 2nd century AD, Galen argued in *The Olfactory Organ* that this was the purview of the olfactory projections, or turbinates, at

for Stoddart, the nose and the sense of smell remain inextricably linked, and the latter is certainly perceived as being the 'primary function' of the former. Nor should this separation of the 'primary function of the nose' and the ability to perceive odours per se be taken to indicate that the sense of smell itself is or ever was of little importance, a vestigial function of an organ otherwise retaining some biological value. While modern urban city-dwellers may well be far less reliant on their olfactory receptors for sustenance than modern hunters-and-gatherers, and humans in general are far less dependent on odour perception than most animals, it is clear that the human sense of smell has never ceased to play a significant role in daily life, both biologically and socially. We are constantly perceiving, processing, and interpreting smells, and we use them both to gather information and to form value judgements about our surroundings and about each other.

Further, it has long if not always been true that in addition to interpreting the smells we perceive in order to form opinions about the world around us, humans as a species deliberately manipulate smells in order to influence the opinions and value judgements formed by others. Richard Doty, whose studies of natural excretions of the human body such as sweat and breath have shown that 'humans, like many other mammals, have the potential for communicating basic biologic information via the smell medium' also points out that 'human beings, since the dawn of civilization, have used scents to add pleasantness to their environment and to change or mask their own body odours'.[6] In other words, we take pains to alter the information which might otherwise be provided by our bodies and our surroundings by deodorising or reodorising them, changing and/or masking 'natural' smells (often with other less

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the front of the brain, and that the nose itself served as the passage by which smells reached these projections.

offensive natural smells) in an effort to improve them.

Doty's claims are well supported. Both extant literature and archaeological evidence concur that this 'changing or masking' was no less important a process in early civilisations than it is now; even before the advent of writing, a great deal of effort was expended in order to facilitate the manufacture of perfume products which might accomplish this goal. Their production became a skilled professional occupation in many ancient and classical societies, contributing to a variety of supporting industries from wildcrafting to pottery-making and glass-blowing, while their distribution had enormous sociocultural repercussions both economically and in terms of the advancement of general knowledge. Clearly we would not see such interest or investment in aromatics and their respective properties if smells were meaningless or trivial, and certainly the Greeks did not consider them as such, nor did the Romans who assimilated so much of the Greek culture. But how did these people themselves examine and explain the sense of smell in the absence of modern ideas regarding olfactory perception or, lacking current anthropological theories, the corresponding roles of perfume?

The fact that different substances give off perceptible smells which can themselves be differentiated and manipulated by humans, and the differences between odours produced by the body in health or illness, youth or old age, with or without the addition of manufactured fragrant compounds, seem to have contributed significantly to the questions posed by the Greek philosophers, physicians, and natural scientists of the Classical and Hellenistic periods. While the physicians were understandably more interested in gross anatomy and the information provided by their patients' body odours, and the philosophers and natural scientists more curious

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[6] Doty, 1981, 351, 373.

about the nature of smells in general (and, in the case of Theophrastus, perfume in particular), both groups had reasons for exploring the intricacies of human nasal physiology, and many of the issues they raised and discussed continue to preoccupy the scientists of today. These ancient scholars were quite aware of and interested in both smells themselves and the relationships between human body odours, the sense of smell, and fragrant plants, many of which had medicinal properties. Similarly, while social science in general and 'anthropology' in particular were not considered discrete fields of specialised study by either the Greeks or the Romans, a vast number of authors and playwrights recorded a wealth of social customs and cultural ideas regarding perfume products over several hundreds of years, whether celebrating them after the fashion of Sappho and Tibullus, poking fun at those who wore them like Aristophanes and Martial, using them to make a point in the manner of Arrian and Plutarch, or simply reporting the information available, as did Herotodus, Athenaeus and Pliny. These writers, whether consciously or subconsciously, were very familiar with the many roles of perfume within their societies, and the messages these perfumes conveyed. But can current technology and terminology be employed to examine these roles and messages without imposing modern mores on civilisations of the past?

One might wonder whether or not 21st century scientific theories and explanations are pertinent or even relevant to the ancient world and its inhabitants. The vast majority of our modern technology and ideas were completely unknown to those people and played no part in how they perceived themselves or their world, and we will find no direct discussion of them in ancient literature. What we can find, however, are correlations. Human genetics evolve very, very slowly, and thus our modern odour perception models are quite useful to the study of previous

civilisations, in much the same way that contemporary spectroscopic techniques can provide us with much more information about the composition of ancient artefacts than was accessible to the peoples who made them. Human cultures are, of course, rather more fluid, but again, modern anthropological theories and findings give us a basis for comparison, a lens through which we can look for similarities and differences.

Bryan Sykes, professor of Human Genetics at Oxford, notes that 'the common mitochondrial ancestor of *all* modern humans lived only about 150,000 years ago', and that 'on average, if the common maternal ancestor of two people lived ten thousand years ago then there would be one difference in their [mitochondrial DNA] control region sequences'. The control sequence of which he speaks is a short section of about 500 base pairs of mitochondrial DNA which 'does not carry the codes for anything in particular'.[7] As such, it is particularly prone to mutation, because the mutations in this region are neutral and can be replicated without harm to the organism, whereas mutations in the DNA which *does* code for something in particular are often harmful to the point of killing the organism before it reproduces, and thus ceasing to be replicated. This is significant, because if the average number of inherited mutations in an unimportant section of mitochondrial junk DNA is *one* in ten thousand years, then there is no significant (or even discernible) physiological difference whatsoever in terms of chemosensory perception between ourselves and the people who occupied the Mediterranean region less than three thousand years ago. Dr. S. Boyd Eaton of Emory University concurs, reporting that the human genome has changed less than .02 percent in the last 40,000 years, and noting that '99.9 percent of our genetic makeup was formed prior to the beginning of the

agricultural age – which was 500 generations, or 10,000 years ago.'[8] Our modern explanations regarding the physiology of our species must be, by definition, as true of our predecessors as they are of us, and thus the more physiological data we acquire regarding the human condition, the more questions we can confidently seek to answer in our studies of 'ancient' societies.

Naturally some theories are less relevant than others. Studies regarding olfactory-related neurons, molecular topography, and the genes governing G-protein-coupled receptors are not terribly useful to the study of the classical world, although they do give us a context for interpreting classical models. However, when we quantify human odour detection thresholds ('what is that smell?'), recognition thresholds ('oh, it's lavender'), odour adaptation and fatigue ('nice perfume, but did she have to bathe in it?'), we are speaking as much of the Classical and Hellenistic Greeks as we are of ourselves. How did *they* perceive and respond to these phenomena as we currently understand them? Similarly, when repeated studies by a variety of researchers indicate that women have a keener sense of smell then men, we must assume that this was as true then as it is now, which begs questions such as whether or not the women of the Classical and Hellenistic periods were more avid consumers of perfume products than men, as is the case today. Finally, modern physicochemical theory gives us another way of looking at the origins of ancient behaviours and mores, just as modern communication theory explains how information regarding these might have been processed and shared. For example, Stoddart describes modern perfumes as follows:

> The ingredients of perfumes may be summarised rather bluntly in the following manner. The top notes are made from the sexual secretions

[7] Sykes, 73, 77, 103. His emphasis.

> of flowers, produced to attract animals for the purposes of cross pollination and often formulated as mimics of the animals' own sex pheromones. Many of these contain compounds with a faecal odour. The middle notes are made from resinous materials which have odours not unlike those of sex steroids, while the base notes are mammalian sex attractants with a distinctly urinous or faecal odour… In offering to the perceiver a cocktail of sex attractant odours at low concentration in the base notes they subconsciously reveal what the strident top notes seek to hide.[9]

This description would never contribute to the sale of a perfume, but it does explain why humans might be attracted to one. As John Amoore demonstrated, chemicals with similar molecular shapes elicit similar olfactory responses; Donald Wilson and Richard Stevenson propose a memory-based object-recognition model which explains how a 'perceptual group' of odour objects might be formed which could include both flowers and pheromones. These very modern ideas thus offer us new ideas regarding why, for example, species of rosaceae, which contain amines mimicking human vaginal secretions, were associated with Aphrodite, and how, once this association between the goddess, love, and roses was widespread, rose-scented perfume products would serve as an immediate cultural reference, calling the association to mind (consciously or subconsciously) whenever an odour object was identified as smelling 'like roses'. Certainly the mental association with this physical perception would have contributed to the semiotics of perfume among the Greeks. Furthermore, modern communication theory suggests that as this was passed down, verbally and in writing, readers and listeners would have made the connection when they saw or heard the word 'rose', even in the absence of the actual plant; indeed,

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[8] Eaton and Konner, 1985.
[8] Stoddart,1990,163.

this cultural subtext is so strongly rooted in social convention that a message of love might be communicated by means of a drawing of a rose on a Valentine's Day card. This is where physiology technically leaves off, and anthropology begins. The two, however, cannot be safely divided; they are different sides of the same coin.

In the grossest possible sense, perfume can be considered a platform for physicochemical stimulus-response relationships, in that the perfume worn by one person is a deliberate stimulus intended to evoke responses in others (whether or not the respondents can process the individual components of that perfume). From a memory-based object-perception standpoint, however, perfume is the ultimate 'odour object'. One does not need to be able to identify all, or even any, of the components of a given perfume in order to perceive that someone is artificially scented and to draw sociocultural conclusions – indeed, the perfumed individual need not necessarily smell 'good' to someone else to evoke such a response. It is to be expected, as well, that given a powerful sociocultural association, such as an increase in perceived social status, individual ingredients in costly perfumes (frankincense, cinnamon, cassia, roses) as well as specific perfume blends (e.g. 'κύπρος' and 'μεγαλεῖον', two well-known compounds as familiar to Classical consumers by name or by scent as Chanel No. 5 is to us today) would come to be widely identifiable and recognised in their own rights. As we shall see, this was indeed the case in the ancient world.

Attempting any sort of anthropological study of a culture no longer extant is problematic at best, as there is no one left to observe. Nevertheless, while it is currently taken for granted by modern social scientists that both communication patterns and value judgements in general are formed through a combination of personal experience and learned behaviour, and that these differ widely between

cultures – as Synnott notes, 'the meanings of odours are extrinsic and individually or socially constructed', and 'what smells foul to one person, or to members of one culture, may seem fragrant to another' – these patterns and judgements can be explicated from outside a given cultural group, even one long since past.[10] The physiological equipment with which humans interpret the olfactory stimuli we perceive is the same, regardless of our ethnic origins or even our place in time, and the psychological ways in which 'odour symbolism' is applied to cultural value judgements appear to be very similar cross-culturally as well. It is only the interpretations which might differ, and these can be explored retroactively by examining both any written evidence of culturally imposed value judgements which pertain to or are associated with smells, and any material culture which supports or contradicts these written value judgements. In the case of the Greeks and Romans a large body of literature remains, much of which provides information (directly or indirectly) pertaining to smells.

Perfumes, by modern definition, are intentionally manufactured for the express purpose of conveying olfactory metaphors; they are designed both to disguise and to mimic natural odours in the process, either by replacing concentrated body odours considered offensive with diluted mimics deemed desirable at very low concentrations (in cultures which value deodorising via bathing), or by masking them with equally pungent but more desirable smells (in cultures which 'reodorise' without deodorising first). This was equally true in Greece and Rome during the Classical and Hellenistic periods, when perfumes also provided discrete, perceptible distinctions between social 'classes', largely on the basis of who could afford to wear

[10] Synnott,1993,184,187.

what.[12] Perfume products provided a sociocultural 'signalling' system defining spaces, events, personal power, and social prestige, and these shared sociocultural signals, dependent upon the continued production and consumption of perfumes, had a significant effect on the general economy of the Greco-Roman world. The overall scope of the influence of perfume in these societies is best summed up by the fact that olfactory sensory imagery is frequently conveyed in classical literature simply by means of the use of words like 'perfumed' or 'fragrant', leaving the reader (or listener, as was often the case) to fill in the blanks from memory rather than direct perceptual experience.[13] In this way, too, perfume was used to convey information even in the absence of clearly defined or described smells.

A variety of new approaches to the study of olfaction are rapidly gaining acceptance among both physical and social scientists, and a significant quantity of separate but converging research on the subject has been published in both fields in the last fifteen years. Modern studies of olfactory chemical proprioception, or the manner in which chemical compounds are perceived and identified by means of the olfactory receptors in the epithelial lining of the central nasal cavity, can be argued to have begun in the late 1800s, but did not really take shape in the physical sciences in the direction they are currently headed until the 1970s. Similarly, the first 'modern' general sociological study of smell was published in 1908, and the next in 1972. Since that time, however, a great deal of work on the subject has been done in both

[12]By 'class' I am referring to the socioculturally perceived differences between (and sometimes among) slaves, freedmen, free men who laboured due to economic dependence on work, free men who laboured by choice, and free men who did not exchange their own labour for monetary renumeration (q.v. De Ste. Croix, 31-33 on 'class' in Greek and Roman society).

[13] This association is still with us; in a study done by Engen and Eaton in 1975 in which 60 participants were asked to name ten odours as quickly as possible, 35% (10 men, 11 women) simply named 'perfume' as being 'an odour', and this was the most popular 'odour label' on the list of responses. Interestingly, the next most frequent response, at 23% (6 men, 8 women) was 'roses'. (Engen, 1982, 104)

disciplines, and quite often the resulting publications blur the boundaries between the two; taken as a whole, they comprise the evolution of the current answers to many of the questions explored by classical authors. Less happily, the ancients get short shrift in many, though certainly not all, of these works.

These new data, as well as the questions which produced them, have a great deal to offer classical historians, especially in combination, and applying them does not require that current cultural mores or ideas be foisted retroactively on the ancients. Rather than attempting to force the societies of antiquity to fit modern models, this paper will explore the ways in which these modern models provide a framework for new questions and answers regarding classical civilisation, and will use perfume as a specific case in which these models and what we know of classical history illustrate each other. It is therefore necessary, in order to facilitate discussion of classical approaches to smells and smelling, to examine more recent developments in smell research from both physiological and anthropological perspectives. I will argue, however, that the reverse is also true. As it happens, many of our 'new' ideas are not so new at all.

The sense of smell is rapidly regaining credibility as an attribute which contributes significantly to what it means to be human, and this 'olfactory renaissance' must incorporate the past to properly inform the present. The new body of modern research must be compared to its classical precursors, both in order to compare ancient and modern explanations and examples of the ways in which smells are physiologically and socially perceived, and to assess the relative merit of classical scholarship on the subject to scientists over time. To this end, perfumery serves beautifully as an initial focus, being both a 'multidisciplinary activity which overlaps the molecular sciences – chemistry, plant biochemistry, biotechnology, with

the humanistic fields – literature, advertising, fashion, and aesthetics' and a bridge between then and now, an industry whose products have never gone out of style.[14]

[14] Van Toller and Dodd, xii. The modern study of perfumery has evolved to include other aspects of psychology and sociology as well, largely due to the efforts of these two scientists.

A Long Past And Short History

Modern explanations regarding how humans physically perceive smells rely heavily on discussions of neurobiology and organic chemistry as we understand those subjects today, and increase in complexity as we attempt to discuss how a single odorant is perceived and identified against a background of competing smells. Few, if any, of these contemporary ideas would have been comprehensible to the Greeks of the Classical period, who relied primarily on observation with the naked eye to define their world and lacked information on any but the grossest aspects of human anatomy. The Greeks were aware, of course, that smells were perceived via nasal apparatuses, and that the mucous membranes lining the nose were normally wet, but their theories regarding the mechanics of olfactory physiology per se were largely based on speculation, far more philosophical than anything we might call scientific. By the beginning of the Hellenistic period, however, this had begun to change. The explanations given by Aristotle (c.384-322 BC) and Theophrastus (c.371-287 BC) regarding how smells are perceived and why substances give off smells at all are quite sophisticated, considered, and both the questions they asked and the problems they encountered in their attempts to quantify and describe smells would sound familiar to any modern researcher.

While this was a great leap forward, these authors were not working in a vacuum. They were informed and inspired by their philosophical predecessors, and their work in turn informed and inspired generations who followed, much as the emphasis by the Hippocratics on the smells associated with health and disease affected the field of medicine for hundreds of years before culminating in the advanced work of Galen (AD 131-210+) in the Roman period. Similarly, while smell research has improved our general knowledge tremendously in the last 50 years, the

scientists of today owe much to their early 19th century predecessors who re-established olfaction as an aspect of the human condition worthy of formal academic study and discussion, and those writers, in turn, were informed by older ideas on the subject. There was continuity between the theories regarding olfaction in the Greco-Roman era and those popular today, but as we are limited in the present to the extant literature, there are significant gaps in the olfactory story and, in any case, there seems to have been little 'progress' in the field for long intervals. Smells, of course, never vanished; nor did perfume products. Their consideration, however, as well as the consideration of the physiology of smell itself, languishes at certain points, although it never disappears entirely.

Descriptions of human nasal physiology and trauma appear in the Edwin Smith Papyrus in ancient Egyptian hieroglyphics; clearly this subject was considered important from a medical standpoint for as long as humans have been using written language.[15] In the 5th century BC, the atomists Leucippus and Democritus believed that smells travelled through the air as groups of tiny particles whose shapes defined their perception; Lucretius would elaborate on the subject in the Roman period, and while this idea was based on pure speculation at the time, it is not incompatible with modern theories regarding molecular topography and differentiated olfactory receptors. Physiology has always been the backbone of medicine, and has informed studies in physics and chemistry throughout recorded history, but the field of anthropology is relatively new, and its origins as a formal, scientific field of study can be dated back to the European 18th century post-Enlightenment period of

[15] This is the world's oldest extant surgical document (c.1600 BC), and is itself considered to be a copy of a composite manuscript dated at least 1000 years earlier (3000-2500 BC). It contains four separate cases (nos. 11-14) relating to nasal trauma, three of which were considered treatable. Q.v. J.H. Breasted, *The Edwin Smith Surgical Papyrus*, 1930, University of Chicago Press.

colonisation at best. The absence of sociological studies on olfaction prior to this time is not, therefore, surprising, although modern anthropologists have their own theories about smell as a 'neglected' sense, and why it has taken the field as a whole so long to incorporate the sense of smell into the discipline. It is interesting, however, that as foreign as current physiological ideas might have been to them, many of the current anthropological theories about 'smell culture' would likely have made a great deal of sense to the Classical Greeks.

At first glance, these might seem very different, and separate, approaches to the analysis of the human condition, but they are intricately interconnected, and their interdependence is even more profound where smells in general, and perfume in particular, are concerned. As Jim Drobnick notes in his introduction to *The Smell Culture Reader*, 'Often delimited as a mere "biological" sense, scents are, on the contrary, subtly involved in just about every aspect of culture, from the construction of personal identity and the defining of social status to the confirming of group affiliation and the transmission of tradition.'[16] Indeed, the perception of smells is as psychological as it is neurobiological. Smells provide us with 'chemical stimuli for everything including detection and discrimination of conspecifics, mates, mothers, home, predators, prey, and food' because they are woven into the very fabric of human memory and emotion, and when we say that humans use smells to orient themselves in their environments, this pertains not only to places, but to their cultural groups as well.[17] 'The aromas are converted from physical sensations to symbolic evaluations', writes Synnott, involving both organic and socioculturally specific

[16] Drobnick, 1.
[17] Wilson and Stevenson, 4.

psychological processes.[18]

Herz and Engen (1996) have pointed out that the olfactory nerve is only two synapses away from the amygdala, the seat of emotional memory in the human brain, which is connected to the hypothalamus and thus the autonomic nervous system. It is three synapses from the hippocampus, an important part of the limbic system associated with short-term memory and spatial navigation, and the primary olfactory cortex forms a direct link with both of these organs. Additionally, olfactory neurons are unmyelinated, which is to say that their axons lack a membrane sheath, and this slows their transduction of signals, making olfaction the slowest of the senses. Nevertheless, while modern physiology thus explains why a perfume can 'linger' after the person wearing it has left the room, it cannot explain with equal confidence why that person chose to wear it, or how this lingering fragrance will be interpreted by others, as cultural resources, social values, personal experience, and learned behaviours are important factors in those equations.

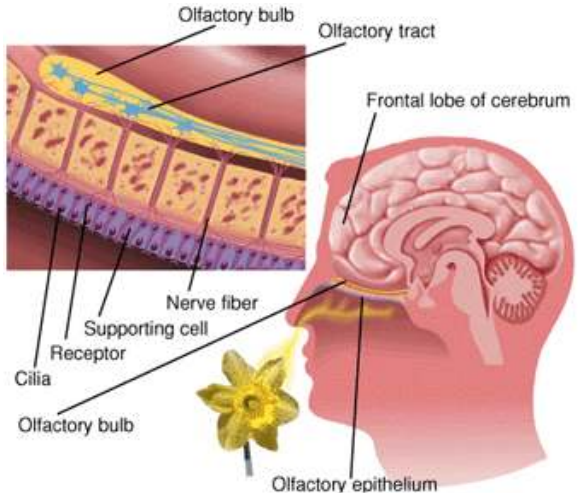
The modern study of olfaction is thus, by necessity, a hybrid product of work in both the physical and social sciences. While the two have evolved to connect, however, this synthesis is recent enough that a brief review of the more important milestones in the history of olfactory studies is more easily undertaken in two steps rather than one.

[18] Synnott, 1993, 191.

The Physiology of Smell

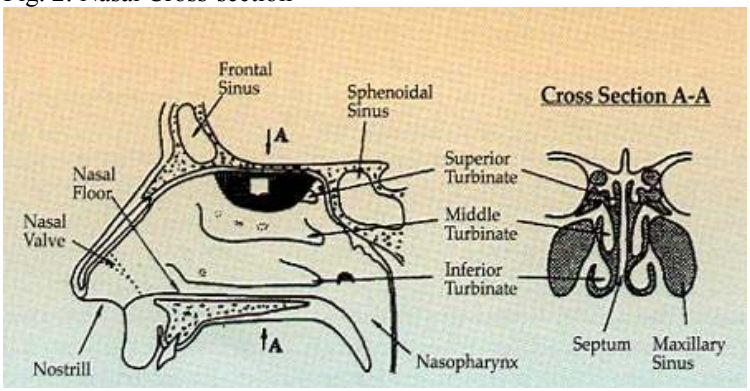
In a nutshell, there are three parts to each side of the human nasal cavity, 'an anterior naris, a central chamber containing the epithelium and the receptors, and a posterior naris through which air inhaled through the anterior naris exits into the nasopharynx behind the soft palate'.[19]

Fig. 1: Olfactory Physiology



The first of these parts, the anterior nares, or the nostrils, are the external openings to the nasal cavity. The respiratory mucosa lining these openings trap particulate matter and bacteria, keeping pollutants from reaching the lungs, at the same time they help to regulate the temperature of inhaled air. Additionally, each nasal cavity contains conchae (also called 'turbinates'), internal folds which keep air from flowing through the nostril in a linear fashion – an important consideration where smell is concerned, as 'flow rate' is thought to effect odour intensity.[20] The last of the three parts, the posterior nares, are the means by which tastes and smells

Fig. 2: Nasal Cross-section



[19] Engen, 1982, 18.

[20] Engen, 1982, 19. He notes, however, that although olfactometer studies revealed that 'perceived odor intensity increases as the flow rate increases, with concentration held constant' (Rehn, 1978, 1979), Teghtsoonian et al. (1978, 1979) 'found that a flow rate that varied as a result of the vigor of the subject's sniff did not influence perceived odor intensity or, presumably, the number of molecules available at the epithelium.'

combine, when odorants reach the olfactory receptors through the nasopharynx via the mouth. These are, for reasons unknown, found to be larger in women than in men, which may or may not explain differences in smell perception between genders. The middle part of the nasal cavity, however, the central chamber, is the primary focus of interest here, as it contains the 'olfactory cleft'. This is more or less simply a slit covered by the epithelial tissue in which the olfactory receptors are located.

The olfactory epithelium is a pigmented tissue about 75 μm thick which contains the receptor cells (bipolar neurons which are the sites of transduction), as well as supporting cells, which produce mucous, and basal cells, which replace the olfactory receptor cells approximately every 28 days, making these the only neurons in the human nervous system which are regularly replenished.[21] The cilia ('olfactory hairs' in fig. 2) which dangle from the dendrites of the receptor cells into the mucous membrane overlying the olfactory epithelium gather sensory information by binding specific receptor proteins which are stimulated by odorant molecules. When these G-proteins are stimulated, the channels in the membrane of the corresponding cilium depolarise, and the resulting action potential transits the axon of the olfactory receptor cell. As a group, these receptor cell axons form the olfactory nerves, which travel through the cribiform plate to the olfactory bulb. There, one of two sets of cells within a few glomeruli will carry the olfactory information on to the rest of the brain, and thus one or more odorants is perceived.[22]

This process, in which the odorant molecules are 'read' and the resulting information is relayed to the brain by means of 'a family of around a thousand different G-protein-coupled receptors', is thought to be the primary physiological

[21] Why the epithelium is pigmented is not clear, but Whitfield and Stoddart (1984) have shown that albino animals are anosmic, and believe that this epithelial pigmentation is associated with olfaction.

means by which mammals recognize and differentiate between smells. Unfortunately no one is entirely sure exactly how that happens, as each of these G-coupled protein receptors can be triggered by any number of different odorant molecules. Trygg Engen, professor emeritus of psychology at Brown University and author of *The Perception of Odors*, notes that:

> Although many researchers had hoped to find receptor specificity, the conclusion seems to be that receptor cells are broadly tuned, and each cell may respond to qualitatively different odorants. The effects of odorants on such cells may be ordered on a scale, with categories ranging from maximum excitation to maximum inhibition, but it is not clear what attribute of the odorant is correlated with this and how the information is coded. . .In general, there seems to be a tendency for all cells to respond differentially to different odorants, but the specificity of receptors remains a problem.[23]

While the lack of receptor specificity remains something of a conundrum, however, more and more information regarding the physiological mechanics of smell perception is becoming available as a result of improved staining and imaging techniques, which literally allow researchers to see the connections between the axons of individual olfactory neurons and the glomeruli. Science journalist Cori Bargmann writes that:

> Different odorants activate different subsets of receptors, allowing discrimination between an enormous variety of odorants. Each receptor gene is expressed in a small fraction of olfactory neurons, and it is likely that each neuron expresses only one or a few receptor genes. The olfactory neurons expressing a given receptor are scattered across a large region of the sensory epithelium, and their axons each project to

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[22] Bear, et al., 1996
[23] Engen, 1982, 24.

the olfactory bulb.[24]

Bargmann reports that studies conducted by Mombaerts et al. reveal that, following genetic manipulation to permit β-galactosidase staining of the P2 subset of olfactory axons, 'The positions of the [stained] blue glomeruli were constant in different mice. Thus, a few defined glomeruli within each mouse receive all inputs from a single olfactory receptor.' While this research raises significant questions regarding the ways in which receptors themselves might influence the targeting of olfactory axons, it contributes significantly to the growing body of evidence that the 'olfactory map' in mammals is 'developmentally hard-wired', and thus reproducible, by 'suggesting that the pattern of axon convergence is fixed among all individuals'. It also serves as further corroboration that olfactory receptors are most likely limited to 'a few distinct classes', any of which might transfer information regarding a vast number of odorants.[25] In other words, it is not necessary (and indeed, it is currently considered impossible) that mammals have one receptor for every possible perceptible smell; a variety of keys will fit the same lock. More importantly, if the means by which different individuals perceive and organise olfactory information is the same, as these studies suggest, then a rose truly smells as sweet regardless of the circumstances in which it is sniffed, or by whom – a premise on which perfumers have relied for millennia.

All of this information, of course, is based on very recent research, and the studies of olfactory physiology from which these theories descend date back only 100 years. Such studies tend to focus on either neuropsychology, the study of the perception of odour by the brain, or physicochemistry, the study of relationships

[24] Bargmann, 512.
[25] Bargmann is discussing P. Mombaerts et al., *Cell* issue no. 87, 675-686 (1996).

between stimuli and the resultant odour percept, but there is a significant overlapping of the two, especially after the 1970s, when both psychologists and biological scientists began to examine the relationship between how smells are physically and mentally perceived. This is not to say, however, that there was no discussion of the subject between antiquity and the late 19th century; questions regarding how olfaction works and why have been consistently debated through the ages. The literary record is spotty, and although it is quite likely that older or minor treatments on the topic of smell have simply been lost, that has probably always been the case. Those works which remain, however, indicate an ongoing effort to describe the olfactory system in connection with defining the human brain, and thus the human species. Naturally some of these are more valuable in that respect than others.

'The study of the nose,' according to surgeon Shashikant Kaluskar, 'is as old as civilisation.' As several issues regarding nasal structure can be found in the Edwin Smith Papyrus, Kaluskar believes that the 4th millennium BC is the period in which sinus surgery originated, having developed as a result of techniques in which 'instruments were used to remove brain [tissue] through the ethmoid sinuses as part of the mummifcation process.' Nevertheless, he writes, 'The major contribution for the complete reconstruction of the nose originated in India by Sushruta in around 600 BC. Writing in Sanskrit in the form of verses he described in detail the technique of total reconstruction. . .' [26] Indeed, the largest group of individuals invested in the study of smells and smelling over time, with the possible exception of perfumers, have been physicians, although philosophers have addressed this as well.

Galen's work on olfaction was considered definitive for hundreds of years. It continued to influence a wide audience after the fall of Rome and the advent of

widespread Christianity in Europe due to its extensive inclusion by the bishop Nemesius of Emesa (390 AD) in his book, *On the Nature of Man*, in which the author also reports that smells can be 'fragrant, foul, or "in between"' and that smells 'reach the surface of the front ventricles of the brain'.[27] The book, an apparently unfinished hodgepodge of philosophy and physiology with a pointedly religious agenda, is described in the *Encyclopaedia Britannica* as being 'the first known compendium of theological anthropology with a Christian orientation', which is to use the term 'anthropology' in its most literal sense. Nevertheless, this study of the human condition became a teaching text which 'considerably influenced later Byzantine and medieval Latin philosophical theology'.[28] It is known to have influenced the Dominican scholar Albertus Magnus, and thus his most famous student, Thomas Aquinas, although at the time the work was erroneously attributed to Gregory of Nyssa due to a faulty Latin translation. Though hardly a 'scientific' study as we might define that now, this book nevertheless contributed significantly to keeping the senses in general, and olfaction in particular, on the academic radar. Sadly, during the European medieval period, it stood more or less alone in that regard.

With one very notable exception, The Middle Ages are remarkably devoid of any 'new' work on olfactory physiology, although Richard Palmer reports that 'Continuity rather than change in the understanding of smell was characteristic of the literature of this period' and that 'the tradition was neither monolithic nor free from internal controversy.'[29] In the early 11th century AD, however, the Persian physician and philosopher known as Avicenna took great interest in both the physical process

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[26] Kaluskar, 101.
[27] Finger, 177.
[28] *Encyclopaedia Britannica*, 'Nemesius of Emesa' (2007).
[29] Palmer, 61.

of smelling and in smells themselves. His many medical treatises, while they cannot be called 'Western' by any means, were influenced by Aristotle and Galen as well as by the Indian surgeon Sushruta, the Ayurvedic physician Charaka, and others, and influenced many Western physicians in turn. These works refer frequently to smell as well as to other forms of sensory perception. Avicenna's description of the olfactory system itself in *Canon of Medicine* (AD 1025) echoes Galen in placing the seat of the sense of smell in the olfactory 'projections' (bulb):

> Smell is a faculty located in a protuberance situated in the fore part of the brain, and resembling a nipple of the female breast, which apprehends what the air inhaled brings to it of odours mingled with the vapours wafted by air currents, or impressed upon it by diffusion from the odorific body.[30]

Avicenna is also credited with the invention of a steam-distillation apparatus at roughly the same time, and is considered to have defined, if not to have pioneered, aromatherapy during this period.[31] Some of his books, particularly the 14 volumes of *Canon of Medicine*, were apparently standard medical texts in European universities from the 12th to the 18th centuries in Latin and Hebrew translation, but neither Avicenna's innate respect for the sense of smell nor his work with essential oils seem to have made much of an impact among the non-medical population, nor to have inspired similar studies within the European medical community.

There was, it seems, a split between physicians and philosophers somewhere along the line between Galen and the work of Cloquet in 1821. Some of the works of Galen had been lost to the West for quite some time, but were rediscovered 'in the

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[30] Quoted in Finger, 177.

[31] Abu Ali al-Husayn ibn Abd Allah ibn Sina, commonly known as Avicenna, lived from approximately 980-1037. In his *Introduction to The History of Science* (1927), George Sarton writes of Avicenna that

years around 1490'; nevertheless, in spite of a resurgence of interest in anatomy, including formal cadaver dissection studies, Galen appears to go largely ignored by the natural philosophers of the Middle Ages, while the works of Aristotle remain prominent in their thinking.[32] Palmer reports that 'Outside the medical tradition, Galen's ideas of olfactory sensation seem to have been less readily accepted', and notes that the Franciscan scholar Bartholomeus Anglicus pays little attention to these in his encyclopaedia, *De Proprietatibus Rerum*, in which he 'described the olfactory nipples as situated in the nose, and his account of olfaction follows the pattern of the other four senses: animal spirits pass from the brain down the nerves to the nipples, where they gather impressions to be conveyed back up to the common sense in the front ventricle of the brain.' Further, he writes that:

> A series of illustrations of brain function popular in the fifteenth and early sixteenth centuries demonstrates the same theory. These illustrations are well known, but it has not been sufficiently stressed that they occur not so much in medical texts as in works on Aristotelian natural philosophy, or in general encyclopaedias, such as the *Margarita philosophica* of Gregorius Reisch, published in 1503. They reflect the tacit assumption of Aristotle that the organ of smell lay in the nose, and as far as smell is concerned they are not representative of Galen and the medical tradition.[33]

'For a thousand years he has retained his original renown as one of the greatest thinkers and medical scholars in history.'

[32] J.J. Martin describes a 'new enthusiasm of humanist doctors and scholars for the works of the Greek medical writer Galen of Pergamon, whose lost treatise on anatomy was recovered at exactly this time', 234-5.

[33] Palmer, 62. Fig. 3 is a woodcut (1517) depicting the ventricular theory of the inner senses from Gregor Reisch's *Margarita Philosophica*. Note the olfactory projections in the upper nose, and the commingling of sight, sound, smell and taste faculties in the 'sensus communis' in the frontal ventricle.

These illustrations, including the example given here [fig. 3], are intended to show the relationship between the 'outer' senses, sight, hearing, smell, taste, and touch, and the 'inner' senses as medieval scholars described those. In this particular drawing, input from the 'outer' senses terminates in the 'sensus communis' in the front ventricle, then passes through the 'inner' senses, given here as 'fantasia' and 'imaginativa' in the front ventricle, then through the vermis to 'cogitiva' and 'estimativa' in the second ventricle, and finally to 'memorativa' in the third ventricle. This conflicts with the work of Galen, who 'was clear in his contention that the mental faculties were located in the substance of the brain rather than in the ventricles.'[34]

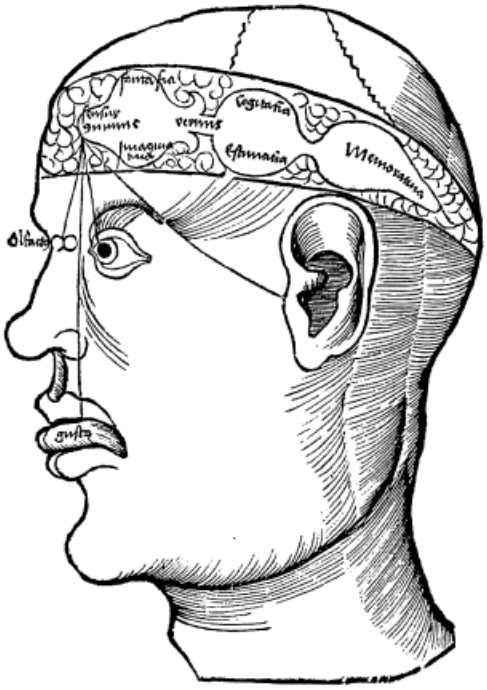

Fig. 3

Among the physicians, however, Galen reigned. Galen, writes Stanley Finger, 'adhered to a pneumatic theory, one in which the brain expanded to bring fresh air with new odorants into the olfactory bulbs and ventricles and contracted to expel the stale air'. Galen, he says,

> . . .thought odors travelled as very fine particles (but larger than those required for hearing or seeing) to the olfactory areas in the nose. These particles supposedly went unchanged through holes in the ethnoid bone. Tubular nerves then transported them to the hollow olfactory bulbs and to the lateral ventricals of the brain. . .Galen and his followers came to the conclusion that the loss of smell could have three causes: (1) obstruction of the nasal passages (e.g. from too much

[34] Green, 131.

mucus coming from the ventricles of the brain), (2) blockage of pores in the ethmoid bone, and (3) diseases of the anterior (lateral) ventricles.[35]

These ideas remained prominent for centuries. Palmer notes, however, that the work of Bartolomeo da Montagnana, a 15th century medical professor who lectured and performed public dissections in Padua, 'was more typical of fifteenth-century medicine' in that he believed that 'the front ventricles of the brain were the organs of smell' and that 'perception lay in the "olfactory breasts" attached to the ventricles'.[36] This opinion, and da Montagnana's summary of the subject, were quite influential, as he was 'among the most prolific writers of *consilia*' for teaching medicine in universities according to Nancy Siraisi, who also notes that da Montagnana's *consilia*, along with those of Antonio Cermisone and Giovanni Matteo Ferrari da Grado, were 'posthumously organized into collections announced by their compilers as "according to Avicenna".'[37] The emphasis in medicine at the time, however, seems to be on gross anatomy in general rather than sensory perception in particular, and Siraisi feels that:

Vesalius' *Fabrica*, 1593.

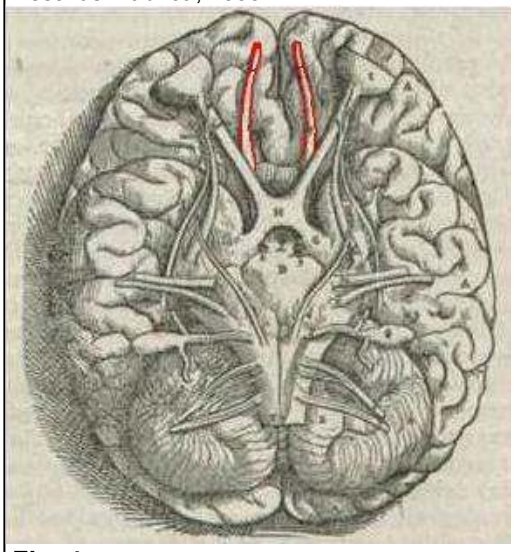

Fig. 4

> The most notable fifteenth-century development was an increasingly serious attention to practica on the part of learned physicians. Recent studies have documented this tendency from several different standpoints. . .These studies certainly suggest the general conclusion that fifteenth-century medicine, in and outside the academic milieu, was characterized by an

[35] Finger, 176-7.
[36] Palmer, 62.
[37] Siraisi, 73.

> increasing interest in discussing the details of medical practice, sometimes on a case by case basis.[38]

It is noteworthy, however, that although physiological concerns were important only to physicians, there were strong connections made by the general public during this period between smell and disease, no doubt largely due to the recurrence of the bubonic plague. These, for the most part, are best examined in the context of anthropology, and will be treated in the following section. In 1543, the Belgian physician and anatomist Andreas Vesalius published *De Humani Corporis Fabrica*, a 700-page manual based on his own dissection studies, which was to have a major impact on anatomical studies in general. Like da Montagnana, he was also a professor at Padua, and performed public dissections there, but his work was not universally accepted, primarily because he disagreed with Aristotle and Galen. His theories regarding olfaction were somewhat radical at the time; he argued that the seat of olfaction did not lie within the anterior ventricles of the brain, and that the primary olfactory organ was probably the brain itself.

> Others, again, on the basis of certain passages by Galen (especially Book VIII of *On The Function of The Parts*), assert that the olfactory organs are simply the anterior ventricles of the brain, implying that these ventricles are the source of this particular sense and no other. . .The fact is that the ventricles are by no means broad at the back of the brain, and as they come forward they are forced to become still narrower, and that is the point at which they put out the olfactory organs. They do not expel pituita into the seat of the olfactory organs, and much less do the olfactory organs themselves act like canals conveying cerebral pituita through here (though this is what Galen says

[38] Ibid, 74.

they do).[39]

While these arguments may not have made much impact during Vesalius' lifetime (he died in 1564), they played an important part in the history of olfaction shortly thereafter. In 1587, the botanist Joachim (also 'Iohannes') Camerarius the Younger, in his thesis for the University of Marburg, compared Galen's work on olfaction with that of Vesalius. This work, *Themata Physica de Odorum Natura et Affectionibus*, proposes new terms for odour classification, discusses the relationship between smell and taste, and offers ideas regarding 'the function of olfaction, the ability of smelling in water, and the effect of heat from the sun on odours' as well.[40] One of the questions Camerarius addressed (as had Aristotle before him), namely whether or not odorants can be perceived only in air, became an issue of great interest in the 19th century. Further, Finger suggests that it was this thesis in particular which 'set the stage for Conrad Victor Schneider to reject and finally destroy the idea that the nose was just a hollow tube to and from the ventricles.'[41] Schneider described the ethmoid cribriform plate as being solid, rather than porous, and established both that it was the nasal membranes (both anterior and posterior) which secreted mucus, rather than the brain, as Galen had it, or the pituitary gland, as Vesalius argued, and that this was normal, although the membranes secreted more mucous when inflamed.

Naturally studies focussing on olfactory physiology increased greatly in both number and scope after the invention of the microscope (circa 1590). This pattern of increase has continued to the present day, as technology has allowed better and further insight into the functions of the brain, with the result that such studies are

[39] Vesalius, 1543, 180. Richardson and Carman, trans. 'Pituita' here refers to mucous.
[40] Doty, 2003, xxvii.
[41] Finger, 177.

currently conducted at the molecular level. Doty offers a more complete progression of the works following those which 'placed the first nails in the coffin of the theory propagated largely by Galen's works that the cribriform plate is pervious to odours and that the sense of smell lies within the ventricles of the brain':

> Other major studies before 1890, a number of which are considered classic, contributed the remaining nails to this coffin and include, in chronological order, those by Hunter (1786), Todd and Bowman (1847), Schultze (1856, 1863), Ecker (1856), Eckhard (1858), Clarke (1861), Hoffman (1866), Martin (1873), Krause (1876), von Brunn (1875, 1880, 1892), Sidky (1877), Exner (1878), Erlich (1886), and Cajal (1889).[42]

Although some very relevant work had been published prior to 1800 – for example, Robert Boyle's *Nature, Properties, and Effects of Effluvia* (1673), which deals largely with olfaction in animals and various sources of odours, and the same author's *Experiments and Observations About the Mechanical Production of Odours* (1675), a discussion of odour intensities in mixtures – it is the 19th century which marks the formal onset of what Doty calls 'the dawn of human chemosensory psychophysics', or an interest in the perception of odorants per se. While this cannot be divorced entirely from the study of physiology for obvious reasons, an increased interest in the nature of odorants themselves and how these were (or were not) perceived took olfactory studies down another path, one with an emphasis on trying to define the nature of odour 'qualities' and a goal of mapping the route taken by smells from the world at large through the nose and on to the brain.

This is not to suggest that the topic had never arisen prior to this period; indeed, Theophrastus devotes many pages to the subject, and quite a few of the

[42] Doty, 2003. His summary as given here does not, but should, include W. Ramsay, who suggested that anything odoriferous must have a particular molecular weight and showed that both extremely

scientists and philosophers who followed in his footsteps, including several of those previously mentioned, attempted to formally 'classify' smells. Rather, this was the period in which such studies became a specialised area of research in their own right, a field which quickly bled into the equally new and burgeoning field of psychology.

In 1821, Hippolyte Cloquet produced his *Osphrésiologie*, a 758-page work on smell which Finger feels 'must be considered in the context of both scientific developments on olfaction and the social history of odours' and which he reports 'became the basic source on olfaction and continued to be cited through the nineteenth century.'

> Cloquet classified odours in a systematic way, described pathological material, talked about uses for scents, attempted to discuss the physiology of smell, and wrote about individual differences. His book on smell described some of the few known scientific discoveries, such as Robert Boyle's seventeenth-century observation that a substance loses weight as it emits its odour. Nevertheless, these discoveries were combined with intuitions and social philosophy, and Cloquet made many statements that were not based on facts.[43]

In spite of these drawbacks from a scientific perspective, however, Cloquet does raise many socially interesting points in this book, and peppers these with anecdotes and stories which are enlightening on several levels. This does not seem to be an unusual style of presentation for this sort of encyclopaedic compilation at the time, and clearly this book enjoyed a wide audience long after its publication.[44] It was not

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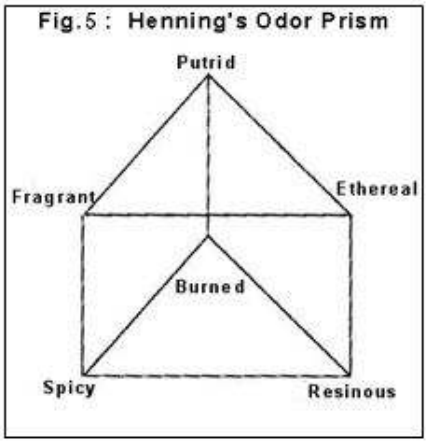
heavy and very light molecules were odourless (1882), and J. Haycraft, who found that chemically related substances smelled similar (1889).

[43] Finger, 178.

[44] See, for example, Gould and Pyle (1896). The authors, both physicians, cite Cloquet on the aphrodisiac properties of certain flora, noting that he 'calls attention to the sexual pleasure excited by the odors of flowers, and tells how Richelieu excited his sexual functions by living in an atmosphere loaded with these perfumes.' Like Cloquet's, this book is also presented as a scientific compendium of

terribly long afterward that a far more scientific approach was taken to the study of odour qualities and their effects on the brain, an area of concern which by definition incorporates perfume.

In 1895, the Dutch physiologist Hendrik Zwaardemaker published his own odour classification system of nine groups in his book *Die Physiologie des Geruchs*, categorising smells as being either 'ethereal', 'aromatic', 'fragrant', 'ambrosiac', 'alliaceous', 'empyreumatic', 'hircine', 'foul', or 'nauseous'.[45] This system overlaps considerably with the seven groups published by Charles Linnaeus in 1756 (Zwaardemaker adds only 'ethereal' and 'empyreumatic' to these, but divides the categories into subclasses and provides examples of each), but Linnaeus' motivation was the classification of flora, and where Linnaeus tends to be cited only for historical purposes, Zwaardemaker is perceived to have been a particularly important figure in the field of osmology, as he 'created interest in the psychology of smell', having 'spent a large part of his professional life looking for new physical principles that would give him a key to smell by an understanding of the true nature of its stimulus', according to psychology historian Edwin Boring.[46] While Zwaardemaker's categories were not based on chemical structure, he did employ a consistent methodology for placing smells within these, using cross-adaptation techniques which involved 'presenting one



knowledge, and is equally valuable from an anthropological standpoint as it offers a vast number of stories regarding smell which, while completely lacking scientific credibility, nevertheless reveal much about the social culture of the period (as well as providing great entertainment for modern readers).

[45] Zwaardemaker's *Die Physiologie des Geruchs* (1895) was so popular that it was translated into French and published as *L'Oderat* in 1925.

[46] Boring, 438.

odorant and, after the subject adapted to it, seeing if this odorant affected perception of a different odorant.'

> The idea was that if substance A affected perception of substance B, the two were related and should be put into the same category. If they did not interact, they should be placed into different categories. . . Testing with hydrogen sulfide and vapors of chlorine or bromine revealed that these odorants were now more difficult to detect (same category), whereas ethereal odours were unaffected (different categories).[47]

Zwaardemaker believed that smell should follow the same rules as vision in regards to mixture and adaptation. He suggested that a mixture of two odours resulted in a single odour weaker than either of the original odours independently of each other, and invented an 'olfactometer' in 1888 for the purpose of testing his 'odour compensation' theories. These theories, and in fact even whether or not true odour compensation exists at all, are still widely debated, but it is a tribute to Zwaardemaker that, as Engen reports, odour compensation and neutralisation 'is a very active field of research today'.[48] Further, Zwaardemaker was the first to present smells in terms of 'absolute threshold, difference threshold, reaction time, adaptation, and cross adaptation data.'[49]

The first empirical classification system followed shortly thereafter in 1916. This was Hans Henning's 'odour prism' (fig.5), which related six 'salient' odours to each other on a three-dimensional scale, the idea being that a mixture of two of these might be symbolised as an edge between points, a mixture of three as a triangular surface, and a mixture of four represented as a square surface. The methodology in

[47] Finger, 179.
[48] Engen, 1982, 9.
[49] Finger, 186.

constructing the prism model was far more 'scientific' than that of any of the previous theoretical models in that the categories were derived by identification of 'the bare sensory quality' of 415 odorants by six human subjects. Attempts to test the reliability of the prism as a model, however, revealed that 'certain odours generated sensations that the geometry of the prism could not accommodate', and that there were difficulties with 'poor interrater reliability', which is generally true of any classification system, simply because even though odours are similarly perceived, not everyone describes perceived smells in the same way.[50] Furthermore, chemicals which 'should have generated sensations falling on a particular part of the prism often did not'.[51] Nevertheless, this prism is considered to be the first physicochemical model developed in the pursuit of smell research. Additionally, though not particularly respectful of previous work in the field, to the extent that a reviewer noted that Henning's 'attitude toward earlier or contemporary work is minutely critical and, in the main, destructive', Henning's book, *Der Geruch*, was the largest work on the subject of smell since Cloquet's, and included a number of research articles published by Henning which:

> . . .described olfactory stimulation of one nostril (monorhinic stimulation), both nostrils with the same substance (dirhinic stimulation), and the two nostrils with different substances (dichorhinic stimulation). It also described differences in findings with the subject knowing what the smell was to be beforehand ('object smell' or *Gegenstandageruch*) as contrasted with 'true smell quality' (*Gegenheitageruch*), which was tested when the subject was not informed about the upcoming

[50] As Engen complains (30), 'After hundreds of years of research on odor classification there seems little hope of achieving agreement that there are such primary and special odor qualities as "ethereal"…'.
[51] Wilson and Stevenson, 13. The authors cite studies by MacDonald (1922), Hazzard (1930), and Findley (1934).

stimulus.[52]

The book was an inspiration to generations of future scientists and led to many similar and improved models intended to be scientific rather than philosophical. What was, according to Wilson and Stevenson, 'the last true descendant of Henning's approach', was published in 1952 by John E. Amoore.[53]

Amoore continued in the tradition of the molecular studies pioneered by Ramsey and Haycraft in the 1880s, proving a correlation between molecular topography and odour by showing conclusively that molecules of similar shape give off similar smells. He then surmised that olfactory receptors might be described according to molecular shapes, and categorised according to thresholds at which specific substances could be detected by anosmic research participants. By studying subjects with a single anosmia, the condition of having little to no ability to perceive one particular type of smell but no difficulty in perceiving other, dissimilar smells, Amoore was able to speculate regarding which smells were 'primary' smells with their own receptor sites (his theory being that a single receptor site, shaped to accommodate the molecule in question, was dysfunctional in the anosmic subjects).[54] The result of this speculation was his stereochemical classification system, which categorised smells into seven groups: 'ethereal', 'camphoraceous', 'musky', 'floral', 'minty', 'pungent', or 'putrid'. More importantly, after isolating what he felt were primary smells, Amoore was able to establish normal detection thresholds for these. Whereas Haycraft proposed, in 1900, a theory of 'involution' which led to

[52] Finger, 187. The review was written by E. A. Gamble in 1916 for *Psychological Bulletin*, and appears on page 135 of vol. 13.
[53] Wilson and Stevenson, 15.
[54] Amoore, 1970. Interestingly, Amoore was also able to show that molecules with a shape similar to that of a pheromone known to cause 'alarm activity' in a certain species of ants also produced alarm activity (*Science*, September 1969, vol. 165, pp.1266-1269), suggesting that stereochemical principles

his conclusion that 'it is probable that the sense of smell was more acute in ancestral forms, and that it played a relatively greater part in the psychology of man's ancestry, a condition which we find today among the microsmatic mammalia', and many subsequent researchers agreed with this, Amoore did not.[55] Stanley Finger remarked in 2001 that

> As more was learned about the extent to which the olfactory capabilities of humans could be trained, the less likely it seemed that there were major innate differences in olfactory acuity across the family of man or that humans were that much worse in their olfactory abilities than many animals.[56]

Amoore's stereochemical theory and experiments were effective in demonstrating the capacity of humans to 'learn' to use their sense of smell.

The suggestion by stereochemical theory that the bond between a molecule and an olfactory receptor designed to perceive it fires nerve cells, producing a specific perception, and that similarly shaped molecules will produce similar perceptions, was (and is) a significant contribution to olfactory chemistry with widespread repercussions in various industries, affecting food additives, the use of synthetic isomers in perfume, and even the neutralisation of smells deemed undesirable by waste management facilities. Wilson and Stevenson note, however, that while Amoore contributed significantly to olfactory chemistry, he did 'little to further our understanding of olfactory perception.'[57] Indeed, it is still unknown how many olfactory receptors exist, although, as has been shown, this number is now considered to be far smaller than originally thought, and identifying them as such

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could be applied to other types of pheromones, particularly sex attractants. This is now largely taken for granted by the perfume industry.

[55] Haycraft, 1248.

[56] Finger, 188.

does not explain how they work.

The primary focus in the field of smell physiology eventually shifted from molecular topography to stimulus-response relationships, but these models have their own pitfalls, as 'biologically significant' odours are composed of individual components which can number into the hundreds, and yet must be distinguished from a background of other odours present; in the same vein, these models do not adequately explain why a 'perfume' is perceived as such even when none of the ingredients in the perfume are familiar to the person perceiving it.[58] Stimulus-response relationship studies nevertheless make up the majority of olfactory sensory physiology studies by biological scientists interested in analysing the subject from a physicochemical angle between the emphasis on molecular topography prevalent in the 1970s and approximately the year 2000. Since that time, however, the focus in the field has shifted once again, this time to the encoding of discrete combinations of odours (odour objects). The most recent work on the subject, Donald A. Wilson's and Richard J. Stephenson's *Learning to Smell: Olfactory Perception from Neurobiology to Behavior* (2006) takes this approach.

Stimulus-response models of olfactory chemoproprioception assume 'a particular and discrete response to each component of the stimulus'. This would require not only receptor sites for thousands of chemical components, but also necessitates that an individual has the same response to the same stimulus every time it is perceived, which is clearly not the case. Neuropsychologists have observed for some time that these models fail to explain the effects of memory loss on a patient's ability to distinguish smells; biologists are well aware that there are human

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[57] Wilson and Stevenson, 15.
[58] Wilson and Stevenson, 17.

limits to detecting individual components in complex smells, and that some smells are perceived against an olfactory background in which other smells are not. The latest work in the field thus suggests an 'object recognition system' approach, the learned perception of odour-objects as whole and discrete units, a model which has many advantages for physical and social scientists alike.[59]

The model of olfaction as a 'memory-based object-recognition system' published by Wilson and Stevenson in 2006 suggests that smells are perceived as discrete 'objects', and that olfactory chemoproprioception thus functions in a fashion similar to other sensory systems. In other words, humans first physically perceive a physicochemical stimulus ('odour imprinting') and then remember that stimulus as a perceptual 'odour object', in the same way that we process visual and haptic stimuli.[60] Our brains, for example, can perceive a complex biological phenomenon as being a 'dog', regardless of its size, weight, or the colour of its fur; we learn to recognise and remember the whole package as being 'a dog', and (after some exposure to dogs) can identify a dog as such even if we can only see, hear, feel, or smell it, regardless of whether or not we have ever encountered that particular dog before. Similarly, rather than presuming that identifying a cup of coffee by its smell requires the discrete processing of the some 600 volatile molecular components of coffee, this model of olfactory object perception suggests that we form a 'perceptual group' of coffee-like smell patterns, learning to recognise and remember 'coffee' as a smell 'distinct from other patterns of input and distinct from background odorants'.[61] Such a 'perceptual group' allows us to identify coffee as being coffee without requiring that we distinguish South American coffee from South African, as well as

[59] Wilson and Stevenson, 20.
[60] Wilson and Stevenson, 23-32.

allowing us to smell something unfamiliar and announce that the mystery substance 'smells like coffee'. Furthermore, we can often identify a smell known to us when the recognised odorant is only one component of a simple but unfamiliar compound, much like a native speaker of English might fail to recognise a short word in another Romance language, but would immediately recognise the individual letters of the Latin alphabet involved.[62]

This object-recognition system, or 'perceptual learning' approach, to the identification of smells is a vast improvement over stimulus-response models, and does not conflict with the current thinking regarding either molecular topography or olfactory physiology; rather, it complements the best of each, comprising an admirable culmination of centuries of speculation and study regarding olfaction. What it does not, and cannot, in and of itself address, however, are the cultural perceptions, the individually or socially learned messages which accompany the recognition and identification of a given smell. Steer manure is rather easily recognised as such after minimal exposure to it, but may be perceived quite differently by a farmer and a banker; though two people might recognise a dog by its scent, they will react quite differently if only one of them has suffered a severe dog-bite in the past. Furthermore, if, within a cultural group, cats are considered sacred and dogs are considered filthy, messages to that effect will be assimilated along with the associated smells as a person in that society learns to identify each animal.

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[61] Wilson and Stevenson, 33.

[62] This is something of an oversimplification, as Engen's research has shown that 'the ability to recognise odours is superior to the ability to label them' (103). He suspects that 'connections between brain centres for language and olfaction are diffuse' and suggests that 'visual memory and olfactory memory involve different brain structures' (109). Wilson and Stevenson (19) also report that as odour complexity increases, recognition decreases – 'when the mixture contains more than three or four pure chemicals, the animal or person cannot detect all of the original components at better than chance level' – and this not true regarding letters, no matter how long an unfamiliar word. Nevertheless, the

These messages, and their sources, are as much a part of being human as having olfactory receptors, but cannot be analysed using laboratory equipment. Both, as perfumer Paul Jellinek writes, are vital to the manufacture of perfume:

> In the author's opinion the study of the influence of odours on the human senses, connected partly with physiology and partly with psychology, is at least as important for the perfumer as the study of any other subject treated by various authors, and considered to be the foundation of perfumery.[63]

While ancient perfumers did not learn their craft in exactly the same ways perfumers do today, there can be no doubt that 'the influence of odours on the human senses' was of equal and thus utmost importance to them, in that what a customer will actually buy is as crucial a consideration within the profession as any mechanical aspect of the production process. As we examine the roles of perfume in the Classical world, we must thus consider not only the sense of smell as the Classical Greeks understood it, and how that compares to our own understanding, but what smells meant to them as well, and this does not appear to be something they ever attempted to define explicitly.

Aristotle, and his students after him, realised that there was an important connection between the human sense of smell and memory and noted the olfactory relationship between experience and association, but failed to analyse either in any detail. Democritus, Theophrastus, and Leucippus attempted to employ physiological explanations to explicate why a perfume might smell 'good', while something in a state of decay might smell 'bad', but stopped short of considering any discrepancies between biological and psychological processes. Nevertheless, it is clear in the

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example is a useful one, and serves to illustrate why models intended to describe visual communication theory might be adapted to describe smells semiotically as well.

extant literature, though never clearly expressed, that for all of these authors and their contemporaries, things that smelled good *were* good, and things that smelled bad *were* bad, with few exceptions. This simple idea is the cornerstone of modern olfactory anthropology, and merits a great deal of attention as we explore that field.

[63] Jellinek, 1959.

The Anthropology of Smell

While physiology describes the senses in terms of physical functions, the anthropology of the senses studies the many ways in which sociocultural groups use data gathered through the senses to organise and define their worlds. 'Each culture, as well as different historical periods of those and our own culture, has its own sensorium,' according to anthropologist Margaret Kenna, and these can differ greatly.[64] Sensory perception itself may be biological, but the interpretation of sensory experiences is learned behaviour, and thus interpretations of the same sensory input can vary widely between cultures. Studies of various cultural sensoria reveal very diverse ways of ordering the senses, sensing the world, defining and categorising sensory experiences, and generating explanations associated with these experiences. Each culture, therefore, has its own semiotic code, the collective of defined signs and symbols recognised by the culture as a whole which enables individual members to process and agree upon the meanings of the stimuli they perceive. These codes, which include spoken and written language as well as non-verbal and non-literary interpretations of stimuli, are perpetuated as subsequent generations are socialised to understand and function within a particular culture's sensorium, and thus the codes which are unifying within a culture can be divisive between cultures. Naturally the codes change within a culture over time as well, signalling transitions into new paradigms and differentiating between generational groups. The anthropology of the senses in general attempts to decipher these semiotic codes as a means of understanding and describing the cultures which employ them. Olfactory anthropologists in particular consider how smells are used by societies to form 'osmologies', and to categorise individuals in terms of class (and

thus power), gender, ethnicity, and morality; what the economics of fragrance say about a society; and how these perceptions are taught, learned, and change over time. All of these considerations can and certainly should be applied to the classical world.

Anthropology is, as previously mentioned, a relative newcomer among the ranks of formally defined sciences, and while anthropologists have been interested in cultural sensoria for some time, this is a relatively new area of research in terms of the discipline of anthropology as a whole. Furthermore, it is only within the last thirty years or so that researchers in the field have seriously focussed their attentions on smell, 'the least valued, and least researched, of all the senses'.[65] It is not, therefore, terribly surprising that the groundbreaking modern osmological study on the social science side, Gale Largey's and Ron Watson's 'The Sociology of Odors', was first published in the *American Journal of Sociology* in 1972.

The purpose of this paper, according to the authors, was to 'point out that odours, though long neglected by sociologists, do indeed have a significant bearing upon human interaction.'[66] They go on to make a multitude of points which more or less define approaches to subsequent work in the field, specifically that: 'moral symbolism relevant to interaction is expressed in terms of olfactory imagery'; 'group intimacy or alignments are at least partially established or recognized through olfactory stimuli'; 'an olfactory identity is related to a sexual identity'; and 'odour often defines a setting'.

This brief article was declared still to be 'the only general article' on the subject

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[64] Kenna, 3.
[65] Synnott, 1993, 183.
[66] Largey and Watson, 29.

by Anthony Synnott as late as 1993.[67] Largey and Watson themselves cite Georg Simmel (1908) as being the only sociologist known to them who has not 'either ignored odours or regarded them as an insignificant dimension of human interaction' and that 'Simmel (1908) and Berger and Luckmann (1967) are just about the only sociologists who even mention the possibility of a sociology of the senses'.[68] The work of Simmel, Largey, and Watson thus comprises the modern history of general sociological smell studies until the 1980s, although Jim Drobnick notes that a few 'texts focusing on the sense of smell appeared relatively intermittently prior to' that 'watershed moment for smell', and Anthony Synnott reports that research into olfaction in general 'has increased substantially, both in quantity and in scope' since the late 1960s.[69] Nevertheless, the attention paid by anthropologists to the sociocultural impacts of smells skyrocketed after Alain Corbin's *The Foul and the Fragrant*, a study of odours in 18th and 19th century France, was published in 1982, and work in the field has steadily grown since Constance Classen, David Howes, and Anthony Synnott began producing (both independently and collaboratively) studies centering on olfaction in 1988.[70] It was the latter group which published the currently definitive work in the field*, Aroma: a Cultural History of Smell*, in 1994, and since that publication, a far greater interest in the anthropology of smell has led to a comparatively high volume of work on the subject by a variety of social scientists.

In virtually all of these works, however, the respective authors complain about the lack of interest in olfaction in the past, as did Largey and Watson before them,

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[67] Synnott, 1993, 183.
[68] Largey and Watson, 40.
[69] Drobnick (2006) cites Bienfang, 1986; Bedichek 1960; Montcrieff 1966; and Winter, 1976. Synnott (1993) writes that 'The total number of olfactory-related publications listed in MEDLINE [a database of predominantly medical articles] increased from 710 in 1966 to 2,535 in 1987: a 357 percent increase; in BIOSIS [a database for the life sciences] the increase was almost 586 percent, from 675 in 1969 to 3,957 in 1987' (p.204).

and this a bit misleading. The implication seems to be that because there were no treatises published on the sociocultural significance of odours in society prior to the 20th century, no one has ever understood or cared that smells have an impact on individuals, groups, and social interaction until modern times. This is not the case. Literature, particularly poetry, reflects through the centuries that smells perceived as being 'good', particularly floral scents, were associated with other 'good' things, and physicians through the ages have repeatedly emphasised that smells perceived as being 'bad' were associated with illness and death. There is solid evidence that people (and institutions) have defined themselves and their environments according to olfactory associations throughout recorded Western history, and have manipulated smells in order to construct these definitions. While they may have had no formal academic sociocultural studies on olfaction to show for it, people were thinking about and reacting to smells all along. The dearth of formal academic discussion regarding how and why simply suggests that the ideas first expressed by Largey and Watson in 1972 were internalized and thus expressed and understood subconsciously, or taken for granted as being common knowledge before smell was theorised as having sociocultural significance.

Classen et al. (1994) feel that the major contributing factor to the absence of scientific – or even philosophical – treatises on smells per se in the early days of formal social science was the devaluation in western culture of the sense of smell itself. They believe that this devaluation was:

> . . .directly linked to the reevaluation of the senses which took place during the 18th and 19th centuries (AD). The philosophers and scientists of that period decided that, while sight was the pre-eminent sense of

[70] Corbin's book was originally published in French in 1982, and again in English translation in 1986.

> reason and civilization, smell was the sense of madness and savagery. . . Modern humans who emphasised the importance of smell were therefore judged to be either insufficiently evolved savages, degenerate proletariat, or else aberrations: perverts, lunatics, or idiots. This powerful denigration of smell by Europe's intellectual elite has had a lasting effect on the status of olfaction. Smell has been 'silenced' in modernity… it tends to be presented in terms of its stereotypical association with moral and mental degeneracy.[71]

D.M. Stoddart, however, places the 'powerful denigration of smell' during the Renaissance beginning in the 14th century AD, when the emphasis on human superiority over other creatures inspired moralists and theologians to divorce humanity from any characteristics shared with animals. He writes that:

> During the centuries from the end of the Dark Ages until the Industrial Revolution, when European culture was experimenting with perfumes for disease protection and to provide a semblance of cleanliness, philosophers argued and debated man's place in the plethora of nature. . .Any characteristic shared with the animals diminished man's glorious image and made him no better than the animals over which he had been set to reign. . .The lives of animals, with their earthy and undecorous habits – including an olfactory interest in the bodies of their fellows – were something to be scorned.[72]

Certainly it seems to be the case that the sense of smell was at some point demoted from third place, where Aristotle has it (behind sight and hearing), to a distant and comparatively ignored fifth place, and this attitude conflicts strongly with the Aristotelian view that the ability to appreciate non-nutritive smells for their own sake (which ability he attributes to a larger and moister brain) specifically *separates*

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[71] Classen, et al., 1994, 3-4.
[72] Stoddart, 1990, 4-6.

humans from the remainder of the animal kingdom.[73] Further, this 'denigration' of smell seems more likely to have taken place earlier rather than later, and Stoddart's arguments for the 14th century thus seem superior to those of Classen et al. for the 18th. For example, his sentiments on the subject echo the writings of Thomas Willis, who suggested in 1664 that:

> The smelling Nerves. . .are larger in all Brutes than in Man, the reason on which is, because they discern things only by these senses, and especially their food by the smell; but Man learns many things by education or nurture and discourse, and is rather led by the taste and sight, than by the smell in chusing his aliments.[74]

There is a clear separation here between education and discourse, on the one hand, and sniffing one's food, on the other, and naturally any sophisticated 17th century reader would have preferred to be 'led by the taste and sight' than thought to have anything in common with 'all Brutes'. Nevertheless, it seems quite likely that the relative demotion of smell in the hierarchy of the senses took place significantly earlier than even Stoddart has it, although he is probably quite right to correlate this with the perceived dominion of humanity over all other creatures, a concept promoted (if not emphasised) in the course of the widespread adoption of Christianity.

Regardless, as we see in Stoddart's paragraphs, there is an obvious contradiction here: 'an olfactory interest' in the bodies of others was 'something to be scorned' during the Renaissance, yet at the same time people were using 'perfumes for disease protection and to provide a semblance of cleanliness'. Herein seems to lie the truth. While it might well have been the mark of the 'degenerate proletariat, pervert, lunatic, or idiot', as Classen et al. have it, to profess an interest in smells in

[73] Aristotle, *De Sensu*, 444a-b.
[74] Willis, 1664, 138.

the 18th century, this does not, and cannot, mean that smells were ever socially unimportant. On the contrary, as Alain Corbin has shown, smells were of paramount importance to the general public in the 18th century, and this was equally true from the Middle Ages onward, especially during plague years, due to the fact that smells were so closely associated with health and hygiene – an idea with which the Hippocratic physicians were very familiar.

Largely because it was commonly believed from the time of Galen until the late 18th century that the cribriform plate in front of the brain was porous, it was also commonly believed that odorants directly entered the brain. This belief made the association with any sort of foul stench and untimely death a very real and frightening one indeed. Finger writes that:

> Until the second half of the eighteenth century, air was viewed as an element and passive carrier of foreign particles that could affect the health of an organism. People had learned to avoid air infected with putrid exhalations. They thought stale air could hasten the putrefaction of the body by causing changes in the four humors. . .The release of foul-smelling organic substances, such as those that might occur with land excavation, could cause a panic. The smell of a corpse was even believed capable of causing death.[75]

Palmer agrees. 'From antiquity,' he writes, 'infections, and especially epidemic diseases, were thought to be caused by miasmatic vapours rising up from decaying and putrid matter to infect the air.' Just as 'Galen observed that it was especially dangerous to associate with the sick whose breath was so putrid that their houses stank' in the second century AD, so did the Franciscan philosopher Bartholomeus Anglicus insist that the 'stinking breath of lepers' was infectious in AD

[75] Finger, 177.

1240. Certainly it is more than likely that general hygiene was much improved and disease vectors were somewhat controlled as 'fear of epidemics motivated public health measures governing street cleaning, sewage disposal, the free-flowing of water courses, the zoning of industries, and hygiene in meat, fish and fruit markets', but Palmer notes that these measures did not stop there:

> During the Black Death of 1348 the Italian town of Pistoia regulated the depth of burials 'to avoid a foul stink' (*ad evitandem turpem fetorem*), and banned the tanning of hides within the city walls 'so that stink and putrefaction should not harm the people (*ut fetor et putredo hominibus obesse non possit*). The Venetian senate in the same crisis solemnly ordered the expulsion from the town of bad salt pork, 'which causes a great stench and in consequence putrefaction which is the corruption of the air' (*que multum fetorem inducunt et per consequens putredinem quod est corruptio aeris*).[76]

Palmer reports further that in 1501, the Venetian Provveditori alla Sanità ordered the removal of a rubbish tip, 'knowing that amongst other measures that we can and should take to keep this city healthy, one of the most important is to remove as far as possible all those things which give off smells and stinks which easily produce diseases'. This policy of removal apparently applied to people as well as to rubbish; in 1522, Venice mandated the involuntary hospitalisation of syphilitic beggars, to prevent infection of their neighbours by means of their great stench (*con grandissimo fettor*).[77]

Where foul smells were thought to compromise health, good ones, conversely, were believed to preserve or even to promote it. Bartholomeus Anglicus (1240) believed that an aromatic smell would overcome a foetid smell if the two were mixed,

[76] Palmer, 64.
[77] Palmer, 64-65.

'for the olfactory sense delighted in the aromatic, and rejected the foetid', and Bartolomeo da Montagnana (d. 1452) recommended burning 'mint, storax, incense and aloe wood' on the fire in dirty inns.[78] Palmer also describes a popular therapy in the Middle Ages, immortalised by Trotula of Salerno in her 11th century work *Passionibus Mulierum Curandorum*, for treatment of the 'wandering womb' associated with hysteria: the physician was 'to apply bad smells to the nose to repel the womb from above – burned wool and old shoes, asafoetida and castor – while applying sweet perfumes to the vagina to attract the womb downwards.' This treatment modality was apparently still popular in the sixteenth century, when the French surgeon Ambroise Paré 'helpfully published an illustration of a fumigating device which might be used for the purpose (*un pot pour recevoir les parfums au col del la matrice*)'. The author notes, however, that 'there seems to have been no suggestion at the time that some diseases had characteristic odours', and that 'Physicians may indeed have been reluctant to investigate too closely the bad odour of their patients.'[79]

This seems rather an understatement given the precautions taken by plague doctors, which included a long waxed (or suet-coated) overcoat, leather pants, a wooden rod to help the doctor avoid having to touch the patient directly, and a bird-like mask featuring red crystal eyepieces and a long beak filled with aromatic herbs (fig. 6) to protect the doctor from potential infection via the miasma of ruptured buboes.[80] Similarly, the mainstream population of Europe in the 14th and 15th centuries attempted to fight the plague with fires of resinous pine or wood sprinkled

[78] Palmer, 65.
[79] Palmer, 64.
[80] Fig. 5: 'Doktor Schabel von Rom', engraving by Paul Furst, Rome 1656.

with sulphur, aromatic pastilles, potpourri, and Eau de Cologne.[81] Thomas Dekker noted in *The Wonderfull Yeare* (1603) that during the plague in London the prices of even simple, locally grown aromatics had soared, complaining that 'The price of flowers, hearbes and garlands, rose wonderfully, in so much that rosemary, which had wont to be sold for 12 pence an armefull, went now for six shillings a handfull.' Not, he noted further, that these nor anything else did much good:

> Neuer let any man aske me what became of our Phisitions in this Massacre, they hid their Synodicall heads as well as the prowdest: and I cannot blame them, for their Phlebotomies, Losinges, and Electuaries, with their Diacatholicons, Diacodions, Amulets, and Antidotes, had not so much strength to hold life and soule together, as a pot of Pinders Ale and a Nutmeg: their Drugs turned to durt, their simples [were] simple things: Galen could do no more good than Sir Giles Goosecap: Hipocrates, Auicen, Paraselsus, Rasis, Fernelius, with all their succeeding rabble of Doctors and Water-casters, were at their wits end, or I thinke rather at the worlds end. . .[82]

Fig. 5: Plague Doctor

Nevertheless, these herbal remedies continued to be popular even after the work of the French physician Félix Vicq-d'Azyr (1748–1794) revealed aromatic fumigation to be ineffective, merely masking smells rather than destroying the sources of odour themselves (as would, for example, 'limewater, sulphuric acid, nitric acid, and related substances', none of which smell particularly pleasant).[83] Alain Corbin summarises the list of protective measures

[81] Stoddart, 1990, 1-3.
[82] Dekker, 23, 25.
[83] Finger, 178.

prescribed in 1800 by Papon:

> A sponge soaked in vinegar or a lemon studded with cloves or an odoriferous ball will be carried in the hand and sniffed from time to time. For people who are not in a position to afford odoriferous balls or perfume-pans, the best authors recommend sachets of rue, melissa, marjoram, mint, sage, rosemary, orange blossom, basil, thyme, serpolet, lavender, bay leaves, orange and lemon bark, and quince rind; they recommend that these always be present in apartments at the time of plague.[84]

One wonders whether people who couldn't afford even the cheapest of these suggestions had access to this list, but whether they did or not, they were surely aware that their poverty endangered them; doubtless they were equally aware that their wealthier neighbours considered them a danger to others.

Stoddart notes that during the Middle Ages, 'Few people, other than the wealthy landlords, had access to baths and servants to fill and heat them', and that after 'the plague had closed down Europe's grand communal bath houses, the body was seldom washed. By the seventeenth century, the "clean" body smelled richly of expensive perfume'. The implication here certainly seems to be that those whose means fell short of purchasing expensive perfume were not considered clean, which must have impacted them socially. Palmer writes that it was due to the associations of stench with disease and death that throughout the Middle Ages, 'Aromatic fires and fumigations, scented candles, rose water, aromatic herbs and sweet-smelling flowers, perfumed clothes and bedding were therefore an important part of the hygiene of the home', but again, this assertion begs the question, whose home?[85] Many homes must have lacked the luxuries Palmer describes, and it stands to

[84] Corbin, 63-64.
[85] Stoddart, 1990, 4; Palmer, 65.

reason that those homes, and their inhabitants, were avoided by the more fortunate. In the panic surrounding contagion, Finger reports that 'people became afraid of crowding together in barracks, churches, and especially in prisons and aboard ships', but it seems obvious that those without access to expensive aromatics, let alone private chapels, would be far more likely to find themselves in those places, and it would be absurd to suggest that no one noticed the difference between those two groups from a purely olfactory standpoint.[86] All of these cases illustrate the dichotomy between 'the rose and the skunk', that which is attractive, and that which must be avoided. It stands to reason that the members of both groups knew who belonged to each on the basis of smell, and that this division had major sociocultural repercussions.

Two equally notable examples of the significance of smells on social interaction in European history involve the cases of tobacco and foreigners. The first is particularly interesting, because there was much disagreement regarding whether tobacco gave off a good smell, and was thus healthy, or stank, and was thus dangerous. The second illustrates the ways in which people use smells to construct their own sociocultural identities and those of others.

Tobacco is native to the Americas, and although it is believed to have grown there since roughly 6000 BC, and to have been in habitual use by Native Americans by 1 BC, it was unknown in Europe prior to the first voyage of Christopher Columbus. According to Gene Bornio, it was one of Columbus' sailors, Rodrigo de Jerez, who 'brought the habit back to his hometown, but the smoke billowing from his mouth and nose so frightened his neighbours he was imprisoned by the holy inquisitors for 7 years.' While de Jerez was in prison, however, a monk named Ramon Pare, who

[86] Finger, 178.

accompanied Columbus on his second voyage, introduced snuff and smoking to Europe in a report entitled *De Insularium Ritibus* (1497), and by the time de Jerez was released, 'smoking was a Spanish craze'.[87] Subsequently, some people used tobacco smoke 'to correct the air' – Palmer cites John Josselyn (1672) as claiming that it 'prevents infection by scents' – while others felt that it was in and of itself a pollutant. There were enough of the latter that a treatise, *Discours sur le Tabac, où il est Traité Particulièrement du Tabac en Poudre*, was published in 1668 by Jean le Royer Sieur de Prade (pseudonym Edme Baillard) to allay their fears, but whether or not this effort convinced anyone that 'tobacco and related substances do not enter the brain', and were therefore safe, tobacco use was clearly socially divisive even among members of the same economic class. This surely had repercussions on interaction, just as it does today.[88] However, it is noteworthy that other smells currently perceived as being toxic do not appear to have bothered the general population; Stanley Finger points out that in the 17th century, 'the growing smell of industrial pollutants (e.g. from burning coal) did not cause any of the anxiety associated with putrefaction.'[89]

Tobacco may have been a contentious subject, but on foreigners, Western Europeans seemed to agree: the more foreign they were, the worse they smelled. 'It was presumed,' writes Finger, 'that Eskimos, Hottentots, and Black Africans emitted stronger odours than Western Europeans. This thinking was consonant with the idea that these races were [evolutionarily] closer to wild animals than Caucasians.'[90] Certainly this thinking facilitated the subjugation and even enslavement of these

[87] Bornio, 2007.
[88] Palmer, 66; Finger, 177.
[89] Finger, 178.
[90] Finger, 178.

people, but Largey and Watson suggest that this sort of perception is commonly applied to outsiders of any kind:

> . . .stereotypes and the dynamics of prejudice often derive from alleged, as well as real, odours given off by particular groups. Indeed, odours are often referred to as the insurmountable barrier to close interracial and/or interclass interaction, and they are repeatedly referred to in order to account for avoidance patterns and segregated ecological niches. . .Class prejudices are equally supported by imputations that those of the lower class are "foul smelling" and must be avoided if one is sensitive to such odours.[91]

Indeed, evidence that this is a virtually universal means by which humans use olfactory symbolism to structure their social realities by defining 'us' as opposed to 'them' abounds. Margaret Kenna reports that the Dassenetch pastoralists of Southwest Ethiopia abhor the odours associated with the nearby fishermen of Lake Turkana:

> For the pastoralists, everything associated with cattle smell good; men smear manure on their bodies and women smear liquid butter on their upper bodies and heads. . .Other pastoralists and agriculturalists are said to smell different but tolerable, but the smell of those who fish for a living is said to be bad to the point of revulsion. . .the Dassanetch will hold their noses not only because they consider the smell disgusting but also because the bad smell of fish is believed to be contagious and will affect the fertility of cattle.[92]

No doubt many Westerners would hold their noses if surrounded by Dassanetch pastoralists, but the 'other' doesn't have to smell 'bad' to be 'other', just different. Subjects in a 2005 study undertaken in Singapore, regardless of their own ethnicity, routinely divided the city into 'Indian, 'Chinese', and 'Malay' smellscapes 'as if they

[91] Largey and Watson, 32-33.

were homogeneous groupings', leading sociologist Kelvin Low to conclude that 'racial categorization transpires, also, via the olfactory, and this takes place through processes of stereotyping, arising from an individual social actor's expectation of person/place and smell, and, thereby, arriving at a perception of the racial other.'[93]

The cultural sensoria of two groups might differ greatly, but the behaviour patterns remain the same, and thus, like physiology, seem to be common to all humans. Sensory interpretation is taught and learned, individuals are enculturated into the smellscapes in which they live, and decisions regarding who is 'us' and who is 'them' are often olfactory in nature. The premises put forth by Largey and Watson in 1972 seem to apply throughout the Western world over time, and just as we have seen the Europeans of the Middle Ages and beyond confirm these premises, so can we expect to see the same patterns in antiquity. How then, do these ideas about smells reveal themselves in the ancient world, particularly the transitions between the Classical Greek period, when interaction with foreigners was more limited, and the Roman period, when the Empire incorporated a wide variety of formerly separate cultural groups? How did these people use olfactory symbolism to define or explain their interactions, to categorise themselves and others? How did smells establish group intimacy and alignments, or define gender and setting? What happened when individuals disagreed whether a smell was a good or bad one? What values can we ascribe to individuals or institutions based on smells? Most importantly, what roles did perfume play in all of these situations?

The problems inherent in studying classical civilisations lie in the fact that these civilisations cannot be observed, and historians are left with only remnants of

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[92] Kenna, 5.
[93] Low, 411.

material and literary culture as clues. Classen et al. refer to the process of deciphering the sociocultural meanings of smells in the past as 'an archaeology of smell', 'an attempt to recover – under the many layers of Western visualism – the olfactory world of the premodern West', but they point out that this is not a process totally divorced from studying an extant culture, as, in any event, 'In the realm of olfaction, we must make do with descriptions and recollections.'[94] These authors feel that 'an olfactory gulf lies between our own deodorized modern life and the richly scented lives of our forebears,' who employed and enjoyed pleasant smells in ways 'so alien as to seem absurd' and suffered unpleasant ones 'eliminated from our modern First World consciousness' as a matter of course.[95] Historian Paul Faure agrees, suggesting that the modern researcher's efforts to describe the tastes and smells of the ancient world are tantamount to a man born blind at birth trying to describe a colourful landscape.[96] According to all of these authors, we cannot possibly imagine the extent to which smells and smelling impacted daily life before the advent of the Christian era, which increases the difficulty of studying Greek and Roman culture. Nevertheless, while we cannot comprehend the exact strengths, natures, or mixtures of the smells which infused the lives of the Classical and Hellenistic Greeks and Romans, we can, at least, explore what these smells meant to them, and how they were perceived and understood both physically and sociologically.

Modern methodologies allow us to begin to answer olfactory questions in the absence of extant smells because olfactory anthropology relies on *words* to deconstruct and explicate the sociocultural meanings and values attached to smells.

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[94] Classen et al., 1994, 5, 3.
[95] Classen et al., 1994,13.

Similarly, modern work on the subject of the psychology of perfume suggests that even within relatively discrete cultural groups, different people are attracted to different perfumes, perfumes elicit different social responses in different circumstances, and fragrance popularity trends change as societies change over time. These, too, are ideas which can be explored in an ancient context.

The aromatic products of the ancient world were defined by their intended purposes rather than by their ingredients, as all of the plant-based materials involved, as well as the fats and alcohol employed, were also used in medicinal preparations and foods. Nevertheless, although the same plant might well appear in cosmetics, drugs, and dinners, the ancient Egyptians had a rich vocabulary to describe the various aromatic concoctions they produced and used, and the Greeks inherited their distinctions between incenses designed to give off scent when burnt (θυμίαμα), scented dry powders made of spices and solids (Theophrastus calls these 'ἀρώματα καὶ διαπάσματα'), and other perfume products (μύρα)[97]. In the latter category, the difference between unguents and ointments, comparatively solid but viscous concoctions with fatty bases, and liquid fragrance oils seems to have been a bit more blurred. Throughout this paper, all of these products will be considered 'perfumes', skin-soluble cosmetics intended to be applied to the body for the purposes of enhancing beauty through scent. Given the descriptions of their uses in the literature, and the greater volume of excavated flasks designed to contain liquid perfumes as opposed to pots designed to contain solid ones, the liquid oil-based perfumes seem to have been far more popular, although there were certainly markets

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[96] Faure, 13.

[97] There are, of course, many variants of these words, and other words to describe these products as well; this is a generalisation. Note that while Theophrastus describes μύρα as being specifically mixtures of solids with liquids (III.8), the products of the processes this word describes were both liquid perfume oils and concoctions such as unguents, which thicken after cooling to form what are currently

for both. To some degree, the inhabitants of the Classical and Hellenistic Greek and Roman societies were very consciously aware of the semiotics of perfume within their cultures, as is evidenced by the extant literature. Material culture, in turn, reveals that perfumes themselves or, at the very least, the exposure to these, were part of everyday life, and featured significantly in special events both public and private. Frequently the messages perfumers intended to be communicated by the perfumes themselves were echoed or enhanced by the containers in which they were bought, sold, and presented, and thus consideration of these containers is also necessary in order to fully decipher the related olfactory codes.

The fact that the ancients did not practice a formal 'anthropology of smell', or indeed any sort of formal anthropology as we currently define that, and therefore produced no studies or treatises on the subject neither indicates their disinterest in smells nor precludes examination of their olfactory culture from a modern perspective. They did have a strong interest in the human body and how that functioned, and olfaction certainly figured into this; they also made a variety of observations regarding both perfume and perfume psychology. Before we analyse, then, the overlaps and discrepancies in Classical and modern attitudes toward smells in general and perfumes in particular, it behooves us to explore olfaction itself from a Greek point of view.

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known as 'perfume solids'.

The Classical Sense of Smell

The modern definition of the word ‘science’ presupposes modern scientific method, which was not formally developed until well into the 18th century AD. William Whewell coined the word ‘scientist’ in 1833, and many modern scientists by his definition seem happy to assume that there were no scientists before that time. The noted psychophysicist Trygg Engen, for example, sneers at the work of Theophrastus, as ‘This scholar also wrote about rocks and plants and treated all of these things at a very general level, judged by present standards.’ While it is certainly true that present standards require both a degree of specialisation and a plethora of highly sophisticated technological equipment which would have flabbergasted Theophrastus and his contemporaries, Engen goes on to add insult to injury by declaring that ‘Most of the old literature is anecdotal and descriptive and of little explanatory value, and I shall not dwell upon it.’[98] Indeed, far from dwelling upon it, he fails to make any further mention either of Theophrastus or of any other classical authors throughout the remainder of his book, and indeed, it seems very unlikely that Engen even bothered to *read* Theophrastus’ work regarding smells. Had he done so, he would certainly have found some interesting correlations with his own research. This sort of ignorance is not unusual, however, as sadly, classical texts are generally considered extraneous by modern researchers simply on the grounds that they are ‘not science’.

The traditional term for those ancient and classical scholars who sought to explain how physical realities work is ‘natural philosopher’, as these people frequently failed to perform experiments (and even more rarely under controlled conditions), often analyzed observable data in strictly theoretical or philosophical terms, and felt

no need to operate outside of a framework of social, cultural, or any other type of bias. In short, most of their methodology would be considered highly suspect or ignored completely by modern standards, and truly, they cannot be called 'scientists' by the modern definition. Aristotle himself felt that physics and psychology (as he understood them), as well as most of the rest of the specific fields of study currently considered 'sciences', fell within the boundaries of philosophy, but that logic did not, as it 'does not examine a particular area of reality'.[99] To him, at least, 'science' and 'philosophy' were one and the same, and indeed, what is and isn't science and why may always be a matter of some debate.

Nevertheless, to claim that these scholars, who laid the groundwork for modern scientific standards, were not in fact engaged in scientific pursuits seems grossly unjust. Furthermore, there are problems with the term 'natural philosopher', as well; as Peter Barker points out, 'A central question is the extent to which natural philosophy is to be subordinated to other fields of knowledge, and to what extent it may be pursued as an autonomous study.' Barker's solution where the ancients are concerned is that 'Calling them scientists is no more than a shorthand way of recognizing their contributions to the history of the subjects we today call "scientific"'.[100] This is a nice work-around, but seems a bit weak. While no one alive today would voluntarily visit a physician who employed only the instruments and technology available in the 4th century BC, no one argues that Hippocrates was in fact practicing medicine at that time. Similarly, one cannot argue that Archimedes, with his hydrostatics and levers, was not engaged in studying physics, or that ancient perfumers weren't the chemists of their day. For the purpose of this paper, then, the

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[98] Ross, 1962; Engen, 1982, 3.
[99] *De Partibus Animalium*, I.1.639a4, W.Ogle, trans.

word ‘science’ and its derivatives will be used both to recognize ancient contributions to modern science, as Barker would have it, and to separate those authors whose works reveal a scientific approach from those which are purely theoretical.

[100] Barker, 136.

Heraclitus

Heraclitus of Ephesus was a pre-Socratic philosopher who lived from roughly 535-475 BCE. His extant fragments cannot be called scientific by any stretch of the imagination, but one is of particular interest here; fragment 98 simply states that:

Αἱ ψυχαὶ ὀσμῶνται καθ' Ἅιδην.

Martha Nussbaum argues that fragment 98 'mocks the absurdity of the typical conception of a world of shades, while playing on the standard folk etymology of Hades as the "sightless place".' Nussbaum continues:

> Since the traditional ψυχή is a principle of breath, Heraclitus may also be declaring the popular picture to be self-contradictory. The way Hades is described, the only way that shades could do anything there would be by sniffing; but the shades are breath, and how could breath itself sniff? To say 'shades sniff' is absurd and illogical. In any case, this fragment by no means outweighs the strong evidence of fragment 36 as to Heraclitus' opposition to traditional ideas of death.

Further, Nussbaum feels that because 'Heraclitus generally uses ψυχή in the singular without the generic article,' the presence of the article in fragment 98 'should indicate that a definite reference is being made. Perhaps it even retains demonstrative force. Thus: 'These (the Homeric) ψυχαί, or shades, must sniff to find their way around down in the "sightless place".'[101]

Homer says nothing of whether or not souls in Hades can smell, but clearly his noncorporeal shades can see and hear. In *Odyssey* 11.206, Odysseus tries three times to hug his dead mother, but she flits from his arms "like a shadow or a dream". This is the lot of the dead, she tells him:

ἀλλ' αὕτη δίκη ἐστὶ βροτῶν, ὅτε τίς κε θάνῃσιν:

[101] Nussbaum, 1972.

οὐ γὰρ ἔτι σάρκας τε καὶ ὀστέα ἶνες ἔχουσιν,
ἀλλὰ τὰ μέν τε πυρὸς κρατερὸν μένος αἰθομένοιο
δαμνᾷ, ἐπεί κε πρῶτα λίπῃ λευκ᾽ ὀστέα θυμός,
ψυχὴ δ᾽ ἠύτ᾽ ὄνειρος ἀποπταμένη πεπότηται.
This is the appointed way with mortals when one dies. For the sinews no longer hold the flesh and the bones together, but the strong might of blazing fire destroys these, as soon as the life leaves the white bones, and the spirit, like a dream, flits away and hovers to and fro.[102]

Heraclitus' shades are apparently noncorporeal as well; Simon Tugwell writes that 'it seems to be generally agreed that Heraclitus thought the soul to be, in principle, fire.' Tugwell feels, however, that arguments like Nussbaum's overthink this simple fragment:

> Perhaps, as so often, we are being too clever, and overlooking the obvious, to which Heraclitus keeps trying to bring us back ('the sun is a foot wide' – fr. 3 DK). Why do souls smell in Hades? Well, 'it is death for souls to become water' (fr. 36 DK), 'it is death for souls to get wet' (fr. 77). . .And what happens when fire gets wet? A lot of smoke. 'And if all things became smoke, the nostrils would discern them' (fr. 7 DK). That is to say, in a place of quenched souls (Hades), it is the sense of smell that has to come into play. [103]

While Homer's shades have no substance, they do have form; Odysseus immediately recognizes his mother and several other denizens of Hades as well. It stands to reason, then, that if shades have a human shape, they have nostrils. They cannot touch, but they can speak and hear; why not smell? It would be fascinating to know *what* souls in Hades smell, but there is no further information given in Heraclitus' fragments.

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[102] *Odyssey* 11.218-222, A.T. Murray trans.
[103] Tugwell, 32.

Hippocrates

Hippocrates (c. 460-370) and the other physicians whose work forms the Hippocratic Corpus certainly deserve credit for inspiring scientific methodology. These authors strove to define and explain human physiology, in states of both health and illness, in terms of natural systems and causes rather than attributing either condition to divine influence. Further, they attempted (albeit with mixed results) to divorce medicine from philosophy as well. Empirical observation and collective experience superseded superstition and conjecture whenever possible in their written work, and, in the words of translator W.H.S. Jones, 'the spirit is truly scientific, in the modern and strictest sense of the word.'[104]

While the practice of medicine was not regulated at the time, Hippocratic physicians studied and apprenticed under other physicians to learn their craft. E.D. Phillips writes:

> The medical profession in those days was not, any more than other professions, an officially organized body of men having recognized qualifications and subject to the discipline and penalties of a governing authority which could debar offending members from practice. There was certainly a professional spirit and ethic, but this was a voluntary and personal αἰδώς, not enforced by external sanctions. It was part of the teaching of the medical schools and of the guilds, particularly the Asclepiadae of Cos to which Hippocrates belonged. The career of a doctor generally began in one of the schools, and it would be natural for him to belong to one of the guilds, but practice was equally open to others, including quacks, charlatans, drug-sellers, and even magicians.[105]

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[104] *Hippocrates I*, xv.
[105] Phillips, 70-71.

What distinguished Hippocratic physicians from charlatans, then, was their code of ethics and their attempts at standardizing practice through experimentation and sharing of knowledge. Obviously, given their limited understanding of human anatomy and the lack of modern medical technology, successes in terms of cures were limited; nevertheless, they were responsible for major medical advancements over time.

Sadly, no Hippocratic work has survived pertaining to the physical process of olfaction, if indeed any were ever undertaken; the moratorium on human dissection studies in the Classical period may well have prevented much exploration into the subject. Smells themselves, however, both those in the environment and those produced by the human body, especially in illness, are taken into account throughout the corpus, both as incidental aspects of external influences on the body and as diagnostic indicators. Clearly the perception of these smells was important to physicians at the time, a tradition which continued for centuries.

Greek medical theory of the 4th century BC was predicated largely on the humoral theory of the Hippocratics, though the precise number and specific nature of both the bodily humours and the 'opposites' which influence these vary from one text to the next. 'There is no unanimity among historians whether the Corpus reveals one underlying common "core" or picture,' write Balzer and Eleftheriadis, and so for the purposes of this paper I will focus on the model which was passed down for centuries, appearing even in Old English medical texts, that model described in the Hippocratic work *The Nature of Man.*[106]

According to *The Nature of Man*, there are four humours – blood, phlegm, yellow bile, and black bile -- which must exist in balance within the body to maintain

physical health, and each possess a certain δύναμις or 'power': 'hot', 'cold', 'moist' and 'dry'.[107] This is, writes Lois Ayoub,

> . . .a tradition dating back to such early Greek philosophers as Empedocles, who explained all matter as consisting of four elements: air, water, fire, and earth. The four qualities – heat, cold, aridity, and moisture – were thought to combine in pairs in these elements; thus air was hot and moist, water cold and moist, fire hot and dry, and earth cold and dry. Although this was only one of several early theories, it achieved a kind of authority in the writings of the Hippocratic Collection. . .While the viewpoints in these essays were far from unified, nonetheless there emerged from them a generally accepted theory of four bodily humours corresponding to the four elements and qualities. . .expressly identified as the crucial factors in health and illness.. . This theory persisted for almost two thousand years in medical literature. Refinements were added by later writers, but this remained the cornerstone of medical belief.[108]

The basic idea is that everything in nature is made up of some combination of these elemental properties (air, water, fire, and earth), and their δυνάμεις act upon the bodily humours, or χυμοί, the essential body fluids by means of whose mixture (κρᾶσις) health is maintained or lost. In its natural state, the body is healthy; disease is the result of influences external to the body having caused an internal imbalance in these bodily humours. 'Thus increase of blood, for instance, leads to increase of warmth and moisture, and conversely,' Balzer and Eleftheriadis explain. 'If phlegm,

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[106] Balzar and Eleftheriadis, 225; Ayoub, 332.
[107] *The Nature of Man* is the only Hippocratic text in which there are four humours as described. It is, however, the most well-known; this is the model which survived and was so prevalent in the Middle Ages.
[108] Ayoub, 334.

for instance, increases then. . .coldness also increases, that is: temperature *decreases*.'

> Thus a person's health depends on three characteristics of his body's humoral state: first, it depends on the mixture of the *humores*; health can obtain only in case they are mixed. Second, 'qualitative intensity' of the *humores*, and third, their quantities have to obtain in the 'right measure.
>
> This ideal mixture-balance *humoral* standard (*eukrasia*) is not the same in every individual, it makes up the special nature of a person's body, and the special humoral condition of his health. If this standard obtains we say that the state of the person is eucratic.
>
> Now the person may be exposed to causes which destroy the optimally proportioned *humoral* state, so that either one of the four *humores* increases or is in lack or becomes qualitatively more intense than the others, and is isolated in some sense. The person then becomes sick. Therapy consists in finding out which of the *humores* have run out of their range of equilibrium and in diminishing or increasing their quantities, qualities, or mixture so that equilibrium is restored.[109]

Clearly the observation of the patient required and the means of determining the appropriate treatment were empirical processes, and Ayoub makes the point that 'The possibility that humoral theory was based on empirical observation has been argued by a modern pathologist, R.G. Macfarlane, who points out that blood taken from patients suffering from certain diseases tends to separate into layers resembling these humors.'

> In this interpretation, the lowest layer of sedimented red cells could be divided into a darker section (corresponding to black bile) and a lighter red section (corresponding to blood) depending on the amount of

[109] Balzer and Eleftheriadis, 208, 212.

> oxygenation, while the upper cell-free fibrin clot would represent phlegm, and the thin serum on top, yellow bile.[110]

Balzer and Eleftheriadis note that 'no strict ways of measuring the qualities [of the humours] were known, and no attempts at measuring the quantities of the *humores* were made. . .There is only "more or less" of some humour or of some quality – in accordance with what could be observed.'[111] Granted, this would preclude humoral theory being considered a scientific process today, but this combination of observation with hypothesis and experimentation with treatment modalities is absolutely a precursor to the scientific method, and there is no doubt that medicine is being practiced here. However, as Phillips notes,

> . . .[W]ith practical doctors generally, prognosis and not diagnosis was the mark of the trained practitioner. The consequence of this view, and in any case of the general ignorance of causes, was that medicines, as we understand them, were little used, except for purges, diuretics, emetics, expectorants, sudorifics, sleeping-draughts, and external applications such as poultices, embrocations, and vapour-baths. The theoretical purpose of these was to draw off, or collect locally, morbid humours which were causing the disorder either by their mere presence or by excessive quantity.[112]

Certainly the ancient Greek pharmacy looked nothing like our modern drugstores, and physicians had far less access to specific treatment modalities, but as the above list shows, there were a wide variety of different remedies available, and the variation increases dramatically when mixtures and combinations of individual 'medicines' are introduced. Salves, oils, ointments and unguents were concocted for the purpose of treating patients and special foods and drinks prescribed, and these might be

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[110] Ayoub, 334.
[111] Balzer and Eleftheriadis, 209.
[112] Balzer and Eleftheriadis, 78.

administered hot or cold, of thick or thin consistency, depending on the condition of the patient. There is discussion in the Hippocratic corpus of the relative value of different drugs for the same ailment, and the different effects on the same patient if a particular drug or emetic is administered during different seasons of the year. In *Regimen of Acute Diseases*, Couch summarizes the different qualities of various wines as treatments:

> Wine in general, as opposed to the cooling and moist qualities of water, is hot and dry, and it has purgative qualities. Thereafter the differing varieties are mentioned and characterized. There are dark and harsh wines which are more dry; there are soft dark wines, sweet dark wines, and harsh white wines. New wines have certain qualities, and those with bouquet differ from those of the same age but lacking bouquet. There are thick wines and thin wines, acid wines and must alone, boiled down wines and wine made from the husks of grapes. Vinegar itself is mentioned and characterized. One concludes again that the physician observed with very great care and over long periods the effects of these different wines on his patients in order to be in a position to differentiate and describe as accurately as he does their appropriate functions.[113]

This attention to detail and specificity regarding what appears on the surface to be a single substance is a pattern throughout the Corpus. In spite of the limited number of treatment modalities, much care was made to make these as efficacious as possible, and this, as Couch puts it, 'indicates a considerable background of experimental research on the part of the physician'.[114] The information gathered as a result of this research was both recorded for and taught to other physicians, and a medical tradition was formed. To refuse to recognize this as being 'science' is absurd. *Regimen* III, Couch adds, includes a long list of various types of foods which may be

[113] Couch, 201; Hippocrates, *Regimen in Acute Diseases*, XLIX.14L-LII.
[114] Couch, 197.

administered to different patients depending on their condition, which list includes pork soup, fish boiled in brine, leeks and onions (both boiled and raw), and pumpkin, among others, and Couch makes the excellent point that 'This paragraph serves again as a reminder that the prescriptions of the physician were not abstruse, but depended necessarily on foods and drinks readily available to the inhabitants of the village or countryside.[115] *Decorum* suggests that 'There should also be a second physician's case at hand, of simpler make, that can be carried on a journey in the hands; this should be methodically arranged. Drugs, simple and compound, and emollients must also be remembered and prepared'.[116] It was necessary that doctors be able to travel to visit patients, and that patients had access to the prescribed treatments; this explains why dietary and pharmacological treatment modalities tended to be simple rather than complex.

While the Hippocratics felt strongly that nature itself was the only means by which an imbalance in the body was corrected, they also believed that appropriate medical treatment by means of diet, drugs, certain behavioural modifications, and, to a very limited extent, surgery, assisted nature in allowing a patient to heal. Understanding the root cause of a given disease, for example an excess of cold moisture, allowed these physicians to treat the patient with an opposing remedy, in this case a hot, drying poultice, in an attempt to encourage the patient's body back to its naturally balanced state. 'Opposites are cures for opposites,' the author of *Breaths* tells us:

> Αὖτις αὖ δίψαν ἔπαυσε πόσις. Πάλιν αὖ πλησμονὴν ἰῆται κένωσις. Κένωσιν δὲ πλησμονή. πόνον δὲ ἀπονίη. ἑνὶ δὲ συντόμῳ λόγῳ. τὰ ἐναντία τῶν ἐναντίων ἐστὶν ἰήματα. ἰητρικὴ γὰρ ἐστιν ἀφαίρεσις καὶ

[115] *Regimen III*, LXXIX.II; LXXX.10; LXXXI.14; LXXXII.13. Couch, 1936, 204.
[116] *Decorum*, VIII; Phillips, 1953, 76.

> πρόσθεσις, ἀφαίρεσις μὲν τῶν πλεοναζόντων, πρόσθεσις δὲ τῶν ἐλλειπόντων. ὁ δὲ τοῦτ' ἄριστα ποιέων ἄριστος ἰητρός. ὁ δὲ τούτου πλεῖστον ἀπολειφθεὶς πλεῖστον ἀπελείφθη καὶ τῆς τέχνης.
>
> Again, drink slays thirst; and again repletion is cured by depletion, depletion by repletion, fatigue by rest. To sum up in a single sentence, opposites are cures for opposites. Medicine in fact is subtraction and addition, subtraction of what is in excess, addition of what is wanting. He who performs these acts best is the best physician; he who is farthest removed therefrom is also farthest removed from the art.[117]

In curing opposites with opposites, the Hippocratics routinely prescribed as medicinal remedies the same plants commonly used in both perfumes and cuisine; the hot, drying herb felt to be an appropriate treatment for an excessively cold and moist condition might just as easily appear on the dinner table or in a fragrant unguent as in a poultice. For localized pain beneath the diaphragm, for example, *Regimen in Acute Diseases* suggests that 'μαλθάσσειν χρὴ τὴν κοιλίην ἢ μέλανι ἐλλεβόρῳ ἢ πεπλίῳ. . .ἢ κύμινον ἢ ἄνησον ἢ ἄλλο τι τῶν εὐωδέων μίσγοντα'.[118] What matters here, however, is that cumin, anise, and the other 'good-smelling' aromatics mentioned have the appropriate medicinal effects, rather than that they smell good; nevertheless, these were also common components of perfumes (as well as culinary spices), and by the century after the death of Hippocrates at the latest, if not before, manufactured perfumes were being employed as treatment modalities in their own rights.[119] One interesting reference in *Aphorisms* suggests covering a patient with wraps and burning perfume beneath her to ascertain whether or not she can conceive; 'if the odor passes through the body and out at the mouth and nostrils,

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[117] Hippocrates II, *Breaths*, I.30. W.H.S. Jones, trans.
[118] Hippocrates II, *Regimen in Acute Diseases*, XXIII. Peplium = *Euphorbia peplus*.
[119] *On Smells,* VIII.

she may be deemed capable of conception.'[120] However, good smells crop up rarely in the Hippocratic Corpus. These physicians were far more interested in the bad smells which could be used to diagnose internal anomalies or to gauge the severity of a disease.

Every possible example of a patient's body fluids was closely examined for clues as to the nature and potential fatality of the patient's illness, and these are routinely described throughout *Epidemics* in terms of volume, appearance, and smell. In this text, stools are, for example, 'μέλανα, λιπαρά, γλίσχρα, δυσώδεα', or in the case of those with a bilious temperament, 'δριμέα'; fluxes are 'πολλά, σμικρά, δριμέα'; vomit is 'πολλὰ, μέλανα, δυσώδεα'. Interestingly, while urine and sweat are frequently mentioned, these are not typically assigned odours.[121] Nevertheless, it is clear that foul and acrid smells emanating from the body were associated with disease, and similarly, the Hippocratic physicians believed that bad-smelling influences such as polluted air or water were causes of disease and general failure to thrive.

Stagnant water smelled no better in the ancient world than it does now, and in *Airs, Waters, Places*, stagnant waters in summer are described as 'θερμὰ καὶ παχέα καὶ ὀδμὴν ἔχοντα', and are therefore 'πονηρὰ' and 'χολώδεα'. Residents who drink these waters are reported to suffer dysentery, diarrhea, and long quartan fevers, and to be 'bilious' by nature. Conversely, the waters in eastern-facing cities where people are healthier are 'εὐώδεα καὶ μαλθακὰ και ἐρατεινὰ'.[122]

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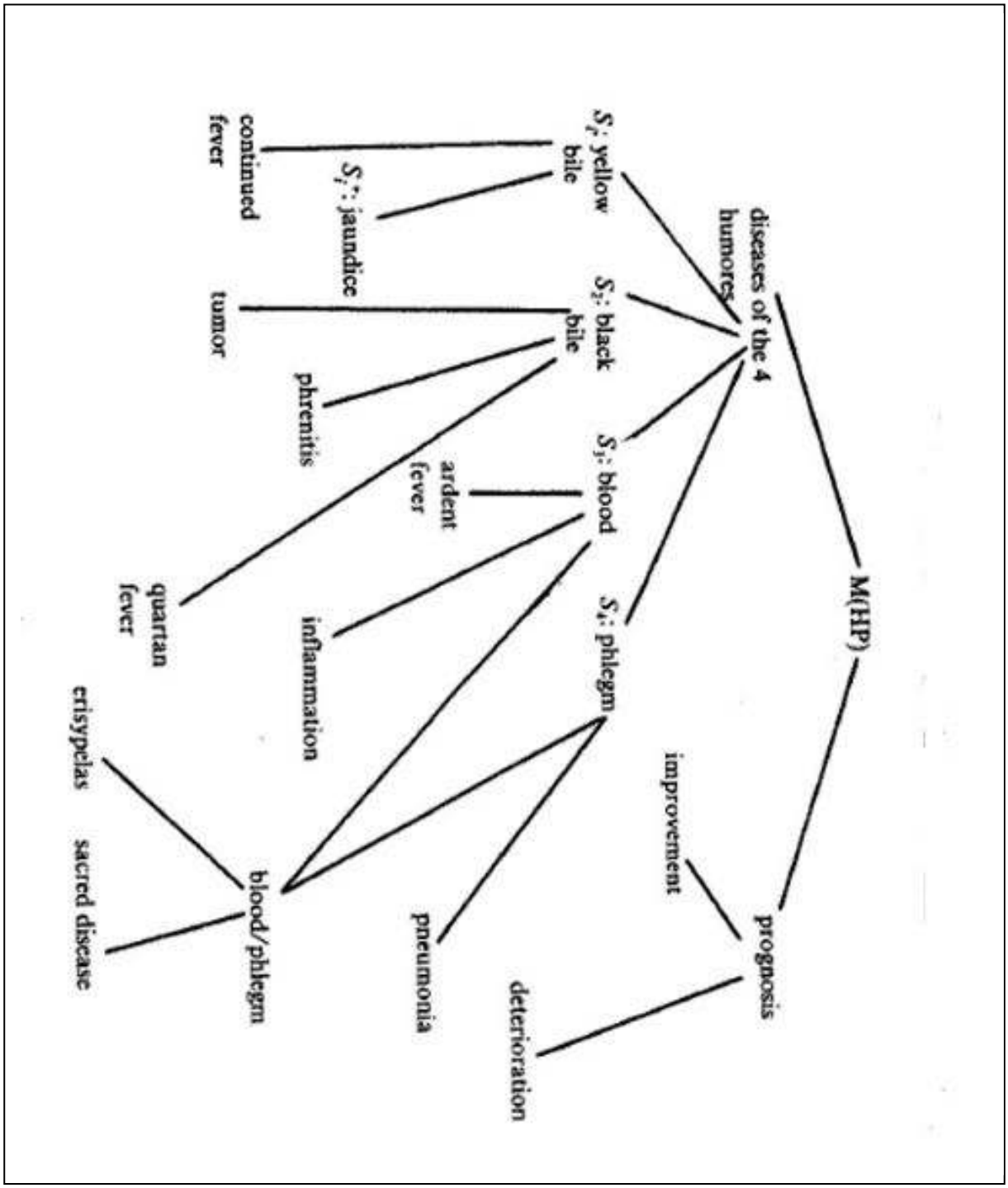
[120] Hippocrates, *Aphorisms*, V.LIX; Couch 1936, 205.
[121] Hippocrates I, *Epidemics* III, cases 3, 6, 12 and section XV.
[122] Hippocrates I, *Airs, Waters, Places*, VII.10,, V.10.

The Hippocratic Theory of Health Balzer and Eleftheriadis 1991



It is a common theme in Greek literature (and indeed throughout Western thought in general) that those things which smell good are good, and those things which smell bad are bad, but throughout the Hippocratic Corpus, environments which smell bad are potentially fatal, and patients with potentially fatal conditions smell bad as well. Unfortunately, these bad smells appear to be incidental; none of the Corpus' authors attempts to make a deliberate connection, either as a cause or an effect, between bad smells and disease. Even the author of *Breaths*, who states unequivocally that air is the direct cause of both life and illness ('τοῖς δ' αὖ θνητοῖσιν οὗτος αἴτιος τοῦ τε βίου, καὶ τῶν νούσων τοῖσι νοσέουσι'), fails to specifically associate air with either olfactory respiration or smells per se, explaining simply that people get sick when air is polluted ('ὅταν μὲν οὖν ὁ ἀὴρ τοιούτοισι χρωσθῇ μιάσμασιν, ἃ τῇ ἀνθρωπείῃ φύσει πολέμιά ἐστιν, ἄνθρωποι τότε νοσέουσιν') and ignoring any possible association between pollution and odours.[134] This apparently incidental nature of bad smells may explain why the Corpus contains no examples of bad-smelling conditions being treated with good-smelling remedies for the sake of curing with opposites – those treatment modalities mentioned which smell good seem to do so equally incidentally to the properties actually chosen to effect or encourage a cure. Over time, however, this would change, and physicians would make more effort both to link smells with conditions and to combat the dangers inherent in foul odours with pleasant scents.

The works of Aristotle and Theophrastus are the first extant which address olfaction per se in a more or less 'scientific' manner, as, like Hippocrates, both authors rely on first-hand observations of the natural world and take pains to

[134] Hippocrates II, *Breaths*, IV.1, VI.20.

generate explanations which mesh with empirical evidence. However, both authors were also no doubt inspired, if not informed, by Plato's less than scientific ideas, which appear briefly in the *Timaeus* and merit some attention.

Plato

The *Timaeus* is considered by scholars to be one of Plato's latest works, written circa 360 BC. Although it touches upon the senses in general and mentions the sense of smell in particular (*Tim*. 66d-67a), it is a primarily theoretical work, and is written from such a philosophical rather than an empirical standpoint that it cannot be considered 'scientific' by any but the most creative stretch of the imagination.

In the Timaeus, Plato (c.424-348) describes smell as being the perception of the transitory states of an olfactory object perceived by the ψυχή through the nose. Hermann Fränkel explains:

> Plato, in Timaeus 48e ff., denies self-identity to any single phenomenal thing (ἕκαστα 49d, 1) known by some specific name, such as e.g. water (ὅ δὴ νῦν ὕδωρ ὠνομάκαμεν, 49b, 7), and characterized by the possession of some one or other of the contrary qualities (τὸ ὁποιονοῦν τι, θερμὸν ἢ λευκὸν ἢ και ὁτιοῦν τῶν ἐναντίων, καὶ πάνθ' ὅσα ἐκ τούτων 50a, 2). Such a thing, Plato maintains, cannot strictly speaking be called an object (τοῦτο or τόδε) but only a modification (τὸ τοιοῦτο 49e-50a). The mere modifications have, according to him, only a transitory, restricted, and relative reality, while the one thing which undergoes the various modifications has a permanent, full, and absolute reality. To illustrate the relationship of the modifications to the modified substance, Plato uses first a simile obviously inspired by Heraclitus frag. 90: the substance is likened to gold and the modifications to shapes given to the gold.[135]

In keeping with this model in *Timaeus* 66d, Plato attempts to explain why pure elemental substances (earth, water, fire, and air) are inodorous:

> περὶ δὲ δὴ τὴν τῶν μυκτήρων δύναμιν, εἴδη μὲν οὐκ ἔνι. τὸ γὰρ τῶν ὀσμῶν πᾶν ἡμιγενές, εἴδει δὲ οὐδενὶ συμβέβηκεν συμμετρία πρὸς τό τινα

[135] Frankel, 239.

> σχεῖν ὀσμήν· ἀλλ᾽ ἡμῶν αἱ περὶ ταῦτα φλέβες πρὸς μὲν τὰ γῆς ὕδατός τε γένη στενότεραι συνέστησαν, πρὸς δὲ τὰ πυρὸς ἀέρος τε εὐρύτεραι, διὸ τούτων οὐδεὶς οὐδενὸς ὀσμῆς πώποτε ᾔσθετό τινος, ἀλλὰ ἢ βρεχομένων ἢ σηπομένων ἢ τηκομένων ἢ θυμιωμένων γίγνονταί τινων·
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> Next, as regards the property of the nostrils, it does not contain fixed kinds. For the whole range of smells is a half-formed class, and no kind possesses the symmetry requisite for containing any smell; for our veins in these organs are of too narrow a construction for the kinds of earth and of water and too wide for those of fire and air, so that no one has ever yet perceived any smell from any of these, but only from substances which are in process of being moistened or putrefied or melted or vaporized.

It is an interesting suggestion that humans smell only substances in transition from one state to another by means of one of these inodorous elements, but this idea is never developed in Plato's very cursory treatment of smells. It is unclear in this passage whether or not Plato is aware of the existence of smells perceptible to animals but not to humans, a topic later addressed by both Aristotle and Theophrastus. These authors also took an interest in the scentless nature of simple, as opposed to compound, substances as well, and carry this discussion much further respectively than does Plato.

In 66e, Plato goes on to describe what it is that humans do smell, namely the 'smoke or mist' arising from the transitional state between one form and another, which 'smoke or mist' is perceptible by the human nose by virtue of being of a 'width' accessible to it:

> μεταβάλλοντος γὰρ ὕδατος εἰς ἀέρα ἀέρος τε εἰς ὕδωρ ἐν τῷ μεταξὺ τούτων γεγόνασιν, εἰσίν τε ὀσμαὶ σύμπασαι καπνὸς ἢ ὁμίχλη, τούτων δὲ τὸ μὲν ἐξ ἀέρος εἰς ὕδωρ ἰὸν ὁμίχλη, τὸ δὲ ἐξ ὕδατος εἰς ἀέρα

καπνός· ὅθεν λεπτότεραι μὲν ὕδατος, παχύτεραι δὲ ὀσμαὶ σύμπασαι γεγόνασιν ἀέρος. δηλοῦνται δὲ ὁπόταν τινὸς ἀντιφραχθέντος περὶ τὴν ἀναπνοὴν ἄγῃ τις βίᾳ τὸ πνεῦμα εἰς αὐτόν·

For smells arise in the intermediate state, when water is changing into air or air into water, and they are all smoke or mist; and of these, the passage from air to water is mist, and the passage from water to air is smoke whence it is that all the smells are thinner than water and thicker than air. Their nature is made clear whenever there is some block in the respiration and a man draws in his breath forcibly. . .

Here, the reader is actually given empirical justification for Plato's ideas regarding the 'width' of both the nasal 'veins' and of smells: when our sinuses are 'stuffed up', we cannot smell anything even when we can manage to force some air up into them, because there isn't room for the 'smoke or mist' that constitutes a smell to traverse our nasal 'veins'. Sadly, it does not seem to have occurred to Plato to experiment along these lines with, for example, cold and dry air versus hot and wet air. Rather, his final point where smells are concerned is a rather incongruous comment regarding the names and types of smells:

τότε γὰρ ὀσμὴ μὲν οὐδεμία συνδιηθεῖται, τὸ δὲ πνεῦμα τῶν ὀσμῶν ἐρημωθὲν αὐτὸ μόνον ἕπεται. δύ' οὖν ταῦτα ἀνώνυμα τὰ τούτων ποικίλματα γέγονεν, οὐκ ἐκ πολλῶν οὐδὲ ἁπλῶν εἰδῶν ὄντα, ἀλλὰ διχῇ τό θ' ἡδὺ καὶ τὸ λυπηρὸν αὐτόθι μόνω διαφανῆ λέγεσθον, τὸ μὲν τραχῦνόν τε καὶ βιαζόμενον τὸ κύτος ἅπαν, ὅσον ἡμῶν μεταξὺ κορυφῆς τοῦ τε ὀμφαλοῦ κεῖται, τὸ δὲ ταὐτὸν τοῦτο καταπραῦνον καὶ πάλιν ᾗ πέφυκεν ἀγαπητῶς ἀποδιδόν·[136]

. . .for then no accompanying smell is strained through, but the breath passes in alone by itself isolated from the smells. So for these reasons the varieties of these smells have no name, not being derived either from many or from simple forms, but are indicated by two distinctive

> terms only, “pleasant” and “painful” of which the one kind roughens and violently affects the whole of our bodily cavity which lies between the head and the navel, whereas the other mollifies this same region and restores it agreeably to its natural condition.

While it is not clear *why* the elementally-driven transitional qualities of smells, or their 'half-formed' state, as Plato perceives it, might preclude assigning specific names to the different varieties, the dearth of olfaction-related vocabulary in most languages has proven to be a stumbling block for researchers since the beginning. This lack is specifically addressed in detail by Aristotle and Theophrastus alike. It is notable, however, that while Plato reduces the number of possible general 'types' of smells to two, which is consistent with the tendency in Greek literature as a whole to describe smells as being inherently either ‘good’ or ‘bad’, he chooses to differentiate between the types using the words ‘ἡδὺ‘ and ’λυπηρὸν’. He must have felt that these descriptors were specific enough to get his point across. At no point does he use either 'εὔοσμα' or 'κάκοσμα', for reasons he does not explain; whether he felt that those terms inadequate to communicate his thoughts or had another reason entirely for avoiding them is unclear.

The *Timaeus*, Plato’s cosmology and history of living things, is far more specific than either Hesiod’s *Theogony* or the biblical Book of Genesis, and discusses in great detail the material composition of the universe and everything in it. It is certainly not, nor was it intended to be, a 'smell study', and the text is not particularly useful in any scientific capacity, at least where osmologists are concerned. It is, nevertheless, of historical value, as it is the oldest Greek text extant posing some of the questions and problems which would come to occupy all future

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[136] *Timaeus* 66e-67a.

researchers in the field. Further, while Plato's cursory treatment of olfaction and smells per se is less than remarkable, his discussion of perception by the senses in general has sparked a great deal of interest among classicists, and their thoughts on the subject are relevant to any exploration of Plato's understanding of smells.

Plato's lengthiest and most specific treatment of sense-perception occurs in his *Theaetetus*, between 151D-186E. This text contradicts some of his earlier work on that topic, most notably that in the *Republic*, but it is considered to be Plato's final word on the subject (and thus a 'correction' of the *Republic*) by scholars such as M.F. Burnyeat and J.M. Cooper, and is in any case the text most closely examined by experts to explicate Plato's theories of sensation and perception. Plato is unique in that these are two very different processes for him, sensation being the physical process in which organs of the body collect data from the outside world, and perception being the subsequent process in which ψυχή independently considers and judges this data. Exactly what roles the senses and ψυχή play in the sense-perception process and how these roles can be distinguised from each other is a matter of great ongoing debate among philosophers, but it seems to be universally accepted at the very least that Plato considers the sense organs and the ψυχή to be separate parts of the body, and the former to somehow facilitate the work of the latter.

The primary obstacle to understanding Plato's theories lies in interpreting the words he uses to explain them. The word 'αἴσθησις', for example, can be translated to mean either 'sensation' or 'perception', and this ambiguity necessitates close reading of the context to distinguish between the two. The other five terms which describe components of the sensing process are difficult to translate at all, and different commentators understand them differently, which naturally leads to different

interpretations of Plato's theories. Nakhnikian, who points out that '[a]mong the commentators there is no uniform agreement as to the number, nomenclature, and characteristics of the motions' which result in sense-perception, feels strongly that the terms Plato uses must be taken in pairs:

> The theory of sensation expanded at 156A-157C is a multiple-relation causal theory. It is a multiple-relation theory because the complex describing the act of sensing is irreducibly hexadic. It's terms are: (i) the sensing organ = αἰσθανόμενον or πάσχον; (ii) the object perceived = ποιόν τι; (iii) the motion emanating from the sensing organ = προσβάλλον (154A); (iv) the motion emanating from the object perceived = προσβαλλόμενον (154A); (v) the sense-quality = ποιότης (182A); (vi) the 'sensation' = αἴσθησις. . .It is inadvisable to discuss these terms separately because they are in necessarily related pairs: πάσχον and ποιοῦν; προσβάλλον and προσβαλλόμενον; ποιότης and αἴσθησις. And that is not all. Each one of these pairs of related motions is itself necessarily related to every other pair within the relational complex. . .πάσχον and ποιοῦν emit, respectively, προσβάλλον and προσβαλλόμενον, and προσβάλλον and προσβαλλόμενον generate ποιότης and αἴσθησις. But there is still one more link in this chain, the causally primary one, and that is the pair, κίνησις which has the δύναμην πάσχειν and κίνησις which has the δύναμην ποιεῖν (156A). This pair is metaphysically identical with, but epistemologically distinguishable from, the πάσχον-ποιοῦν pair.[137]

We have here, then, an elaborate process in which 'motion' emitted from the sense organ interacts with 'motion' emitted from the object being sensed. At the same time that the motion from the sense organ acts on the object, bestowing upon it a 'sense-quality' which transforms it into an object perceived, the motion from the object 'actualises the power of sensing potential in the organ', which results in the sensation. According to Nakhnikian, 'All of this happens at once. The causes and

[137] Nakhnikian, 131-133; he uses 'ποιόν τι' and 'ποιοῦν' interchangeably as above.

effects are simultaneous.'[138] Veda Cobb-Stevens uses *Theaetetus* 153d8-154a9 to illustrate this idea:

> In phraseology which recalls that of 152d3 [Socrates] says, 'In the case of the eyes, first, you mustn't think of what you call white color as being some distinct thing (αὐτο ἕτερόν τι) outside your eyes, or in your eyes either – in fact, you mustn't assign any place to it; because in that case it would, surely, be at its assigned place and in a state of rest, rather than coming to be' (158d8-e2). Whereas Socrates' explication of his earlier statement emphasized the contrary qualifications of (phenomenal) objects, his statements here focus on the nature of the qualities themselves. Furthermore, they do so with a view toward specifying the ontological ground of their appearance. . .Given that nothing is one thing by itself, it follows that 'black, white, or any other color will turn out to have come into being, from the collision of the eyes (ἐκ τῆς προσβολῆς τῶν ὀμμάτων) with the appropriate motion (πρός τὴν προσήκουσαν φοράν. What we say that a given color is will be neither the thing which collides (προσβάλλον), nor the thing it collides with (προσβαλλόμενον), but something which has come into being between them; something peculiar to each one' (153e5 – 154a2). . .It is clear that the 'thing itself', that is, a stone, is simply a movement (phora) which the eye encounters, thus generating the sensed color.[139]

The same idea, of course, would pertain to smells, with smells 'coming into being' during the interaction between the perceiver and the object being smelled. This is, nevertheless, only half of the equation, and while it is a relatively concise explanation of how the senses gather data, it does not explain how we acquire knowledge by means of the senses. Again, Plato is clear in the *Theaetetus* that the senses can only gather sensory data and, though they may be capable of cursory judgements such as 'that is white', they cannot impart knowledge. If all of this is

[138] Nakhnikian, 141.

merely how a sense-object is sensed, then, according to Plato, how is it truly perceived and understood? There is a lack of agreement among scholars in this regard, and the discussion of different 'parts' of the ψυχή in the *Republic* does much to contribute to the discord.

Benjamin Jowett notes that in the *Republic*, Plato writes of a 'division of the mind into the rational, concupiscent, and irascible elements'; this division is seen most clearly in Book X, where he notes that the same object appears to be larger or smaller depending on the distance between itself and the viewer, or straight or bent depending on whether or not it is in water, and these discrepancies lead him to conclude in 603a that there is a 'superior part' of the ψυχή which is in accordance with measures and calculations and an 'inferior principle' which is not. He goes on to say here that 'the soul has been acknowledged by us to be full of these and ten thousand similar oppositions occurring at the same moment'.[140] This model in which there is 'confusion and opposition' in the ψυχή where sensory perception is concerned conflicts with what Plato writes in the *Theaetetus*, in which the senses can only perceive and cannot judge or quantify perceptions, and this conflict is the catalyst for the debate among authorities on Plato's understanding of the sensory perception process. Further, scholars disagree as to the importance of Plato's theory of Forms (or 'Ideas') in his later writings regarding perception and sensory knowledge. F.M. Cornford feels strongly that all of Plato's work, including his discussion of the senses, is predicated on the understanding of his 'theory of Reminiscence', that 'knowledge of the perfect Forms, and indeed all knowledge of truth and reality, is at all times present in the soul itself'.

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[139] Cobb-Stevens, 253.
[140] Jowett, introduction; *Republic* X.602 c-d, 603a-b, Jowett's translation.

> . . .[I]f knowledge is at all times present to the soul [ψυχή], the soul must be immortal and independent of the body and its senses. It has seen all truth in some former state of existence before it came into the body. The truth has been forgotten, but has been stored in a memory from which it can be recovered. This memory is not what we commonly call the memory, not a register of the experience which flows in, during this bodily life, through the channels of sense. Its contents are impersonal, the same in all human beings, and they have never been extracted or distilled out of sensible experience.[141]

While it is taken as a given by Platonic scholars that the ψυχή and the senses are separate, Cornford's argument diminishes Plato's treatment of perception by rendering the senses somewhat incidental to acquiring knowledge. Αἴσθησις, says Cornford, is a function of the ψυχή, and, contrary to Theaetetus' conclusion, perception itself is not knowledge:

> Plato naturally starts [in 151D-E] with the position of common sense, that knowledge comes to us from the external world through the senses. In his own view this is the lowest type of cognition; he works upwards from beneath towards the world of intelligible objects, so as to see whether we can find knowledge at these lower levels without having to cross the boundary between the sensible and the intelligible. . .In ordinary usage *aesthesis*, translated 'perception', has a wide range of meanings, including sensation, our awareness of outer objects or of facts, feelings, emotions, etc. At [*Theaetetus*] 156b the term is said to cover perceptions (sight, hearing, smell), sensations of heat and cold, pleasures and pains, and even emotions of desire and fear. All these are seated in the sentient part of the soul, inseparably associated with the body. Theaetetus' words, 'one who knows something is perceiving the thing he knows', suggest that he is chiefly thinking of perception of external objects, and the criticism which follows narrows down the word

[141] Cornford, 71-2.

> to that sense or at least treats sense-perception of external objects as typical of all *aesthesis*.[142]

'By far the longest investigation in the Theaetetus,' Andrea Tschemplik writes, concerns the first hypothesis that the young mathematician proposes, that perception is knowledge'.

> Socrates wants to clarify the contribution of the body through the sense organs and the contribution of the soul (psychē) through its ability to identify and judge what has been reported by the senses. Socrates explains perception as a cooperative endeavour between body and soul and it is through this recognition that both body and soul are involved, that he can proceed, attempting to isolate the soul's contributions. It turns out that it is through a kind of self-reflection that Theaetetus discovers the work of soul. [143]

John M. Cooper divides the camps as follows:

> On the one hand, F. M. Cornford and others think that Plato rejects the proposal [that knowledge be defined as αἴσθησις] on the ground that the objects which we perceive are not the sort of objects of which one could have knowledge: only the unchanging Forms can be known. On the other hand, there are those who think Plato's argument has nothing to do with Forms but instead turns on a distinction between sensation and judgement which has the consequence that the thinking we do *about* the deliverances of the senses, and not the mere *use* of the senses, is the source of our knowledge.[144]

Cooper is in the second camp, and indeed this approach seems to be superior to any alternatives. This thinking 'about the deliverances of the senses' is the role of an undivided ψυχή, one which does not contain separate 'parts' and is not in conflict with

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[142] Cornford, 30-31.
[143] Tschemplik, 67-68.
[144] Cooper, 123. Cornford also notes the enthusiasm of H.F. Cherniss for this approach 'in assigning to the senses the task of "stimulating" the mind to engage in pure thought by turning away from the sense-world toward that of the Forms' (126).

itself. Additionally, as Cooper writes, it cannot be said that 'the mind's independent activity, when it produces knowledge, consists in acquaintance with Forms. This. . .is not to be found in Plato's text at all.'[145] He notes that in the Theaetetus, sensations are referred to the mind (ψυχή), and that:

> Plato points out (184d 1-5) that our sensations (αἴσθησις, d2) are referred to the mind (ψυχή), and that it is not the sense organs (or the sense faculties) which perceive colors and sounds but the mind itself, operating *through* the organs, or, as he also says (e8, 185b8, e7), through the senses. The organs are parts of the *body* (184e 5-6, 185 d3), and the power of sight, touch and the rest are capacities of the *body* (185e 7). It is quite incorrect to say, as Plato himself had said in the *Republic*, that the senses see this or that, or say or report this or that: it is the subject himself who perceives things with his mind through the organs and powers of the body, who says or thinks this or that on the basis of his sense-experience.[146]

Taking the *Theaetetus* as being a correction of the *Republic*, as Cooper does, resolves the discrepancies between the two texts. M.F. Burnyeat elaborates on this:

> Socrates begins the *Theaetetus* discussion by making clear that he does not believe in verbal niceties for their own sake (184C). If he feels the need to correct a misleading form of expression, it is for a reason, and an important part of the reason is that he is going to distinguish perception and judgement in a way that effectively denies to the senses the judgemental function they had in the *Republic* and earlier in the *Theaetetus*. Autonomy in a perceiving subject presupposes judgement (conceptualiation, consciousness) brought to bear by the subject on the objects of sense – on this important point Plato is surely right – so the rejection of idioms which endow the senses with cognitive powers of their own and the separation of judgement from perception are two

[145] Cooper, 126.
[146] Cooper, 127.

linked aspects of the same enterprise.[147]

Like Cooper, Burnyeat feels that it is significant that Socrates specifies in *Theaetetus* 184C that the sense organs are not what we sense *with* (as expressed by using the dative case) but rather what we sense *through* (δια + genitive), both in the more active manner of looking through a window to see something on the other side, and in more passive terms 'of physical stimuli passing through the body to impinge upon the mind', as sunlight through the same window might strike us whether we were looking in that or another direction. Thus 'what the soul discovers in perception is external to and independent of ourselves and our bodies'.[148]

> Since no organ or sense can be pointed out as the means of access to common features like being, identity, similarity, or dissimilarity, it is legitimate to conclude that these features, and others like them, are not apprehended through perception at all (185CD). . .it must be the soul on its own, acting independently of the body and its sense organs, which considers these aspects of what one perceives (185E).[149]

Plato is adamant that the senses are not capable of perceiving Being; this is the function of the ψυχή. Cooper's interpretation that 'in applying common terms to the objects of the senses the mind is not perceiving but doing something else, which we may call reflecting and comparing' contradicts Cornford, who suggests that the relationship between the ψυχή and the senses is such that the ψυχή is 'centrally receiving their several reports'. Burnyeat supports Cooper here, opining that 'the sense organs are not agents or subjects at all; the mind is the sole subject in perception and should reserve all responsibility to itself, leaving for the senses the

[147] Burnyeat, 36.
[148] Burnyeat, 30, 43.
[149] Burnyeat, 49.

role Socrates assigns to them of indispensable aids.'[150] However, Burnyeat goes further than Cooper in his explanation of the functions of the ψυχή with his argument that 'the soul may take the initiative, use the senses as equipment provided by the body. . .and generally investigate the sensible qualities of things', giving the ψυχή a more active role in the process of achieving knowledge. Here, not only is the ψυχή the 'organ' which thinks and reasons about sense data, it can think and reason *first* and deliberately collect sense data afterward. Unlike Nakhnikian, Burnyeat stresses that for Plato 'subject and object meet not through a pair of transitory motions, as on the Heraclitean theory, but through the body and its organs', but these do not seem to be entirely mutually exclusive ideas. The 'sensible qualities' encountered by the soul in perception can, as Burnyeat has it, have their 'own nature and identity apart from particular perceptions' without severely compromising Nakhnikian's explanation regarding how the senses gather the raw data which can then be interepreted in context by the ψυχή. Whether or not the nature of a stick in water is such that it is straight independently of perception, this function of the ψυχή explains, for example, how sensory data gathered by the senses through a process of interaction of 'motions' can suggest that the stick in water is crooked even though the perceiver knows that it is not, without dividing the ψυχή as occurs in the Republic, or attributing more than cursory powers of judgement ('that stick is crooked') to the senses. According to Cooper's explanation, one can employ the undivided ψυχή to reach the conclusion that the stick is not crooked by thinking *about* what our senses are telling us.

In addition to the *Timaeus* and *Theaetetus*, another text which might be used to explore Plato's understanding of sensory data is the *Protagoras*. This work might

[150] Cooper, 1970, 128; Burnyeat, 1976, 38.

seem at face value to be unrelated to a discussion of the senses in general and olfaction in particular, but Plato's use of ἡδέα to describe things that are pleasant corresponds to his description in the Timaeus of pleasant smells as being ἡδύ. T.D. Goodell notes that Plato is using such a broad term to incorporate 'the unity of class implied in the common class-names', and suggests that 'the range of the word [pleasure] is wide because body and soul are unlike and each has many needs and desires':

> The ordinary word for pleasure in the broadest sense in ἡδονή, for 'pleasant' is ἡδύς; the verb is ἥδεσθαι, 'be pleased'. . .Finally we reach, near the close of the discussion (in 360A) a broad generalization. It has been agreed that what is honorable or beautiful (καλόν) is also good, that καλαὶ πράξεις are all good. It is now further agreed that whatever is honorable and good is also pleasant (ἡδύ). . .The word pleasure designates the feeling with which human nature, body or soul or both combined, welcomes what satisfies a need or desire.[151]

Cynthia Hampton continues this line of thought:

> Consider Plato's discussion of true pleasures at Philebus 51b – 52c. Here he divides the true pleasures into two types: those which are divine and those of a less divine nature. The former arise from beautiful colors, shapes, odors, or sounds. . .the beauty of these is not relative, but absolute. Of a less divine nature are those pleasures which simply belong to the kind which have no necessary pains mixed with them, for, in this way, they are similar to the divine kind.[152]

Plato is, of course, speaking here primarily of pleasures which result in the greatest moral good, rather than about perfumes. In spite of these texts, however, Plato does not believe that what is good is *always* pleasant; in the *Gorgias*, Socrates says to Polus, 'Ἆρα τὸ ἡδὺ καὶ τὸ ἀγαθὸν τὸ αὐτὸ ἐστιν; Οὐ ταὐτον' , mentioning, for

[151] Goodell, 27, 29, 32.
[152] Hampton, 43.

example, beneficial but unpleasant medical treatment, and that paying the penalty for injustice and wrongdoing is unpleasant but benefits the soul.[153] However, Goodell writes that 'Plato holds firmly from beginning to end that the soul is by nature good and greets *all good* as akin to itself.'[155] It is interesting to think, then, that Plato might have associated the soul with good smells.

While Plato never felt the need to connect these dots himself, by taking these texts as a group and using the interpretations and translations previously employed, one might piece together a Platonic theory of the olfaction process from start to finish. The process of smelling a rose, for example, might be described as being one in which the προσβαλλόμενον, or 'motion from' the rose, which is emitted in the form of a 'smoke or mist' arising from a transitional state between one form and another, interacts with the προσβάλλον, or 'motion' emitted from the olfactory sense (πάσχον). This interaction simultaneously imparts a sense-quality, or ποιότης, to the rose, causing it to become a sensed object (ποιόν τι), and at the same time actualizes the sense-potential in the nose, which results in the specific sensation (αἴσθησις), after comparison and reflection by the undivided ψυχή, of smelling a rose. Whether or not the olfactory organ itself is capable of determining that this is a pleasant smell, it is still the role of the ψυχή to contemplate and analyze this smell, at which point it will also determine that roses, which smell good, are in fact good, or at the very least, not 'painful' or bad.

It is a failing of Plato's that he is never truly specific about exactly how the ψυχή operates in terms of perceiving the information gathered through the senses, or how the perceptions of the ψυχή are transformed into knowledge, other than to say

[153] *Gorgias*, 506c, 478b, 479d.
[155] Goodell, 29.

that the ψυχή can reason or think about the data the senses have gathered; nor does Plato discuss the work of previous philosophers in detail, although it is clear that he was not the first to address the subject. Frankel suggests that Plato was quoting a partial fragment of Heracleitus when he wrote 'the simile of oil in unguents':

> . . .πάντων ἐκτὸς ἐιδῶν εἶναι χρεὼν τὸ τὰ πάντα ἐκδεξόμενον ἐν αὑτῷ γένη. Καθάπερ περὶ τὰ ἀλείμματα ὁπόσα εὐωδη τέχνῃ μηχανῶνται, πρῶτον τοῦτ' αὐτὸ ὑπάρχον ποιοῦσιν, ὅτι μάλιστα ἀώδη τὰ δεξόμενα ὑγρὰ τὰς ὀσμάς. . ."
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> That which is to receive in itself all the types of things must be free from any peculiarity, just as in the technical manufacture of perfumed unguents the first thing is to provide a base of this very kind, that is to have the liquid which is to receive the scents as odourless as possible.

Unfortunately, Plato does not comment on the original phrases or attribute ideas to the original author, and so it is difficult if not impossible to tell what he is borrowing from whom. Aristotle and Theophrastus, as we shall see, quote passages from older texts no longer extant which mentioned the senses at least in passing, and these were clearly available at the time that the *Timaeus* was written; although Plato does not refer to them in that context, he was surely familiar with their content. Fortunately they seem to have had greater impact on Plato's successors, and although the glimpses Aristotle provides appear only so that he can refute them, Theophrastus describes them in some detail. Aristotle borrows some of Plato's terminology in *De Sensu* as well, for the same purpose: to debate or dispute his ideas.

Aristotle

In Aristotle's treatment of the senses, he asks and answers at length the difficult questions Plato skirts: how, exactly, do humans perceive sensory information? What is it that they are actually perceiving when this occurs? What is the nature and the purpose of the senses both individually and taken as a whole? How do human perceptions and those of animals differ? These are, of course, the same questions addressed by modern doctors and life scientists, but in order to understand Aristotle's answers to these questions it is important to note that for him, sensory perception by means of the sense-organs was not first, or only, a physiological process; he considers this process a primarily cognitive one, with physiological ramifications.[156] This would align his work on the subject more closely with modern neuropsychology than with biology or medicine, although his conviction that the senses are faculties of the soul (*De Anima* II.5) might well exclude his ideas from serious consideration in that field as well.

Aristotle was very aware that he was writing for an audience who were quite familiar with the ideas of his teacher and predecessor, Plato, as well as the Presocratics before him. Out of necessity, he had to use similar vocabulary, and he takes pains to distinguish his thoughts from those which had been presented before. D. W. Hamlyn writes that

> Aristotle's account [in De Anima] is transitional not only in the sense that there is a trend in his actual discussion, but also in the sense that he is trying to develop a new view of aesthesis, or one with new emphases, and at the same time to free himself from the influences of

[156] I.e. the transition from one mental state (before perception) to another (after perception) in the process of perceiving a given sensory stimulus necessitates intermediate changes in physical states; q.v. Johansen 1998, 1-22, for an in-depth discussion of the roles of the soul and the body in living things.

> his predecessors. . .I think that there have been few philosophers with so keen a sense of the history of his subject. The consequence is that he continually finds it difficult to shake off the bonds which attach him to an older point of view. This is nowhere more true than in his account of aesthesis.[157]

The primary problem, Hamlyn opines, is that the word αἴσθησις 'covers both what we should call "perception" and also what we should call "sensation".'

> There has always been a tendency (natural but incorrect) on the part of philosophers to assimilate perception to sensation, and where, as in Greek, there is no distinct terminology, it is only too easy not to make the distinction at all. To perceive something, however, is not merely to have sensations (indeed we do not speak of having sensations when we are perceiving). The faculty of sense-perception is that faculty by means of which we are able to characterize or identify things as a result of the use of our senses. It is reasonable, therefore, to connect perception with judging, as Aristotle does, although it is incorrect to identify it with judging, as he also does.[158]

In De Sensu 438b, Aristotle agrees with Plato that odors present themselves in the form of a smoke, or mist:

> ἡ δ' ὀσμὴ καπνώδης ἀναθυμίασίς ἐστιν, ἡ δ' ἀναθυμίασις ἡ καπνώδης ἐκ πυρός. διὸ καὶ τῷ περὶ τὸν ἐγκέφαλον τόπῳ τὸ τῆς ὀσφρήσεως αἰσθητήριόν ἐστιν ἴδιον. δυνάμει γὰρ θερμὴ ἡ τοῦ ψυχοῦ ὕλη ἐστίν.
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> Now odour is a smoke-like fume and smoke-like fumes originate from fire; hence the organ of smell is appropriately located in the regions around the brain, as the substrate of that which is cold is potentially hot.[159]

At first glance, this is somewhat confusing. Thomas Johansen explicates the necessary qualities of and changes required in the sensing organ in order for it to

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[157] D. W. Hamlyn, 6.

perceive a sense-object:

> First, the patient must be the sort of thing that is able to become like the agent. Water, for example, is able to become hot. That is because water is such a thing as to have a degree of temperature and having one degree of temperature enables you to acquire another. Second, the patient must not yet be what the agent actually is. In order for the patient to be able to become hot it must not yet be hot. Aristotle puts these two points by saying that the patient must be potentially like the agent. Thus cold water is potentially like a hot stove. It is potentially hot. . .when the potentiality of the patient and the actuality of the agent are brought together, the agent necessarily acts on the patient (Metaphysics Q, 5 1048a6-8). If nothing interferes, the patient then necessarily becomes like the agent. For instance, when the cold water is put on the hot stove it necessarily heats up. This, in outline, is Aristotle's theory of change. It is also his basic theory of perception. For perception is a sort of change (cf. DA II.5 418a3ff.; III.7 431a4ff). In perception the agent is a sense-object and the patient is a sense-faculty.

For Aristotle, an organism perceives sensory stimuli when a sense-object (such as a flower) *changes* (κινεῖσθαι) or *affects* (πάσχειν) that organism's sense-faculty (in this case, its sense of smell) by causing a potentiality of the sense-faculty to become like the actuality of the sense-object.[160] The two define each other; the nature of the sense of smell is that it is the faculty which detects smells, and the nature of a smell as such is that it is a sense-object independent of the sense of smell which can be detected by this faculty. There is, however, a great deal of debate regarding Aristotle's definition of the relationship between the perceiver and the perceived; the arguments on either side are most specifically addressed by

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[158] D.W. Hamlyn, 6.
[159] *De Sensu* 438b, G.R.T. Ross, trans.

Richard Sorabji and Myles Burnyeat respectively. Sorabji feels strongly that actual material alteration is necessary for perception to occur.

> For DA 425b12-25 equates the question of how we are aware that we are seeing (425b12; b13) or, in other words, how we are aware of our sight (425b13; b16), with the question of how we are aware of the organ that sees (to horōn, 425b19; b22). This implies that it is through awareness of the organ that we are aware that we are seeing. He goes on to remind us that the organ is coloured during the perceptual process (425b22-25), and presumably we will be aware of its coloration. This coloration is a physiological process, which could in principle, even if not in practice, be seen by other observers, using ordinary sense-perception. . .Of sense perception he says that it is a matter of being affected by something, that it is a change in the body, that it is a qualitative change, and that a certain change in the eye is seeing.[161]. . . So there is an answer to the question how one can possibly know that another person is seeing. One can in theory observe the fact. Perhaps it will be objected that to observe the coloration of another man's eye-jelly is to observe only the material cause of his seeing, not the seeing itself. But this objection fails to do justice to Aristotle's position in two ways. First, in Aristotle's view, it is by this means that one is aware of one's own seeing. One perceives its material cause, the coloration of the eye-jelly. Secondly, it should not be supposed that after one has observed the physiological process, there is some purely mental act still waiting to be detected. . .There are no such acts.[162]

Sorabji's 'controversial position that sense organs literally take on the qualities of their proper objects' was defended in Martha C. Nussbaum and Hilary Putnam's 1995 article 'Changing Aristotle's Mind' and Stephen Everson's 'Aristotle on

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[160] Johansen 1996, 2.
[161] Sorabji, 11, 15. Sorabji refers to *De Anima* 424a7-10, 425b22-24, 427a-9, 435 a22-24, 417a20, 418a3, 422a7, 422a34, 423b30, 424a18, 424b2, 427a9, 429a15, and 434a29; *Phys*, 244b11-12; *Insom*. 459b4-5; *Mot*. 701b18; *GA* 780a3. He suggests that it is the jelly within the eye which takes on

Perception' in 1997; Burnyeat was championed by Joseph Magee in 2000 in 'Sense Organs and the Activity of Sensation in Aristotle'. The debate rages on. John Sisko summarizes this disagreement by stating that 'As it stands, those now involved in the debate over the nature of perception fall into two camps, those who think that perception does require material alteration and those who (along with Burnyeat) think that it does not.'[163] Sisko's own opinion is that 'on Aristotle's account material alteration is required both for any episode of perception in animals taken generally and for any episode of thought in human beings'.[164] Burnyeat responds:

> I argue that [De Anima] refutes two claims defended by Martha Nussbaum, Hilary Putnam, and Richard Sorabji: (1) that when Aristotle speaks of the perceiver becoming like the object perceived, the assimilation he has in mind is ordinary alteration of the type exemplified when fire heats the surrounding air; (ii) that this alteration stands to perceptual awareness as matter to form. Claim (i) is wrong because the assimilation that perceiving is is not ordinary alteration. Claim (ii) is wrong because the special type of alteration that perceiving is is not its underlying material realisation. Indeed, there is no mention in the text of any underlying material realisation for perceiving. . .The negative message of II.5 is of some significance for current controversies about Aristotle's theory of perception. Richard Sorabji has defended, and continues to defend, an interpretation whereby the alteration Aristotle has in view, when he speaks of perceiving as alteration, is an ordinary qualitative alteration that would be observable to scientists who, unlike Aristotle, had instruments giving access to the inside of the relevant organ. . .on Sorabji's account, what goes on inside the organ is an alteration – a replacement of one sensible quality by another – of the same kind as the alterations that occur outside when a cold thing is

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colour, 'and it would not have been obvious, with the instruments available to Aristotle, that this eye-jelly did not in fact become coloured during the process of vision.'

[162] Sorabji, 27.

[163] Sisko, 139.

> warmed or a green thing coloured red. My objection is that this is the sort of alteration that in II.5 Aristotle contrasts with the sort that perceiving is, where the altered state is not lost (like the cold and the green in the ordinary examples) but preserved (417b 3-4).[165]

While I must agree with Burnyeat, I agree that there are nuances in Aristotle's work which render translation difficult. It is an interesting question with no explicitly obvious answer; equally interesting is the idea that a similar question might be argued today – do the opening and closing of calcium ion channels which admit odor particles, for example, constitute a physiological alteration, or is this merely a function of the olfactory system which involves no real change in that system per se? Arguments could be made both ways.

Whether or not physiological alteration is involved in olfactory perception, however, it is clear that according to Aristotle, the sense of smell must be potentially like an actual smell; it must itself be potentially sweet, bitter, sharp, etc., in order to be affected by and thus to become like the actuality of a given smell. One could not, in other words, smell honey if one's sense of smell were not potentially 'sweet'.[166] In keeping with his explanations of the sense of vision in terms of the visible, and the sense of hearing in terms of the audible, Aristotle tells us that the sense of smell is defined by what can and cannot be smelled, the odoriferous and the inodorous (*De Anima* 421b). He points out, however, that this construct is problematic where the sense of smell is concerned, because unlike colours or sounds, smells are difficult to define in their own rights:

> Περὶ δὲ ὀσμῆς καὶ ὀσφραντοῦ ἧττον εὐδιόριστόν ἐστι τῶν

[164] Sisko, 141.
[165] Burnyeat, 2002, 28.

εἰρημένων. οὐ γὰρ δῆλον ποιόν τί ἐστιν ἡ ὀσμή, ὅυτως ὡς ὁ ψόφος ἢ τὸ χρῶμα. αἴτιον δ' ὅτι τὴν αἴσθησιν ταύτην οὐκ ἔκομεν ἀχριβῆ, ἀλλὰ χείρω πολλῶν ζῴων. φαύλως γὰρ ἄνθρωπος ὀσμᾶται, καὶ οὐθενὸς αἰσθάνεται τῶν ὀσφραντῶν ἄνευ τοῦ λυπηροῦ ἢ τοῦ ἡδέος, ὡς οὐκ ὄντος ἀχριβοῦς τοῦ αἴσθητηρίου. . .

Smell and its object are much less easy to determine than what we have hitherto discussed [vision and hearing]; the distinguishing characteristic of smell is less obvious than those of sound or colour. The ground of this is that our power of smell is less discriminating and in general inferior to that of many species of animals; men have a poor sense of smell and our apprehension of its objects is bound up with pleasure and pain, which shows that in us the organ is inaccurate.[167]

Interestingly, Aristotle uses the same words in this passage which were employed by Plato to describe the human interpretation of smells as being simply either pleasant or painful (although he adds considerably to his perspective on this topic in *De Sensu*). However, whereas Plato never addresses the facultative discrepancies between animals and humans, it is an important consideration throughout the Aristotelian corpus that smells exist which humans cannot perceive, or cannot perceive well. Indeed, he struggles with this repeatedly. In *De Sensu* 440b, he opines that it is *because* man's sense of smell is 'the least perfect' of the senses.

Περὶ δὲ ὀσμῆς καὶ χυμοῦ νῦν λεκτέον. σχεδὸν γάρ ἐστι τὸ αὐτὸ πάθος, οὐκ ἐν τοῖς αὐτοῖς δ' ἐστὶν ἑκάτερον αὐτῶν. ἐναργέστερον δ' ἐστὶν ἡμῖν τὸ τῶν χυμῶν γένος ἢ τὸ τῆς ὀσμῆς. τούτου δ' αἴτιον ὅτι χειρίστην ἔχομεν τῶν ἄλλων ζῴων τὴν ὄσφρησιν καὶ τῶν ἐν ἡμιν αὐτοῖς αἰσθήσεων, τὴν δ' ἁφὴν ἀκριβεστάτην τῶν ἄλλων ζῴων. ἡ δὲ γεῦσις ἁφή τις ἐστίν.

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[166] Aristotle tells us that honey smells 'sweet' in *De Anima* 421b.
[167] *De Anima* 421a. J. A. Smith, trans.

> We are now to discuss smell and taste. While as subjective phenomena they are practically identical, their vehicle is diverse; and tastes as a class are more vividly presented to human perception than odours. The reason for this is that our sense of smell is inferior to that of other animals, and is the poorest of the human senses. In delicacy of touch, however, we excel all other animals; now taste is a sort of touch.[168]

Aristotle feels that it is due to the fact that humans find it so difficult to distinguish between smells and tastes that 'odours as well as savours are spoken of as pungent, sweet, harsh, astringent, rich; and one might regard fetid smells as analogous to bitter tastes'.[169] How, then, given the lack of vocabulary specific to smells, does one distinguish between smells and tastes? If, as was suggested previously, one cannot smell honey unless one's sense of smell is potentially 'sweet', then we must be able to separate and to explain the difference between honey's 'sweet' smell and 'sweet' taste in order to differentiate between these two sense-faculties. This is no minor problem, as Aristotle's entire approach to understanding sense-perception is predicated on defining the sense-faculties in terms of their sense-objects; as Thomas Johansen notes, '[T]he difficulty of defining the sense-object of smell should also make it difficult to define the sense-faculty... The definition of the sense stands or falls with the definition of its object.'[170]

Aristotle solves this problem by differentiating between the types, or forms, of matter which convey tastes and smells respectively. Water, he tells us, conveys both tastes and smells to the appropriate sense-faculties, which is why these faculties are easily confused, but smells are conveyed by air as well. In the case of tastes, then,

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[168] J. I. Beare, trans.
[169] *De Sensu* 443b.
[170] Johansen 1996, 4.

the emanations themselves must be both flavoured and dry, requiring the addition of moisture in order to be perceived, whereas smells are flavoured and moist, and are thus perceived in air as well as in water. Tastes, as a group, are thus limited to nutrients, for 'neither the dry without the moist, nor the moist without the dry, is nutrient.' Smells, which consist 'of the sapid dry diffused in the moist' are moist as a result of this diffusion, and as such (moist without dry) are non-nutritive. Therefore 'the theory held by certain of the Pythagoreans, that some animals are nourished by odours alone, is unsound.'[171] Not only does this explanation of the difference between smells and tastes serve to preserve Aristotle's methodology in defining the senses, it allows him both to refute the theories proposed by his philosophical predecessors with confidence, and to answer difficult questions they never posed.

According to the doctrine of Empedocles, for example, 'we must suppose that water contains in itself the various kinds of savour, though in amounts so small as to be imperceptible', but while Aristotle agrees that 'the four elements can be assigned to the sense-organs', he refutes Empedocles' explanation by showing that the nature of taste per se is one of flavoured dryness, and that something is tasted as a result of 'washing the dry and earthy in the moist', pointing out that 'the natural substance water tends to be tasteless.' [172] Democritus is equally in error when he 'reduces savours to the atomic figures' because 'since figures are infinite in number, savours also should be infinite; for why should one savour be perceived, and another not?'[173] Clearly this pertains to smells as well; there are a finite number of these within two 'species' ('εἶδος'), the nutritive and the non-nutritive. Like Theophrastus, Aristotle agrees with Plato that 'The elements, viz. fire, air, earth, water, are inodorous', but

[171] *De Sensu* 441b; 443a; 445a.
[172] *De Sensu* 441a, 441b; Johansen 1998, 44.

rather than attributing this lack of smell to the symmetry of forms or the width of nasal 'veins' as Plato does, he states that it is because 'both the dry and the moist among them are without sapidity, unless some added ingredient produces it' ('sea-water' is given as one of several examples here). Herakleitos cannot be any more correct in suggesting that the 'essence of odour' is 'exhalation, which is a compound of earth and air' than Plato is to call it 'smoke and mist', as 'vapourous exhalation consists of mere water; and smoky exhalation cannot occur in water at all'.[174]

This last point is of particular importance to Aristotle as a means of explaining how 'fishes and testacea, which are seen to have a sense of smell' can detect smells when 'these creatures do not breathe'; he notes in *History of Animals* as well that 'Fishes have no visible organs for hearing or for smell...but for all this fishes undoubtedly hear and smell.'[175] Richard Sorabji comments:

> Another example of the importance of sense objects for identifying senses is to be found in Aristotle's insistence that since fish and other animals perceive odor, we must allow that they exercise smell. Evidently, the perception of odor is to be counted as smell, in spite of considerable differences in the mechanism involved. For the medium through which water animals perceive odor is not air, as it is for us, but water (De Sensu 442b29 - 443a3; De Anima 421b9 - 13). Correspondingly, the organ they use for perceiving odor contains water, in Aristotle's view, not air. Nor is the organ used at all like our nostrils in structure. Fish use their gills, dolphins their blowhole, and insects the middle part of their body, according to Aristotle. And neither fish nor insects, he says, inhale when perceiving odor. In spite of these

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[173] *De Sensu* 442b.
[174] *De Sensu* 443a-b.
[175] *De Sensu* 443a; *History of Animals* 533b, d'A.W. Thompson, trans. Note that the Hippocratic author of *Breaths*, a much earlier work, is certain that there is air in water and that this is what fish breathe (III.20).

differences, their perception of odor is to be counted as smelling.[176]

By virtue of the fact that fishes smell, but do not breathe, smells must occur in water. This ongoing interest in the correlations and differences between the sense-faculties of animals and humans seems to originate with Aristotle; he does not mention any previously published opinions on the subject. Notably, it is this concern which seems to inspire his classification of smells into nutritive and non-nutritive 'species', apparently with an end to distinguishing humans as being superior to animals in spite of the fact that the two groups have sense-faculties in common, and that, in the case of smell, the faculty is more acute among the animals.

Aristotle's categorisation of smells into two groups differs from Plato's in that Plato's are merely 'painful' or 'pleasant' to humans, whereas Aristotle's are either analogous to tastes and thus nutritive, by virtue of which they are pleasant or painful 'accidentally' to both animals and humans, or not analogous to tastes and thus non-nutritive and pleasant or painful 'as such':

> One class of odours, then, is that which runs parallel, as has been observed, to savours: to odours of this class their pleasantness or unpleasantness belongs incidentally. For owing to the fact that savours are qualities of nutrient matter, the odours connected with these are agreeable as long as animals have an appetite for the food, but they are not agreeable to them when sated and no longer in want of it; nor are they agreeable, either, to those animals that do not like the food itself which yields the odours. Hence, as we observed, these odours are pleasant or unpleasant incidentally, and the same reasoning explains why it is that they are perceptible to all animals in common. The other class of odours consists of those agreeable in their essential nature, e.g. those of flowers. For these do not in any degree stimulate animals to food, nor do they contribute in any way to appetite; their

[176] Sorabji, 57-8.

> effect upon it, if any, is rather the opposite...Of this species of odour man alone is sensible...its nature is agreeable or disagreeable per se.[177]

Aristotle goes on to say that these non-nutritive odours 'have been generated for human beings, as a safeguard to health' as 'the odour arising from what is fragrant, that odour which is pleasant in its own right, is, so to say, always beneficial to persons in any state of bodily health whatsoever.' While he takes this idea no further, it stands to reason that if this is the case, then non-nutritive smells which are *unpleasant* in their own right are necessarily harmful to humans, an idea with which the Hippocratic physicians, among others, would certainly agree.

Aristotle is not suggesting here that animals perceive non-nutritive smells but fail to enjoy them; he is stating that animals do not perceive them at all, 'for in the fact that they breathe, the other animals have already sufficient provision for their perception of the one species of odour only, as human beings have for their perception of both.' The grounds for this rather amazing claim are that animals have no need of the health benefits which non-nutritive smells confer on human beings, as their brains are smaller and drier than those of man:

> ...the perception of the second class of odours above described is confined to human beings because man's brain is, in proportion to his whole bulk, larger and moister than the brain of any other animal. This is the reason of the further fact that man alone, so to speak, among animals perceives and takes pleasure in the odours of flowers and such things. For the heat and stimulation set up by these odours are commensurate with the excess of moisture and coldness in his cerebral region.[178]

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[177] *De Sensu* 443b-444a.
[178] *De Sensu* 444b.

In other words, Aristotle implies, the fact that animals have a far more acute sense of smell where nutritive smells are concerned than do humans accords them no superiority over man at all – in fact it renders them inferior to humans, in that their enhanced ability to perceive nutritive smells is all that they require. Taken in this context, perfume is not only beneficial in terms of health, it is a tribute to civilisation and a testament to human supremacy over the animal kingdom.

Throughout his lengthy treatment of the subject, Aristotle says very little about the actual physiological process of smelling; he does note that respiration is a function of the lungs, and that odours enter through the nostrils when humans inhale, but seems disinterested in the hows and whys of what happens next.[179] Again, this is most likely due to a combination of lack of anatomical knowledge and his belief that sense perception is primarily a function of the soul, only incidentally facilitated by the body.

[179] *De Sensu* 421b, 444a; this concept comes up in other works as well, for example *On Youth and Old Age.*

Theophrastus

Whether or not Aristotle's lack of attention to olfactory physiology is shared by the scientists and natural philosophers who followed is unknown; we do not have an in-depth treatment of the subject until Galen addresses it at length in the 2nd century AD, but it is certainly possible that works regarding (or even merely mentioning) nasal physiology were published in the interim and subsequently lost. Works entitled *Physics* and *On the Senses* are attributed by Diogenes Laertius to Theophrastus, Aristotle's contemporary and close friend, and the author himself refers in *Περὶ ὈσμῶνΟσμῶν* to 'another treatise' in which he addressed the senses. Sadly, only fragments of these works remain, and his thoughts on the subject are otherwise unavailable. His work on smells themselves, however, survives largely intact, and offers a great deal of insight.

In his *De Sensibus*, Theophrastus gathered and offered commentary on the ideas of several Presocratics regarding sense-perception, and these fragments illuminate considerably the popular theories of writers whose original work has not survived. G. M. Stratton calls this text 'the most important source of our knowledge of the earlier Greek physiological psychology' and notes that 'for a knowledge of Greek psychology before Plato – apart from the question as to the nature of the soul, which Theophrastus in this writing almost wholly ignores – we are indebted to Theophrastus for more than to all the other ancient authorities combined.'[180] The text is significant as well for its attempt at objective reporting prior to judgement, although of course some internal criticism occurs; as Stratton notes, 'both as reporter and judge, he seems studiously to hold back his own more positive conviction upon the topic under discussion, yet he does not wholly succeed in this restraint. In this very

criticism one catches something of his view of the truth, some principle by which he judges, some observation of fact.'[181] Nevertheless, this constitutes a much more 'scientific' approach than Aristotle's work on the subject, with which Theophrastus was intimately familiar; Theophrastus is making an effort here to record and consider previous work on the subject as well as to provide commentary on the ideas proffered by earlier writers. He categorizes these ideas of his predecessors into two groups:

> Περὶ δ' αἰσθήσεως αἱ μὲν πολλαὶ καὶ καθόλου δόξαι δύ' εἰσίν. οἱ μεν γὰρ τῷ ὁμοίῳ ποιοῦσιν, οἱ δὲ τῷ ἐναντίῳ. Παρμενίδης μὲν καὶ Ἐμπεδοκλῆς καὶ Πλάτων τῷ ὁμοίῳ, οἱ δὲ περὶ Ἀναξαγόραν καὶ Ἡράκλειτον τῷ ἐναντίῳ.
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> Τὸ δὲ πιθανὸν ἔλαβον οἱ μὲν ὅτι τῶν ἄλλων τε τὰ πλεῖστα τῇ ὁμοιότητι θεωρεῖται καὶ ὅτι σύμφυτόν ἐστι πᾶσι τοῖς ζῴοις τὰ συγγενῆ γνωρίζειν, ἔτι δ' ὡς τὸ μὲν αἰσθάνεσθαι τῇ ἀπορροία γίνεται, τὸ δ' ὅμοιον φέρεται πρὸς τὸ ὅμοιον.
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> Οἱ δὲ τὴν αἴσθησιν ὑπολαμβάνοντες ἐν ἀλλοιώσει γίνεσθαι καὶ τὸ μὲν ὅμοιον ἀπαθὲς ὑπὸ τοῦ ὁμοίου, τὸ δ' ἐναντίον παθητικόν τούτῳ προσέθεσαν τὴν γνώμην. Ἐπιμαρτυρεῖν δὲ οἴονται καὶ τὸ περὶ τὴν ἁφὴν συμβαῖνον. Τὸ γὰρ ὁμοίως τῇ σαρκὶ θερμὸν ἢ ψυχρὸν οὐ ποιεῖν αἴσθησιν.
>
> Καθόλου μὲν οὖν περὶ αἰσθήσεως αὗται παραδέδονται δόξαι. Περὶ ἑκάστης δὲ τῶν κατὰ μέρος οἱ μὲν ἄλλοι σχεδὸν ἀπολείπουσιν, Ἐμπεδοκλῆς δὲ πειρᾶται καὶ ταύτας ἀνάγειν εἰς τὴν ὁμοιότητα.
>
> By some investigators, sense perception is ascribed to similarity, while by others it is ascribed to contrast: Parmenides, Empedocles, and Plato attribute it to similarity; Anaxagoras and Heraclitus attribute it to contrast.
>
> The one party is persuaded by the thought that other things are, for the most part, best interpreted in the light of what is like them; that it is a native endowment of all creatures to know their kin; and

[180] Stratton, 1.
[181] Stratton, 2.

> furthermore, that sense perception takes place by means of an effluence, and like is borne toward like.
>
> The rival party assumes that perception comes to pass by an alteration; that the like is unaffected by the like, whereas opposites are affected by each other. So they give their verdict for this <idea of opposition>. And to their mind further evidence is given by what occurs in connection with touch, since a degree of heat or cold the same as that of our flesh arouses no sensation.
>
> Such then are the teachings handed down to us with regard to the general character of sense perception. As for the various senses severally, they are almost wholly neglected by these authors, save Empedocles, who tries to refer also the particular senses to similarity.[182]

Han Baltussen points out that this is a classic example of peripatetic dialectic as outlined in Aristotle's *Topics*. Aristotle indicates that

> [D]ialectic provides the only method in which we can determine basic principles because these cannot be deduced from the principles proper to a science nor from even more primary ones. Our alternative source is a specific category of opinions, the *endoxa*, that is, the 'accepted views held by everyone or the majority or the most reputable persons...' (*Top*. 1.1, 100b21-23).[183]

Certainly that is what Theophrastus is doing here, although whether this is an exhaustive list of available sources, a majority of available sources, or simply a representative sample by the authors he feels are the most reputable is never stated. It is possible that sources were ignored due to failure to address the questions in which Theophrastus was particularly interested here. Several of the authors included receive only a couple of paragraphs in this work, while Empedocles, Democritus, and Plato merit pages and extensive criticism. Nevertheless, they are all categorized on

[182] *De Sensibus*, lines 1.1 - 3.13.
[183] Baltussen, 6.

one side or the other of the 'likeness' issue, with the exception of Democritus, whom Theophrastus feels plays both sides. Baltussen concludes that

> (1) the lucid introduction, (2) the diaeresis of the endoxic material into mutually exclusive positions, (3) the testing of implications and consistency, (4) universal validity and (5) the demand for clarity and unequivocable terminology encourage an investigation into the 'argumentative blue-print' of the *De Sensibus*, in order to expose the hidden traces of a dialectical procedure.[184]

This investigation would, Baltussen feels, help to illuminate the 'original purpose' of this fragment, shedding light in particular on whether or not it was part of Theophrastus' *Physics* or perhaps a stand-alone book on sense-perception.

Little space is devoted to Parmenides in the *De Sensibus*, but Theophrastus notes that his theory of sense perception says 'merely that there are two elements, and that our knowledge depends upon the excess of one or the other. . .for to perceive by the senses and to have intelligence are treated by him as identical.' Theophrastus' issue with this is that 'if there should occur an exact equality in the mixture, he does not make it clear whether there would or would not be thought, nor what would be the general state <resulting>.'[185] While none of the others mentioned by Theophrastus limit the material world to two elements, we can see here the seed of the great debate as to whether or not sense-perception is knowledge, a subject on which Plato in particular spent a great deal of time.

Empedocles, writes Theophrastus, espouses another theory which will sound quite familiar to Platonic scholars, the theory that 'perception occurs because something fits into the passages of the particular <sense organ>.' This is the reason, he explains, that one sense cannot discern another's sense-objects; the different

[184] Baltussen, 19.

passages of the organs are dissimilar in size. Empedocles is sure that perception occurs as a result of emanations from the sense-objects, and smell, he says, 'is due to the act of breathing. As a consequence, those have the keenest smell in whom the movement of the breath is most vigorous.'[186] This is an interesting idea, and one must speculate as to whether or not the observation that elderly people, whose breathing slows with age, also lose their sense of smell over time was taken into account in formulating this theory. If Empedocles mentioned this, however, Theophrastus does not bring it up, nor does he mention, for example, what happens when one has a cold and loses the ability to inhale air as well as to smell. Rather, he notes that Empedocles suggests that 'The intensest odour emanates from bodies that are subtle and light' and that 'pleasure is excited by things that are similar <to our organs>, both in their constituent parts and in the manner of their composition; pain, by things opposed.' On a similar note to Parmenides, writes Theophrastus, Empedocles felt that 'thought is either identical with sense perception or very similar to it'. He goes on to say, however, that 'we think chiefly with the blood, for here the elements are more fully mingled than in any other of our members.'[187] How then, Theophrastus asks, do 'animate beings differ from other kinds of being so far as sense perception is concerned, since particles fit into the minute passages in lifeless objects also'? Empedocles suggests that this is why oil and water will not mix, but Theophrastus points out that were this the case, 'all things would perceive, and mixture, sense perception, and growth would be identical (for he ascribes them one and all to a correspondence with the passages), unless he add some further difference.' Similarly, Theophrastus finds it strange that Empedocles correlates

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[185] *De Sensibus*, 3.13, 4.20.
[186] *De Sensibus*, 9.15.

'thought as having the same constitution as sense, for then all creatures would share in thought', and adds that 'his idea is odd that the special abilities of men are due to the composition of the blood in their particular members, as if the tongue were the cause of eloquence or the hands, of craftsmanship'.[188]

Theophrastus also notes that 'if effluence involves a loss of substance – and this [Empedocles] uses as a universal testimony <for his theory> -- and if it be true, too, that odours arise through effluence, then those substances with the strongest odour would most rapidly perish.' The fact, he continues, 'is nearly the reverse: the most fragrant plants and other bodies that are most odorous are the most enduring.'[189]

As far as smell in particular is concerned, Theophrastus calls Empedocles' account 'odd' and reports that:

> Πρῶτον μὲν γὰρ οὐ κοινὴν αἰτίαν ἀπέδωκεν. Ἔνια μὲν γὰρ ὅλως οὐδ' ἀναπνέει τῶν ὀσφραινομένων. Ἔπειτα τὸ μάλιστα ὀσφραίνεσθαι τοὺς πλεῖστον ἐπισπωμένους εὔηθες. Οὐδὲν γὰρ ὄφελος μὴ ὑγιαινούσης ἢ μὴ ἀνεῳγμένης πως τῆς αἰσθήσεως. Πολλοῖς δὲ συμβαίνει πεπηρῶσθαι καὶ ὅλως μηδὲν αἰσθάνεσθαι. Πρὸς δὲ τούτοις οἱ δύσπνοοι καὶ οἱ πονοῦντες καὶ οἱ καθεύδοντες μᾶλλον ἂν αἰσθάνοιντο τῶν ὀσμῶν. Τὸν πλεῖστον γὰρ ἕλκουσιν ἀέρα. Νῦν δὲ συμβαίνει τοὐναντιον. Οὐ γὰρ ἴσως καθ' αὑτὸ τὸ ἀναπνειν αἴτιον τῆς ὀσφρήσεως, ἀλλὰ κατὰ συμβεβηκός, ὡς ἔκ τε τῶν αλλῶν ζῴων μαρτυρεῖται καὶ διὰ τῶν εἰρημένων παθῶν.
>
> First, he does not assign a cause which applies to all cases, since some animals that have a sense of smell do not breathe at all.[190] Secondly, it is silly to assert that those have the keenest sense of smell

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[187] *De Sensibus*, 10.5, 10.13.
[188] *De Sensibus*, 12.25-31.
[189] *De Sensibus*, 20.5-9.
[190] Theophrastus is most likely referring here to fish, which were not thought to breathe, as air and water were considered mutually exclusive.

> who inhale most, for if the organ is not in health or is, for any cause, not unobstructed, mere breathing is of no avail. It often happens that man has suffered injury <to the organ> and has no sensation at all. Furthermore, persons 'short of breath' or at hard labour or asleep – since they inhale the most air – should be most sensitive to odours. Yet the reverse is the fact. For in all likelihood respiration is not of itself the cause of smell, but is connected with it incidentally, as is shown in the case of other living creatures as well as by the facts just recounted.[191]

Alcmaeon, according to Theophrastus, believed that perception is predicated on something other than similarity, and quotes him regarding the primary difference between men and animals: that 'man alone has the power to understand. Other creatures perceive by sense but do not understand'. Theophrastus seems to agree with Alcmaeon that 'to think and to perceive by sense are different processes and not, as Empedocles held, identical.'[192]

Anaxagoras is on Theophrastus' list of those who feel perception 'comes to pass by means of opposites, for the like is unaffected by the like'. Apparently, in his original work, Anaxagoras applied his philosophy to each sense independently; however, all that Theophrastus tells us of his views on smell is that it 'accompanies inhalation', and that large animals smell things that small animals don't, 'for rarefied air has a stronger odour, since it is odorous when heated and rendered less dense':

> ἀναπνέον δὲ τὸ μὲν μέγα ζῷον ἅμα τῷ μανῷ καὶ τὸ πυκνὸν ἕλκειν, τὸ δὲ μικρὸν αὐτὸ τὸ μάνον, διὸ καὶ τὰ μεγάλα μᾶλλον αἰσθάνεσθαι. Καὶ γὰρ τὴν ὀσμὴν ἐγγύς εἶναι μᾶλλον ἢ πόρρω διὰ τὸ πυκνοτέραν εἶναι, σκεδαννυμένην δὲ ἀσθενῆ. Σχεδὸν δὲ ὡς εἰπεῖν οὐκ αἰσθάνεσθαι τὰ μὲν μεγάλα τῆς λεπτῆς [ἀέρος], τὰ δὲ μικρὰ τῆς πυκνῆς.
>
> A large animal when breathing, accordingly, inhales the dense along

[191] *De Sensibus*, 21.16 – 22.24.
[192] *De Sensibus*, 25.19.

> with the subtle, while the small animal inhales merely the subtle; large animals as a consequence have the more perfect sensory power. For an odour nearby is more intense than one remote, he holds, because it is denser, and in scattering becomes faint. Roughly, then, his view is, that large animals perceive no 'subtle odour' and small animals no odour that is dense.[193]

Anaxagoras also believed that all sense perception 'is fraught with pain', which Theophrastus explains is in 'keeping with his general principle, for the unlike when brought in contact <with our organs> always brings distress'; nevertheless, Theophrastus refutes this almost immediately, writing that while 'there is a certain reasonableness, as I have said, in explaining sense perception by the interplay of opposites, for alteration is held to be caused, not by similars, but by opposites', it is also true that 'some objects are actually perceived with pleasure, and most of them at least without pain'.[194] He also disagrees with Anaxagoras that larger animals have keener powers of sense, on the grounds that 'it would seem to be essential to keener sense perception that minute objects should not escape it. And we might reasonably suppose, too, that an animal with power to discern smaller objects could also discern the larger.'[195]

Unlike his predecessors who connect the senses with fire, Theophrastus writes that Diogenes of Apollonia 'connects the senses with the air, even as he connects with it both life and thought.' He is on the side of those who ascribe perception to likeness, 'for, he holds, here would be neither activity nor passivity unless all things were from a single source'.

Τὴν μὲν ὄσφρησιν τῷ περὶ τὸν ἐγκέφαλον ἀέρι. Τοῦτον γὰρ ἄθρουν

[193] *De Sensibus*, 30.33 – 31.
[194] *De Sensibus*, 31.5.
[195] *De Sensibus*, 34.32.

εἶναι καὶ σύμμετρον τῇ ὀσμῇ. Τὸν γὰρ ἐγκέφαλον αὐτὸν μανὸν καὶ τὰ φλεβία, λεπτότατον δ' ἐν οἷς ἡ διάθεσις ἀσύμμετρος καὶ οὐ μίγνυσθαι ταῖς ὀσμαῖς. ὡς εἴ τις εἴη τῇ κράσει σύμμετρος, δῆλον ὡς αἰσθανόμενον ἄν. . .ὀσφρησιν μὲν οὖν ὀξυτάτην οἷς ἐλάχιστος ἀὴρ ἐν τῇ κεφαλῇ, τάχιστα γὰρ μίγνυσθαι. Καὶ πρὸς τούτοις ἐὰν ἕλκῃ διὰ μακροτέρου καὶ στενωτέρου, θᾶττον γὰρ οὕτω κρίνεσθαι. Διὸπερ ἔνια τῶν ζῴων ὀσφραντικώτερα τῶν ἀνθρώπων εἶναι. Οὐ μὴν ἀλλὰ συμμέτρου γε οὔσης τῆς ὀσμῆς τῷ ἀέρι πρὸς τὴν κρᾶσιν μάλιστα ἄν αἰσθάνεσθαι τὸν ἄνθρωπον.

Smelling is effected by the air about the brain; since the air is massed there and is commensurate with odour, while the brain of itself, with its ducts, is already of light consistency. But <the cephalic air> in some whose condition departs from this proper measure is too attenuated and does not unite with the odours. Thus it is evident that perception occurs in anyone whose composition has this correspondence. . .smell, to begin with, is keenest in those who have the least air in the head – for then this air most readily unites <with the odours> -- and in those, furthermore, who inhale through an unusually long, narrow <passage>, for <odour> is thus more readily detected. Some animals in consequence are keener of smell than are men. Yet man's perceptive power is extremely acute whenever the odour corresponds to the <cephalic> air in point of composition.[196]

According to Diogenes, pleasure and pain are also correlated with air, says Theophrastus. 'Pleasure and pain, he holds, arise in the following way. Whenever the air mingles in large quantities with the blood and sublimates it – since the air is now in its normal state and pervades the entire body – there is pleasure. But when <the condition is> abnormal and the air no longer unites with the blood, then the blood settles and becomes too sluggish and thick, and there is pain.'[197]

Even thinking has to do with air, insofar as this philosopher is concerned:

> Φρονεῖν δ', ὥσπερ ἐλέχθη, τῷ ἀέρι καθαρῷ καὶ ξηρῷ. Κωλύειν γὰρ τὴν ἰχμάδα τὸν νοῦν. διὸ καὶ ἐν τοῖς ὕπνοις καὶ ἐν ταῖς μέθαις καὶ ἐν ταῖς πλησμοναῖς ἧττον φρονεῖν. ὅτι δὲ ἡ ὑγρότης ἀφαιρεῖται τὸν νοῦν, σημεῖον, διότι τὰ ἄλλα ζῷα χείρω τὴν διάνοιαν. Ἀναπνεῖν τε γὰρ τὸν ἀπὸ τῆς γῆς ἀέρα καὶ τροφὴν ὑγροτέραν προσφέρεσθαι. . .τὰ δὲ φυτὰ διὰ τὸ μὴ εἶναι κοῖλα μηδὲ ἀναδέχεσθαι τὸν ἀέρα παντελῶς ἀφῃρῆσθαι τὸ φρονεῖν.
>
> Thinking, as was said, is due to pure dry air, for moisture clogs the intellect. Thought is at a low ebb consequently in sleep and in one's cups and in repletion. That moisture robs one of reason is proved by this, that the other living creatures are inferior of understanding, for they breathe air that comes from the earth and they take moister nourishment. . .plants are entirely bereft of thought because they are not hollow and consequently do not receive the air.

We can see that Diogenes has made a heartfelt attempt here to distinguish men from beasts in terms of thought, but Theophrastus complains that 'he makes neither sense perception nor thought a peculiar mark of things animate. For presumably such air and in such combination and correspondence can exist everywhere and in everything. . .and so, according to this theory, it would also be possible for us to detect odours by the breath taken into the chest, for <this air> might sometimes be proportionate to the odours'.[198]

Theophrastus devotes many pages of *De Sensibus* to Democritus, whose work on sense perception seems to have been much more in depth than that of the other writers mentioned. Theophrastus writes that Democritus, in frag. 8, 'in his account of sense perception does not make it entirely clear whether it is due to contrast or similarity', and 'he may consequently be understood in either way' in that

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[196] *De Sensibus* 39.14, 41.25.
[197] *De Sensibus*, 43.14.
[198] *De Sensibus*, 44.23-28, 44.33, 46.11.

> Εἰ μὲν γὰρ τῷ ἀλλοιοῦσθαι ποιεῖ τὸ αἰσθάνεσθαι, δόξειεν ἄν τοῖς διαφόροις. Οὐ γὰρ ἀλλοιοῦται τὸ ὅμοιν ὑπὸ τοῦ ὁμοίου. Πάλιν δ' εἰ τὸ μὲν αἰσθάνεσθαι καὶ ἁπλῶς ἀλλοιοῦσθαι τῷ πάσχειν, ἀδύνατον δὲ, φησί, τὰ μὴ ταὐτὰ πάσχειν, ἀλλὰ καν ἕτερα ὄντα ποιῇ οὐχ ᾗ ἕτερα ἀλλ' ᾗ ταὐτόν τι ὑπάρχει, τοῖς ὁμοις.
>
> In so far as he ascribes the action of the senses to an alteration, it would seem to depend on contrast, for the like is never altered by the like. On the other hand, sense perception would seem to depend on similarity in so far as he ascribes the perceptive process and, in a word, alteration to the fact that something is acted upon. For things that are not the same cannot be acted upon, he says, but even when things that are different do act, <their action is> not due to their difference but to the presence in them of something identical.[199]

R. W. Baldes writes that 'It has been argued that this is a confession of ignorance on Theophrastus' part, and that this ignorance is due to Theophrastus' own naivete in conflating two separate accounts by Aristotle.' Baldes does not believe that this is the case, and suggests that rather than trying to combine the different points of view in Aristotle's *Metaphysics* and *De Generatione et Corruptione*, 'one of which involves contraries, while the other speaks of similars', Theophrastus is 'keeping clear the distinction between material and efficient causes as they are discussed by both Aristotle and Theophrastus in reference to Democritus' and that 'there seems to be no grounds at all for assuming a self-contradiction here. Nor,' he continues, 'does this passage in frag. #8 seem to provide the occasion for Theophrastus' statement about Democritus' teaching at De Sensibus 49', the paragraph in which he writes that Democritus' doctrine seems to accept both similars and contraries where perception is concerned.[200] According to Democritus, the differences in shape, order, and

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[199] *De Sensibus*, 49.10-15.
[200] Baldes, (sic) 1976, 42, 45.

placement of the atoms materially cause objects and their differences from each other. Thus, writes Baldes, Aristotle and Theophrastus 'are talking only about the material "cause" in Democritus and are saying nothing at all about the *interaction* of atomic complexes', this interaction being the efficient cause which Theophrastus ascribes to a philosophy of similarity rather than contrast.[201] For example, Baldes notes, in Democritus 'the eye sees things (i.e. colors) which have an atomic structure *similar* to one another and to the eye. Still, there is also a process of vision which operates by *contraries*: seeing by reflection involved the observation that the more the color seen is like the color of the eye, the less readily it is reflected there and hence seen.'[202] Indeed, nothing about this analysis appears to be 'a confession of ignorance'; the point that Theophrastus makes here seems to be entirely valid.

Unlike most of the authors he discusses in *De Sensibus*, Democritus does, Theophrastus notes, discuss each of the senses in turn, but these discussions are given somewhat short shrift in this work; Theophrastus spends more time refuting Democritus' 'unique account' of the mechanics of vision than he devotes to explaining it, and calls his commentary on hearing 'absurd, while original' before dismissing the topic of Democritus' work with 'As for our other senses, his treatment hardly differs from that of the mass of writers.'[203] The olfactory process is never specifically mentioned here, and anything Democritus might have had to say on the subject is lost.

What Democritus does contribute, according to Theophrastus, is a study of 'the intrinsic character and quality of each of the senses' objects', which Theophrastus feels that other writers, with the exception of Plato, fail to state. Of

[201] Baldes, 43.
[202] Baldes, 47.

Plato, Theophrastus merely remarks that he 'gives greater heed to the senses severally' than does Parmenides, and yet 'he actually does not speak of them all, but only of hearing and sight. . .Of smell, taste, and touch he tells us nothing whatever, nor does he say whether there are any other senses than these <five>. He undertakes a more accurate account, however, of the objects of these senses.'[204] Following the summary of the various philosophies regarding the sensory process, the remainder of what is left of the *De Sensibus* is devoted to the objects of sense themselves as described by Democritus and Plato. He states clearly here that his aim in this section is not to ascertain the truth, but to examine the theories proposed by each:

> Δημόκριτος δὲ καὶ Πλατῶν ἐπὶ πλεῖστον εἰσιν ἡμμένοι. Καθ' ἕκαστον γὰρ ἀφορίζουσι, πλὴν ὁ μὲν οὐχ ἀποστερῶν τῶν αἰσθητῶν τὴν φύσιν, Δημὸκριτος δὲ πάντα πάθη τῆς αἰσθήσεως ποιῶν. Ποτέρως μὲν οὖν ἔχει τἀληθές, οὐχ ἂν εἴη λόγος. Ἐφ' ὅσον δὲ ἑκάτερος ἥπται καὶ πῶς ἀφώρικε, πειραθῶμεν ἀποδοῦναι πρότερον εἰπόντες τὴν ὅλην ἔφοδον ἑκατ́ρου.
>
> Δημόκριτος μὲν οὖν οὐχ ὁμοίως λέγει περὶ πάντων, ἀλλὰ τὰ μὲν τοῖς μεγέθεσι, τὰ δὲ τοῖς σχήμασιν, ἔνια δὲ τάξει καὶ θέσει διορίζει. Πλάτων δὲ σκεδὸν ἅπαντα πρὸς τὰ πάθη καὶ τὴν αἴσθησιν ἀποδίδωσιν. Ὥστε δόξειεν ἄν ἑκάτερος ἐναντίως τῇ ὑποθέσει λέγειν. Ὁ μὲν γὰρ πάθη ποιῶν τῆς αἰσθήσεως καθ' αὑτὰ διορίζει τὴν φύσιν. Ὁ δὲ καθ' αὑτὰ ποιῶν ταῖς οὐσίαις πρὸς τά πάθη τῆς αἰσθήσεως αποδίδωσι.
>
> Democritus and Plato, however, are the investigators who go into the question most fully, for they define the object of each sense, <Plato> never robs these objects of their external reality, whereas Democritus reduces them one and all to effects in our sensuous faculty. Where the truth itself lies, is not the question we are now discussing. Let our aim be rather to report the range of each author's treatment and the precise

[203] *De Sensibus*, 57.20.

definitiions he gives, stating by way of preface his general method.

> Democritus has no uniform account of all <the sensory objects>; some he distinguishes by the size <of their atoms>, others by the shape, and a few by the <atomic> order and position. Plato, on the other hand, refers nearly all of them to effects in us, and to our perceptive faculty. Consequently each of these authors would seem to speak directly counter to his own postulate. For the one of them, who would have sensory objects to be but effects in our perceptive faculty, actually describes a reality resident in the objects themselves, while the other, who attributes the objects' character to their own intrinsic being, ends by ascribing it to the passive change of our perceptive faculty.[205]

Democritus, as reported in the *De Sensibus*, feels that 'proof that <sensory qualities> are not objectively real is found in the fact that they do not appear the same to all creatures', and that 'men vary in composition according to their condition and age, whence it is evident that a man's physical state accounts for his inner presentation'. Most of this discussion revolves around vision in general and colours specifically; about smell Theophrastus only reports that 'as for smell, [Democritus] says nothing definite except that something subtle emanating from heavy substances is the cause of odor.'[206] His point of view regarding tastes, however, is telling; Democritus describes sweetness as consisting of 'atomic figures that are rounded and not too small', astringency as being 'derived from <atomic> figures that are large and of many angles and are least rounded', bitterness as being 'composed of small, smooth, round <atomic figures> whose surfaces moreover are furnished with hooks', and pungency atoms as 'small, round, and angular, but not irregular.' These atoms, then, affect the body in diferent ways; they flow smoothly or 'clog and occlude the

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[204] *De Sensibus* 5.7, 59.
[205] *De Sensibus* 60.13 - 61.24.
[206] *De Sensibus*, 63-64.

ducts', and furthermore 'no one of all these figures is present pure and without admixture of the others; on the contrary there is a multitude of them in each savour, and the self-same taste includes figures that are smooth, rough, round, sharp, and so on.' Democritus reiterates, also, that 'it makes a great difference <what our condition is>, inasmuch as the same substance at times causes opposite feeling, and opposite substances cause the same feeling'.[207] Theophrastus takes objection to this, wondering how the same figure can 'possibly be a subjective effect', or how the same substance might be 'spherical for certain persons and of another shape for others, although such an assumption were perhaps inevitable if what is sweet for some is bitter for others, nor can the shapes <of atoms> change according to differences of state in us'.[208] He does not seem to take into account that there might be differences within each human body which could cause the same atomic structure to combine with other atomic structures in different ways, which seems here to be Democritus' point, but it is difficult to tell given that Democritus' work is being both summarized and paraphrased and the overwhelming majority of the work is missing. One might suppose that Democritus would describe the process of odor detection in exactly the same way as he describes perception of savours, given the close relationship between odours and tastes, but this is never specifically mentioned by Theophrastus, nor, apparently, by Democritus. 'There are some things of this kind, then,' Theophrastus writes, 'that Democritus has neglected.'[209]

In his treatment of Plato, Theophrastus appears to be working only with Plato's *Timaeus*, and our extant fragment of *De Sensibus* ends with a summary of the portions of this work regarding sense perception – a very minor part of the whole.

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[207] *De Sensibus*, 65-67.
[208] *De Sensibus*, 69.12.

Paraphrasing primarily *Timaeus* 66e, Theophrastus reports only that

> Τὰς δὲ ὀσμὰς εἴδη μὲν οὐκ ἔχειν, ἀλλὰ τῷ λυπηρῷ καὶ ἡδεῖ διαφέρειν. εἶναι δὲ τὴν ὀσμὴν ὕδατος μὲν λεπτότερον, ἀέρος δὲ παχύτερον. Σημεῖον δὲ ὅτι ὅταν ἐπιφράξαντες ἀνασπῶσιν, ἄνευ ὀσμῆς τὸ πνεῦμα εἰσέρχεται. Διὸ καθάπερ καπνὸν καὶ ὁμίχλην εἶναι τῶν σωμάτων ἀόρατον. εἶναι δ᾽ καπνὸν μὲν μεταβολὴν ἐξ ὕδατος εἰς ἀέρα, ὁμίχλην δὲ τὴν ἐξ ἀέρος εἰς ὕδωρ.
>
> Odours, according to Plato, admit of no <true> classification, but are distinguished by their painful or pleasant effect. Odour is subler than water, though less refined than air; the proof is this, that if we inhale through obstruction, the breath enters without odour. Thus odour is a kind of invisible vapour or mist from bodies, vapour being a transition from water to air, mist the transition from air to water.[210]

Theophrastus also notes that Plato defines pleasure as 'a sudden and violent experience of return to the natural state' and pain as 'a sudden experience of forcible disturbance of the natural state'; these, then, are the effects of odours on an individual according to Plato.

Again, Theophrastus finds some of these explanations problematic, arguing that Plato's transitions between states of matter are skewed:

> ἀπορήσειε δ᾽ ἄν τις καὶ περὶ τῶν ὀσμητῶν εἰ ἔστιν εἴδη. Καὶ γὰρ τοῖς πάθεσι καὶ ταῖς ἡδοναῖς διαφέρουσιν, ὥσπερ οἱ χυλοί. Καὶ ἅμα δόξειεν ἄν ὁμοίως ἔχειν ἐπὶ πάντων. Περὶ δὲ τῆς ὀσμῆς ὅτι μὲν ἀπορροή τίς ἐστι καὶ ἀνάπνευσις τοῦ ἀέρος, σχεδὸν ὁμολογεῖται. Τὸ δὲ ἀφομοιοῦν καρνῷ καὶ ὁμίχλῃ ταὐτά τε λέγειν οὐκ ἀληθές. Οὐδὲ γὰρ αὐτὸς φαίνεται ποιεῖν. Τὸν μὲν γὰρ ἐξ ὕδατος εἰς ἀέρα, τὴν δ᾽ ὁμίχλην ἐξ ἀέρος εἰς ὕδωρ λέγει μεταβάλλειν. Καίτοι δοκεῖ γ᾽ ἀνάπαλιν ἔχειν ἐπὶ τῆς ὁμιχλης, διὸ καὶ παύεται τὰ ὕδατα γινομένης ὁμίχλης.
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> Regarding the objects of smell, too, one could well doubt whether there

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[209] *De Sensibus*, 83.20.
[210] *De Sensibus*, 85.11-16.

> might not be differences of kind. For they differ in their affections, as well as in the pleasures they give us, quite as do the savours. . .As for smell itself, it is generally agreed that there is some emanation and that there is an inhalation of air. But it is incorrect to liken odour to vapour and mist, and to say that vapour and mist are identical. Nor does he himself seem actually so to regard them; for vapour is in transition from water to air, he says, while mist is in transition from air to water. And yet in regard to mist the very opposite is generally held to be the case, for when mist arises, water disappears.[211]

And thus, 'in sum and in substance', as Theophrastus puts it, 'these are the conclusions with regard to perception and thinking which have come down to us from the earlier investigators.' We can see throughout this report, as succinct as it might be, the questions which consumed philosophers from Anaxagoras to Plato: whether sensory perception is best described as occurring by means of likes or contrasts operating on each other; the number of elements of which the material world is composed and how these interrelate to affect sensory perception; whether sensory perception is knowledge or thought or merely facilitates these; precisely how sensory perception occurs; what roles pleasure and pain play in sensory perception and why; and what sorts of emanation result in smells. It is impossible to know, of course, whether or not this list of philosophers was exhaustive, or whether there were perhaps other texts regarding the senses available to Theophrastus which he deliberately chose to ignore. While the preponderance of the material discussed in this work regards vision, and there is very little at all regarding smell, this text is still the best compilation of ancient and Classical scholarship regarding the senses available. It is hardly news that olfactory perception has taken a backseat to vision and hearing throughout history, and while it is quite likely that Theophrastus

[211] *De Sensibus*, 90.23-91.

addressed sensory perception himself, including the olfactory process, in works that have not survived, his work *On Odours,* or *De odoribus,* has come down to us, far and away the best extant work on the subject from this time period and many centuries thereafter.

The original form of *De odoribus* remains a mystery. Gary Reger writes that 'when Diogenes Laertius wrote his biography of Theophrastos, *De odoribus* had already become a separate treatise, but in fact it was almost certainly originally all or a large part of Book VIII of *De causis plantarum*, following a book on wine and oils.'[213] He notes that G. R. Thompson originally suggested this idea in 1941, and cites Georg Wöhrle, who wrote in 1988 that 'If, as is probably the case, *CP* originally had a lost Book 7 which discussed juices produced by means of man's skill (since juices are discussed before odors in *CP* 6 also), then it is fairly certain that the fragrant products, such as ointments and perfumes, were dealt with in Book 8; *CP* 6.20 also refers to this subject.'[215] This idea is now, according to Reger, 'virtually universally accepted', and as such, *De odoribus* 'fits into the etiological scheme of that treatise (*CP*), itself the 'explanatory' complement to the *Historia plantarum's* descriptive brief. This goes a long way to account for the character of *De odoribus* and for its inclusions and omissions. . .'[216]

Though Plato and Aristotle make the same complaint, Theophrastus seems irked to a far greater extent than either by the lack of a specific olfactory vocabulary, complaining from the beginning of *On Odours* that 'τῆς δ' εὐωδίας καὶ κακωδίας οὐκέτι τὰ εἴδη κατωνόμασται καίπερ ἔχοντα διαφορὰς μεγάλας ἐπὶ γ' αὐτῶν τῶν γλυκέων καὶ πικρῶν' and pointing out that although smells are described as being

[213] Reger, 257.
[215] Wöhrle, 4.

'δριμεῖα', 'ἰσχυρὰ', 'μαλακὴ', 'γλυκεῖα' and 'βαρεῖα', these words can describe things that smell either good or bad.[217] He specifically finds fault with Democritus for neglecting to define or even to contribute to an olfactory classification system, asking:

> Τί δή ποτε Δημόκριτος τοὺς μὲν χυμούς πρὸς τὴν γεῦσιν ἀποδίδωσι, τὰς δ' ὀσμὰς καὶ τὰς χρόας οὐχ ὁμοιως πρὸς τὰς ὑποκειμένας αἰσθήσεις; ἔδει γὰρ ἐκ τῶν σχημάτων. ἢ τοῦτό γε πρὸς ἅπαντας κοινόν; ἅπαντες γὰρ οἱ μὲν μόνης οἱ δὲ μάλιστα ταύτης τὰ πάθη λέγουσι καὶ τὰς διαθοράς, ὡς ἐν χρώμασι λευκὸν καὶ μέλαν, καὶ ἐν χυμοῖς γλυκὺ καὶ πικρόν, οὐχ οὕτω δ' ἐν ὀσμαῖς. οὐδὲν γὰρ πλὴν τό τ' εὔοσμον καὶ τὸ κάκοσμον.[218]
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> What can be the reason why Democritus, though he assigns various flavours to the sense of taste, yet does not in like manner assign various smells and colours to the senses to which they belong? According to his system he should have done so. Perhaps the same criticism should apply to all who have dealt with the subject, for they all either give the various qualities and distinguish the experiences of this sense alone or at least comparatively neglect the others: thus with colours they distinguish white and black, and with flavours sweet and bitter, yet they make no corresponding classification of smells, but merely class them as 'pleasant' or 'unpleasant'.

In spite of this diatribe against Democritus and everyone else who has previously addressed the senses, however, Theophrastus fails to propose his own classification system in this text, choosing instead to let the problem stand; Wöhrle notes that

> Theophrastus had already critically examined Democritus' theory of an atomistic explanation for the different types of flavors in *CP* 6 and had rejected the theory. In *CP* 6.1.6, he lists Democritus' system of the different atomic forms assigned to their respective flavours. The atom

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[216] Reger, 257, 284.
[217] *On Odours*, I.2.
[218] *On Odours*, XIV.64.

> producing a sweet effect, Democritus states, is round and large; that which produces a sour taste is large, rough, and many-cornered, etc. In *Od*., Theophrastus obviously believes that since, according to Democritus, specific atomic forms produce specific types of flavour, it follows that he should indicate the atoms producing specific odors. . .It is interesting that Theophrastus says in CP 6.4.1 that the forms (ideai) of flavour appear to be seven, as is the case for odor and color. This indicates, first of all, that Theophrastus has a very definite list of the types of odor in mind; however, no such list is to be found in his existing works.[219]

Indeed, throughout this text, Theophrastus simply refers to smells as being either 'εὔοσμα' or 'κάκοσμα'.

For Theophrastus, smells generally result from a 'mixture' of substances, 'τὸ γὰρ ἄμικτον ἅπαν ἄοδμον ὥσπερ ἄχυμον, διὸ καὶ τὰ ἁπλα ἄοδμα, οἷον ὕδωρ ἀὴρ πῦρ.'[220] Though he agrees with Aristotle that 'unmixed' substances such as these elements have no smell, however, he does feel that smells themselves are, in fact, exhalations, and he presents a great deal of support for this idea throughout the remainder of the treatise.[221] Similarly, while he reiterates Aristotle's distinction between nutritive and non-nutritive smells, and agrees that 'αἱ μὲν τῶν χυλῶν καὶ τῆς τροφῆς κατὰ συμβεβηκός, αἱ δ' ὥσπερ τῶν ἀνθῶν καθ' αὐτάς', he does not go so far as to share Aristotle's pronouncement that animals cannot smell non-nutritive substances, noting, for example, that herbivores smell other animals. Rather, he

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[219] Wöhrle, 10.

[220] *On Odours*, I.1; earth, he goes on to explain, has more of a smell to it than any of the other three, as it is of a more composite nature. Regardless, he contradicts this declaration that uncompounded things are always inodorous in III.7: 'ἔισι μὲν οὖν καὶ τοῖς ἀμίκτοις ὀσμαί τινες πρὸς ἃς συνεργεῖν πειρῶνται καὶ ταῖς παρασκευαῖς, ὡς καὶ πρὸς τὰς τῶν χυμῶν εὐστομίας.'

[221] *On Odours*, I.3. Theophrastus uses derivatives of the verb ἀναπνέω throughout to describe these 'exhalations', rather than referring to them as 'smoke' or 'mist' in the manner of some of his predecessors. It should be noted, however, that the word incorporates respiration in general, or breathing *in* as well as breathing *forth*; while Theophrastus employs it to describe emanations of

states quite plainly that animals simply fail to appreciate non-nutritive smells and can even find them irritating (q.v. II.4). While for the most part he agrees with his contemporaries that good things smell good and that things which smell bad are bad, he examines this idea carefully as well, attributing 'the stench of putridity' (ἡ τοῦ σαπροῦ κακωδία) to everything in a state of decomposition, but noting that in some cases those things produced by decaying matter, like mushrooms, do not stink of decay. Finally, while he notes that tastes and smells accompany each other (ὡς γὰρ ἐπὶ τὸ πᾶν οὐδεὶς οὔτε χυλὸς ἄοσμος οὔτε ὀσμὴ ἄχυλος), he takes pains to differentiate these senses, noting that frequently things which smell good (εὔοσμα), like flowers, are also things which taste bad (δύσχυμα), and that similarly, some things which taste good smell foul, like carob ('τὸ Αἰγύπτιον καλούμενον σῦκον').[222]

Everything that is not odorless, according to Theophrastus, whether plant, animal, or 'inanimate', has a smell particular to itself whether humans can perceive this or not, and this smell may or may not correspond with taste. However, like tastes, these smells fluctuate according to changes over time, increases in temperature, and, in the case of perfume, contamination by foreign substances. Natural things smell like what they are, but the smell associated with 'inanimate' things such as perfume is dependent on the properties of its components: 'ἐν δὲ τοις ἀψύχοις ταῖς τῶν ἁπλῶν δυνάμεσι καὶ γίγνονται καὶ μεθίστανται καθάπερ οἱ χυμοί.'[223]

Theophrastus is obviously familiar with and informed by Aristotle's ideas regarding smells, but it is his distinction between smells which do and do not occur in

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smells in general and diffusion through the air of the scents of plants and perfumes in particular, perception of these by the same respiratory process is understood.

[222] *On Odours*, I.3, II.5, XIV.67.

[223] *On Odours*, II.6.

nature which sets him uniquely apart. Because perfumes are manmade, and involve the manipulation and blending of multiple components with individual smells under a variety of conditions with greater or lesser success, studying perfumes allows Theophrastus to explore the nature and properties of smells themselves in a manner which Aristotle, who restricted his discussion to natural materials, could not. The overwhelming majority of *Περὶ Ὀσμῶν* is thus devoted to examining perfumes, their ingredients (which, while natural, might be either nutritive or non-nutritive and are only found in combination in manufactured products), and the perfume-making process itself in order to explain such things as variations in odour intensity, how smells combine, why some smells seem to neutralize others, and why the scent of one ingredient in a mixture might prevail over the rest – all concerns still highly relevant in the fields of psychophysics and olfactory neurobiology today, as well as being of utmost importance to modern perfumers and waste management consultants alike.

Theophrastus is the first extant Greek author to offer a specific definition regarding the precise nature of a 'perfume'. According to him, it is a combination of solids and liquids which improves upon the scent of the individual ingredients for the purpose of appealing to the sense of smell:

> Ὅσαι δὲ δὴ κατὰ τέχνην καὶ ἐπίνοιαν γίνονται περὶ τούτων πειρατέον εἰπεῖν ὥσπερ καὶ περὶ τῶν χυλῶν. ἐν ἀμφοιν δὲ δῆλον ὡς ἀεὶ πρὸς τὸ βέλτιον ἦν ἡμῖν ἡ ἀναφορά. πᾶσα γὰρ τέχνη στοχάζεται τούτου . . '.Εκ δυοῖν γὰρ τούτων καὶ ἡ τῶν χυλῶν καὶ τῶν οσμῶν γένεσις. ὡς μὲν οί τὰ ἀρώματα καὶ τὰ διαπάσματα συντιθέντες ξηροῖς πρὸς ξηρά. ὡς δ' οἱ τὰ μύρα κεραννύντες ἢ τῷ οἴνῳ ἐπιχέοντες ὑγροῖς πρὸς ὑγρά. τὸ δὲ τρίτον, ὃ καὶ πλεῖστόν ἐστιν, ὡς οἱ μυρεψοὶ ξηροῖς πρὸς ὑγρα.

παντὸς γὰρ μύρου καὶ χρίσματος ἡ σύνθεσις αὕτη. [224]

> Next we must endeavour to speak of those odours, and also those tastes, which are artificially and deliberately produced. In either case it is clear that improvement is always what we have in view, for that is the aim of every artificial process. . .For tastes and odours alike are derived from two things: the method of the makers of spices and perfume-powders is to mix solid with solid, that of those who compound unguents or flavour wines is to mix liquid with liquid, but the third method, which is the commonest, is that of the perfumer, who mixes solid with liquid, that being the way in which all perfumes and ointments are compounded.

The primary liquid involved is the carrier oil, which is not meant to be perceived in most cases, but which rather provides a vehicle of support for the aromatics. Wine and water are also employed at various points in the manufacturing process, both for steeping astringent ingredients and, in the case of water, for heating the ingredients which require it. The dry components are plant products, specifically 'flowers, leaves, twigs, roots, wood, fruits, and resins', and most perfumes are mixtures of these.[225] Of the goals of perfumery, Theophrastus tells us that improvement on the scents of individual aromatics is of utmost importance, 'πᾶσα γὰρ τέχνη στοχάζεται τούτου', and that 'τῶν δὲ μύρων ἡ σύνθεσις καὶ ἡ κατασκευὴ τὸ ὅλον οἷον εἰς θησαυρισμόν ἐστι τῶν ὀσμῶν'. The art of the perfumer is predicated on the fact that 'δεῖ δ' εἰδέναι ποῖαι ποῖοις εὔμικτοι καὶ ποῖαι ποίοις συνεργοῦσιν εἰς τὸ ποιεῖν μίαν'.[226] Having thus defined exactly what he is talking about, as any good scientist would,

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[224] *On Odours* III. 7-8.
[225] *On Odours*, IV.27. Throughout the text, Theophrastus uses the word 'ἀρώματα' to refer to any of these plant products both singly or in any combination. Two examples are given in IV.16, that of an Egyptian oil, βαλάνος, and the Cilician oil made from bitter almonds, into which 'κελύφη αὐτῶν' are added to improve the smell. For the most part, however, the ideal carrier oil is the one 'τὸ ἀοσμότατον ζητεῖν'.
[226] *On Odours*, IV.14, III.7-8.

Theophrastus goes on to ask a long series of questions about perfume and perfume ingredients, and attempts to answer these using specific examples, all of which require observation, and some of which clearly require experimentation as well.

Theophrastus discusses the fact that the smells of different substances can be perceived at different distances, and explains this in terms of both mass and relative density. Since flowers are 'insubstantial' ('οὐκ ἐχόντων βάθος') and the parts which are scented are exposed to the air, they can be perceived by the nose (specifically in the form of garlands) even at a distance, whereas roots, which are solid, emit little scent. Breaking up the roots, and thus opening their passages, causes them to be fragrant, whereas crushing the petals of flowers causes them to smell worse. Resins such as frankincense and myrrh, which are of even closer texture than roots, give off some scent when crushed but must be heated gently in order to produce a sweet, long-lasting smell, as being warmed causes their scents to be dispersed.[227] It should be noted that Theophrastus is quite right about all of this, despite having none of the modern equipment for studying essential oil chemistry or plant physiology at the time; while he also lacked the modern concepts and vocabulary we employ to describe *why* crushed flowers smell worse and broken roots smell stronger than whole ones, he was obviously aware that this was the case, and his conclusion that perfumes made from flowers deteriorate quickly whereas those made from roots and resins last much longer ('Τὰ δ' ἄνθινα πάντα ἀσθενῆ. . . τὰ δ' ἐκ τῶν ριζῶν καὶ τῶν λοιπῶν χρονιώτερα') is equally accurate.[228] All of these comments suggest firsthand observation rather than secondhand reports, although he relies on data gathered from professional perfumers throughout the text as well.

[227] *On Odours*, III.12-13.
[228] *On Odours*, IX.39.

Oil, Theophrastus tells us, while convenient and a good preservative, is not naturally a vehicle particularly supportive of aromatic smells, 'αὐτῶν δὲ τούτων τὸ λιπαρώτατον, οἷον τὸ ἀμυγδάλινον', and this is why 'ὑποστύφουσι γὰρ πᾶν εἰς τὸ δέξασθαι μᾶλλον τὴν ὀσμήν, ὥσπερ τὰ ἔρια εἰς τὴν βαφήν.'[229] In the manufacture of perfumes, he explains, the ingredients meant to be perceived in the final product always go in last (as opposed to astringents, thickening agents, or dyes), as adding the primary aromatic components at the end of the process ensures that these are what the consumer smells rather than the fillers:

> ἐπικρατεῖ γὰρ ἀεὶ τὸ ἔσχατον ἐμβαλλόμενον καὶ ἂν ἐλαττον ᾖ. οἷον ἐὰν εἰς κοτύλην σμύρνης ἐμβληθῇ μνᾶ καὶ ὕστερον ἐμβληθῶσι κιναμώμου δραχμαὶ δύο, κρατοῦσιν αἱ τοῦ κιναμώμου δύο δραχμαί.[230]
>
> For that which is put in last always dominates, even if it is in small quantity; thus, if a pound of myrrh is put into a half-pint of oil, and at a later stage a third of an ounce of cinnamon is added, this small amount dominates.

He attributes this to an attraction between the solid fillers and the glutinous part of the oil. As the oil's viscosity attracts and binds the solids, the oil is thinned ('ξηρὰ γὰρ ὄντα τὸ λίπος ἕλκει πρὸς ἑαυτὰ καὶ αναδέχεται, διὸ καὶ τὴν συνέχειαν ἐξαιρεῖ'), and thus 'δεκτικώτερον ἐγένετο τοῦ ἐπιβαλλομένου διὰ τὸ μὴ ἀντιστατεῖν. . .κἂν ἔλαττον ᾖ τὸ ἐπιβαλλόμενον ἐπικρατεῖν τὴν τούτου ὀσμήν. εἰς ἀσθενέστατον γὰρ ἐμπίπτει καὶ δεκτικώτερον.'[231] Again, this is a fascinating explanation from a researcher with no understanding of modern organic chemistry, and one easily adapted to incorporate current ideas regarding molecular bonding.

Theophrastus continues to use this combination of firsthand observation and

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[229] *On Odours*, IV.14, IV.17.
[230] *On Odours*, IV.17.
[231] *On Odours*, IV. 18.

collected intelligence to discuss many issues pertinent to the manufacture of perfume throughout the text, with an obvious interest in the underlying principles. He notes, for example, that all astringents and many odoriferous ingredients must be heated in order to impart their qualities to a perfume, and that it is always necessary to use a double-boiler to heat perfume ingredients:

> παντῶν δὲ ἡ ἕψησις εἴς τε τὴν ὑπόστυψιν καὶ τὰς κυρίας ὀσμὰς ἐνισταμένων τῶν ἀγγείων ὕδατι γίνεται καὶ οὐκ αὐτῷ τῷ πυρὶ χρωμένων. τουτοῦ δέ, ὅτι μαλακήν εἶναι δεῖ τὴν θερμότητα, καὶ ἀπουσία πολλὴ γένοιτ' ἄν τῇ φλογὶ χρωμένων, καὶ ἔτι καῦσιν ἄν ὄζοι.[232]
>
> In all cases the cooking, whether to produce the astringent quality or to impart the proper odour, is done in vessels standing in water and not in actual contact with the fire. The reason being that the heating must be gentle, and there would be considerable waste if these were in actual contact with the flames, and further the perfume would smell of burning.

The watery barrier between the fire and the pot containing the oil thus prevents the scorching of the perfume and the wasting of ingredients, and if the heating is done properly, which is to say gently, there is even less 'waste' than there would be if the perfume were cold-processed, as the dry ingredients are first steeped in water or wine prior to being added to the heated oil and thus are less absorbent, leaving a greater volume of product:

> ποιεῖ δ' ἐλάττω τὴν ἀπουσίαν ὅσα πυρούμενα λαμβάνει τὰς κυρίας ὀσμας μᾶλλον ἢ ὅσα ψυχρὰ διὰ τὸ προφυρᾶσθαι τὰ πυπούμενα, τὰ μὲν οἴνῳ εὐώδει, τὰ δὲ ὕδατι. ἧττον γὰρ ἀναπίνει. τὰ δὲ ψυχρὰ ξηρὰ ὄντα

[232] *On Odours*, V.22. Note that derivatives of 'ἕψω' (including μὔρεψός) are often translated as having to do with 'boiling', but this is erroneous in the context of perfume manufacture, as boiling any of the ingredients would utterly spoil a perfume. The common use of 'unguent-boiler' rather than 'perfumer' in many English translations is thus misleading at best.

μᾶλλον. . .[233]

> However there is less waste when the perfume obtains its proper odour by exposure to fire than when it does so in a cold state, since those perfumes which are subjected to fire are first steeped either in fragrant wine or in water. For then they absorb less, while those which are treated in a cold state, being dry, absorb more.

Wine, he points out, is preferred in many cases: 'ποιεῖ δὲ καὶ ἡ τοῦ οἴνου κατάμιξις καὶ μύρα ἔνια καὶ θυμιάματα εὐοσμότερα, καθάπερ τὴν σμύραν'. However, whereas with solids anything goes, and fragrant powders (διαπάσματα) are further improved the more ingredients they contain, with a combination of solids with liquids, one has to be careful: 'ἀλλ' ἔνθα μὲν ἴσως χείρω ποιεῖ ἔνθα δὲ βελτίω, καθάπερ ἐπὶ τῶν μύρων. τὰ μὲν γὰρ ἀφαιρεῖται τὸ ἄκρατον καὶ σκληρόν, τὰ δ' ἀποθηλύνει καὶ ὥσπερ ἐξυδατοῖ τὰς ὀσμάς.'[234]

The final product is then stored in vessels of lead or stone (specifically alabaster) away from the sun, as:

> διαφθείρι δὲ τὰ μύρα καὶ ὥρα θερμὴ καὶ τόπος καὶ ὁ ἥλιος ἂν τεθῶσι. . .ἀφαιρεῖται γὰρ τὰς ὀσμὰς ὁ ἥλιος καὶ τὸ θερμὸν καὶ ὅλως ἐξίστησι τῆς φύσεως μᾶλλον τοῦ ψυχροῦ. . .ἡ πονηρὰ γὰρ φθορά, καθάπερ τῶν οἴνων καὶ τῶν ἄλλων χυλῶν, τῷ τὸ οἰκεῖον ἀφαιρεῖσθαι θερμόν. διὸ καὶ εἰς ἀγγεῖα μολυβδᾶ ἐγχέουσι καὶ τοὺς ἀλαβάστρους ζητοῦσι τουιούτου λίθου. . .ἐπεὶ καὶ τὰ πνεύματα φθείρει και καταναλίσκει, καθάπερ ἐλέχθη, τὰς ὀσμάς, ἄλλως τε καὶ τὰς μὴ φυσικάς.[235]
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> Perfumes are ruined by a hot season or place or by being put in the sun. . .For the sun or a hot place deprives the perfumes of their odour, and in general makes them lose their character more than cold treatment. . .For the most destructive thing that can happen to them, as

[233] *On Odours*, V. 23
[234] *On Odours*, XIV.66.
[235] *On Odours*, IX.40-41.

> to wines and other savours, is that they should be deprived of their proper heat. This is why men put them into vessels of lead and try to secure vials of alabaster. . .Even draughts of air destroy odours and cause them to waste, as was said, especially those odours which do not belong to a thing's essential nature.

Rather than being a simple report on perfumes and the perfume manufacturing process, this entire treatise closely examines established procedures with a goal of understanding why they work. Like Plato, Aristotle, and Hippocrates, Theophrastus assumes the veracity of Humourism throughout his work, using this to explain the nature of perfume ingredients, which he believes (with the exception of flowers) have 'hot and dry' properties, as well as to explain the interactions of perfume ingredients with each other and perfumes with the human body. Because most aromatics are 'hot and dry' and have certain other qualities ('τὰ δ' ἀρώματα πάντα σχεδὸν καὶ ἔυοσμα πλὴν τῶν ἀνθῶν ξηρὰ καὶ θερμὰ καὶ στυπτικὰ καὶ δηκτικά'), they produce heat and thus have effects on the humours of the body much as the individual ingredients might when used medicinally.[236] He notes, however, that the potency of these qualities varies depending on the aromatics themselves, pointing out that 'Κρᾶσις δὲ καὶ μῖξις οὐκ ἐστιν ὡρισμένη τῶν ἀρωμάτων, ὥστ' ἐκ τῶν αὐτῶν ἀεὶ χρηστὰ καὶ ὅμοια γίνεσθαι, ἀλλαοῖα δὲ συμβαίνει διὰ τὴν ἀνωμαλιάν τῶν δυνάμεων τῶν ἐν τοῖς ἀρώμασι' due to the vagaries of weather during the growing season, whether or not the aromatics are collected at the right time, and whether or not they are used while they are still at their peaks ('Νέα μὲν οὖν ὄντα τῶν ἀρωμάτων ἔνια δυνάμεις μὲν εὐθὺς ἔχει βαρείας καὶ δριμείας παλαιούμενα δὲ μέχρι τῆς ἀκμῆς γλυκαίνεται, εἶτ' ἀναλύεται πάλιν'). The first of these variables, he

[236] *On Odours*, VII.34, IX.37, V.21.

reports, is beyond human control, but the other two are not.

Much as Hippocrates was interested in the effects of environment and climate on human health, Theophrastus is interested in their effects on perfume, possibly as a result of his in-depth botannical studies. Both air and pollution can destroy a perfume by causing the scent to dissipate: 'ἐπεὶ καὶ τὰ πνεύματα φθείρει καὶ καταναλίσκει, καθάπερ ἐλέχθη, τὰς οσμὰς, ἄλλως τε καὶ τὰς μὴ φυσικάς.' Further, perfumes change with the seasons: μετακινοῦνται δ' ἐν ταῖς ἐτέιαις ὥραις πάνθ' ὡς εἰπεῖν, μάλιστα δὲ τὰ ἀσθενέστατα, τὰ δ' ἄνθινα καθ' ἣν ὥραν ἀνθεῖ τὸ ἄνθος.'[237] He is also quite interested in the potential medical uses of various compounds of perfumes and why they work, despite his admission that 'ταῦτα μὲν ἔξω τῆς τέχνης'. That perfumes should have medicinal effects on the human body stands to reason, he writes:

> Εὐλόγως δὲ τὰ μύρα φαρμακώδη διὰ τὴν τῶν ἀρομάτων δύναμιν. καὶ γὰρ τὰ ἀρώματα τοιαῦτα. δηλοῖ δὲ τά τε καταπλάσματα καὶ ἃ δή τινες μαλάγματα καλοῦσιν ὅιας ἀποδείκνυται δυνάμεις τά τε φύματα καὶ τὰ ἀποστήματα διαχέοντα καὶ ἄλλα πλείω τῶν κατὰ τὸ σῶμα διαλλοιοῦντα, ἐπιπολῆς μὲν ἀλλὰ καὶ τὰ ἐν Βάθει, ὅιον, ἄν τισ καταπλάσῃ τὰ ὑποχόνδρια καὶ τὸ στῆθος, εὐθὺς σὺν τοῖς ἐρυημοῖς ἀποδίδωσιν εὐώδεις τὰς ὀσμάς. . .[238]
>
> It is to be expected that perfumes should have medicinal properties in view of the virtues of spices, for these too have such virtues. The effects of plasters and of what some call 'poultices' prove what virtues they display, since they disperse tumours and abscesses and produce a distinct effect on other parts of the body, on its surface, but also on the interior parts: for instance, if one lays a plaster on his abdomen and breast, the patient forthwith produces fragrant odours along with his eructations.

[237] *On Odours*, IX.41, XIV.68.

Here, as in Hippocrates, the pleasant-smelling effects of the poultice or plaster are incidental to its ability to resolve tumours and lesions, merely an extra benefit for anyone exposed to the patient's body odours. In other examples, however, the smells associated with a treatment modality do seem to play a part in its efficacy. Theophrastus' explanation, for example, why rose-perfume (τὸ ῥόδινον) is good for treating strangury but iris-perfume (τὸ ἴρινον) is not is that rose-perfume contains a great deal of salt, which may assist in removing blockages, and its pleasant smell provides the catalyst for flow (αἴτιον δ' ἄν εἴη διότι πᾶν τὸ ὑπεξαχθησόμενον. τοῦτο δὲ οἱ ἅλες ποιοῦσιν, ἡ δ' εὐωδία τὴν ὁρμὴν ἀπέδωκε) whereas iris-perfume, though equally fragrant, is astringent and may constrict the urinary tract, exacerbating the problem (διὰ τί δὲ τὸ ἴρινον εὔοσμον μὲν οὐ ποιεῖ δὲ τὴν ὁρμήν; ἢ διότι στυπτικὸν καὶ συνάγει τοὺς πόρους, ὥστε συηκλείσει κωλύειν τὴν δίοδον;). He notes, however, that iris-perfume is a good laxative as a result of its heating quality and astringent effects, just as rose-perfume, primarily due to the drying and warming properties of salt, is good for ear infections. Further, Theophrastus reports that rose-perfume, because its scent is delicate and light, and its heat warms and opens passages, actually alleviates headaches, even those caused by heavier perfumes such as μεγαλεῖον, sweet majoram, spikenard, and 'most of the cheap ones', 'οἱ γὰρ δὴ πόνοι τῆς κεφαλῆς ἢ καθυγραινομένης ἢ πνευματουμένης τῷ ἐναπολαμβάνεσθι, ὥστε τὸ μὲν ἐκκρῖναι δεῖ τὸ δὲ πέψαι ἢ ἀφελαεῖν.' In spite of its potential for causing a headache, however, μεγαλεῖον, a very popular and expensive strong-smelling perfume made with cassia, cinnamon, myrrh, and 'burnt resin' (most likely frankincense) is alleged to be a powerful anti-inflammatory ('δοκεῖ δὲ τὸ μεγαλεῖον ἀφλέγμαντον εἶναι παντὸς

[238] *On Odours*, XII.60

τραύματος'). This information, most of which is probably being reported secondhand, is consistent with other records of medical prescriptions; the ancient Egyptians used frankincense as both a disinfectant and an anti-inflammatory, and the physician Herophilos, a later contemporary of Theophrastus, similarly prescribes frankincense and myrrh (among other plant products) in a compound for the expectoration of blood, and rose-oil in an anal suppository.[239]

While Theophrastus says nothing in this text regarding how the olfactory process works physiologically, he asks many questions involving olfactory chemoproprioception, and answers these with varying degrees of conviction. Noting that perfumers routinely apply their scents to customers' wrists, he asks why perfumes appear to be most pleasant when applied at that location, and then attributes this to the heat of the skin at the wrist: 'Τὴν δ' αἰτίαν ἐκ τοῦ ἐναντίου ληπτέον, ὅτι τὸ θερμὸν ἐξίστησι καὶ ἀλλοιοῖ. ταχεῖα δ' ἤδη ἡ αἴσθησις τοῖς μύροις ἀναμιηνυμένοις τῷ χρωτί'. He is equally certain that heavy or light, perfumes smell stronger on a person in motion, for 'ἁπλῶς δὲ πᾶν τὸ πολύοδμον ἄντ' εὐῶδες ἄντε κακῶδες ἄντε δριμὺ ἄντ' ὀξὺ ἄντ' ὁποιονοῦν τυγχάνῃ, κινούμενον ἐμφανέστερον. τότε γὰρ ὥσπερ ἐνεργείᾳ ἀναμίγνυται μᾶλλον τῷ ἀέρι.'[240] Not all of Theophrastus' queries, however, present such obvious solutions. He wonders, for example, why perfumes seem to smell stronger on individuals who don't often use them than they do on habitual consumers, but on this point, he is flummoxed, and offers a variety of possibilities: this phenomenon may be an illusion; it may have to do with the scent of the last perfume applied being weakened as it mixes with the pre-existing scent of perpetually perfumed skin, as opposed to skin lacking detrimental contaminants; or it

[239] *On Odours* VIII.35-36, IX.49, X.42; Herophilos fragments 258 and 259.
[240] *On Odours*, X.44,

may be that unperfumed skin is slower to absorb perfume than habitually perfumed skin, and thus the scent seems more powerful and is preserved for a longer time. This is simply not a question Theophrastus can answer, and he summarizes his attempt with 'καὶ τοῦτο μὲν ἔλαττον καὶ οὐ φανερῶς ὁμολογούμενον.'[241] Similarly, he finds the underlying physiological cause of odour fatigue elusive, and offers multiple potential explanations. Taking the case of rose-perfume, which renders imperceptible any scents subsequently applied ('κουφότατον γὰρ ὂν καὶ ἀσθενέστατον ἀφανίζει τὰς τῶν ἄλλων ὀσμὰς ὅταν προμυρισθῶσι), he speculates that:

> Αἴτιον δ' ὅτι λεπτότατον ὂν καὶ προσφιλὲς τῇ αἰσθήσει διὰ τὴν κουφότητα μάλιστα διικνεῖται καὶ συμπληροῖ τοὺς πόρους, ὥσθ' ἡ αἴσθησις κατειλημμένη καὶ πλήρης οὖσα κρίνειν ἀδυνατεῖ. δύο γὰρ εἰσι τρόποι, τάχα δὲ τρεῖς, οἱ κωλύοντες τὴν κρίσιν. ἓς μὲν ὁ νῦν εἰρημένος. ἄλλος δ' ὁ ἀπὸ τῶν ἰσχυρῶν ὥσπερ μεθύσκων τὴν αἴσθησιν καὶ καρηβαρᾶν ποιῶν. τρίτος δ' ὅταν προκαταληφθῇ τῷ βελτιονι. τὸ γὰρ ἐπεισάγειν τὸ χεῖρον οὐ ῥᾳδιον. Οὐ δέχεται γὰρ ἡ αἴσθησις, ὥσπερ οὐδ' ἐπὶ τῶν χυλῶν καὶ ὅλως τῶν κατὰ τὴν τροφήν.[242]
>
> The explanation is that, being very delicate and acceptable to the sense of smell, by reason of its lightness it penetrates as no other can and fills up the passages of the sense, so that being entirely taken up and filled with it, it is unable to judge of others. For the power of judging is inhibited in two, or possibly in three ways: one is that which has just been mentioned; another is that the sense of smell is, as it were, intoxicated with its powerful virtues and becomes stupefied; the third is that the sense may be preoccupied with the superior odour, for then it is not easy to introduce after it what is inferior, since the sense of smell refuses this – just as the sense of taste in like case refuses flavours and

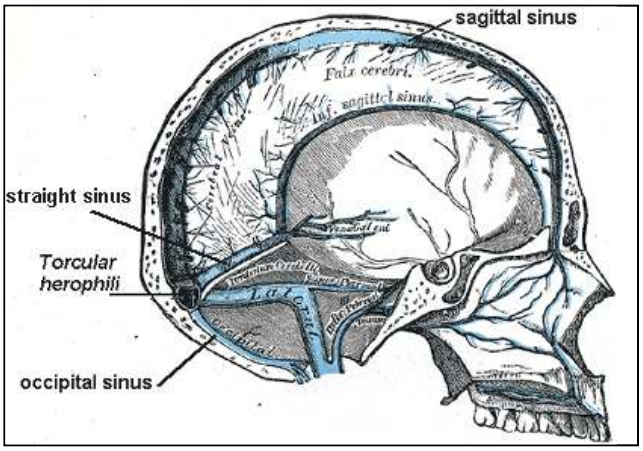
[241] *On Odours*, XI.53-54. There is no conclusive evidence either way, to my knowledge. It is still true that 'all do not agree as to the fact'.
[242] *On Odours*, X.45-46.

foods in general.

Theophrastus thus distinguishes himself from his predecessors and contemporaries by his consistent willingness both to pose questions to which he has no determinate answers and to base his admittedly unsubstantiated hypotheses solely on the empirical evidence available. Of course, he had no way of knowing at the time that perfumers, chemists, and neurobiologists alike, all of whom had access to vastly superior technology, would continue to struggle with some of these problems over a thousand years later, and would come up with much the same conclusions.

The Peripatetics

It is deeply unfortunate that the books authored by Herophilos (c. 335-280 BC) have been lost, and that his works, as well as the works of his student, Erasistratus (c. 304-250 BC), are preserved only in short fragments quoted by Galen and others. This duo, both physicians and anatomists, were the first Greeks known to use dissection and, controversially, vivisection studies to distinguish between sensory nerves (αἰσθητικά) and motor nerves (προαιρετικά) and to link these to the brain. Of the two, Herophilos was apparently particularly interested in sensory perception. The confluence of sinuses (the superior sagittal sinus, straight sinus, and occipital sinus which connect beneath the occipital protuberance at the base of the skull) was later called the *torcular herophili* in his honour (although he called this λένος himself), suggesting that he must have written descriptions of general nasal physiology, and possibly some conjectures regarding the sense of smell as well. Indeed, it seems highly improbable that this was not the case, and the absence of such studies leaves a gaping hole in the olfactory story. However, while it seems likely that this is simply due to the fact that Herophilos' work on the subject was later considered to have been rendered obsolete and was gradually phased out of circulation, it is also possible that no such work ever existed.[243] Regardless, the lack of extant physiological material of any significance prior to Galen where olfaction is concerned cannot be construed to suggest that there was no interest in the subject in the interim



between the work of Theophrastus and the Roman period. Certainly the nature of the sense of smell and smells themselves were of interest; the Peripatetic compilation entitled *Ἀριστοτέλους Φύσικα Προβλήματα*, or ***Problemata***, is rife with questions related to these, accompanied by answers of varying degrees of sophistication.

In spite of the fact that many of the topics discussed in this book fall within the modern purview of the sciences, the *Problemata* is primarily a philosophical rather than a scientific work, as it lacks a deliberately empirical focus overall. However, the variety of authors causes the degree of imbalance between philosophical and scientific methodologies to be inconsistent throughout, and medical theories are often incorporated. While modern experts currently agree that it is impossible this text was produced by Aristotle himself, it is considered to be a product of the Peripatetic school of philosophy in the Aristotelian tradition, and translator W.S. Hett suggests that the work as it has come down to us was adapted from 'a lecture notebook containing problems for discussion, to which additions were made by many hands at many times', and suggests further that the book did not reach 'its present form until a date which some scholars place as late as the fifth century of our era'. Whether or not this is the case, however, the Peripatetic school failed to survive the 3rd century AD, and the nature of the material included within the extant text suggests a far earlier date of origin.[244]

Very little commentary exists regarding the *Problemata*, and none of the commentary available has anything to do with sense-perception. Further exploration of this topic is warranted and the field appears to be wide open. What commentary is

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[243] Von Staden, 250-251.
[244] *Problemata*, introduction, vii-viii.

available has to do with the authorship of the work, which Ann Blair points out has been in doubt at least as far back as the Renaissance:

> Humanist scholars discussed, as their successors have since, the authenticity of the work. This was hardly a new topic in the Renaissance either: 'authenticity' was one of the seven topics standard in the prolegomena to a commentary on a work of Aristotle in late antiquity. Commentators on the *Problems* – from Pietro d'Abano (whose *Expositio* of 1310 was reprinted in a number of early editions) to his early modern successors, Julio Guastavini and Ludovico Settala, both Italian medical doctors active independently of one another in the early seventeenth century – adduced arguments for and against Aristotle's authorship which are still current today. . .Guastavini notes that the order and number of the Problems were not original with Aristotle: the arrangement in the 38 books is confusion rather than order, with a plethora of examples in one place and a dearth in another, not to mention repetitions within and between sections. . .Ludovico Vives, in his preface to a 1554 edition, concluded: 'it appears that this work was not written by Aristotle but compiled and collected from his disputations by those who heard them.' He too points to the repetitions, the lack of order, and the 'many cold, light and feeble reasons, foreign to the gravity and sharpness of Aristotle's character, while still others are obscure and unpleasant. Indeed everything is left in doubt, nothing is affirmed'.[245]

Blair's summary and discussion of authorship runs on for 40 pages, but the bottom line remains that information regarding the original authors, compilers, and format is lost along with any concrete ideas about when individual questions and answers were developed and published. Certainly the writing style is not typical of Aristotle, and there is no discernable order to the problems presented. Nevertheless, this work is an insightful and intriguing glimpse into the Peripatetic school of thought, a text

which can be placed in 'a long-lived natural philosophical genre imitated from such ancient models attributed to Aristotle and Alexander of Aphrodisias and that consisted in a collection of causal questions and answers, mostly about natural and medical topics.'[246]

Unlike the Hippocratic Corpus, the *Problemata* is not a series of discrete essays by individual authors. Rather, the 'problems' discussed in this work are arranged by the compilers in short collections, with some attempt to do so according to their general subject matter (κατ' ειδος συναγωγης) and presented in list format, and thus each section contains the work of multiple authors who may or may not have been contemporaries and who clearly have disparate backgrounds where exposure to earlier publications is concerned. For example, the most sophisticated and thoughtful answer to a question regarding smell within the text ponders whether or not it is true that trees become scented when touched by a rainbow, and, if so, why? This problem is taken quite seriously by the respondent, who systematically lists conditions and situations in which the contention is false and then goes on to state that in cases in which it *seems* to be true, the rainbow, being merely a reflection which does not actually exist in nature, must be incidental to the smell phenomenon, which he attributes to increased moisture from rainfall subsequently heated by the earth. The answer to this question is a theoretical one, as it is predicated on logic (and indeed the question would require the same approach today, as it has gotten no easier to find a tree touched by a rainbow), and could thus be considered more philosophical than scientific; nevertheless, the methodology here is that of a scientist,

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[245] Blair, 192-4.
[246] Blair, 189.

and the response reveals an impressive understanding of optics and climatology.[247]

Sadly, none of the other questions regarding smells are answered with anything close to this degree of insight and background knowledge, and some of the answers given are quite poor. One natural philosopher asks why roses with rough centres smell more pleasant than roses with smooth centres, which is certainly an intriguing question, but he answers this query simply by stating that the thorniest roses are those which smell the most pleasant, never bothering to correlate thorniness with the central texture of roses. This is hardly a scientific response, and it is difficult to believe that it was even considered adequate by philosophers at the time it was written. Similarly, another writer questions why mixed wine smells more strongly than unmixed wine, and his response suggests not only that he has not read Theophrastus, but that he has not bothered to study the rest of the questions and answers in the text.[248] However, these are the extremes; most of the olfaction-related material in the *Problemata* is a happy medium between them, and much of it, thankfully, is closer on the spectrum to the first example than to the latter two. Many of the sections contain nearly identical questions, and the answers provided may or may not be in harmony with each other; most of the questions are simply slighter or greater variations on a theme. Some of the questions posed cannot be answered empirically, and many have been addressed by earlier writers. Where smells are concerned, these questions are physiological, medical, or address both the nature of the sense of smell and of scents and odours themselves.

Only two questions in the entire collection of *Problemata* pertain specifically to the nose, and these shed little light on contemporary understanding of nasal or

[247] Book XII, 906a37.
[248] Book XII, 907a20, 907b13.

olfactory physiology. The first ponders why humans are the only living creatures who get nosebleeds, which seems a rather odd question in itself, in that epistaxis is not uncommon in dogs, cats, pack animals, or livestock. Nevertheless, the author apparently believes this premise, and suggests that the cause is due to the fact that ‘ἐγκέφαλον ἔκει πλεῖστον καὶ υγρότατον, ἀφ’ οὗ αἱ φλέβες πληρούμεναι τοῦ περιττώματος διὰ τῶν πόρων προΐενται τὴν ῥύσιν’. Unhealthy blood, he explains, is lighter than healthy blood, and this unhealthy blood mixes with the ‘waste product’ of the brain (‘τοῦ ἐγκεφάλου περιττώμασιν’, presumably phlegm, although this is not specified). The second question, based on an equally unsubstantiated premise, asks why it is that humans sneeze more than other creatures. Two possibilities are examined here; the first is that it is the combination of moisture with air which causes sneezing, and because human nasal passages are broader than those of animals, more moisture enters these passages more often. Alternatively, the author suggests that because human nostrils are narrower in proportion to their length than those of animals, incoming moisture is not cooled in the nasal passages, and the heated moisture becomes air and causes a sneeze.[249] This answer is too vague to date with any certainty. The author of the response on epistaxis, however, appears to be familiar with the presence of cerebral veins, suggesting knowledge of advancements in anatomy made during the 3rd century B.C. at the earliest, and thus tenuously bridging the gap between Hippocrates and Galen.

In spite of the fact that neither of these contributors seems to have spent much time with many animals or understands nasal anatomy with any degree of sophistication, it is significant that they, and the compilers who followed, were interested in these mysteries of the nose. It is unfortunate that these are the only

[249] Book X, 891a13, 892b23.

such questions within the *Problemata*, but the fact that they appeared within the text at all and remained as it was copied over centuries is an indication that even philosophers were not entirely disinterested in the subject. Many of the other questions in the *Problemata* address physiological concerns relating to smells, if not to noses per se.

In the section regarding 'problems of a medical nature', queries are posed concerning why drugs which are bitter and smell 'bad' are often purgatives, and seeds and plants which smell 'good' are diuretic. Again, these very interesting assumptions are taken for granted in the text; there is no further elaboration on either hypothesis. The answers provided, however, echo the works of both Hippocrates and Theophrastus. In the first case, the solution to the problem is explained in terms of lack of absorption by the body:

> ἅπαντα δὲ ταῦτα διὰ τὸ μὴ εἶναι εὔπεπτα καθαίρει, καὶ τούτοις οἷς μὴ εὔπεπτα καθαίρει καὶ τούτους. ἔστι γὰρ ἄλλα ἄλλοις εὔπεπτα καὶ δύσπεπτα. διὸ οὐ πᾶσι ταὐτὰ φαρμακώδη, ἀλλ' ἐνίοις ἴδια. ὅλως γὰρ τὸ φάρμακον δεῖ οὐ μόνον μὴ πέττεσθαι, ἀλλὰ καὶ κινητικὸν εἶναι, ὥσπερ καὶ τὸ ηυμνάσιον ἔξωθεν ἧκον ἢ ἔσωθεν τῇ κινήσει ἐκκρίνει τὰ ἀλλότρια.[250]
>
> All such things have a purgative effect because they are not easily concocted. For to different persons some things are concocted easily and some with difficulty. So the same things do not act as drugs on all men, but some men have their own specifics. Speaking generally, the drug must not merely be unconcocted but must also produce motion, just as exercise whether inside or outside expels foreign matter by movement.

It is thus this failure of bitter-tasting and foul-smelling drugs to be digested by some

[250] Book I, 865a3.

patients (and so to be diluted by mixture, which according to Theophrastus would require the addition of an astringent) and the production of 'motion' which acts as a purgative, just as milk, oil, and sweet wine are purgative when administered in quantity to patients who cannot digest them. The emphasis on the fact that different patients react differently to the same drugs reflects the Hippocratic focus on the patient rather than the treatment modality. Similarly, pleasant-smelling plants and seeds, even those with strong smells like garlic, are reported to be diuretic because they are hot and easily digested ('θερμὰ καὶ εὔπεπτα'), and thus produce more excretions when absorbed by the body.

Mixtures, absorption, and movement are clearly of import to these writers when it comes to smells. The topics are raised again throughout, particularly in Books II, IV, XII, and XIII, which sections concern problems related to 'sweat', 'sexual intercouse', 'good smells' and 'bad smells' respectively. One author writes that 'heavy' smells like those of rue make sweat smell worse when mixed with the waste moisture of the body; another suggests that while children's sweat, being an unabsorbed secretion, is somewhat unpleasant, that of postpubescent adults is much worse, particularly in the region of the armpits. The latter writer theorises:

> ἢ ὅτι τὰ ἄπεπτα τούς τε χυμοὺς ἔχει (ἢ γὰρ ὀξυτέρους ἢ ἁλμυρωτέρους ἢ πικροτέρους) καὶ τὰς ὀσμὰς δυσωδεστέρας, τὰ δὲ πεπεμμένα ἢ γλυκεῖς ἢ ἧττον ἀγλευκεῖς, καὶ τὰς ὀσμὰς εὐδεστέρας ἢ ἧττον δυσώδεις; τοῦτο δ' ἐστὶ δῆλον ἐπὶ πάντων θεωμένοις καὶ φυτῶν καὶ ζῴων.[251]
>
> Is it because unconcocted secretion always has a worse taste (for it is either acrid, salt, or bitter), and a more unpleasant smell, but concocted matter is always sweet or at least more pleasant, and has a more

[251] Book IV, 877b20.

> pleasant or less unpleasant smell? This is evident to the observer in all plants and animals.

Another author poses a very similar question: why do those old enough to be lovers smell bad, whereas children do not? Those past puberty, he claims, smell like goats; perhaps this is because, 'ὥσπερ εἴρηται', sweat and moisture are absorbed by the πνεῦμα in children, but not by that of adults.[252] Why this might be the case and who it is who says so are not discussed here, and obviously this response conflicts with that given in the previous example. Nevertheless, it is interesting from a social standpoint, as throughout Greek literature, well into the Roman period, beauty is associated both with youth and with pleasant smells; certainly there is nothing romantic or beautiful about smelling like a goat. Sadly, as we learn in Book XIII, perfumes might not help with this problem:

> διὰ τί οἱ τοῦ γράσου ὄζοντες, ὅταν ἀλείφωνται μύρῳ, δυσωδέστεροι γίνονται; ἢ διότι τοῦτο ἐπὶ πολλῶν γίνεται, οἷον ὀξὺ καὶ γλυκὺ συμμιχθὲν τὸ ὅλον γλυκύτερον ἐγένετο; εἶτα πάντες ἱδρώσαντες δυσωδέστεροί εἰσι, τὸ δὲ μύρον θερμαντικόν ἐστιν, ἱδρῶτας οὖν παρασκευάζει.
>
> Why do those who have a goat-smell, when they are anointed with perfume, become more unpleasant-smelling? Is it due to what happens in many cases, for instance, when bitter and sweet are mixed the whole becomes more sweet? So all men smell more unpleasant after sweating, but perfume produces heat; hence it causes sweat.

In this frightening example, the 'heat' produced by perfumes actually exacerbates the situation, causing individuals who already smell like goats to smell even worse in spite of the fact that the mixture of the bitter with the sweet produces a sweeter scent overall. Further on, however, we are told that not all perfumes have this effect; some

[252] Book IV, 879a23.

are 'ἡδίω ἢ οὐ χείρω' than sweat, a comforting thought to be sure.[253]

One would think that if the general population believed these assertions, perfume sales at the time would have been less than stellar. It is clear from the overwhelming majority of the literature that this was not the case. Most people must have believed, therefore, that perfume mixed with sweat was an improvement over sweat alone. It is noteworthy, however, that 'natural' body odours, particularly those associated with sweat in general, the region of the armpits in particular, and the breath, are never presented as anything but causes for concern in the *Problemata*; the most positive remarks in the text regarding corporeal odours are that children do not smell as bad as adults, and that hair, bones and fat do not stink, 'ὅτι τὰ μὲν πέττεται, τὰ δὲ οὐκ ἔχει ὑγρότητα'. One writer goes so far as to say that of all living creatures, only the panther has a pleasant smell! This, on the other hand, is a cultural concept of the body which would certainly contribute to consumption of perfume products.[254]

When it comes to the body, it is that which is unabsorbed, and thus unmixed, which is the problem from an olfactory point of view. Humans and animals, being hot but not dry, smell bad by their very nature because not all of their waste products are absorbed; the resulting bad smells produced by the body are either caused by or result from heat and moisture in combination. Things that are dry and hot, have no waste product, and do not rot do not smell worse and can even smell better (εὐώδη γίνεται) in a state of decay, for example, 'many flowers', and 'the good-smelling things' (τὰ εὐώδη) from the hot, dry regions of Syria and Arabia (resins), whereas

[253] Book XIII, 908b24, 908b34.
[254] Book XIII, 907b35; the panther is apparently singled out here because 'other animals enjoy sniffing it'.

everything else smells 'foul and rotten' when dead.[255] Bad breath is reported to be the result of the 'decay' of the unabsorbed moisture within, which is why those fasting have worse breath than those who have eaten, and why hunchbacks 'δυσοσμοτέρα καὶ βαρυτέρα ἡ ὀσμὴ τοῦ πνεύματος' – the breath and moisture are confined in their crooked bodies and thus prone to decay. Similarly, the armpits are described as being the 'worst-smelling' (δυσωδέστατος) region of the body due to the decay of the fat there, 'ἢ διότι ἀκίνητος καὶ ἀγύμναστος'.[256]

Just as 'motion' is a necessary catalyst for foul-smelling drugs to act as purgatives in Book 1, so 'movement' in general is an important consideration in the perception of smells throughout the *Problemata*, as crucial to the process of producing smells as heat and moisture. Urine, for example, reportedly 'δυσωδέστερον γίνεται' the longer it stays in the body, as it is thought to become thick and less liquid, in the manner of stagnant water; the lack of motion concentrates the odour. Mixture and absorption play parts in the dispersal of good smells as well, according to these authors, but here, too, 'movement' is an equally important factor in the equation, particularly movement through air. One writer asks, 'Διὰ τί πάντα μᾶλλον ὄζει κινούμενα; ἢ ὅτι ἀναπίμπλησι πλείω ἀέρα ἢ ἡδυχάζοντα; διαπέμπεται οὖν ἡ ὀσμὴ θᾶττον οὕτω πρὸς τὴν αἴσθησιν ἡμῶν.'[257] This mirrors Theophrastus' statement in X.44 of *Περὶ Ὀσμῶν* (ἁπλῶς δὲ πᾶν τὸ πολύοδμον. . .κινούμενον ἐμφανέστερον. τότε γὰρ ὥσπερ ἐνεργείᾳ ἀναμίγνυται μᾶλλον τῷ ἀέρι), and yet it is phrased as a question; it seems highly unlikely that none of the authors of the

[255] Book XIII, 908a10.
[256] 908b11 and 29 (breath), Books IV, 877b and XIII, 908b20 (armpits).
[257] Book XII, 907a5. Almost exactly the same question and response are also presented in Book XIII at 909a8 ('διὰ τί πάντα μᾶλλον ὄξει κινούμενα; ἢ διότι ἀναπίπλησι τὸν ἀέρα; διαπέμπεται οὖν θᾶττον ἡ ὀσμὴ πρὸς τὴν αἴσθησιν'), as though it was unclear to the compilers which section was more appropriate.

Problemata had read Theophrastus, so clearly this was still a matter for speculation, although it seems to be taken for granted by the majority as likely being true. Exactly how it is that smells permeate the air, however, and how mixture with contaminants affects this process, is of great interest to many of the respondents in this text.

Of the 13 questions in Book XII, '"Οσα Περὶ τὰ Εὐώδη', four have to do with why spices and flowers smell differently ('ἧττον', 'ἧττον εὐώδεις', and 'μᾶλλον ἥδιον' respectively) depending on the distance between the source of the smell and those perceiving it, and two more address the reason that the scent of aromatics is more pungent (δριμύτερον) if they are allowed to smoulder on a bed of ashes (ἐπὶ τέφρας) than they do if simply thrown on a fire (ἐπὶ τοῦ πυρός).[258] In both cases, the consensus is that mixture with contaminants in the immediate vicinity, specifically fire and earth, detract from the smell nearby, but that these contaminants are not perceived from afar, where the scent seems pure. One author suggests that fire burns away the smell, 'διὸ καὶ ἐπὶ τῶν ἀνθράκων οὐκ ὄξει, πορρώτερον δὲ καθαρώτερον φαίνεται καὶ λεπτότατον τοῦτο.' Another concurs, noting that the smell of spices is less absorbed on ashes than in fire, but is more specific about the process: 'πολὺ οὖν καὶ τοῦ γεώδους συναναθυμιᾶται καὶ γίνεται καπνός. τὸ δὲ πῦρ φθάνει ἐκκάον τὸ γεῶδες αὐτῶν, ὥστε ἡ ὀσμὴ καθαρωτέρα καὶ εἰλικρινὴς ἀφικνεῖται ἄνευ τοῦ καπνοῦ.' A third notes that fire 'quickly' absorbs the scent of spices, thus causing it to change in close proximity, 'ἡ γὰρ πέψις ἀλλοίωσις ἐστιν τοῦ πεττομένου.'[259]

[258] Book XII, 906a 25-30; 907a1, 15, 25, 35. Interestingly, neither of these questions is specifically raised by Theophrastus in *Περὶ Οσμῶν*, although he does note in III.12 that the scents of flowers and other things used in garlands can be perceived far away, whereas some stronger-smelling or 'heavier' perfume ingredients, for example iris and spikenard (both rhizomes), are perceptible only in close proximity to the source. He attributes this to the relative mass of the medium.

[259] Book XII 906a23, 906b35, 907a13.

Similarly, both flowers and spices are felt to be made up of 'earthy parts' which detract from their scents. 'Bits of earth' come away with the smell, one writer suggests, but they are heavier than the scent, and 'ἃ προκαταφέρεται διὰ βάρος, ὥστε καθαρὰ πορρώτερον γίνεται ἡ ὀσμή'. Another agrees, noting that 'κεραννύμενον ἀσθενεστέραν ποιεῖ τὴν δύναμιν, εἰς δὲ τὸ πόρρω καταφέρεται ἡ ὀσμή,' and he adds that 'διὰ ταῦτα δὲ καὶ τριφθέντα τὰ ἄνθη ἀπολλύουσι τὴν ὀσμήν.' By far the most comprehensive, and certainly the most interesting, explanation for why aromatics smell better at a distance, however, is this one:

> Διὰ τί τὰ ἄνθη καὶ τὰ θυμιώμενα πόρρωθεν μᾶλλον ἥδιον ὄζει, ἐηηύθεν δὲ τὰ μὲν ποωδέστερον, τὰ δὲ καπνωδέστερον; ἢ ὅτι ἡ ὀσμὴ θερμότης τίς ἐστιν καὶ τὰ εὐώδη θερμά, τὸ δὲ θερμόν κοῦφον, ὥστε διὰ μὲν τοῦτο πορρωτέρω διιόντων ἀμιγεστέρα γίνεται ἡ ὀσμὴ τῶν συμπαρεπομένων ὀσμῶν ἀπὸ τῶν φύλλων καὶ τοῦ καπνοῦ, ὄντος ὑδατώδους ἀτμοῦ, πλησίον δὲ ὄντων τὰ μεμιγμένα αὐτοῖς συνόξει ἐν οἷς ἐστίν.[260]
>
> Why do flowers and burning spices smell more sweetly at a distance, whereas nearby some smell more like grass and others more like smoke? Is it because scent is a kind of heat, and sweet-smelling things are hot; but heat is light, so that for this reason at a greater distance the scent is less mixed with concomitant smells due to leaves and smoke, which is a watery steam, but, when they are nearby, the smells, which are mixed with the plants in which they are, are also perceptible.

This is the only response to this question which addresses the nature of smells, by suggesting that the reason smells are lighter than (earthy) leaves and (watery) smoke is that smell itself is a form of heat, and heat, being relatively weightless, travels more easily through the air. This is a unique perspective in the *Problemata*, but other contributors are equally interested in the relationship between heat and smell. Why, one writer asks, do we smell less in winter, and especially in a frost?

ἢ ὅτι ὁ ἀὴρ ἀκινητότερός ἐστιν ἐν τῷ ψύχει; οὔκουν ἀφικνεῖται ὁμοίως ἡ κίνησις ἡ ἀπὸ τοῦ σώματος τοῦ τὴν ὀσμὴν ἔχοντος διὰ τὴν δυσκινησίαν τῆς ἀπορροῆς καὶ τοῦ ἀέρος ἐν ᾧ ἐστίν.[261]

Is it because the air moves less in the cold? The movement, therefore, which arises from the body which produces the odour does not reach as far owing to the difficulty of setting in motion the emanation and the air in which it is.

Another writer expands on this idea, asking why it is that things which already smell bad smell even worse when heated:

ἢ ὅτι ἐστίν ἡ ὀσμὴ ἀτμὸς καὶ ἀπορροή τις; ὅ τ' οὖν ἀτμὸς ὑπὸ θερμοῦ γίνεται, καὶ ἡ ἀπορροή. κίνεσις γάρ τίς ἐστιν, τὸ δὲ θερμὸν κινητικόν. τὸ δὲ ψυχρὸν τοὐναντίον στατικόν και συσταλτικόν, και φορὸν δὲ κάτω, τὸ δὲ θερμὸν καὶ αἱ ὀσμαι πᾶσαι ἀνωφερεῖς διὰ τὸ ἐν ἀέρι τε εἶναι καὶ τὸ αἰσθητήριον αὐτῶν ἄνω εἶναι, μὴ κάτω. πρὸς γὰρ ἐγκέφαλον περαίνουσα ἡ ὀσμὴ αἴσθησιν ποιεῖ. [262]

Is it because smell is vapour and an emanation? Now vapour is due to heat, and so is an emanation. For it is a form of movement, and heat causes movement; cold on the other hand is stationary and causes contraction and movement downwards, but heat and all smells travel upwards, because they are in air and the sense which perceives them is above and not below; for a smell causes sensation when it penetrates the brain.

The idea that a smell causes sensation when carried to the brain is a fascinating one, and seems almost tacked on here; unfortunately this is never developed in any part of the text. Nevertheless, in both of these examples, it is the heat which facilitates the travel of a smell through the air, and cold which impedes it, rather than the smell itself being a form of heat. This makes more sense from a

[260] Book XII, 906b35.
[261] Book XII, 907a3.

modern perspective, but the suggestion that smell is heat is not ridiculous; as we have seen, there was no consensus among philosophers or scientists regarding how to categorize smells. One author wonders, calling to mind Herakleitos, Plato, Aristotle, and Theophrastus in one fell swoop:

> Πότερον αἱ ὀσμαὶ καπνὸς ἢ ἀὴρ ἢ ἀτμίς; διαφέρει γάρ, ᾗ τὸ μὲν ὑπὸ τοῦ πυρός, τὸ δὲ καὶ ἄνευ τούτου γίνεται. καὶ πότερον ἀπὸ τῆς αἰσθήσεώς τι πρὸς ἐκεῖνα ἢ ἀπ' ἐκείνων πρὸς τὴν αἴσθησιν ἀφικνεῖται, ἀεὶ κινοῦν τὸν πλησιον ἀέρα; καὶ εἰ ἀπ' ἐκείνων ἀπορρεῖ, ἔδει ἔλαττον γίνεσθαι. καίτοι τὰ εὐωδέστατα ὁρῶμεν μάλιστα διαμένοντα.[263]
>
> Are scents smoke or air or vapour? It makes a difference, inasmuch as the first is due to fire, but the last arises without it. Also does something pass from the senses to the object or from the object to the senses, as it continually moves the neighbouring air? If it comes from the object, it should grow less; and yet we find that sweetest-smelling objects remain so for the longest time.

It is interesting to note that the author of the above paragraph might have explained the apparent mystery regarding sense perception from the object to the nose by employing an example of odour fatigue, with which at least one of his contemporaries was familiar (it is given in 907b27 as the reason that those who have just eaten seem not to smell unpleasant odours), but he does not, again illustrating the discrepancies in background education between contributors. Regardless, he asks the big question no one can answer: what are smells? Are they heat or smoke or air or vapour? Arguments were made in favour of one or the other from at least the age of Herakleitos, if not before, but none seem to have been considered definitive, and clearly this had not been resolved when the *Problemata* was compiled.

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[262] Book XIII, 908a20. Why this scope of this question is limited to things which smell bad is not clear, since many good smells are also rendered stronger by heat, such as those of aromatic resins.
[263] Book XII, 907a30.

We are left, then, with an incomplete understanding of olfactory phenomena, but probably one which accurately reflects the information available to scholars at the time: whatever smells are, the bad ones are a result of decay exacerbated by moisture; the good and bad alike travel through the air; their movement is facilitated by heat; and their intensity is dependent upon or caused by mixture and absorption (or the lack thereof). Although it is impossible to determine exactly when any single paragraph was written or added to the text, or when the text which has come down to us was compiled, it is clear given the longevity of the work that even informed, well-educated philosophers and scientists were still questioning the exact nature of smells and the olfactory process long after the deaths of Aristotle and Theophrastus. Certainly this was true of Lucretius, whose *De Rerum Natura* was published in the 1st century B.C. His approach, however, is entirely different.

Lucretius

Being an atomist, Lucretius defined smell in terms of invisible particles thrown off by a source; as an Epicurean he believed that these particles were dispersed at high velocity in all directions at random, rather than travelling in a straight line according to the models of Leucippus and Democritus. Everything we sense, according to Lucretius, is a result of these invisible, constantly discharged and constantly moving particles which strike our senses. Lucretius' mission in *De Rerum Natura*, according to James Warren, is to write his work 'as a committed adherent to Epicureanism'.

> He is confident that Epicureanism gives the correct answers to major philosophical questions such as the nature of the universe, the nature of a person and of the gods, and the goal of a human life. This commitment determines his presentation of all other philosophical ideas since any philosophy which is incompatible with the Epicurean truth is by definition false. Lucretius is also convinced that Epicureanism has been comprehensively described and elaborated by Epicurus himself. There is no further philosophical inquiry to be done; Lucretius' task is therefore expository and explanatory. He has merely to make clear the truth and make it palatable to his, as yet, uninitiated Latin audience.[264]

Warren notes that 'Lucretius follows the tradition of works On Nature and, most importantly, the scope of Epicurus' work by that name, in concentrating his attention on Epicurean natural philosophy to the comparative exclusion of other areas of Epicurean interest' and adds that Lucretius:

> displays both a desire to find natural Latin equivalents for some Greek technical terms, those he wishes to "naturalize" and recommend to his Roman audience, and also a willingness to declare certain other Greek terms alien, untranslatable, and therefore to be rejected. Famously,

[264] Warren, 19.

> Lucretius consistently avoids using the Latin transliterated form of the Greek word 'atom' even though a large part of his work is concerned with demonstrating that, according to Epicurean physics, the universe is composed of innumerable indivisible particles of matter, atoms, forever moving in a limitless void. Instead, Lucretius offers a range of Latin terms to capture what it is that atoms do.[265]

As we shall see, this avoidance of Greek on Lucretius' part causes some confusion and much discussion among commentators, but Johnson and Wilson suggest that nevertheless, 'Lucretius' poem produced both fascination and alarm' due to his 'theses that reality consists exclusively of atoms and void, that atomic interactions are purposeless and reflect no plan, that there are no immaterial spirits, and that the gods do not care about humanity and produce no effects in the visible world'.[266]

Lucretius writes that:

> Usque adeo omnibus ab rebus res quae que fluenter
> fertur et in cunctas dimittur undique partis
> nec mora nec requies interdatur ulla fluendi
> perpetuo quoniam sentimus, et omnia semper
> cernere odorari licet et sentire sonare.
>
> So true it is that from all things there is a different something which passes off in a flow, and disperses in every direction around; there is no delay, no rest to interrupt the flow, since we constantly feel it, and we can at all times see all these, smell them, and perceive the sound.

In terms of smells, this means that 'perpetuo fluunt certis ab rebus odores; frigus ut a fluviis, calor ab sole'.[267]

Unlike images, which he describes as being 'quasi membranae summo de corpore rerum dereptae, volitant ultroqure citroque per auras', visually perceptible

[265] Warren, 21-22.
[266] Johnson and Wilson, 131.
[267] IV.225, 218.

thin films thrown off from the surface of an object, he believes smells to emanate from deep within the source:

> Praeterea omnis odor fumus vapor atque aliae res
> consimiles ideo diffusae e rebus abundant,
> ex alto quia dum veniunt intrinsecus ortae,
> scinduntur per iter flexum, nec recta viarum
> ostia sunt qua contendant exire coortae.[268]
>
> All smell, smoke, heat, and other such things stream away from such objects all diffused abroad for this reason, because they arise from the depths, and as they come forth they are torn up in their tortuous course, there being no direct openings to the paths to let them push out together when they have gathered together.

That smells emerge from 'the depths of things' and are fragile is shown by virtue of the facts that things smell stronger when they are broken, ground up, or burned than they do whole, and that smells do not travel as far as images or sounds, being carried away by breezes.[269]

As evidence that smells are propagated by unseen particles, Lucretius notes that rubbing 'quaecumque suo de corpore odorem expirant acrem', for example 'panaces, absinthia taetra, habrotonique graves et tristia centaurea' between two fingers will impart the smell of the plant to those fingers without visible evidence of this transfer.[270] Additionally, these smell particles are larger than sound particles, as is evidenced by the fact that sound will pass through things which smells do not. The particles which constitute smells are also of a variety of different shapes, and thus 'verum aliis alius magis est animantibus aptus dissimilis propter formas'. Bees are

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[268] *De Rerum Natura*, IV.90
[269] IV.687-700.
[270] IV.123. The paragraph is corrupted, but the point that invisible particles are transferred from plants to fingertips is implied, and of course this is true. The plants mentioned here are *Prunella vulgaris,*

therefore drawn to honey, and vultures to carrion, since some smells are better 'fitted' to some creatures, like keys to locks.[271] This last idea sounds exactly like the stereochemical theory proposed in the 1970s by John Amoore, who suggested that odor molecules came in seven varieties (camphoraceous, musky, pepperminty, floral, ethereal, putrid, and pungent), and that these varieties fit into corresponding receptors which then fired nerve cells to produce a particular odor perception. More complex odors were thought to be molecules which locked into more than one type of receptor. According to Fred Senese, 'Amoore explained the almondy odor of benzaldehyde by showing that it could fit comfortably into the postulated shapes for the camphoraceous, floral, and pepperminty receptors'. Senese continues:

> Amoore's stereochemical theory is now known to be an oversimplification, but it's still useful in relating smells to molecular shapes. There are over a thousand olfactory receptors, not just seven. The molecule's ability to move through tissue containing layer after layer of receptors also determines how its odor is perceived. For example, attaching a hydrocarbon tail to a molecule improves its solubility in fats and alters its behaviour at cell membranes. Perfume chemists have long known that adding a hydrocarbon tail to some perfume molecules increases their potency.[272]

Doubtless none of this would have surprised Lucretius; while he did not write about perfume specifically, it is perfectly in keeping with his Epicurean theory that the addition of atoms to a particular molecular 'shape' would change how a smell was perceived.

The atomists in general have been accused of stumbling upon a largely theoretical and unsupported explanation of the nature of things which simply

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Artemisia absinthium, Artemisia abrotanum, and an unidentified species of the genus *Centaurium* (of which there are 20).

happens to mesh with modern particle and quantum physics, rather than achieving any true understanding of the principles involved. While it certainly cannot be claimed that they had any 'true understanding' of atoms as we do today, it seems unfair to dismiss these ideas wholesale, as particle physics as we know it was itself once a series of largely theoretical and unsupported ideas, and these were not developed in a vacuum. Joseph Pike addresses this issue beautifully in his 1916 article on the Greek conception of matter, an article written long before atoms were split and quanta discovered and defined:

> Modern physics postulates that all substances, solids as well as liquids and gases, are composed of minute particles called molecules and that these molecules are in very rapid motion. When the term 'molecule' is used exactly, it will indicate the smallest portion of matter which retains its identity as a particular substance. Any further division would destroy the identity of the substance and reduce it to the atom. In the case of the chemical elements the atom and the molecule may be identical. . .the atom, therefore, is a living and vital thing, and it may be of some interest to consider the ancient speculations with regard to its nature and behaviour.[273]

Pike goes on to speculate regarding the structure of the atom, mentioning specifically the atomic model accepted today, with negatively-charged electrons orbiting a nucleus of positive charges. This was still, in 1916, considered a theory; empirical 'proof' was, at the time, impossible, as there were no electron microscopes or particle accelerators available, and indeed there would none be today without that initially theoretical model. It would be absurd to suggest that the physicists who originally proposed it and went on to establish it as a working model from which the rest of this

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[271] IV.678, 687.
[272] Senese, 1.
[273] Pike, 188-9.

new field could spring had merely stumbled upon an unsupported idea which later coincidentally proved to be valuable; they deserve credit for advancing the field, and credit is due the ancients who developed rudimentary atomic theory in the first place as well, particularly Leucippus, Democritus, Epicurus, and Lucretius. Of these authors, only Lucretius' work is extant in more than fragments; Pike makes another excellent point when he writes that 'It is true that Lucretius did not, so far as we know, make a single contribution to the doctrine as formulated by Epicurus, but our debt to him is great because our understanding of the theory is due almost exclusively to his clear and striking exposition.'[274] It cannot be denied that the Epicurean approach to empiricism is far more in keeping with modern scientific practices than any yet explored. Epicurus (341-270 BC) insisted that nothing should be believed but that which was directly observed or which logically followed from direct observation, and is thus quite rightly considered one of the forefathers of modern scientific method. Those precepts are evident throughout the work of Lucretius, who uses them to explore the very nature of the senses themselves.[275]

Some of Epicurus' theories regarding atoms, for example his idea that they are solid and contain no 'void', and his explanation that bitter-tasting things have 'jagged' atoms, conflict with modern atomic theory. Many, however, are absolutely standard theories today. According to Epicurean theory, Lucretius wrote, the amount of matter in the universe is constant; atoms move indescribably quickly, and yet the universe appears to be at rest because we cannot perceive atoms or their movements. What

[274] Pike, 189.
[275] A book entitled '*On The Senses*' is attributed to Democritus, but this cannot be compared with Lucretius, as only the citation remains. The philosopher Bertrand Russell wrote of the atomists in 1972 that 'they can be viewed as having hit on a hypothesis for which, two thousand years later, some evidence happened to be found' (p.66), a fairly typical dismissal of these thinkers, in spite of the fact that most of their thoughts are lost and thus impossible to analyze in depth. Nevertheless it must be

appears to be destruction is simply change. Epicurus posited that everything consisted of atoms or void; there was no third material. We believe that everything is matter or energy; again, there is no third option. The Epicurean ideas which Lucretius describes are sophisticated and insightful, and Pike writes that 'It has been suggested that had Epicurus had but a part of the geometrical knowledge of his contemporary Euclid, and that conception of cosmography which many men then living had, he might have discovered the laws of universal gravitation and not only the laws but – what was the despair of Newton – it's mechanical cause.'[276] Robert Wardy writes, quite rightly, that 'Ancient atomists could claim either that what we perceive is only an illusion or that our vision is partial yet trustworthy.'[277] Epicurus, and thus Lucretius, are clearly among those who believe that our senses are trustworthy even though we cannot perceive atoms and their movements directly. Wardy continues:

> It is, I think, correct to portray Democritus as a thinker who denies that anything exists apart from atoms taken singly and Epicurus as an opponent of the reduction of the human mind to its constituent atoms... Lucretius does not take a stand on reductionism; but in his attempt to convince us that a few microscopic properties give birth to the fecundity of familiar appearances he tries to face and overcome the effect of alienation.[278]

Many scholars have mentioned that the fact that Epicurus wrote in Greek and Lucretius wrote in Latin causes some problems in interpretation of the ideas Lucretius is trying to transmit. One of the biggest examples is the word *sensus*. Ralph Keen writes:

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pointed out that much of modern physics is equally theoretical, and that new theories in physics inevitably start out that way.

[276] Pike, 195.

[277] Wardy, 115.

> Starting with the word for sensation itself, we find that the term αἴσθησις poses questions from the start, inasmuch as there is one translation given by Lucretius, *sensus*, but, as F. Solmsen has pointed out, two different meanings: 'feelings' and 'sensation'. Feelings are such experiences as pleasure and pain, happiness and sadness; and sensations are those perceptions of our sense-organs: sight, smell, touch, hearing, taste. But does that necessarily mean that there is a conflict?[279]

Keen resolves this issue by suggesting that 'Sensation is a function of the soul, which comprises the perceptions and our reactions to them. . .the two functions of sensation cannot be separated as representing two different operations of the soul.' He notes that 'In Book III.94-135 (Lucretius) assigns physical sensation to the *anima*, and the *animus* performs the functions of what is commonly known as the *mens*'.[280] David Glidden expounds upon the problem, explaining that 'Lucretius used *sensus* to denote both *aesthesis* and *pathos* as well as to denote the sense organs (*aistheteria*) and their physical operations', writing that:

> Where Epicurus employed three different Greek expressions, Lucretius used the same Latin word. By his very use of these expressions Epicurus was able to map out three different areas of inquiry within his overall theory of perception. We need not examine the details of Epicurus' argument to recognize that his vocabulary implicitly distinguishes between the mechanism of perception (e.g. how the eye functions), one's corporeal feelings (e.g. a pain in the eye), and one's perception of some feature in his environment (e.g. seeing a tower). . .these three reference points – perceiving, feeling, and the mechanism of the sense organs – are common to a number of different perceptual

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[278] Wardy, 115-6.
[279] Keen, 1981, 59.
[280] Keen, 1981, 59.

theories.[281]

Glidden concurs with Keen in that 'Although soul atoms are responsible for the physiological process, one can regard the entire sense organ (e.g., the eye at 3.359-369) as part of the mechanism.' Sensation per se and feelings in general are thus two sides of the same coin. 'It is with this point in mind,' Glidden adds, 'that Lucretius coins the expression *sensiferos motus*. These motions produce a *potestas sentire* (3.334) that extends to body and soul atoms alike, that gives life to the organism and that ignites the physiological process.'[282]

Typically, Lucretius spends far more time discussing vision and optics in this text than he accords any of the other senses, but he is quite interested in the senses and sensation in general, and their relationships to each other. For him, empiricism by means of the senses is the only credible means of perceiving the universe; logic cannot refute sensory perception, and one sense cannot refute another:

> Invenies primis ab sensibus esse creatam
> notitiem veri neque sensus posse refelli. . .
> Qui nisi sunt veri, ratio quoque falsa fit omnis. . .
> . . .Nam seorsum cuique potestas
> divisast, sua vis cuiquest. . .
> . . .Ideoque necesse est
> non possint alios alii convincere sensus.
> Nec porro poterunt ipsi reprehendere sese,
> aequa fides quoniam debebit semper haberi.
> Proinde quod in quoquest his visum tempore, verumst.
>
> You will find that it is from the senses in the first instance that the truth has come and that the senses cannot be refuted. . . For unless they be true, all reasoning is false. . .For each has its own separate function,

[281] Glidden, 155.
[282] Glidden, 166.

> each its own power. . .Therefore it is necessary that one sense cannot refute another. Nor furthermore will they be able to convict themselves, since equal credit must always be allowed to them. Accordingly, what has seemed to these at any given time to be true, is true.

When the senses seem to lie, therefore, the real problem is that our mind is refuting what we have perceived, 'propter opinatus animi quos addimus ipsi, pro visis ut sunt quae non sunt sensibu' visa'.[283] This sort of 'delusion' appears also to apply to dreams, in which the mind of the dreamer relives those pursuits to which he is devoted; Lucretius himself, he tells us, dreams that he is studying the nature of things and reporting his findings in Latin. Similiarly, he notes that 'venantumque canes in molli saepe quiete iactant crura tamen subito vocesque repente mittunt et crebro redducunt naribus auras, ut vestigia si teneant inventa ferarum.'[284] Unfortunately, this paltry sentence is the only reference within the text to smells appearing in dreams, and it is unclear whether or not Lucretius felt that similar phenomena were experienced by humans. No doubt this is due to the fact that as dreams are 'delusions of the mind', they are not 'real' in the empirical sense, and are thus irrelevant for his purposes.

[283] IV.478-500, 453.
[284] *De Rerum Natura*, IV.991

Galen

The Greek physician Galen (c.131-201 AD) subscribed to and significantly expanded upon humoral theory. Lois Ayoub writes,

> Galen's authority was an important factor in the spread of humoral theory, as his assertions were widely quoted and summarized in later medical compilations. In extension of the doctrine of the humours and their corresponding qualities, Galen proposed a complex theory which stresses the importance of *pepsis* or proper digestion of food and drink in forming healthy blood. In terms of the humours, overdigestions – digestion "supra justum modum" – results in an excess of bilary fluids in the blood, while incomplete digestion leads to an excess of raw fluids (phlegm).[285]

Like the Hippocratics, Galen also used smells produced by the human body as diagnostic indicators, in the tradition that what is good smells good, and what smells bad is bad. In the 2nd century BC, he followed their practices of tasting or smelling a patient's body fluids for clues to the nature of a patient's disease, but he does not limit these studies to examinations of stools and fluxes:

> For to those tasting and smelling it, the best [breast] milk is sweet, looks white, and is midway between thin and thick. But poor milk is either thick and cheesy, or watery, thin, and livid, variable in consistency and colour, and sour to the taste, and will give the impression of brine or some other extraneous quality, and is not sweet to the smell.[286]

Similarly, in taking Erasistratus to task regarding his dearth of discussion of 'the errors of blood production', Galen writes:

> Πῶς δ' οὐκ αἰδεῖται τάς μὲν τῆς πέψεως ἀποτυχίας διαιρούμενος, ὡς πολλαί τ' εἰσι και κατὰ πολλὰς γίγονται προφάσεις, ὑπὲρ δὲ τῶν τῆς αἱματώσεως σφαλμάτων οὐδ' ἄχρι ῥήματος ἑνὸς οὐδ' ἄχρι συλλαβῆς

[285] Ayoub, 335.

> μιᾶς φθεγξάμανος; καὶ μὴν εὑρίσκεταί γε καὶ παχὺ καὶ λεπτὸν ἐν ταῖς φλεψὶν αἷμα καὶ τοῖς μὲν ἐρυθρότερον, τοῖς δὲ ξανθότερον, τοῖς δὲ μελάντερον, τοῖς δὲ φλεγματωδέστερον, εἰ δ' ὅτι καὶ δυσωδες οὐχ ἕνα τρόπον ἀλλ' ἐν πολλαῖς πάνυ διαφοραῖς ἀρρήτοις μὲν λόγῳ, σαφεστάταις δ' αἰσθήσεσι φαίνεται γιγνόμενον, εἰδείη τις, οὐκ ἂν οἶμαι μετρίως ἔτι καταγνώσεσθαι τῆς Ἐρασιστράτου ῥᾳθυμίας αὐτὸν οὕτω γ' ἀναγκαίαν εἰς τὰ ἔργα τῆς τέχνης θεωρίαν παραλιπόντος.
>
> Why is Erasistratus not ashamed to distinguish all the various kinds of digestive failure and all the occasions which give rise to them, whilst in reference to the errors of blood-production he does not utter a single word -- nay, not a syllable? Now, there is certainly to be found in the veins both thick and thin blood; in some people it is redder, in others yellower, in some blacker, in others more of the nature of phlegm. And one who realizes that it may smell offensively not in one way only, but in a great many different respects (which cannot be put into words, although perfectly appreciable to the senses), would, I imagine, condemn in no measured terms the carelessness of Erasistratus in omitting a consideration so essential to the practice of our art.[287]

Clearly the scent of the patient's blood was an important diagnostic tool for Galen. Far more fascinating, however, is that Galen takes this concept one step further, using not only smells generated by the patient's body, but also those generated by the patient's mind as definitive signs of health or illness:

> For it is likely that in sleep the soul, having gone into the depths of the body and retreated from the external perceptions, perceives the dispositions throughout the body and forms an impression of all that it reaches out to, as though these things were already present. And if this is the case, it would in no way be marvellous, whenever the psychic faculty, weighed down by an excess of humours, is troubled, that those moving themselves with difficulty have that impression in a dream and

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[286] Galen, *De Sanitate Tuenda* in Giladi, 56.
[287] Galen, *On The Natural Faculties*, II.IV [Kuhn 108-9] in Brock, pp.168-69.

> bear some vexations; or on the other hand, whenever the disposition of the body is light and unsuperfluous, that those who are so disposed have a dream that they are flying or running swiftly, the impressions of the soul always agreeing with the dispositions of the body, even to the point of seeming to smell bad or good odours. For those who have this impression that they are passing time in dung and mire either have their internal humours in bad condition, foul-smelling, and putrid, or they have an excess of dung encompassed in their bowels. One must conclude that those who are disposed in the reverse of this way and seem to be passing time in fragrant places have the opposite disposition in their body.[288]

This must have seemed a novel approach to medicine at the time; while dreams were accorded great importance at the temple of Asclepius, they do not seem to merit consideration in the Hippocratic corpus (possibly for that very reason), nor are they mentioned in association with medicine in the *Problemata*. Nevertheless, many modern psychotherapists use dream analysis in their work with patients, and recent medical studies suggest that doctors would profit from doing so as well.

G.W. Domhoff, who agrees with Lucretius that 'dream content in general is continuous with waking conceptions and emotional preoccupations', also seemingly supports Galen, noting that 'The fact that defects in the neural network for dreaming can lead to changes in dream content suggests that the general relationship between this network and specific aspects of dream content can be studied by examining the dream reports of patients in a wide variety of disease states.'[289] While this study concentrated on patients who had focal lesions in one or both parietal lobes or lesions in the white matter of the forebrain, it stands to reason that documented

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[288] Galen, On Diagnosis in Dreams, http://www.ucl.ac.uk/~ucgajpd/medicina%20antiqua/tr_GalDreams.html
[289] Domhoff, 2008.

consistencies within their reported 'dream changes' could be used as preliminary diagnostic indicators of lesions in patients reporting such changes, and that eventually, as Domhoff suggests, this technique might be employed where other physical problems are concerned. Clearly Galen was on to something.

Similarly, Richard Doty mentions 19 specific diseases, as well as 'some respiratory and gastrointestinal problems', including 'gout, yellow fever, pellagra, scrofula, cirrhosis of the liver, uremia, typhoid, diphtheria, scurvy, [and] rubella', which 'lead to unusual odors of the body' and can thus be diagnosed by physicians merely on the basis of the presence of these odours.[290] 'Literally thousands of volatiles, many with odors, are excreted or secreted from the human body,' Doty writes.

> These chemicals reflect, in varying degrees, (a) environmental factors (e.g. chemicals in the air, drinking water, diet, drugs and personal hygiene products) and (b) organismal factors (e.g. the individual's gender, reproductive state, race, age, health, exercise schedule, hygiene and emotional state. Such volatiles are exuded from a number of sources, including sweat, urine, feces, breath, saliva, breast milk, sexual secretions, and oily secretions of the skin.[291]

Humans 'possess a variety of secretory and excretory systems which potentially provide a rich substrate for olfactory communication', Doty concludes, which would doubtless fail to surprise the ancient physicians who studied Hippocrates' *Air, Water, Places*,.or who routinely sniffed their patients' bodily secretions for medical information without opining that 'Appropriate controls using several types of odors and double-blind procedures are sorely needed before a number of findings in this field can be adequately interpreted.' Doty later laments the fact that 'the use of smell

for diagnostic purposes is fast becoming a lost art', but this is true only because modern technology has surpassed the sensitivity of the human nose.[292]

In the October 2013 issue of Time Magazine, Alice Park reports that:

> A new batch of studies suggests that breath tests – exhaling into a medical sensor for analysis – can effectively screen for lung cancer, infections, diabetes, and more. Although researchers have long known that those diseases alter our bodies' chemical makeup, they're starting to pinpoint the specific ways each alters our breath. . .Already these tests are used to see if heart transplant patients are rejecting the organ (based on the alkanes they emit), if asthma drugs are working (from the breath's nitric oxide content) and if infection causing anaerobic bacteria are nesting in the gut (by the hydrogen they release).[293]

The article goes on to admit that 'in addition to potentially lethal compounds, [breath] contains the emissions of good bacteria that help us digest food and ward off diseases', and that breath analysis 'would likely be used along with other diagnostic methods', but notes that breath analysis is 'cheaper and less invasive than screening options like biopsies' and would thus offer more people preventative measures which would diagnose disease before it became serious.[294] While these sensors are significantly more sensitive than the human sense of smell, they validate the methodology of physicians in antiquity by measuring chemical changes in the body due to disease which manifest in the breath and thus proving that these are detectable.

For Galen, smells were important diagnostic tools whether given off by a patient or experienced by that patient in dreams, and he was very interested in both

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[290] Doty, 1981, 351.
[291] Doty, 1981, 351-3.
[292] Doty, 1981, 373, 351.
[293] Park, 16.

nasal anatomy and olfactory physiology as well. His anatomical works on the brain and the nerves connected to this organ were based on the dissection of animals, and he expanded considerably the works of Herophilus, Erasistratus, and many others over the course of his career. His emphasis on producing a unified, demonstrable explanation for the processes of the body as a whole certainly qualifies him as a scientist as well as a physician; a prolific writer, he has left numerous volumes describing the results of and his conclusions regarding his many carefully conducted experiments.

Galen wrote specifically about smell and its objects in four treatises: *On the Organ of Smell (De Instrumento Odoratus)*, *On the Use of Parts (De Usu Partium*, VIII, 6*), On the Doctrines of Hippocrates and Plato (De Placitis Hippocratis et Platonis,* VII 5-6), and *Compendium Timaei Platonis*, 15. The scope and importance of his work cannot be overstated; Julius Rocca writes:

> In Galen's hands anatomical science in Antiquity reached its apogee. Until the advent of Vesalius and Harvey, Galen was regarded as its most important exponent. For centuries, Galen's was the voice that mattered in anatomical discourse. He deftly combined and enhanced the Aristotelian method of investigation together with advances in anatomy made by Herophilus and Erasistratus. To this, Galen added his own relentlessly detailed and formidable researches, especially concerning the brain and nerves (where he was not eclipsed until Thomas Willis).[295]

Galen felt strongly that the brain, rather than the heart, was the command centre of the body and the seat of the senses. He felt that 'if the soul is without body, the pneuma [in the brain] is, as it were, its first home, or if the soul is embodied, then

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[294] Park, 16.
[295] Rocca, 257. Willis' *Cerebri Anatome* was published in 1664.

pneuma is the soul.'[296] According to Armelle Debru,

> In fact, Galen understands the parts of the soul as principles or sources (archai) of the psychic and physiological activities. He makes use of this idea especially in the case of the ruling part of the soul, which he locates, following the Alexandrians, in the brain: 'where the source of the nerves is to be found, there too is found the ruling part of the soul' (PHP V 588). . .he seeks to establish experimentally that the brain has no need of the cooperation of the heart in order to receive psychic pneuma into its ventricles. The pneuma, a vapourous substance which fills the ventricles of the brain, certainly derives in part from the arterial blood; however, Galen insists that it only requires a very small quantity of it (*Ut. Resp*. IV 503-4).[297]

His description of the ventricles of the brain Rocca calls 'one of the most impressive of Galen's contributions to anatomical science':

> Galen describes two lateral paired lateral ventricles – the anterior (or first) ventricles – deep within each cerebral hemisphere, which communicate with each other and with the third (or middle) ventricle via a passage (the aquaduct) which Galen says some anatomists have viewed as a ventricle. The roof of the fourth ventricle is dominated by the mass of the cerebellum. The floor of the fourth ventricle narrows into the central canal of the spinal cord, which Galen interprets as a passage through which psychic pneuma gains access to the nerves. Galen's ventricular system is thus a continuous series of symmetrical chambers, linked by passages or canals, and communicating with the brain substance, the cranial nerves and the spinal cord. . .The anterior ventricles also communicate with the nasal passages. The olfactory outlet is the only sense instrument created within the anterior ventricles of the brain.[298]

Galen posited that the perception of odor takes places in the anterior ventricles and

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[296] Galen, *On the Doctrines of Hippocrates and Plato*, V 605-6.
[297] Debru, 268. Her quotations.

olfactory bulbs of the brain as the brain dilates and contracts, drawing in and expressing air, and that this was a phenomenon separate from inhalation through the nostrils.[299] The nose itself, he argued, is not the organ of smell, in that the bony parts of the nose contain no nerves, and the membranous parts contain insufficient nerves to manage the job. Rather, the nose is the channel via which smells were transported to the olfactory turbinates at the front of the brain (as is evidenced by the fact that smells are not perceived when a subject inhales while holding his nose). From there, the smells would travel to the anterior ventricles of the brain, and these, therefore, were the seat of the sense of smell.[300] Galen was aware that the nares were divided, and that the posterior nares were connected to the nasopharynx:

> The nose has a septum in the middle and hence two important channels, these being apparent, one in each nostril, but one must be aware that they are divided into two higher up. One of these divisions goes backward to the mouth and the other straight, as it is directed from the beginning, mounting upwards to the brain itself. The brain beneath it, has two outgrowths elongated and hollow, having their beginnings from the anterior ventricles coming down to that part of the cranium where the nose begins. Here is the seat of the sieve-like bones… and the dura mater overspreading these bones is pierced with minute holes.[301]

He was wrong in his assumption that the ethmoid cribriform plate was porous, and equally incorrect regarding both the purpose of the pituitary gland, which he described as the receptacle for mucus travelling from the ventricles and draining into

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[298] Rocca, 247-8. He cites UP III 647.
[299] Eastwood, 269-71.
[300] Galen, *On the Organ of Smell*, 239. This theory was virtually universally accepted until the late 16th century, following the work of Vesalius (1543).
[301] *On the Organ of Smell*, 240.

the nasopharynx, and his association of the third ventricle with the pituitary gland.[302] Nevertheless, his extensive work on the subject was translated into Arabic and considered medical canon in the Middle East as well as in the West for well over a thousand years.

Like Plato and Empedocles, Galen believed that odor particles are perceived as vapour, describing smells as being thinner than water and thicker than air.[303] He felt that olfactory perception was the result of 'direct contact' between this vapour and the brain, and rather than assigning smells to a particular elemental quality, he believed that the vapour involved in olfaction comprised a combination of elements – but here he is not entirely consistent, and seems to have developed his theory on the subject over time. Galen quotes Plato's Timaeus on the subject of smells arising from the changing of air into water and water into air, believing that vapour is the product of elements in transition. Like Theophrastus, he describes decay as being a specific example of this process:

> The ancients called the changing of one substance into another, different sort of thing 'decay. . .The moderns among physicians and people in general use the word 'decay' only for the changing, which destroys the substance itself, whereby smell then appears. But that happens only with the substances which tend more to mist and dampness.[304]

Interestingly, however, in addition to the air and water mentioned in *On the Organ of Smell*, Galen adds fire in *On the Use of Parts* and earth in the *Compendium Timaei*. Bruce Eastwood reconciles these discrepancies by looking at them within the context

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[302] The anatomist Mondino de' Liuzzi, in his *Anothomia*, corrected the latter misperception in the 14th century long before Vesalius agreed, suggesting instead that the third ventricle is an "integrator" of body functions. The cribriform plate was not shown to be solid until Conrad Victor Schneider did so in the 19th century.

[303] Plato, *Timaeus* 66D-66E.

of Galen's theory that some smells, like that of roses, are cooling, and other smells, like those of burning frankincense, myrrh, and other strong-smelling resins are heating. Galen describes the organ of smell as being 'vaporous, not in any way hard and earthy, like the membranes in the nostrils', which Eastwood feels:

> means to stress the limitations of the sensitive neura in the nostrils, which only record sensations proper to touch and not smells. The vapour, which characterizes the sense of smell, may yet be mingled in some way with earthy material when odours are created. . .odors produced by the burning of 'asphalt, cassia, myrrh, frankincense, storax, [are] distinctly aromatic and normally involve smoke as the result of burning. Also, as the result of burning, they seem to be relatively dry and possessed of heat.[305]

Thus the air and water particles which comprise smell-vapour might be mingled with those of fire or earth depending on the nature of the smell involved. Smells thus directly affect the brain by virtue of their particular cold or heat; a cooling smell was thought to be healthful, whereas a heating smell was injurious. Galen elucidates:

> That intense odors at once cause pains in the head, make it stuffy and heavy, sometimes even bringing on delirium, is also a sign that some of the material itself reaches the brain. For the brain could not be affected to so violent and acute a degree just on the basis of a similar quality [viz., cool and wet]. Similarly it is now to be expected, when the brain suffers as a result of heatstroke, that the scent of roses is healthful. Wheras nothing less than roses, and also inhaled cold air, helps, so on the other hand very warm air rather clearly is deleterious. And when in fact the whole respiration is carried on by the brain in order to preserve the correct amount of heat in the heart, it is quite reasonable for the brain to provide this [equilibrium] first for itself, since by nature it is most susceptible of being injured through excessive heating up or cooling

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[304] Galen, Commentarius; Eastwood, 282.
[305] Eastwood, 284.

down.[306]

With or without the additions of fire and earth, Galen agreed overall with Aristotle that smells themselves were a combination of air and moisture, rather than being simply one or the other, and he believed that air (whether dry or moist) was attracted to the brain either by means of a function of respiration or by the brain itself; thus were smells drawn upwards toward the brain as a result of inhaling through the nose. Eastwood writes, however, that 'Galen's relative silence about Aristotle's contributions to the understanding of smell apparently stems from the great usefulness of specific aspects of Aristotle's theory despite the unacceptability of his overall theory of the sense of smell.'[307] Debru points out that Galen also made use of Aristotle's methodology, much as did Theophrastus, noting that:

> [T]he field was already full of his predecessors' speculations; thus providing an explanation involves refuting other people's opinions as well as defending his own positions and giving the most convincing possible demonstration of them. One needs to show how the thing comes about, what its cause is, and what it is for (this, of course, had already been Aristotle's method). None of this could be done without a rational method, one founded on a mastery of the theory of demonstration, something which required training in both philosophy and logic, and which was the only way of arriving at the truth, such as that which Galen had developed in his great lost work *On Demonstration*.[308]

Indeed, Galen's emphasis on empiricism and demonstration were as much a contribution to science and medicine as his carefully constructed conclusions regarding olfactory physiology. And while the contributions of those philosophers

[306] Eastwood 285.
[307] Eastwood, 287.
[308] Debru, 264.

and scientists who were not physicians may seem less relevant to modern science, they are still important in a historical sense, and indeed they have much to offer modern researchers in that capacity. The lack of an olfactory vocabulary is no less a problem now than it was in the ancient world; attempts to classify smells have never entirely succeeded, and those in the field have not come much further than 'εὔοσμα' and 'κάκοσμα' (modern professional perfumers, whether or not they are familiar with the work of Theophrastus, are, in fact, classifying smells into the same two categories as their ancient counterparts: smells that sell, and smells that don't). Lucretius' atomistic theory of smell would fit right in with the stereochemical theory of John Amoore, and should be taught alongside it in spite of the fact that new and improved neurochemical theories have superceded both of them. Likewise, those in the field today should be as interested in the theories regarding odour adaptation, compensation, and fatigue in the *Problemata* as they are in those of Hendrik Zwaardemaker; no doubt Zwaardemaker himself would have found these quite insightful. Most importantly, these texts are currently significant because we are still asking many of the same questions asked by the ancient writers, not only those about how humans perceive and interpret smells, but also those about the role of smells in influencing human behavior.

While the Classical understanding of olfactory physiology was rudimentary at best by modern standards, the sense of smell itself was no different, and the values and mores we see associated with smells are very familiar. Perfume products provided a means by which 'bad' or injurious smells, both those specifically of the body and those in the environment at large, might be made 'good', countering and in fact *correcting* the 'natural' smells perceived to be inferior to these manufactured ones.

Identifying the Perfumers

It stands to reason that if perfume was such a precious commodity that it 'attracted the finest work of both potter and painter', the perfumers who produced the scented oil were a crucial part of the equation, but these workers do not seem to have been thought equally precious, or even given much thought at all.[315] Perfume making 'was considered a *sordida ars*', writes Jean-Pierre Brun, 'and perfume makers were held in low public esteem.'

> This maligned profession was nevertheless in permanent contact with the upper classes; its activity was very profitable but required large investments to buy the expensive exotic aromatics. Thus perfume production and trade may have been financed by leading citizens who, through their freedmen, collected most of the profit.[316]

In spite of the extant literature of Theophrastus, Pliny, and others on the nature and virtues of perfume and its components, very little is written of the people who actually produced it. Whether they were male or female, slaves or free, local or foreign, what skills their work involved and how they were trained, and how they and the value of their labour were perceived was either common knowledge unworthy of discussion or simply considered unimportant by these authors, who rarely, if ever, bothered to comment on the subject. Who were these people who worked in the 'perfume factories', in the palaces and agorai, creating and dispensing these prime necessities?

The two most common Greek words used to describe perfumers are 'μυρεψός' and 'μυροπώλης'. Liddell and Scott list three other words as referring to perfumers: one, μυροπωλικός, appears in a feminine accusative form in P. Fayum 93.6 (161 AD)

[315] Boardman, 192, quoting Haspels (1936).
[316] Brun, 277-278.

in reference to a business rather than to an individual person; I have found this word in no other form in any context. The second, μυροποιητής, seems equally obscure; the single reference given is *Catalogus Codicum Astrologorum Graecorum* 8 (4).137 and I cannot confirm its existence in any other document. The last, θυωρός, is given as referring to a perfumer only in *Scholia in Nicandri Theriaka* 103, and I disagree with this translation.[317] In pursuing perfumers, I will thus focus on the first two well-attested words, 'μυροπώλης' and 'μυρεψός'. However, even these words pose problems in identifying those whom they describe. While 'μυροπώλης' appears to refer specifically to someone who sells perfume rather than someone who makes it, these words were apparently more interchangeable than they seem. A 1st century BCE papyrus addressed to a 'μυροπώλης' declares that 'ἐπικεχωρήκαμέν σοι μυρεψεῖν καὶ μυροποεῖν,' and other papyri record payments to 'μυρεψοί' for perfume that was not resold.[318] Therefore, for purposes of categorization, I will assume that all of the individuals to whom either word refers made a living in the perfume trade, whether they were manufacturers, retailers, or simply the owners of perfumeries.

'Μυρεψός' is a masculine noun which was apparently applied to women who made perfume as well as to men, and so it is impossible to determine whether an otherwise unidentified μυρεψός was male or female. This is frustrating, as female perfumers are already difficult to find in Greek documents, although we know that they existed. In more ancient times, women appear to have been far more closely associated with perfumery than they were in the Hellenistic period, and in some societies may have been the sole practitioners of the art, although this is debatable.

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[317] Liddell and Scott, 2000.

[318] P. Lond 7.2192; examples of payment to μυρεψοὶ include *Pap. Choix* doc. 20, a list of burial expenses such as gravedigging, which includes the notation ['μισθ(οῦ) μυρεψ(ῷ) ὑπ(ὲρ) θεραπ(είας)

Jean-Pierre Brun declares that 'In Assyria in the 13th century BC, women were the perfumers,' and bases this on a word apparently in the feminine plural, *murraqitû*, which appears on Assyrian tablets. While this does not rule out the possibility that there were male perfumers in Assyria as well, it does seem clear that women were employed as perfumers throughout the ancient history of the Middle East.[319] Brun also mentions by name a perfume-maker (*lù raqqû*), Nûr-ili, who appears in 18th century archives from the Mesopotamian palace of Mari.[320] Martin Levey goes so far as to suggest that 'the extensive use of kitchenware in chemical processes' may be attributed to the fact that 'women had a share in the development of early chemistry from Babylonian times onward', and reports that one of these women, Tapputi-Bēlatēkallim, is specifically referred to as a 'perfumeress' in a text dated to 1200 BCE. Another 'perfumeress' whose name is partially obscured (…nīnu) also appears.[321] Older documents are less informative, as there was no gender marking in Sumerian to distinguish women from men in occupations which both shared between the third and first millennia; this differentiation was apparently an Akkadian influence. The social status of these women is impossible to infer from these simple references, but as they are mostly administrative records and recipes with no mention of additional titles, it is doubtful that these perfumers were particularly socially important. It would be nice to know whether they were free or enslaved, but I cannot guess.

Flavius Josephus has Samuel telling the Jews that, should they accept the leadership of kings, 'τὰς θυγατέρας δ'ὑμῶν μυρεψοὺς ἀποφανοῦσι', suggesting either

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(δραχμαὶ)']. However, Hyperides makes clear in several passages that the perfume-seller Athenogenes purchased at least some perfumes from others for resale.

[319] Levey, 382.

[320] Brun, 278.

[321] Levey, 382.

that they will be enslaved or possibly just treated like slaves, and that perfumery is a less than noble profession.[322] Assuming that Samuel said this, or something like it, in roughly 1100 BCE, the comment would correspond with the presence of female perfumers in neighbouring territories. However we are told in Paralipomenon 1 9.30 that perfumers were appointed, apparently by David and Samuel, from among 'the sons of the priests' ([καθεσταμένοι] '…καὶ ἀπὸ τῶν νἱῶν τῶν ἱερέων ἦσαν μυρεψοὶ τοῦ μύρου καὶ εἰς τὰ ἀρωμάτων'). No mention of daughters is made, and this seems incongruous for the additional reason that if being a perfumer was the equivalent of being a cook or baker, comparisons made later in the rest of Josephus' passage, persons other than the sons of priests would have been more likely appointees. The only perfumer actually mentioned by name in the bible, Hananiah, appears centuries later in Nehemiah 3.8, where he helps to rebuild the walls of Jerusalem, and whether or not he was the son of a priest is unknown.[323] Unfortunately, there is no useful information here regarding the typical gender or social status of perfumers. If it was the case that female perfumers were common, or even appeared at all, among the Biblical Israelites and Judeans, they have been obscured in phrases such as 'τέχνη μυρεψῶν.'

The Linear B texts refer to 14th and 13th century perfumers in Crete with the words 'arepazoo' or 'kupirijo', both of which mean 'the Cypriot', according to Brun.[324] It is not made clear whether these people were actually Cypriots, or this was a borrowed word applied to Mycenaean perfumers, but given the perfumery discovered at the Pyrgos-Mavroraki site in Cyprus, which was described by the *Greek-American*

[322] Josephus, VI.41
[323] Hananiah does not appear in Esdras II, in the Septuagint, but he does appear in Nehemiah in the Modern Greek bible as 'Ἀνανιὰη, ὁ ἐκ τῶν μυρεψῶν.' Another biblical Hananiah is described as being a son, so the name is definitely masculine. He would have been contemporary with Artaxerxes I.

Herald as being 'the centre of a prosperous export business' due to 'the scale of the site and the presence of huge 500-litre oil storage jars', it is not surprising that the Mycenaeans would associate perfume with Cyprus in any case.[325] What is interesting, however, is that perfume, or at least the marketing of it, seems to have continued to have been associated with perfumers in Greece through the ages.

There is an enormous gap in the documentation following the Linear B tablets, and in spite of the wide distribution of their wares, perfumers do not specifically reappear until the 4th century. At that point, however, there are several mentions of perfumers by name, including a 4th century Athenian burial inscription which refers to a woman named Thraitta as having been a μυρεψός. No further information is given, but Lefkowitz and Fant write that 'it was generally more common to name the occupation of the deceased in the case of slaves than of freedmen and women', and as Thraitta was a common name for female slaves from Thrace, and the inscription is so spare, it seems likely she was a slave.[326] Another 4th century inscription commemorates the manumission of three 'perfume-sellers', Hermona, Habrosyne, and another whose name is partially obscured but has a feminine ending (…τάτην). This appears to have been their occupation at the time (and thus presumably before) they were freed by their owner, a metic named Hippocrates, who is not described as a perfume-seller on the marble fragment.[327]

The aforementioned inscriptions illustrate the difficulty in determining from a single reference whether a given perfumer was a slave, a former slave, or had never been enslaved. Unlike the Latin inscriptions which appear in Italy in the Roman

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[324] Brun, 281.
[325] http://www.helleniccomserve.com/ancientperfumery.html, 2000.
[326] IG^2 11688; Lefkowitz and Fant, 223.
[327] D.M. Lewis, 370.

period, references to perfumers in Greek often fail to reveal their social status. Their names by themselves are seldom helpful; Thraitta may have been a freedwoman in spite of the clues which suggest she was not, and documents bearing Habrosyne's name before and after her manumission would probably not have revealed this change in her situation. It is confusing to refer to both owners and slaves with the same word, but the word 'μυροπώλης', which appears on the manumission fragment, seems to have been applied both to business owners who owned slaves responsible for making or selling perfume, and to those slaves as well. We cannot, therefore, assume that those specifically called 'perfume-sellers' were free, or had been freed, and the same is true of 'perfume-makers'. For example, Midas, the slave purchased by Epicrates in Hyperides' speech Κατ' Ἀθηνογένους (circa 330 BCE), is identified in the speech as being the manager of Athenogenes' perfume shop at the time of the purchase; Athenogenes, the business owner, is referred to as being a 'μυροπώλης', but Midas was obviously selling perfume as well, as were Panaclus and Polycles, to whom debts were owed for perfume presumably used or resold in the shop Midas managed.[328] Athenogenes was an Egyptian metic, Midas a slave, and no particulars are given for Panaclus and Polycles, but all four would most likely be described as perfumers.

Athenogenes and Midas are an excellent case study, as they seem to reveal a very typical relationship between business-owners and their staff. A.H.M. Jones writes that slaves were 'commonly employed throughout antiquity in secretarial and managerial posts', as was Midas, and that it was 'a common practice for owners of industrial slaves to let them work independently, collecting from them a fixed rent and

[328] Polycles also appears as Procles later in the speech, and it is unknown which name is correct. Hyperides writes that these two men 'ὅτι μύρων τιμαὶ ὠφείλοντο' in 5.10. Why this money is owed by

allowing them to keep for themselves what they earned in addition.'[329] Hyperides never mentions whether or not Midas was earning his own money or paying rent, although his debts are certainly considered his own, as they are sold along with him. However, it can be assumed that he was left to work independently; Athenogenes owned two perfume shops in addition to the one managed by Midas, and could not have been in all three at once. Epicrates, who had no plans to run the business himself, must have intended that Midas would continue to manage the shop after its purchase.[330] In a similar case, Lysias' Aeschines, who purchased a perfume business from the wife of 'Hermaios the perfume-seller', is only reported to have studied philosophy with Socrates, which would hardly qualify him as a perfumer.[331] We must assume that the sale of this perfumery, too, included the slaves who knew the trade.

It is also notable that both Hippocrates, who freed Habrosyne and her co-workers, and Athenogenes, owner of Midas, were metics. Brun suspects that the Arab merchants on Delos, 'mainly Sabaeans' whose presence is recorded through 'dedications to their national gods', were there to serve as middle-men between aromatics merchants and perfumers, taking 'advantage of their knowledge of the Semitic countries and languages.' He compares these to Gerizim Samaritans in Babylon, who 'used their privileged relationship with the large Jewish community' to the same advantage. He further suggests that the large perfumery in Delos' stadium district belonged to Italians, and says that 'several perfumeries of more modest dimensions in the theatre district must have belonged to rich owners; some could

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Midas rather than by Athenogenes is never explained.

[329] Jones, 185, 187.

[330] Hyperides, 12.26.

[331] Athenaeus, 13.612e. Reger suggests that 'the role of the wife may perhaps indicate that the perfumery came into Hermaios' possession as part of his wife's dowry' (Reger, 287).

have been from Italy and others from the Orient.'[332] While no information is given regarding Hippocrates' nation of origin, Hyperides does specify that Athenogenes is Egyptian, and although it was originally a Greek colony, the perfumery at Paestum dates to the Roman occupation. There seems to be a pattern here; apparently the perfumers in Greece were often not Greek. Unfortunately, there are so few specific examples of perfumers that it is impossible to guess what percentage of them may have been foreigners.

It is clear from Brun's documentation that many if not most of the perfumers in Italy during the Roman period were male, and that many of these were freedmen running a business belonging to a wealthy family.[333] The evidence is not so clear in Greece prior to the Roman period. Whether business owners were more likely to free their slaves, like Hippocrates, or sell them, like Athenogenes, cannot be determined with any certainty. Jones remarks that many craftsmen trained slaves as assistants, 'hoping ultimately to retire and live in their declining years on the proceeds of their work' and mentions five contemporaries of Socrates who 'lived in some affluence on the labour of their slaves', but he also mentions a banker who freed his slave and left him the business, and reports that this freedman later leased the bank to his own freed slave.[334] He does not address which of these scenarios was the more common, and in Hippocrates and Athenogenes we have one example of each.

As disappointing as it is, all that can truly be said of Greek perfumers from the evidence extant is that they may have been either male or female; slaves, freed, or free; and either local or foreign, which is certainly not very informative.

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[332] Brun, 288-9. He cites N.K. Rauh, 1993, as the source of information about the Samaritans.
[333] Of 56 Latin inscriptions naming perfumers, 46 of which are epitaphs, '22 specifically mention freedmen, 3 mention *seviri*, and 1 a slave.' Brun 302. Martial also mentions perfumers Cosmus and Niceros (XII.LXV), both male names.
[334] Jones, 185-7.

Perfumers in Society

Jean-Pierre Brun reports that perfume makers were held in low esteem during the Roman period (presumably by the Romans); he calls the profession 'maligned' and writes that perfume making was considered 'a *sordida ars*', on a par with 'those of the *popinarus* (tavern-keeper), *tabernarius* (shop-keeper), and *leno* (brothel keeper). While this may have been true in Rome at that time, I find no evidence to suggest that perfume making was considered a less desirable profession than any other in Athens or, for that matter, in the Hellenistic kingdoms, and it was certainly more desirable than some. The harshest references I have found to professional perfumery are the aforementioned passage written by Josephus, and a comment attributed by Plutarch to Pericles, neither of which strike me as being overwhelmingly negative.

Pericles, in Plutarch's Lives, remarks that 'πολλάκις δὲ καὶ τοὐναντίον χαίροντες τῷ ἔργῳ τοῦ δημιουργοῦ καταφρονοῦμεν, ὡς ἐπι τῶν μύρων καὶ τῶν ἁλουργῶν τούτοις μὲν ἡδόμεθα, τοὺς δὲ βαφεῖς καὶ μυρεψοὺς ἀνελευθέρους ἡγούμεθα και βαναύσους.'[335] The most damning part of this comment where perfumers are concerned, as I see it, is the comparison between themselves and dyers, as cloth-dyeing was a profession associated with particularly bad smells. However, the reason these two particular professions were chosen for this example probably had nothing to do with the smells with which each was associated, but rather with the fact that the products produced by perfumers and dyers were consumed and appreciated by everyone, and these professions thus provide an ideal contrast between 'the work' and 'the workman'. If, however, Pericles did consider perfume making to be particularly ignoble, this sentiment does not seem to have been shared by his

countrymen in the century which followed.

Similarly, when Josephus threatens the Jews that 'τὰς θυγατέρας δ'ὑμῶν μυρεψοὺς ἀποφανοῦσι καὶ ὀψοποιοὺς καὶ σιτοποιούς, καὶ πᾶν ἔρηον ὃ θεραπαινίδες ἐξ ἀνάηκης πληγὰς φοβούμεναι καὶ φασάνους ὑπηρετήσουσι', his point seems not to be that becoming a perfumer, cook, or baker is the worst thing that could happen to one's daughter, but rather the horrors of servitude. Jones writes that 'self-respecting free men were unwilling to accept positions in which they had to obey the orders of an employer', and gives the example from Xenophon of Eutherus, a man working as a manual labourer who was horrified by Socrates' suggestion that he find a job as the agent of a wealthy man.[336] The only thing worse to Eutherus than working was working for someone else, and this is what Josephus' Samuel is predicting will happen to the daughters of the Jews, forced labour and worse, the threat of whippings and torture. Being a perfumer, cook, or baker was surely more preferable to women and their fathers than working in a tavern or brothel, and it would surprise me greatly if it weren't more preferable to anyone than cloth-dying. Nor do we see Epicrates and Aeschines buying inns or whorehouses; they are purchasing perfumeries.

Perfumeries often seem to be located where there was a lot of foot traffic, near popular destinations and especially where they were particularly necessary, such as within close proximity of gymnasia and baths. Brun notes that they appear in Delos in the stadium district and the theatre district, and in Rome 'at the end of the Republic and beginning of the Empire, perfume merchants had their shops along the *via sacra*, then along the *vicus unguentarius*, south of the Forum Romanum.' He writes that

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[335] Plutarch, *Pericles* 1.4.
[336] Jones, 186.

there were perfume-selling 'districts' in the cities of Paestum, Pompeii, and Capua, near the forum in each case, and this suggests to him that 'as in Athens, and probably in Delos', the perfume shops in Italian cities 'also served as meeting places where people from different classes met and exchanged news and information.'[337]

This does seem to be one of the primary functions of a perfumery. In his speech 'On the Refusal of a Pension' (Πρὸς τὴν εἰσαγγελίαν περὶ τοῦ μὴ δίδοσθαι τῷ ἀδυνάτῳ ἀργύριον), Lysias implies that the perfumer's shop is near the agora, along with the barber's and cobbler's shops, and that they are frequently visited: 'ἕκαστος γὰρ ὑμῶν εἴθισται προσφοιτᾶν ὁ μὲν πρὸς μυροπώλιον, ὁ δὲ πρὸς κουρεῖον, ὁ δὲ πρὸς σκυτοτομεῖον, ὁ δ' ὅποι ἂν τύχῃ, καὶ πλεῖστοι μὲν ὡς τοὺς ἐγγυτάτω τῆς ἀγορᾶς κατεσκευασμένους, ἐλάχιστοι δὲ ὡς τοὺς πλεῖστον ἀπέχοντας αὐτῆς.' No perfumery has been discovered in ancient Athens, but Lysias places the barber shop where the Deceleans met in the north-western part of the agora, by the Herms, which seems a desirable location, 'closely associated with the two stoas.'[338] Sian Lewis writes that 'Primarily the shop served as a meeting place outside the house where friends could gather in an informal setting', and suggests that 'the aristocrats may have felt the barber shops of the Piraeus to be beneath them, but still visited a perfume shop to meet their peers during the day.'[339] The playwright Pherecrates echos both Lysias and Theophrastus in his fragment 64 from 'The Oven and the Vigil': 'And besides, what is a man thinking of that he should keep a perfume-stall, loftily seated under an awning, his establishment just a gathering-place for lads to gossip in the livelong day?' The awning would have been necessary, of course, to protect the perfumes from the sun, but by all accounts these shaded, sweet-smelling

[337] Brun, 299.
[338] Wycherley, 11.

perfume shops or stalls were perfectly acceptable, and probably very pleasant, places to simply pass the time. None of the ancient authors mentions clientele shunning the sordid perfumers whilst chatting with each other.

Perfumery was a very lucrative business, providing of course it was well managed. Although the ingredients, especially for the rarer or more complex perfumes, were very expensive, Brun estimates the sale price at four times the production cost. However, he believes that 'the bulk of the profits went to the owners of the olive groves and rose fields'.[340] This would be difficult to prove either way. I suspect that perfumery was far more lucrative than many professions, and that a shop would have paid for itself relatively quickly given skilled employees and sufficient funds to buy the initial raw materials. If that was indeed the case, the owner of such a shop could expect to maintain a better financial position than other shopkeepers (in addition to smelling better than most). The economic implications of both perfume making and perfume selling deserve far greater scrutiny, but more importantly, the relative perception of perfumers as a group must be re-evaluated in terms of their peers rather than their owners or clientele.

Especially in the Hellenistic Middle East, when 'under the Ptolemies the monopolistic organisation of the ἀρώματα had provided conditions necessary for the operation of large-scale enterprises', the scent of perfume was the scent of civilisation, and the scent of expensive perfume was the scent of personal success.[341] Alexandria was a headquarters for both the importation and exportation of exotic resins and spices into the Roman period, and the home of several factories producing valuable fragrance oils; Loane adds that 'from Hellenistic times many of

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[339] Sian Lewis, 435, 438.
[340] Brun, 300.

the factories of Alexandria had been engaged in processing spices and unguents for a wide market.'[342] At least two perfume production centres, those at Edfu and Dendera, were funded by Cleopatra VII in association with temples there. If royalty thought so highly of perfume, surely perfumers themselves had higher status than, to use Brun's example, tavern keepers. The Ptolemies were famous for their highly organised system of taxation, and given their earning potential, it stands to reason that perfumers were a welcome source of tax income.

Compared to the inherent status in other skilled trade professions whose products were desirable by an affluent population, for example, goldsmiths, glassblowers, and garland makers, I imagine perfumers would hold their own, and I suspect that perfumers were far more highly socially regarded than professionals such as tanners, fishmongers, and of course cloth-dyers. Unfortunately, considerations such as the placement of shops and residences would be impossible to examine before the Hellenistic period, but I doubt that perfumers suffered socially over time to much of an extent. In fact, I suspect that the period of highest disregard for them was the Roman period, when perfumery was strongly associated with freedmen fronting for wealthy families, but even then I would not be surprised to find that the disdain of the elite was directed more specifically at would-be Trimalchios in general than at perfumers in particular.[343]

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[341] Loane, 12.
[342] Loane, 12.
[343] Grant, 2006, 28-31.

The Perfumer's Art

Repeating the story appearing in the Book of Exodus, which most religious scholars date to the 18th Egyptian dynasty, Flavius Josephus has Moses delivering a recipe dictated to him by Yahweh, and commanding the people to:

> take 500 shekels of choice myrrh, an equal quantity of cassia, and half the foregoing weight of cinnamon and calamus; to crush them, and wet them with an *hin* of olive oil, and mixing them together and cooking them down, prepare them after the art of the perfumer to make a very sweet anointing oil…(σκευάσαι τέχνη μυρεψῶν χρῖσμα εὐωδέστατον)[344]

This is obviously a recipe for perfume, but what exactly was 'the art of the perfumer'? Could anyone simply pound resin and spices, heat them in olive oil, and produce perfume? What additional knowledge, if any, was required?

Perfumery through the ages can be summarized as a three-step process or extraction, purification, and preservation. In this short passage, Moses has described the major process involved in making perfume, which is that of extraction; presumably it would have occurred to someone without further instruction to strain the plant material from the olive oil after it had cooled, and given that the mixture was full of myrrh, a natural fixative (and was likely to be used sooner rather than later, as it was intended to purify the priests and tabernacle), additional preservatives were probably unnecessary. The passage almost exactly describes the Egyptian painting in Rekhmireh's tomb (circa 1430 BCE) in which perfumers are crushing ingredients in mortars, mixing the ingredients with oil, and heating the oil in cauldrons.[345] On the surface, then, this seems to be a fairly simple procedure that anyone could follow

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[344] Josephus 3.197. I have omitted his parentheticals regarding plant identification and units of measure. This particular recipe was intended to produce perfume for religious purposes, but the technique is the same regardless of the intended use of the product. Some scholars insist that the Moses story actually dates to the 19th dynasty, but all seem to agree that it falls within 1444-1290 BCE.

with good results. However, though perfume-making processes changed very little from the time of Moses to that of Josephus, there were any number of pitfalls which might ruin the expensive ingredients involved, and a fair amount of other information necessary to producing specific perfume products. How much of this could be learned by rote without being understood is another question entirely. Gary Reger writes that

> [T]he technology required to produce perfumes was not complicated, and certainly could be reproduced anywhere in the Hellenistic world. The really crucial factors of production were knowledge, including the skill that accompanied long practice, and capital. . .Although the equipment needed to make perfume was relatively simple, the ingredients even for the simplest perfumes typically included some substance(s) which had to be imported. Athenaios recognised both these factors – skilled labour and capital – when he denied that location was the crucial factor in making good perfume.[346]

Theophrastus is quite specific on the subject of the art of the perfumer. Compounds, he explains, are obtained by mixture, and these mixtures can be combinations of solids, liquids, or solids and liquids. While perfume-powders (τὰ ἀρώματα καὶ διαπάσματα) are mixtures of solids, and those who make unguents and flavour wines mix liquids with liquids, the third and most common method of producing perfume, 'ὡς οἱ μυρεψοὶ', is to mix solid with liquid, 'παντὸς γὰρ μύρου καὶ χρίσματος ἡ σύνθεσις αὕτη.' A perfumer's art is thus the mixing of solids with liquids to produce perfume.[347] In fact, it is impossible to make a perfume of any complexity without doing this, as the first and most important part of the perfume-making process

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[345] Brun, 278.
[346] Reger, 256-7.
[347] This is, of course, Theophrastus' definition of a μυρεψός rather than a μυροπώλης who may have simply sold the result. III.7-8.

is the extraction of the fragrant esters from plant material (solid) into an excipient (liquid). It was done in a variety of ways in the ancient world, depending on the plant material used. The excipient itself, however, also had to be the right one for the job, and often required the initial step of being rendered astringent so as to facilitate the extraction of plant oil from the plant tissue into the carrier.

The most common excipients in ancient Egypt were ben oil (from *Moringa* species, in this case most likely *peregrine*), sesame oil, and almond oil, which were produced by crushing the seeds with a stone or roller-press and then removing the water. Of these, Theophrastus mentions sesame and almond, and his reference to βαλάνος, which he lauds as being the best possible carrier, probably refers to ben oil. In Greece, of course, olive oil was far more readily available, though oil from green, wild olives was preferred, as it is less greasy and has less odour than the alternatives.[348] Viscosity of carrier oils was an important consideration, as the least viscous oils are the most receptive to fragrance, which is why ben oil was considered preferable to all others and why olive oil was rendered astringent with additives such as sedges, juniper, coriander, and others prior to being mixed with other fragrance oils or the plants from which these were extracted.[349] Other excipients were employed in other cases; cinnamon oil, for example, was commonly extracted from the bark into sea-water, which is naturally astringent due to the salt content, and some waxier plant materials were soaked in wine, to take advantage of the alcohol as a solvent. Sesame oil, though inferior as a carrier for other scents as it is viscous and cannot be heated without giving off its own scent, was the preferred carrier for rose oil, which must be cold-processed (and to which a great deal of salt was added

[348] Carrier oils are discussed in Theophrastus IV. Brun reports that safflower oil was also used in Mycenae (281).

to prevent rancidity).[350]

Given the appropriate excipient, the extraction process might be undertaken with or without the application of heat. Cold extraction could be accomplished by maceration and enfleurage, or, in the case of citrus fruits and a few flowers, cold-pressing, all three of which techniques are known to have been used in ancient Egypt, and which were still in practice when Theophrastus wrote Περὶ ὀσμῶν in the late 4th century BCE. Maceration involves simply chopping or breaking plant material into small parts and steeping it in an excipient, usually oil, until it is more or less dissolved. This is particularly effective with roots, barks, and other very solid matter. With some plant materials, the oil can be gently heated to expedite the process, as, for example, in Moses' recipe above, but others, such as quinces, are ruined by heat and must be macerated cold – simply steeped in oil until their fragrance has been extracted. Flowers like jasmine, violet, and rose blossoms cannot withstand heat, and their oils were extracted through cold enfleurage, which is a similar process but took even longer. The petals were steeped in fat or non-evaporating oils, and replaced at intervals until the fat was saturated with essential oil; petals and spices (and quinces) subject to rapid decay when wet had to be removed quickly, squeezed out, and replaced often, as the scent was ruined otherwise.[351] This fragrance-saturated fat could then be used as a pomade, formed into a 'bitcone' of the type worn by some ancient Egyptians, or it could be mixed with wine to purify it, as alcohol dissolves essential oils but will not dissolve fatty acids. The mixture would have to be filtered many times to remove the fat, and the alcohol would then be evaporated off to leave the pure floral absolute. This was a very labour-intensive and time-

[349] Brun, 281; Theophrastus V.24.
[350] Theophrastus IV.20.

consuming process, and expensive as well, given that it could require a great deal of plant material depending which plants were involved (several kilos of rose petals, for example, yield only one fluid ounce of essential oil). Like maceration, the process of enfleurage was adapted to include gentle heating if the plant material could withstand it. Cold-pressing, in which heat was never applied, was accomplished simply by crushing the plant material in the same manner that olive oil was obtained from olives, but very few fragrant plant materials are oily enough for this to be effective.

The most common methods of extraction were hot enfleurage and hydrodistillation. Both of these methods required a great deal of care and attention; the difference is that whereas the process of hot enfleurage involves heating the carrier oil with the plant material in it until the latter disperses its oil into the former, hydrodistillation involves vaporising the essential oils in heated water (or a mixture which includes water) and reconstituting them either by allowing the mixture to cool, at which point the oil and water will separate and the oil can be skimmed off the surface, or securing the top of the heated vessel with linen, which was then squeezed into another vessel once saturated with the oily steam (at which point again, the remaining water would separate from the oil). Even with the use of a condenser to draw off the vapour, hydrodistillation is a touchy process, and condensers were quite primitive in the ancient East and apparently absent in Greece. As different essential oils vaporise at different temperatures, and overheating will ruin them, temperature control was of paramount importance during this process. According to Levey, the Babylonian perfume tablets found in the Temple of Assur, where perfumers were apparently using iron pots as well as ‘excellent clay containers of a variety of sizes and shapes which were capable of withstanding a high degree of

[351] Theophrastus V.26.

heat', are quite specific with regard to 'fire, its kindling, intensity, and to the cooling process.'[352] Similarly, Theophrastus cautions at length that heating must be gentle, and that a double-boiler is required so that the pot containing the plant material is never directly exposed to the fire.[353]

Essential oil molecules are surrounded by micro-fine membranes, and if these are fractured, the properties of the oils are lost. High pressures will also destroy them, by distorting the electrical balance of the molecules and in the worst case, altering the pH. Unfortunately, there is no universal formula for success; cypress oil, which was highly prized in ancient Egypt, requires at least 24 hours of distillation at no more than 245ºF to release all of its constituents, whereas lavender oil can be distilled in an hour and a half but requires 350ºF.[354] The ancient perfumers did not have thermometers, or a vocabulary for concepts such as hydrolysation, polymerisation, or flashpoint, but they were certainly capable of smelling the unfortunate results when perfume ingredients got too hot. One can imagine what a financial disaster this would be if '500 shekels of choice myrrh' were involved.

Once the fragrance oil had been extracted into the carrier oil, and the resultant mixture had been strained, separated, or distilled with alcohol and was relatively pure and free of debris, the final step was to ensure the perfume's longevity. Theophrastus felt that this in itself was the entire point of the process: 'Τῶν δὲ μύρων ἡ σύνθεσις καὶ ἡ κατασκευὴ τὸ ὅλον οἷον εἰς θησαυρισμόν ἐστι τῶν ὁσμῶν.'[355] Choosing the appropriate carrier oil helped, as did adding inert ingredients (spices, here τοῖς ἀρώμασι) to render it less volatile; natural fixatives such as resins were

[352] Levey, 381, 387.
[353] Theophrastus V.22.
[354] Kelsey Associates LLC, 2010.
[355] Theophrastus, IV.14.

often incorporated into the recipe, or inert preservatives if necessary, such as the salt added to rose oil (almost 3 parts salt to 1 part oil!).[356] Finally, the perfumes had to be packaged to protect them from light, heat, and contaminants to avoid evaporation, chemical breakdown, and decay. Early containers were ceramic, often decorated with animals and flowers; later, opaque glass bottles were used. Theophrastus tells us that lead was used, and alabaster when it could be obtained, for their coolness and minimal porosity, 'ψυχρὸν γὰρ καὶ πυκνὸν καὶ ὁ μόλυβδος καὶ ὁ λίθος ὁ τοιοῦτος, καὶ ἄριστος τοῖς μύροις ὁ μάλιστα τοιοῦτος.' He also writes that perfumers choose 'upper rooms' (οἰκίας ὑπερῴους) which are shady and do not face the sun, and try to avoid frost as well, to protect their wares.[357]

Colorants were also added to some perfumes, although no reason for this is given; perhaps it was to identify them from others, or perhaps those blends were particularly unattractive in their natural state. Theophrastus reports that colour was added to sweet marjoram, rose, iris, and megaleion (an expensive and complex blend) perfumes, but not to the Egyptian, kupros (another famous blend), or quince perfumes; the cheaper perfumes were not coloured as it was not worth it. He mentions a root from Syria, which was probably one of the madders (*Rubia tinctorum* et al.), and alkanet (*Alkanna tinctoria*, a member of the borage family).[358]

In addition to knowing the standard recipes, which fragrance oils required which excipients, processing methods, additives, and preservatives, and how to store and package perfumes for sale, Theophrastus records several other considerations ancient perfumers had to take into account. Seasonal weather, and the timing of the

[356] Theophrastus, V. 25.
[357] Brun, 282; Theophrastus IX.40.
[358] Theophrastus VI.31, 33. Pliny also mentions cinnabar as a colorant in *Historia Naturalis* 13.2, but this mineral may have been unknown to Theophrastus as a perfume additive, as the extraction process to obtain it was a recent discovery during his lifetime.

harvest affect perfume ingredients; while no one can control the weather, he suggests, one can control when the plants are collected, and how they are kept afterward.[359] It is unlikely that perfumers harvested their own ingredients, which were probably purchased from professional herb-sellers, but they would have to know how to select those of the best quality, and how to store them. Additionally, perfumers, like chefs, had to know which odours mixed well with each other, as well as which liquids will combine without separating to produce a pleasant result. Dry ingredients will always mix well, Theophrastus writes, but this is not true of liquids. He gives several interesting examples, noting that milk floats, and vinegar causes separation, and that even though sea-water will mix with wine, the one spoils the other. Similarly, with perfumes, any given mixture will not necessarily blend with any other, and every possible blend is not necessarily an improvement.[360] This point is well taken. Powdered spices blend well because the components merely coexist without affecting each other directly, but liquids, especially when heated, interact chemically, and the result can be unexpected at best and very undesirable at worst. He also notes that ingredients added to blends later have a more powerful effect than those added first, thus 'οἷον ἐὰν εἰς κοτύλην σμύρνης ἐμβληθῇ μνᾶ καὶ ὕστερον ἐμβληθῶσι κιναμώμου δραχμαὶ δύο, κρατοῦσιν αἱ τοῦ κιναμώμου δύο δραχμαί.'[361] Perfumers apparently capitalised on this by adding rose oil to cheaper blends to cause them to smell of rose (although this effect was transitory) and scented customers with rose perfume so that they could not smell any others.[362]

Theophrastus asks questions and speculates on many observations in Περὶ

[359] Theophrastus IX.38.
[360] Theophrastus III.8, XII.57- 59, 66.
[361] Theophrastus III.17.
[362] Theophrastus X.45, 47.

ὀσμῶν which most perfumers probably didn't, such as why some plants require crushing and others suffer for it, why thickening agents increase receptivity in carrier oils (truly an excellent description of molecular bonding for someone without words for this), the variable absorption rates of wet and dry ingredients, why some scents dissipate before others, and why perfumes have medicinal properties. Some of these questions are still being addressed today.[363] It is doubtful that most of the perfumers who were his contemporaries shared his interest in applied chemistry, or had the time to consider the issues he raises at such length, but they certainly had to possess a great deal of knowledge about the production, preservation, and retailing of a wide variety of perfume products. What is never specifically addressed by the ancient authors, however, is how this knowledge was acquired or shared.

Some perfumeries were inherited. Hyperides' Athenogenes is described as being a third-generation 'μυροπώλης' and the owner of three shops who knew the business well.[364] However, he sold one shop to Epicrates, who knew nothing about the trade and was not interested in learning it; Epicrates declares in court that he is a farmer, as was his father, and that 'οὔτε μυροπώλης εἰμὶ οὔτ' ἄλλην τέχνην ἐργάζομαι.'[365] In Epicrates' case, the shop was part of a package deal which included its manager, Midas, and Midas' sons; presumably Midas would continue to operate the shop. But Hyperides never tells us whether or not Midas' sons were involved in that business or any other, and indeed Epicrates apparently had other plans for one of them, which is why he made the purchase in the first place.[366] Similarly, Lysias mentions that Hermaios' widow has sons, yet she sold her

[363] Theophrastus III.12, IV.18, V.23, VIII.35, X.43.
[364] Hyperides 9.19.
[365] Hyperides 12.26.

husband's perfumery to Aeschines.

If perfumeries were routinely bought as investments by purchasers completely unfamiliar with the business, obviously someone else involved had to know what to do. Although the evidence is scanty, it seems most likely that the perfumer's art, at least in Greece, was taught to slaves by other slaves and freedmen, who were probably not the owners of the perfumeries where they worked. This seems somewhat odd, as it was such a demanding trade with great potential for financial disaster in incompetent hands; buying a slave with the intent to train him as a perfumer sounds rather risky, as someone unsuited to the profession might cause tremendous damage to the business. Jones tells us, though, that slaves were very commonly employed as industrial workers, and that the difference in price between a slave skilled in a trade and one who was not was significant: between 125 and 150 drachmae for an unskilled worker and about 5 minae for a craftsman.[367] He also notes that 'industrial slaves were one of the recognised forms of investment for the wealthy', and this is understandable if a slave purchased for 150 drachmae were to fetch five minae in a year or two. As we have seen from Athenogenes' example, a skilled slave could also be an important business asset (assuming he was not five talents in debt). It seems likely, then, that perfumeries were purchased or started with at least one skilled, expensive slave, and that additional, unskilled and thus cheaper slaves were taught the trade by these craftsmen, but this is speculation on my part, as it is simply not clear from whence perfumers usually came.

Whatever their origin, it seems likely that many perfumers learned the

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[366] The entire basis of the case is predicated on Epicrates' having been defrauded when, along with the boy he desired to purchase, he was persuaded to buy the boy's father, brother, and the perfume shop as well, and soon discovered that significant undeclared debt was part of the bargain.
[367] Jones, 189, from averaged figures given by Demosthenes and Xenophon.

particulars of perfumery by rote, as successive generations simply repeated what had been known to work before. In his discussion of 'Perfume Texts and Arabic Chemistry', Martin Levey writes that:

> . . .[W]e have one procedure which involves forty extractions, and also techniques necessitating approximately a score of steps in the winning of perfume, each step requiring many subsidiary operations. In Middle Babylonian times, this large number of steps was essential since ancient sublimation, filtration, extraction and other processes were highly inefficient. However, unfortunately, the later chemists, in spite of their technical improvements, retained the numerous Babylonian, seemingly repetitive processes.[368]

He concludes that 'In some of the facets of Babylonian perfumery. . .there may be found such carryovers as repetitive processes which were blindly taken over by the Greeks. . .'[369] This only stands to reason. Working with such expensive ingredients, in an era without any real understanding of chemistry, an arbitrary decision to skip a step might have had major consequences for both perfumery and perfumer. It is not at all farfetched that ancient perfumers might have distilled cypress oil longer than lavender oil or added salt to rose perfume simply because they had been taught to do so by their predecessors, and doubtless many of them, unlike the scholar Theophrastus, never asked why.

[368] Levey, 387. He assumes (on 386) that this knowledge was 'transmitted by means of the ancient, powerful oral traditions of handing on knowledge from father to son and through the organisations of artisans and craftsmen.' Apparently there is no literature regarding training in Arabic, either.
[369] Levey, 388.

The Tools of the Trade

The difficulty inherent in identifying most of the actual equipment used in the manufacture of ancient perfume is that most of it could have served any number of purposes. Unless general items such as pots and bowls are meticulously examined for organic residues, they may never be identified as having been used by perfumers; as Levey puts it, 'The list of apparatus used by the Babylonians in perfumery reveals that, without exception, each article might well have come from the utensil cupboard of a second millennium BC kitchen.'[370] Even rooms equipped with furnaces and presses are often supposed to have served other purposes (and may well have done so more often than not) unless they contain relatively indisputable evidence of perfume making. The excavation at Tel Goren, for example, is linked to perfume production not because 'furnaces, jars, and various metal and bone objects' dated between 630 and 532 BCE have been recovered there, or because Judean balsam trees are known to have been harvested nearby, but because royal seals found on the site indicate that this was in fact a perfume industry.[371] A structure in the En Boqeq oasis, occupied in the time of Herod, contained a room with mortars, furnaces, mounds of pits, and stone presses, but had the excavation team failed to test the equipment, which bears remaining traces of resin and other aromatic plant material, it is doubtful that this building would have been associated with perfumery either.[372] Certainly similar evidence has been discounted in Greece; though Mycenaean tablets found at Pylos provide clear evidence for the manufacture of perfume, and refer to rose-scented and sage-scented oils, no perfumery has been identified. Brun suspects that perfumers' workshops in Pylos 'could have been located in front of the

[370] Levey, 382.
[371] Brun, 278.

building's eastern entrance, where cauldrons, basins, and vases have been found', but other archaeologists disagree.[373] Archaeologists in general seem to ignore the possibility that any equipment such as presses and furnaces may have done double duty, and while perfume bottles are finally being sent to laboratories for analysis, mundane pot shards seem to merit less attention.

This, then, is the problem: cloth torsion presses were used to press grapes as well as other plant material; heavy presses used for making olive oil fail to reveal how that oil was used; furnaces or 'hearths so simple as to be atypical' reveal no clues; date stones 'may have come from fruit stored there as a food reserve'; and a perfumer's toolkit of bowls, pots, cups, stirrers, sieves, and handcloths calls no attention to itself as such.[374] Unfortunately, nothing like the stills Levey describes at Tepe Gawra have been found anywhere in Greece, and Theophrastus' accounts of extraction using double-boilers fail to describe vessels distinguishable from any other cooking pots. 'There is no archaeological evidence of a perfumery from the Archaic or Classical periods,' according to Brun, who explains the appearance of such evidence in the Hellenistic period as being a shift from 'a small-scale process done by artisans' to more 'quasi-industrial' practices 'requiring permanent installations that ultimately left more easily identifiable traces.'[375]

The wedge press begins to appear near other perfume making equipment at some point in the 2nd century BCE. The presses were vertical, with a flat, round platen at the end of a beam which could be slowly lowered into a basket of olive paste, pressing it against a stone press-bed and allowing the oil to trickle from a

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[372] Brun, 280.
[373] Brun, 281.
[374] Brun, 277, 280.
[375] Brun, 282.

spout at the front of the press-bed and into another container. They were apparently quite an improvement over the beam-and-lever presses previously used for olive-crushing, at least where perfumers were concerned, because they would fit in a small shop, could be used to crush resins more effectively than could be done by hand as well as to press smaller quantities of olives, and produced superior oil of lower viscosity than was obtained by pressing olives in fabric sacks with the older alternatives. They are also ideal in terms of archaeological evidence because the wedge press is particularly associated with perfume production, first by Hero of Alexandria, and later by archaeologists themselves. Brun quotes Hero as having written, in a treatise regarding presses: 'The fourth simple machine which follows the others is the one called wedge. Perfumers use it for some of their preparations.'[376] Archaeologist D.J. Mattingly confirms that Pompeiian paintings of the perfume making process depict wedge presses, specifically describing the painting of the wedge press in the House of the Vettii, two brothers who were both freedmen in the 1st century CE:

> The wedge press is shown at the right hand end and comprises a solid, rectangular or square base, with a wooden superstructure apparently fixed into its top surface. This wooden structure consists of two upright timbers with vertical grooves pierced through them. Five horizontal planks are shown in between the two uprights, their ends presumably located in the grooves and thus able to move up and down. Beneath the bottom plank and resting on top of the stone base is a pile of baskets or mushed fruit of some description. Two cupids, one in front and one behind the press (though they appear at either side in the painting) and armed with large mallets, are hammering wedges home between the planks. . .the wedges force the planks apart, compressing

[376] Brun is quoting *Mechanika 2.1.4*, translated from the Arabic by Carra de Vaux.

> the pulp on the base block and expressing liquid which is carried in a channel to a large mortar in front of and below the press.[377]

Twelve wedge-press beds were excavated at Delos, all of which have been dated to the 2nd and 1st centuries BCE, and of these, six feature 'a heart in low relief behind the spout, all carved by the same craftsman.'[378] While all of them were originally assumed to be associated with regular olive oil or wine, these six seem more likely associated with the production of perfume. As Pliny confirms perfumery in Delos, and the presses are found 'in the virtual absence of olive crushers and the presence of mortars', perfumery makes more sense than the alternatives, as it would not involve the crushing of such quantities of olives, or anything else, as to require a full-scale crusher rather than a mortar. Brun also points out that small shops 'had limited space' and smaller, vertical wedge presses would fit where large lever and weight presses would not.[379] Most interestingly, the presses found at Delos bear close resemblance to similar presses recovered in a confirmed perfume shop in Paestum, and Brun suggests that the heart-shaped design which decorates them might 'also represent a brand image, an identifying symbol like the apothecary's mortar or the early printing press.'[380] Brun also notes that paintings found at Pompeii and Herculaneum 'show that the preparation of perfumes as well as the pressing and enfleurage of the oil were sometimes done in the presence of customers', and suspects that this is why these presses were 'so carefully sculpted and even

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[377] Mattingly, 72.
[378] Brun, 283. How these have been determined to have been carved by the same craftsman is not revealed.
[379] Pliny 13.2, Brun 285-6. The shop in Paestum, formerly the Greek colony of Poseidonia before the Romans won it in 273 BCE, was definitively identified as a perfumery due to strategically located 'ungentaria rubbish dumps'. Reger (273) notes that 'it has often been remarked that *unguentaria*, especially the fusiform varieties, correspond in date almost precisely with the Hellenistic period.'
[380] Brun, 287.

decorated.'[381] Gary Reger notes that:

> The perfumers' workshops that have been identified archaeologically at Paestum and Delos seem set up for small batch production and relatively easy switching of recipes. The fresco from the House of the Vettii at Pompeii depicts the pressing of oil and cooking of perfumes in relatively small batches. In other words, put together, the evidence suggests that production was small scale and flexible, readily adaptable to the ability of the customer to pay.[382]

Apparently because a significant number of wedge presses have been recovered from Italy and parts of Greece, such as those in Delos, Brun feels that consumption of perfume must have 'increased considerably, starting in the second century BC, because of apparent economic prosperity and the immigration of a cosmopolitan population.'[383] While I agree with him regarding an overall increase in consumption, I suspect that it began somewhat earlier than this, and that, while it was likely considerable, it may not have been as considerable as it would appear at first glance. Certainly there seem to be many more perfume production sites in the later Hellenistic and early Roman periods than are thought to have existed before, but some of the discrepancy must be due to the ambiguity of evidence. It cannot be that there were no perfume workshops, or even large-scale factories, where clearly there was perfume to be had; it is far more likely that any production centres which existed prior to the Hellenistic period are simply unremarkable to archaeologists. It is easier to identify the flasks and jars in which perfumes were sold than it is to identify where they were made prior to the 2nd century BCE, but afterward it seems that 'perfumeries' suddenly appear wherever wedge presses are found – and do not

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[381] Brun, 293.
[382] Reger, 263.
[383] Brun, 286. He does not include the Ptolemaic monopoly of ἀρώματα as a factor in the large-scale, industrial production of perfume, and this seems an astonishing oversight.

appear where they are absent. Surely there must have been perfumeries without these presses later, just as there must have been before; certainly there are plenty of perfume containers from the Archaic and Classical periods, and any number of furnaces and cooking pots. The fact that there is no evidence considered definitive by archaeologists in Greece until the appearance of the wedge press does not necessarily mean that perfume production was restricted to a few artisans working on a small scale prior to that time. Additionally, Brun's wedge press discoveries led him to refute the identification of a building in Delos' stadium district as an inn or restaurant, as it had been originally classified due to the presence of four furnaces and two oil presses, in favour of 'a large perfumery indicative of the famous "industry" echoed in Pliny,' and I agree with this completely.[384] However, I have to wonder how many similar 'inns' will never be properly reclassified for lack of a vertical press or royal seal.

Because older artefacts are so seldom definitively categorised as having contributed to perfume production, most of the evidence for the tools employed before wedge presses (or the later, less common direct-screw presses which appear in the first century CE) were standard equipment comes from written records and from art. The written works imply the equipment necessary more often than they actually describe it; obviously anything which has to be cooked or measured requires the use of cooking and measuring tools, and recipes which call for material to be chopped and strained require knives and sieves. Some texts, however, are specific, such as the Babylonian tablet KAR 222, which specifies that a metal pot with a lid, a couple of clay pots, and a straining cloth be used to produce a perfume containing myrrh, calamus, and cypress oils. Other tools specified in these tablets include a

[384] Brun, 288.

bowl or plate, a measuring cup, and a flask – hardly anything extraordinary, but more descriptive than the later Greek recipes nevertheless.[385] While there are more recipes extant than wall carvings, ancient art offers depictions of both the equipment and the ways in which it was used; for example, we know that linen was used in torsion pressing and in distillery (by being tied over the mouths of vats to catch steam) from Egyptian bas-reliefs, and the painting in Rekhmireh's 14th century BCE tomb depicts perfumers using mortars and cauldrons. A 4th century BCE relief, currently in the Louvre, shows a large vat being placed atop a furnace by two workers while a third approaches with a basket of irises.[386]

Art created after the widespread use of the wedge press is equally informative; paintings in Herculaneum and Pompeii which helped archaeologists to identify wedge presses depict these being used by perfumers, confirming Hero's comments, and another shows plant material being heated.[387] Similarly, the fresco in the house of the Vettii shows not only the wedge press, but the entire perfume-making process being conducted by cupids. Reger adds to Mattingly's description:

> The fresco depicts six Erotes or Cupids engaged in the manufacture of perfume. On the far right, one figure stands before a rack swinging a hammer; a basin sits below receiving a fluid. This undoubtedly represents a wedge press, in which oil was expressed by hammering wedges into a rack of wood and squeezing the material inside. Such presses did not yield large quantities of oil, but were well suited for producing fine oil of high quality. . . Since this fine quality oil did not keep well (Theophrastus says it cannot be stored more than a year) it paid a perfumer to have his own press, which allowed him to press at

[385] Levey, 381, 383.
[386] Brun, 278-9. It should be noted that it is the roots of the iris which are used to make perfume, not the flowers, and that heat is almost never applied to blossoms but always to roots. Still, depicting only roots would no doubt have made the scene less interesting and far more difficult to identify.
[387] Brun, 294.

> need and better control the quality. . .The next figure to the left is seated before a big pot, stirring the contents as a fire heats them from below. . .the two figures next to the left are mashing or stirring the contents of a big, unheated container. . .Another figure stands by a table with a scale and a roll which has been interpreted as a book of recipes but could just as easily be accounts; behind him is a cabinet packed with containers. Finally, a figure on the far left serves a female customer, who is testing perfume on the back of her wrist. A large basin stands before him. . .One could not ask for a more vivid picture of a shop in operation, although staffing levels cannot be inferred, since there is no guarantee that the operations shown did not occur serially rather than simultaneously.[388]

Reger also notes that 'three other frescoes from Pompeii and Herculaneum likewise depict perfumeries, two with wedge presses'.[389] With the exception of the specific type of press and the composition of the bottles, these might be a depiction of perfume-making in any earlier era as well.

[388] Reger 266-7.
[389] Reger, 267.

The Noses of the Gods

In his *Theogony*, Hesiod tells us why sacrificial animals are divided between mortals and the gods in such a way that men get the meat while the gods receive only the smoke from cremated bones wrapped in fat and burnt with various aromatics: Prometheus, he says, intended to trick Zeus into choosing the inferior portion, and Zeus, though not decieved, chose this portion regardless and punished men for it accordingly.[463] This is not, however, merely a story which attempts 'to explain a strange detail of the ritual, the cremation of the bones,' writes Jean-Pierre Vernant, but a means by which, in the process of sharing a banquet, the separation of men from the gods is 'reflected in the contrast between two types of eating', and serves as a reminder to mortals that those 'blessed times when men and gods sat down together to feast are forever ended.'

> The presence of the gods sanctions the feast of fleshly food, but only to the extent that what truly belongs to the gods is set aside for them: the very life of the animal, released from the bones with the soul at the moment the victim falls dead and gushing forth in the blood splattering the altar – in short, those parts of the animal that, like the aromatics with which they are burned, escape the putrefaction of death.

The word θυῶ, which 'is found associated with terms meaning "to feast, to eat well"', Vernant notes, 'eventually prevailed as the general term referring to the totality of the sacrificial ceremony and never ceased to convey the memory of burnt offerings and fragrant smoke'.[464] Marcel Detienne concurs, writing that:

> a whole series of words which are part of the technical terminology connected with sacrifice are constructed on the root θυ- which forms a semantic group including θυῶ, θυσία, θύος, and which expresses the all-important role played by

[463] Hesiod, *Theogony* 535. We see exactly how these animals were apportioned in the *Iliad*, 1.458-465, although additional aromatics are not mentioned here.

> fire and smoke in conveying offerings to the seat of the gods. Thus it has been noted that one of the most ancient terms used in the Homeric epic to refer to offerings to the gods, namely θυός (plural θύεα) originally had the sense of 'substance burned in order to obtain fragrant smoke'.[465]

It is significant that the same root, θυ−, is associated with a variety of words which relate specifically to incense, or aromatics intended for burning, including 'θυμιάματα', 'θυμιατήριον', 'θυόεις', and so forth. Theophrastus reports that prior to the importation of expensive foreign plant products such as Arabian resins, cinnamon, and cassia, the Greeks sacrificed by burning fragrant shrubs; Detienne notes that Philochorus of Athens names thyme (θύμος) as the herb burnt in 'the most ancient of sacrifices', which Detienne conjectures is because 'the name θύμος clearly makes it out to be the shrub most likely to produce the smoke (θυμιᾶν) that is the basic principle of sacrifice.'[466] Indeed, it is clear that sacrifice need not involve an animal at all, or even include barley or other foodstuffs. Though a combination of edible goods with inedible aromatics was the norm, aromatics alone would apparently suffice. Homer tells us:

> καὶ μὲν τοῦς θυέσσι καὶ εὐχωλῇς ἀγανῇσι
> λοιβῇ τε κνίσῃ τε παρατρωπῶσ' ἄνθρωποι
> λισσόμενοι, ὅτε κέν τις ὑπερβήῃ καὶ ἁμάρτῃ.

Their hearts by incense and reverent vows and libations and the savor of sacrifice do men turn from wrath with supplication, whenever anyone has transgressed and sinned.[467]

Since 'κνῖσα' specifically refers to the smell given off by sacrificial meat, 'θύος'

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[464] Vernant, 24-26.
[465] Detienne, 38. He cites J. Casabona (1966) here.
[466] Theophrastus, *Περὶ Εὐσεβείας*, 146. Detienne, 39.
[467] Homer, *Iliad*, 9.499-501. Note that the smoke itself was optional as well, as can be seen by the application of perfumed oils to temple statuary in the ancient world.

as used here must be at least inclusive of sacrificial aromatics, if not meant to refer specifically to incense. Detienne suggests that 'it is from the dietary system of a marginal group' – the Pythagoreans, who would not kill or eat animals – 'that the religious significance of aromatic perfumes in Greece emerges most clearly', in that these aromatics corresponded with 'true life which is reserved for the immortal gods whose bodies are not made of flesh and blood but remain forever incorruptible as do spices and perfumed substances.' Spices, he writes,

> . . .are food for the gods as are ambrosia and nectar. . . when men allow the smoke from their sacrifices of myrrh and frankincense to rise up to heaven they are, in a way, simply returning to the world of the Olympians those substances which are most intimately related with the powers from Above. . . frankincense and myrrh are the gifts most acceptable to the hearts of the gods because, once consumed in the flames, they belong to them wholly and utterly, leaving nothing to be shared'.[468]

Both resins such as frankincense and myrrh and dried plant products like cinnamon bark *are* relatively incorruptible, easily shipped across vast distances and stored, and retain their fragrant natures (which heat will release) for a very long time. Certainly they burn cleanly, leaving nothing useful behind. Are these aromatics, however, actually *food* for the gods, meant to be somehow ingested by the divinities to whom they are offered?

Vernant's reference to 'two types of eating' is particularly interesting; in his example, by consuming their portion, the gods are sharing banquets with men by literally *dining* on the 'fragrant smoke', which is what Detienne seems to have them doing in *The Gardens of Adonis*. Detienne's summary of the situation in *The Cuisine of Sacrifice* differs slightly from his earlier work, however, although it agrees both with

[468] Detienne, 48-49, 51-52. He cites Menander, Antiphanes, and Theophrastus here.

his original and with Vernant's primary points: 'by eating flesh destined for corruption, men are condemned to hunger and death, while the gods enjoy the privilege of perfumed smoke – the incorruptible substances that the flames of the sacrificial fire have transformed into superior food reserved for the divine powers.' Here the gods are not necessarily consuming the smoke as the men are consuming the meat, but rather 'enjoying' it as their privilege, which makes rather more sense. While Hesiod mentions the gods' 'banqueting' on nectar and ambrosia, and Homer's Calypso feeds Hermes the same meal, neither author ever states that the gods actually require sustenance; whether or not they believe this is unclear, although as both agree that the gods are immortal, it seems unlikely.[469] Regardless, it must be noted that it is never specifically mentioned in either Hesiod or Homer that the gods consider the smoke rising from either the inedible portions of sacrificial victims or from aromatics burnt in their honour to be *nutritious* per se, or that they might in fact need it. In *Birds*, Aristophanes makes fun of this idea by having Prometheus tell Pisthetaerus that the wall the birds have built between earth and heaven is in fact causing the gods to go hungry:

> There is not a man who now sacrifices to the gods; the smoke of the victims no longer reaches us. Not the smallest offering comes! We fast as though it were the festival of Demeter. The barbarian gods, who are dying of hunger, are bawling like Illyrians and threaten to make an armed descent upon Zeus, if he does not open markets where joints of the victims are sold.[470]

Later in the play Pisthetaerus informs the celestial 'ambassadors', Poseidon, Heracles, and the barbarian god 'Triballos', that if Zeus agrees to give his scepter to the birds, Pisthetaerus will invite the three of them to dinner, and Heracles, clearly

[469] Hesiod, *Theogony* 640; Homer, *Odyssey* 5.92.
[470] Aristophanes, *Birds*, 1515-1520.

tired of 'fasting', responds, 'That's good enough for me. I vote for peace.'[471] All of this, however, is very tongue-in-cheek, and clearly the idea that the gods are truly starving from a lack of sacred smoke is not meant to be taken seriously. The humour in this situation would not work, however, if it were not universally understood by the audience that whether or not the gods are actually 'eating' the sacrificial smoke, as it were (and, if so, whether or not this is necessary for their well-being), this smoke does reach them, and they *enjoy* its fragrance just as they appreciate the fragrance of the resinous incenses burnt in their behalf. Whether or not the gods would actually suffer without it is a moot point among a population who believe that those who fail to send this smoke to the heavens will suffer if the gods do not receive it.

Both Vernant and Detienne make excellent points regarding the symbolism of sacrifice, and why the Greeks might have made the sacrifices that they did, but these considerations fail to take into account the noses of the gods. Why might incense, as Homer suggests, 'turn the gods' heads from wrath' in the same manner as prayers, libations, and the smell of burnt bones? Not because they derive nutrition from it, obviously, nor due to the expense, as tools or weapons or embroidered cloth might be just as costly; as for Detienne's 'incorruptible' nature of sacrifical aromatics consumed 'wholly and utterly' in the flames, foul-smelling resins such as galbanum or asafoetida would keep just as long and burn just as cleanly. No, as the scholiast to Aeschines notes, 'the purpose of the spices is to attract the gods' because 'like is attracted to like'.[472] Sacrifiicial aromatics are those which smell good to humans, because the gods appreciate these good smells as well. Homer in particular makes it very clear that the gods themselves smell good to humans, and that they like

[471] Aristophanes, *Birds*,1603.
[472] Schol. in Aeschines, I, *Against Timarchus*, 23; cited in Detienne 1977.

anything else which humans perceive to be pleasant-smelling as well.

Jean-Pierre Brun notes that 'perfumed oils and incense have been used in the Near East since early antiquity for liturgical purposes for the gods, the kings and priests who embodied them, and the dead, as well as for medical purposes or simply for pleasure,' and this sums up the uses for such products in Greece as well.[473] It is important to note that perfume was often used as a sacrificial offering as well as for other religious purposes, and that these practices continued into the Hellenistic period, when cult statues were smeared (sometimes daily) with perfume, and many sanctuaries, such as the temples at Delos, Edfu and Dendera, had their own perfume-making workshops.[474] Interacting with the gods through ritual sacrifice was of paramount importance to the Greeks, and I have no desire to minimize that, or the vast body of modern work on the subject. In keeping with the scope of this paper, however, it is necessary to focus on an obvious principle underlying the practice of ritual sacrifice in the ancient world: that the gods are perceived to have a sense of smell, and that this divine sense of smell appears to correspond exactly with that of mortals. The noses of the gods are never described as being any more or less keen than human noses; they seem to find the same smells to be as pleasant or as foul as men do, and they can be seen to manipulate odours to their divine advantage. Sacrificial or not, the gods enjoy perfume, and it is this which must be further explored.

In his discussion of aromatics, Marcel Detienne notes that they:

> . . .are a constituent element in the nature of the gods. Anything in any way connected with the Olympians – altars, temples, clothes – is fragrantly

[473] Brun, 277.
[474] IG^2 161.A, 1.102, purchases of perfume for cult statues. Delos, Edfu and Dendera reveal extensive evidence of perfume-making on site; q.v. Brun and associated bibliography.

> perfumed. Just as flashing eyes, majestic stature or youthful limbs denote the divine to the Greeks, a sweet smell, εὐωδία, is a specific feature of the gods, a sign of their supernatural condition. The most delicious perfumes emanate from the powers of life which dwell on Olympus just as, conversely, the powers of death give off a nauseous smell.[475]

Homer's gods radiate fragrance, but this is not entirely due to their inherent qualities. The gods themselves can be seen to employ perfume products for their own benefit and enjoyment in exactly the same fashion humans do, and they apply these to humans as well, both the living and the dead. While Homer never tells us whether it was the gods themselves who established these customs, that seems a safe assumption; nevertheless, while their perfumes are clearly superior to those manufactured by humans, his gods exhibit the same deodorization and reodorization practices described thoroughout ancient literature as they pertain to men.

In *Iliad* 14.170-175, Homer describes Hera's ablutions prior to getting dressed:

> ἀμβροσίῳ μὲν πρῶτον ἀπὸ χροὸς ἱμερόεντος,
> λύματα πάντα κάθηρεν, ἀλείψατο δὲ λίπ' ἐλαίῳ
> ἀμβροσίῳ ἑδανῷ, τό ῥά οἱ τεθυωμένον ἦεν:
> τοῦ καὶ κινυμένοιο Διὸς κατὰ χαλκοβατὲς δῶ
> ἔμπης ἐς γαῖάν τε καὶ οὐρανὸν ἵκετ' ἀϋτμή.
>
> With ambrosia first did she cleanse from her lovely body every stain, and anointed her richly with oil, ambrosial, soft, and of rich fragrance; were this but shaken in the palace of Zeus with threshold of bronze, even so would the savor thereof reach unto earth and heaven.[476]

This passage clearly shows both that Hera is in fact subject to 'defilements' or 'things of a filthy nature' (λύματα) – she can get dirty – and that she counters this first by 'cleaning her lovely skin' with ambrosia and then applying more ambrosia in the

[475] Detienne, 48.
[476] A.T. Murray, trans.

form of a perfume, a substantially more potent product than that available to mortals. Similarly, in Odyssey 8.363-365, Aphrodite, who has just been released by Hephaestus from the trap he contrived in order to catch her with Ares, flees to her 'τέμενος βωμός θυήεις' in Paphos on Cyprus:

> ἔνθα δέ μιν Χάριτες λοῦσαν και χρῖσαν ἐλαίῳ
> ἀμβρότῳ, οἷα θεούς ἐπενήνοθεν αἰέν ἐόντας,
> ἀμφὶ δὲ εἵματα ἕσσαν ἐπήρατα, θαῦμα ιδέσθαι.
>
> There the Graces bathed her and anointed her with ambrosial oil, such as gleams upon the gods that are forever. And they clothed her in lovely raiment, a wonder to behold.

Again, this passage implies that Aphrodite needs, or at the very least wants, a bath, which is naturally followed by an application of the ambrosial oil 'of the sort which covers the immortal gods'. Interestingly, this passage is almost word for word the description given of the same scene in the Homeric Hymn to Aphrodite (*HH5*), only there, she covers herself with 'ἀμβροσίῳ ἑδανῷ, τὸ 'ῥὰ οἱ τεθυωμένον ἦεν', and accessorizes her beautiful clothes with gold jewelery. The inclusion in the Hymn of the θυ- derivative strongly suggests a connection between the scent of the divine ambrosial perfume and the scent of sacrificial aromatics, which allows a case to be made that these have components in common. Naturally the gods would employ the finest fragrances available, and to the Greek nose, there were no finer fragrances than those of the expensive foreign resins imported from hot climates, which were also standard sacrificial offerings. This 'ambrosial' oil, then, would appear to be the source of the divine εὐωδία of which Detienne speaks, as opposed to a scent inherent in deity; while the scent itself is, as he puts it, 'a sign' of their 'supernatural condition', it is apparently applied. What the gods might smell like if they were not, as Homer writes, 'always covered' with this ambrosial oil is never addressed, though it is

unlikely that the Greeks would have attributed to their gods the same natural body odours they found so offensive in themselves. In keeping with sacrificial smoke, however, it seems very clear that whether or not this divine perfume is *required* by the gods, the gods certainly *desire* it – and it is reserved for their use.

It is noteworthy that none of the male gods are shown to be so deliberate about hygiene as are Hera and Aphrodite, and we are not given the same descriptions of their scent. Ares, having left the same bed as Aphrodite in the passage from the *Odyssey*, appears to go straight to Thrace without having a wash beforehand or afterward, and when Apollo and Iris find Zeus atop Anatolian Mount Ida's Gargarus in *Iliad* 15.153, we are merely told that 'θυόεν νέφος ἐστεφάνωτο'. Neither this fragrance nor its actual source are described further, and this passage could be taken to imply that this is Zeus' natural state. It is likely, though, given the use of the adjective 'θυόεν', that the cloud and its scent derive from earthly sacrifices, just as Aphrodite's 'τέμενος βωμός' in Paphos is described as being 'θυήεις' – emitting a fragrance specifically associated with sacrificial incense[477]. Similarly, in the Homeric Hymn to Demeter (*HH2*), the goddess' robes smell of incense at epiphany and ambrosia does not appear:

> ὣς εἰποῦσα θεὰ μέγεθος καὶ εἶδος ἄμειψε
> γῆρας ἀπωσαμένη: περί τ' ἀμφί τε κάλλος ἄντο:
> ὀδμὴ δ' ἱμερόεσσα θυηέντων ἀπὸ χροὸς ἀθανάτοιο
> λάμπε θεᾶς, ξανθαὶ δὲ κόμαι κατενήνοθεν ὤμους. . .
> when she had so said, the goddess changed her stature and her looks, thrusting old age away from her: beauty spread around her and a lovely fragrance was wafted from her sweet-smelling robes, and from the divine body of the goddess a light shone afar, while golden tresses

[477] This is exactly the description given by Achilles of the altar to Spercheüs in *Iliad* 23.138; he will not be returning home, he tells the god, 'ὅθι τοι τέμενος βωμός τε θυήεις'.

spread down over her shoulders. . .[478]

Here, the word describing the fragrance of the "sweet-smelling" robes, θυηέντων, specifically refers to incense. These θυ- derivatives, which as Detienne suggests, denote 'the all-important role played by fire and smoke in conveying offerings to the seat of the gods', differ significantly from Aphrodite's 'ambrosial' or simply divine scent; Hera covers herself 'ἐλαίῳ ἀμβροσίῳ ἑδανῷ', the same perfume Aphrodite is using, and here, as in the *Hymn to Aphrodite*, it is associated with ἡδονή, or pleasure, that word which T.D. Goodell tells us 'designates the feeling with which human nature, body or soul or both combined, welcomes what satisfies a need or desire'. Interestingly, in *HH7* Dionysius is also associated with an ambrosial smell at epiphany. As he reveals himself on the pirates' ship,

> ὃινος μὲν πρώτιστα θοὴν ἀνὰ νῆα μέλαιναν
> ἡδύποτος κελάρυζ' εὐώδης, ὤρνυτο δ' ὀδμὴ
> ἀμβροσίη: ναύτας δὲ τάφος λάβε πάντας ιδόντας.
> First, sweet, fragrant wine ran streaming throughout all the black ship
> and an ambrosial smell arose, so that all the seamen were seized wth
> amazement.[479]

While the word ἀμβροσίη may be taken simply to mean "divine", the nuance of ambrosia itself is unmistakable. However, nowhere in Homer are the male gods shown to bathe with or to apply ambrosia; the inference here is that this is simply how Dionysius smells. Whereas Demeter's scent evokes sacrificial incense and is associated with her youth and beauty, Dionysius' scent evokes immortality and is associated with his power; and yet, like the god and his wine, it is also associated with pleasure.

It is interesting that Hesiod's *Theogony* is devoid of smells of any kind. While

[478] *Homeric Hymn to Demeter*, lines 275-279.

Hesiod's gods are frequently described as having lovely voices, skin, and hair, rosy arms, slim ankles, and so forth, they are never described as being perfumed or otherwise pleasant-smelling, an epithet one might expect would occur to a shepherd – although he does tell us that at least the Muses bathe, 'in the Horse's Spring, or in Permessus or Olmeius.'[480] Ambrosia is never mentioned at all, as a perfume or as a meal. It is, however, of key importance to Homer's gods, and affects the mortals they oversee as well, but it is never truly described; it simply exists.

Ambrosia appears to be the privilege of every divinity, no matter how minor. Even on her secluded island, where she lives in a cave with only two chairs, the nymph Calypso has access to ambrosia. But while she offers this to Hermes in Odyssey 5.92 and dines on it herself in 5.199, she does not offer it to Odysseus, her companion of seven years:

> ἶξον δὲ σπεῖος γλαφυρὸν θεὸς ἠδὲ καὶ ἀνήρ,
> καί ῥ' ὁ μὲν ἔνθα καθέζετ' ἐπὶ θρόνου ἔνθεν ἀνέστη
> Ἑρμείας, νύμφη δ' ἐτίθει πάρα πᾶσαν ἐδωδήν,
> ἔσθειν καὶ πίνειν, οἷα βροτοὶ ἄνδρες ἔδουσιν.
> αὐτὴ δ' ἀντίον ἷζεν Ὀδυσσῆος θείοιο,
> τῇ δὲ παρ' ἀμβροσίην δμῳαὶ καὶ νέκταρ ἔθηκαν.
>
> And they came to the hollow cave, the goddess and the man, and he sat down upon the chair from which Hermes had arisen, and the nymph set before him all manner of food to eat and drink, of such sort as mortal men eat. But she herself sat over against divine Odysseus, and before her the handmaids set ambrosia and nectar.

Nowhere in the Odyssey is either Calypso or Hermes shown to bathe with ambrosia, but both are described dining on it. As Calypso does so, Odysseus eats food for mortals. We are not told why this divine delicacy is not offered to the hero

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[479] *Homeric Hymn to Dionysius*, lines 35-37.

(or if it had been), although he does tell his hosts later that Calypso wanted to make him immortal; nor is there any suggestion in this epic as to why the gods are utterly disinterested in the food which humans find nourishing. It is simply understood that the dichotomy between gods and men includes ambrosia (and, apparently, nectar). Nevertheless, the gods do share their ambrosia with mortals; it is interesting that Athena herself anoints Penelope:

> τέως δ᾽ ἄρα δῖα θεάων
> ἄμβροτα δῶρα δίδου, ἵνα μιν θησαίατ᾽ Ἀχαιοί.
> κάλλεϊ μέν οἱ πρῶτα προσώπατα καλὰ κάθηρεν
> ἀμβροσίῳ, οἵῳ περ ἐϋστέφανος Κυθέρεια
> χρίεται, εὖτ᾽ ἂν ἴῃ Χαρίτων χορὸν ἱμερόεντα. . .
>
> And meanwhile the fair goddess was giving her immortal gifts, that the Achaeans might marvel at her. With balm she first made fair her beautiful face, with balm ambrosial, such as that wherewith Cytherea, of the fair crown, anoints herself when she goes into the lovely dance of the Graces. . .

This is, then, the same oil with which Aphrodite is bathed by the Graces in Paphos, and between this and a few other enhancements, 'the knees of the wooers were loosened, and their hearts enchanted with love, and they all prayed, each that he might lie by her side.'[481] The ambrosial perfume has rendered Penelope young and radiant again. Why would Odysseus choose against the same treatment – or was he offered a choice? He tells Arete that Calypso 'said that she would make me immortal and ageless all my days, but she could never persuade the heart in my breast'.[482] Having refused immortality, however, is not he same as having refused ambrosia, as we have seen, and it does not make sense that he would forego the

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[480] Hesiod, *Theogony* 5.
[481] Homer, *Odyssey*, 18.191-2.14, A.T. Murray, trans.

opportunity to be youthful and attractive, at least not at the point at which he knew he was able to leave Calypso's island. Perhaps his failure to partake of this heavenly food is merely a literary device employed to allow the hero to go unidentified even by his wife upon returning to his home.

The nature and underlying purposes of ambrosia have been a subject of some debate among contemporary scholars. Not only do the gods bathe with it, they also eat it, which leads to some interesting questions. On the surface, this would not strike the Greeks as being unusual, in that many perfume ingredients such as rosemary, coriander, and thyme were edible and put to culinary use, but the gods are immortal – why do they need to eat at all? Further, there is argument about the consistency of ambrosia, even in the ancient world. Sappho, Alcmaeon, and Anaxandrides have the gods drinking it, although F.A. Wright feels that Anaxandrides 'is using the method of comic inversion when he says 'I eat nectar and I drink ambrosia', but he goes on to opine that 'ambrosia was originally conceived not as a solid but a liquid, not as a food but a drink, probably the best of all drinks – water.' Ambrosia, he insists, 'cannot be a solid substance'; he cites Hera's bath in particular as evidence that 'ambrosia is a liquid not a solid, and its natural meaning is 'magic water'. Nectar, he feels, was the gods' 'wine', and ambrosia was their water. [483]

Whatever the specific nature of ambrosia, it seems entirely clear that it is not water, nor is it likely that this was a liquid. Given the uses of ambrosia, particularly in Homer, it is most likely that ambrosia was a viscous substance, one which could be made thin enough to be 'poured' or 'dripped' in some cases, and more of a lotion or cream unguent in others. Modern 'body butters' might be the best modern example

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[482] Homer, *Odyssey*, 7.57-8.
[483] Wright, 5-6.

of this consistency. Paul Haupt writes that

> It would seem, however, that both nectar and ambrosia denote fragrant fat. . .The ancients had no scents dissolved in alcohol, but perfumed greases, solid or liquid fats charged with odors. Pliny's statement (13.2) that scented unguents were unknown at the time of the Trojan war is incorrect. Fats and oils absorb odors. Perfumes are extracted from flowers by the agency of inodorous fats. . .Hera cleansed herself with ambrosia and anointed herself with fragrant ambrosian oil. This was no soap, as has been suggested, but a scented massage cream... Some of our modern massage creams are said to cleanse all dust and dirt from the pores; after they have been rubbed in gently they rollout, bringing with them all the dirt and skin impurities, so that the skin appears clean and healthy with a clear and glowing color, while the cream that comes from the pores appears darkened and dirt laden.[484]

This explanation makes far more sense, and corresponds with the information reported by Theophrastus regarding how perfumes are manufactured. A 'massage cream' might have a consistency anywhere between viscous liquid and a soft solid, depending on fat content and possibly the addition of wax, and the Greeks were very familiar with the process of extracting scent into carrier oil (most commonly olive oil), although the standard means of doing this was *not* enfleurage, but rather the gentle heating through of ingredients added to olive oil to release the volatile scented oils of aromatic plants.

Jenny Strauss Clay draws an excellent correlation between ambrosia and agelessness in her 1981 article 'Immortal and Ageless Forever'. Agelessness and immortality, she writes, 'are not simply synonymous'.

> Doomed to death, mankind is wretched or miserable (δειλοί), but the gods remain blessed and "live easy' (μάκαρες, ῥεια ζωόντες). .

[484] Haupt, 232-3.

> .Exemption from death, then forms the primary characteristic of Homer's gods. But the gods are not only immortal; they are also unaging. . .Their agelessness, however, is secondary and is based on a conception of divine physiology closely analogous to the physiology of mortals. . .The bodies of the gods contain ichor, "immortal blood," ambroton aima, which means at the same time "bloodless blood". . .The gods nourish themselves on "red nectar" – analogous to the wine of men – and "ambrosia", or bloodless food.[485]

Nectar and ambrosia, suggests Strauss Clay, 'do not by themselves make the gods immortal, but they prevent them from aging and exempt them from the natural cycle of growth and decay'. She gives many examples of instances in which ambrosia is applied to mortals, living or dead, in order to slow the process inevitably leading to old age, death, and/or decay but without rendering them immortal. Most importantly, she makes the point that the gods abhor aging and decay, as Aphrodite explains to her mortal lover Anchises when she explains why she would rather leave him than see him lose his youth:

> Νῦν δέ σε μὲν τάχα γῆρας ὁμοίιον ἀμφικαλύψει
> νηλειές, τό τ' ἔπεντα παρίσταται ἀνθρώποισιν,
> οὐλόμενον καματηρόν, ὅ τε στυγέουσι θεοί περ.
> But now you will soon be enveloped by levelling old age,
> That pitiless companion of every man,
> Baneful, wearisome, and hated even by the gods.

'While many stories are told of the birth and childhood of the gods,' Strauss Clay writes, 'none is told of their senescence. The Olympians reach their prime quickly and remain forever fixed in the perfection of maturity'. It is ambrosia, then, the bloodless food, which keeps them young and beautiful with its ability to halt and even to reverse decay, which the gods abhor.

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[485] Strauss Clay, 112-114.

Thomas Van Nortwick draws an interesting parallel between fragrance and 'trickery', taking seduction in particular 'as a special form of trickery'. While I disagree with him on the definition of 'seduction' as involving 'trickery', he makes some very good points regarding fragrance, mentioning Hera, Aphrodite, Circe, Calypso, Penelope, Europa, and Medea as being main characters in stories in which both fragrance (including ambrosia) and seduction are key components.

> These passages indicate that a web of ideas and images came to be associated in early Greek hexameter poetry with situations involving trickery or, more specifically seduction. . .for the poet of the Iliad or the Hymn to Aphrodite, odors and ambrosia simply went along with trickery. . .The genesis of these associations is lost to us. At some point early in the evolution of Greek hexameter style, this conjunction of image or idea and situation became habitual, and the conservative, stylized narration of such poetry reinforced the associations until they became traditional.[486]

These associations were not pure invention; there is science to support them. D.M. Stoddart notes that the structure of the plant steroids in myrrh mimic the steroid testosterone, as only one example of the mammalian sex attracts in 'the most sought-after and expensive perfumes'.[487] His research leads him to the conclusion that there is a significant relationship 'between the sense of smell and human emotion'.

> . . .humans have developed incense culture and body perfumes based on the odours reminiscent of sex attractants which played an adaptive role in man's pre-gregarious days, and which have their effect because they are able to penetrate to the deeper levels of the psyche to gently stimulate the emotions. . .the neurons of the olfactory system terminate in that part of the brain which is now thought to be the seat of emotion. .

[486] Van Nortwick, 2.

> .the cortical and medial nuclei of the amygdala receive information from the olfactory system... The amygdala has also been shown experimentally to control sexual behaviour in rodents via its connections with the preoptic/hypothalamic region (Yahr, 1981). There seems little doubt that the olfactory system has a direct input to that part of the brain concerned both with emotion and sex.[488]

All of which is to say that there is a very real, physical response both to the scent of perfume and an equally real response to the scent of decay. Perfume is physically correlated, in the deepest part of the human brain, with sexual attraction and its inherent connotations of youth and beauty; anything rotten or putrid is equally associated with death. Further, these associations can be transmitted through literature; given the social conventions involved, we can apply these connotations to descriptions of smells in print in the absence of the smell itself, and as the stories are handed down, the connections between perfume and seduction and putrescence with death are passed along as well. We will examine this in detail later, but it is an important consideration in many of the ancient Greek myths.

As Marcel Detienne put it, 'the most delicious perfumes emanate from the powers of life which dwell on Olympus just as, conversely, the powers of death give off a nauseous smell.' These scents are in fact opposites – in the ancient stories, the flip side of perfume is not just stink, but actual decay, literal or figurative. Perfume is not the only means by which the gods manipulate scent for their own benefit; inasmuch as the gods appreciate "good" smells, such as those of sacrifice, ambrosia, and fragrant wood, so do they deplore bad smells, just as humans do – and they use these to punish transgressors. Putrescence is the ultimate expression of divine disapproval; those whom the gods find foul are made to suffer olfactory foulness,

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[487] Stoddart, 1988, 14.

rendering them not only miserable, but ostracized as well.

The best, most dramatic example of this is the case of Philoctetes, who, in the most well-known version of the story, was abandoned on Lemnos after suffering a snake-bite to his foot at the shrine of Chryse, although the location of the incident and circumstances of the wound vary according to author. Homer tells us nothing but that Philoctetes lay suffering grievous pain on Lemnos, 'ὅθι μιν λίπον υἷες Ἀχαιῶν ἕλκεϊ μοχθίζοντα κακῷ ὀλοόφρονος ὕδρου. ἔνθ' ὅ γε κεῖτ' ἀχέων.'[489] Proclus reports that the hero was bitten by a water-snake on Tenedos; Apollodorus sets the scene during a sacrifice to Apollo; Tzetzes the Scholiast has Philoctetes being bitten while he was cleansing or clearing Chryse's altar of soil; Pausanias writes that the bite occurred on the island of Lemnos where Philoctetes was abandoned; and Servius preserves an account in which the wound was the result of a dropped arrow tipped with hydra venom after Philoctetes revealed (by stamping with his foot) the final resting place of Heracles, a location he had taken a sacred oath to keep secret.[490] Regardless, all authors agree that Philoctetes was stricken by a divine influence with a constantly festering injury to his foot, the putrescent odor of which was unbearable to the rest of the army, and that this and his constant agonized shrieks caused the Greeks to maroon him on the island of Lemnos for ten years, until his presence was required to win the Trojan War.

Dio Chrysostom, in his 52nd discourse, makes much of Philoctetes' loneliness on Lemnos. While he notes that Euripides' chorus apologizes during the course of his play for having neglected Philoctetes, which Aeschylus' chorus of locals does not, he opines that the hero could not have survived for ten years without any aid at all,

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[488] Stoddart, 1988, 15-16.
[489] *Iliad* 2.722-4.

and suggests that he was given some help, but that his loneliness stemmed from lack of invitations to the locals' homes 'διὰ τὴν δυσχέρειαν τῆς νόσου'. Very little is written by Dio Chrysostom of the plays of either Aeschylus or Sophocles, but it should be noted that Sophocles' Lemnos is uninhabited, and that Philoctetes 'lives in virtually complete isolation on a desert island (Phil. 301-304) which he is desperately eager to escape {Phil. 468-506).'[491] Euripides' Philoctetes, writes S. Douglas Olson, behaves 'like a hermit, determined to drive away any intruder (Or. 59.6)' whereas Sophocles' Philoctetes 'is ecstatically happy to see someone in Greek dress and to have a chance to speak with him (Phil. 218-231)'. One would think that Philoctetes' loneliness and sense of abandonment would be worse on an inhabited island, but in any case, it can be assumed that all three playwrights emphasized Philoctetes' isolation. However, as the tragedies by Aeschylus and Euripides have survived only in fragments, I will focus for the purpose of this paper on the most complete extant retelling of the myth, the tragedy of Sophocles performed in 409 BC, and the modern scholarship regarding this play.

Modern commentators consistently point to the hero's overwhelming loneliness, ostracization, and fury at having been unfairly discarded, as it were, as a result of his 'disgusting illness' as Philoctetes' primary problem. Bernard Knox calls him 'the loneliest of the Sophoclean heroes' and 'the most outrageously wronged', and Olson describes him as being 'murderously enraged' and claims that 'Philoctetes has good reason for being embittered toward the Greeks' as 'he was thrown away and utterly ignored for nine years, and he has now been summoned back only

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[490] Frazer,commentary on Apollodorus.
[491] Olson,281.

because he has once again become useful to them.'[492] Although she mentions that Philoctetes' 'pain has a specifically bodily focus' and that 'we are several times reminded (891, 876, 1032, 473f., 520), attended with an evil smell', Penelope Biggs simply leaves it at that, suggesting that

> Constant repetitions of *monos*, *erēmos* emphasize loneliness. . .This is the poison of deep grief, the natural reaction of a man of profound feeling left ten years alone with a true grievance; solitude deepens self-pity and hate until they come almost to be cherished for themselves (βόσχων τὴν ἀδηφάγον νόσον, 313). . .this 'festering' is the ugliness of the disease. . .[493]

Indeed, most contemporary authors imply that Philoctetes' abandonment was unjust and intolerant, that the Greeks could have managed to put up with Philoctetes' screams and foul odor and were wrong to have marooned him. By minimizing the impact of the magnitude of the infection and presenting the wounded foot as a symbol for Philoctetes' festering anomie, these commentators create an emphasis which is in itself unfair to the other heroes and which invalidates a major literary device in this story. As J. Ceri Stephens writes,

> The wound of Philoctetes has inspired much writing, a great deal of it brilliant. The brilliance has been inspired considerably by the wound's potential as a symbol. . .the references are endless, the connections innovative, the scrutiny minute and the details instructive. Yet enjoyable and useful as this interpretation is, like most modern interpretations of the Philoctetes it does the play a disservice. . .if the reason for deserting Philoctetes in the first place is played down or neglected, his comrades' treatment of him becomes irrational, indefensive and, in terms of probability, inexplicable. . .Perhaps as a result of the generally secure status of those who have read and

[492] Knox, 42; Olson, 281.
[493] Biggs, 231, 233.

> interpreted the Greek classics in recent centuries, such words as purulence, odor and putrescence flow more readily from our pens than pus, stink, and rotten flesh. . .Perhaps this is why on reading modern treatments of Philoctetes' malady one might be led to feel that he was suffering from nothing more than a severely twisted ankle, that his wound appeared little uglier than a burst carbuncle, that his smell only fractionally surpassed the unpleasantness of a well-used squash shirt, and that his screaming merely approximated a hungry infant's cry, albeit with a few rich expletives thrown in.[494]

Stephens' take on the minimization of Philoctetes' wound is by far the most descriptive and useful approach to this problem by modern commentators; she goes on to note that 'Only twenty years or so earlier during the plague corpses had rotted in the streets' and that in an environment in which 'open drains, garbage, animal and human feces were realities', the 'average Athenian spectator was acquainted with ugliness'. This spectator would thus grasp the nature of the disease as being sufficient to inspire the healthy members of the expedition to strand Philoctetes on Lemnos. While I applaud Stephens for interpreting the wound literally, and wholeheartedly agree that the Greek audience would recognize both the heroes' dilemma and the miasma of putrifying flesh, I do not think that Stephens goes far enough in bringing this reality to a modern audience, who would be unlikely by comparison to have any familiarity with exposure to tissue necrosis. Further, I would argue that the stench of the festering, weeping, rotten foot would have been enough in and of itself to convince the Achaeans that Philoctetes must be put off of the ship, even without the agonized cries which interrupted sacrifices and drove the army to distraction. In Sophocles' play, Philoctetes tells Neoptolemus that he has found an herb with which he can 'ease his pain completely' (650), and while this herb does not

[494] Stephens, 154-5, 158.

prevent the attack he suffers later, it must certainly greatly reduce the amount of noise he makes – but he does not make this point. Instead, he agrees to be banished to a remote corner of the ship (468ff) and suggests that the chorus stay away from him (890-991) lest 'βαρυνθῶσιν κακῇ ὀσμῇ πρὸ τοῦ δέοντος.'[495] Clearly Philoctetes is aware just how difficult it will be to tolerate his presence, and that this difficulty has to do with the way he smells.

Necrosis is a result of cellular injury caused by external factors such as trauma, toxins, or infection which leads to premature cell death within living tissue. An uncontrolled release of the products of this cell death into intracellular space provokes an inflammatory response, preventing phagocytes from eliminating the dead cells and causing septicaemia 'resulting from the free communication between infected fluid and circulatory fluid' – in other words, the blood becomes toxic – which in turn causes tissues to swell and decay. The classic type of this condition is 'wet gangrene', in which 'the affected part is edematous, soft, putrid, rotten, and dark'[496] If the infected flesh is not surgically removed, the patient will die.

Fig. 8: tissue necrosis

An infected bite by a poisonous snake would comprise all three precursors for gangrene; even if the snake involved were not envenomed (as most water snakes

[495] Stephens, 166.

are), a ‘dry bite’ by a snake whose fangs and saliva harbour pathogenic microbial organisms can lead to tissue necrosis and eventual fatality. Philoctetes’ condition would not be unknown to a Classical population, and they could be reasonably expected to imagine it in all of its horror. Additionally, they, or at the very least, those who lived through the plague, would recognize the odor of the putrefied, liquefying gangrenous flesh which emanates from the afflicted area in the form of gas produced within the decaying tissues, which gas causes the disease to spread as nearby tissues are destroyed, and thus to generate more gas at the same time. The accompanying smell of diseased, rotting flesh is one which humans are biologically programmed to avoid at all costs, and is so pervasive as to penetrate anything porous; it is infamously difficult to remove from carpet, upholstery, draperies, and even walls. Even in the absence of pain and thus relatively silent, his wound would have rendered his surrounding environment noxious and nauseating, and in close quarters on a ship this would be truly physically intolerable, the stench permeating all of the wood and fabric nearby, and quite possibly the food as well. The Achaeans were not being petty or intolerant in putting Philoctetes off of the ship; they were suffering as well, and had every reason to fear contagion to boot. Without the incentive provided by Calchas the seer, there was no good reason for them to expose themselves to Philoctetes’ disease. Similarly, the apologetic chorus of Euripides must be excused – no one, then or now, would invite someone in Philoctetes’ physical condition into their homes, as Dio Chrysostom notes.

Additionally, Philoctetes condition was not entirely medical in nature, and the audience would have been aware of this as well. This disease was not going to kill him as it would have otherwise; a large part of the curse was that Philoctetes was not

[496] NHS Health A-Z, 2010.

simply going to die of blood poisoning in a few weeks. It is this endless non-fatal suffering and its attendant isolation from the community which would seem to be the epitome of divine punishment, and his wound rendered Philoctetes *spiritually* intolerable as well. His rotten extremity, as extremely unpleasant as it was, was merely a symptom of the real problem: he had offended the gods, and proximity to him might offend the gods as well, especially when his tortured screams prevented the other heroes from proper worship. Philoctetes, Sophocles tells us, was left on Lemnos

> νοσῶ καταστάζοντα διαβορῳ πόδα,
> ὅτ' οὔτε λοιβῆς ἠμιν οὔτε θυμάτων
> παρῆν ἑκήλοις προσθιγεῖν, ἀλλ' ἀγρίαις
> κατεῖχ' ἀεὶ πᾶν στρατόπεδον δυσφημίαις,
> βοῶν, στενάζων.
>
> . . .his foot all ulcerous with a gnawing sore, when neither drink-offering nor sacrifice could be attempted by us in peace, but with his fierce, ill-omened cries he filled the whole camp continually, shrieking, moaning...[497]

That these cries were considered 'ill-omened' suggests that the Achaeans did not feel that they had a choice; Philoctetes' condition was insufferable on every level. Stephens makes the point that

> [The Classical theatregoer] would understand here that this particular snake bite was some form of divine action and that the stricken hero was undoubtedly a source of contagion and public pollution, someone dangerous to be around. It was clearly more than a private 'misfortune' or accident. . .For 5th century Greeks an interrupted sacrifice heralded possible dire consequences. At the best of times religious rituals needed perfect conditions to be effective; critical times such as those of

the Trojan expedition left no room for scruples.[498]

I have no desire to minimize Philoctetes' anger or bitterness at having been abandoned by his peers or neglected by any inhabitants of Lemnos; certainly his grief would be deep and his rage justified. Nor do I wish to dismiss the impact of his cries on the morale or religious observances of the Achaeans. Again, however, I feel strongly that the odor of his putrescent foot would have been more than enough to occasion his expulsion from the community even had he been silent, and while his continually rotting limb is certainly symbolic of divine displeasure, it should be appreciated for the infliction that it is rather than merely being taken as a symbol of his frustrated fury at having been literally left to rot.

The decay described in this play is literal rather than figurative, but it is still clear that much of Philoctetes' fate and subsequent misery is a result of the decay of the natural order, the degradation of his quality of life, his social position among the Greeks, and thus civilization as he knows it. He is reduced to fending for himself without community as a result of his intolerable stench, stricken not only with a severe and disgusting medical problem but decay of the soul and his self-image as well.

This 'divine pollution' which renders a transgressor spiritually insufferable is a theme revisited in the stories of both the Lemnian Women and the seer Phineus, and it is notable that in each of these stories intolerable odor leads to the same sort of social decay, rather than the reverse, regardless of the lack of physical injury or disease. While far more has been written about Philoctetes -- his story is the more popular one, there is more primary material extant, and his festering foot adds a

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[497] J. Ceri Stephens, trans., 162. She feels that 'the inclusion of ἀεί is significant to counter the apparent brevity of the attack in the play itself'.

crucial layer to his suffering – and the physical disease suffered by Philoctetes makes no appearance in either the story of the Lemnian Women or that of Phineus, both intolerable odors and the dangers of contagion by association are still very much present in those stories. In each of these cases, the divine curse of social isolation and erosion of civilization is manifested as a by-product of δυσωδία.

Apollodorus gives us a descriptive account of the curse and crime of the Lemnian women:

> ἔτυχε δέ ἡ Λῆμνος ἀνδρῶν τοτε οὖσα ἔρημος, βασιλευομένη δέ ὑπο Ὑψιπύλης τῆς Οόαντος δί αἰτιαν τῆνδε. Ἀι Λήμνιαι τὴν Ἀφροδιτην οὐκ ἐτίμων· ἡ δέ αὐταις ἐμβαλλει δυσοσμίαν, και διὰ τοῦτο οι γήμαντες αὐτας ἐκ τῆς πλησιον Θράκης λαβοντες αἰχμαλωτιδας συνευνάζοντο αὐταις, άτιμαζομεναι δὲ αἱ Λημνιαι τούς τε πατέρας καὶ τοὺς ἄνδρας φονεύουσι: μόνη δὲ ἔσωσεν Ὑψιπύλη τὸν ἑαυτῆς πατέρα κρύψασα Θόαντα. Προσσχόντες οὖν τότε γυναικοκρατουμένῃ τῇ Λήμνῳ μίσγονται ταῖς γυναιξίν. Ὑψιπύλη δὲ Ἰάσονι συνευνάζεται, καὶ γεννᾷ παῖδας Εὔνηον καὶ Νεβροφόνον.
>
> At that time it chanced that Lemnos was bereft of men and ruled over by a queen, Hypsipyle, daughter of Thoas, the reason of which was as follows. The Lemnian women did not honor Aphrodite, and she visited them with a noisome smell; therefore their spouses took captive women from the neighboring country of Thrace and bedded with them. Thus dishonoured, the Lemnian women murdered their fathers and husbands, but Hypsipyle alone saved her father Thoas by hiding him. So having put in to Lemnos, at that time ruled by women, the Argonauts had intercourse with the women, and Hypsipyle bedded with Jason and bore sons, Euneus and Nebrophonus.[499]

Like Philoctetes, these women suffered divine retribution in the form of a loathsome odor, with its attendant rejection by their companions, and like Philoctetes,

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[498] Stephens, 59.

this caused tremendous grief and rage. It is interesting that no extant versions of the story suggest that the afflicted Lemnians were driven to kill as part of the curse; the death associated with their divine reek seems to have been a choice, unlikely as it seems that it would be a choice made by every woman on the island but one. Nevertheless, their isolation from men following the massacre was total and complete until the Argonauts arrived.

Apollonius Rhodius, who describes so dramatically the olfactory plight of the seer Phineus, leaves the Lemnian smell entirely out of his version of the myth; Myrsilus of Methymna has the massacre occurring before the ships landed, but writes that the pervasive stink was the result of a drug used by a jealous Medea on the Argonauts' way *back* from retrieving the golden fleece. Both of these versions serve to explain why the Argonauts did not find the Lemnian women as repugnant as did their husbands. But the story was already very well-known by the time of Myrsilus' writing in 250 BC, and the suggestion in Aeschylus' play *Hypsipyle* that threats rather than seduction swayed the Argonauts leads the reader to believe that at the time of the Argonauts' landing the curse was still in effect. Steve Jackson writes that this was the version 'plainly known to Aeschylus and Sophocles, and so, no doubt, to earlier epic sources'.[500] He asks:

> Were the Lemnian women still malodorous by the time of the Argonauts' arrival? They were obviously desperate to have sexual intercourse with the heroes, threatening recourse to violence if they failed to oblige. But why was this threat of arms necessary? They could not *all* have been ugly. They could, however, *all* have been stinking. Clearly, the women had a good reason for believing that the Argonauts would not have had sex with them unless forced. A

[499] Apollodorus 1.9.18, James George Frazer, trans.
[500] Jackson, 83.

> dysosmia seems more than a plausible explanation. If this was the case, Apollonius would have had to omit the smell element from his version straightaway. Hypsipyle may have been able to conceal the massacre of the Lemnian male population in her address to Jason, but she could not possibly have dissimulated a prevailing body odor. Not only was the dysosmia story inappropriate to the Apollonian scenario, but also one can well imagine its embarrassing effect on the Lemnians who Myrsilus met.[501]

Were the Lemnian women that desperate for sex? Were the Argonauts actually intimidated by their threats? The point of the story seems rather to be the reestablishment of 'proper' sociocultural mores and way of life on Lemnos. The result of the Lemnian odor, as it were, was, again, the decay of civilization as it was commonly understood. While the Lemnian women certainly had a community of sorts, they were unable to live in the way that they believed civilized people did, and sought to recreate their society with the help of the Argonauts. The underlying elements of this divine punishment can be seen in the fire-festival of Lemnos, a religious ritual in which all fires on the island were extinguished and 'new fire' created. This festival, Walter Burkert believes, mirrored the myth of Aphrodite's curse and the 'Lemnian crime':

> . . .Lemnos was a community of women without men, ruled by the virgin queen Hypsipyle, until the day when the ship arrived, the Argo with Jason. This was the end of Lemnian celibacy. With a rather licentious festival the island returned to bisexual life. . .Thus one of the most curious features of the myth reappears in ritual, at least down to Hellenistic times: the foul smell of the women, which isolates them from men. . .Extinguishing all fires on the island – this in itself means a dissolution of all normal life. The ἑστία, the centre of the community, the centre of every house is dead. What is even more, the families

[501] Jackson, 80.

> themselves are broken apart, as it were by a curse: men cannot meet their wives, sons cannot see their mothers.[502]

We can see in the elements of this festival the disruption of social life from the home to the community at large; this is the true nature of the curse. Though uninjured – in fact, having committed the most grevious injury themselves – the Lemnian women, like Philoctetes, were rejected and isolated from normal life due to their foul smell. They radiated the displeasure of the gods in a cloud of stink which no one could fail to notice.

The same theme underlies Apollonius Rhodius' story of Phineus. Here, as in the story of the Lemnian women, there is no specific medical complaint associated with miasma, but like the story of Philoctetes, there is both a component of actual physical decay associated with divine punishment and an attendant loss of participation in community causing deep feelings of isolation and misery.

Phineus, the son of Agenor, 'suffered the most terrible woes of all men', according to Apollonius Rhodius. After having offended Zeus by using his prophetic gift to share the details of of Zeus' sacred intentions to men,

> τῶ καὶ οἱ γῆρας μὲν ἐπὶ δηναιὸν ἴαλλεν,
> ἐκ δ' ἕλετ' ὀφθαλμῶν γλυκερὸν φάος. οὐδὲ γάνυσθαι
> ἴια ἀπειρεσίουτιν ὀνείασιν, ὅσσα οἱ αἰεὶ
> θέσφατα πευθόμενοι περιναιέται οἴκαδ' ἄγειρον.
> ἀλλὰ διὰ νεφέων ἄφνω πέλας ἀίσσουσαι
> Ἅρπυιαι στόματος χειρῶν τ' ἀπὸ γαμφηλῇσιν
> συνεχέως ἥρπαζον. ἐλείπετο δ' ἄλλοτε φορβῆς
> οὐδ' ὅσον, ἄλλοτε τυτθόν, ἵνα ζώων ἀκάχοιτο.
> καὶ δ' ἐπὶ μυδαλέην ὀδμὴν χέον. οὐδέ τις ἔτλη
> μὴ καὶ λευκανίηνδε φορεύμενος, ἀλλ' ἀποτηλοῦ
> ἑστηώς. τοῖόν οἱ ἀπέπνεε λείψανα δαιτός.

[502] Burkert, 6-7.

> Zeus sent upon him a prolonged old age, and took sweet light from his eyes, and did not allow him to enjoy all the lavish gifts of food that the neighbouring people gathered for him in his house whenever they asked for oracles. But swooping suddenly through the clouds to his side, the Harpies continually snatched the food from his mouth and hands with their beaks. Sometimes not even a morsel of food was left, at other times just enough for him to stay alive and suffer. Furthermore, they would shed a putrid stench upon it: no one could bear even to stand at a distance, let alone bring it up to his mouth – so terribly did the remains of his meal reek.

Apollonius goes on to describe this most miserable of mortals: his feet are withered, he has to walk with a stick and feel his way along the walls,

> τρὲμε δ’ ἄψεα νισσομένοιο
> ἀδρανιῃ γήραι τε. πίνῳ δέ οἱ αὐσταλέος χρὼς
> ἐσκλήκει, ῥινοὶ δὲ σὺν ὀστέα μοῦνον ἔεργον.
>
> . . .his body was dry and caked with filth, and his skin was all that held his bones together.

Whereas Philoctetes had to wait ten years for the Greeks to need him badly enough to interact with him, Phineus’ skill makes him very valuable to the general population; they visit him to ask for oracles and bring him food to thank him, but he cannot enjoy it, or their company. This is the epitome of the wrath of the gods; perpetual old age without death, denial of the simplest pleasures, and isolation from a community with whom he cannot dine due to the ever-present Harpies and their overwhelming, putrescent stench. Again the natural order of things is upset, as this blind, emaciated old man suffers alone without care, albeit in a community in which he is liked and respected, and we see him engulfed in a process of decay, both physical and social. As in the case of the Lemnian women, the Argonauts arrive and put everything to rights, but not before they have ascertained that they will not incur the wrath of the

gods themselves. In 246-254, Zetes, one of the sons of Boreas, says to Phineus:

> ἦ ῥα θεοὺς ὀλοῇσι παρήλιτες ἀφραδίῃσιν
> μαντοσύνας δεδαώς. τῶ τοι μέγα μηνιόωσιν.
> ἄμμι γε μὴν νόος ἔνδον ἀτύζεται ἱεμένοισιν
> χραισμεῖν, εἰ δὴ πρόχνυ γέρας τόδε πάρθετο δαίμων
> νῶιν. ἀρίζηλοι γὰρ ἐπιχθονίοισιν ἐνιπαὶ
> ἀθανάτων. οὐδ' ἂν πρὶν ἐρητύσαιμεν ἰούσας
> Ἁρπυίας, μάλα περ λελιημένοι, ἔστ' ἄν ὀμόσσῃς,
> μὴ μὲν τοῖό γ' ἔκητι θεοῖς ἀπὸ θυμοῦ ἔσεσθαι.
>
> Surely you sinned against the gods out of baneful recklessness through your knowledge of prophecy, and that is why they feel great wrath against you. As for us, however, our minds are troubled within us, though we long to help, as to whether a god has truly proffered this honor to the two of us. For rebukes from the immortals are obvious to earthly men, and we shall not fend off the Harpies when they come, in spite of our great desire, until you have sworn that we will not lose the gods' favour for that reason.

Zetes' fear of divine retribution revisits the theme of 'spiritual contagion' we saw in the story of Philoctetes; it is clear to everyone present that Phineus is under a very strong divine curse, and counteracting that curse might bring similar punishment to his rescuer. This curse is, in fact, so strong, that after the harpies have been chased away, the Argonauts have bathed Phineus 'all over' and eaten at the same table with him, Phineus is still trapped in his 'interminable old age', blind, crippled, and feeble.[503] Nevertheless, he can feast in community and enjoy the smell and taste of his food, and this is cause for rejoicing. Unlike Philoctetes, he is not restored to physical health, but he is able to resume his social position among his peers, and one presumes that more company and help with the occasional bath is forthcoming.

[503] *Argonautica* 221, 301-2.

There are positive stories which emphasize the relationship between perfume and decay as well. In *Odyssey* IV, Menelaus tells Telemachus a fascinating tale of his journey home from the Trojan War: he and his men had been stranded, exhausted and starving, on Pharos, an island off of Egypt. After 20 days without enough wind to get them off of the island, they were in deep despair, but the goddess Eidothea, daughter of Proteus and granddaughter of Poseidon, took pity on Menelaus and formulated a plan to help him escape. He and three of his men would disguise themselves as seals, ambush Proteus when he came to take his daily nap, and hold him until the god told them how they might safely return to Greece. There was only one problem with this plan – the seals stank! Fortunately, however, Eidothea had some ambrosia on hand and saved the day:

> ἑξείης δ᾽ εὖνησε, βάλεν δ᾽ ἐπὶ δέρμα ἑκάστῳ.
> ἔνθα κεν αἰνότατος λόχος ἔπλετο: τεῖρε γὰρ αἰνῶς
> φωκάων ἁλιοτρεφέων ὀλοώτατος ὀδμή:
> τίς γάρ κ᾽ εἰναλίῳ παρὰ κήτεϊ κοιμηθείη;
> ἀλλ᾽ αὐτὴ ἐσάωσε καὶ ἐφράσατο μέγ᾽ ὄνειαρ:
> ἀμβροσίην ὑπὸ ῥῖνα ἑκάστῳ θῆκε φέρουσα
> ἡδὺ μάλα πνείουσαν ὄλεσσε δὲ κήτεος ὀδμήν.
>
> She made us to lie down in a row, and cast a skin over each. Then would our ambush have proved most terrible, for terribly did the deadly stench of the brine-bred seals distress us — who would lay him down by a beast of the sea? — but she of herself delivered us, and devised a great boon; she brought and placed ambrosia of a very sweet fragrance beneath each man's nose, and destroyed the stench of the beast. [504]

The terrible odor of the seal skins here is eliminated through the use of ambrosia, but is it just that the pleasant smell has overpowered the stink? The ambrosia was not applied to the seal skins themselves, but rather to the heroes underneath.

Nevertheless, the social literary convention that perfume counteracts death and decay suggests that by virtue of exposure to ambrosia, this process was not only halted, but reversed, as occurs in the cases of Hector and Sarpedon. We see many examples of the gods using scent in Homer, and where ambrosial meals are never consumed by mortals, where ambrosial perfume products are concerned the applications are almost always the same as those employed by humans with mortal perfume; again, the only difference is in the quality of the products.

The general process of deodorizing and reodorizing is clearly the same whether undertaken by men or gods, and the same is true of the treatment of the dead. Just as Zeus has dictated the preparation of Sarpedon's corpse for transportation and funeral rites, so do our epic heroes order a wash, oil, and fresh clothing for those whose remains are to be cremated. It is, in fact, 'the due of the dead' ('τὸ γὰρ γέρας ἐστὶ θανόντων', line 675) according to Zeus, and this important point is echoed in Achilles' treatment of Patroclus' body in lines 18.349-353:

> αὐτὰρ ἐπεὶ δὴ ζέσσεν ὕδωρ ἐνὶ ἤνοπι χαλκῷ,
> καὶ τότε δὴ λοῦσάν τε καὶ ἤλειψαν λιπ' ἐλαίῳ,
> ἐν δ' ὠτειλὰς πλῆσαν ἀλείφατος ἐννεώροιο·
> ἐν λεχέεσσι δὲ θέντες ἐανῷ λιτὶ κάλυψαν
> ἐς πόδας ἐκ κεφαλῆς, καθύπερθε δὲ φάρεϊ λευκῷ.
>
> Then when the water boiled in the gleaming copper [cauldron], they washed him and anointed him richly with oil, filling his wounds with ointment nine years old, and they laid him upon his bed and covered him with a soft linen cloth from head to foot, and thereover with a white robe.

Included in the impressive list (beginning at line 23.165) of Patroclus' funerary goods, along with a plethora of sacrifical animals, the bodies of twelve Trojan

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[504] Homer, *Odyssey*, 4.440-48. A.T. Murray, trans.

warriors, and a pyre comprised of 100 square feet of wood are amphorae of honey and unguents, which Achilles leans against the bed on which the body lies (ἓν δ' ἑτίθει μέλιτος καὶ ἀλείφατος ἀμφιφορῆας πρὸς λέχεα κλίνων). After all of this, and a nearly endless catalogue of funeral games with expensive prizes, Achilles still worries that Patroclus will hear in Hades that he has returned Hector's body, and assures his dead and buried friend that 'σοὶ δ' αὖ ἐγὼ καὶ τῶνδ' ἀποδάσσομαι ὅσσ' ἐπέοικεν' (24.595). After his own death, Achilles' shade is told in *Odyssey* 24 by the more recently deceased Agamemnon that Achilles' funeral was no less dramatic or expensive than Patroclus', including the apparently mandatory rich clothing and scented offerings:

> καίεο δ' ἐν τ ἐσθῆτι θεῶν καὶ ἀλείφατι πολλῷ
> καὶ μέλιτι γλυκερῷ. . .
> αὐτὰρ ἐπεὶ δή σε φλὸξ ἧνυσεν Ἡφαίστοιο,
> ἠωθεν δή τοι λέγομεν λεύκ' ὀστέ', Αχιλλεῦ,
> οἴνῳ ἐν ἀκρήτῳ καὶ ἀλείφατι. . .
>
> So you were burnt in the raiment of the gods and with an abundance of unguents and sweet honey . . . but when the flame of Hephaestus had made an end to you, in the morning we gathered your white bones, Achilles, and laid them in unmixed wine and unguents.[513]

Odysseus goes so far as to envy these men, and the rest of the fallen Danaan heroes, in Odyssey 5.306-12. After eighteen days alone at sea, just as land has finally appeared on the horizon, his raft is buffeted by winds at the direction of Poseidon and seems sure to capsize, and Odysseus laments the penalties inherent in such a 'miserable death':

> τρὶς μάκαρες Δαναοὶ καὶ τετράκις, οἵ τότ' ὄλοντο
> Τροίῃ ἐν εὐρείῃ χάριν Ατρεΐδῃσι φέροντες.

[513] *Odyssey* 24.67-73. A.T. Murray, trans.

ὡς δὴ ἐγώ γ' ὄφελον θανέειν καὶ πότμον ἐπισπεῖν
ἤματι τῷ ὅτε μοι πλεῖστοι χαλκήρεα δοῦρα
Τρῶες ἐπέρριψαν περὶ Πηλεΐωνι θανόντι.
Τῷ κ' ἔλαχον κτερέων, καί μευ κλέος ἦγον ᾽ Αχαιοί:
νῦν δέ λευγαλέῳ θανάτῳ ἔιμαρτο ἁλῶναι.

Thrice blessed those Danaans, aye, four times blessed, who of old perished in the wide land of Troy, doing the pleasure of the sons of Atreus. Even so would that I had died and met my fate on that day when the throngs of the Trojans hurled upon me bronze-tipped spears, fighting around the body of the dead son of Peleus. Then should I have got funeral rites, and the Achaeans would have spread my fame, but now by a miserable death was it appointed me to be cut off.

These postmortem honours, or 'κτέρεα', were extremely important to the heroes in the field, and Odysseus tells us why; in the absence of any Achaeans, he fears that his fame and glory will die with him. The rites, gifts, and contest prizes associated with a hero's funeral and games seem to have emphasized his value to the group and insured his legacy by means of a series of unforgettable spectacles, and we can see from the examples above that perfumes were a critical component of the lavish excess involved in these funerary preparations. Further, George Mylonas suggests that

> [T]he Greeks of the epics believed that at death the *psyche*, abandoning the body, proceeded towards the House of Hades, but could not mingle with the other denizens of Erebus; that it was kept away from the realm of shadows until the corpse was given proper burial; that the *psyche* remained sentient as long as the body remained unburied. Once the body was properly buried, and in the poems once the body was destroyed by fire, the *psyche* was no longer tied to the world of the living. . .It seems clear that the destruction of the flesh and the sinews formed the important part of the burial; that the sinews and flesh were believed to tie the *psyche* to the world of the living and to

> prevent its admission to the circle of the phantoms; that the bones had no significance after they were deprived of the flesh and sinews which covered them.[514]

It is 'generally agreed', writes Mylonas, 'that cremation was the sole method of burial employed by the Homeric people', and resins or oils would have been quite helpful in this regard. Perfumes are clearly absolutely mandatory for properly honoring the important dead; the scented oil with which Patroclus' corpse is covered, the nine-year-old ointment applied to his wounds, and the amphorae of unguents burnt with his body are his 'due', and a terribly expensive gift, as are the oils and unguents with which the body of Achilles is prepared and interred. These examples seem to suggest that the funeral bier, pyre, and associated offerings, the funeral games, and the actual interment and burial are the responsibility of immediate family and friends, but the ritual bathing, anointing, and dressing of the corpse for transport to those family and friends would appear, from the cases of Hector and Sarpedon, to be the responsibility of the initial caretaker of the dead body. No doubt this custom was as practical in some ways as it was expensive in others. The finest perfumes contained exotic resins such as frankincense, myrrh, or balsam, which would act as preservatives and slow the process of decay during any necessary transport or delay (as in the case of funeral games), and any oil-based liquid would promote the speedy ignition and consumption by flames of the corpse, as well as significantly improving the scent of the resulting smoke.[515] Nevertheless, no underlying reasons are given for the practice; certainly if Aphrodite and Apollo could prevent the tearing or rotting of Hector's body whether behind a moving chariot or left lying in a field, Zeus might

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[514] Mylonas, 481.

[515] The preservative properties of frankincense and myrrh have been used to treat corpses since the Ancient Egyptian civilisation, where they were an important part of the mummification process (q.v. Brier and Wade 2001).

have taken deliberate steps to insure that Sarpedon's body remained pristine and intact on its way to Lycia, but he does not – he simply does (via Apollo) what is required to honour Sarpedon out of respect, because this is, according to him, 'the γέρας of the dead'. It would appear that it is not, however, the γέρας of *all* of the dead; in Iliad 7.425-35, the mass interment of two large groups of corpses is undertaken with no mention whatsoever of any anointment, jugs containing perfumed oil, or perfumed clothing:

> ἀλλ' ὕδατι νίζοντες ἄπο βρότον αἱματόεντα
> δάκρυα θερμὰ χέοντες ἀμαξάων ἐπάειραν.
> οὐδ' εἶα κλαίειν Πρίαμος μέγας: οἳ δὲ σιωπῇ
> νεκροὺς πυρκαϊῆς ἐπινήνεον ἀχνύμενοι κῆρ,
> ἐν δὲ πυρὶ πρήσαντες ἔβαν προτὶ' Ιλιον ἱρήν.
> ὣς δ' αὖτως ἐτέρωθεν ἐϋκνήμιδες' Αχαιοὶ
> νεκροὺς πυρκαϊῆς ἐπινήνεον ἀχνύμενοι κῆρ,
> ἐν δὲ πυρὶ πρήσαντες ἔβαν κοίλας ἐπὶ νῆας. . .
>
> With water they washed from them the clotted blood, and lifted them upon the wagons, shedding hot tears the while. But great Priam would not suffer his folk to wail aloud; so in silence they heaped the corpses upon the pyre, their hearts sore stricken; and when they had burned them with fire they went their way to sacred Ilios. And in like manner over against them the well-greaved Achaeans heaped the corpses upon the pyre, their hearts sore stricken, and when they had burned them with fire they went their way to the hollow ships.

This is a funeral for ordinary soldiers, rather than heroes, and like the games and expensive grave goods, the funerary rites and offerings related to perfume are apparently reserved for heroes as well. The corpses in this passage are washed, but unannointed; there are no changes of clothing, no jars of unguents, not a mention of even so much as a handful of incense thrown into the flames in which the bones of

the dead mingle unseparated. Perfumes, it would seem, are only the γέρας of the important and worthy dead.

The same pattern can be seen pertaining to the living. The hygienic ritual demonstrated in the cases of the dead heroes – a bath, the application of scented oil, and a change into fragrant clothes – is also, it would seem, the due of an important guest or social superior, whose status as such is reinforced not only by this ritual but by the resulting scent. In several instances throughout Homer's work, visitors of note are treated by gods and men alike in virtually exactly the same way their hosts might treat an important corpse: bathed, anointed with oil, dressed in luxurious perfumed clothing, and given gifts. With the exception of the gifts, the same behaviour is frequently exhibited by inferiors – always women, though not always slaves – toward their superiors within the same household or demesne, just as Hebe bathed Ares on Mount Olympus and the Graces bathed Aphrodite at her altar in Paphos.

Perfume is a hallmark of civilization in this culture, and defines social status; additionally, the act of one person's perfuming another seems to reinforce the social hierarchy. Further, in addition to civilized bodies, personal space and apparel are also expected to smell pleasant. Just as the home of the gods is described as being redolent with heavenly ambrosial and sacrificial scents, so are the homes of wealthy and socially important mortals also described in terms of their fragrance, and their clothes, too, are expected to smell of costly aromatics. For example, in Iliad 3.382, Aphrodite sets Paris down in his 'fragrant' chamber (ἐν θαλάμῳ εὐώδεϊ κηώεντι); Helen's chamber in Odyssey 4.121 is 'θυώδεος', and in 24.191 we learn that Priam's treasure chamber smells of cedar (θάλαμον κηώεντα κέδρινοὐ). While these rooms could never compete with the ambrosial halls of Mount Olympus, they are reminiscent of Calypso's cave, which in Odyssey 5.59 she scents by burning cedar

and juniper, and which is ringed by sweet-smelling cypress trees (πῦρ μὲν ἐπ' ἐσχαρόφιν μέγα καίετο, τηλόσε δ' ὀδμη κέδρου τ'εὐκεάτοιο θύου τ' ἀνὰ νῆσον ὀδώδει δαιομένων. . .ὕλη δὲ σπέος ἀμφὶ πεφύκει τηλεθόωσα, κλήθρη τ' αἴγειρός τε καὶ εὐώδης κυπάρισσος). These naturally oily woods render wealthy households more pleasant at the same time they broadcast the social status of the mortals within who use them to emulate the abodes of the gods. Similarly, Helen's garment is described (in the genitive case) in Iliad 3.385 as being a 'νεκταρέου ἑανοῦ', a robe redolent with the fragrance of nectar, and Achilles' tunic in 18.25 is 'νεκταρέῳ', just as is Leto's in 21.502. The mortals are noted in Homer to keep their fine clothing in chests (ideally made of cedar), and these vestments would be sprinkled with perfume-powders (the διαπάσματα described by Theophrastus) before being stored. When Homer refers in 6.483 to Andromache's κηώδεϊ κόλπῳ, it is unclear whether her bosom is 'fragrant' because her skin is perfumed or whether the scent emanates from what she is wearing, but the point is moot as both body and garment would have been reodorized.

The correlations between the behaviours of gods and mortals where perfume is concerned abound throughout Homer's texts whether the beneficiary of the fragrance is living or dead; again, the only difference seems to be that the gods enjoy a far higher quality of perfume. That these are the ways of the gods underscores the behaviour of the heroes, and generations upon generations of listeners and readers have been initiated into the mysteries of the olfactory sensorium of the Bronze Age through Homer's epics. On the one side, we have youth, beauty, and divine favour, and on the other, old age and decay, even putrescence. We can see and understand the semiotic codes pertaining both to perfume and its fouler alternatives

transmitted here; the olfactory culture of the period comes alive through the written word, and the messages regarding who smells in what way are clear.

As mentioned before, each culture has its own collective of defined signs and symbols which enables individuals to process and agree upon the meanings of the stimuli they perceive, and smells are no different. In spite of the fact that they are not verbal signals, and in the case of literature cannot even be perceived by means of olfaction, smells are nevertheless used by a given society as a group to categorise the world around them and the people in it, and these perceptions and conventions are taught and learned within that society. Exactly how this occurs is worth a closer look.

Saying It With Scent

In *Learning to Smell: Olfactory Perception from Neurobiology to Behavior*, Donald A. Wilson and Richard J. Stevenson write,

> [T]o date there is no account in the literature that presents a modal model of olfactory information processing. Rather, thinking in this respect has been guided, logically so in fact, by information-processing models derived from other modalities or from the study of human memory in general. Moreover, because there has been relatively little theoretical development in psychology of the basic information-processing steps in olfactory perception, cognitive processes have not typically been related back to perceptual ones, resulting in a lack of integration of the extant research literature. . .perhaps the most striking finding of research into olfactory cognition during the past forty years has been that of differences with other modalities rather than similarities. All this suggests that an integrated olfaction-centered model is needed. Such a model is inevitably going to be an approximation of the truth; nonetheless, it should serve a useful purpose if it helps to specify important questions to ask about olfactory information processing.[516]

The deficit to which Wilson and Stevenson refer is directly related to the lack of smell vocabulary in European languages. As Classen et al. note, "The closest we can come is to say that something smells like something else."[517] Developing a cohesive model for discussing social signals in general and interpersonal communication in particular where smells are concerned is extremely difficult when the smells involved are so difficult to discuss, and no model of olfactory information processing exists. The most efficacious solution to this persistent problem, therefore, is to emulate the researchers in smell cognition and memory by deriving a model

[516] Wilson and Stevenson, 2006.

from other information-processing modalities. While a variety of perceptual theories have been proposed over time, for the purposes of this paper, the best model available for the discussion of sociocultural smell interpretation is one of visual information-processing.

In her groundbreaking 1996 article entitled 'Abduction and A Theory of Visual Interpretation', Sandra Moriarty offers a new model of communication theory defining visual communication as 'an important and largely ignored platform for a more complex approach to understanding meaning', noting that 'visual communication processes are different from language based communication processes because of the way observation impacts upon thinking'. Her proposed explanation for the interpretation of symbolic signs not based in language 'sees visual communication as grounded in perception, extended internally through cognition and language, and modified externally through social and cultural frames'. Exactly the same might be said of olfactory communication, and thus this excellent theoretical model will serve to facilitate discussion of the communication process implicit in the application of perfume to the body. Like Moriarty's visual symbols, smells in general are grounded in perception, interpreted socioculturally, and their perceived meanings shared within a given society through cognition and language, resulting in a collective perception and serving as conformity enforcers and both social unifiers and dividers.

Importantly, however, Moriarty goes on to apply the linguistics-based concept of 'open and closed texts' to visuals, noting that 'a stop sign is always a stop sign, but a rose is not always a rose'. [518] This distinction is somewhat problematic where perfume is concerned, as perfume in general, a social signal given by means of the

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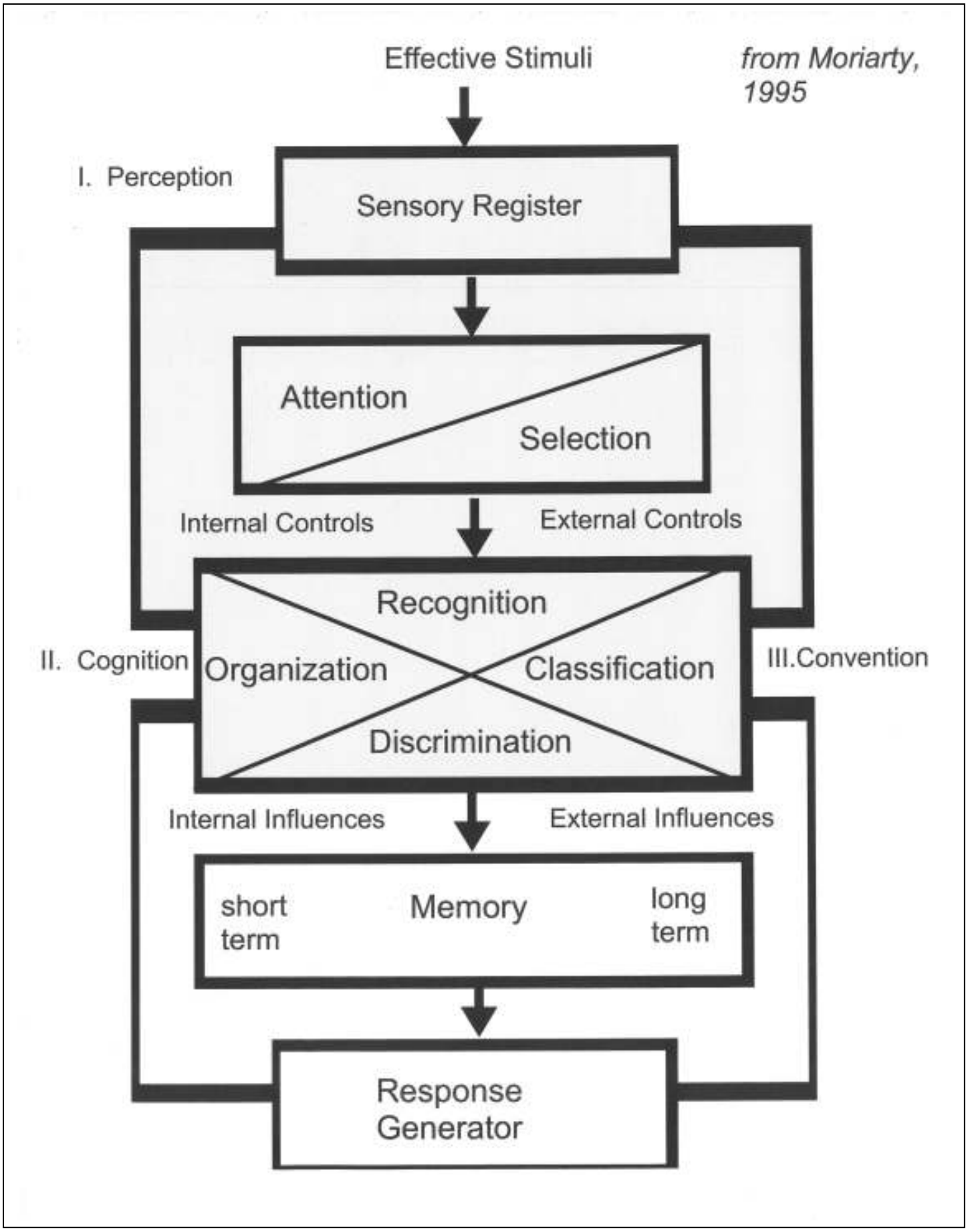
[517] Classen, Howes, and Synnott, 1994
[518] Moriarty, 1996, p.1-2.


Effective Stimuli
from Moriarty, 1995
I. Perception
Sensory Register
Attention
Selection
Internal Controls
External Controls
II. Cognition
Recognition
Organization
Classification
Discrimination
III.Convention
Internal Influences
External Influences
short term
Memory
long term
Response Generator

deliberate reodorization of the body, would be a 'closed text' in that it is immediately perceivable as perfume with all of the associated social contexts, and yet individual perfumes are symbolic signs firmly in the 'open text' category, as while they are intended by the reodorizer to impart specific information to those perceiving the smells involved, they are also inherently subject to the interpretation of the perceivers, 'because of the way observation impacts upon thinking'. Nevertheless, this particular model of communication theory extrapolates nicely from sights to smells, as the perceptual and interpretive processes are quite similar. 'Symbolic signs,' Moriarty points out, 'arbitrarily stand for something through a process of consensus as a word stands for a concept', and are 'linked by convention' with their objects. This is certainly true of perfumes from antiquity to the present day. Perfumes reflect on the person wearing them, for better or worse, or, in broader contexts, as Athenaeus shows us, on the person providing them to others. Moriarty's perception process model explores the relationships between perception, cognition, and convention – exactly what Engen, Wilson, Stevenson and other smell researchers have been striving to do with smells.[519] Once stimuli have made impact on the sensory register, according to Moriarty's model,

> The primary activities that comprise sensory registration are attention and selection. The second major step is cognition. The activities of recognition, organization, classification, and discrimination make the bridge from perception, or sensory registration, to cognition, or making sense of incoming data. The next major step in the process is encoding the information into memory, either short term or long term; and the last step is the generation of some sort of response, if response is needed… What the new version of this model adds is the idea of

[519] Moriarty, 1995, p.4. She notes that this model is based on one by Gerald Murch in 1973, but has been adapted 'to include the concept of context and convention.'

> cognition as the internal process and subject to internal influences, which is represented by the left side of the model; at the same time that convention – as expressed through the social and cultural environment – operates as an external influence on the cognitive process, which is represented in the model by the activities on the right side of the diagram. In other words, cognitive processing does not happen in a vacuum. It is encapsulated in an environment that includes both internal and external influences. [520]

As previously discussed, perception of an odor is thought to occur when the cilia, or olfactory hairs, bind specific receptor proteins stimulated by odourant molecules, causing the membrane channels in the hairs to depolarize and the resulting action potential to transit the axon of an olfactory receptor cell. This potential is then transmitted through the cribriform plate to the olfactory bulb, where one of two sets of cells within a few glomeruli carry the information to the brain. Unlike visual stimuli, olfactory stimuli are perceived within the immediate environment regardless of where the perceiver happens to be standing or looking, and in spite of the ubiquitous suggestions that the human sense of smell is poor and lacks significance in modern daily life even to the point of being vestigial, Trygg Engen reports that the human nose can 'detect one small drop of perfume diffused throughout a whole house.' Engen also notes that 'An average person is good at detecting odors when compared with so-called physical sensors such as a smoke detector', and that the same average person 'can detect the skunk odor of ethyl mercaptan if only .5 ml are dispersed in 10,000 liters of air'.[521] Olfactory stimuli are thus more pervasive than visual stimuli; smells can be difficult to ignore. An ambient scent is thus far less likely to be 'ineffective' than a sign which might be overlooked.

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[520] Moriarty, p.4
[521] Engen, 1982, 3-4.

Using Moriarty's model, once a given odorant has been perceived 'effectively', it is 'registered' according to 'attention' and 'selection'. The two important factors here, according to Moriarty, are 'personal observation and individual experience', both obviously subjective.[522] 'Attention' in this case, described by Moriarty as an 'internal control', really involves noticing and paying attention to the smell; a person entering a coffee bar will notice and pay attention to all of the ambient smells in the room, whereas the staff surrounded by them all the time become attenuated, suffering 'odor fatigue', and may cease to notice the smell of coffee, sublimating this smell into the background of their environment in favor of less prevalent, more unusual smells. Having perceived the smells involved, our customer can then 'select' the smell of coffee over that of, say, baked goods; nevertheless, their interpretations of either of these smells might be quite different. Similarly, whereas any two average people might perceive a small quantity of perfume diffused throughout a house, their thoughts about and associations with that particular sensory stimulus may be quite different.

The next step in Moriarty's process is that of 'cognition', and with it, recognition, organization, classification, and discrimination. Taking our coffee bar example, this might go something like, 'I smell coffee. Several particular smells in this room smell like coffee, but that particular coffee smells like a dark roast, which smells more intense than a blond roast.' This example is oversimplified, in that our perceiver would also smell and cognitively process other smells in the room simultaneously, but this example outlines the overall pattern. Rather than process this series of cognitions consciously, however, it is quite probable that this and any other perceived smells will be interpreted by this individual without language or

[522] Moriarty, 4.

'conscious awareness of interpretive activity' – the signal can be 'immediately processed to some point of meaning without being translated into words'. Moriarty opines that 'Language is used for interpreting some kinds of information – particularly abstract and theoretical concepts – but a great deal of what we process visually is managed without stopping to find a word for it', and the same is true of the smells we perceive.[523] Following this cognitive process, memory plays a part in generating a response, and here overarching social conventions come into play. In a culture in which coffee is most commonly served for breakfast, this would be perceived as a breakfast smell; alternatively, if one were used to drinking coffee only after dessert, it would not. Either influence might well affect the customer's ultimate order ('I want coffee' as opposed to 'I'll just have juice') as might the short-term associations of someone with little exposure to coffee, who simply remembers that he or she did or didn't like it the last time, regardless of the full knowledge that everyone else in the coffee bar seems to like it. This dichotomy is more dramatic with perfume. Given the overwhelming choices between brands and products, exposure to unfamiliar perfumes is almost a given, and with no previous associations these smells might be simply categorized first as 'perfume' and then as being 'pleasant' or 'unpleasant', though the perceiver is aware of the smell as being distinctly a perfume smell, and probably has his or her own associations with perfume in general. The perception process is, of course, notably different when the perceiver does have specific associations with a particular scent, and the reactions to an identified scent would vary if the scent were associated with a lover, for example, or a cranky old aunt. Nevertheless, many people recognize certain high-profile branded perfumes, for example Chanel No. 5, or the ubiquitous Axe line of products inescapable on any

[523] Moriarty, 5.

train full of schoolboys, whether they themselves wear them or not, and those who do wear perfumes will immediately recognize their own signature scents. The same was true in the Classical and Hellenistic periods, when popular perfume blends such as 'μεγαλεῖον', a cinnamon-based perfume, and 'κύπρος', a perfume made by steeping cardamom and ginger-grass aspalathos in sweet wine, were in high demand.

'Because perception is active,' Moriarty writes, 'the individual selects the information and modifies it depending upon the individual's previous experiences... what we understand is moderated by what we know or have experienced in the past and how we have made sense of these experiences and recorded them in memory.'[524] While this holds true with olfactory perception, much of the research on encoding smells into memory is largely inconclusive, and this process is poorly understood.

It is particularly notable that Aristotle, and therefore generations of his readers, recognized this process. In his article regarding 'incidental perception' in Aristotle, Joseph Owens writes that Aristotle's comments in De Sensu and De Memoria

> . . .might be taken to imply that [the common sensibles] are not actually *sensed* at the moment. Rather, they would be aspects that are merely recalled on account of former concomitance with what is now being sensed, as in the examples given by Aristotle of incidental perception at De Anima 418a20-24 and 425a23-b9. In *seeing* something sweet, sight is not affected by the flavor, an aspect that on former occasions had been directly attained by taste. Nor in seeing Cleon's son is the filial relationship an object of sight, but only of information previously had from others. . .As additions made to what is actually being sensed, these incidental aspects contribute to the total percept, with percept taken as the entire object of one's cognition at the time. . .'Perceived'

[524] Moriarty, 6.

> has to be taken as broader than 'sensed,' if his notion of incidental perception is to be grasped.

This is exactly what Moriarty is talking about in constructing her model of communication theory. In seeing a cup of coffee, sight is not affected by the smell, but the smell is immediately recalled to mind as part of the perception process regardless, just as the smell of coffee is immediately identified, and that identification enhanced by memories of the sight and taste of coffee. Other memories and associations which have nothing to do with the senses may be applied as well as the smell in particular is recognized and filtered through the cognitive process, and all of this may well occur without 'thinking' about it. Without mentioning Aristotle, Moriarty has outlined his commentary; with no access to modern theories of communication, Aristotle has put these 'modern' ideas forth in quite recognizable form. While the effective stimulus of a smell immediately calls to mind images and associations with that smell, however, it is impossible to try to recollect a smell without the use of visual imagery, as Dan Sperber points out:

> Certain types of information are easier to recognize than to recall in the absence of an external stimulus. . .Smells are an extreme case in this respect: one recognizes them, but one doesn't recall them. If I wish to recall the smell of a rose, it is in fact a visual image that I invoke; a bouquet of roses under my nose. . .and I will almost have the impression that I sense that scent – a misleading impression, however, which will fade as soon as, relinquishing the recollection of the object it emanated from, I try mentally to reconstitute the smell itself.[525]

Sperber nicely illustrates the ephemeral qualities of smells here, and the impossibility of total recall. To conjure a smell is to conjure a memory, which is indeed primarily visual. In the case of literary smells, however, the primary visual image associated

with the recall of a smell is provided for the reader; when Martial writes that Thais smells like 'pullus abortive nec cum putrescit in ovo', the mental image of a chicken rotting in an aborted egg is offered to the reader as the primary association with Thais.[526] If the reader has no association with rotten eggs per se, this image defaults to the word 'rotten', a symbol, as Moriarty puts it, 'grounded in perception, extended internally through cognition and language, and modified externally through social and cultural frames'. Simply reading the word 'rotten' is enough to wrinkle a reader's nose, in spite of the fact that putrescence is a smell that one can recognize but not recall.

A smell should be a symbol 'par excellence', Sperber writes, as an object which 'gives rise to thoughts of something other than itself'. He notes that:

> Certain smells, such as that of incense, are institutionalized and belong in this respect to what semiologists call a cultural code. But it is in the area of individual symbolism, in their ability to evoke recollections and sentiments that are withheld from social communication, that these olfactive impressions take on all their force.[527]

This really is a two-step process, as Moriarty's model clearly shows; smells, especially literary smells, are processed first in terms of convention and then in terms of personal memory. Incense is an excellent example; in her 2005 article entitled 'Why Does Incense Smell Religious?' Margaret Kenna notes that the scent of incense 'appears to act as a marker of transition between the profane and the sacred.'[528] To read the word 'incense' is to mentally place oneself within the domain of the divine, and yet 'olfactive education varies with cultures and individuals,' as Sperber puts it, and each reader will apply his or her own associations with incense

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[525] Sperber, 116-7.
[526] Martial, VI.XCIII.

to the word, which may or may not include passages in Homer or memories of modern church services.[529] Sperber's bouquet of roses is a visual image associated with a smell that he can share with his readers, a symbol leading to the fleeting impression that one can almost mentally conjure that scent. However, this phenomenon is removed one step further when the visual cue is impossible to interpret as a smell – for example, the word 'ambrosia'. Here is a smell that no one can describe other than to say that it is 'heavenly' – and yet, that is enough of a symbol to evoke a reaction in a reader or listener in spite of the lack of recall.

Multiple studies have been undertaken regarding capacity differences between short-term and long-term memory with regard to smells, and while it is apparent that some capacity differences do appear and that hit rates (the subjects' identification of particular odorants) fall as set rate (the number of different odorants presented in the study) increases, the overall findings throughout were simply that set size can affect memory odors at both short and long delays. No one, according to Wilson and Stevenson, 'has as yet directly contrasted short- and long-term tasks' where set similarity is concerned, although 'both appear subject to capacity limitations by virtue of set similarity. There is certainly nothing as yet to suggest that qualitative differences emerge from the manipulation of delay.'[530]

Interestingly, however, when an odorant is familiar, a subject's associations with it can be retained for a very long time, even 'for most of the participant's life'[531]. Kester, Degel, and Piper (2000) found that when subjects were exposed to different odorants, the same odorants, or no odor in two visually distinct rooms, then 'asked to

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[527] Sperber, 118.
[528] Kenna, 1.
[529] Sperber 119.
[530] Wilson and Stevenson cite Engen, Kuisma, and Eimas, 1973; Engen and Ross, 1973; Lawless and Cain, 1975; Jones et al., 1978; Walk and Johns, 1984; and White, 1998.

judge how well a set of odorants fitted pictures of a variety of different scenes... including the two target rooms', they found that

> When a participant had, for example, experienced lavender in one room and then lavender in the second room as well, there was evidence of interference, in that the most recent experience was judged a better fit than the earlier experience. However, this effect only occurred in participants who could not verbally label the two target odorants. Participants who could identify the odorants did not show any evidence of learning associations between the odors and the rooms, so no interference could be expected.[532]

Once an individual's association with a smell has been formed, therefore, this association can be shown to be relatively permanent, even in the presence of new associations with that particular smell (for example, one's mother's perfume will always be associated with one's mother, even when it is detected on someone else).[533] Moriarty notes that 'It takes repeated observations for us to make sense of the patterns around us and that is where perception interacts with cognition through the processes of recognition, organization, and discrimination', and this is an excellent description of how these smell associations are originally formed.[534] Repeated exposure to a particular odorant or combination of odorants paired with a specific person, place, or situation will be interpreted eventually as a pattern, until one calls up the other, consciously or subconsciously. The process of 'recognition, organization, and discrimination' is based on the smell-association, e.g.: 'That scent is jasmine; jasmine smells like my mother; that is not my mother.' Again, all of this cognition often takes place without conscious translation into words. 'You don't have

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[531] Wilson and Stevenson, 197.
[532] Wilson and Stevenson, 203.
[533] Zucco, 2003.
[534] Moriarty, 5.

to think the word /rose/ to interpret meaning from a picture or real flower,' Moriarty emphasizes. 'Our minds process information too fast to stop and put verbal labels on everything, so interpretation must be happening independent of language processing.'[535] Certainly this is also the case with the scent of a rose, which may call up not only an association with a real flower, but one involving a person or situation as well. 'Once an odor association is acquired,' Wilson and Stevenson conclude, 'it is apparently difficult to alter subsequently.'[536]

It is Moriarty's inclusion of 'convention' in her model which makes it a vast improvement over previous offerings, especially in terms of exploring smells in the ancient world. Of 'convention', Moriarty says,

> Meaning can be internalized, as is much of what we learn, through [olfactory] processing of reality-based information, but it can also be socially or culturally driven, which creates an externalized dimension in interpretation. In other words, much of what we know that is language or code based including most visual symbols, is derived from social learning. For example, most of us are taught that the little squiggles on a piece of paper are letters and they can be combined to make words and sentences; likewise the way we dress is derived from a socially determined code of fashion… This suggests a continuum of interpretation factors moving from internal to external. So not only do we understand things using both the [nose] and the brain, we understand things using internally derived information learned from experiences combined with externally based conventions.[537]

The importance of convention in the interpretation of smells can be seen most dramatically in odor studies involving children. 'If odour responses are innate,' Trygg Engen notes, 'children should respond to them as adults do… the evidence is very

[535] Moriarty, 6.
[536] Wilson and Stevenson, 201.

clear that they do not.'[538] Our interpretations of smells are learned, individually and in groups, passed down and socioculturally disseminated, as are odor associations with, for example, youth, beauty, civilization, and even the approval of the gods.

It has been shown that language follows sensory information when it comes to perception, but since smells themselves cannot be transferred through literature, all that remains to be studied where ancient smells are concerned is language. When we are reading about smells, our interpretive activity must by default begin with visual interpretation and only afterward be extrapolated where possible first into an author's interpretation and then into our own. In these cases, while the reader (and even the author) may have his or her own associations with the smells mentioned in print, the author in question is relying on the social conventions regarding those smells to make a point, and it is these sociocultural assumptions which must be inferred which provide the most information regarding how smells were perceived in the ancient world in general. As literature is inherited by subsequent generations, these 'smell conventions' are socially and culturally driven to the extent of becoming internalized. We have seen, for example, explicit examples of reodorizing culture in Homer in terms of both bathing and funerary rituals, and other passages in which these were left out; his audience is expected to fill in the blanks, and indeed, while a modern audience may not have specific 'smell memories' to enhance the descriptions of scent in the epics, our imaginations suffice. Even without cultural exposure to richly scented olive oil, we understand that this was a standard of civilized people and a hallmark of sophistication, and no matter how inaccurate our cognitive interpretation of the associated smells might be, we can nevertheless recognize and categorize

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[537] Moriarty, 6.
[538] Engyen, 1988, 80.

these smells as such. Eventually, an 'odor association' is formed visually, through nothing but the written (or spoken) word, even with perfumes such as 'ambrosia', which no human in the Classical world could describe any better than today's readers.

Throughout the literature of the Classical and Hellenistic periods, several patterns are very clear. Perfume is associated not only with youth and beauty, but social status in general. While certain ingredients, especially imported plant products such as frankincense, myrrh, cinnamon, and cassia, were always quite expensive and signaled personal wealth, the conquests of Alexander of Macedon propelled perfume into a new social awareness. Suddenly perfume didn't just smell of money, it smelled of power.

Plutarch writes that after Alexander's great victory in the mountains,

> . . .τὴν δὲ Δαρείου σκηνὴν ἐξῃρηκότας ἐκείνῳ, θεραπείας τε λαμπρᾶς καί παρασκευῆς καί χρημάτων πολλῶν γέμουσαν. . .ὡς δὲ εἶδε μὲν ὅλκια καί κρωσσοὺς καί πυέλους καί ἀλαβάστρους, πάντα χρυσοῦ, ἠσκημένα περιττῶς, ὠδώδει δὲ θεσπέσιον ὅιον ὑπὸ ἀρωμάτων καί μύρων ὁ οἶκος, ἐκ δὲ τούτου παρῆλθεν εἰς σκηνὴν ὕψει τε καί μεγέθει καί τῷ περὶ τὴν στρωμνὴν καί τραπέζας καί τὸ δεῖπνον αὐτοῦ κόσμῳ θαύματος ἀξίαν, διαβλέψας πρὸς τοὺς ἑταίρους, 'τοῦτο ἦν, ὡς ἔοικεν', ἔφη, 'τὸ βασιλεύειν.' [539]

> . . .his men had picked out for him the tent of Dareius, which was full to overflowing with gorgeous servitors and furniture, and many treasures. . .And when he saw the basins and pitchers and tubs and caskets, all of gold, and curiously wrought, while the apartment was marvelously fragrant with spices and unguents, and when he passed from this into a tent which was worthy of admiration for its size and height, and for the adornment of the couch and tables and banquet prepared for him, he

[539] Plutarch, *Alexander*, 20.6

> turned his eyes upon his companions and said: 'This, as it would seem, is to be a king.'

In fact, this description would fit right in with Homer's depiction of life on Olympus, and seeing such wealth in a commander's portable tent must have been something of a shock both to Alexander and his armies. They seem to have gotten used to it in short order, however, as Plutarch reports that Alexander later took his companions to task for becoming 'vulgar in their ways of living. . .when they took their exercise and their baths, more of them actually used myrrh than olive oil. . .'[540] It seems unlikely, however, that the other soldiers were using myrrh and Alexander was not.

By the time that the army arrived in Egypt, having travelled through the lands native to frankincense, myrrh, cinnamon, cassia, and nard and seeing firsthand how liberally the local populations used what they themselves knew only as precious trade commodities, Alexander seems to have become more than willing to live like a god-king himself. Ephippus, one of Alexander's officers, is quoted in Athenaeus as having written that at dinner-parties, Alexander often not only dressed up as gods, he 'sprinkled the floor with both excellent perfume and sweet-smelling wine', and this behavior seems to have set a trend for the monarchs who followed.[541] Whether or not, as Athenaeus suggests, these excesses made others uncomfortable, Alexander's successors quickly escalated this indulgence and over-consumption. Athenaeus quotes Callixeinus of Rhodes as describing a grand procession led by Ptolemy Philadelphus through Alexandria featuring carts carrying censers spewing incense, camels laden with raw resins, and countless jars of unguents.[542] Demetrius

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[540] Plutarch. 40.1
[541] Athenaeus, 12.537.
[542] Athenaeus 5.198.

Poliorcetes sent 'showers of perfume over the land' and exhausted the perfumes available to him in the course of trying to attract a certain flute-girl, and in the second century, Antiochus Epiphanes arranged to perfume daily the spectators at his games:

> . . .on the first five days, everyone who came into the gymnasia was anointed with a saffron perfume shed on him out of golden dishes. . .And in a similar manner in the next five days there was brought in an essence of fenugreek, and of amaracus, and of lilies, all differing in their scent.[543]

This sort of collective social perfuming was new behavior on the parts of these generals; examples are absent in Greek literature prior to Alexander, although they existed in the East. The general population seems far more interested in perfume products as well. Between the 4th and the 2nd centuries BC we see not only an increase in the numbers of baths and palestrae, but in the workshops and 'factories' which produced the scented oils considered necessary in these, and improved equipment specific to the manufacture of perfume appears toward the end of the Hellenistic period, at which point the population had even begun to *ingest* perfume. Jean-Pierre Brun calls this shift in the Hellenistic period 'the democratization of perfume use', at which point 'what soon distinguished the aristocracy from the common people was not the use of perfumes but the quality and relative rarity of perfumes used.'[544]

The *Periplus Erythraei* credits a Greek captain named Hypallos with the discovery that the Eastern monsoons reversed directions twice a year.[545] Hypallos

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[543] Athenaeus, 5.312
[544] Brun, 277.
[545] Strabo relates the claim of Posidonius that Eudoxus of Cyzicus made this voyage twice (2.3.4). If it were true, Eudoxus would have sailed around 116 BC, an earlier date than given for Hypallos, but regardless, the journey seems not to have been undertaken on any regular basis until after the Roman occupation of Egypt under Augustus, and then only slowly and with great trepidation. This gives credence to Hypallos' claim to being the first to deliberately use the monsoons.

learned, probably in the mid-1st century AD, that if these monsoon patterns were properly exploited, a ship could make a round-trip voyage from the Egyptian city of Berenice, on the coast of the Red Sea, to the Malabar Coast in India in less than a year by sailing directly across the Arabian Sea and back in concert with the winds. The southwest monsoon allowed passage from Arabia to India between October and April, and the northeast monsoon allowed a safe return between April and October. This discovery had an immediate and significant impact on trade. Sea traffic increased dramatically; Strabo reports that before the monsoon patterns were understood, fewer than 20 Mediterranean vessels went to India annually, but that afterward, 120 made the voyage.[546] This, in turn, increased overland trade heavily as well. Trade routes were established in both directions, the Indian Route across the Arabian Sea and the African Route which went around Cape Guardafui and down the east coast of Africa as far as Dar-es-Salaam.[547]

The increased supply of luxury goods from the East correlated to an increased supply of discretionary income among the Roman merchant class, some of whose assets were beginning to eclipse those of patricians. Limited supply might have kept foreign exotics like cinnamon, cassia, frankincense and myrrh out of any but aristocratic hands before, but now that there was plenty to go around and more Romans had money to buy them, consumption and extravagance increased at an alarming rate. Perhaps the combination of the sudden availability of vast and relatively liquid wealth and the focus of individuals redirected from the community at large to themselves and their dependants was the precursor for conspicuous consumption among the population, or perhaps they were simply emulating their

[546] *Geographies*, 2.118, 17.798.
[547] Grant, 2005, 20-23.

leaders, whose self-promotion exploited the traditional trappings of the Eastern kings and pharaohs. The repercussions of this influx of liquid assets may well mirror the shift in ancient Egyptian economics between the Old and Middle Kingdom periods; it certainly seems to have had the same effect where perfume is concerned.

Pliny, in attempting to outline the history of the social use of perfume, references Plutarch when he opines that:

> Unguentum Persarum gentis esse debet. Illi madent eo et accersita commendation inluvie natum virus extingunt. Primum, quod equidem inveniam, castris Darii regis expugnatis in reliquo eius apparatus Alexander cepit scrinium unguentorum. Postea voluptas eius a nostris quoque inter lautissima atque etiam honestissima vitae bona admissa est, honosque et ad defunctos pertinere coepit.[548]
>
> We ought, by good rights, to ascribe the first use of unguents to the Persians, for they quite soak themselves in it, and so, by an adventitious recommendation, counteract the bad odours which are produced by dirt. The first instance of the use of unguents that I have been able to meet with is that of the chest of perfumes which fell into the hands of Alexander, with the rest of the property of King Darius, at the taking of his camp. Since those times this luxury has been adopted by our own countrymen as well, among the most prized and, indeed, the most elegant of all the enjoyments of life, and has begun even to be admitted in the list of honours paid to the dead.

The extent to which perfumes have been adopted by his countrymen includes, to Pliny's horror, use of perfumes even among the army; he writes sarcastically that:

> Maxime tamen mirum est hanc gratiam penetrasse et in castra; aquilae certe ac signa, puiveruienta illa et cuspidibus horrida, unguuntur festis diebus, utinamque dicere possemus quis primus instituisset. Ita est minirum: hac mercede corruptae orbem terrarium devicere aquilae. Ista

[548] Pliny the Elder, *Hist. Nat*. 13.1, John Bostock and H.T. Riley, trans.

> patrocinia quaerimus vitiis, ut per hoc ius sub casside unguenta sumantur.[549]
>
> But the most wonderful thing of all is, that this kind of luxurious gratification should have made its way into the camp even: at all events, the eagles and the standards, dusty as they are, and bristling with their sharpened points, are anointed on festive days. I only wish it could, by any possibility, be stated who it was that first taught us this practice. It was, no doubt, under the corrupting influence of such temptations as these, that our eagles achieved the conquest of the world: thus do we seek to obtain their patronage and sanction for our vices, and make them our precedent for using unguents even beneath the casque.

Pliny felt strongly on the subject, complaining that the gods themselves were no less propitious when they received sacrifices of salted cakes instead of incense. It bothered him that incense was being burnt for human corpses, and he reports that '[Arabia] does not produce in a whole year so large a quantity of perfumes as was burnt by the Emperor Nero at the funeral obsequies of his wife Poppaea.'

Pliny leaves us an extensive list of perfumes which have been fashionable among the Romans over time, noting the shifting trends in popularity of both individual scents and the locations in which these scents were produced:

> Unguentis cognomina dedere aliis patriae, aliis suci, aliis arbores, aliis causae, primumque id scire convenit, mutatam auctoritatem et saepius transisse gloriam. Laudatissimum fuit antiquitus in delo insula, postea mendesium. Nec mixtura et compositione tantum hoc accidit, sed iidemsuci varie alibi atque alibi praevaluere aut degeravere. Irinium corinthi diu maxime placuit, postea cyzici, simili modo rhodinum phaseli, quam gloriam abetulere neapolis, capua, praeneste. Crocinum in solis ciliciae diu maxime laudatum est, mox rhodi, oenanthinum in cypro, post adramytteo, amaracinum in coo, postea eodem loco praelatum est

[549] Pliny, 13.4.

melinum, cyprinum in cypro, deinde in aegypto, ubi medesium et metopium subito gratius factum est. Mox haec abstulit phoenice et cyprinid laudem aegypto reliquit. Panathenaicum suum athenae perseveranter optinuere. Fuerat et pardalium in tarso, cuius etiam conpositio et mixtura oblitterata est. Narcissinum quoque ex flore narcisso desiit conponi.

The names of unguents are due, some of them, to the original place of their composition, others, again, to the extracts which form their bases, others to the trees from which they are derived, and others to the peculiar circumstance under which they were first made; and it is well, first of all, to know that in this respect the fashion has often changed, and that the high repute of peculiar kinds has been but transitory. In ancient times, the perfumes the most esteemed of all were those of the island of Delos, and at a later period those of Mendes. This degree of esteem is founded not only on the mode of mixing them and the relative proportions, but according to the degree of favour or disfavor in which the various places which produce the ingredients are held, and the comparative excellence or degeneracy of the ingredients themselves. The perfume of iris from Corinth was long held in the highest esteem, until that of Cyzicus came into fashion. It was the same, too, with the perfume of roses from Phaselis, the repute of which was afterwards eclipsed by those of Neapolis, Capua, and Praeneste. Oil of saffron from Soli in Cilicia was for a long time held in repute beyond any other, and then that from Rhodes, after which perfume of oenanthe from Cyprus came into fashion, and then that of Egypt was preferred. At a later period that of Adramytteum came into vogue, and then was supplanted by unguent of marjoram from Cos, which in its turn was superseded by quince blossom unguent from the same place. As to perfume of cypress, that from the island of Cyprus was at fist preferred, and then that of Egypt, when all of a sudden the unguents of Mendes and Metopium rose into esteem. In later times Phoenicia eclipsed Egypt in the manufacture of these last two, but left to that country the

> repute of producing the best unguent of Cyprus. Athens has perseveringly maintained the repute of her 'panathenaicon'. There was formerly a famous unguent known as 'pardalium' made at Tarsus; at the present day its very composition and the mode of mixing it are quite unknown there. They have left off, too, making unguent of narcissus from the flowers of that plant.

Similarly, Athenaeus quotes a list from a lost work entitled *On Perfumes* by 'Apollonius, of the school of Herophilus' in which Apollonius discusses which locations produce the best perfumes:

> ἶρις μὲν ἐν Ἠλιδι χρηστοτάτη καὶ ἐν Κυζίκῳ. ῥόδινον δὲ κράτιστον ἐν Φασήλιδι, καὶ τὸ ἐκ Νέας δὲ πόλεως καὶ Καπύης. κρόκινον δ' ἐν Σόλοις τοῖς Κιλικίοις καὶ ἐν Ῥόδῳ. νάρδινον δ τὸ ἐν Τάρσῳ. οἰνάνθη δὲ ἡ ἀρίστη τὸ παρ' οὐδενί πω γεγονὸς λιβανώτινον μύρον.[550]
>
> The best orris-root is that grown in Elis and in Cyzicus; of the rose, the best perfume is obtained in Phaselis, also from Naples and Capua; of the saffron crocus, in the Cilician Soli and Rhodes; spikenard, in Tarsus; the best drop-wort is from Cyprus and what had never been made by anyone before, the perfume from frankincense.

We can see here that use of perfume in Roman culture spoke not only of wealth (Athenaeus reports that a half-pint of perfume sold for five to ten minas in Athens), but of social status and being fashion-forward.[551] Certainly the use of perfume was widespread and, just as in Greece from the Bronze Age, reodorization signified civilized sophistication, but now there is an emphasis on *which* perfumes were employed for this purpose. This added layer of social convention puts more importance on the recognition and cognition processes described in Moriarty's model as perfumed individuals were categorized with respect to perception of their choice of

[550] Athenaeus, Book VII, XVe 81-90. His last comment is in error, as perfume derived from frankincense was produced in Ancient Egypt.
[551] Athenaeus, Book VII, xv.499-502.

scent. Interestingly, at this point in time the ‘opposite’ of perfume is no longer *decay* as it was earlier; now perfume’s mirror image becomes *stink*, as it is today.

When Good Smells Go Bad

In Rome, for hundreds of years after the Hellenistic period, smells generally perceived to be 'good' consistently elicit associations with power, wealth, and desirability throughout the primary sources, and conversely, bad smells imply not only low status, poverty, disease or lack of hygiene, but also the social stigmata which accompany these. Martial, however, often associates smells which are usually perceived within this culture as being 'good' with a *lack* of desirability, promoting deodorization while denigrating reodorization, and in most cases, maligning perfume in general. 'It would appear from his own words,' remarks John Spaeth Jr., 'that the great Roman epigrammatist had an extremely sensitive nose, in spite of existing sanitary conditions that must have demanded a certain deadening of the olfactory sense to insure peace of mind.'[552]

The transition between reservation of aromatics and perfumes for the gods and personal use by the elite in Rome closely mirrors what took place in Ancient Egypt, but happened even more abruptly. Historian Jack Turner reports that

> So potent was perfume's reputation that in republican times its use in a secular context rankled of sacrilege. When Julius Caesar entered Rome in triumphal procession in 46 BC, he was flanked by attendants bearing censers of sweet-smelling perfumes. However well the gesture went over with the masses, among the senatorial elite Caesar's trespass on a custom previously reserved for the gods was viewed with outrage, as though he were some oriental monarch posturing as the son of Heaven.[553]

After sea trade opened up due to newfound understanding of the monsoon patterns, however, it was a short journey from the gods to the dead to the living. The second

[552] John W. Spaeth Jr., 1922, 46.
[553] Turner, 2004, 230.

century A.D. marked the height of the trade in frankincense and other exotic resins, and personal scents seem quickly to have become a veritable necessity for proving one's sophistication and social status. Not everyone felt that this was an improvement in the quality of Roman life; Polybius wrote that

> It is evident that, by the lengthened continuance of great wealth within [the Republic], the manner of life of its citizens will become more extravagant. . .And as this state of things goes on more and more, the desire of office and the shame of losing reputation, as well as the ostentation and extravagance of living, will prove the beginning of a deterioration.[554]

Just as hardliners Cato the Elder and Cicero had in their respective days, second century historians bemoaned '*luxuria atque avaritia*', railing against what they perceived as a decline in moral standards and a trend toward soft living unbecoming to Romans.

Whether or not it marked a deterioration, this extravagance of living only increased where perfume was concerned, and Martial, a satirist who frequently exaggerated greatly in order to make a point, nevertheless provides a great deal of insight into the social prevalence of perfumes by his contemporaries. Throughout his epigrams, Martial employs bad smells as a means of casting certain specific individuals in a negative light. While he cannot be taken entirely literally, his epigrams would not have been amusing to the public if they did not reflect social customs his readers recognized, and these epigrams therefore provide a glimpse into both the common use of perfumes among the Roman elite and the tendency of some Romans to douse themselves, whether to show off or to hide social failings. Martial thus makes use of smells socially perceived as *both* 'bad' and 'good' to make fun of

[554] Polybius 6.57.

social behaviors which must have been common enough to entertain his readers. In I.XXVIII, for example, the poet writes of Acerra:

> Hesterno fetere mero qui credit Acerram,
> Fallitur: in lucem semper Acerra bibit.[555]
>
> Anyone who thinks that Acerra stinks of yesterday's wine
> Is mistaken; Acerra always drinks till sunrise.

This verse, while very short, nevertheless makes its point; by simply describing a single smell, Martial imparts the information that Acerra is a drunkard who reeks of wine consumed in the morning. Rather than accusing him of appearing disheveled, or of specifically aberrant behavior, Acerra's most abhorrent quality is neatly summed up in the fact that he stinks not of yesterday's wine, but today's. A similar if more elaborate sentiment is directed at Fescennia in I.LXXXVII:

> Ne gravis hesterno fragres, Fescennia, vino,
> Pastillos Cosmi luxuriosa voras.
> Ista linunt dentes iantacula, sed nihil obstant,
> Extremo ructus cum redit a barathro.
> Quid quod olet gravius mixtum diapasmate virus
> Atque duplex animae longius exit odor?
> Notas ergo nimis fraudes deprensaque furta
> Iam tollas et sis ebria simpliciter.
>
> Fescennia, not wishing to reek of yesterday's wine, you greedily devour Cosmus' pastilles. Such breakfasts smear the teeth, but they are no obstacle when a belch comes back from the depth of the abyss. Moreover, the evil element smells worse when mixed with scented powder and the doubled odor of the breath carries further. So away now with your too familiar tricks and detected cheats, and simply inebriate yourself.

[555] Epigrams translated by D. R. Shackleton Bailey with minor amendments.

Here, not only is Fescennia an alcoholic (although apparently not one who drinks in the morning), she compounds this flaw by trying to hide it with perfumed pastilles, which stain her teeth but have no effect on her wine-induced eructations. Clearly she is undesirable company indeed; the reader can easily imagine her inebriation, foul breath, and ugly smile, and cognitively apply his own associations with these characteristics as well as the social conventions they violate. It is the combination of her fetid emanations with the sweet fragrance of perfume, however, which remains the most prominent of Martial's accusations, and the reader is expected to be able to imagine exactly how badly this reeks. The social conventions obviously in play here are that drunkenness is bad, that the perpetually intoxicated stink, and that attempts to reodorize in order to conceal this odor (and thus the drunkenness) are unsuccessful and indeed, as was proposed in the *Problemata*, actually compound the problem, conventions still shared throughout Western society.

Certainly one of the most dramatic examples of satirizing an individual by maligning the way he smells occurs in Epigram IV.IV:

> Quod siccae redolet palus lacunae,
> Crudarum nebulae quod Albularum,
> Piscinae vetus aura quod marinae,
> Quod pressa piger hircus in capella,
> Lassi vardaicus quod evocati,
> Quod bis murice vellus inquinatum,
> Quod ieiunia sabbatariarum,
> Maestorum quod anhelitus reorum,
> Quod spurcae moriens lucerna Ledae,
> Quod ceromata faece de Sabina,
> Quod volpis fuga, viperae cubile,
> Mallem quam quod oles olere, Bassa.

> The odor given off by a marsh from its dry bed, or the vapors of raw Albulae, or the stale reek of a salt-water fishpond, or a sluggish billy goat on top of his nanny, or the boot of a weary veteran, or a fleece twice stained with purple dye, or the breath of a Sabbath fasting Jewess, or the sighs of unhappy men on trial, or the sputtering lamp of dirty Leda, or wrestlers' mud from Sabine dregs, or a fox in flight, or a viper's lair – I would sooner smell of any of these than smell you, Bassa.

This is no doubt one of the most eloquent and descriptive versions of 'You stink!' ever written, but Martial gives us many variations on the theme. In VI.XCIII, the complaint against Fescennia's failed reodorisation and litany of odiferous comparisons against Bassa are joined to describe Thais:

> Tam male Thais olet, quam non fullonis avari
> Testa vetus, media sed modo fracta via,
> Non ab amore recens hircus, non ora leonis,
> Non detracta cani transtiberina cutis,
> Pullus abortive nec cum putrescit in ovo,
> Amphora corrupto nec vitiata garo.
> Virus ut hoc alio fallax permutet odore,
> Deposita quotiens balnea veste petit,
> Psilothro viret aut acida latet oblita creta
> Aut tegitur pingui terque quaterque faba.
> Cum bene se tutam per frauds mille putavit,
> Omnia cum fecit, Thaida Thais olet.
>
> Thais smells worse than the veteran crock of a stingy fuller, recently broken in the middle of the road, or a billy goat fresh from his amours, or a lion's mouth, of a hide from beyond Tiber torn from a dog, or a chicken rotting in an aborted egg, or a jar polluted with putrid garum. In order to exchange this stench for a different odor, whenever she takes off her clothes to get into the bath, the crafty lady is green with depilatory or lurks under a lining of chalk and vinegar, or is coated with

> three or four layers of thick bean meal. A thousand tricks, and she thinks she's safe. But when all's done, Thais smells of Thais.

Like Bassa, Thais smells very, very bad. Like Fescennia, Thais is aware of this, has taken pains to mask her body odor, and thinks she has succeeded. Again, we are treated to a list of the worst smells the poet can think of, and his choices still wrinkle the modern nose. Interestingly, however, we can see in these verses that both Fescennia and Thais themselves understand the negative connotations of unpleasant body odor in their society, recognize the negative perceptions of others where they are concerned, and are worried enough about being perceived to stink to attempt to compensate with perfumes and unguents, which smell good, but not good enough. Neither is unaware of nor considers herself exempt from social conventions. There is no implication that either Acerra or Bassa acknowledge or do anything to cover the smells they emanate in spite of the fact that use of perfume was the social norm for Martial's peers at the time, and one is left to wonder whether or not they are aware of their respective odors, and whether or not this oversight on their parts is due to different social standards for men and women, or the fact that women are more perceptive when it comes to odors, or both.

The association of a person with a stench is an immediate social divider between 'us' and 'them':

> From the sociological standpoint, the 'skunk' we avoid may be an individual, a group, or even a setting, that is, a physical environment. If we encounter an individual 'skunk' (e.g. a person with bad breath), it is commonly accepted that we may step back from the person so as to prevent further violation of our sense of smell. Usually we mentally label such a person, and we may extend our discreditation by informing others that the person has a 'problem'. Strangely enough, these persons are seldom directly confronted about their 'problem' because of

> the embarrassment it would cause the dishonored self to embarrass the dishonoring one. Nonetheless, it is quite clear that if sensorial involvement were disrupted repeatedly, then social involvement would become sharply jeopardized – particularly in modern societies in which there appears to be a growing consciousness of odors.[556]

All of these divisions can be seen in Martial's work. In addition to singling out individuals for their personal odors, he is picking on groups such as drunks, fasting Jews, and women who try in vain to mask their body odors, and similarly, he evokes distasteful physical environments such as swamps, vipers' nests, and the tanning industry on the other side of the bridge across the Tiber, which was environmentally polluting enough to be removed from polite society and universally understood to be an extremely undesirable location due to the smell. Juvenal also references this in his 14th Satire at 201-205:

> nec te fastidia mercis
> ullius subeant ablegendae Tiberim ultra,
> neu credas ponendum aliquid discriminis inter
> unguentae et corium: lucri bonus est odor ex re qualibet.
>
> And do not feel disgust at any merchandise that must be banished to the other side of the Tiber; do not believe that any distinction ought to be made between perfumes and hides: the smell of profit is good, from any source at all.[557]

Both authors in these examples are playing on the universal association of this area with its miasma, and Martial's use of this social convention serves to make Thais even less attractive in VI.XCIII, just as Fescennia's malodorous breath marks her as 'the skunk we avoid'; it is these personal attacks which distinguish Martial's work. In the case of Fescennia's breath in particular, Benjamin Stevens notes that 'attribution

[556] Largey and Watson, 1972, 32.
[557] Robert Colton, trans.

of bad or good breath are common tropes in Latin literature. . .despite the connection between breath and the body, reports of good and bad breath are not primarily functions of physiology but are culturally encoded expressions of judgement on social position and socially relevant behavior.' Stevens notes that 'social cognition is central to Roman thought', and indeed it is not only Fescennia's breath which Martial judges in this epigram, but her drunkenness and ill-fated attempts to hide it.[558]

In modern times, 'You smell!' or 'You stink!' is a childish insult most often heard on a grade-school playground, but Martial takes his adult version of this taunt over the top in his diatribes, particularly those against Bassa and Thais. Though no olfactory stimuli are available through the medium of literature, the poet very successfully conveys sensory information through language, and while the reader's interpretive activity is limited at first to the visual, associations with the smells catalogued coupled with imagination serve quite well to transmit the idea that Bassa smells very bad indeed. Interestingly, Martial expects his readers to be able to conjure the odors of alcoholic sweat, halitosis, stagnant water, salt-water fish ponds, rutting goats, sweaty shoes, Tyrian dye, ketotic breath, unwashed criminals, a tallow lamp, the decaying matter at the bottom of a swamp, a fleeing fox, a viper's nest, stale urine, a lion's mouth, a tanned hide, a rotten egg, and oily fish paste, and to agree that all of these smells are particularly undesirable, which no doubt they did. While the modern reader is likely unfamiliar with the majority of these smells, we can still look at this list in the present and understand that these are smells both prevalent and perceived with disgust in Martial's world – and a few of them are common enough now to serve to impart the same conclusions regarding Bassa's lack of hygiene and Thais' failed efforts to reodorize.

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[558] Stevens, 166, 162.

It is well documented that women are more reactive to odors than men, although there is some debate as to whether this is because they have a keener sense of smell, possibly due to larger posterior nares, or simply because they pay more attention and retain sense impressions better over time. Donald Wilson and Richard Stevenson write that:

> A consistent finding in the literature has been the advantage that female participants have in naming odors when compared with men (e.g. Gilbert and Wysocki 1987; Cain 1982; Engen 1987). Several possibilities emerge as to the cause of this difference, the most basic being that it stems either from an inherent biological difference between men and women, or experiential differences, namely in the greater attention given to odorants by women than men (Herz and Cahill 1997). Dempsey and Stevenson (2002) explored which of these two alternatives might be correct by having male and female participants learn associations between unfamiliar odorants and novel Swahili names, thus ruling out any a priori benefits women might have in identifying these particular stimuli. Both men and women acquired the associations equally well and at the same rate, suggesting no differences in attention or motivation by gender. However, when they were retested one week later, male participants were poorer at retrieving the odor names relative to female participants. A second experiment replicated this finding and eliminated the possibility that it might reflect differences in sensitivity to interference (i.e. men being more sensitive). The results suggest a biological origin for differences in naming ability, a similar confusion to that reached by a recent review on this topic (Brand and Milot 2002).[559]

Whatever the reason, there is a strong argument to be made that Fescennia and Thais are more aware of and more concerned with their body odors than are Acerra and Bassa. Further, in a study conducted by J. Byrne-Quinn, a survey of 800

American women revealed that of the 'personal attributes they noticed about people on first meeting',

> 43 per cent indicated 'smell; slightly more indicated 'face', 'eyes' and 'voice', but fewer talked of 'hair', 'dress', 'skin' and 'hands'. So it is hardly surprising that motivational research reveals that women are very concerned with the messages they send out about themselves when they use perfume. . .in a social setting a woman may be setting out to reinforce her position in her reference group; she may be seeking maintenance of her position among peers; or she may be striving for acceptance in a group she aspires to.[560]

We can see this clearly in the case of Martial's Philaenis:

> Tinctus muricae vestibus quod omni
> et nocte utitur et die Philaenis,
> non est ambitiosa nec superba:
> delectur odore, non colore.[561]
>
> Philaenis wears purple-dyed garments every night and day, but she is not ostentatious or haughty; she likes the odor, not the color.

In this short verse, Martial makes it plain not only that Philaenis *is* ostentatious and haughty, but that she smells like dead shellfish, the source of the extremely expensive purple dye imported from Phoenicia.[562] Given that Philaenis is wearing purple, it stands to reason that she is also wearing expensive, exotic perfumes, but Martial does not mention this, or comment on the combination of odors. Whether or not Philaenis thinks she smells good, which it can be assumed that she does, it is

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[559] Wilson and Stevenson, 205.
[560] Byrne-Quinn, 205-6.
[561] Epigrams, IX.LXII.
[562] The same smell that he prefers to Bassa in IV.IV ('Quod bis murice vellus inquinatum') and by which he identifies the garments of Licinianus in I.XLIX ('. . .et nusquam toga oliaeque vestes murice'). In X.XLI, Martial writes that buying Proculeia's husband a 'Megalesian purple robe' would have cost her 100,000 sesterces.

obvious in this epigram that she thinks she is making a positive social impression, and she certainly seems to be 'seeking maintenance of her position among peers' or 'striving for acceptance in the group she aspires to', as Byrne-Quinn suggests is common to women. What is so clever is the pairing of the visual signal she offers the public, meant to denote wealth and status, with the very negative olfactory signal which detracts from her image.

Purple dye production was associated with a 'notorious stench' in antiquity, according to Robert Stieglitz, and Martial is trading on this, associating the colour not only with the wealth and status it conferred, but with hauteur, ostentation, and most importantly, a smell so foul that Strabo calls the wealthy dye-producing city of Tyre 'unpleasant for residence'.[563] The dye, which was literally worth its weight in gold by the time of Diocletian, was the product of 'a liquid, obtained directly from the hypobranchial glands of Mediterranean mollusks.'[564] The odor of the secretion is 'not pleasant', writes Lloyd Jensen, 'and a chemist accustomed to "laboratory effluvia" might mutter: "A mixture of a whiff of garlic breath and dilute bromine gas."'[565] Additionally, each mollusk 'produced only a few drops of the precious secretion', which meant that literally thousands of shellfish were required in order to 'produce Tyrian purple in commercial quantities.'[566] 'Only the live snail provided good dye', according to Jensen, and 'the cast off portions decayed.' Since these cast-off portions formed midden heaps 'representing astrophysical numbers of shells', the stench of the dyeworks must have been noxious indeed.[567] However, neither Stieglitz nor Jensen suggest that the final dyed product smelled bad, and it probably

[563] Stieglitz, 46; Strabo *Geography* XVI. 2.23.
[564] Stieglitz, 46.
[565] Jensen, 108.
[566] Stieglitz, 46.
[567] Jensen 106-7.

didn't, just as leather has no unpleasant odor in spite of the fact that tanneries reek. Martial is simply associating Philaenis with the smell of the dyeworks in order to comment on her personality.

While his work relies on contemporary social conventions to be impactive, Martial often twists these conventions by presenting a derogatory association with something ordinarily perceived as being good. In epigram XX.XXXIX, he is attempting to associate Tyrian dye, which was always associated with wealth and frequently associated with power, with an obnoxious odor in order to say something derogatory about Philaenis. To look at this through the lens of Moriarty's model, the effective stimuli of the image of the colour purple would normally be recognized and classified as having to do with elite status by convention, just as the mention of the dyeworks would normally be recognized and classified as having an overpowering stench. Martial is attempting to re-classify this image of the colour purple as it were, and to associate it with a pretentious and vulgar display as socially unwelcome as the stench of the dyeworks.

Interestingly, Martial mentions the colour purple in several other epigrams; in his verses on Crispinus' Tyrian cloak in VIII.XLVIII he remarks, 'Non quicumque capit saturates murice vestes / nec nisi seliciis convenit iste color'. Certainly Martial knew influential people with 'twice-dipped' garments and by his own admission had at least one friend with a cloak 'saturated in purple dye'. In XI.XXXIX he even implies that he has worn a Tyrian robe himself ('si Tyrios sumpsi cultus unxive capillos, / exclamas "numquam fecerat ista pater"'). In none of these cases does he mention the smell of the clothing described. Did Philaenis really smell so bad? Probably not.

The same is true of Martial's other victims. In Carmina 69 and 71, Catullus compares Caelius Rufus to a rutting goat, the only smell which appears in both of Martial's epigrams regarding Bassa and Thais. In 69, he writes:

> Laedit te quaedam mala fabula, qua tibi fertur
> valle sub alarum trux habitare caper.
> Hunc metuunt omnes. Neque mirum: nam mala valde est
> bestia, nec quicum bella puella cubet.
> Quare aut crudelem nasorum interfice pestem,
> Aut admirari desine cur fugiunt.
>
> A certain ill tale injures you, that you bear housed in the valley of your armpits a grim goat. This everyone fears. It's no wonder: for it is an exceeding ill beast, with whom no fair girl will sleep. Therefore, either murder that cruel plague of their noses, or cease to marvel, 'why do they fly?'

This comparison ceases to be a 'mala fabula' in 71, a self-addressed poem in which Rufus and Catullus' former mistress, Clodia Metelli, are lampooned:

> Si cui iure bono sacer alarum obstitit hircus
> aut si quem merito tarda podagra secat,
> aemulus iste tuus, qui vestrum exercet amorem,
> mirifice est a te nactus utrumque malum.
> Nam quotiens futuit, totiens ulciscitur ambos,
> illam affligit odore, ipse perit podagra.
>
> If ever the blessed goat of the armpits justly beset anyone,
> or if ever crippling gout deservedly scourged anyone,
> that rival of yours, who is now working your mutual lover,
> has miraculously caught both diseases.
> For whenever he beds her, he punishes them both:

> he afflicts her with his stench, while he himself perishes of gout.[568]

Of the association of Caelius Rufus with pervasive body odor, John Nicholson writes,

> Still, we must account for the inherent implausibility of the accusation that Caelius Rufus, the dashing and popular young playboy of Roman history, drove off women by his negligent hygiene. This objection, which has often been raised against the identification, is actually quite easily answered: an accusation does not have to be literally true in order to function effectively as an invective weapon. In fact, the insult value of such accusations would be lost if they were true. The ridicule lies precisely in libeling an urbane man such as Caelius with so gross a social offense.

Nicholson goes on to suggest that 'both the goat and the gout in poem 71 are symbols of bad reputation and infidelity', and that 'the allegation of body odor operates on two levels':

> On the literal surface level, these poems are merely rowdy lampoons and coarse invective in the spirit of Aristophanes. But Catullus also has a deeper intent. It is not that Caelius Rufus literally smelled like a goat, but that, having treacherously stolen his friend's treasured mistress (*eripuisti omnia nostra bona*, 77.4), he has become *morally* odious. The real stench is not physical, but ethical. And what better metaphor could there be than a goat, a beast proverbial not only for its odor but for its lechery. . .The goat is also appropriate as a symbol of rustic boorishness; as an epithet it implies that Caelius is a gauche lout who lacked the savoir fair so prized by Catullus and his sophisticated circle. . .Throughout the collection we find invective poems aimed at men guilty of stuprum in all its forms, but particularly against Lesbia's (Clodia's)

[568] John Nicholson, trans. Although the victims are unnamed, Nicholson makes an excellent argument that these are in fact Rufus and Clodia, and that this verse continues the story of Clodia's faithless switch from Catullus and Rufus begun in 69.

> other lovers. Against these men Catullus frequently lashes out with redolent obscenities suggesting rank, evil smell.[569]

Nicholson attributes an accusation of 'disgusting odors, especially foul mouths', to 'moral corruption and the resulting gossip and bad reputations', and specifically 'the stench of the goat' to 'the ethical corruption of the faithless lovers', and suggests that the Roman audience would immediately understand these insinuations whether or not the individual ridiculed reeked as badly as a verse might claim. All of the individuals mocked in verses such as these no doubt wore perfume, as that was the social convention, yet we are led to believe that in these particular cases it did not help. Largey and Watson reiterate that 'many alleged odors of groups are related with stereotyped notions about their moral laxity' and opine that odours 'whether real or alleged are often used as a basis for conferring a moral identity upon an individual or a group. And certainly such moral imputations bear upon the processes of human interaction.'[570]

It is interesting that although we can surmise that Acerra and Fescennia are drunkards, Martial says nothing specific of the actual character of his targets either, most notably Bassa and Thais. However, if Nicholson's analysis is correct, which it seems very likely to be, it stands to reason that Martial assumes that socially negative qualities in general will be associated with his allegedly foul-smelling victims as a group. Here we can see how the effective visual perception of Moriarty's model translates to olfactory imagery which is recognized and classified according to the external influences of convention, generating a response in which cognition causes an association between smells and character traits. This would serve to make Thais, whose stench lingers in spite of baths and deodorizing agents, a particularly odious

[569] Nicholson, 253-4.

and possibly inethical person whose association with the tanning trade may also have been meant to describe her as being without class, and perhaps Fescennia, with her perpetually foul breath, was intended to be seen as a gossip or slanderer.

In spite of his disgust regarding the respective odours of Thais and Fescennia, Martial seems to be against perfume in general, preferring no smell at all, as difficult as this must have been to accomplish. In VI.LV, he tells Coracinus:

> Quod semper casiaque cinnamoque
> et nido niger alitis superbae
> fragras plumbea Nicerotiana,
> rides nos, Coracine, nil olentis:
> malo quam bene olere nil olere.
>
> Always smelling of Niceros' leaden boxes and blackened by cassia and cinnamon and the nest of the haughty bird, you laugh at us, Coracinus, who smell of nothing. I would rather smell of nothing than smell good.[571]

In this and several more epigrams featuring perfume, Martial acknowledges the social convention that perfumes smell good, then refutes it. He implies here that Coracinus is as haughty as he smells, that the expensive unguents he buys stain his skin, and that he might be a better person if he smelled of nothing at all, employing irony when he contrasts this with smelling 'good'. Notably, however, this is one of a small handful of epigrams in which Martial names a perfumer, and in none of these instances is the perfumer the target of Martial's derogatory remarks. Additionally, it is also worth mentioning that Martial certainly isn't advocating a more natural body odor here; he is promoting deodorization rather than reodorization. He directs similar comments to Postumus in II.XII:

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[570] Largey and Watson, l34.

> Esse quid hoc dicam quod olent tua basia murram
> quodque tibi est numquam non alienus odor?
> Hoc mihi suspectum est, quod oles bene, Postume, semper.
> Postume, non bene olet qui bene semper olet.
>
> What am I to make of it that your kisses smell of myrrh and that you always have an odor from outside yourself? I find it suspicious that you smell good all the time, Postumus. Postumus, a man does not smell good who smells good all the time.

Again, the poet seems to be saying that Postumus would be more desirable if he did not smell 'good', or at the very least, did not always smell of perfumes, implying that he should smell 'of nothing at all' instead. This is at odds with the widespread social convention that perfumes rendered individuals more attractive, and Martial is aware of this; he seems to be expressing a personal preference which he knows is not the preference of the majority and which, indeed, must have been nearly impossible to accomplish. 'Romans like Scipio', writes Victoria Rimell in reference to Seneca's *Epistle* 86, 'only took a full bath weekly, so must have stunk of earth and sweat.'[572]

> The shock of how utterly filthy these ancient Romans were is captured in the gossipy hiss of Seneca's imaginary interlocutor at 86.12: 'liquet mihi inmundissimos fuisse,' quid putas illos oluisse? ('"they must have been disgusting alright." Can you imagine how much they reeked?'). . .In one of the letter's many contrasts, he explains how the modern equivalent to natural body odor, rinsed off in the bath but reappearing minutes afterward in the fields, is perfume – also short-lasting and (these days) needing to be reapplied two or three times a day (86.13). Whereas sweat builds up and must be rinsed off, perfume fades and must be reapplied: a mirroring inversion you can *smell*. . . Perfume and

[571] 'The haughty bird' is the phoenix, who was reputed by Herodotus and Pliny to guard Arabian frankincense.
[572] Rimell,8; she is commenting on Seneca's Epistle 86, line 12.

> sweat are opposed yet parallel: they both figure scent through evaporation, liquid evanescence.[573]

Under the circumstances, to smell of 'nothing at all' was no doubt a highly unrealistic suggestion on Martial's part.

Martial is not incapable of employing 'good' smells in his epigrams without implying that they are bad; these examples are simply in the minority, and rarely involve perfume. The most descriptive of these is XI.LIV, in which he exhorts Zoilus to empty his pockets of the perfumes he has stolen at funerals:

> Unguenta et casias et olentem funera murram
> Turaque de medio semicremata rogo
> Et quae de Stygio rapuisti cinnama lecto,
> improbe, de turpi, Zoile, redde sinu.
> A pedibus didicere manus peccare protervae,
> non miror ferrem, qui fugitivus eras.
>
> Shameless Zoilus, return from your filthy pocket the unguents and the cassia and the myrrh, redolent of funerals, and the half-cremated incense you took from the midst of the pyre, and the cinnamon you snatched from the Stygian couch. Your impudent hands learned wickedness from your feet. I don't wonder you're a thief, seeing that you used to be a runaway (slave).

Amid the slanders heaped on Zoilus, Martial has given us a very clear picture of a Roman funeral with its attendant perfumes and incenses. All of the resins and spices mentioned are expensive, imported exotics, and smell very strong, and this conjures an image of a costly fragrant fog comingling with the pyre, a veritable 'smellscape' of social convention. The thought of someone darting in and out,

[573] Rimell, 9-10.

swiping these expensive funerary goods, is indeed disgusting, but it is doubtful that Zoilus is an isolated case, and this adds to the image created here.

In spite of his lack of regard for their fragrance, Martial avails himself of the majority preference for perfumes in some verses, again using social convention to make his point but in a more mainstream and socially expected way, even as he is mocking another victim. In a short verse Plato would have loved, Martial writes,

> Unguentum fuerat, quod onyx modo parva gerebat:
> olefecit postquam Papylus, ecce, garum est.
>
> It once was perfume, carried a while ago in its small onyx jar. After Papylus smelled it, see, it's garum.

Here, the perfume is 'a good one', worthy of an expensive container; the perceived, however, is changed by the perceiver when Papylus smells it, the implication being that Papylus stinks so badly of mackerel paste as to spoil a fine unguent merely by opening the jar and sniffing it.

Throughout his epigrams, Martial masterfully uses social convention to differentiate between 'us' and 'them'. *They* stink; *we* don't. *We* might use perfume, but *they* don't use enough, or use too much, or use it in vain. This dichotomy illustrates what Constance Classen refers to as 'the scent of the other' – while perfume is a 'conformity enforcer' in that social convention in this case dictates that one 'should' smell of perfume, it is also a means of social division between and within social classes. Those who fail to smell of the appropriate amount of perfume are automatically 'them'; those of 'us' who attempt to smell as one 'should' and fail become 'them' as well, and it is perfectly acceptable to laugh at or admonish 'them' for falling short of the socially agreed upon parameters of propriety. But what of

individuals like Martial's Postumus (II.XII) and Coracinus (VI.LV), whom the poet admits smell 'good' and then takes to task for exactly that? How does a 'good' smell become a source of social division?

The effect of personal scent on others in a social setting is complex. While an odour perceived to be foul will certainly have a negative social effect, as we see throughout Martial's epigrams, a smell normally perceived as being 'good' can backfire, as it were, depending on other variables within a social situation. A study undertaken by R. A. Baron at Purdue University revealed that male undergraduates responded more positively to a 'female accomplice of the researcher' when she was dressed informally like themselves and wearing scent than when she was dressed informally and was not wearing scent, but responded more *negatively* to her when she was appeared in formal dress and wearing scent than when she was dressed formally but was unscented:

> At first glance, the results of this initial study were somewhat puzzling. Contrary to predictions, the use of scent did not uniformly enhance reactions to the accomplice. Instead, it appeared that this grooming aid (perfume) produced positive effects only when the accomplice was dressed informally. However, when she dressed in a more formal manner, opposite results were obtained: the use of scent actually reduced ratings of her attractiveness, and led subjects to perceive her as colder and less romantic. . .On a college campus where informality was the rule rather than the exception, this combination of careful (formal) dress and use of a specific grooming aid was somewhat unusual and distinguished the accomplice fairly sharply from most other students.[574]

This study offers empirical evidence that even a 'good' scent can enhance a social division where a difference is already perceived, rather than promoting a positive

response -- an effect which Martial seems to reference in the cases of Postumus and Coracinus. Indeed, this is a theme throughout Roman literature, in which scents form a boundary between locals and foreigners, members of different social classes or age groups, and perceived degrees of morality. 'Olfactory symbolism,' write Classen et al., 'was used very effectively to pass value judgements on different groups of people in antiquity.'

> The wealthy, for example, were categorized as fragrant not only because of their use of perfumes, but because of their high status in society, while the poor were characterized as foul not only because of the malodours of their impoverished living conditions, but because of their low social status. . .such an olfactory classificatory system would have been a potent aid to maintaining different classes in their 'proper' place in the social order.[575]

We see the latter dichotomy in Plautus' *Mostellaria*, in which a city-dwelling slave, Tranio, and a country-dwelling slave, Grumio, insult each other on the basis of their different, socially significant odours:

> Tranio: At te Iuppiter
> dique omnes perdant, fu, oboluisti alium.
> Germana inluuies, rusticus, hircus, hara suis, caeno κοπρὼν
> commixte.
>
> Grumio: Quid uis fieri? Non omnes possunt olere unguenta
> exotica
> si tu oles, neque superiors accumbere
> neque tam facetis quam tu uiuis ulctibus.
> Tu tibi istos habeas turtures pisces auis
> sine me aliato fungi fortunas meas.
> Tu fortunatu's ego miser: patiunda sunt.

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[574] Baron, 1981; 1988, 93-96.
[575] Classen, et al. 1994, 35, 38.

Meum bonum me, te tuom maneat matum.[576]

> Tranio: May Jupiter and all the gods destroy you! Phew, you smell strongly of garlic. Lump of native filth, hick, he-goat, pigsty, mixture of mire and manure!
>
> Grumio: What do you want me to do? We can't all smell of exotic perfumes, as you do, or dine at the head of the table on such rich victuals as you. Go ahead and have your squabs, fish, and birds, and let me enjoy my garlic and my lot. You're fortunate, I'm wretched, but it's all to be endured so long as my good awaits me and your bad awaits you.

This passage is particularly interesting because both men are slaves, and yet they are clearly not social equals; Tranio is not a rich man in any context other than comparison to Grumio, over whom he can lord his exposure to fine perfumes and gourmet fare as opposed to farm animals and garlic. 'This connection between perceived odor and social standing is not Grumio's and Tranio's innovation, but a staple of Plautus' repertoire of comic commentary on social norms,' writes Benjamin Stevens. 'The basic idea is that social judgements of many kinds may all be made on the basis of scent-perception. Distinct social groups are attributed different odors, and the odors, like the groups themselves, may be valorized according to a social hierarchy.'[577] Here we see the perceived hierarchy between two slaves, but the social division may be even stronger than that; it is quite probable that Tranio lives more comfortably and luxuriously than does Grumio's master[578].

Similarly, in the same play, the aging matron Philematium asks whether or not she should wear perfume, and her servant Scapha replies emphatically in the negative on the basis of Philematium's age (273-278):

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[576] Plautus, *Mostellaria*, 38-50; Benjamin Stevens trans. 2008, 159.
[577] Stevens, 2008, 160.

> Quia ecastor mulier recte olet, ubi nihilo let.
> Nam istae ueteres, quae se unguentis unctitant, interpoles, uetulae,
> edentulae, quae uitia corporis fuco occulunt,
> ubi sese sudor cum unguentis consociauit, ilico
> itidem olent, quasi cum una multa iura confudit cocus.
> Quid olant nescias, nisi id unum, ni male olere intelligas.
>
> Because, by god, a woman smells right when she doesn't smell at all. For those old women who douse themselves in perfumes, touched up, rather old, and toothless, who hide their bodies' flaws with makeup, as soon as their sweat has mingled with their perfume they smell just like when a cook combines a lot of sauces. You can't tell what they smell of, but you know that they smell bad.

Scapha's words recall the sentiments of the authors of the *Problemata* who complained respectively that elderly people smell bad and that perfume mixed with body odor forms a combination which smells worse rather than better, as well as Martial's commentary on the same phenomenon; Athenaeus, too, quotes Archilochus as having written 'οὐκ ἄν μύροισι γραῦς ἐοῦσ' ἠλείφετο' – 'Being an old woman, she would not be anointing herself with perfumes'. Old women, these authors seem to be saying, need not try to smell desirable, as they are no longer youthful or beautiful and are unattractive regardless. These stereotypes and many others were applied regardless of basis in fact; 'It is evident', as Classen et al. point out, 'that the olfactory class distinctions of antiquity were not simply based on actual differences in odour, but were also symbolic in nature.'[579]

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[578] 'The actual living and working conditions of slaves might differ greatly', q.v. Wiedemann, 122.
[579] Classen et al., 1994, 35.

The Perfume That Came to Dinner

Perfume was offered to guests at symposia at least as far back as the Classical period in Greece; it is mentioned in dramatic literature as well as in Plato, who quotes Socrates as objecting to this:

> ὥσπερ γάρ τοι ἐσθὴς ἄλλη μὲν γυναικειά, ἄλλη δὲ ἀνδρεία οὕτω καὶ ὀσμὴ ἄλλη μὲν γυναικί, ἄλλη δὲ ἀνδρὶ πρέπει. . .ἐλαίου δὲ τοῦ ἐν γυμνασίοις ὀσμη καὶ παροῦσα ἡδίων ἢ μύρου γυναιξὶ καὶ ἀποῦσα ποθεινοτέρα. καὶ γὰρ δὴ μύρῳ μὲν ἀλειψάμενος δοῦλος καὶ ἐλεύθερος εὐθὺς ἅπας ὅμοιον ὄζει.
>
> For just as there is one kind of garment for women, but another for men, so also one kind of smell is appropriate to a woman, but another for a man. . .The smell of olive oil in our gymnasia, when present, is sweeter than perfume on women, and when absent, is missed more. And slave or freeman, all smell alike the moment they anoint themselves with perfume.

Like many of his contemporaries, Socrates thought that a man who wore perfume was effeminate and foppish; he felt that men were supposed to smell of the gymnasium rather than to smell of flowers. However, the tide was turning even then, and by Theophrastus' time if not before the use of perfume by men was a standard luxury for those who could afford it. It was also routinely dispensed at formal dinner parties. Just as it appeared to be in the *Iliad*, perfume was a hallmark of civilization, not only an olfactory signal that the wearer was a cultured and hygienic member of society, but also that a host was both sophisticated and wealthy enough to share exotic scents with his guests, which makes Socrates' complaint that perfume serves as a social equalizer somewhat ironic. His point, however, is taken even further by Martial in epigram III.LV:

> Quod, quacumque uenis, Cosmum migrare putamus

et fluere excusso cinnama fusa uitro,
nolo peregrinis placeas tibi, Gellia, nugis.
Scis, puto, posse meum sic bene olere canem.

Wherever you come we fancy Cosmus is on the move,
and that cinnamon flows streaming from a shaken out glass bottle.
I would not have you, Gellia, pride yourself upon foreign trumpery.
You know, I think, my dog can smell sweet in the same way.

Never mind that the same perfume can make a slave smell like a freedman, says Martial; perfume can make a dog smell like a lady of high status. Although an exaggeration, it is an interesting suggestion. On the one hand, in some respects perfume is *intended* to be a social equalizer, or 'conformity enforcer'; if we all agree that civilized people smell of perfume, then we can all ensure that we will be perceived by others as being civilized. In that respect, perfume can indeed help a slave to smell like a freedman or, for example, in the case of Tranio, better. On the other hand, while the use of perfume was expected by the elite according to social convention, perfume itself varied widely in terms of component ingredients and cost. A cinnamon-based perfume like Gellia's, or Coracinus' cassia and frankincense, would have been exponentially more expensive than any perfume worn by the average freedman, and discerning noses certainly would have known the difference. Like any other scent, maybe even more so, a perfume would have been registered, recognized, and classified by those who smelled it, and interpreted immediately according to the perceivers' sociocultural and personal associations.

The same was true in the sympotic setting. By Martial's time, perfume was not only expected to be provided to guests, it was expected to be expensive and presented in artfully designed containers. Martial himself makes fun of a host whose fine perfume seems to have necessitated cost-cutting elsewhere:

> Unguentum, fateor, bonum dedisti
> convivus here, sed nihil scidisti.
> Res salsa est bene olere et esurire.
> Qui non cenat et unguitur, Fabulle,
> hic vere mihi mortuus videtur.[581]
>
> You gave a good unguent to your guests yesterday, I admit, but you carved nothing. To be nicely scented and go hungry, that's amusing. He who is anointed without any dinner, Fabullus, is truly dead in my way of thinking.

Here, rather than having satirized Fabullus, as one might expect, for the cost, the type, or the scent of the perfume expected to accompany the dinner, Martial admits that the perfume was a good one, only to point out that the dinner expected to accompany the perfume was not forthcoming. Surely his complaint that the guests were treated like corpses was as amusing to his readers then as it is now; regardless, we can see here both this social convention of the elite and the corresponding judgement of the diners. The underlying suggestion is that, to at least one host, the perfume was even more important than the dinner.

Throughout his *Deipnosophistae*, Athenaeus paints us a clear picture of the social conventions regarding perfume in the sympotic setting. At various points in the text, the diners discuss various types of perfumes, which are appropriate for symposia, and when and how these are dispensed. Perfume occupies an important, ritualized and formal role on these occasions, serving to increase the social status of the host and, by extension, the diners, as well as to delineate and separate the sympotic space from the outside world. 'For important gatherings,' write Classen et

[581] Martial, Epigrams, III.XII

al., 'such as the holding of athletic games, the use of perfumes could be quite lavish.' The authors go on to say that:

> Putting on a good show in antiquity, therefore, involved putting out a good scent. The spicy, sweet scents offered to the spectators at such events would not only serve to please and excite them, but would help make them feel involved in the activities in a way that a purely visual display could not. Not only would the spectators see and hear the pageantry, they would breathe it in and feel identified with it and each other.
>
> In the modern West, we tend to think of the use of perfumes as a purely individual matter. In antiquity, however, collective perfuming was an important means of entertaining and impressing the masses and of establishing group solidarity.[582]

This is exactly the dynamic we see at symposia, albeit on a much smaller scale. The collective perfuming of the sympotic space not only pleases the nose, adding the sense of smell to the involvement of the senses, but helps to define the area in which the banquet and other festivities take place as well, providing the participants a private environment and unifying them in a way that visual and aural stimulation could not. The status of the necessarily wealthy host increased with the cost associated with these perfumes, but the diners who received them were honored as well.

The vessels in which perfume was offered were valuable in and of themselves. The ornate, expensive containers in which the perfume was served are an example of what Stephen Houston and Karl Taube call 'synaesthetic' material culture, in which stimulus in one modality, here sight or touch, triggers perception in another, in this

[582] Classen et al., 26-7.

case, smell.[583] The authors note that 'meta-sensory views tend to adopt the notion that acts of emanation, whether of sight, smell, or sound, are inseparable from perception and its semantic interpretation' and discuss an archaeological synaesthesia in which 'the modality of sight gleans signs that are intended to carry meaning, sound, and scent'.[584] The Greek alabastron or Roman unguentarium *meant* perfume; even in the absence of sight, the shape of the vessel would provide tactile confirmation of the contents within. Of course, the more expensive of these containers were designed to be visually beautiful as well as to evoke the expectation of a pleasurable scent, and the combination of all of these sensory messages would have been part and parcel of the symbolism inherent in the vessel.

Fig. ?: Hellenistic alabastron carved in relief with Achilles dragging Hector behind his chariot. *http://edgarlowen.com/greek-art.shtml*

Such containers enhanced the value of the unguents inside as well as the perceived sophistication of the host and spoke highly of the recipient's social value. Even after the perfume was gone, these containers would surely recall very positive associations with the lavish dinner party, the conspicuous consumption involved, and the status and largess of the wealthy man who arranged it.

[583] Houston and Taube, 261. q.v. Day, 299; Murphy, 259.

Athenaeus is clearly aware of the 'long tradition hostile to luxury' in the Roman Empire, as is his host, Larensis.[585] 'More austere minds might regard Larensis' conduct as an example of the worst kind of imperialist behaviour,' writes David Braund, 'bringing the foods of far-off lands to corrupt Roman palates, a tendency condemned by authors from Cato to Columella and beyond. . .However, austerity is not the spirit of Athenaeus' work: rather he can combine texts and ideas on austerity with their more numerous counterparts on luxury, for each has its particular validity and context.'[586] Braund notes that at his symposium, Larensis 'proceeds to approve Posidonius' analysis of Roman history as a decline from frugal austerity and the farmer's lifestyle into luxury' and 'praises Romans who observed the sumptuary law of Fannius' even as he is hosting his remarkable dinner:

> At first sight, Larensis seems guilty of outrageous hypocrisy, for he holds forth in praise of sumptuary legislation while hosting numerous guests at a luxurious feast, one among a number of such feasts. Yet his position is defensible enough, for he locates himself and his feasting in a period when past limitations have fallen into complete neglect... Standards have changed, it is argued, so that luxury has become the norm (cf. 15.692c).[587]

Perfume was an important part of this 'new' norm, both personally and socially. The nature and presentation of the perfumes at symposia seem to have varied according to the pomp which accompanied them and were, of course, correlated with the wealth of the host, but it was apparently standard practice in Athenaeus' day to provide perfume after the banquet table had been removed and the guests had washed their hands. Perfume was apparently associated with the

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[584] Houston and Taube, 262-3.
[585] Wilkins, 2014.
[586] Braund, 2000, 10.
[587] Braund, 2000, 12.

end of the banquet and the bringing in of 'the second table' which bore a dessert course. A basis for comparison, produced in the 5th century BC, is the description provided by Xenophanes, which appears to describe a small, private symposium:

> Now is the floor clean, and the hands and cups of all; one sets twisted garlands on our heads, another hands us fragrant ointment on a salver. The mixing bowl stands ready, full of gladness, and there is more wine at hand that promises never to leave us in the lurch, soft and smelling of flowers in the jars. In the midst the frankincense sends up its holy scent, and there is cold water, sweet and clean. Brown loaves are set before us and a lordly table laden with cheese and rich honey. The altar in the midst is clustered round with flowers; song and revel fill the halls.
>
> But first it is meet that men should hymn the god with joy, with holy tales and pure words; then after libation and prayer made that we may have strength to do right -- for that is in truth the first thing to do -- no sin is it to drink as much as a man can take and get home without an attendant, so he be not stricken in years. And of all men is he to be praised who after drinking gives goodly proof of himself in the trial of skill, as memory and strength will serve him. Let him not sing of Titans and Giants -- those fictions of the men of old -- nor of turbulent civil broils in which is no good thing at all; but to give heedful reverence to the gods is ever good.[589]

Here perfume arrives with the garlands, the scents of which mingle with fragranced wine and the frankincense burnt as an offering; hands are washed, and a dessert table brought in. At several places in the *Deipnosophistae*, Athenaeus quotes other authors on the 'proper' order of a symposium, and while these differ to some degree, the overall pattern is very much the same. Xenophanes' 'brown loaves, cheese, and rich honey' might well have been taken for a rather poor offering in Athenaeus' day,

[589] Xenophanes, fragment 1; John Burnet, trans.

but in spite of the notable trend toward profligate expenditure and conspicuous consumption over time, the structure of these occasions seems not to have changed.

Throughout the text, as they do here, perfume and wreaths appear in tandem, and these were not merely decorative or pleasant-smelling. Rather, the wreaths, which were often perfumed, reportedly enhanced or replaced an earlier practice of binding the temples to prevent the ill effects of drinking. 'It is better,' says Athenaeus, 'since all of our sensations are in the head, to wreathe that, than to have our temples covered and tightly bound as an expedient against the wine.' He also tells, however, of a particularly lavish symposium hosted by Caranus at which gold crowns were provided to the diners; wreaths are not mentioned here. This particular symposium, however, featured such a dramatic display of the host's wealth that perfume is reported to have been served no fewer than three times: before dinner, during the entertainment following the dinner, and again during the drinking which followed the entertainment, and in each case the perfume was served in gold and silver double-jars, each of which reportedly held half a pint.[593] This appears nevertheless to be highly atypical of the average dinner party, and it is the particularly extravagant and excessive luxuries involved which merit multiple pages in the text. Wreaths or garlands seem to have been far more common than crowns through the ages, and the perfumes provided with them were not provided by the half-pint. The perfumes distributed during Larensis' symposium, for example, appeared 'in alabaster bottles and also gold containers', which were no doubt far more standard.[594]

The purpose of dressing the hair with wreaths and unguents is reported in several places in the *Deipnosophists* to be to 'put good odours to the brain'.

[593] Athenaeus, Book VI, 111; Book II, 95-97.
[594] Athenaeus, Book VII, 175.

According to Cynulcus, 'the sensations of our brain are soothed by sweet odours and cured besides'; Alexis is quoted as saying much the same thing.[595] This sentiment is reminiscent of the Hippocratics, who touted the merits of pleasant odours and warned of the dangers of foul ones; Theophrastus, who advocated rose oil for a headache; and especially Galen, who believed that odor particles actually came into direct contact with the brain. Athenaeus quotes a lost work entitled '*On Perfumes and Wreaths'* by Philonides which contains another theory on the subject:

> The practice of oiling the head in drinking-parties arose from the following cause: when, namely, the head is dry, whatever is taken into the stomach is drawn upward; for this reason, as the fevers inflame their bodies, men moisten the head to prevent the partly burned elements from getting a start toward the part that is dry. . .[596]

This idea is echoed by Athenaeus himself, who notes that 'men were induced to oil the head believing that the violence of the wine would be abated if they moistened the head beforehand' with perfumed oils, and there are several mentions of perfuming the chest as well, as 'that is where the heart is', and 'obviously because even the heart is comforted by sweet odours.'

> Τοῦτο δ' ἔπρασσον οὐ μόνον τῆς εὐωδίας ἀπὸ τοῦ στήθους κατὰ φύσιν ἀναφερομένης ἐπὶ τὴν ὄσφρησιν, ἀλλὰ καὶ διὰ τὸ νομίζειν ἐν τῇ καρδίᾳ τὴν ψυχὴν καθιδρῦσθαι, ὡς Πραξαγόρας καὶ Φυλότιμος οἱ ἰατροὶ παραδεδώκασιν.[597]
>
> They did this, not merely because fragrance is naturally borne upwards from the breast to the sense of smell, but also because they believed the soul is seated in the heart, as the physicians Praxagoras and Phylotimus have taught.

[595] Athenaeus, Book VI, 111; Book VII, 181.
[596] Athenaeus, Book VII, 205; Book I, 199.
[597] Athenaeus, Book VII, 183.

Perfumes, in conjunction with wreaths, thus served both prophylactic and medicinal purposes in addition to enhancing the sympotic environment. For this reason, some perfumes were thought to be more appropriate for guests than were others; Athenaeus informs Cynulcus that 'we must use those perfumes in a drinking-party which have the least stupefying effect, and which are astringent and can cool for a short time', and quotes Hicesius:

> Καὶ ῥοδινον μὲν πρὸς πότον ἐπιτήδειον, ἔτι δὲ μύρσινον, μήλινον. τοῦτο δ' ἐστὶν καὶ εὐστόμαχον καὶ ληθαργικοῖς χρήσιμον. τὸ δ' οἰνάνθινον εὐστόμαχον ὂν καὶ τὴν διάνοιαν ἀπαραπόδιστον φυλάσσει. καὶ τὸ σαμψούχενον δὲ καὶ ἑρπύλλινον ἐπιτήδεια πρὸς πότον καὶ κρόκινον τὸ χωρὶς σμύρνης πολλῆς. καὶ ἡ στακτὴ δὲ ἐπιτήδειος πρὸς πότον, ἔτι δὲ ναρδος. τὸ δὲ τήλινον καὶ γλυκύ ἐστι καὶ ἁπαλόν. τὸ δὲ λευκόϊνον καὶ εὐῶδες καὶ σφόδρα πεπτικόν.[598]
>
> Rose perfume is appropriate for a symposium, also myrrh and quince; this last is wholesome and efficacious for patients suffering from lethargic fever. The perfume from drop-wort is wholesome and keeps the brain clear. Those made of marjoram and tufted thyme are appropriate for a symposium, so, too, saffron crocus if not mixed with too much myrrh. But the stakté also is appropriate for a symposium, and nard as well. Fenugreek is both sweet and delicate. Perfume from gilliflowers is fragrant and very helpful to digestion.

Absent in this list are the 'heavier' scents such as Egyptian perfume (based on frankincense), orris-root, and others mentioned elsewhere in the text as having been commonly served at symposia; Athenaeus is more concerned with quoting the widest possible variety of extant authors than in promoting a single point of view. Regardless, it is clear that above and beyond the expectation that perfume will be provided following the meal, there is some emphasis on (and judgement regarding)

[598] Athenaeus, Book VII, 190.

which perfume is provided and how it is presented. Nor does perfume appear only in alabaster bottles or ornate gold jars; in a fascinating post-Hellenistic twist, perfume begins to appear in the *food*.

Perfume on Lentils

The ancient Egyptians dissolved frankincense in wine, and while this practice does not seem to have been common in Greece before Alexander, Theophrastus writes that it occurred regularly afterward:

> Συνεργεῖν δὲ δοκοῦσι πρὸσ τὰς γεύσεις οὐχ αἱ ὀδμαὶ μόνον ἀλλὰ καὶ αἱ δριμύτητες καὶ αἱ θερμότητες ἐνίων, διὸ καὶ τωῦ οἴνων τισὶ τὰ τοιαῦτα μιγυύτες ὥσπερ κέντρον ἐμποιοῦσιν.[599]
>
> It is thought that not only the smells of perfumes contribute to a pleasant taste, but also the qualities of pungency and heat which are found in some of them: accordingly some of these perfumes are also mixed with certain wines to give, as it were, 'point' to them.

He mentions that myrrh and cinnamon were used for this purpose, as well as other 'hot, pungent, and astringent' perfume ingredients, and notes specifically that myrrh is quite bitter (ἔχει δὲ καὶ πικρίαν). 'The Egyptian perfume, myrrh-oil, and any others that have a strong odor become sweeter if they are mixed with fragrant wine,' he informs us, 'for then their heavy quality is removed. In fact myrrh itself is made to exhale a more fragrant odour by being steeped in sweet wine.'[600] He does not mention, however, that perfume was routinely used in cookery; this seems to have been a development in the Roman period after the monsoon patterns had been discovered, exotics were flowing more freely, and more personal wealth was available. Wilkins and Hill write that:

> Trade brought to cities both exotica such as perfumes and spices and additional supplies or variants on what was locally available, such as wheat, wines, and other essentials. Exotic imports were likely to attract the attention of competitive members of society, members of the wealthy elite in particular who might wish to display on social occasions

[599] On Odours, VI.31-2.

> food items that marked them out as being part of a knowledgeable international network.[601]

Wilkins and Hill mention perfumes and spices arriving from 'Arabia, Africa, India, and the Spice Islands', and go on to say that 'the more distance the spice had travelled, the more desirable it might appear to be to the rich Roman consumer.'[602] This desire on the part of the elite to amaze their guests with extravagant cuisine translated, at some point, to cooking with non-nutritive flowers and, most notably, perfume. This must have been quite the acquired taste, as most resins, like myrrh, are quite bitter, and it is difficult to imagine that anyone would voluntarily consume a blend such as the Egyptian perfume in a sauce, or myrrh in a salad; the desire to be on the cutting edge of exotic, expensive cuisine must have overridden the more natural desire to avoid introducing these resins to the mouth. Andrew Dalby suggests that myrrh in particular was added to wine 'not for the sake of the taste, but for its heady aroma with its festive and erotic associations,' and this was probably true for food as well.[603] Perhaps by Athenaeus' time the Roman elite had grown up with and become accustomed to these strong tastes.

In Book IV of the *Deipnosophists*, Athenaeus' host Larensis quotes three variations on an old proverb about adding perfume to lentil soup:

ὅταν φακῆν ἕψητε, μὴ πιχεῖν μύρον

τοὐπὶ τῇ φακῇ μύρον and

τὸ ἐπὶ τῇ φακῇ μύρον.

Larensis attributes these to Strattis, Sopater, and Clearchus respectively. While the consensus among scholars for some time was that to pour perfume on lentils was a

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[600] On Odours, X.44.
[601] Wilkins and Hill, 2006, 114.
[602] Wilkins and Hill, 2006, 139.

proverbial example of waste or extravagance, Lionel Pearson offers the explanation that it is rather an example of incongruity -- the two simply don't go together. Citing Cicero's use of the phrase in Ad. Att. 1.19.2, 'Legati sunt Q. Metellus Creticus et L. Flaccus et, τὸ ἐπὶ τῇ φακῇ μύρον, Lentulus Clodiani filius', Pearson suggests that 'we should, therefore, be content to suppose that Lentulus is considered just as much out of place in the company of two distinguished colleagues as perfume would be out of place in the kitchen'. He feels that 'the notion of waste or extravagance does not seem to apply, and in any case perfume is not "too good" to serve with lentils. . .it is "no good at all" with them; it simply does not go with them.'

> The point becomes even clearer from Aristotle's discussion of the senses of taste and smell in De Sensu 443b. He explains that some odors are pleasing only because of their association with appetite – the smell of food does not please or attract us unless we are hungry; such odors are pleasant only κατὰ συμβεβηκός, but others are pleasant in themselves, like the fragrance of flowers, which bears no relation to appetite and does not stimulate it.[604]

While his explanation makes a great deal of sense since, as Pearson suggests, the proverb does not seem to be intended to contrast luxury with simplicity in the context of the phrases in which it is found, Pearson's arguments – and Aristotle's – suffer in the first century AD, when perfume is *not* out of place in the Roman kitchen. Although rarely attested, as opposed to the well-attested use of perfumes at symposia, it was certainly served on occasion, although it is unlikely that lentils were involved. Andrew Dalby reports that nard, a perfume derived from the Himalayan spikenard root, was both 'costly enough to be presented in a glass bottle'

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[603] Dalby, 2013, 226.
[604] Pearson, 1963, 176-8.

and used 'occasionally in cuisine. It is called for twice in the recipes of Apicius.'[605] Athenaeus describes an appetizer made with 'pepper, a salad leaf, myrrh, sedge, and Egyptian perfume', which certainly sounds very aromatic if not particularly tasty.[606] And in a passage which no doubt would have confounded Aristotle, Athenaeus quotes Aemilianus' cook describing a treat he calls The Dish of Roses:

> And it is prepared in such a way, that you may not only have the ornament of a garland on your head, but also in yourself, and so feast your whole body with a luxurious banquet. Having pounded a quantity of the most fragrant roses in a mortar, I put in the brains of birds and pigs boiled and thoroughly cleansed of all the sinews, and also the yolks of eggs, and with them oil, and pickle-juice, and pepper, and wine. And having pounded all these things carefully together, I put them into a new dish, applying a gentle and steady fire to them. And while saying this, he uncovered the dish, and diffused such a sweet perfume over the whole party, that one of the guests present said with great truth —
>
> The winds perfumed the balmy gale convey
> Through heaven, through earth, and all the aerial way;
> so excessive was the fragrance which was diffused from the roses.

That meat soaked in rose oil was considered a delicacy rather than a waste of both meat and roses utterly refutes Aristotle's ideas regarding non-nutritive smells. Here, the fragrance of flowers *is* intended to stimulate appetite, as well as admiration, if not awe, of the cook and his master. Suddenly perfume is no longer necessarily incongruous with soup.

Perfume has, in this era, come full circle; like Homer's gods, the sympotic participants are dining on the stuff. Rather than speaking of youth and beauty, these scents speak of wealth, power, and opulence, unifying the little community at the

[605] Dalby, 2013, 230.
[606] Athenaeus, Book I, 289.

table with garlands within and without, and reinforcing their perceived social status in the process.

Conclusions

Far from being a vestigial biological function, our sense of smell helps to organize and define the people, places, and things in our world, conveying symbolic information according to socially constructed meanings. Smells help to establish self-identity, define social status, and confirm group affiliation.[607] Scents of all types and the meanings assigned to them contribute to and shape human cultures; every culture has its own sensoria which defines it, just as 'smellscapes' define our environments, and humans have deliberately manipulated smells to sway the opinions and value judgements of others since, at the very least, the dawn of agriculture. These human behaviors were as prevalent in the Classical world as they are now.

No significant changes in human anatomy have occurred for some 40,000 years; any modern developments in the descriptions and explanations of olfactory physiology must necessarily apply to the ancients as well as to ourselves. Further, the history of these descriptions and explanations over time should be seen as a continuous, if somewhat sporadic, progression. Science never operates in a vacuum, and newer theories are built on older theories, even when those older theories have been disregarded as being obsolete. The Edwin Smith papyrus produced in the 3rd millennium BC is evidence that issues regarding nasal structure have been of interest for thousands of years, and certainly this interest existed in the Classical era. Modern osmologists and olfaction researchers should be aware of what has gone before in their fields, and conversely, it behooves classicists to have a working idea of modern theories on the subject simply as a basis for comparison and contrast.

Using Martial as a case study, we have seen that modern models provide a framework for new questions about the ancient world and the relationships between how smells were mentally and socially perceived. Martial's use of smell as a social divider evokes modern ideas about 'the scent of the other' by casting various persons as 'the skunk we avoid' (285-6), and his attention to and selection of targets frequently attempts to reclassify conventional ideas about smells (see Moriarty's model, pg#). By looking at Martial's invective, we can deduce what was considered normal as well as what was considered foul. Largey and Watson's modern observation that odours 'whether real or alleged are often used as a basis for conferring a moral identity upon an individual or a group' holds true throughout Martial's epigrams.[608]

When we study how people in the ancient world examined the sense of smell in general and the corresponding roles of perfume in particular, we see many of the same issues and questions being raised as concern scientists today. The transition between the Hippocratics' commentary on the dangers of foul smells to human health and the dissection work of Herophilus and Erasistratus which came to inform and inspire Galen show both an ongoing interest and a clear progression in the study of olfactory perception over time. Correlations between body odors and disease continue to be studied by modern scientists, and while we currently understand that odor particles do not directly penetrate the brain, we are equally aware that odors frequently accompany situations and environments which will, in fact, make people ill; much work has been done since the 1970s to counteract these effects.

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[607] Drobnick, 2006, 1.
[608] Largey and Watson, 34.

Similarly, it has been shown to a clear degree of certainty that molecules similar in construction to each other smell the same to the human nose, a concept currently used by modern perfumers to their advantage and one which would have come as no surprise whatsoever to Leucippus, Democritus, and, by extension, Empedocles and Lucretius. The questions and commentary of Aristotle and the Peripatetics concerning the differences in both the sense of smell and body odors in youth and old age as well as in sickness and health are still topics of speculation by modern researchers, and the overarching dearth of 'smell vocabulary' and osmologically specific models remain a persistent problem. The correlations between ancient and current means of dealing with these issues are significant, and well worth further exploration.

Similarly, much work might be done in future regarding the transition between the early Greek associations of perfume with sensuality and eroticism, as apparent in Homer, and the Hellenistic association of perfume with wealth and social prestige.

Spice historian Jack Turner refers to 'the oldest seduction scene in Western literature', the passage in the *Iliad* in which Hera, with the help of ambrosia, seduces Zeus to distract him. Turner notes also that Plato argues in the *Republic* that desire is stimulated by perfume, and that Myrrhine in Lysistrata 'drives her frustrated husband wild with desire with the help of a fragrant ointment'.

> It was the Greeks, too, who made aroma a feature of exotic verse. Archilochus (ca. 675 – ca. 635 BC) wrote of courtesans who 'with their hair and breasts covered in perfume would arouse the desire even in an ancient. . .That this was something more than a theological or literary conceit is suggested by the fact that perfumes and spices were widely employed at fertility rites and weddings.[609]

[609] Turner, 2004, 205-6.

We see the opposite concept at work in the Greek literature as well; the Lemnian women were anything but desirable, and Philoctetes and Phineus were to be avoided, not only due to their respectively foul smells, but as victims of divine pollution. Just as perfume was associated with the gods, so was stench associated with their disfavor, and the pollution emanating from miasma was perceived as being dangerous to more than one's health and something to be fled. Additionally, there was a clear social distinction between fish-mongers or dyers and perfumers; one group smelled bad, the other ran shops where people purposely congregated to share gossip. While much of this is outside the scope of this paper, similar cultural behavior is seen today; although there is no religious association involved, the homeless, for example, are frequently stereotyped as a group as being unwashed and are avoided, and the stink associated with textile mills or sewage treatment plants is met with social outcry. Certainly these topics are worth looking into in future.

As trade between the East and West blossomed, resins and spices from India and Arabia became far more common, albeit outrageously expensive. Turner fails to mention the associations between perfume, power, and wealth prevalent from this period throughout the Hellenistic era. These associations became particularly marked in the Roman Empire, where perfume was *de rigeur* among the elite, but in both Greece and Rome, to be civilized was to be perfumed.

In Rome, we see the same concept in Martial, Juvenal, and other authors as we do in Classical Greece: people, places, and things which smell good *are* good, and those which smell bad are bad. Here, however, 'bad' is directly related to morality rather than divine punishment. The social signals transmitted by use of perfume are different as well; while it is clear that perfume is applied in order to make

individuals, particularly women, attractive, it is equally clear that perfume is a status signifier and a symbol of wealth or power. It is highly unlikely, for example, that the Roman army was attempting to be seductive in the camps, though Pliny tells us that the legions were using perfume themselves. Further, the use of perfume to define group environments appears on a far grander scale after the death of Alexander, with crowds being perfumed in arenas and at parades, and while the Greeks did use perfume at their symposia, they did not seem to be so elaborate about this as Athenaeus reports in the Roman period, nor is there any mention of people eating it.

How we smell what we smell and *why* we interpret what we smell the way we do are inextricably intertwined. Odors elicit responses both physiological and psychological, and these responses cannot be separated. Interpretation of odors, however, is largely learned behavior, and while language always initially follows perception, perception can follow language as well; we can be initiated into the mysteries of a different cultural sensorium through the written word. Nevertheless, this literature can and should be mined for clues as to how the ancients perceived the sense of smell and how they smelled their world, and further research in this area will be most contributory to our grasp of what their lives were truly like.

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