ARISTOTLE

DE SENSU AND DE MEMORIA
ARISTOTLE

DE SENSI AND DE MEMORIA

TEXT AND TRANSLATION
WITH INTRODUCTION AND COMMENTARY

BY

G. R. T. ROSS, D.PHI. (EDIN.)

CAMBRIDGE:
at the University Press
1906
ROBERTO PURVES HARDIE
AMICO
VIR PHILOSOPHIA ARISTOTELEA ERUDITISSIMO
AMICUS, DISCIPULUS
HANC EDITIONEM DEDICAT
PREFACE.

In the following pages I have attempted to give an adequate translation of the first two tractates belonging to the Parva Naturalia and I have appended a commentary which, I hope, will elucidate the many difficulties occurring in the interpretation of the text.

As regards the text I have been fortunate in having to my hand the admirable edition prepared for the Teubner series by the late W. Biehl. Before its appearance many of the difficulties seemed absolutely hopeless, but now there are but few passages where emendation seems to be desirable or, at least, where any alteration that can come nearer to the ipsissima verba of Aristotle may be successfully devised.

As my interest in preparing this edition was not mainly textual, I have refrained from discussing variant readings at great length unless they were of importance in determining the actual doctrine of the treatise. My purpose was to give a rendering of the Greek which should be accurate and should meet the needs of students of philosophy who, not being expressly classical scholars, have hitherto had no adequate means of becoming acquainted with these two important works. I have not prepared an apparatus criticus, but simply reproduce Biehl’s text, indicating at the foot of the page little else than the alterations I have made. For
full information as to the ms. sources of our text I refer to Biehl's introduction. Suffice it to say that the mss. fall into two main classes, L S U and E M Y; the former, though often agreeing with the excerpts found in Alexander's commentary and drawn from a source of high antiquity, yet seem to be specimens of an 'improved' version in which the crabbedness of the original text has been smoothed down, though often with a loss of the significance which a more thorough-going interpretation might have found in the concise and often awkward phrasing of the authentic statements. The E M Y group (of which Paris E—10th century—is the most important), though full of misspellings and inaccuracies, seem to have suffered less from editorial tampering, and thus apparently give us hints as to the genuine reading; they are often supported by the ancient Latin translation of William de Moerbeka used by Thomas Aquinas. Unfortunately the commentators generally have followed the mss. of the former group, especially Vatican L (14th century), and often expend great pains on explaining passages where their version is hopeless.

In my commentary I have tried not only to give such explanations of ordinary words and expressions as a student not yet versed in the Aristotelian philosophy will find useful, but to contribute an adequate elucidation of the undoubted difficulties which continually arise. In dealing with these I have derived much assistance from M. Rodier's monumental edition of the De Anima. Many of the ἀποφαίας in the De Sensu arise also in connection with the larger psychological treatise and, as a result of M. Rodier's labours, the path is now much clearer than formerly. Mr Beare's work on Greek Theories of Elementary Cognition came to hand just after I had finished the correction of the proofs of the present volume. Though I notice some points in which we
are not in agreement, I see many more in which I should have been able to profit by his great learning if the result of his researches had been accessible at an earlier date.

It should be stated that the present work originally formed a thesis, for which the University of Edinburgh awarded me, in April, 1904, the degree of Doctor of Philosophy. Since that date it has been revised and slightly enlarged.

It remains for me to thank the Syndics of the Cambridge University Press for undertaking the publication of this volume, and to express my gratitude also to the Press Reader and Staff for their valuable assistance. I am much indebted also to Mr J. A. Smith, of Balliol College, Oxford, for many important criticisms and suggestions. Above all my thanks are due to Mr W. D. Ross, of Oriel College, Oxford, who has read the whole work both in proof and in manuscript and whose counsels and criticisms have guided me at every turn.

G. R. T. ROSS.

May, 1906.

Note. I should like to point out to readers that though I have used Bekker's paging for purposes of reference, it has been found necessary to take a larger number of lines than he requires for the printing of each of his columns. Hence there is a tendency towards a discrepancy (which increases as we approach the foot of the Bekker page) between the number of the line in which a word or passage stands in this edition and its line-number in Bekker's text.

G. R. T. R.
# Table of Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>1–40</td>
</tr>
<tr>
<td>II. Text and Translation of the <em>De Sensu</em></td>
<td>41–99</td>
</tr>
<tr>
<td>III. Text and Translation of the <em>De Memoria</em></td>
<td>100–119</td>
</tr>
<tr>
<td>IV. Commentary on the <em>De Sensu</em></td>
<td>121–243</td>
</tr>
<tr>
<td>V. Commentary on the <em>De Memoria</em></td>
<td>244–286</td>
</tr>
<tr>
<td>VI. Appendices</td>
<td>287–292</td>
</tr>
<tr>
<td>VII. Indices</td>
<td>293–303</td>
</tr>
</tbody>
</table>
INTRODUCTION

SECTION I. THE PARVA NATURALIA.

The two treatises styled briefly the *De Sensu* and the *De Memoria* form the initial members of that collection of tractates on separate psychological topics known to the Latin commentators as the *Parva Naturalia*. The full list of these 'opuscles' is not found in *De Sensu*, ch. i, but practically the whole of the topics to be discussed are there set forth. They are essays on psychological subjects of very various classes, and there is so much detail in the treatment that, if incorporated in the *De Anima*, they would have detracted considerably from the unity of the plan of that work. Consequent on the separateness of the subjects in the *Parva Naturalia*, the method of treatment is much more inductive than in the *De Anima*. There, on the whole, the author is working outwards from the general definition of soul to the various types and determinations of psychic existence, while here, not being hampered by a general plan which compels him to move continually from the universal to the particular, he takes up the different types of animate activity with an independence and objectivity which was impossible in his central work.

Some plan, of course, there must be in any coherent scientific exposition, and Aristotle seems to proceed from a discussion of those activities which are ἡδια to animals, *i.e.* belong to animals *quid animae*, to those which are Κοιναι, viz. affections which, though found in animals, are not
uniquely a feature of animate existence; to the former category belong sensation and memory etc., to the latter evidently such phenomena as νεότης καὶ ὑήρας, ᾠων καὶ θάνατος. I have selected the first two treatises of the former class, on Sense and on Memory, for translation and comment. They have perhaps more importance for general psychological doctrine than any of the others, and in them certain metaphysical problems of unusual interest are raised.

SECTION II. THE DE SENSU.

The περὶ αἰσθήσεως καὶ αἰσθητῶν—Sense and its Objects, is not merely a treatise on the subjects referred to in the title but takes in also an account of the organs of sensation, not an account of each organ in detail but of the general character and ultimate constituents of the sensitive members. This occurs in chapter 2, and thereafter the objects of the special senses are discussed not merely as relative to sense but in their own proper nature as modifications of external reality. It is this which distinguishes the account of sense given here from that in the De Anima; there the objective physical nature of that which stimulates the sense organ is only glanced at. The treatment of taste and odour is particularly minute, and here we get involved in the details of the Aristotelian physics which now-a-days seems so crude and remote from our habits of thought. In fact, in the whole of this treatise we seem to be immersed in detail, and there is less of the wide generalisation and speculative insight which characterise Aristotle's chief psychological work.

In the treatment of the special sense objects there are notable omissions. Not a word is said about touch, while the physical process involved in hearing has little more than a reference made to it1.

In chapters 6 and 7 Aristotle goes on to discuss certain problems which have arisen in the course of the

1 In ch. 6, 445 b 3 sqq.
discussion, problems lying at the root of all perceptive process. First, do the objects of perception have any part too minute to be perceived? Are there any imperceptible magnitudes? The answer is no; but this is not stated without an important reservation. Considered separately the minute parts of an object are only potentially perceptible, though taken in conjunction with the other parts that go to make up the total object, they do make an impression on the sense and hence are actually perceptible. The simple converse of this proposition is proved at the end of chapter 7. Every sensible object has magnitude; whatever has magnitude has parts and there is no atomic object of sensation. If you suppose an object to be so far removed as, while yet remaining visible, to be perfectly indivisible to the eye, it must occupy a mere point in space; any further removal from us would render it invisible, while any nearer approach would give it magnitude. It then occupies a point where the distance at which it is invisible and that at which it is visible meet; but, since a point is an absolute numerical identity and is without parts, the object occupying this point must be simultaneously visible and invisible—an absurd conclusion.

In the second part of chapter 6 Aristote raises points about the process involved in the stimulation of sense by a distant object, deciding that in the case of sight it is instantaneous. In chapter 7, he inquires about the principle of coordination in sense perception. He decides that, except in the case of sensations which fuse, we cannot account for the simultaneous perception of two objects unless we assume that there is some unitary principle over and above the special senses which, though numerically a unit like a point, yet has a double aspect, like the point, which may be regarded as the terminus of each of the two lines which it separates; or again the unity of the central sensitive principle may be regarded on the analogy of that of the self-identical object which yet may have diverse attributes. This central sense is λόγος or

\[1\] 446 a 22 sqq.
INTRODUCTION

τῷ ἐνναῷ plural, though it is ὑν ἀριθμῷ. Its organ is localised in the heart, and to it other functions as well as those of coordination are ascribed.

SECTION III. THE DE MEMORIA.

The full title of this treatise is περὶ μνήμης καὶ ἀναμνήσεως (Memory and Recollection), and the two subjects occupy respectively the first and second of the two chapters which the book contains.

Memory (μνήμη) depends upon the retention of a sense stimulation after the object producing it has ceased to affect us. The stimulus appears to persist in the heart and is then known as an image (φάντασμα). Memory consists in regarding this φάντασμα as the image of the absent object and not merely as an object of consciousness that does not refer to a reality other than itself. The condition to be fulfilled, if the image of an object is to be regarded as objective, is the union with it of the image representing the time which has elapsed since the experience took place.

Memory may occur either through the persistence of the original sense stimulation or through its reinstatement by another process which has been originally experienced in connection with it. This latter process of reinstatement it is which Aristotle distinguishes by the term ἀναμνήσεις. In its most typical meaning it is the purposive revival of a previous experience by a process of active search among the contents of mind, but apparently involuntary recollection is also grouped along with the voluntary. In describing the process Aristotle formulates definitely for the first time the three well-known laws of the Association of Ideas, the laws of Similarity, Contiguity, and Contrast. With some subsidiary discussions, e.g. that which shows the dependence of

1 De Mem. and Section IX. below.
2 De Mem. ch. 2, 455 b 36 sqq.
memory and recollection on bodily processes, the treatise on memory closes. On the whole this treatise is on a higher level and contains more suggestive thoughts than the previous one.

SECTION IV. ARISTOTLE'S PHYSIOLOGY.

In order to understand the relation in Aristotle of the Physiology to the Psychology of sense and memory we must go back to the De Anima and seek the sources of our discussion there. The common terms for the phenomena belonging to both faculties alike are πάθος—modification, and κίνησις—change or process. But the question is, of what are they the changes or modifications? They are πάθη of the soul, but all the πάθη (with the exception of νοῦς\(^1\)) are common to soul and body alike (De An. i. ch. 1) and are as much affections of the body as of the soul. The true φυσικὸς—scientist—who studies the phenomena of life must not leave out of account the material embodiment of the psychic processes. Sight is, as it were, the soul of the eye but it cannot be studied apart from the eye; and this holds good of all psychical phenomena generally. At the same time Aristotle does not lose sight of the superiority of the mental aspect of the facts. The soul generally is an ἔνεργεια or ἐνεργεία; that is to say, in manifesting soul the body realises its proper end and fulfils its proper function. ἐνεργεία means perfection and properly (like ἔνεργεια) refers to something mental. Aristotle illustrates the relation of soul to body, by that existing between a manufactured article (an axe) and the idea realised in it. Here once more the ἔνεργεια or ἐλέος is something mental (though of course the cases are different, as the ἐλέος of an axe is not an immanent motive principle regulating the existence of the thing through a series of changes, as the soul of a man maintains his bodily life). Similarly an act of perception which is a πάθος—a passive affection, in so far as it involves

\(^1\) De An. ii. ch. 1, 413 a 7.
a bodily affection, is, as an act of mind, an ἐνέργεια and not a mere πάθος or κίνησις. Just as in the act of perception or knowledge the passive bodily determination serves as the instrument for the realisation of a mental act; so in the passive alteration which must be experienced in building up a state of knowledge there is involved a transition which is not ἅλλοιωσις—qualitative change, in the usual acception, but is the realisation of a determinate state of mind the existence of which alone makes the processes of transition intelligible. We may generalise then and say that only in so far as they are bodily affectings are mental phenomena processes or passive modifications; mind as such is ἀπαθής; in thinking we are not passively affected.

This is especially true of the highest faculty of consciousness, νοῦς or νόησις, the apprehension of concepts, but the question need not be raised here whether in the human soul this impassivity or pure spontaneity of thought is anything that has a separate existence. Aristotle’s answer in his special discussion of the subject in De An. III. ch. 5, leaves no room for doubt that in his view it is not so. The human νοῦς is παθητικός, i.e. it is merely the cognitive aspect of a process ultimately material.

Thus Aristotle’s theory of the relation of mind and body may in a way be designated as a doctrine of psychophysical parallelism. But this should not blind us to the fact that with him the mental aspect of the process is no epiphenomenon. Mind occupies the higher place in the scale. It is the important member of the pair of correlatives, is the end for which the bodily changes exist and has all the dignity implied in the epithets ἐνέργεια, εἶδος and ἐντελέχεια. Having made this reservation we may be quite untroubled at finding in his account of sensation and memory what looks like the crudest materialism. Objects exist in the physical world external to and in relation with an organism; they, whether when in contact with it, or at a distance, act upon this

---

1 De An. II. ch. 5 passim.
2 Cf. De An. II. ch. 5, 417 b 8; cf. also I. ch. 3, 407 a 32.
organism and produce changes, whether mechanical (mere φαρά), or qualitative (αλλαώσεις), in certain of its members. The reception of these changes in the sense organ is perception. But why should the mere production of a process in a bodily part be an apprehension of the object which causes it? We must remember what Aristotle says about sense being δεκτικὴ τοῦ ἐιδοῦς, and what he affirms about the sense holds equally of the sense organ. In fact, he frequently talks of a sense and its organ without discrimination of the two. Evidently then what gets inside the organ must be the ἐιδος of the external object. If we think of the ἐιδος or knowable character of the object as existing independently in the external world, then the ἐιδος which is present in the sensorium cannot be numerically the same; it will be only specifically identical with it or analogous to it. With regard to the subjective processes persistent in the central sensorium and representative of absent objects this seems to be the view held. Again with sense a similar position seems at times to be taken up. The eye is transparent and receives the light which exists in the external medium, and similarly the movement of the air which sound is, is something ἀλλατριος, and merely sets in activity a corresponding movement in the air of the internal ear. But from another point of view it seems erroneous to talk of the ἐιδος in the object and that in the organ as being numerically different. You may not talk of the same concept when realised in two distinct individuals as being numerically different; it is rather the individuals that are numerically distinct, while in concept, i.e. specifically, they are one. Thus it is in ἐιδος that the object and the organ are one. The ἐιδος of the object is its ἐνέργεια. Hence the ἐνέργεια of the object and that of the sense organ are one; it is only in respect of particular existence (τῶν ἐνεργ.) that they can be regarded as distinct.

1 De Sens. ch. 1, 438 a 13 note; cf. De An. III. ch. 2.
2 De Mem. ch. 2, 452 b 16 note.
3 De Sens. ch. 2, 438 b 11.
4 De An. II. ch. 8, 420 a 17.
5 Cf. De An. III. ch. 2, 426 a 15 and 425 b 37.
A grave difficulty arises here; the object as it is for knowledge will, on this showing, only exist in the act of perception; it will have merely potential existence before this. Such is the view taken in De An. III. ch. 2, and Metaph. IV. ch. 5, 1010 b 30 sqq.; but there Aristotle is quite sure that though the sense object as such only exists in perception yet its ἐποκείμενον (substrate) exists independently. There is, however, no way of characterising this substrate if all the qualities given in sensation are abstracted from it, and yet it is clear that, when Aristotle talks of the ἐποκείμενα of sense objects, he cannot mean the mere undifferentiated πρώτη ὑλή. He cannot, on the other hand, mean by them objects with geometrical and kinetic qualities only, the subterfuge by which atomistic physics avoids the difficulty of the independence of the external object; Aristotle did not believe in atoms. Accordingly we continually find expressions which imply that the ἐνέργεια or ἐνεπέλεχεια already exists as realised in some way in the external object. In truth, the fact that the external object is the agent in perception and transmits its character to the sense, shows that it must already possess that character. It is from this point of view that Aristotle discusses the physiology of the sense organs.

It is obvious that, if the sensoria are to be capable of receiving the same εἴδος as that existing in the external object, they must consist of the same ὑλή; if, on the other hand, the subjective affection were merely an ἀνάλογον of the external as is suggested in De Mem. ch. 2, 452 b 17 it would hardly be necessary for the ὑλή to be identical. The latter, of course, is the modern conception. Molecular disturbances in the brain correspond one by one to different transferences of energy in the external world; every event in the universe can have an appropriate and more or less adequate symbolisation in the human brain. But one would

---

1 Cf. below, Sec. x. of Introduction, for a further discussion of the objectivity of objects of sense.
2 e.g. De An. II. ch. 5, 418 a 3.
3 This is implied in De An. loc. cit. 417 a 6 sqq.
INTRODUCTION

hardly say that the formula of the neural process (if it could be found) was the same as that which expressed the production of a red light or the flight of a projectile, nor would the oscillation of particles in the brain be in the least like those external phenomena. Aristotle, on the other hand, tried to think of the subjective κίνησις as occurring in pari materia with the external event, and probably where he refers to the subjective ἐλέος as an ἀνάλογον of the external he does so because he is thinking of the processes in the central organ involved in memory; the heart, probably to be identified as the organ of memory, is not of the same character as the external transparent medium; but the eye, the organ of the special sense of sight, is\(^1\).

SECTION V. PHYSIOLOGY OF THE SPECIAL SENSES.

The qualitative identity of the organ with the vehicle or medium in which the objective sensuous quality is generated is most conspicuous in the case of sight and hearing. The συνόψις ἀπό of the ear\(^2\) and the transparent pupil accept, in the one case the impulsive movement set up in the external air, in the second the light which is the basal principle of all specific modifications of colour. The primary constituent of the visible ἐλέος of things is light. Light is the activity of a transparent element which penetrates all bodies in differing degrees and, at the extremity of solid bodies, shows as colour. This colour is either positive or negative, black or white, and all other colours are mixtures of those two elements in different proportions\(^3\). The visible form of a thing is therefore the determinate mixture of these two constituents and, when we see, this (by a propagative process said to be not a transition in time\(^4\)) gets, as it were, stamped upon the sense-organ\(^5\). We hear that it is the

\(^1\) De Sens. ch. 2, 438 b 7 sqq.
\(^2\) De Sens. ch. 2, 438 b 21; De An. 11. ch. 8, 450 a 3.
\(^3\) De Sens. ch. 3, 439 b 19 sqq.
\(^4\) Cf. De Sens. ch. 6, 446 b 31.
\(^5\) De An. 111. ch. 12, sub fin., and De Mem. ch. 1, 450 a 33; also De An. 11. ch. 12, 474 a 19.
colour which stimulates the medium\(^1\) and consequently the sense, and one would thus suspect that the colour was something different from the process which it produces. But that can hardly be so; the colour or modification of light must be the visible form of the object, and it is that or something qualitatively identical with it which enters the eye. The process of transition in the medium which results in the establishment of vision, or indeed of any of the mediated acts of sense perception, seems to be conceived as consisting in a pushing forward of this sensuous character until it actually gets embedded in the percipient organ. In the case of hearing this process is mere φορά—change in place, whereas in smell it is a continuous qualitative change—ἀλλαγώσις, and in sight something still higher, something not a transition at all in the sense of occupying time\(^3\). There must be, however, some object which originates the process, which itself does not move. This is, we must suppose, the ἅπαξ ἑπεφθάνον of the sensuous character. It is, however, Aristotle's practice to allude both to the object which causes sensation and to its sensuous character, the sound or colour, by the single word τὸ ἀκούων.

It had been the ambition of the earlier psychologists to identify each sense organ with one of the four elements. On the theory that like is perceived by like each organ will perceive the qualities of that element with which its nature is identical. Aristotle shows that, prior to perception, the organ must be unlike the quality perceived. The sense organs are not all composed of a single element. As we have seen two are (the eye and the ear); but the organ of smell consists of both air and water, or perhaps one element in some animals, the other in others, while πνεῦμα, if present anywhere, enters into all and γῆ into that of touch\(^4\). But we do not by any organ perceive the qualities actually possessed by the substance composing it. The qualities possessed by any of the elements are tactual, while those apprehended by the

\(^1\) De An. ii. ch. 7, 418 a 31.
\(^2\) Cf. De Sens. ch. 6, 446 b 30 and also De An. iii. ch. 12, 434 b 30 sqq.
\(^3\) Here I follow the account in De An. iii. ch. 1, 425 a 3 sqq.
senses of sight, hearing, and smell are not tactual. The organ fulfils its function in being the vehicle or neutral receptacle of qualities existing in a vehicle of the same nature outside it. In being neutral in this way the organ will be capable of receiving the opposite determinations which characterise the contents of each sense. In the case of the qualities apprehended by touch, the organs, being composed of the various elements, must show a μεσότης of the various tactual qualities; this must mean a combination in equal proportions of those qualities in order that something neutral and capable of registering the variations on this side and that of the mean point may be formed. This organ would naturally be the flesh, which is a composite formed from all the elements, and we should expect that its λόγος τῆς μέξους was the μεσότης in question, but though at times this is his doctrine, in the De Anima Aristotle apparently will not have it so, probably, however, meaning only that the external surface of the body is not the sensorium but rather the medium which communicates tactual impressions, the real organ or ἐσχατον αἰσθητήριον being the heart. This, however, is after all a fleshly organ, and in fact, on the analogy of the senses of sight and hearing, the medium must be of the same nature as the receptive organ, for it has to be capable of transmitting the stimulus which ultimately reaches the organ and so causes perception.\footnote{For confirmation of this view cf. De Part. Animal. 11. ch. 8, 633 b 24. Talking of the flesh he says: ταύτης (ἀφθή) ἢ αἰσθητήριον τὰ τοιοῦτον μόνον ἐστιν, ἢ τὸ πρῶτον ὡστε ἢ κόρη τῆς ἄνευς, ἢ τὸ δὲ ὀσ τονυπάλλευν, ὡστε ἢ ἂν εἰ τις προκάλξει τῇ κόρῃ τὸ διαφανές πάν. The flesh functions both as organ and as medium, cf. Bäumker, Des Aristotles Lehre von den Aussen- und Innern Sinnes- vermögen, pp. 55, 56.} Evidently he conceives of the exterior flesh of the body transmitting the tactual properties of things, heat, cold, hardness, softness, etc., by a progressive qualitative alteration like the propagation of odour in the air, or, in a way, of light in the transparent medium. Since in this case the organ and the medium alike are bodily members and they receive and transmit the differentiae of other elements than earth, they cannot consist of one element alone; they cannot be the hard
parts of the body, e.g. bone, etc., which must be referred to earth\(^1\), and hence there is nothing left for them to be but the flesh.

The eye consists of water; though air would have served, being also transparent, yet water is more easily retained in position\(^2\). The material out of which it is constructed is derived from the brain, which Aristotle describes as an organ with an excess of moisture\(^3\). The material of the organ of hearing is simply a \(\sigmaυμφωνης\ \alpha\iupsilon\rho\). The ultimate organ of touch seems, as we have seen, to be the heart, and consists of flesh, a compound of all the elements. Yet, though not consisting of \(\gamma\eta\) alone, the flesh, as something \(\sigmaυμτωτωδες\), i.e. solid, seems to contain a preponderance of \(\gamma\eta\), that element which is most characteristically a \(\sigma\omegaμα\)\(^4\). This fact may lend some countenance to a statement made at the end of the second chapter of the \textit{De Sensu}\(^5\), according to which the organ of touch consists of earth. This assertion as it stands without qualification is in flat contradiction with the teaching in the \textit{De Anima}, and it is noteworthy that it occurs in a passage where Aristotle is not stating his own final opinions, but is discussing in a tentative way some possible working interpretation of the theory which assigns a special element to each organ\(^6\). Aristotle there tries to combine with it his own theory that the organ is, before perception, only potentially of the nature of the determination which it perceives. But this will conflict with the doctrine that the organ of touch actually consists of \(\gamma\eta\); for, in order to perceive the qualities of \(\gamma\eta\), it will need to be only potentially of that nature, and is, in fact, Aristotle says, warm, being connected with the heart, the seat of the animal heat, and \(\gamma\nu\alpha\) hot it must have the character opposite to \(\gamma\eta\) (which is cold).

\(^1\) Cf. \textit{De An.} iii. ch. 13, 435 a 20 and \textit{De Part. Animal.}\ II. ch. 1, 647 a 14.

\(^2\) \textit{De Sens.} ch. 2, 438 a 15.

\(^3\) \textit{De Sens.} ch. 2, 438 b 30, and \textit{De Gener. Animal.}\ II. ch. 6, 744 a 5 sqq.

\(^4\) Cf. \textit{De Part. Animal.}\ II. ch. 1, 647 a 19 sqq. and ch. 8, 653 b 29, and cf. also notes to \textit{De Sens.}\ ch. 5, 445 a 20 sqq.

\(^5\) 438 b 31.

\(^6\) Cf. \textit{De Sens.}\ ch. 2, notes to 438 b 17 sqq., and Bäumker \textit{op. cit.}\ pp. 47, 48.
Similarly the organ of smell will be only potentially warm, if the nature of odour lies in heat. This will accord with a derivation of the sensorium of smell, like that of vision, from the watery substance of the brain. But, though heat is required for the diffusion of the odorous principle, it is not that principle, and consequently the theory breaks down once more. His own doctrine, as we have seen, is that the organ consists both of air and of water or of either one or the other.

The organ of taste is the tongue, though, as in the sense of touch, there is a reference back to a still more primary organ—the heart¹. Aristotle regards taste as a subvariety of touch, evidently on the ground both that contact with the object is necessary in each alike and that taste discriminates in an indirect way the tactual properties of things which go to make up their nature as the possible constituents of nutriment². A certain independence, however, is allowed to the tongue, and, since tastes only exist in humid matter, the tongue must have a neutral humidity³,—once more the doctrine that the sense organ shows a μεσότης of opposite determinations. In this case, however, the parallel to the other senses cannot be consistently worked out. The opposite determinations in taste are not excess and deficiency of ἔργωτης but rather τὸ γλυκὸν and its negative τὸ πικρὸν, which are ultimately reduced to τὸ κοῦφον and τὸ βαρύν respectively. Again, in the passage from De An. ii. ch. 10 referred to above, Aristotle confuses two distinct conceptions; if the tongue is only potentially humid, as he says, it cannot be described as of a neutral humidity.

The above inconsistencies only show the enormous difficulty in giving any coherent account of the process of sense stimulation in terms of the ancient physics. They in no way detract from the value of the central principle involved—that the organ is of a nature capable of manifesting in itself the contrary determinations which characterise the objective qualities falling under any one specific sense; that apart

---
² De Sens. ch. 4 passim.
³ De An. ii. ch. 10, 422 a 34 sqq.
SECTION VI. THE PHYSIOLOGY OF THE SO-CALLED COMMON SENSE.

In addition to the special senses there is an unifying or central function of sense by means of which we perceive the κοινὰ αἰσθήματα, i.e. the determinations of number, unity, figure, magnitude, and change involved in the apprehension of the special sensations of colour, sound, hardness, etc. Figure and magnitude are perceived at least by two senses, viz. sight and touch, and unity seems to be an idea involved in the functioning of each single sense alike. Again, the comparison and discrimination of qualities belonging to different senses require a unifying principle in some way over and above the particular sense organs. Indeed, the simultaneous discrimination of qualities given by the same sense seems to require the existence of such a principle. Lastly, to this also is to be ascribed the self-consciousness that accompanies all perception, e.g. the perception that we see, hear, and feel, etc.

This central function of sense is localised in an internal

1 The explicit references are only to touch (De An. II. ch. 11, 424 a 4, III. ch. 13, 435 a 21, Meteor. IV. ch. 4, 382 a 19) and the discrimination of pleasure and pain (De An. III. ch. 7, 431 a 11).
2 Cf. De Sens. ch. 4, 447 b 8.
3 Cf. De An. III. ch. 1, 425 a 20 and De Sens. ch. 7, 447 b 37. It is specific unity which is perceived by the functioning of a single sense.
4 De An. III. ch. 2, 456 b 12 sqq.
5 Cf. De An. loc. cit. infra and III. ch. 7, 431 a 17 sqq.; also De Sens. ch. 7, 449 a 1 sqq. and notes.
6 Cf. De Somnia, ch. 2, 455 a 15 sqq.; De An. III. ch. 2, 475 b 12 sqq.
7 It is well to note that the mere fact of talking about 'the common sense' or 'the central sense' may give a wrong impression of the way in which Aristotle conceived this faculty to exist. Aristotle, in fact, does not talk except in one instance (De Mem. ch. 1, 450 a 12) of κοινὰ αἰσθήματα but usually of τὰ κοινά.
organ, and that is universally admitted to be the heart\(^1\). But
great difficulties arise when we attempt to determine whether
it is the heart as a whole which is the organ, or only some part
of or constituent in it. Great uncertainty also surrounds the
question as to how the central and the peripheral organs are
connected, and similarly what is the exact relation between
the inner faculty and the special senses. As to the physiology
of the central organ there is but little said in the two treatises
which we are discussing (the passages, De Mem. ch. 1, 450 b,
and ch. 2, 453 a 16, do not help us much), while as to the
connection between central and end organ there is not a
word. Accordingly a full discussion of this subject belongs
rather to a treatise dealing with the De Somno, De Insomniis,
and De Juvent., De Resp., etc. At present it will be sufficient
to examine the main contentions of Neuhäuser\(^2\) as to the
subject in question in so far as they derive confirmation or
the reverse from passages in our text.

Neuhäuser maintains (1) that, though many passages\(^3\)
would lead us to believe that the perception of the special
sense qualities is localised in the end organs, this is not really
so. The stimulation communicated from the external objects
or the medium to the end organ is continued right up to the
heart. Perception does not result unless the heart is in a

\[\alpha\nu\theta\gamma\alpha\] and \[\tau\iota \kappa\omega\nu \ \alpha\nu\theta\gamma\alpha\nu\]. It is not a sense functioning in independence of
the special senses, as any one of these may function in independence of the others; as such it would require to have a special organ independent of the other sense-organs—a doctrine against which he argues in De An. III. ch. 1, 425 a 13–21.

The common sense is, in fact, that common function which all the special senses possess, namely that of discrimination, which, as common to all, is contrasted with the special receptivity which each has for the separate kinds of objective quality, e.g. sound, colour, etc. It is this function of discrimination which requires the coordination of the stimuli received by the special sense organs in a central or common sensorium. Perhaps then, in strictness, we should talk not about a common sense but about the common discriminative function of sense. Cf. section X. below and Neuhäuser, Aristoteses Lehre von den sinnlichen Erkenntnisvermögen, pp. 30 sqq.

\(^1\) Cf. De Juvent. ch. 3, 469 a 10, ch. 4, 469 b 3. De Gener. Animal. II. ch. 6, 743 b 25, De Part. Animal. II. ch. 10, 666 b 24 etc.


\(^3\) Cf. Bäumer, pp. 79, 80.
condition in which it can function, hence it is the presence of the κυήσεως in the central organ that constitutes perception. Secondly (2), the medium of communication between the peripheral and central organs consists of πόροι—canals (in the case of the three senses of sight, hearing, and smell), which are filled with a substance identical with that which composes the end organs themselves. This he extracts from statements (a) that these organs are in connection with the heart, (b) that πόροι from them extend into the veins of the brain, (c) that the organs of hearing and smell are themselves really πόροι full of air (σύμφυτον πνεῦμα), and (d) that in the case of the eye its substance has issued through the πόροι from the brain; finally (e), it is neither the blood nor any bloodless part which is the organ of sensation, but a structure created out of the blood. Thirdly (3), the central organ of sensation is not the heart itself, but a substance found in its middle chamber and designated by Aristotle τὸ καλούμενον θερμὸν and also πνεῦμα. We hear as well that this substance is analogous to the element found in the stars (ἀνάλογον οὖσα τῷ τῶν ἄστρων στοιχείῳ), yet it is not πῦρ, though we generally identify τὸ ἄνω σώμα—the aether, with fire, and we hear elsewhere that the ψυχή is ὀσπερ ἐμπεπυρωμένη—suffused with fire. The point is that this substance is different from the elements of the sublunary world and seems to serve as a basis or substratum for terrestrial conscious life, just as the upper aether serves as the substratum for the psychical existence of the heavenly bodies. It is frequently named τὸ φυσικὸν θερμὸν, τὸ σύμφυτον θερμῶν, and is to be identified with τὸ σύμφυτον πνεῦμα, of which we hear so much in the περὶ ζωῆς κυήσεως.

Neuhäuser seems to show pretty conclusively that the
heart is properly characterised as the place in which the central organ or faculty of perception is situated, not as the organ itself (except surely in the case of the sense of touch); again, if the organ of consciousness is not the heart as a whole but only some constituent in it, the seat of this organ is probably the middle chamber of the heart.

Now these contentions may all be just, but the question arises whether this element or anything of the nature of a substance will serve as a counterpart of that principle of unity which, according to Aristotle, the common sense must be. This σύμφυτον θερμόν or σύμφυτον πνεύμα must be a substance and hence quantitative. Aristotle tells us that the primary organ of sensation or that which perceives must be a magnitude. It is the sense or its concept which is non-quantitative. Now in the De Anima, III. ch. 2, 427 a 1 sqq., he likens the principle of unity to something for which the only analogue is a point, the point which, while remaining indivisibly one, has yet a double reference as the end of the two segments respectively of a line which it divides. This is also the doctrine to be extracted from De An. III. ch. 7, 431 a 19 sqq. and De Sens. ch. 7, 448 b 19—449 a 22. In the latter passage he takes up the supposition that different qualities could be simultaneously discriminated by an organ which, while not atomic, was yet atomic in the sense of being completely continuous. Such a description would fit, if not the heart, that supposed internal substance of celestial affinities which it contains. The hypothesis is negated, and Aristotle passes on to the conclusion of the De Anima—that that which accounts for the holding of different sensations in unity must be actually a perfect unity, though in aspect diverse. It is true that he also compares the unity of this psychic principle

---

1 In the passage in De Part. Animal. II. ch. 1, 647 a 28, where he talks of a μέρος (evidently the heart) being capable of receiving all sense-qualities he is probably referring to actual ἀληθήρα.

2 Neuhäuser, op. cit. p. 86.

3 De An. II. ch. 12, 424 a 17 sqq.

4 Cf. notes ch. 7, below loc. cit.

5 The heat in the heart is καθαρώματα; De Gen. Animal. II. ch. 6, 744 a 29.
to the unity of an object with diverse qualities\(^1\). But, as we shall see, this involves no difference of theory; the ascription of two attributes to one spatial thing involves a reference to an identity which is itself not spatial.

Hence we come to the conclusion that Aristotle in accounting for ‘apperception’ has to make reference to a unity that cannot be described as a material organ. It is true that in consonance with his general psycho-physical parallelism he should be forced to try to think of it as an organ, but it has that characteristic which nothing corporeal can possess; it is \(άτομον πτέρυγα\). Hence we cannot conceive both the soul and its immediate substrate (numerically the same as the central organ of sensation) as unity\(^2\).

It is naturally just here that the parallelism of mind and body, \(αληθησις\) and \(αληθητήριον\), should break down. It is just in coordinating and distinguishing the contributions of the senses that the \(ἐνέργεια\) of a typical act of mind comes in. It is as referred to a unity that sensations are anything for mind. Now \(χωδε\) \(ἐνέργεια, i.e. χωδε\) mental, a psychical phenomenon is nothing passive and nothing to be ascribed to body. Mind in its proper nature is \(ἀπαθῆς\), and hence, if we were to ascribe the function of apperception of sensations to anything, it would need to be assigned to the \(νοῦ\), which is \(ἀπαθῆς\), and “comes in from outside”\(^3\). The essence of my contention is, that it is impossible to ascribe to an organ that which, not being an instance of \(πάσχει\)—passive alteration, it is the function of nothing corporeal to account for. Unless Aristotle were to maintain that the substrate of the soul, the \(σύμφυτον \thetaερμὸν\ or \(πνεῦμα\), were not extended (which would be the same as making it immaterial) he could not attribute to it the unification of consciousness. As facts are, he says or implies in \(De An.\ II. ch. 12 ad init.\) that the organ is a \(μέγαθος\).

At the same time this psychical substance may very well

---

\(^1\) Both here and in \(De An.\).

\(^2\) I note that Neuhäuser, p. 110, agrees with me in thinking that \(τὸ \άτομον και \ἐνέργεια\, De Mem. ch. 2, 451 a 28\), refers to the organ of sensation.

\(^3\) Neuhäuser, p. 104.

\(^4\) \(De Gen. Animal.\ II. ch. 3, 736 b 28 \τὸν νοῦν μόνον \θερμά \ἐν \πάσχει.\)
be the organ which accounts for the *plurality* of impressions which are united in one act by the mind. It may be this which is the delicate structure capable of receiving and retaining the multitude of impressions which function in memory. In our treatise (the *De Memoria*) there is nothing which bears this out. We hear about processes in *τὸ αἰσθητικόν* being interfered with by the too great pressure of the parts above them¹, and of defects of memory being due to excessive fluidity or hardness of the receptive structure². This last description would surely suit the heart as a whole better than the mysterious *πνεῦμα* which it contains. It really does not matter which was Aristotle’s theory; anything extended will suffice, so far as space goes, for the reception of a plurality.

On the subject of the connection between central and end organ there are, in our treatises, no materials to enable us to come to a decision. We hear³ of affections going on *καὶ ἐν βάθει καὶ ἐπιπολής*, *i.e.* both in the central and the end organ, and we hear that it is the *κίνησις* going on *in the eyes* which causes us to have light sensations still when we turn aside out of the sun into the dark. Of course it may still be the case that perception does not occur until the *κίνησις* reach the heart, but it is not necessary to believe that the medium of communication was, according to Aristotle, qualitatively the same as that of the end organ, and that the process transmitted to the heart was hence qualitatively the same as that realised in the end organ⁴. An impression in the central organ is known as a *φάντασμα*⁵; the question is whether an *αἰσθήμα* is, as Neuhäuser maintains, numerically the same as and only in aspect different from a *φάντασμα*. Without committing ourselves to an answer it might be profitable to point out that a possible solution is that,

¹ *De Mem.* ch. 1, 453 b 1.
² Ch. 1, 450 b 1 sqq.
³ *De Insom.* ch. 2, 459 b 7.
⁴ Neuhäuser thinks that in maintaining this doctrine Aristotle anticipated the discovery of the nerves (due to Herophilus) or at least invented an analogue to them.
⁵ *Cl. De Mem.* ch. 1, 450 a 11.
though consciousness cannot arise unless the central organ be stimulated, the stimulation reaching it might be only analogous to and not identical with the modification of the peripheral organs.

SECTION VII. THE OBJECTS OF SPECIAL SENSATION.

(a) Colour. The ground-work of all colour phenomena is τὸ διαφάνες, which is a κοινὴ φύσις, a common characteristic, of two of the four elements, namely air and water. We translate τὸ διαφάνες as the transparent medium, but though it functions as a medium between the coloured object and the eye, it is not merely as a medium that Aristotle considers it. It is most frequently referred to simply as τὸ διαφάνες without the further qualification that it is a medium. It is properly a vehicle or ground-work for the manifestation of colour. It penetrates all bodies to a greater or less degree (doubtless Aristotle means all composite bodies, which contain air and water in some proportion), and it is in so far as they are thus permeated by it that they are capable of showing colour. The colour of a solid body is the limit, i.e. the surface, not of the body itself but of the διαφάνες in it. That is the colour seen, but the same nature extends right through the body. Similarly bodies that are not opaque but consist of a diaphanous substance altogether (αὐτῶν τῶν διαφανῶν) show colour. But that colour is light. This brings us to the consideration that it is not merely the existence of the transparent vehicle that causes colour or light phenomena to arise. In itself it is a mere δίναμις; it must be raised to the state of ἐνέργεια by the presence of fire in it. Hence light is the ‘colour’ of the diaphanous quality in bodies and is due to some other determining cause (κατὰ συμβεβηκός); it is not anything self-existent. It is equally defined as the ἐνέργεια or ἐνελεχεῖα τοῦ διαφανοῦς.

1 Cf. note to De Mem. ch. 2, 452 b 16, 17.
2 De Sens. ch. 3, 439 b 9.
3 439 a 34 sqq.
4 439 b 13.
5 439 b 1.
6 439 a 20 sqq.
The presence of fire causes the existence of actual light, the positive determination of the transparent medium, its absence that of darkness, the privation of light. These are the contrasted determinations for substances typically transparent: in definitely bounded (opaque) bodies, in which, it is implied, τὸ διαφανὲς does not exist in the same degree or purity, the contrasted determinations are black and white. Thus far there is no particular difficulty in the Aristotelian conception; light and colour are determinations ultimately identical, of the type ἐνέργεια, affecting a material or vehicle which, apart from these determinations, is neutral to them. Light is to be perceived as an all-pervasive character of transparent substances equally and instantaneously present in every part. But when we come to consider the action of a coloured object upon the eye, and remember that it is said to affect the vision by means of a κίνησις through the medium, it seems natural to consider this κίνησις to be light. When, in De Sensu, chapter 6, Aristotle talks of light proceeding from the sun through the medium to the eye, it is evidently thought of as the stimulation which causes sight. Similarly, when in the latter part of the same chapter he affirms that all parts of the medium are affected at the same time, e.g. that light travels instantaneously (and hence is not really a κίνησις), he seems to be still thinking of it as an activity exerted by the object on the eye (τὸ γὰρ φῶς ποιεῖ τὸ ὀράν). Yet in other passages it seems to be rather the indispensable condition of the operation of a coloured object on the eye.

The colour stimulates the transparent medium which already is in a condition of actuality, i.e. is illuminated; objects are seen ἐν φωτί. Again, in De Sensu, ch. 2, 438 b 4, light is referred to as possibly itself the medium. It is the κίνησις through the medium, whether that be light or air (in a state of illumination), that causes vision. Hence from this point of view light is not the activity exerted by the object on the sense organ but merely the condition of the exertion of this

1 De Sens. ch. 3, 439 b 17.
2 Ch. 6, 446 a 30 sqq.
3 447 a 10.
4 Ch. 2, 438 b 5.
5 446 b 30 sqq.
6 De An. 11, ch. 7, 419 a 7 sqq.
activity. When in chapter 6 Aristotle denies that light is a κίνησις (equally whether that κίνησις be of the type φορά—spatial transference, or διάλογος—qualitative alteration\(^1\)) he is still thinking of it as an activity, and the substance of his contention is, that that ἐνέργεια, which was elsewhere treated as the indispensable condition of that activity, is itself the activity which accounts for vision. It is very difficult to get the two conceptions to blend. The transference of the εἴδος of the object to the sense organ can only be thought of as a κίνησις, i.e. a process involving time. The activity as such is caused by the coloured object, whereas the ἐνέργεια is caused by the presence of the illuminating fire. Yet Aristotle, misled by the apparent instantaneousness of light, wished to conceive as not a κίνησις that which could only be a κίνησις and to raise it to the rank of an ἐνέργεια, i.e. something not physical at all.

The fundamental colour-tones are black and white, and Aristotle thinks to account for all other tints by the mixture of these two. He apparently wishes to make out that a mixture or rather chemical union of the substances which are black and white will give the chromatic tints\(^2\). One might have thought that common observation would have refuted this, and it is true that he does not say exactly this but merely “when substances unite so do their colours.” True union of any two substances is one in which the original character of the component substances is lost and a third distinct qualitative character emerges as characterising every minutest part of the compound. To our modern chemical theory this holds true only if we stop our subdivision of the composite at the molecule. Any further analysis is supposed to give us parts which are not qualitatively identical, i.e. the molecule is supposed to split into atoms which have the qualities of the diverse component substances. But to Aristotle this was not so; the minutest conceivable subdivision of a true compound would still yield parts which were qualitatively identical with the whole. The compound

---

\(^1\) Cf. notes ch. 6 ad loc.  
\(^2\) Cf. De Sens. ch. 3, 440 b 15 sqq.
was ὀμοιομερές. Of such a sort was the mixture of black and white resulting in the chromatic tones supposed to be. Mere juxtaposition of the minute parts of differently coloured substances resulted only in the production of an indeterminate neutral tint which varied with the acuteness of our perception and our remoteness from the object. It is noteworthy that, if one were to define black and white in the modern way as the capacity of a surface to reflect none or all of the light cast upon it, one could still describe the chromatic tints as intermediate between these, as diverse aptitudes for reflecting one portion and absorbing the rest of the total light. But of course nothing like this is to be found in Aristotle. What is suggestive in his theory is his contention that the difference of the composite tones depends upon the different proportions of the ingredients entering into them. This is an attempt to assimilate the theory of colours to that of harmonies; the pleasantest colours are those in which the proportions are simplest. This idea, if erroneous, is interesting as showing his readiness to recognise that mathematical relations enter into the constitution of reality. These relations are arithmetical; from mere geometrical characteristics you cannot derive any new quality; but, given a pair of opposed fundamental sensuous attributes, you can by a proportionate combination of the two account for the intermediate qualities. The same theory is worked out also in connection with flavour.

1 Cf. notes to ch. 3, 440 a 34 sqq.
2 In Metaph. x. ch. 7, 1057 b 8 sqq., white and black are distinguished as τὸ διαφαντικὸν χρῶμα and τὸ συγκράτικὸν χρῶμα, and one might suspect that this implied some theory that white was the active and black the passive element in colour mixture in conformity with the principle in Meteorol. iv. ch. 1, 378 b 22 τὸ γὰρ συγκρατικὸν ὀνείρεσθαι τὸ ἔσται. But from various passages in the Topics, e.g. III. ch. 5, 119 a 30. IV. ch. 3, 123 a 2, we find that it is white which is τὸ διαφαντικὸν χρῶμα. It is also said to be διαφαντικὸν ὑφέσω. I suppose the fact alluded to by this term is that it dissipates and exhausts the energy of the sense organ. If indeed the term is properly Aristotelian and not simply taken by way of illustration from some current popular theory, it is to be connected with the doctrine referred to in De An. iii. ch. 13, 435 b 13 and elsewhere, that excessive stimulation destroys the sense organ, and white being the purest and most characteristic colour will tend to this extreme.
(β) Sound is not treated at length in the De Sensu, and the theory of taste and smell involves to a still greater degree than that of light the crudities of the Aristotelian psychics. Not that we should speak with entire disrespect of the generalisation which assigned the constituents of all things to but four ultimate elements. The grouping of substances together according as they were dry, fluid, gaseous, or manifested warmth, implied something more than a mere universal of sense in each case. The distinctions reappear in modern science not as the designations of different primitive substances but as marking distinct states in which all matter can exist. At lees τὸ ἔτηρον ὑπὸ τὸ ἔρηπον ὑπὸ ὑδάτων, and ὁ ἄφινα corresponds to the solid, the liquid, and the gaseous states, and in the celestial fire—τὸ ἀνοὸ σώμα—which though not identical with is yet analogous to πῦρ, Aristotle in a way shadows forth the conception of the ether.

(ε) Flavour is, according to the De Sensu, a qualitative affection of liquid by dry substance. This modification is effected by the agency of heat (heat is the cooperating cause—συναίτισιν), and the process by which it is produced is a sort of solution of the dry in the liquid (πλώσις, ἐναποτέλεσιν). Knowing Aristotle’s theory of the qualitative modification of one substance by another, we shall, however, refuse to regard this as a diffusion of the particles of the solid in the liquid. It is no mechanical diffusion, but what we should call a chemical union of the dry with the moist; it is, in fact, a union more intimate than our chemical union is supposed to be. If it were not so, then really the particles of the solid would stimulate the sensation, and there would be some ground for the Democritean theory that it was the different shapes of these particles that produced the different flavours. This Aristotle entirely rejects; though taste is a tactual sense, that does not mean that it is acted upon by the spatial and mechanical properties of the minute parts of bodies,

1 τῶν τι τὸ ὑγρὸν παρασκευάζειν, ch. 4, 441 b 21.
2 De Sens. 441 b 17, cf. also ch. 5, 445 a 15.
3 Cf. above in connection with colour mixture.
4 Ch. 4, 442 a 31 seq.
analogous to those properties discerned by touch when the bodies have an appreciable mass. It is not the particle impinging on the tongue that causes the taste, but the qualitative modification of the liquid medium which is identified as the flavour. If we lived amidst this vehicle, surrounded by it as we are by the air, then it would act as a medium just exactly as the air does in odour or sound, and the sense of taste would be a mediated one. In assigning the sense of taste as a subvariety of touch, Aristotle no doubt has in mind the fact that, as things are, it is only effected by contact with a portion of the substance in which the qualitative modification known as flavour subsists; he also, of course, has in view his theory that the fundamental qualities of flavour, sweetness and bitterness, are really indices of the tactual properties of food which go to determine its value as nutrient. The sweet—τὸ γλυκὺ—is identified with the light—
τὸ κοῖνον, i.e. with that light substance which can be raised up by the supposed vital heat operative in digestion and so get incorporated in the organism. The bitter—τὸ πικρόν—
being heavy, sinks down and passes away as excrement. Those actual properties, be it noted, are not spatial or dynamical according to Aristotle, but qualities given by the special sensations of touch, and it is upon such tactual attributes of objects that their value or hurtfulness for our organisms depends.

All other tastes than sweet and bitter are composites of those two qualities in different proportions, exactly as the chromatic tones are compounds of black and white.

(d) For odour to exist we require the prior production of flavour; we must already have τὸ ἐγχυμον ὑμρόν, i.e. liquid modified by flavour, or, what is the same thing, τὸ ἐγχυμον ἔμρον, dry substance which has produced a qualitative modification on liquid. The further solution of this flavoured substance in either air or water is, it seems, that which

1 De Sens. ch. 6, 447 a 8.
2 441 b 26 sqq.
3 Cf. above (a) on colour.
4 De Anim. 111, ch. 13, 435 b 4 sqq.
5 Cf. notes to ch. 5, 442 b 31.
produces odour. The diffusing agency is again heat, but it must be a fresh diffusion of the sapid substance which produces odour; if not, odour to creatures living in water would be identical with taste, whereas Aristotle distinctly assigns the sense of smell as such to them. Similarly odour to animals that respire is not simply the presence in air of exactly the same thing that in liquid causes taste; it is a ‘diffusion’ in the air of the flavour itself, not of the cause of the flavour. But, since flavour is the basis of odour, differences in the latter correspond to the varieties of the former, and the scents derive their names from those distinguishing the tastes to which they correspond, owing to the similarity of the actual sensations.

Animals that respire perceive odour by means of the air in which it is ‘diffused’ entering the nostrils. The characteristic which modifies the air seems to be thus transferred to the organ, which Aristotle probably thought was composed of air alone in respiring animals. The air in entering the organ displaces a membrane and so effects communication. But in animals which dwell in water, the organ (probably consisting of water) is uncovered, just as the eys also of fishes have no protecting covering; though the manner of perception is different the sense is still the same, for it is the same objective quality which affects them as in us causes smell.

Thus far odours are strictly parallel to flavours, and serve as an index to the character of the food from which they proceed. But we can classify them in a different way and not according to the taste to which they correspond; or rather, as Aristotle says, there are two different varieties or groups of odour. As we saw, heat is required in the propagation of all, i.e. the δύναμις or φύσις of odour contains the heat. Now in man this heat entering the nostrils tempers the cold

---

1 De Sens. ch. 5, 443 b 7.  
2 443 b 17.  
3 443 a 4, 444 b 21.  
4 443 b 9.  
5 Cf. De An. ii. ch. 9, 421 b 1.  
6 Cf. De An. iii. ch. 1, 425 a 5 (θάλασσα τούτων sc. θάλασσα καὶ ταῖρος) and cf. section v. above.  
7 De Sens. ch. 5, 444 b 24.  
8 Cf. notes to 444 b 21.  
9 Cf. 444 a 27.  
10 Ch. 5, 444 a 19 sqq.
which is supposed to prevail in the brain and its neighbourhood. Odours then appear to have a direct effect upon health and to be regarded as pleasant or the reverse in proportion as their action is beneficial or not. It is thus that Aristotle accounts for the appreciation felt by man for the scents of flowers and perfumes which have no association with edible things, an appreciation not felt by the lower animals. In the latter the brain, not being nearly so large in proportion to their size, does not apparently need this tonic influence. Thus Aristotle assigns to what we should call an aesthetic satisfaction a purely physiological and naturalistic explanation.

SECTION VIII. PERCEPTION AS QUANTITATIVE.

In chapters 6 and 7 of the De Sensu Aristotle raises the question (1) whether all perception is of a quantum\(^1\) and (2) whether all quanta are perceptible\(^2\). Both are answered in the affirmative; the reasons for maintaining the former principle we have already seen\(^3\). Spatial quantity is to be identified as the continuous (πάσα ἀνώπός), and the continuous is just that in which there is no least part, in which you never come to the indivisible; objects of perception may, however, appear to be indivisible and therefore non-quantitative\(^4\). What this admission amounts to we must now discuss. In raising the problem whether there are an infinite number of perceptible parts in any object (e.g. whether all quanta are perceptible), Aristotle points out that the different species of qualities belonging to any one sense must form a limited number\(^5\). They can all be arranged in a linear series with the simple qualities most opposed to each other forming the extreme points and the others arranged in proximity to the two poles in accordance with the preponderance of the one or the other element respectively in them. But though thus arranged in linear fashion, they do not form a continuum, i.e. in analysing the whole of which they are constituent parts, you come

\(^1\) De Sens. ch. 7, 449 a 22 sqq.
\(^2\) Ch. 6, 445 b 3 sqq.; cf. also ch. 7, 448 a 21 sqq.
\(^3\) Sec. ii. above.
\(^4\) Ch. 7, 448 b 17.
\(^5\) Ch. 6, 445 b 24.
ultimately to units which cannot be subdivided, *i.e.* you come to the indivisible. Hence there must be a finite number of parts or steps between the ends of the scale. This is a general proposition that holds good equally of a series of cognate qualities and of the number of middle terms to be interposed between subject and predicate in the proof of any proposition. It is true equally of any finite magnitude. There must be a finite number of assignable parts (equal, ἡσα, cf. ch. 6, note *ad loc.*) between point A and point B, or else Achilles can never overtake the tortoise.* What then becomes of the assertion that all quantities are perceptible, *i.e.* that no matter how far you analyse the object the parts obtained are still something for sense? Aristotle solves the difficulty by pointing out that it is one thing for a part to be perceived by itself and another as in the whole. We come to a limit at which a part ceases to be *per se* actually (*ἐπεργείη*) an object of perception. The very minute parts of bodies are in their individuality only potentially (*δύναμις*) perceptible. As taken along with the others and going to compose the whole they are, no doubt, actually perceptible. They do produce an effect upon the sense, but taken in their individuality they do not; in fact, if a very minute part of any substance is actually isolated from the whole it is altered qualitatively and reduced to the nature of the new medium in which it is placed. The conclusion of the whole doctrine is, that the sum of distinct objects of consciousness into which any total can be divided is limited, and that, for explicit consciousness, such units are indivisible. All specific existences are as such indivisible, and the mind can grasp absolute unity. This must be the truth underlying the statements that sense objects can appear indivisible; as objects of mind they may be indivisible, though, as existences in the physical world and hence continuous, they cannot really be so.

---

1 Cf. notes, *De Sens.* ch. 6, 445 b 24.  
2 Cf. *Physica,* vi. ch. 9, 239 b 14 sqq.  
3 *De Sens.* ch. 6, 446 a 8 sqq.  
4 Cf. *Metaph.* x. ch. 3, 1054 a 27 where it is pointed out that τὸ ἔλεγχος and τὸ διαρεῖα is μᾶλλον αἰσθητών, and unity and the indivisible only known by opposition to these.
Aristotle’s distinction between the actual and the potential perceptibility of a sense object may throw some light upon the conception of the subconscious existence of ideas which is so much in evidence in modern psychology. To many writers it seems to be the case that ideas or sensations may go on diminishing in intensity until they reach a zero point—the threshold of consciousness, after which they pass over into the subconscious region and go on existing as ‘petites perceptions’ with a separate individuality just as good as that which they had before. They are not ‘unconscious mental modifications,’ i.e. they are still in some way present to consciousness, for, it appears, they may go on diminishing still further in intensity until they reach a zero of total oblivion. Now such a conception of an intermediate subconscious zone interposed between the conscious and the unconscious is quite self-contradictory. A sensation in its individuality is either an object of consciousness or it is not; if it is not you may call it subconscious if you like, meaning by that that in conjunction with others it produces an effect upon the mind, but in its individuality it is not an object of consciousness of any grade whatsoever. The subconscious ‘region’ should then be defined, not as a region, but as that state of an object in which, as a separate thing, it cannot be distinguished, but still in conjunction with others helps to produce a total psychical disposition. Whether the object can ever become a distinct element in consciousness per se depends upon circumstances. Sometimes by straining the attention or banishing other stimuli we can detect separate sensations hitherto unnoticed; sometimes sensations which, we know, must to a more acute sense appear distinct, are known to us only in the total volume which they produce. So too with ideas and memories, some can be aroused in their individuality by recollection, while others are real only in so far as by their former existence they modify our total present mood.

1 This is what Lewes (Aristotle, p. 253) seems to have in mind in criticising Hamilton’s theory of ‘latent’ knowledge. He by no means, however, makes his point clear.
(as above explained) fits in well with his general polemic against the atomic theory. With his expressly physical objections to atoms we are not here concerned. What his teaching amounts to is, that, though the characters of the minute parts called atoms are supposed to explain the sensational quality of the total substance which they compose, they themselves as occupying space will have parts and hence will want explaining by the nature of their minute parts and so on *ad infinitum.* Merely mathematical or mechanical qualities will not explain the special differentiae perceived by sense, and the atoms themselves, if corporeal, cannot be thought of as having merely mathematical and mechanical properties. To think of them we must invest them with the attributes known to us by sense. Hence instead of assuming that the sense-quality of an appreciable object is due to the configuration alone of its parts, it is as well to suppose that those parts have qualitative affections which, if not identical with those of the whole, are yet like them sensuous and contribute in some way to the resultant nature of the total object.

**SECTION IX. APPERCEPTION.**

Apperception is, of course, a term not corresponding to any expression in Aristotle, but by it we may designate that function of sense in which it judges (*κρίνει*) and by so doing coordinates in the same indivisible act different objects. The physiology of the matter we have already dealt with; Aristotle localises the function in a central organ and hence it may be held to correspond to what is known to modern science as the action of the higher centres as opposed to the stimulation of end organ and lower ganglia merely. The latter affection does not result in perception of the typically human kind, which requires that higher coordination which has often been referred to by the current psychological term ‘apperception.’ The term *αἰσθάνεσθαι* with Aristotle includes discrimination (*κρίνειν*), and though in the discussion
in the *De Sensu* he almost invariably employs the former term, whereas in the *De Anima* the latter emerges more conspicuously, he does not mean to distinguish two different functions by the different expressions. *Ἀλάθνεσθαι* implies both receptivity and discrimination, and would not be *ἄλθησις* without discrimination. Accordingly, when Aristotle asks how perception of two objects at the same time is possible, he is not asking how two impressions may be *received* at the same time; the sense organ, being a *μέγεθος* and having an indefinite plurality of parts within it, can easily account for that—the different parts may be differently modified. What he wants to find out is how the different determinations can be simultaneously discriminated, for that requires simultaneous existence in the same individual entity, not merely in different parts of it. Discrimination and coordination go together; as he shows in the *De Anima*¹, the consciousness which discriminates must be single. The objects perceived must not be present in separate moments² or to a divided consciousness.

In chapter 7 of the *De Sensu*, Aristotle without first hinting at his theory of how an indivisible unit of consciousness is possible, and thus leaving the field free for any other theory, asks whether discrimination of different sense elements in an indivisible moment can be effected. He distinguishes the cases of (1) perception of opposite qualities belonging to the same sense, *e.g.* black and white, and (2) determinations due to different senses—sweet and white. If, he says, such discrimination were likely to occur, it would be most natural to expect it in the case of the *ἐναστία*³—contrary determinations of one single sense,—μᾶλλον γὰρ ἀμα ἤ κινησις τῆς μίας—⁴ for the modifications due to black and white colour being localised in the same organ are more ‘together’ than those caused by sweetiness and whiteness (which exist in different organs), and hence they have more chance of being coordinated. But, as it turns out, when

¹ III. ch. 2, 426 b 17 sqq.
² 447 b 33.
³ De Sens. ch. 7, 448 a 21 sqq.
⁴ 447 b 9.
two modifications occur together one either drives out the
other or modifies it in some way, and, in the latter case, it is
so modified in return that a third and new modification arises
in which the individuality of the component elements is lost.
Two equal and contrary determinations might completely
annul each other¹, but when we get qualities belonging to the
same sense simultaneously presented, what does occur is μεῖζον,
a fusion of the two elements, as in the case of harmony; they
form one thing, a compound, and though they are, as forming
such a thing, present to consciousness, their individuality is
lost and hence they cannot be discriminated. In an obscure
passage² which Biehl has had to reconstruct almost entirely,
Aristotle rejects the theory that this discrimination can be
effectcd by the determination in different ways of the different
parts of an organ which are yet continuous with each other.
This leads up to his own theory that, if either contrary or
diverse qualities are to be simultaneously perceived there
must be an absolutely indivisible psychical unity which can
yet be viewed in two different ways at the same time. Its
nearest analogue is, as has been said³, the mathematical
point, or the unity of an object which possesses diverse attributes.
It has been debated whether those two solutions of
the difficulty are the same, or whether the latter, if satisfac-
for the case of qualities like white and sweet, belonging
to different senses, will not be insufficient to account for
the harder⁴ case of contrary modifications like black and
white. A passage in the De Anima⁵ might make us think so,
but, as Rodier in his elucidation of De An. III. ch. 7⁶ points
out, there is no real discrepancy between the two theories.
Opposed qualities—ἐναρξία—though existing in different parts
of the same total object must (if between them they cover
the whole extent of the ground) meet in a common indivisible
point if they are still to be ascribed to the same object, and
diverse characters (ἐρεπά) like white and sweet, which do not
exist in different parts of the substance, must be deemed (as

¹ De Sens. ch. 7, 447 a 27.
² Section vi.
³ III. ch. 2, 426 b 28 sqq.
⁴ 448 b 19 sqq.
⁵ Cf. notes to 449 a 4 sqq.
INTRODUCTION

long as the substance has those qualities) to belong equally to its minutest parts, i.e. to be held together in a unity which, like the point, is absolutely indivisible. Of such a nature, then, is the psychic faculty involved in discrimination. It would be natural, if we followed out the parallelism between mind and body mechanically, to imagine that there was some corporeal organ which had the same properties, and there is a passage in the De Memoria\(^1\), where, having evidently the organ of consciousness in mind, Aristotle refers to it as atomic; hence there is some countenance for Neuhäuser's theory that this organ is the mysterious vital heat of heavenly or transcendent origin. But as we have seen, nothing corporeal can fulfil the functions of an absolute indivisible unity; the unity of apperception is generally styled ἔν τι τῆς ἀφομοίωσις\(^2\), and perhaps the emphasis is on the latter word. We might have expected that it would have been in some way affiliated with the operation of νοῦς, which is non-spatial and has a really transcendent origin. The account of the activity of νόησις in De An. III. ch. 6, is almost entirely parallel to his description of the higher function of sense. However, the tendency of Aristotle to treat νοῦς simply as the highest of the intellectual faculties—that of pure conceptual thought—prevents us from making this identification; but, on the other hand, his refusal to see in discrimination of any kind mere passivity or determination by what is foreign to one's own being, leads us to surmise that the faculties of Sense and of Reason must be in essence one. This no doubt is his real belief but, as usual, it is veiled by his cautious manner of presenting the subject.

SECTION X. MEMORY AND RECOLLECTION.

The text of the treatise on Memory and Recollection presents some difficulties in interpretation which are perhaps still greater than those met with in the De Sensu. The worst

\(^1\) Ch. 2, 451 a 28. Cf. above, Section vi.

\(^2\) Cf. De Sens. ch. 7, 449 a 10, 448 b 23.
of these occur in passages where (e.g. 452a 18sqq., 452b 16sqq.)
symbols are employed, and in one case at least it is not
claimed that a perfectly satisfactory explanation has been
arrived at.

The main results of the treatise now claim our attention.

(1) Memory (μνήμη) is used in a very restricted sense,
one much narrower than that assigned to it in modern
psychology. It does not comprise retention: that rather is
an element present in the general faculty of Imagination, of
which Memory is a special determination. A sense impres-
sion which persists as a psychic change resulting from an
actual perception\(^1\) is an image (φάντασμα); it is the ascrip-
tion of this image to some object existing in past time which
is memory in the proper sense. In φάντασμα generally
(though not apparently always\(^2\)) the object which has
produced the originating sense-impression is not present,
but that fact does not constitute the mental state a memory.
The sense of time, either determinate or indeterminate, must
enter into the apprehension before we can be said to re-
member. Thus Memory is relatively a high mental function,
and though it is not denied of several of the lower animals,
it is nothing which need emerge in that assimilation of
present to past which must be found in any consciousness
which profits by experience.

(2) Aristotle thus thinks that a mental image may be
used and become an object of thought without the reference
to historical reality which memory implies. It was quite
natural that he should do so. As we have already seen,
the κίνησις in the body reproduces some κίνησις which has
existed in the external world, and the tendency of his
thought is to ascribe as nearly as possible identity of nature
to the two; at least his whole theory of sense-perception
implies this. Hence, if a bodily κίνησις give knowledge of
external reality in sense perception, there is no reason why
it should not do so when the source of sense stimulation is
no longer present. Certainly it is only when we remember

\(^1\) De An. III. ch. 3, 429a 11, 438b 11 sqq.
\(^2\) Cf. De Mem. ch. 1, note to 449b 33.
in the strict sense, that the bodily κίνησις, which functions
as νόημα or θεωρήμα—an object of thought, gives us know-
ledge of the external object which caused the perception to
which it is due; nevertheless it has an objective character,
just as the animal in a picture has a definite nature as an
object of consciousness independent of the reference to the
actual living model from which it was copied or which
suggested it1. From this account of the matter it might
appear that Aristotle believed that the physiological modi-
fication in our bodies was the object of our thought when
we imagined anything. So it is in a way, but it is only
physiological per accidens; it is the same εἶδος whether
existing in the external world or in the human body. To
our minds the disparateness between the physiological and
the merely physical seems extreme and we can think of
the physiological process only as being some very remote
symbolization of the external; not so was it to Aristotle,
by whom the complexity of organic structures was very
inadequately comprehended. It is noteworthy that the
difference of the physiological and the physical seems to
have been much more clearly realised by the time of
Spinoza, who, when defining mind as ‘idea corporis,’ avoid-
s the objection we have instanced above by explaining that our
ideas involve the nature both of the external bodies and of
the human organism2; he holds, however, that in perceiving
the external we perceive also the nature of our own body.
Nevertheless, the fact that no thought is the thought of
the physiological process occasioning it, but is rather the
consciousness of that which this process symbolizes, need
not conflict with Aristotle’s definition of memory or his
account of the objective nature of a φάντασμα apart from
memory. Just as the animal in a picture has an existence
καθ’ αίτια—qua animal, and not merely as a certain arrange-
ment of paint devised to represent a living animal, so the
φάντασμα may have an objective character without referring
to the particular event or object to which it owes its origin.

1 450 b 23 sqq.  
2 Ethica, ii. Prop. xvi. and Corollaries.
When it does so refer and is used as an ἔικων or μνήμο-
νευμα\(^1\), the representation of the object is coincident with a
representation (either definite or vague) of the time which has
elapsed since it was present to sense, and it is this coincidence\(^2\)
alone which gives memory in the true sense.

To modern thought it may seem strange that Aristotle
should regard a φάντασμα, a mere alteration in the bodily
organs, as something objective. But one must remember
that this κίνησις was to him something of a definite pattern,
as definite as that of any object external to the human
organism, and that the knowledge of the one would not
differ from that of the other in point of 'objectivity.' The
stimulation of the sense organs by an external object might
originally cause the κίνησις. But this stimulation is nothing
else than the communication of the εἴδος of the external
object to the human organism. It is this εἴδος which forms
the content of thought, and whether existing in the external
physical object or in the sense organ it is equally objective.
The psychological problem as to how we perceive and re-
member and think is never for Aristotle the question of
how mind knows a real object. This latter, a metaphysical
difficulty, is quite distinct. That real objects existed and
could be known was the assumption from which he started.
Knowing was a fact which must be accepted, but how a
corporeal organism could manifest this function wanted ex-
planation. The presence of the actual fact thought of in the
body of the thinking being and at the moment of thought
was the only solution he could offer. It is for modern
physiology to discover a better. But his was an attempt
in the right direction and a very natural answer also, for his
question was, not how mind thinks, but how we—embodied
creatures—think.

If it be asked: 'Is Aristotle's a theory of representative
knowledge or perception?' we must answer no, at least it is
not so in the modern sense of such a theory. In a sense, no
doubt, there is representation; between the individual and a

\(^1\) De Mem. 451 a 3.  \(^2\) ch. 2, 452 b 26.
body external to his organism the κίνησις in the sense organs mediates, but between ‘mind’ and its object nothing interposes, and our apprehension of an external object is direct,—the immediate awareness of an objective, real character of things. Hence Aristotle could think of a φάντασμα which was not due to an object at the moment stimulating the senses, but was merely retained in the organs, as having objectivity apart from memory. This was so because the εἴδος or character it had was equally real whether in the body or out of it. Memory in fact adds nothing to the objectivity of the φάντασμα involved in it. It is merely the union of the κίνησις caused by lapse of time and the φάντασμα originated by an external thing.

(3) The characteristic of involving continuous quantity, spatial or temporal, which cleaves to sense perception\(^1\) infects also imagery, and hence memory. Thus memory must be assigned to the faculty of sense and its organ; it is not a function of pure thought\(^2\). The function of pure thought (νοῦς) is the apprehension of concepts apart (κεχορισμένα) from this continuity which forms their ἔλη νοητή; the concept (νόημα) is to the image as the equation to a curve is to the curve in which it is realised. But memory, the apprehension of time, which is a continuum, can thus never belong to pure thought as such. Hence we may conclude (indeed, if my interpretation of ch. I, 45ο a 20 be correct, we find it stated) that higher beings whose activity is purely intellectual do not share in memory.

(4) Differences in powers of memory Aristotle accounts for by the condition of the bodily organ (which is identical with the central organ of sensation). In language suggested largely by a passage in the Theaetetus\(^3\) of Plato he describes the causes of variation between different individuals and the different ages of life. Generally speaking too great ‘fluidity’ of the receptive structure causes impermanence of the impression; too great ‘density’ occasions a difficulty in getting

\(^1\) Cf. De Sens. ch. 6, 445 b 32.

\(^2\) De Mem. ch. 1, 45ο a 12 sqq. and notes.

\(^3\) Theaetetus, 191 C sqq.
any experience ever impressed. Similarly in the process of recollection (which we shall next proceed to discuss) bodily conditions influence the recall of ideas either by impeding\(^1\) the series of changes which occur in the central sensorium or by causing it to diffuse and so cause emotional disturbance\(^3\).

(5) Recollection (ἀνάμνησις) is to be distinguished from memory, the ascription of an image to some event in the past, which may be due either to the persistence\(^8\) of a sense-impression or to its reinstatement afresh; ἀνάμνησις is just that process of reinstatement and is so to be defined. It must, however, be carefully distinguished from the process involved in learning (which was identified with it by Plato). We may actually have reproduced in us by learning some knowledge previously possessed which might have been recalled but has totally passed into oblivion; under those circumstances the process is quite different from recollection; the latter process is self-conducted, while, for the former, we require instruction. Again, the basis from which we start is different in the two cases; much more than the meagre knowledge required in order to be capable of receiving instruction will be necessary, if we are to recall the previous idea unaided.

The objects to be recalled are twofold; they are either those which have a necessary connection with one another, like the concepts and judgments in mathematical science, or again they may be contingently related. The former are easily remembered, the latter not so, but in both cases the order of recall depends upon the experienced connection of the facts\(^4\), and the connection is either that of like with like, or of things contiguous or opposed. The ease with which an idea may be recalled depends upon the frequency of the repetition of the particular series of connections by which it is reinstated. Frequent repetition due to custom produces a natural disposition\(^5\) which tends to actualisation just like any other δύναμις or φύσις. Here,

\(^1\) De Mem. ch. 2, 453 b 1.  
\(^2\) 453 a 16 sqq.  
\(^3\) 451 b 1 sqq.  
\(^4\) 451 b 32.  
\(^5\) 452 a 29 sqq.
however, just because the disposition is due to custom, it is liable to be interfered with, just as any tendency in nature may be thwarted, only more so.

The laws of Association here formulated by Aristotle (Contiguity, Similarity, and Contrast) are obviously merely principles governing the reinstatement of ideas previously experienced. Hence their scope is much narrower than that assigned to them by modern psychology. Aristotle certainly held no 'Associationist Theory of Knowledge,' but for that the most recent theorists are hardly likely to blame him. There are, however, other psychical operations like 'complication,' his αἵοθῆς κατὰ συμβεβηκός, which many writers would rank generally under 'association' but which he left unaffiliated to the process involved in recollection. This discreteness in his treatment of mental functions is no doubt due to his empirical way of approaching his data and his caution in all but the widest generalisations.

(6) Finally we hear that recollection is a higher activity than mere memory. It is peculiar to man\(^1\). Though it may operate involuntarily\(^2\) it is typically a purposive operation\(^3\) and is to be regarded as a kind of search, like the search for the middle term in demonstration or for the means to effect the fulfilment of an end in practical deliberation. Its purposiveness seems to argue to its higher nature; it is in this way illustrative of the ἀμνάθεα which belongs to mind \textit{per se}\(^4\). In recollecting the soul seems to be active, producing an activity which proceeds \textit{towards}\(^5\) the organs of sense. Apart from the aspect of activity we must, however, recognise that, in recollection, there is a process going on in the organs of sense or rather in the central sensorium. The various ideas which reinstate one another are all to be described as \textit{kινήσεις}, and the end of a process of recollection seems to be attained when one particular \textit{kινησις} is produced which seems to constitute a terminus to the series—namely the

\(^1\) \textit{De Mem.} ch. 2, 453 a 11. \(^2\) 451 b 26. \(^3\) Cf. Prof. Laurie's \textit{Institutes of Education}, p. 233 sqq. \(^4\) Cf. Section iv. above \textit{ad init.} \(^5\) \textit{De An.} 1. ch. 4, 408 b 17.
κίνησις corresponding to the idea to be recalled. It is throughout implied that these κίνησις, prior to the act of recollection, are dormant; that is to say they are not, until revived, κίνησις. What then persists or what is the κίνησις when it is dormant? Aristotle talks of the impression on the organ being like an imprint—τύπος, and, no doubt, he must have thought of the impression left by an experience as being some kind of structural modification of the organ. He talks of the subjective affections involved in apprehending magnitudes as being σχήματα\(^1\) like the objective magnitudes themselves. He does not work out his theory of the persistence of impression, but doubtless the dormant impression is merely something of the nature of a σχήμα (at least in the case of the perception of magnitude), while the affection whether when first experienced or when revived is of the nature of a κίνησις, though a κίνησις which still has a spatial configuration and can be represented by a motion passing along a determinate path—as in the construction of a triangle. At any rate we find no hint in Aristotle of that modern theory which would make psychical dispositions consist in the faint functioning of the same parts as are brought into play when an idea is explicitly realised.

\(^1\) Cf. De Insom. ch. 3, 461 a 8 sqq.
ΠΕΡΙ ΑΙΣΘΗΣΕΩΣ ΚΑΙ ΑΙΣΘΗΤΩΝ
ΠΕΡΙ ΑΙΣΘΗΣΕΩΣ ΚΑΙ ΛΙΣΘΗΤΩΝ

I

'Επει δὲ περὶ ψυχῆς καθ’ αὐτὴν διώρισται καὶ περὶ τῶν δυνάμεων ἐκάστης κατὰ μόριον αὐτῆς, ἐχομένων ἐστὶ ποιήσασθαι τὴν ἐπίσκεψιν περὶ τῶν ἡγων καὶ τῶν ἡγων ἐχοντων ἀπάντων, τίνες εἰς ἰδιὰ καὶ τίνες κοινὰ 5 πράξεις αὐτῶν. τὰ μὲν οὖν εἰρημένα περὶ ψυχῆς ὑπο- κείσθω, περὶ δὲ τῶν λοιπῶν λέγωμεν, καὶ πρῶτον περὶ τῶν πρῶτων. φαίνεται δὲ τὰ μέγιστα, καὶ τὰ κοινὰ καὶ τὰ ἱδια τῶν ἡγων, κοινὰ τῆς ψυχῆς ὑντα καὶ τοῦ σώματος, οἷον αἰσθήσεως καὶ μνήμης καὶ θυμὸς καὶ ἐπιθυμίᾳ καὶ 10 ὁλως ὀρέξει, καὶ πρὸς τούτους ἠδονή τε καὶ λύπη. καὶ γὰρ ταῦτα σχεδὸν ὑπάρχει πάσι τοῖς ἡγων. πρὸς δὲ τούτους τὰ μὲν πάντων ἐστὶ τῶν μεταχέων ἡγων κοινὰ, τὰ δὲ τῶν ἡγων ἐνίοτε. τυγχάνουσιν δὲ τούτοις τὰ με- γιστα τεττάρες συνεχόμενοι τὸν ἀριθμόν, οἷον ἐγρήγορος 15 καὶ ἄπνος, καὶ νεότης καὶ γήρας, καὶ ἀνάπνοι καὶ ἐκπνοι, καὶ ζωὴ καὶ θάνατος. περὶ δὲν θεωρητέων, τί τε ἔκαστον αὐτῶν, καὶ διὰ τίνας αἰτίας συμβαίνει. φυσικοῦ δὲ καὶ περὶ ὑγείας καὶ νόσου τὰς πρώτας ἴδες ἀρχές: οὔτε γὰρ ὑγείαν οὔτε νόσον οἰ δὲν τε γίνεσθαι 20 τοῖς ἑστερημένοις ἡγων. διὸ σχεδὸν τῶν περὶ φύσεως οἱ πλεῖστοι καὶ τῶν ιατρῶν οἱ φιλόσοφοι φιλόσοφοι τὴν τέχνην 436b μετώπουμε, οἱ μὲν τελευτῶσιν εἰς τὰ περὶ ιατρικῆς, οἱ δὲ
I

Now that we have given a definite account of soul in its essential nature and of each of its faculties individually, the next thing to do is to consider animals and all things possessed of life and to discover which activities are specific and which they have in common.

Assuming as a basis our exposition about the soul, let us discuss the remaining questions, beginning with those that are primary.

The most important of the characteristics of animals, both generic and specific, evidently belong to soul and body in common, e.g. sense-perception and memory, passion, desire and appetite generally, as well as pleasure and pain. These are found practically in all animals.

But further, certain of the phenomena in question are common to all things which participate in life, while others are shared by particular kinds of animals. Of these the most important fall into four pairs of correlatives, to wit, waking and sleep, youth and age, the inhalation and expulsion of breath, life and death. These phenomena call for discussion, and we must investigate both the nature of each and the reasons for its existence.

It falls within the province of the natural scientist to survey the first principles involved in the subject of health and disease, for to nothing lacking life can either health or sickness accrue. Hence pretty well the most of our investigators of nature do not stop until they have run on into medicine, and those of our medical men who employ their...
ἐκ τῶν περὶ φύσεως ἄρχονται περὶ τῆς ιατρικῆς. ὥστε δὲ τὰ λεχθέντα κοινὰ τῆς τε ψυχῆς ἐστὶ καὶ τοῦ σώματος, οἷς ἀδηλον. πάντα γὰρ τὰ μὲν μετ' αἰσθήσεως 5 συμβαίνει, τὰ δὲ δὲ αἰσθήσεως. ἐπὶ δὲ τὰ μὲν πάθη ταύτης ὄντα τυγχάνει, τὰ δὲ ἔξεις, τὰ δὲ φυλακαὶ καὶ σωτηρία, τὰ δὲ φθοραὶ καὶ στερήσεις. ἥ δ' αἰσθήσεως ὅτι διὰ σῶματος γίγνεται τῇ ψυχῇ, ἡδὴν καὶ διὰ τοῦ λόγου καὶ τοῦ λόγου χωρίς. ἀλλὰ περὶ μὲν αἰσθήσεως καὶ τοῦ αἰσθάνεσθαι, τί ἐστι καὶ διὰ τί συμβαίνει τοῖς ψυχῆς τούτῳ τῷ πάθῳ, εἰρήνη τρόπον ἐν τοῖς περὶ ψυχῆς. τοὺς δὲ ψυχῆς, ἡ μὲν ψυχὴν ἐκαστον, ἀνάγκη ὑπάρχειν αἰσθήσειν, τούτῳ γὰρ τὸ ψυχὴν εἶναι καὶ μὴ ψυχὴν διαρίζομεν. ἕδρα δ' ἡ δὲ καθ' ἐκαστον ἡ μὲν ἁφή 10 καὶ γεύσις ἀκολουθεῖ πάσιν ἐς ἀνάγκης, ἡ μὲν ἁφῆ διὰ τὴν εἰρήμενην αἰτίαν ἐν τοῖς περὶ ψυχῆς, ἡ δὲ γεύσις διὰ τὴν τροφὴν· τὸ γαρ ἢδον διακρίνει καὶ τὸ λυπηρόν αὐτῇ περὶ τὴν τροφὴν, ὡστε τὸ μὲν φεύγει τὸ δὲ διώκειν, καὶ ὅλως ὁ χυμὸς ἐστὶ τοῦ θεραπευτικοῦ πάθος. αἱ δὲ 15 διὰ τῶν ἐξωθεῖν αἰσθήσεις τοῖς πορευτικοῖς αὐτῶν, ὅτι διειρήθης καὶ ἀκοὴ καὶ ὁμιλοῦσι μὲν τοῖς ἐξουσιάς σωτηρίας ἕνεκα ὑπάρχουσι, ὅπως διώκοις τα προαιρετικάνα την τροφήν καὶ τὰ φαῦλα καὶ τὰ φθαρτικά 437α φεύγομεν, τοῖς δὲ καὶ φρονήσεως τυγχάνουσι τοῦ εὖ ἑνεκά· τολλὰς γὰρ εἰσαγγέλλουσι διαφοράς, ἐξ ὧν ἡ τε τῶν νοσητῶν ἔγινεται φρονήσεις καὶ τῶν πρακτῶν. αὐτῶν δὲ τούτων πρὸς μὲν τὰ ἀναγκαῖα κριτίων ἡ ὁμιλεία 20 καθ' αὐτὴν, πρὸς δὲ νοῦν καὶ κατὰ συμβεβηκός ἡ ἀκοὴ. διαφοράς μὲν γὰρ τολλάς καὶ παντοδαπᾶς ἡ τῆς ὁμιλίας ἀγγέλλει δύναμις διὰ τὸ πάντα τὰ σώματα μετέχουσι χρώματος, ὡστε καὶ τὰ κοινὰ διὰ ταύτης αἰσθάνεσθαι
art in a more scientific fashion, use as the first principles of medicine truths belonging to the natural sciences.

There is no lack of evidence that the phenomena we have mentioned are shared by both soul and body in common, for they all either occur in concomitance with sensuous experience or are due to it. Some are modifications, some permanent dispositions of sensuous experience, while some protect and preserve and others destroy and annul it.

That the psychical function of sensation depends upon the body is clear both à priori and apart from such evidence. However, the nature of sense and its function and the reason why this phenomenon is found in animals, have already been explained in the Psychology. Animals quâ animal must possess sensation, for it is by means of this that we distinguish animate from inanimate.

To each animal in its own proper nature touch and taste must necessarily accrue, touch for the reason given in the Psychology, taste owing to the fact that it takes nutriment; for by taste the pleasant and unpleasant are distinguished in food, so that as a consequence the one is pursued and the other shunned; to put it generally, flavour is a determination of that which is nutritive.

In animals with the power of locomotion, are found the senses which are mediated by something external, to wit, smell, hearing, and sight. These exist uniformly for the purpose of the self-preservation of the animals possessing them, in order that they may become aware of their food at a distance and go in pursuit of it and that they may avoid what is bad and injurious. Where intelligence is found they are designed to subserve the ends of well-being; they communicate to our minds many distinctions out of which develops in us the intelligent apprehension alike of the objects of thought and of the things of the practical life. Of these three sight is per se more valuable so far as the needs of life are concerned, but from the point of view of thought and accidentally, hearing is the more important. The characteristics are many and various which the faculty of sight reports, because all bodies are endowed with colour;
μάλιστα (λέγω δὲ κοινά σχῆμα καὶ μέγεθος, κίνησιν, 
10 ἀριθμόν)· ἢ δ’ ἁκοὴ τὰς τοῦ ψόφου διαφορὰς μόνον, ὦλχοις δὲ καὶ τὰς τῆς φωνῆς. κατὰ συμβεβηκός δὲ πρὸς φρόνησιν ἢ ἁκοὴ πλείοτον συμβάλλεται μέρος. ὁ γὰρ λόγος αὐτὸς ἐστὶ τῆς μαθήσεως ἀκούστος ὦν, οὐ καθ’ αὐτὸν ἀλλὰ κατὰ συμβεβηκός· ἐξ ὀνομάτων γὰρ 
15 σύγκειται, τῶν δ’ ὀνομάτων ἐκαστὸν συμβολῶν ἐστιν. διότερ προνιμότεροι τῶν ἐκ γενετῆς ἐστηριχμένων εἰσὶν ἐκατέρας τῆς αἰσθήσεως οἱ τυφλοὶ τῶν ἐνεών καὶ 
κωφῶν.

II

Περὶ μὲν οὖν τῆς δυνάμεως ἢν ἔχει τῶν αἰσθήσεων 
20 ἐκάστη, πρότερον εἴρηται. τοῦ δὲ σώματος ἐν οἷς ἐγ-
γίγνεσθαι πέφυκεν αἰσθητήριος, νῦν μὲν ξηροῦσι κατὰ 
tὰ στοιχεῖα τῶν σωμάτων· οὐκ ἐνποροῦντες δὲ πρὸς 
tέταρτα πέντε οὕσας συνάγειν, γλίχονται περὶ τῆς 
pέμπτης. ποιοῦσι δὲ πάντες τὴν ὁμοῦ πυρὸς διὰ τὸ 
25 πάθους τωδ’ ἄγνοει τὴν αἰτίαν· θλιβομένου γὰρ καὶ 
kυνωμένου τοῦ ὀφθαλμοῦ φαίνεται πῦρ ἐκλάμπειν· τούτο 
δ’ ἐν τῷ σκότει πέφυκε συμβαίνει, ἢ τῶν βλεφάρων 
ἐπικεκαλμένων· γίνεται γὰρ καὶ τότε σκότος. ἔχει 
δ’ ἀπορίαν τοῦτο καὶ ἐτέραν, εἰ γὰρ μὴ ἐστὶ λαυτάνειν 
30 αἰσθανόμενον καὶ ὀρῶντα ὀρῶνον τι, ἀνάγκη ἢ’ αὐτὸν 
ἐαυτὸν ὀρῶν τοῦ ὀφθαλμοῦ. διὰ τί οὖν ἤρεμωντι τούτ’ 
οὐ συμβαίνει; τὰ δ’ αἰτία τοῦτον, καὶ τῆς ἀπορίας καὶ 
tοῦ δοκεῖν πῦρ εἶναι τὴν ὁμοῦ, ἐνετέθειν ληπτέον. τὰ γὰρ 
λεία πέφυκεν ἐν τῷ σκότει λάμπειν, οὐ μεντοί φῶς 
437 b ποιεῖ, τοῦ δ’ ὀφθαλμοῦ τὸ καλύμμενον μέλαιν καὶ μέγαν 
λείον φαίνεται. φαίνεται δὲ τοῦτο κυνωμένον τοῦ ὀμ-
ματος διὰ τὸ συμβαίνειν ὀστερ δύο γίγνεσθαι τὸ ἐν. 
tούτο δ’ ἡ ταχυτῆς ποιεῖ τῆς κινήσεως, ὡστε δοκεῖν 
5 ἐτέρον εἶναι τὸ ὀρῶν καὶ τὸ ὀρῶμενον. διὸ καὶ οὐ
thus by this sense especially are perceived the common sensibles (by these I mean figure, magnitude, motion, and number).

But hearing gives merely differences in sound and, in a few cases, in articulate utterance too. Hearing, however, has the greatest share in the development of intelligence, though this is an accidental function. Speech being audible is instrumental in causing us to learn; but this function it possesses not per se but accidentally, for speech is a complex of words, every one of which is a conventional symbol. A consequence is that of those who from birth have been without one or other of those two senses, the blind are more intelligent than deaf-mutes.

II

We have already given an account of each of the sense faculties. But each develops, according to the course of nature, in a bodily sense organ, and these we shall proceed to discuss.

Present-day investigators attempt to reduce them to the ultimate elements of all bodies; but, since the senses are five, they have a difficulty in reducing them to the four elements, and the fifth causes them anxious consideration.

Sight they all ascribe to fire owing to the misunderstanding of a certain phenomenon, viz. when the eye is pressed and moved, fire appears to flash out from it; and it is the nature of this phenomenon to occur in the dark, or when the eyelids are closed, for then, too, there is darkness.

But this theory—that sight is of the nature of fire—raises a fresh difficulty; for, if it is impossible for that which is conscious of and sees some object to be unaware that it does so, the eye will of necessity perceive itself. Why then is this not the case when the eye is at rest?

From the following considerations we shall discover the cause of this circumstance and of the apparent identity of fire and vision. It is the nature of smooth things to shine in the dark; but, nevertheless, they do not produce light; now what we call the "black" and "middle" of the eye has a smooth appearance and it shows on the eye moving, for the reason that this occurrence is a case of the reduplication of a single thing. The swiftness of the motion effects this, causing that which sees and that which is seen to appear to be distinct. Hence also if the motion is not swift and does not
48 ARISTOTLE

gίγνεται, ἃν μὴ ταχέως καὶ ἐν σκότει τοῦτο συμβῇ; τὸ γὰρ λέων ἐν τῷ σκότει πέφυκε λάμπευν, οἷον κεφαλαὶ ἱκθῶν τινῶν καὶ ὁ τῆς σητίας θολός· καὶ βραδεός μεταβάλλοντος τοῦ ὁμματος οὐ συμβαίνει, ὅπετε δοκεῖν ἀμα ἐν καὶ δύο εἶναι τὸ θ' ὀρῶν καὶ τὸ ὀρῷμενον. ἐκεῖνος δ' αὐτὸς αὐτὸν ὄρα ὁ ὀφθαλμός, ὅσπερ καὶ ἐν τῇ ἀνακλάσει, ἐτεὶ εἰ γε πῦρ ἦν, καθάπερ Ἑμπεδοκλῆς φησὶ καὶ ἐν τῷ Τιμαιῷ γέγραπται, καὶ συνέβαιν τὸ ὀρᾶν ἐξίοντος ὅσπερ ἐκ λαμπτῆρος τοῦ φωτός, διὰ τὶ ὦν καὶ ἐν τῷ σκότει ἑώρα ἂν ἡ ὅψις; τὸ δ' ἀποσβέννυσθαι φάναι ἐν τῷ σκότει ἐξιόνται, ὅσπερ ὁ Τιμαιος λέγει, κενὸν ἐστιν παντελῶς· τὸ γὰρ ἀπόσβεσις φωτὸς ἀστών; συβέννυται γὰρ ἡ ύγρός ἡ ψυχρά τὸ θερμὸν καὶ ἐξηρόν, οἷον δοκεῖ τὸ τ' ἐν τοῖς ἀνθρακώδεσιν εἶναι πῦρ

cο καὶ ἡ φλόγη, ὅων τῷ φωτὶ οὐδέτερον φαίνεται ὑπάρχον.
εἰ δ' ἀρα ὑπάρχει μὲν ἄλλα διὰ τὸ ἱσημα λανθάνει ἡμᾶς, ἐδει μεθ' ἡμέραν τε καὶ ἐν τῷ ὑδατι ἀποσβέννυσθαι τὸ φῶς, καὶ ἐν τοῖς πάγοις μᾶλλον γίνεσθαι σκότον· ἡ γοῦν φλόγη καὶ τὰ πεπυρωμένα σύμματα πάσχει τούτο· νῦν δ' ὡδὲν συμβαίνει τοιοῦτον. Ἑμπεδοκλῆς δ' ἐοικε νομίζων ὅτε μὲν ἐξίοντος τοῦ φωτός, ὅσπερ εἰρηται πρότερον, βλέπων· λέγει γοῦν οὕτως·

438a ὡς δ' ὅπε τῷ πρόσοδον νοέων ὀπλίσσατο λύχνοι, χειμερίνην διὰ νύκτα πυρὸς σέλαις αἰθρόμενοι, ἀφοῦ παντοῖοι αἵματον λαμπτήρας ἀμοργοὺς, οὔτ' ἀνέμων μὲν πνεῦμα διασκίδιαν ἀνέμων, πῦρ δ' ἐξω διαθρόσκων, ὅσον ταναύτερον ἤσε, λάμπτεσκεν κατὰ βηλῶν ἀτείρειαν ἀκτίνεσσιν· ὅς δὲ τῷ τ' ἐν μνήμειν ἑρυθρῶν ὀργυμοὶ πῦρ λαστρησιοῦδόσησι λοχάζετο κύκλωσα κούρφην· αἱ δ' ὅδατος μὲν βέβους ἀπέστεγον ἀμφιώγευτος, πῦρ δ' ἐξω διατρόσκων, ὅσον ταναύτερον ἤσε. ὅτε μὲν οὕτως ὀρᾶν φησίν, ὅτε δὲ ταῖς ἀπορροίαις ταῖς 5 ἀπὸ τῶν ὁρῳμένων.
occur in the dark, the phenomenon does not take place. It is the nature of smooth things to shine in the dark, as e.g. the heads of certain fishes and the juice of the cuttle-fish. When the eye moves slowly, the effect—the apparent simultaneous identity and duality of that which sees and that which is seen—is not produced. But in the former case—that of swift movement—the eye sees itself as it does too when reflected in a mirror; this is so, for, if it really consists of fire, as Empedocles alleges and we read in the Timaeus, and if vision is produced by the issuing forth of light from the eye as it were from a lantern, why does not sight function in the dark as well as by day?

The explanation in the Timaeus, that the sight issuing from the eye is extinguished in the darkness, is quite without point, for what can the extinction of light mean? Heat and dryness are annulled by damp or cold, as we see in the case of the fire and flame in burning coals; but neither of these is a characteristic of light. If they are and we do not detect their presence owing to the smallness of their amount, light would of necessity be extinguished in broad daylight too, when it was wet, and darkness would increase in frosty weather. This at any rate, viz. extinction, is what happens to flame and burning bodies, but nothing of the kind occurs in the phenomenon in question.

Empedocles evidently holds the view at times, that we see upon the issuing of light from the eye, as we mentioned before. At any rate these are his words:

“As who a journey intendeth, himself with a candle equippeth Thorough the blustering night with its fiery radiance gleaming, And, to ward off every gust, in lantern-case fits it, That this may part to this side and that the breath of the wild winds While the fire pierces through, inasmuch as its nature is subtler, And shines over the threshold with splendour that naught can conquer, Thus too the world-old fire was confined in the delicate membranes And lies hid ‘neath the screens of the spherical-fashionèd pupil; These keep in check the ocean of water that circles around it, But the fire pierces through, inasmuch as its nature is subtler.”

Sometimes he says this is the way in which we see, but at other times he explains it by a theory of effluxes issuing from the objects seen.
Δημώδριτος δ' ὅτι μὲν ὑδωρ εἶναι φήσει, λέγει καλῶς, ὅτι δ' οἴεται τὸ ὅραν εἶναι τὴν ἐμφασιν, οὐ καλῶς· τούτῳ μὲν γὰρ συμβαίνει ὅτι τὸ ὁμма λεῖον, καὶ ἐστὶν οὖς ἐν ἐκείνῳ ἀλλ' ἐν τῷ ὑδῶρ· ἀνάκλασις γὰρ τὸ πάθος. ἀλλὰ καθόλου περὶ τῶν ἐμφανομένων καὶ ἀνακλάσεως οὖδὲ πω δήλου ἤρ, ὡς ἐσκεκ. ἀποστὸν δὲ καὶ τὸ μὴ ἐπελθεῖν αὐτῷ ἀπορήσαι διὰ τὸ ὁ ὄφθαλμος ὅρα μόνον, τῶν δ' ἄλλων οὐδὲν ἐν οἷς ἐμφαίνεται τὰ εἴδωλα. τὸ μὲν οὖν τὴν ὅψιν εἶναι ὑδατὸς ἀληθὲς μὲν, οὐ μέντοι συμβαίνει τὸ ὅραν ἢ ὑδωρ ἀλλ' ἢ διαφάνες·

δ' καὶ ἐπὶ τοῦ ἀέρος κοινὸν ἔστων. ἀλλ' ἐνθυλακτότερον καὶ εὐπληθότερον τὸ ὑδωρ τοῦ ἀέρος· διόπερ ἡ κόρη καὶ τὸ ὅραμα ὑδατός ἔστων. τούτῳ δὲ καὶ ἐπὶ αὐτῶν τῶν ἐργαν δήλων· φαίνεται γὰρ ὑδωρ τὸ ἐκρέον διαφθείρομένων, καὶ ἐν τοῖς πάμπαν ἐμβρύους τῇ πυρρήτητι ὑπερβάλλω καὶ τῇ λαμπρότητι. καὶ τὸ λευκὸν τοῦ ὄμματος ἐν τοῖς ἔχουσιν αἷμα πώς καὶ λεπάρων· ὅπερ διὰ τοῦτο ἐστίν, πρὸς τὸ διαμένειν τὸ ὑγρὸν ἀπηρτον. καὶ διὰ τοῦτο τοῦ σώματος ἀργυρότατον ὁ ὄφθαλμος ἔστιν· οὔδεις γὰρ πω τὸ ἐντὸς τῶν βλεφάρων ἐφρίσωσεν. τῶν δ' ἀναίρων σκληρὸδερμοί οἱ ὀφθαλμοὶ εἰσίν, καὶ τούτῳ ποιεῖ τὴν σκέπην. ἀλλογον δὲ ὅλος τὸ ἐξίοντι τοῖς τὴν ὅψιν ὅραν, καὶ ἀποτινίεσθαι μέχρι τῶν ἄστρων, ἢ μὲχρι τῶν ἐξουσίων συμψυχοῦσιν, καθάπερ λέγουσιν τινες. τούτου μὲν γὰρ βέλτιον τὸ ἐν ἄρχη συμψυχεῖθαι τοῦ ὄμματος. ἀλλὰ καὶ τούτῳ εὐθῆς· τὸ τά γὰρ συμψυχεῖ τί ἐστὶ φωτὶ πρὸς φῶς; ἢ πὼς οὖν ὦ ὑπάρχειν; 438b οὐ γὰρ τῷ τυχόντι συμφύεται τὸ τυχόν. τό τ' ἔτος τῷ ἐκτὸς πώς; ἡ γὰρ μὴν γάρ μεταξὺ ἔστων. περὶ μὲν οὖν τοῦ ἀνευ φωτός μὴ ὅραν ἐφιέρται ἐν ἄλλοις· ἀλλ' εἰτε φῶς εἰτ' ἄϕρ. ἔστι τὸ μεταξὺ τοῦ ὦραμένου καὶ τοῦ ὄμματος, ἢ διὰ τοῦτον κίνησις ἐστὶν ἢ ποιοῦσα τὸ ὅραν. καὶ εὐλόγως τὸ ἔτος ἔστων ὑδατὸς. διαφάνεις γὰρ τὸ
Democritus is in the right in saying that the eye consists of water, but his theory that sight is the mirroring of an object is wrong. This phenomenon indeed—the visibility of an object as in a mirror—occurs in the case of the eye because it is smooth, and exists not in it (the reflecting eye) but in the spectator; for the phenomenon is one of reflection. But he seems to have attained to no clear general theory of the mirroring and reflection of objects. It is ridiculous too that it never entered his head to ask why the eye alone sees and none of the other things in which images are mirrored.

Thus his theory is true that the sight-organ consists of water; but the eye functions not quâ aqueous but quâ transparent; this property it shares with air as well. But water is more easily kept in, being denser than air; and hence the pupil and the eye are composed of water.

The facts themselves make this clear; what issues from the eyes when they are seriously hurt is evidently water, and when they are quite in the embryonic stage it is excessively cold and brilliant. Further, in sanguineous animals the white of the eye is fat and oily; this is designed to keep the moisture unfrozen. Hence the eye is less liable to be chilled than any other part of the body; no one ever felt cold under the eye-lids. In bloodless animals, however, the eyes have a hard skin and this it is which protects them.

The theory is wholly absurd that sight is effected by means of something which issues from the eye and that it travels as far as the stars or, as some say, unites with something else after proceeding a certain distance.

Than this latter a better theory would be, that the union is effected in the eye—the starting point; but even this is childish. What can the union of light with light mean? How can it come about? The union is not that of any chance light with any other chance light whatsoever. Again how can the internal light unite with the external? The membrane of the eye divides them.

We have elsewhere stated that vision without light is impossible; but whether it is light or air that intervenes between the object seen and the eye, it is the motion propagated through this that produces sight. Thus, as our theory would lead us to infer, the interior of the eye consists
υδωρ. ὀρᾶται δὲ ὅσπερ καὶ ἐξω οὐκ ἀνευ φωτός, οὔτως καὶ ἐντὸς· διαφανὲς ἄρα δεῖ εἶναι. καὶ ἀνάγκη υδωρ εἶναι, ἐπειδὴ οὐκ ἄψρ. οὖ γὰρ ἐπὶ τοῦ ἐσχάτου ὦμματος ἡ ψυχὴ ἢ τῆς ψυχῆς τὸ αἰσθητικόν ἐστιν, ἀλλὰ δῆλον ὅτι ἐντὸς· διόπερ ἀνάγκη διαφανές εἶναι καὶ δεκτικὸν φωτὸς τὸ ἐντὸς τοῦ ὦμματος. καὶ τούτο καὶ ἐπὶ τῶν συμβαίνουσιν δῆλον· ἢδή γάρ τοις πληγεῖσιν ἐν πολέμῳ παρὰ τὸν κρόταφον οὕτως ὡστ' ἐκτιμηθήναι τοὺς πόρους τοῦ ὦμματος, ἐδοξεῖ γενέσθαι σκότος ὅσπερ λύχνου ἀποσβεβαθέντος, διὰ τὸ οἰον λαμπτῆρά τινα ἀποτηθήναι τὸ διαφανές, τὴν καλομεμένην κόρην. ὡστ' εἴπερ τούτων τι συμβαίνει, καθάπερ λέγομεν, φανερὸν ὡς εἰ δεῖ τούτων τοῦ πρότερον ἀποδιδόναι καὶ προσάπτειν ἕκα.

20 στοι νῶν τῶν αἰσθητικῶν ἐνὶ τῶν στοιχείων, τοῦ μὲν ὦμματος τὸ ὀρατικὸν ὦματος ὑποληπτέον, ἀέρος δὲ τὸ τῶν ψυχῶν αἰσθητικῶν, πυρὸς δὲ τὴν ὀσφρήσειν. ὁ γὰρ ἐνεργεία ἡ ὀσφρήσεις, τοῦτο δυνάμει τὸ ὀσφρατικὸν· τὸ γὰρ αἰσθητικὸν ἐνεργεῖν ποιεῖ τὴν αἰσθησίαν, ὡστ' ὑπάρχειν ἀναγκαίον αὐτὴν δ' ἀναλάμβανε τοῦτον. δ' ὑπακόη κατανόησις ἀναθυμίας ἐστιν, δ' ἀναθυμίας ἡ κατανόησις ἐκ πυρός. διὸ καὶ τῷ περὶ τὸν ἐγκέφαλον τόπον τὸ τῆς ὀσφρήσεως αἰσθητήριον ἐστι τῶν ὑδάων· δυνάμει γὰρ θερμή ἡ τοῦ ψυχροῦ ὕλη ἐστίν, καὶ ἢ τοῦ ὦμματος γένεσις τῶν αὐτῶν ἔχει τρόπον. ἀπὸ τοῦ ἐγκέφαλου γὰρ συνεστηκέναι· οὕτως γὰρ ὑγρότατος καὶ ψυχρότατος τῶν ἐν τῷ σώματι μορίων ἐστὶν. τὸ δ' ἀπτικῶν γῆς· τὸ δὲ γενεστικῶν ἐδῶς τι ἄφης ἐστίν. καὶ διὰ τούτο πρὸς τῇ καρδίᾳ τὸ αἰσθητήριον αὐτῶν, τῆς τε γενέσεως καὶ τῆς ἀφῆς· ἀντικείμετα γὰρ τῷ ἐγκέφαλῳ αὐτή, καὶ ἐστὶ θερμοτάτων τῶν μορίων. καὶ

438b, 18 ὡς εἰ δὲ (Biehl)] ὡς εἰ δὲ E M V et omnes edd., ὡς εἰ δὲ reliqui codd. vet. tr. et sine dubio Alex., etiam Böckler, Arist. Lehre von den Sinnesvermögen S. 47, ita scribi vult, cui assentitur Zeller, Gesch. der gr. Ph. 11. 2, S. 238.
of water; for water is transparent. Just as we cannot see without the presence of light outside the eye, so without light inside the eye vision is impossible; this is the reason why the eye must be transparent, and since it is not air it must be water.

The reason for these contentions is that the consciousness, or the psychical faculty of sense perception, does not reside on the surface of the eye but evidently within; this is why the interior of the eye must be transparent and receptive of light. The facts make this plain; for there have been cases of people wounded in war by a blow grazing the temple in such a way that the passages of the eye were severed, to whom darkness seemed to ensue just as when a light is put out; this was because the transparency we call the pupil was severed like a lamp that has its wick cut.

Thus if our account is at all in accordance with fact and if, as in the fashion proposed, we should reduce the sensoria to the elements and correlate each of the former with one of the latter, it is clear we should ascribe the eye's power of sight to water and the capacity of perceiving sounds to air and the sense of smell to fire.

This is because that which has the faculty of smell is potentially what smell is in actuality; for the object of sensation rouses the sense to activity, which hence necessarily is that which, before stimulation, it was potentially.

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.

The origin of the eyes is of the same fashion; they derive their composition from the brain, the coldest and most watery of the bodily members.

The sense of touch is connected with earth; and taste is a species of touch. Hence the sensoria of both—taste as well as touch—are closely related to the heart, which has qualities contrary to those of the brain and is the warmest of the members.
περὶ μὲν τῶν αἰσθητικῶν τοῦ σώματος μορίων ἦστω τοῦτον τὸν τρόπον διωρισμένα.

III

Περὶ δὲ τῶν αἰσθητῶν τῶν καθ’ ἐκαστὸν αἰσθητήριον, ὁδὸν λέγω χρώματος καὶ ψόφου καὶ ὀσμῆς καὶ χυμοῦ καὶ ἀφῆς, καθότου μὲν εἴρηται ἐν τοῖς περὶ ψυχῆς, τί τὸ ἔργον αὐτῶν καὶ τί τὸ ἐνεργεῖν καθ’ ἐκαστὸν τῶν αἰσθητηρίων. τί δὲ ποτε δεῖ λέγειν ὁμοίως αὐτῶν, ὅν τί χρώμα ἢ τί ψόφον ἢ τί ὀσμῆν ἢ χυμὸν, ὀμοίως δὲ καὶ περὶ ἀφῆς, ἐπισκεπτέον, καὶ πρῶτον περὶ χρώματος. ἔστι μὲν οὖν ἐκαστὸν διχῶς λεγόμενον, τὸ μὲν ἐνεργεῖα

τὸ δὲ δυνάμεν. τὸ μὲν οὖν ἐνεργεία χρώμα καὶ ὁ ψόφος πῶς ἐστὶ τὸ αὐτὸ ἢ ἐτερον ταῖς κατ’ ἐνέργειαν αἰσθήσεων, οὗν ὀράσει καὶ ἀκούσει, εἴρηται ἐν τοῖς περὶ ψυχῆς. τί δὲ ἐκαστὸν αὐτῶν ὃν ποιήσει τὴν αἰσθητήν καὶ τὴν ἐνέργειαν, νῦν λέγομεν. ὥσπερ οὖν εἴρηται

περὶ φωτός ἐν ἐκείνους, ὃτι ἐστί χρώμα τοῦ διαφανοῦς κατὰ συμβεβηκός· ὅταν γὰρ ἐνή τι πυρῶδες ἐν διαφανεὶ, ἡ μὲν παρουσία φῶς, ἡ δὲ στέρησις ἐστὶ σκότος· ὃ δὲ λέγομεν διαφανὲς, οὐκ ἔστων ὑπὸν ἀέρος ἢ ύδατος οὐδὲ ἀλλοῦ τῶν οὕτω λεγομένων σωμάτων, ἀλλὰ τῆς ἐστὶ

κοινῆ φωσίς καὶ δύναμις, ἧ χωριστή μὲν οὖν ἐστὶ, ἐν τούτοις δ’ ἐστι, καὶ τοῖς ἄλλοις σώμασι παραρχεῖ, τοῖς μὲν μᾶλλον τοῖς δ’ ἦττον· ὅσπερ οὖν καὶ τῶν σωμάτων ἀνάγκη τι εἶναι ἐσχάτων, καὶ ταύτης· ἡ μὲν οὖν τοῦ φωτός φωσίς ἐν αὐρίστῳ τῷ διαφανεὶ ἐστὶν.

τοῦ δ’ ἐν τοῖς σώμασι διαφανοῦς τὸ ἐσχάτων ὃτι μὲν εἰθε ἂν τι, δὴλον, ὅτι δὲ τούτ’ ἐστὶ τὸ χρώμα, ἐκ τῶν συμβαίνοντων φαινομένων. τὸ γὰρ χρώμα ἢ ἐν τῷ πέρατι ἐστὶν ἡ σήμερα· διὸ καὶ οἱ Πυθαγόρειοι τὴν ἐπιφάνειαν χρωματίκα ἐκάλουν· ἐστὶ μὲν γὰρ ἐν τῷ τοῦ σώματος πέρατι,
Let this be the way in which we discriminate the sensitive organs of the body.

III

In the Psychology we have given a general account of the objects corresponding to the particular sense-organs, to wit colour, sound, smell, flavour, and touch; we have stated what their function is, and described the mode of their operation in relation to the several sense-organs. But the nature we must ascribe to any one of these objects we have still to consider; we must ask, for instance, what is colour, or sound, or odour, or flavour? So, too, what is the object of touch? Let us begin our inquiry with colour.

Now we can regard each of these sense objects in two ways, as potentially or as actually existent. We have explained in the Psychology in what sense actual colour and sound are identical with or different from actual sense experience, e.g. sight and hearing; but now we are to discuss the nature of those sense objects in virtue of which they cause sensation and its activity.

It was stated in the work quoted above when we treated of light that it is the colour of the transparent medium contingently determined; for when anything of the nature of fire is found in the transparent medium its presence constitutes light, its absence darkness.

What we have spoken of as the transparent element is nothing which is found exclusively in air or in water or in any one of the substances of which transparency can be predicated; it is some sort of constitution and potency which they have in common, and which, not being an independent reality, finds its existence in these bodies and subsists in varying degrees in the rest of material substances. Thus, in so far as these bodies must have boundaries, this too must have its limits.

Now it is in the transparent medium apart from its limits that light has its being; but it is clear that the boundary of the transparent element which exists in bodies is something real. That this is colour the facts make plain, for colour either exists in the boundary or constitutes the boundary of a thing, and hence (a corroborating circumstance) the Pythagorean terminology identified the visible superficialis with colour. This was plausible, for colour exists in the
35 ἀλλ' οὖ τι τοῦ σώματος πέρας, ἀλλὰ τὴν αὐτὴν φύσιν
439 b δεῖ νομίζειν, ἥτερ καὶ ἐξ ἐρωματιζομεναι, ταύτην καὶ ἐντόκοι. φαίνεται δὲ καὶ ἄρθρο καὶ οὐδ' ἐρωματιζομένα· καὶ γὰρ ἡ αὐγὴ τοιούτων ἐστιν. ἀλλ' ἐκεί μὲν διὰ τὸ ἐν ἀορίστῳ οὖ τὴν αὐτὴν ἐγγύθευ καὶ προσιούσα καὶ
5 πόρρωθεν ἔχει χρυσαῖν οὔθ ὁ ἄρθρο οὐθ' ἡ βάλαττα· ἐν ἐν τοῦ σώμασιν ἐάν μὴ τὸ περιέχον ποιή τὸ μεταβάλλειν, ὁρισταί καὶ ἡ φαντασία τῆς χρώας. δῆλον ἄρα ὅτι τὸ αυτὸ κάκει καὶ καθάδε δεκτικόν τῆς χρώας ἐστίν. τὸ ἄρα διαφανεῖς καθ' ὅσον ὑπάρχει ἐν τοῖς σώμασιν (ὑπάρχει
10 χρώματος ποιεῖ μετέχειν. ἐπεὶ δ' ἐν πέρατι ἡ χρώα, τοῦτον ἄν ἐν πέρατι εἰς. ὡστε χρώμα δὲν ἐν τοῦ διαφανοῦς ἐν σώματι ὁρισμένος πέρας. καὶ αὐτῶν δὲ τῶν διαφανῶν, οἷον ὑδάτως καὶ
15 εἰ τὸ ἄλλο τοιούτων, καὶ ὁσοὶ φαίνεται χρώμα ὡςον ὑπάρχει κατὰ τὸ ἐσχατον, ὁμοίως πᾶσιν ὑπάρχει. ἐστὶν μὲν οὖν ἐνείναι ἐν τῷ διαφανεῖ τοῦθ' ὅπερ καὶ ἐν
17 τῷ ἀέρι ποιεῖ φῶς, ἐστὶ δὲ μὴ, ἀλλ' ἐστερηθήσαται.

17 Ὡμοπρο οὖν
dei τὸ μὲν φῶς τὸ δὲ σκότος, οὕτως ἐν τοῖς σώμασιν ἐγγύθεναι τὸ λευκὸν καὶ τὸ μέλαν. περὶ δὲ τῶν ἄλλων
χρωμάτων εἰδή διελομένους ποσαχώς ἐνδέχεται γίγνεσθαι

20 λεκτέον. ἐνδέχεται μὲν γὰρ παρ' ἄλληλα τίθεμεν τὸ λευκὸν καὶ τὸ μέλαν, ὥστ' ἐκάτερον μὲν εῖναι ἀόρατον
dia συμκρότητα, τὸ δ' ἐξ ἀμφότερον, οὕτω γίγνεσθαι. τούτῳ γὰρ οὔτε λευκὸν οὐκ ἐνείναι οὔτε μέλαν.

25 ἐπεὶ δ' ἀνάγκη μὲν τὶ ἔχειν χρώμα, τούτων δ' οδήγετον
dυνατόν, ἀνάγκη μικτόν τι εἶναι καὶ εἰδὸς τοῦ χρῶας
ἐτερον. ἐστὶ μὲν οὖν οὕτως υπολαβεῖν πλείον εἶναι
chiας παρὰ τὸ λευκὸν καὶ τὸ μέλαν, πολλὰς δὲ τῷ

28 λόγῳ· τρία γὰρ πρὸς δύο, καὶ τρία πρὸς τέταρτα, καὶ
30 κατ' ἄλλους ἀριθμοὺς ἐστὶ παρ' ἄλληλα κεῖσθαι, τά δ'
boundary, but it by no means is the boundary of the body; nay, we must believe that internally there exists the same constitution as externally displays colour. So both air and water show tint; the sheen they have is a phenomenon of this kind; but here, because it exists in something with no definite boundaries, the colour both of the air and of the sea is not the same when regarded from afar and from near at hand. In solid bodies, however, unless the surrounding medium cause it to change, the coloured appearance remains, equally with the surface, fixed. It is therefore clear that in both cases it is the same nature which is capable of being endowed with colour: hence the transparent element in so far as it is found in bodies (and it exists in all in varying degrees) causes them to be endowed with colour. But since it is in a bounding surface that colour is found, it is in the surface of this—the transparent element—that colour exists. Colour then is the limit of the transparent element in a determinately bounded body; and it is found in all bodies alike, both in transparent substances themselves, such as water and anything similar to it, and in those which appear to have a surface colour of their own. Consequently, that, which in air causes light, may be present in the transparent medium or it may not, i.e. may be wanting.

Thus, just as we can explain light and darkness respectively by the presence or absence of this cause in the air, so in the case of solid bodies we can account for the existence of black and white colour. But the other colours still await classification and an inquiry into the various ways in which they may be produced.

Firstly, white and black may be juxtaposed in such a way that by the minuteness of the division of its parts each is invisible while their product is visible, and thus colour may be produced. This product can appear neither white nor black, but, since it must have some colour and can have neither of the above two, it must be a sort of compound and a fresh kind of tint. In this way, then, we may conceive that numbers of colours over and above black and white may be produced, and that their multiplicity is due to differences in the proportion of their composition. The juxtaposition may be in the proportion of three of the one to two of the other, or three to four or according to other ratios. Others again
διόλος κατὰ μὲν λόγον μηδένα, καθ’ ὑπεροχὴν δὲ των καὶ ἐλλειψιν ἀνόμμετρον, καὶ τῶν αὐτῶν δὴ τρόπων ἔχειν ταύτα ταῖς συμφωνίαις: τὰ μὲν γὰρ ἐν ἀριθμοῖς εὐπλούτευτοι χρώματα, καθάπερ ἐκεῖ τῶν συμφωνίας, τὰ 440α ἣδικα τῶν χρωμάτων εἶναι δοκοῦντα, οἷον τὸ ἄλουργον καὶ φουκικὸν καὶ ὀξὺ ἄττα τοιαῦτα, δ’ ἰδέα παρ’ αὐτῶν καὶ αἱ συμφωνίαι ὀλίγαι, τὰ δὲ μὴ ἐν ἀριθμοῖς τάλλα χρώματα, ἣ καὶ πάσας τὰς χρώσεις ἐν ἀριθμοῖς εἶναι, τάς 5μέν τεταγμένας τὰς δὲ ἀτάκτους, καὶ αὐτὰς ταύτας, ὅταν μὴ καθοριζότως, διὰ τὸ μὴ ἐν ἀριθμοῖς εἶναι τοιαύτας γίγνεσθαι. Εἰς μὲν οὖν τρόπος τῆς γενέσεως τῶν χρωμάτων ὁποῖος, εἰς δὲ τὸ φαινόμενον δι’ ἀλλήλων, οἷον ἠνίκους οἱ γράφεις ποιοῦσιν, ἐτέρα ὁμοίως ἐφ’ ἐτέραν ἐναργεστέραν ἐπαλείφονσιν, ὡσπερ ὅταν ἐν ὑδάτι τῇ ἐν ἀέρι βούλωται ποιῆσαι φαινόμενον, καὶ οἷον ὁ ἦλιος καθ’ αὐτὸν μὲν λευκὸς φαινεῖται, διὰ δ’ ἀκήλος καὶ καταναλοῦσα φοινικοῦς. πολλαὶ δὲ καὶ οὕτως ἐσούνται χρῶσι τῶν αὐτῶν τρόποι τῷ πρότερον εἰρημένῶς λόγοις γὰρ ἄν 10 εἰς τις τῶν ἐπιστολῆς πρὸς τὰ ἐν βάθει, τὰ δὲ καὶ ὄλως οὐκ ἐν λόγῳ. [τὸ μὲν οὖν, ὡσπερ καὶ οἱ ἀρχαῖοι, λέγειν ἀπορροήν εἶναι τὰς χρώσεις καὶ ἀράσθει διὰ τοιαύτην αὐτῶν ἀναφοράς ταύτως χρῶσις γὰρ δ’ ἀφής ἀναγκαῖον αὐτός ποιῶν τὴν αἰσθήσειν, ὅπτ’ εὐθὺς κρείττον φάναι τῷ 15 κινεῖται τὸ μεταξύ τῆς αἰσθήσεως ὑπὸ τοῦ ἀνατηνοῦ γίγνεσθαι τὴν αἰσθήσειν, ἄφηκ’ καὶ μὴ ταῖς ἀπορροίαις.] ἐπὶ μὲν οὖν τῶν παρ’ ἀλληλα κειμένων ἀνάγκη ὡσπερ καὶ μέγεθος λαμβάνειν ἀδρατον, οὕτω καὶ χρώσεις ἀναισθησθαι, ὡς λάθος αἰ κυνήσεις ἀφικνοῦμεν καὶ ἐν 20 δοκῇ εἶναι διὰ τὸ αἷμα φαινόμενα: ἐνατίθη καὶ ὡδεμία ἀνάγκη, ἀλλὰ τὸ ἐπιστολῆς χρώματα ἀκύρωτον ὅμως καὶ κυνόμενον ὑπὸ τοῦ ὑποκειμένου οὖχ ὁμοίως ποιήσει τὴν

440, 21 interpositis vers. 16—21 contextum interrupit recte indicat Thurot, cui assentitur Susemmihl, Philol. 1855.
may be compounded in no commensurate proportion, with an excess of the one element and deficiency of the other which are incommensurable, and colours may, indeed, be analogous to harmonies. Thus, those compounded according to the simplest proportions, exactly as is the case in harmonies, will appear to be the most pleasant colours, e.g. purple, crimson, and a few similar species. (It is an exactly parallel reason that causes harmonies to be few in number.) Mixtures not in a calculable ratio will constitute the other colours. Or again, all tints may show a calculable proportion between their elements, but in some the scheme of composition may be regular, in others not, while when those of the latter class are themselves impure, this may be due to an absence of calculable proportion in their composition.

This is one of the ways in which colours may be produced; a second is effected by the shining of one colour through another. This we may illustrate by the practice sometimes adopted by painters when they give a wash of colour over another more vivid tint, when, for example, they wish to make a thing look as though it were in the water or in the air. Again, we may illustrate by the sun, which in itself appears white, but looks red when seen through mist and smoke.

According to this account the multiplicity of the colours will be explained in the same way as in the theory mentioned before; we should have to suppose there was some ratio between the superficial and the underlying tints in the case of some colours, while in others there would be an entire lack of commensurate proportion.

[Thus we see that it is absurd to maintain, with the early philosophers, that colours are effluxes and that vision is effected by a cause of the efflux type. It was in every way binding on them to account for sensation by means of contact, and therefore it was obviously better to say that sensation was due to a movement set up by the sense object in the medium of sensation, and thus account for it by contact without the instrumentality of effluxes.]

According to the theory of juxtaposition, just as we must assume that there are invisible spatial quanta, so must we postulate an imperceptible time to account for the imperceptibility of the diverse stimuli transmitted to the sense organ, which seem to be one because they appear to be simultaneous. But on the other theory there is no such necessity; the surface colour causes different motions in the medium when acted on and when not acted on by an under-
κίνησιν. διὸ καὶ έτερον φαύνεται καὶ οὕτε λευκὸν οὕτε μέλαν. ὡστ' εἰ μὴ ἐνδέχεται μηδὲν εἶναι μέγεθος
30 αἴρατον, ἀλλὰ τὰν ἐκ των ἀποστήματος ὅρατον, καὶ ἀνὴρ τὰς ἐν εὐθ' χρωμάτων μέζις; καλείνως δ' οὐδὲν
κωλύει φαύνεσθαι τινα χρόνον κοινῆν τοὺς πόρρωθεν· ὅτι γὰρ οὐκ ἔστων οὐδὲν μέγεθος άρατον, ἐν τοῖς
υστερον ἐπισκεπτέον. εἰ δ' ἐστὶ μέζίς τῶν σωμάτων
440 b μη μόνον τὸν τρόπον τούτον ὅπερ οἴκυταί τινες, παρ' ἀλλήληα τῶν ἐλαχίστων τιθεμένων, ἀδήλων δ' ἡμῖν διὰ τὴν ἀισθήσιν, ἀλλ' ὅλως πάντη πάντως, ὡστε ἐν τοῖς
περὶ μίξεως εὑρήται καθόλου περὶ πάντως· ἐκείνως μὲν
5 γὰρ μίγνυται τάτα μόνον ὅσα ἐνδέχεται διειλεῖν εἰς τὰ ἐλάχιστα, καθάπερ ἀνθρώπων ἵππων ἢ τὰ σπέρματα·
tῶν μὲν γὰρ ἀνθρώπων ἀνθρωποῖς ἐλάχιστος, τῶν δ' ἵππων ἵππων· ὡστε τῇ τούτων παρ' ἀλλήλα θέτει τὸ
πλῆθος μέμικται τῶν συναμφιστέρων· ἀνθρωπὸν δὲ ἐένα
10 ἐνί ἵππῳ οὐ λέγομεν μεμιχθαί· ὅσα δὲ μῆ διαφέρεται εἰς τὸ ἐλάχιστον, τούτων οὐκ ἐνδέχεται μῖξεν γενέσθαι τῶν
τρόπων τούτου ἀλλὰ τῷ πάντῃ μεμιχθαί, ἀπὲρ καὶ
μάλιστα μίγνυσθαι πέρυκειν· τῶς δὲ τούτο γίγνεσθαι
δυνατόν, ἐν τοῖς περὶ μίξεως εὑρήται πρώτον· ἀλλ' ὅτι
15 ἀπάγχη μιγνυμένων καὶ τὰς χρόας μίγνυσθαι, δήλον,
καὶ τάτην τὴν αἴτιαν εἶναι κυρίαν τοῦ πολλάς εἶναι
χρώας, ἀλλὰ μη τὴν ἐπιτυλάσων μηδὲ τὴν παρ' ἀλλήλα
θέσιν· οὐ γὰρ πόρρωθεν μὲν ἐγγύθεν δ' οὐ φαύνεται
μία χρώα τῶν μεμιχθένων, ἀλλὰ πάντωθεν. πολλαὶ δ' ἐς
20 ἐστοίχαι χρώα διὰ τὸ πολλοίς λόγοις ἐνδέχεσθαι μίγνυ-
σθαι ἀλλήλοις τὰς μιγνύμενα, καὶ τὰ μὲν ἐν ἀρθροῖς
tα δὲ καθ' ὑπεροχήν μόνον. καὶ τάλα δὴ τῶν αὐτῶν
τρόπων ὅπερ ἐπὶ τῶν παρ' ἀλλήλα τιθεμένων χρωμάτων
ἡ ἐπιστολή, ἐνδέχεται λέγειν καὶ περὶ τῶν μιγνυμένων.

440 a, 31 τίς...μέξις; Simon | τίς...μέξις. Biehl, Bek. et ceteri omnes.
ly tint. Thus it appears to be something different, and neither black nor white.

Therefore, if an invisible spatial quantity is an impossibility and every magnitude must be visible at some distance, we must dismiss the former theory and ask what sort of a colour mixture this latter also is. But, on the former theory as well, there is nothing to prevent distant objects appearing to have a uniform colour; for no magnitude is invisible, a problem to be discussed later on.

But let us premise that substances are mixed not merely in the way some people think—by a juxtaposition of their ultimate minute parts, which, however, are imperceptible to sense—but that they entirely interpenetrate each other in every part throughout; how this happens in all cases was explained in general terms in our dissertation on mixture. The former theory accounts for the mixture only of those things which can be resolved into ultimate least parts, e.g. men or horses or seeds. In a division of men, a man is the least part; in the case of horses, a horse; thus by the juxtaposition of these individuals the mixture produced is a mass consisting of both components, whereas we do not talk of mixing single man with single horse. On the other hand, things which cannot be resolved into least parts, cannot be mingled in this way; they must entirely interpenetrate each other; and these are the things which most naturally mix. We have already, in our treatment of mixture, explained how this is possible.

Now, all this being so, it is clear that when substances are mixed their colours too must be commingled, and that this is the supreme reason why there is a plurality of colours; neither superposition nor juxtaposition is the cause. In such mixtures the colour does not appear single when you are at a distance and diverse when you come near; it is a single tint from all points of view. The reason for the multiplicity of colours will be the fact that things which mix can be mixed in many different proportions, and some mixtures will show a numerical ratio, others only an incommensurable excess of one of the elements. So far indeed as other considerations go, the same account will apply to the juxtaposition or superposition of
25 διὰ τίνα δ’ αἰτίαν εἰδή τῶν χρωμάτων ἐστὶν ὁρισμένα καὶ οὐκ ἀπειρά, καὶ χυμῶν καὶ ψόφων, ύστερον ἔρούμεν.

IV

Τι μὲν οὖν ἦστι χρώμα καὶ διὰ τίν’ αἰτίαν πολλαὶ χρωμαὶ εἰσιν, εἰρήται· περὶ δὲ ψόφου καὶ φως ἐιρήται πρότερον ἐν τοῖς περὶ ψυχῆς· περὶ δὲ ὅσμης καὶ χυμοῦν 30 νῦν λεκτέον. σχεδὸν γὰρ ἦστι τὸ αὐτὸ πάθος, οὐκ ἐν τοῖς αὐτοῖς δ’ ἐστὶν ἕκατερον αὐτῶν. ἑναργέστερον δ’ ἐστὶν ἢμῖν τὸ τῶν χυμῶν γένος ἣ τὸ τῆς ὅσμης. τούτον 441α δ’ αἴτιον ὅτι χειρόνον ἔχομεν τῶν ἄλλων χρώμων τὴν ὀσφυρέως καὶ τῶν ἡμῖν αὐτοῖς αἰσθήσεως, τῇ δ’ ἀφήνω ἀκριβεστάτην τῶν ἄλλων χρώμων. ἢ δὲ γεύσις 4 ἀφῇ τις ἐστὶν.

4 Ἡ μὲν οὖν τοῦ ὕδατος φύσις βουλεταὶ 5 ἄχυμος εἶναι· ἀνάγκη δ’ ἢ ἐν αὐτῷ τὸ ὑδρὸν ἔχει τὰ γένη τῶν χυμῶν ἀναίσθητα διὰ μικρότητα, καθάπερ Ἐμπεδοκλῆς φησίν, ἡ ὑλὴ τοιαύτην εἶναι οὐν παν- στερμάν χυμῶν, καὶ ἀπαντᾶ μὲν ἐξ ὕδατος γίγνεσθαι, ἀλλὰ δ’ εἰς ἄλλου μέρους, ἡ μηδεμίαν ἔχοντος διαφοράν 10 τοῦ ὕδατος τὸ ποιοῦν αἴτιον εἶναι, οἷον εἰ τὸ θερμὸν καὶ τὸν ἥλιον φαίνει τις. τούτον δ’, ὡς μὲν Ἐμπεδοκλῆς λέγει, λιῶν εὐφυσόττον τὸ ψεύδος· ὁρῶμεν γὰρ μετα- βάλλοντας ὑπὸ τὸ θερμὸν τὸς χυμοῦν ἀφαίρεσμένον τῶν περικαρπίων εἰς τὸν ἥλιον καὶ πυρρομένων, ὡς 15 οὐ τῷ ἐκ τοῦ ὕδατος ἔλκειν τοιουτοὺς γιγαντιαῖος, ἀλλ’ ἐν αὐτῷ τῷ περικαρπίῳ μεταβάλλοντας, καὶ ἐξίκεμαζο- μένους δὲ καὶ κειμένους, διὰ τῶν χρόνων, αὐτρητοῦ ἐκ γλυκέων καὶ πυκνοῦ καὶ παντόδιπος γυναικέων, καὶ ἐξομένους εἰς πάντα τὰ γένη τῶν χυμῶν ὡς εἰσεῖν 20 μεταβάλλοντας. ὀμοίως δὲ καὶ τὸ πανστερμίας εἶναι

441α, 14 πυρρομένων conicio | πυρρομένων Biehl, Bek. etc.
colours as to their mixture. The reason why they, and like-
wise tastes and sounds, have definite species limited in number,
will be given later on.

IV

We have defined colour and accounted for the multiplicity
of its tints, while sound and articulate utterance have been
treated in the Psychology; we are now to discuss smell and
taste.

While as subjective phenomena they are practically 30
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.

To proceed to our discussion—water is characteristically
of a flavourless nature; yet, either it must, tasteless as it is, 5
be the receptacle in which the various flavours reside in
amounts too minute to be detected—the Empedoclean theory
—or it must be a material adapted to be the matrix, as it
were, for the germs of all tastes. In this case all tastes will
originate out of water, but different ones will arise from
different parts of the matrix. Or we may hold that water
is entirely undifferentiated, and impute the causality to that
which acts upon it, for instance heat or the sun. A glance 10
will suffice to show the falsity of the Empedoclean theory;
for we can observe that the alteration in flavour is due to heat,
when fruits are plucked, integument and all, and set in the sun
and reddened. Their new flavour, then, cannot be extracted
from water; nay, the change must take place within the fruit— 15
covering itself. Through lying and drying fruits become, in
time, harsh and bitter instead of sweet, and display all sorts
of flavours; further, any kind of taste, so to speak, can be
produced by subjecting them to the process of cooking.

Similarly water cannot possibly constitute the material of 20
τὸ ὕδωρ ἦλθην ἀδύνατον. ἐκ τοῦ αὐτοῦ γὰρ ὅρῶμεν ὡς
τροφῆς γεγονόμενος ἐτέρους χυμοὺς. λείπεται δὴ τῷ
πάσχειν τι τὸ ὕδωρ μετὰβάλλειν. ὅτι μὲν τούτων οὐχ
ὑπὸ τῆς τοῦ θερμοῦ δυνάμεως λαμβάνει ταῖτην τὴν
25 δύναμιν ἢν καλὸμεν χυμὸν, φανερῶν· λεπτότατον γὰρ
τῶν πάντων ὕγρων τὸ ὕδωρ ἐστὶ, καὶ αὐτοῦ τὸ ἐλαῖον·
ἀλλὰ ἐπεκτείνεται ἐπὶ πλείου τοῦ ὕδατος τὸ ἔλαιον διὰ
tῆς γλυκυρότητας· τὸ δὲ ὕδωρ ψυχρόν ἐστι· διὸ καὶ
χαλεπώτερον φυλάξει ἐν τῇ χειρὶ τὸ ὕδωρ ἦπερ ἔλαιον.
30 ἐπεὶ δὲ θερμαίνομενον οὐδὲν φαίνεται παχυνόμενον τὸ
ὕδωρ αὐτὸ μόνον, δῆλον ὅτι ἐτέρα τις ἃν οἴη αὐτία·
οἱ γὰρ χυμοὶ πάντες πάχος ἔχουσιν μᾶλλον· τὸ δὲ
θερμὸν συναίτοιον. φαίνονται δὲ οἱ χυμοὶ δοσιτερ καὶ
441 b ἐν τοῖς περικαρπίοις, οὕτωι ύπάρχοντες καὶ ἐν τῇ γῇ.
διὸ καὶ πολλοὶ φασί τῶν ἀρχαίων φυσιολόγων τοιοῦτον
εἶναι τὸ ὕδωρ δὲ οίας ἄν γῆς πορευτήται. καὶ τοῦτο
δῆλον ἐστιν ἐπὶ τῶν ἀλμυρῶν ὕδατῶν μάλιστα· οἱ γὰρ
5 ἄλες γῆς τι εἰδὸς εἰσίν. καὶ τὰ διὰ τῆς τέφρας δυνθοῦ-
μενα πικρὰς οὐχὶς πικρῶν ποιεῖ τῶν χυμῶν. εἰσὶ τε
κρῆναι πολλαὶ αἱ μὲν πικραί, αἱ δὲ ἰξωτικές, αἱ δὲ παντο-
δαποὺς ἔχουσαν χυμοὺς ἄλλους. διὸ εὐλόγων ἐν τοῖς
φυσικοῖς τῶν χυμῶν γίγνεται γένος μάλιστα. πά-
10 σχεῦν γὰρ πέφυκε τὸ ὕγρων, ὡσπερ καὶ τάλλα, ὑπὸ
tοῦ ἐναντίου· ἐναντίον δὲ τὸ ἔξηρον. διὸ καὶ ὑπὸ τοῦ
πυρὸς πάσχει τι· ἔχηρα γὰρ ἢ τοῦ πυρὸς φύσις. ἀλλὰ
tῶν τοῦ πυρὸς τὸ θερμὸν ἐστὶ, γῆς δὲ τὸ ἔξηρον,
ὡσπερ εὑρίσκεται ἐν τοῖς περὶ στοιχείων. ἣ μὲν οὖν πῦρ
15 καὶ ἢ γῇ, οὐδὲν πέφυκε ποιεῖ καὶ πάσχειν, οὐδὲ ἀλλο
οὐδέν· ἢ δὲ ύπάρχει ἐναντίοτητας ἐν ἐκάστῳ, ταύτῃ πάντα
καὶ ποιοῦσαι καὶ πάσχοντες. ὡσπερ οὖν οἱ ἐναπαλύ-
νοντες ἐν τῷ ὕγρω τὰ χρώματα καὶ τοὺς χυμοὺς τοιοῦτον
ἐχεῖν ποιοῦσι τὸ ὕδωρ, οὕτως καὶ ἡ φύσις τὸ ἔξηρον.
a universal matrix of flavours. It is a matter of observation that out of the very same water taken as nutriment, plants develop different flavours.

True, this leaves us with the theory that the water is acted on in some way, and changes in consequence. Now, plainly, it is not owing to the power resident in heat that it acquires the potency we call flavour; water is the thinnest of all liquids, thinner even than oil, though oil on the other hand spreads out more than water on account of its viscosity. Water, however, is non-cohesive, and hence is more difficult to keep in the hand without spilling than oil.

Since water by itself is the only substance which shows no thickening under the influence of heat, clearly something else must be the cause of the phenomenon in question, for all flavours tend to exhibit density. The heat is the cooperating cause.

It is a conspicuous fact that all the savours found in fruits exist also in the soil. Hence many of the early physical philosophers allege that water takes its character from the soil through which it passes. This is clearly so in the case of saline waters, for salt is a species of earth. Filtration through ash—a bitter substance—makes the taste bitter, and there are many springs, some of which are bitter, some acid, and others possessing manifold other tastes. Hence, as one would expect, it is principally in plants that flavours as a class develop.

The reason for this acquisition of a specific character by water is—it is the nature of humidity, as of everything else, to be acted on by its opposite; now its opposite is dryness. Hence fire too has an effect upon it, for fire by constitution is dry. But of fire heat is a peculiar property, of earth dryness, as we explained in discussing the elements.

Now, by constitution, fire quà fire and earth quà earth do not display activity and passivity, nor do any of the other elements per se; it is in so far as they have opposing qualities that the elements one and all react on each other. Thus, just as men by dissolving colours or savours in water communicate those qualities to the water, so nature acts upon that which is dry and earthy in character; by the aid of heat it causes liquid
καὶ τὸ γέωδες, καὶ διὰ τοῦ ἔξοροῦ καὶ γεώδους δηθοῦντα καὶ κυνοῦσα τῷ θερμῷ ποιῶν τι τὸ ὕγρον παρασκευάζει. καὶ ἐστὶ τούτῳ χυμῷ τὸ γεινόμενον ὑπὸ τοῦ εἰρημένου ἔξοροῦ πάθος ἐν τῷ ὕγρῳ τῆς γεύσεως τῆς κατὰ δύναμιν ἀλλοιωτικῶν εἰς ἐνέργειαν· ἀγει γὰρ τὸ αἰσθητικὸν εἰς τοῦτο δυνάμει προϋπάρχον· οὐ γὰρ κατὰ τὸ μανθάνειν ἀλλὰ κατὰ τὸ θεωρεῖν ἔστι τὸ αισθάνεσθαι. ὅτι δ᾽ οὖ παντὸς ἔξορος ἀλλὰ τοῦ τροφήμου οἱ χυμοὶ ἢ πάθος εἰσίν ἢ στέρησις, δεῖ λαβεῖν ἐντεῦθεν, ὅτι οὔτε τὸ ἔξορον ἀνεύ τοῦ ὕγρου οὔτε τὸ ὕγρον ἀνεύ τοῦ ἔξοροῦ· τροφή·

γὰρ οὐχ ἐν μόνῳ τοῖς ζῴοις, ἀλλὰ τὸ μεμυγμένον. καὶ ἐστὶ τῆς προσφερομένης τροφῆς τοῖς ζῴοις τὰ μὲν ἀντὰ τῶν αἰσθητῶν αὐξήσων ποιοῦντα καὶ φθίνων· τούτων μὲν γὰρ αἶτιον ἢ θερμὸν καὶ ψυχρόν τὸ προσφερόμενον·

ταῦτα γὰρ ποιεῖ καὶ αὐξήσων καὶ φθίνων· τρέφει δὲ ἢ γευστὸν τὸ προσφερόμενον· πάντα γὰρ τρέφεται τῷ γλυκεί, ἢ ἀπλῶς ἢ μεμυγμένως. δεῖ μὲν οὖν διορίζειν περὶ τούτων ἐν τοῖς περὶ γεύσεως, νῦν δ᾽ ὅσον ἀναγιαίνων 5 ἀρχαίς αὐτῶν. τὸ γὰρ θερμὸν αὐξάνει καὶ δημουργεῖ τὴν τροφήν, καὶ τὸ μὲν κούρην ἐλκεῖ, τὸ δ᾽ ἀλμυρὸν καὶ πυκρὸν καταλείπει διὰ βάρος. δὴ ἐν τοῖς ἐξ ἐπάρκειας ποιεῖ τὸ ἐξ ὕγρῳ ψυχροῦ, τοῦτο τὸ ἐν τῇ φύσει τῶν ζῴων καὶ φυτῶν· διὸ τρέφεται τῷ γλυκεί. συμμέ-

γεννᾶ τῷ οἳ ἀλλοι χυμοὶ εἰς τὴν τροφήν τῶν αὐτῶν τρόπων τῷ ἀλμυρῷ καὶ ἁετί, ἀντὶ ἡδύματος. ταῦτα δὲ διὰ τὸ ἀντὶ πάντων λίιν τρόφιμον εἶναι τὸ γλυκύ

13 καὶ ἐπιπολαστικῶν.

13 ὤσπερ δὲ τὰ χρώματα ἐκ λευκοῦ καὶ μέλανος μίξεως ἐστιν, οὕτως οἱ χυμοὶ ἐκ γλυκέως καὶ 15 πυκροῦ. καὶ κατὰ λόγον δὴ τῷ μᾶλλον καὶ ἂντον ἑκαστοῦ εἰσίν, εἰτε κατ᾽ ἀριθμοῦς τινὰς τῆς μίξεως καὶ

441 b, 30 οὐχ ἐν μόσοι | ἐδέχεται οὕτων Biehl.
442 a, 12 ἀντὶ πάντων Biehl | ἀποτιμῶν τῷ Bck. et reliqui edd.
to percolate and pass through dry and earthy substance, and thus gives it a definite quality. This is flavour, the modification which the said dry element produces in liquids, and which is capable of stimulating the sense of taste existing as a potentiality into active operation. This effect which it produces upon the sense-faculty has already potential existence in the sense-faculty, for sensation is parallel, not to learning, but to the exercise of knowledge.

It is not of all dry substance but of that which is nutritive that flavours are a modification positive or negative. The fact that neither does the dry apart from the humid nor liquidity apart from dryness yield savour, supplies us with a proof of this, for neither of these alone, but their mixture, furnishes nutriment to animals. In the food of animals it is the objects of tactual sensation that cause growth and decay; it is quid hot or cold that the food they eat is responsible for these phenomena, as heat and cold cause growth and decay. On the other hand it is in so far as it affects the taste that what is given to animals nourishes them, for they all thrive on that which is sweet, either pure or mixed with something else.

The full discussion of these facts which is entailed will be found in the work On Generation; at present we must touch on them only so far as is necessary. Heat causes growth; it is the active cause in the preparation of food, making the light elements rise and allowing the saline and bitter to fall on account of their weight. In fact, in plants and animals, their native heat performs the same function as that fulfilled by external heat in the case of external bodies; hence it is by sweet things that they are nourished. Other tastes are commingled with food for the same reason as the saline and acid; they serve as seasoning. This is necessary because the sweet is, in comparison with all other things, excessively nutritive, and tends to rise in the stomach.

Just as colours arise from a mixture of black and white, so tastes are a product of the sweet and the bitter. Proportion it is—a difference in the quantity of their components, that gives them individuality; and either the mixture and conse-
κωνήσεως, εἶτε καὶ ἀφοίτως. οἱ δὲ τὴν ἤδονήν ποιοῦντες μυγνύμενοι, ὅστοι ἐν ἀριθμοῖς, μόνος μὲν οὖν λιπαρός ὁ τοῦ γυνικός ἐστὶ χυμός, τὸ δὲ ἀλμυρόν καὶ πυκρόν
20 σχεδὸν τὸ αὐτὸ, ὃ δὲ αὐστηρός καὶ δυσμῖς καὶ στρυφυσίς καὶ δέξιος ἀνὰ μέσον. σχεδὸν γὰρ ἵσα καὶ τὰ τῶν χυμῶν εἰδὴ καὶ τὰ τῶν χρωμάτων ἐστὶν. ἔπει γὰρ ἀμφοτέρους εἰδῆ, ἀν τις τιθῇ, ὡσπερ εὐλογοῖν, τὸ φαιῶν μέλαιν τι ἔλαιον· λείπεται γὰρ τὸ ξανθὸν μὲν τοῦ λευκοῦ εἶναι
25 ὡσπερ τὸ λιπαρὸν τοῦ γυνικοῦ, τὸ φωσικὼν δὲ καὶ ἀλμυρόν καὶ πράσινων καὶ κυναίνων ἀνὰ μέσον τοῦ λευκοῦ καὶ μέλαινος, τὰ δὲ ἄλλα μικτὰ ἐκ τούτων. καὶ ὡσπερ τὸ μέλαιν στέρησις ἐν τῷ διαφανεί τοῦ λευκοῦ, οὔτω τὸ ἀλμυρόν καὶ πυκρόν τοῦ γυνικοῦ ἐν τῷ τροφίμῳ
30 ὑγρῷ. διὸ καὶ ἡ τέφρα τῶν καμμένων πικρὰ πάντων·
31 ἐξίκραται γὰρ τὸ πότιμον ἔξε αὐτῶν.

Δημόκριτος δὲ καὶ οἱ πλείστοι τῶν φυσικῶν, ὅσοι λέγουσι περὶ αἰσθήσεως,
442b ἀποτότατον τι ποιοῦσιν· πάντα γὰρ τὰ αἰσθητὰ ἀπά τι ποιοῦσιν. καὶ τοῖς εἰ καὶ τούτῳ οὕτως ἔχει, δῆλον ὃς καὶ τῶν ἄλλων αἰσθήσεως ἐκάστη ἀφή τις ἐστὶν· τούτῳ δὲ ὅτι ἀδύνατον, οὐ χαλεπὸν συνιδεῖν. ἦπὶ δὲ τῶν κοινῶν
5 τῶν αἰσθήσεων πᾶσῶν χρῶται ὡς ἰδίους· μέγεθος γὰρ καὶ σχῆμα καὶ τὸ τραχύ καὶ τὸ λεῖον, ἦπὶ δὲ τὸ δέξιον καὶ τὸ ἀμβλύτθν τὸ ἐν τοῖς ὑγκος κοινὰ τῶν αἰσθήσεως ἐστίν, εἰ δὲ μὴ πασὸν, ἀλλ’ ὅψεως γε καὶ ἀφής. διὸ καὶ περὶ μὲν τοῦτον ἀπατῶται, περὶ δὲ τῶν ἰδίων οὖν
10 ἀπατῶται, οἷον ἡ ὄψις περὶ χρώματος καὶ ἡ ἀκοή περὶ ψόφων. οἱ δὲ τὰ τίς εἰς ταῦτα ἀνάγουσιν, ὡσπερ Δημόκριτος τὸ λευκὸ καὶ τὸ μέλαν· τὸ μὲν γὰρ τραχύ φήσιν εἶναι τὸ δὲ λεῖον, εἰς δὲ τὰ σχῆματα ἀναγεῖ τοὺς χυμοῦς. καὶ τοῖς ὅψεως ἡ μᾶλλον τῆς ὅψεως τὰ 15 κοινὰ γνωρίζει. εἰ δὲ ἀρα τῆς γεννήσεως μᾶλλον, τα
sequent stimulus is in terms of some numerical ratio, or it varies indefinitely.

The mixtures, however, which produce pleasure are in a calculable proportion. Sweet flavours alone are oily; saline and bitter are practically the same; but sour, pungent, astringent, and acid occupy an intermediate position. The species of tastes and colours are practically equal in number. If, as is reasonable, one reckons grey to be a kind of black, there are seven of each, for there remain yellow—to be referred to white, as oily was to sweet—with crimson, purple, green, and blue intermediate between black and white; and all other colours are got by combining these. Just as black is absence of white in the transparent medium so salinity and bitterness are a deficiency of sweetness in nutritive liquid. Consequently the ashes of things which have been burned are bitter, for the scorching they have received has expelled their palatable fluid qualities.

Democritus and most of the physical philosophers who treat of sensation commit a most senseless blunder. They identify all sense qualities with the tactual. It is clear that if this were true each of the other senses would be a sort of touch; but it is not difficult to see that this is impossible.

In addition they treat the common sensibles as though they were the objects of a special sense; but this is erroneous, for magnitude, figure, roughness, and smoothness, as well as the sharpness and bluntness found in material bodies, are generic objects of sensation which, if not discerned by all the senses, are common to sight and touch at least. Hence we can explain the fact that we can make mistakes in perceiving the latter, but are never deceived as to the special sensibles; sight, for instance, makes no mistakes about colour, nor does hearing err in the matter of sounds.

These philosophers, however, reduce the special to the common, following the example of Democritus in the case of black and white. He identifies the one with the rough, the other with the smooth, and he reduces flavours to geometrical figures. But it falls to sight first, if to any sense, to discriminate
γοῦν ἐλάχιστα τῆς ἄκριβεστάτης ἐστὶν αἰσθήσεως διακρίνειν περὶ ἑκαστον γένος, ὡστε ἔχρην τὴν γεύσιν καὶ τῶν ἄλλων κοινῶν αἰσθάνεσθαι μᾶλλον καὶ τῶν συχμάτων εἶναι κριτικώτάτην. οὕτως τὰ μὲν αἰσθητὰ πάντα ἔχει ἐναντίως, οἷον ἐν χρώματι τῷ μέλαν τῷ λευκῷ καὶ ἐν χυμόις τῷ γλυκῷ τῷ πικρῷ· σχῆμα δὲ σχῆμα δὲ δοκεῖ εἶναι ἐναντίου. τίνυ γὰρ τῶν πολυγώνων τῷ περιφερέσσει ἐναντίου; ἐτί ἀπείρων ὄντων τῶν συχμάτων ἀναγκαίον καὶ τοὺς χυμοὺς εἶναι ἀπείρους. οὕτως δὲ πάντως τά γάρ ἄλλα πάθη τῶν χυμῶν οἰκείαν ἔχει τὴν σκέψιν ἐν τῇ φυσιολογίᾳ τῇ περὶ τῶν φυτῶν.

V

Τὸν αὐτὸν δὲ τρόπον δεῖ νοῆσαι καὶ περὶ τὰς ὁρμᾶς· ὅπερ γὰρ ποίει ἐν τῷ ὕγρῳ τῷ ἔργῳ, τοῦτο ποιεῖ ἐν ἄλλῳ γένει τὸ ἐγχύμον ὑγρόν, ἐν ἀέρι καὶ ὑδάτι ὁμοίως. κοινὸν δὲ κατὰ τοῦτον νῦν μὲν λέγομεν τὸ διαφανὲς, διότι δὲ σφραγεῖ οὕς ὃς διαφανεῖς, ἀλλά οὐ πλυντικοὶ οὐ ρυπηκτικοὶ ἐγχύμοι ἔχρητος· οὐ γὰρ μόνον ἐν ἀέρι ἀλλὰ καὶ ἐν ὕδατι τὸ τῆς δοσφρήσεως ἐστίν. δὴ δὲ ἐπὶ τῶν ἱθύων καὶ τῶν ὀστρακοδέρμων· φαίνονται γὰρ σφραγεῖσθαι τὰ ἐδραμομένα ὑπὲρ ἐρείσ τῶν ὑδάτων (ἐπιπολάζει γὰρ ὁ ἄγρ, ὅταν ἐγγείοναι) οὐτ' αὐτὰ ἀναπένευτα. εἰ δὲ τις τῆς καὶ τὸν ἀέρα καὶ τὸ ὕδα τῷ ἄμφω ὑγρά, εἰς ἂν ἂν ἐν ὕγρῳ τοῦ ἐγχύμου ἔρημον φύσις ὀσμής, καὶ δοσφράτου του ὑδάτου. οὕτως δὲ ἐπὶ ἐγχύμον ἐστὶ τὸ πάθος, δὴ Ἱστὸν ἐκ τῶν ἐχόντων καὶ μὴ ἐχόντων ὀσμῆς· τὰ τὸ γὰρ στοιχεῖα ἄσσαμα, οἷον τῷ ἄγρῃ γῇ ὑγρῇ, διὰ τὸ τὰ τῆς ἐγχύρα καὶ ἐγχύρα αὐτῶν ἀχµα εἶναι, ἂν μὴ τις μεγάλων ποιήσῃ. δὲ καὶ ἡ ὀθάλαττα ἔχει ὀσμῆς· ἔχει
the common sensibles; it is, at any rate, the function of the most delicate sense to discern the finest differences in its particular domain, and so, if it fall to taste first to perceive the common sensibles, taste would need to possess the finest discrimination of figure and be as well the best means of perceiving the other common sensibles.

A further objection is, that the objects of special sense all show contrariety in their determinations; for example, in colour black and white are opposed, in taste sweet and bitter. But there seems to be no opposition between one figure and another. To which of the polygons is the circle a contrary? Again, as figures are infinite in number, there must be an infinitude of tastes also, for why should one figure produce a taste and not another?

This is our account of flavour and its effect on taste. The other qualities which flavours present find their special treatment in the Natural History of Plants.

V

The theory to be accepted about odour also is the same as that about flavour. Precisely as dry substance produces an effect in liquid, liquid impregnated with flavour acts in a new field, operating in air and water alike.

We have just said that the transparent element is common to these two substances, but it is not quâ transparent that they affect the sense of smell; they do this in so far as they dissolve and absorb by erosion dry substance which possesses flavour; both substances form a medium for this sense, for smell is exercised not only in air but in water also. The case of the fishes and the testacea makes this plain; they evidently employ the sense of smell and yet neither is there air in the water (for it rises to the surface if ever it gets in) nor do these animals breathe.

Premising, then, the fact that air and water are both moist, we might define odour as the nature dry substance possessing flavour assumes in the moist, and the object of the sense of smell will be anything so qualified.

That this phenomenon issues from the possession of flavour, is clear on a review of those substances that are and those that are not odorous. The elements have no odour, to wit—fire, air, earth, and water, since they are flavourless—both those of them which are moist and those which are dry—except when forming a combination. Hence the sea too smells, for it has a taste and contains dry substance.
γὰρ χυμὸν καὶ ἔγροτητα. καὶ ἄλες μᾶλλον νῖτρον
15 ὀσμώδεις· δὴ λοι ἐὰν έτὸς κινμαζέων εὖ αὐτῶν ἐλαιὸν· τὸ ἁὔρῳ νῦν γῆς ἔστι μᾶλλον. ἐτὶ λίθος μὲν ἀοσμον, ἄχυμον γάρ, τὰ δὲ ἐπίκα ὀσμώδης, ἐγχυμα γάρ· καὶ τοῦτων τὰ ὕδατωδὴ ήττων. ἐτὶ ἐπὶ τῶν μεταλλευμάτων χρυσοῦ ἀοσμον, ἄχυμον γάρ, ὁ δὲ χαλκός καὶ ὁ σίδηρος
20 ὀσμώδης. ὅταν δ', ἐκκαυθή τὸ ὕγρον, ἀοσμότεραι αἰ σκωρίαι γίγνονται πάντων. ἄργυρος δὲ καὶ καττίτερος τῶν μὲν μᾶλλον ὀσμώδη τῶν δ', ήττων· ὕδατωδὴ γάρ. δοκεὶ δ', ἐνιω ἡ καπνώδης ἀναθυμίασις εἶναι ὀσμή, οὖσα κοινή γῆς τε καὶ ἄερος. [καὶ πάντες ἑπιφέρονται
25 ἐπὶ τὸ θάνον περὶ ὀσμῆς·] διό καὶ Ἡράκλειτος ὡτος εἰρήκει, ὡς εἰ πάντα τὰ ὄντα καπνός γίγνοστο, ὅτι μίνες ἀν διαγροῖες. ἐπεὶ δὲ τὴν ὀσμήν πάντες ἑπιφέρονται <ἐπὶ τὸ θάνον>, οἱ μὲν ὡς ἄτριδα, οἱ δ' ὡς ἀναθυμίασσιν, οἱ δ' ὡς ἄμμο ταῖς· ἔστι δ' ἡ μὲν ἀτμίς ὑγρότης τις,
30 ἡ δ' καπνώδης ἀναθυμίασις, ὡσπερ εἴρηται, κοινῶν ἄερος καὶ γῆς· καὶ συνιστᾶται ἐκ μὲν ἱκείνης ύδατος, ἐκ δὲ ταύτης γῆς τι εἴδος· ἀλλ' ὁδέτερον τοῦτον ἔοικεν· ἡ μὲν γάρ ἀτμίς ἐστιν ύδατος, ἡ δ' καπνώδης ἀναθυμίασις ἀνάψωσεν ὑδατε γενέσθαι· ὀσμὰτι δὲ καὶ τὰ ἐν τῷ

443b ὕδατι, ὡσπερ εἴρηται πρῶτον· ἔτι ἡ ἀναθυμίασις ὄμοιος λέγεται ταῖς ἀπορροιάσις· εἰ οὖν μηδ' ἐκείνης καλὸς, οὖν αὐτὴ καλὸς. ὅτι μὲν οὖν ἐνδέχεται ἀπολαύσεις τὸ ὕγρον καὶ τὸ ἐν τῷ πνεύματι καὶ τὸ ἐν τῷ
5 ὕδατι καὶ πάσχειν τι ὑπὸ τῆς ἐγχυμοῦ ἔγροτητος, οὖν ἢδηλον· καὶ γὰρ ὁ ἀπὸ ὕγρον τὴν φύσιν ἔστιν. ἐτὶ δ' εἴπερ ὦμοιος ἐν τοῖς ὕγροις ποιεῖ καὶ ἐν τῷ ἀέρι οὖν ἀναπληνύομεν τὸ ἔχρον, φανερῶ ὅτι δὲ ἀνάλογον εἶναι τὰς ὀσμὰς τοῖς χυμοῖς. ἀλλὰ μὴν τούτο γε ἐπ' ἐνών
30 συμβέβηκεν· καὶ γὰρ δρομαίαι καὶ γλυκεῖαι ἐξίσων ὀσμαῖ· καὶ αὐστηραὶ καὶ στρυφναὶ καὶ λιπαραί, καὶ τοῖς πικροῖς

443a, 24 καὶ ... ὀσμῆς 25 damnat Thurot. 28 ἐπὶ τοῦτο om. codd. et edd., addidit Christ probat etiam Biehl.
Salt smells more than natron, as the oil extracted from it proves, while natron is more of the nature of earth. Moreover, stone is odourless, since flavourless; but woods, being possessed of taste, are scented, the watery ones less so. Again, among metals gold is odourless, having no taste; bronze and iron have a smell. The dross left, when the fluid element is smelted out of these metals, in every case possesses less odour than the ore itself. Silver and tin smell more than the one class and less than the other; for they are aqueous.

Some people think that the smoky variety of fume constitutes odour, since it is a joint product of earth and air. [All ascribe odour to this.] Hence too the saying of Heraclitus that “if all things were turned into smoke the nostrils would distinguish them.” Now all ascribe odour to this phenomenon, some taking it to be steam, others a fume, while some again ascribe it to both.

Steam is a sort of moisture, and smoke-like fume is a joint product of air and earth, as has been said; out of the former water condenses, out of the latter some species of earth. But neither of these seems to be odour; for steam may be classed as water, while again smoke-like fumes cannot exist in water; but creatures living in water do employ the sense of smell, as already said. Further the theory of fumes is similar to that of effluxes and, if that theory was erroneous, so is this.

It is clear that moisture, both as it exists in the atmosphere and as it exists in water, can derive something from and be modified by dry substance which possesses flavour, for air too has moisture in its constitution. Moreover if the effect of the dry substance in liquids and in air, when it is, as it were, dissolved in them, is similar to its previous action in liquid alone, manifestly odours and tastes must be analogous to each other. Indeed in several cases this correspondence occurs; odours are pungent and sweet, harsh, astringent and
τὰς σαπρὰς ἄν τις ἀνάλογον ἔστιν. διὸ ὅσπερ ἐκείνῳ δυσκατάποτα, τὰ σαπρὰ δυσανάπνευστά ἐστιν. δὴ λοιπὸν ἄρα ὅτι ὅσπερ ἐν τῷ ὑδάτι ὁ χυμός, τούτῳ ἐν τῷ ἀέρι καὶ ὑδάτι ἡ ὅσμη. καὶ διὰ τούτῳ τὸ ψυχρόν καὶ ἡ πτέρνη καὶ τοῦς χυμοὺς ἀμβλύνει καὶ τὰς ὅσμας ἀφανίζει· τὸ γὰρ θερμὸν τὸ κινοῦν καὶ δημιουργοῦν ἀφανίζουσιν ἡ ψύξις καὶ ἡ πτέρνη.

Εἶδος δὲ τοῦ ὀσφραντοῦ δῶρ ἐστὶ· οὐ γὰρ ὅσπερ τινὸς φασιν, οὐκ ἐστιν εἰδή τοῦ ὀσφραντοῦ, ἀλλ’ ἐστιν. διοριστέον δὲ πῶς ἐστι καὶ πῶς οὐκ ἐστιν· τὸ μὲν γὰρ ἐστὶ κατὰ τοὺς χυμοὺς τεταγμένον αὐτῶν, ὅσπερ εἶπομεν, καὶ τὸ ἥδυ καὶ τὸ λυπηρὸν κατὰ συμβεβηκός ἐξουσία· διὰ γὰρ τὸ θρεπτικοῦ πάθη εἶναι, ἐπιθυμοῦντες μὲν ἢ 25 ἢδεῖαι αἱ ὅσμαι τοῦτον εἰσὶν, πεπληρωμένοις δὲ καὶ μυδῆν δεομένοις οὐχ ἢδεῖαι, οὐδ’ οὕσοις μῆ καὶ ἡ τροφή ἢ ἐχουσα τὰς ὅσμας ἢδεῖαι, οὐδὲ τούτοις. ὥστε αὕτη μὲν, καθάπερ ἐπομεν, κατὰ συμβεβηκός ἐξουσία τὸ ἥδυ καὶ λυπηρόν, διὸ καὶ πάντων εἰσὶ κοιναὶ τῶν ζώων· αἱ 30 δὲ καθ’ αὐτὰς ἢδεῖαι τῶν ὅσμών εἰσίν, οἷον αἱ τῶν ἀνθών· οὐδὲν γὰρ μᾶλλον οὐδ’ ἢτοι πρὸς τὴν τροφὴν παρακαλοῦσιν, οὐδὲ συμβάλλονται πρὸς ἐπιθυμίαν οὐδὲν, ἀλλὰ τονωστῶν μᾶλλον· ἀληθὲς γὰρ ὅσπερ Ἐὐριπίδην σκότων ἐπει Στράττος, “ὅταν φακὴν ἔφητε, μὴ ’πείξειν μάρον.” οἱ δὲ νῦν μιγνύστες εἰς τὰ πόματα τὰς τοιαύτας δυνάμεις βιάζονται τῇ συνθείᾳ τὴν ἡδονήν, ἐως ἅν ἐκ δι’ αἰσθήσεως γενήσῃ τὸ ἥδυ ὡς ἄν καὶ ἀπὸ μᾶς. τοῦτο μὲν οὖν τὸ ὀσφραντὸν ἰδιόν τῶν ἀνθρώπων ἐστίν, 5 ἢ δὲ κατὰ τοὺς χυμοὺς τεταγμένη καὶ τῶν ἀλλων ζωῶν, ὅσπερ εἰρήται πρότερον· κάκεινον μὲν, διὰ τὸ κατὰ συμβεβηκός ἔχει τὸ ἥδυ, διηρήται τὰ εἰδή κατὰ τοὺς χυμοὺς, ταύτης δ’ οὐκέτι, διὰ τὸ τὴν φύσιν αὐτῆς εἶναι καθ’ αὐτὴν ἢδεῖαι ή λυπηράν. αὕτων δὲ τοῦ ἰδίου εἶναι τον ἀνθρώπου τῆς τοιαύτης ὅσμην διὰ τὴν ἢδα τῆς περὶ
oily, and we might regard fetid odours as corresponding to bitter tastes; this would explain the parallel unpleasantness of the latter and noisomeness of the former. Thus it is clear that smell is in air and water precisely what flavour is in water.

It is for this reason that cold and frost blunt flavours and reduce odours to non-existence, for the heat which is the active and creative cause is nullified by the cooling and congelation.

There are two sorts of odorous qualities; it is not the case, as some allege, that there are not different species of odour. They do exist; but we must determine in what sense they are authentic and in what sense not.

The one set are in order parallel to the various flavours as we have explained. Their pleasantness and unpleasantness belong to them contingently, for, since they are qualities of that which forms our food, these smells are pleasant when we are hungry, but when we are sated and not requiring to eat, they are not pleasant; neither are they pleasant to those who dislike the food of which they are the odour. Hence, as we said, their pleasantness and unpleasantness are contingent and hence too they are common to all animals. But the other class of smells are per se pleasant, for example the scents of flowers. They have no influence either great or small in attracting us to our food nor do they contribute anything to the longing for it. Their effect is rather the opposite; there is a truth contained in Stratti's jibe at Euripides—“Pray perfume not the good pea-soup.” Those who do as a fact mix such elixirs with their drink get a forced pleasure by accustoming themselves to it, so that the pleasantness arising from the two sensations becomes apparently the result of one. This sort of odorous quality is thus peculiarly the object of human sense, but that coordinate with the varieties of flavour is proper to the other animals as well, as said before. Those odours, because their pleasantness is contingently attached to them, are classified in species which correspond to the several flavours, but in the other group this feature disappears, as there agreeableness and the reverse attach to the essential nature of the odour.

The cause of the restriction of odour of this kind to human sense comes from the constitution of the body in the
τὸν ἐγκέφαλον. ψυχροῦ γὰρ ὄντος τὴν φύσιν τοῦ ἐγκέφαλον, καὶ τοῦ αἰματος τοῦ περὶ αὐτὸν ἐν τοῖς φλεβῶις ὄντος λεπτοῦ μὲν καὶ καθαροῦ, εὐφυκτοῦ δὲ (διὸ καὶ ἡ τῆς τροφῆς ἀναθυμίας ψυχομένη διὰ τὸν τόπον τα 15 νοσηματικά ρέωματα ποιεῖ), τοῖς ἀνθρώποις πρὸς βοηθεῖαν ὑγείας γέγονε τὸ τοιοῦτον ἐδοσὶ τῆς ὀσμῆς. οὕτων γὰρ ἀλλο ἐργον ἠστίν αὐτὴν [ἡ τοῦτο], τούτο δὲ ποιεῖ φανερῶς. ἡ μὲν γὰρ τροφὴ ἦδεια ὀσφα, καὶ ἐξηρὰ καὶ ὑγρά, πολλάκης νοσῶδης ἦστιν, ἡ δ’ ἀπὸ τοῦ εὐώδους 20 ὀσμῆς ἢ καθ’ αὐτὴν ἦδεια> ὀσισσοὺς ἔχοντων ὀφέλωμα ὡς εἰπέων αὐτὶ. καὶ διὰ τοῦτο γίγνεται διὰ τῆς ἀναπνοῆς, οὐ πάσιν ἀλλὰ τοῖς ἀνθρώποις καὶ τῶν ἐναίμων οἷον τοῖς τετράποσι καὶ ὅσα μετέχει μᾶλλον τῆς τοῦ αέρος φύσεως. ἀναφερομένων γὰρ τῶν ὀσμῶν πρὸς τὸν ἐγκέφαλον διὰ τὴν ἐν αὐταῖς τῆς θερμότητος κοιφότητα ὑγειοντέρως ἔχει τὰ περὶ τῶν τόπων τούτων. ἡ γὰρ τῆς ὀσμῆς δέωμας θερμή τῆς φύσιν ἠστίν. κατακεχρηται δ’ ἡ φύσις τῇ ἀναπνοῇ ἐπὶ δύο, ὡς ἐργον μὲν ἐπὶ τὴν εἰς τὸν θάρακα βοηθεῖαν, ὡς παρέργῳ δ’ ἐπὶ 25 τὴν ὀσμῆν. ἀναπνέοντος γὰρ ὄσπερ ἐκ παράδοου ποιεῖται διὰ τῶν μυκτήρων τὴν κίνησιν. ἰδιὸς δὲ τῆς τοῦ ἀνεθρώσου φύσεως ἔστι τὸ τῆς ὀσμῆς τῆς τοιοῦτος γένος διὰ τὸ πλεῖστον ἐγκέφαλον καὶ ὑγρότατον ἔχειν τῶν ἄλλων ζῶων ὡς κατὰ μέγεθος: διὰ γὰρ τοῦτο καὶ μόνον 30 ὡς εἰπέων αἰσθάνεται τῶν ζῴων ἀνθρώπως καὶ χαίρει ταῖς τῶν ἄνθρωπος καὶ ταῖς τῶν τοιοῦτος ὀσμῶς. στίμητρος γὰρ αὐτῶν ἡ θερμότητα καὶ ἡ κίνησις πρὸς τὴν ὑπερβολήν τῆς ἐν τῷ τόπῳ ὑγρότητος καὶ ψυχρότητος ἀστίν. τοῖς δ’ ἄλλοις ὡσα πλεύμωνα ἔχει διὰ τοῦ ἀναπνεύτην τοῦ ἐτέρου γένους τῆς ὀσμῆς τὴν αἰσθησιν ἀποδεδωκεν ἡ φύσις,

444 a, 17 ἡ τοῦτο ἐλευ. L S U Alex. vet. tr. et omnes edd. excepto Biehl.
18 ἢ ante ἐφάδα et ante ἐφάδα legunt exceptis E M Y et Biehl omnes codd. et edd.
19 et 20 ἡ δ’ ἀπὸ τῆς ὀσμῆς τῆς καθ’ αὐτὴν (ταυτὴν L P U) εὐώδους (quibus verbis ἔδωκα addunt L S U) habent omnes codd. et edd., text. recept. omisso ἔδωκα Biehl.
444 b, 3 τῶν ἀναπνεύτων edd., τοῦ P U et Wilson.
region of the brain. The brain is of a cold nature and the blood around it in the veins is thin and pure and is easily chilled (this explains why the upward ascending fumes from food on turning cold owing to the nature of that region cause a morbid flow of rheum). Hence it is for man's benefit, for the preservation of his health, that this species of odour has come into existence. This is its only function and it evidently fulfils it. Food, though sweet, being both dry and moist, is frequently unhealthy; but the odour, *per se* pleasant, of a fragrant perfume, is beneficial to us in whatever state we are. It is for this reason that it is by means of respiration that smell takes place, if not in all animals, yet in man and, among sanguineous animals, in the quadrupeds and such as participate more largely in an aerial constitution. When scents are carried up to the brain, owing to the lightness of the warm element contained in them, the parts in this region have a healthier tone; this takes place because the power in odour to produce an effect is constituted by heat.

Nature employs respiration for two purposes; its chief function is to maintain the action of the chest, its secondary one subserves the ends of smell, secondary, for the passage of the breath through the nostrils is, as it were, a cursory contrivance.

The reason why the class of odours of this description is restricted to man, is, that his brain is larger and more humid than that of all other animals in proportion to his size. This is why he alone, so to speak, among the animals, perceives and also enjoys the odours of flowers and similar scented objects; they are pleasant because their heat and activity are proportionate to the excess of humidity and cold in that part of the body.

Among other animals, in those which have lungs, breathing is the means which nature has bestowed upon them for the
5 ὅπως μὴ αἰσθητήρια διὸ ποιήσας ἄποχρη γὰρ καὶ ἀναπνεοῦσιν, ἀπέπερα, τοὺς ἀνθρώπους ἀμφοτέρως τῶν ὅσφρας τῶν, τούτως τῶν ἔτερων μόνων ὑπάρχουσα ἡ αἰσθήσις. τὰ δὲ μὴ ἀναπνεοῦσα ὅτι μὲν ἔχει αἰσθηθῆναι τὸν ὅσφραυν, φανερὸν· καὶ γὰρ ἠκούει καὶ τὸ τῶν ἑντόμων γένος πάντα ἀκριβῶς καὶ παρρωθεὶς αἰσθάνεται, διὰ τὸ ἑρετικὸν εἰδὸς τῆς ὁσμῆς, ἀπέχουσα πολὺ τῆς οἰκείας τροφῆς, ὅπως αἱ τέκνα καὶ τὸ τῶν μικρῶν μυρμήκων γένος, ὅπως καλοῦσι τινὲς κνίσας, καὶ τῶν φαλακτίων αἱ πορφύραι, καὶ τόλμα τῶν ἄλλων τῶν τοιούτων ἔκτις ὑδάτων. 15 αἰσθάνεται τῇ τροφῆς διὰ τὴν ὁσμῆν. ὅτι δὲ αἰσθάνεται, οὐχ ὁμοίως φανερῶς. διὸ καὶ ἀπορρείπει τις τῶν αἰσθάνεσθαι τῆς ὁσμῆς, εἴπερ ἀναπνεύσῃ μὲν γίνεται τὸ ὅσμάζωσι μοναχῶς, (τοῦτο γὰρ φανερός ἐπὶ τῶν ἀναπνεούσων συμβαίνοντων πάντων), ἄκουμεν δ' οὐθὲν ἀναπνεύει, αἰσθάνεται μέντοι, εἰ μὴ τις παρὰ τὰς πάντες αἰσθήσεις ἔτερα. τοῦτο δ' ἀδύνατον· τοῦ γὰρ ὅσφραου τῆς ὁσμῆς, ἄκουμεν δὲ τούτοις αἰσθάνεται, ἀλλ' οὐ τῶν αὐτῶν ἢσος τρόπος, ἀλλὰ τοῖς μὲν ἀναπνεύσῃ τὸ πνεῦμα ἀfspare τὸ ἐπικείμενον ὅσπερ πομά τι (ὅδε οὖν αἰσθάνεται· 20 μὴ ἀναπνέουσα), τούτο δὲ μὴ αἰσθάνεσθαι ἀφηρημένα τοῦτο, καθάπερ ἐπὶ τῶν ὁμοίων τὰ μὲν ἔχει βλέφαρα τῶν ἔκτισιν, ὅπως μὴ ἀνακαλυφθέντων οὐ δύναται ὡς, τὰ δὲ σκληροῖαι ὁμοίως ἔχει, ἀφετέρου εἰς τὸν ἀνακαλύφθοντα, ἀλλ' ὁρᾶ ἐκ τοῦ ἄνωτος ἔκτισιν εἰ δύναται ὡς τῶν ἀνθράκων ἀτμίδος καρπαραβαύσι καὶ φθείρουσι πολλάκις· οὕτως ὑπὸ τῆς

444 b. 5 ἐπεθερ καὶ δὲ ἰδιωτ. ἵππων etiam Alex. et vet. tr. 29 ὅσοι Biehl | ὅσοι L S U Alex. et omnes edd., “a facultate existente” vet. tr. | abdi ei E Y Biehl, αὐτὴς reliqui et scripti et impressi.
perception of the other genus of odour. This was to avoid creating two sense-organs; for if creatures merely breathe, the sense of smell is sufficiently well provided for, in the case of the animals the perception of the one class of odorous qualities, the only one possessed by them, just as it is in man who perceives both kinds.

That non-respiring animals perceive odorous quality is a matter of observation. Fishes and the insect-tribe perceive quite accurately and at a distance by means of the species of odour connected with nutriment, even when they are far away from the things that form their special food. For example bees and the kind of small ants called knipes and, among marine creatures, the purple-murex and many similar animals, have a very acute perception of food by means of smell.

But the organ of perception is not so obvious and so one might raise a difficulty and ask, “what is the organ with which these animals perceive smell, if in all respiring animals the sensation occurs in one way only, viz. by respiration (as is evidently the case in all creatures that breathe), and none of these breathe but yet do perceive odour? Perhaps they do not smell but have a new sense over and above the five.”

This, however, is impossible; it is smell that is the sense of that which smells and this they perceive. Yet perhaps the manner of perception is not the same; perhaps in the case of respiring animals the breath displaces a superficial structure which serves in a way like a lid to cover the sense-organ; (this will explain why when we do not inhale the breath we do not smell;) but in the non-respiring animals this is entirely lacking. A parallel for this is the eye; some animals have eyelids and, unless these are open, they cannot see; but hard-eyed animals, not possessing them, do not require anything to open them, but see an object directly out of the organ which itself has the capacity of vision.

Similarly in accordance with our previous distinction we must notice that none of the other animals are distressed by the smell of things per se malodorous, unless any of these chance to be destructive to life. These noxious odours have a destructive effect upon them, just as they have upon men too, in whom the gas arising from coal causes headache and frequently death. So too, sulphurous and bituminous fumes
35 τοῦ θείου δυνάμεως καὶ τῶν ἀσφαλτωθῶν φθείρεται
445 ἄρα τὰλλα ζῶα, καὶ φεύγει διὰ τὸ πάθος. αὐτὴς δὲ καθ’
αὐτὴν τῆς δυνατίας οὐδὲν φροντίζουσιν, καίτοι πολλὰ
τῶν φυσικῶν δυνάμεις ἔχει τὰς ὁμοίας, ἐὰν μὴ τι
συμβάλληται πρὸς τὴν γεύσιν ἢ τὴν ἐνέργην αὐτοῖς.
5 ἐνοικε δ’ ἡ αἰσθήσεις ἡ τοῦ ὀσφραίνεσθαι περιττῶν οὐσῶν
τῶν αἰσθήσεως καὶ τοῦ ἄριθμοῦ ἕχοντος μέσον τοῦ
περιττοῦ καὶ αὐτὴ μέσῃ εἶναι τῶν τέ ἄπτικῶν, οἴον
ἀρθρός καὶ γεύσεως, καὶ τῶν δ’ ἄλλον αἰσθητικῶν, οἴον
ὁμοιοὶ καὶ ἀκοῆς. διὸ καὶ τὸ ὀσφραντόν τῶν θρησκευτικῶν
10 ἐστὶ πάθος τι (ταῦτα δ’ ἐν τῷ ἄπτῳ γένει) καὶ τοῦ
ἀκουστοῦ δὲ καὶ τοῦ ὀρατοῦ, διὸ καὶ ἐν ἄρει καὶ ἐν
ὑδατὶ ὀρμώνται. ὡστ’ ἐστὶ τὸ ὀσφραντὸν κοινὸν τι
τούτων ἀμφοτέρων, καὶ τῷ τε ἄπτῳ ὑπάρχει καὶ τῷ
ἀκουστῷ καὶ διαφανεί· διὸ εὐλόγως παρείκασται ἐξηρά
15 τῆς ἐν ὑγρῷ καὶ χιτῶ ὀξων βαφής τις εἶναι καὶ
πλῦσις. πὼς μὲν οὖν εἴδη δεῖ λέγει καὶ πῶς οὐ δεῖ
17 τοῦ ὀσφραντοῦ, ἐπί τοσοῦτον εἰρήσθω.

Ο δὲ λέγουσι τινες
4 τῶν Πυθαγορείων, οίκ έστων εὐλόγων· τρέφεσθαι γάρ
φασιν ἐνα ζῶα ταῖς ὁμοίαις· πρώτον μὲν γάρ ὀρθῶς
20 ὅτι τὴν τροφήν δεῖ εἶναι συνεδρήν· καὶ γὰρ τὰ τρεφόμενα
οὐχ ἀπλὰ ἐστὶν, διὸ καὶ περίττων γίνεται τῆς τροφής,
ὥστε καὶ ἐν αὐτοῖς ὃ δ’ ἔστω, ὧσπερ τοῖς φυτοῖς. ἔνι δ’
οὐδὲ τὸ νῦν ἐθέλει αὐτό μόνον ἀμικτὸν ὅπῃ τρεφόν·
συμματῶθες γὰρ τι δεῖ εἶναι τὸ συστηρόμενον. ἔνι
25 πολὺ ἤτον εὐλόγων τῶν ἀέρα σωματοστηθαί. πρὸς δὲ
τούτοις, ὅτι πᾶσιν ἐστὶ τοῖς ζῴοις τόπος δεκτικός τῆς
τροφῆς, ἐξ οὗ ὅταν εἰσέλθη λαμβάνει τὸ σώμα· τού
δ’ ὀσφραντοῦ ἐν τῇ κεφαλῇ τὸ αἰσθητήριον, καὶ μετὰ
πνευματώδους εἰσέρχεται ἀναθημάτης, ὡστ’ εἰς τῶν
30 ἀναπνευστικῶν βαδίζοι ἂν τόποι. ὅτι μὲν οὖν οὐ
συμβάλλει τες τροφήν τὸ ὀσφραντόν, ἡ ὀσφραντόν,
have the power of causing death in the other animals and are shunned by them in consequence. But they reckon not at all of the essential unpleasantness of the smell (though many plants are malodorous) unless it make some difference to the taste and to eating.

The number of the senses is uneven and the sense of smell, since an uneven number has a middle term, seems itself to occupy the intermediate position between the senses which require contact, viz. touch and taste, and those where the perception is mediated by something else, to wit, sight and hearing. For this reason also odour is a quality both of that which is nutritive (which falls within the class of things tangible) and of the audible and the visible, and hence the sense of smell is exercised both in air and in water. Thus the object of smell is something common to both of these and is found in things tangible, things audible and things transparent.

We had, therefore, good reason in comparing it to an infusion and solution of dry substance in that which is liquid and fluid. This is the sum of our account of the sense in which it is correct and that in which it is incorrect to talk of species in odour.

The theory held by certain Pythagoreans that some animals live on odours is an irrational doctrine.

In the first place, food must be a composite substance; the creatures that it nourishes are themselves not simple in structure. Hence from food a waste residue is developed which in some is internal, in others—plants, external; secondly, water by itself alone and unmixed has no nutritive tendency; food which is to form a concrete body must have solidity. Much less reason is there for supposing that air can be solidified. Furthermore, in all animals there is a receptacle for food and out of this the body is supplied upon the entrance of nutriment. But the organ for perceiving smell is in the head; odour enters the body along with the waft of the air we breathe and so must pass into the organs of breathing.

It is clear, then, that the object of the sense of smell has,
δήλων· ὅτι μέντοι εἰς ὑγίειαν, καὶ ἐκ τῆς αἰσθήσεως καὶ ἐκ τῶν εἰρημένων φανερῶν, ὡστε ὅπερ ὁ χυμός ἐν τῷ ἑρπτηκῷ καὶ πρός τα ἱρέματα, τούτω ἢ ἐστὶ πρὸς 445δ ὑγίειαν τὸ ὀσφραυτῶν. καὶ ἐκαστὸν μὲν οὖν αἰσθήτηρι
με τὸν ὀσφραυτῆρον διαφόρως τὸν τρόπον τούτων.

VI

Ἀπορήσεις δ' ἂν τις, εἰ πάν σώμα εἰς ἄπειρα διαφο
ῥεῖται, ἁρα καὶ τὰ παθήματα τὰ αἰσθητά, οἷον χρώμα
5 καὶ χυμὸς καὶ ὡμή καὶ ψόφος καὶ βάρος καὶ ψυχρὸν καὶ
θερμόν καὶ κόψιν καὶ σκληρόν καὶ μαλακόν; ἡ
ἀδύνατον· ποιητικόν γάρ ἔστω ἐκαστὸν αὐτών τῆς αἰσθήσεως· τῷ δύνασθαι γὰρ κυνεῖν αὐτὴν λέγεται
πάντα. ὡστ' ἀνάγκη τὴν τε αἰσθήσιν εἰς ἄπειρα διαι
10 αίσθησιν καὶ πάν ἔναι μέγεθος αἰσθητῶν· ἀδύνατον γὰρ
λευκὸν μὲν ὅραν, μὴ ροσοῦ δὲ. εἰ γὰρ μὴ ὁυτώς,
ἐνθέχοντ' ἂν εἰναι τὰ σώμα μηδέν ἐχον χρώμα μηδὲ
βάρος μηδ' ἀλλ' τοιοῦτον πάθος. ὡστ' οὐδ' αἰσθητῶν
ὅλως· ταύτα γὰρ τὰ αἰσθητά. τὸ ἀρα αἰσθητῶν ἔσται
15 συγκείμενον οὐκ ἐξ αἰσθητῶν. ἀλλ' ἀναγκαῖον· οὐ γὰρ
δὴ ἐκ γε τῶν μαθηματικῶν. ἔτι τίνι κρινοῦμεν ταύτα ἢ
γνωσόμεθα; ἢ τῷ νῷ. ἀλλ' οὐ νοεῖ, οὐδὲ νοεῖ ὁ
νοῦς τὰ ἑκτὸς μὴ μετ' αἰσθήσεως. ἀμα δ' ἂι ταύτ' ἔχει
ουτώς, ἔσκεις μαρτυρεῖν τοῖς τὰ ἄτομα ποιουσί μεγέθη.
20 οὐτω γὰρ ἄν λύοιτο ὁ λόγος. ἀλλ' ἀδύνατα· εἰρηται δὲ
περὶ αὐτῶν ἐν τοῖς λόγοι τοῖς περὶ κυνήσεως. περὶ δὲ
τῆς λύσεως αὐτῶν ἀμα δήλων ἔσται καὶ διὰ τι πεπέρασται
tὰ εἴδη καὶ χρώματος καὶ χυμοῦ καὶ φθόγγον καὶ τῶν
ἀλλῶν αἰσθητῶν. οὖν μὲν γὰρ ἐστὶν ἔσχατα, ἀναγκαῖον
25 πεπεράσθαι τὰ ἐντὸς· τὰ δ' ἐναντία ἔσχατα. πᾶν δὲ
tὸ αἰσθητῶν ἔχει ἐναντίωςν, οἷον ἐν χρώματι τὸ λευκὸν
per se, nothing to do with nourishment. That it makes a difference to health is, however, obvious; both the experience of the sensation itself and our argument prove it. Hence we may conclude that odour has precisely the same office in relation to health as flavour has in food and in relation to the creatures that food nourishes.

This finishes our account of the objects relative to the several sense-organs.

VI

The question might be raised whether, if all bodies are infinitely divisible, the same is the case with their sensuous qualities also, e.g. colour, flavour, odour, sound, weight, cold, heat, lightness, hardness and softness. Or is this impossible? Each of those phenomena is able to cause sensation; they are all styled sense-qualities owing to their power of stimulating the sense. Consequently, on the former alternative sensation will be capable of infinite subdivision and, as well, every magnitude will be perceptible, since it is impossible to perceive anything white which is not a quantum.

If this were not so, body might exist which was totally without colour or weight or any other similar attribute. Consequently it would be totally imperceptible, for the above form the list of the sense-qualities. The object of sensation must then be composed of things which are imperceptible. But it must be composed of constituents which are sensible; for it certainly cannot consist of mathematical entities. Further how should we distinguish them or be aware of them? By means of thought? But they are not objects of thought; thought does not think external objects unless sense cooperates.

At the same time also, this, if true, seems to give evidence in support of the theory of atomic magnitudes, since that would furnish a solution of the problem. But atomic magnitudes are impossible, as was explained in our treatment of motion.

The solution of this problem and the reason why the species of colour, taste, sound, etc. are limited in number, will become apparent at the same time.

Where extremes exist the internal parts must be determinate. Now contraries are extremes and every object of sense exhibits contrariety, e.g. in colour black and white,
καὶ τὸ μέλαν, ἐν χυμῷ γλυκῷ καὶ πυκρόν, καὶ ἐν τοῖς ἄλλοις δὴ πάσιν ἐστιν ἐσχάτα τὰ ἑναίτια. τὸ μὲν οὖν συνεχές εἰς ἀπειρὰ τέμνεται ἀύνοια, εἰς δ’ ἱστα πεπε-30 ρασμένα. τὸ δὲ μὴ καθ’ αὐτὸ συνεχὲς εἰς πεπερασμένα ἐιδῆ. ἐπεὶ οὖν τὰ μὲν πάθη ὃς εἰδῆ λεκτέον, ὑπάρχει δὲ συνέχεια ἀεὶ ἐν τούτοις, ληπτέον ὡς ὁ δυνάμει καὶ τὸ ἐνεργεία ἐτερον καὶ διὰ τοῦτο τὸ μνημοσύνων λανθάνει τῆς κέγχρου ὁρωμένης, καίτοι ἡ ὄψις ἐπελή. λιθον, καὶ ὁ ἐν τῇ διείσει φθόγγος λανθάνει, καίτοι συνεχοῦς ὅντος ακοῦει τοῦ μέλους παινότ. τὸ δὲ διά-446στημα τὸ τοῦ μεταξὺ πρὸς τοὺς ἐσχάτους λανθάνει. 5 ὁμοίως δὲ καὶ ἐν τοῖς ἄλλοις ἀισθητοῖς τὰ μικρὰ πάμπαν. δυνάμει γὰρ ὅρατα, ἐνεργεία δ’ οὐ, ὅταν μὴ χωρίς ἦ’ καὶ γὰρ ἐνυπάρχει δυνάμει ἡ ποδιαία τῇ δίποδι, ἐνεργεία δ’ ἡ διαφερεῖσα. χωριζόμεναι δ’ αἱ τηλικαία ἦπε-ροχιει εὐθύγγεις μὲν ἄν καὶ διαλύουσι εἰς τὰ περιέχοντα, 10 ὁσπερ καὶ ἀκαριαίως χυμὸς εἰς τὴν θάλασσαν ἐκχυθεῖς. οὐ μὴν ἄλλ’ ἐπειδὴ οὐδ’ ἡ τῆς αἰσθήσεως ὑπεροχή καθ’ αὐτὴν αἰσθήτην οὐδὲ χωριστὴ (δυνάμει γάρ ἐνυπάρχει εἰς τῇ ἀκριβεστέρᾳ ἡ ὑπεροχή), οὐδὲ τὸ τηλικοῦτον αἰσθητῶν χωρίστων ἐσται ἐνεργεία αἰσθάνεται, ἀλλ’ ὁμοίως ἐσται αἰσθητῶν. δυνάμει τε γὰρ ἐστιν ἤδη, καὶ ἐνεργείαι ἐσται προσγεγόμενον. ὃτι μὲν οὖν ἕνα μεγέθη καὶ πάθη λανθάνει, καὶ διὰ τῶν αἰτίων, καὶ πῶς αἰσθητά καὶ πῶς οὐ, εἰρηται. ὅταν δὲ δὴ ἐνυπάρχοντα οὔτω ἠδη πρὸς αὐτὰ ἦ’ ὡστε καὶ ἐνεργεία αἰσθητά εἶναι, καὶ 15 μὴ μόνον ὃτι ἐν τῇ ὅλῳ ἄλλα καὶ χωρίς, πεπερασμένα αἰνήγητι εἶναι τῶν ἁριθμῶν καὶ χρώματα καὶ χυμοῦς καὶ φθόγγον. 22 'Απορρήσειε δ’ ἂν τις, ἀρ’ ἀκμαίοντι ἴ τὰ αἰσθητά ἴ αἱ κυψέεις αἱ ἀπὸ τῶν αἰσθητῶν, ὁποτέρως 446a. 6 μὴ χωρὶς ἦ’ μὴ χωρὶς θ’ E M Y vett. tr., χωρισθή Biehl, Bek. 7 τῇ ἐνυπάρχῃ τῷ ἐνυπάρχῃ τῷ τῷ τῷ πολλ’ E M Y 18 ἐνυπάρχῃ τοῦ τοῦ τοῦ E M Y , ἐνυπάρχῃ τοῦ τοῦ τοῦ ὅστις τῶν ἀρτα ἦ’ P vett. tr. Bek. Didot text. recept. Biehl.
in taste sweet and bitter, and in the others every one the contrary qualities form extremes.

Now continuous quantity when divided falls into an infinite number of unequal parts but into a finite number of equal parts. On the other hand that which is not *per se* continuous, falls into a finite number of species. Thus, while on the one hand sense-qualities must be considered as species, but on the other hand universally present the aspect of continuity, we must, to solve the difficulty, bring in the distinction between potential and actual. It is by this means that we explain why the ten thousandth part of a visible grain of millet escapes notice although the sight has encountered it, and why a sound within a quarter-tone escapes detection, although the whole series of notes in which it exists, being continuous, is heard; the interval between the mean point and extremes is not discernible and so too it is with very minute fractions in other objects of sense; they are potentially perceptible but not actually so unless they be isolated. So even the one-foot measure has but potential existence in the two-foot rule but, from the moment bisection takes place, it is something actual.

But it is reasonable to believe that, when fractions so excessively minute are isolated, they are moreover resolved into the surrounding medium, just as a tiny drop of flavouring is lost when spilled in the ocean, and so escapes perception. However that may be, since not even in the perception of minute objects is the excessively minute sensation in its individuality appreciable or isolable (it has a potential existence in that which is more accurately discriminated), neither will it be possible to have actual perception of the similarly minute object of sense in its separateness. Nevertheless perceptible it is; for it already is so potentially and, when taken in union with the whole, it becomes actually perceptible. Thus certain magnitudes and their qualities escape detection; this is our account of them and of the reason why that is so and of the senses in which they are and are not perceptible. But when the constituents of anything are already so related among themselves as to be also actually perceptible and perceptible not merely in the whole but individually as well, the determinations of colour and flavour and sound must be finite in number.

It may be asked—Do the objects of sense or the motions which issue from sense-objects (whichever of the two theories perception involves), when acting on us penetrate the medium through which they pass, prior to causing sensation? This is
ποτὲ γίνεται ἡ αἰσθήσις, ὅταν ἐνεργῶσι, εἰς τὸ μέσον
25 πρῶτον, οἷον ἢ τε ὅσμῃ φαίνεται ποιοῦσα καὶ ὁ ψόφος: πρότερον γάρ ὁ ἐγχύς αἰσθάνεται τῆς ὀσμῆς, καὶ ὁ ψόφος ὑστερον ἀφικνεῖται τῆς πληγῆς. ἀρ' οὖν οὖν καὶ τὸ ὀρέμμενον καὶ τὸ φῶς; καθάπερ καὶ Ἐμπεδόκλης φησίν ἀφικνεῖται πρότερον τὸ ἀπὸ τοῦ ἡλίου φῶς εἰς τὸ μεταξὺ πρὶν πρὸς τὴν ὄψιν ἢ ἐπὶ τὴν γῆν. Ὁδέζει δ' ἂν εὐλόγως τοῦτο συμβαίνειν· τὸ γὰρ κυνωόμενον κυνείται ποθὲν ποι, ὡστε ἀνάγκη εἶναι τινα καὶ χρόνον 446β ἐν ὃ κυνεῖται ἐκ βατέρου πρὸς βατέρου· ὁ δὲ χρόνος πᾶς διαρεῖτο, ὡστε ἡν ὅτε οὖν ἐωράτο ἀλλ' εἴ έφερετο ἡ ἀκτίς ἐν τῷ μεταξὺ καὶ εἰ ἄπαν ἁμα ἀκούει καὶ ἀκίκητο καὶ ὅλως αἰσθάνεται καὶ ἱσθήσαται καὶ μὴ ἐστί 5 γένεσις αὐτῶν, ἀλλ' εἰσὶν ἀνευ τοῦ γύνησθαι, ὅμως οὔδεν ἢττον, ὥστε ὁ ψόφος ἢη γεγενημένης τῆς πληγῆς οὗτο πρὸς τῇ ἀκοή, ὑστεροὶ δὲ τούτο καὶ ἡ τῶν γραμμάτων μετασχημάτισις, ὡς γιγνομένης τῆς φορᾶς ἐν τῷ μεταξύ· οὐ γὰρ τὸ λεχθὲν φαίνεται ἀκηκοότες διὰ τὸ μετα- 10 σχηματίζεσθαι φερόμενον τοῖν ἀέρα αὐτ' οὖν οὖν καὶ τὸ χρῶμα καὶ τὸ φῶς; οὐ γὰρ δ' τῷ ποι(/^

15 τῶν ψόφων καὶ τὴν ὀσμὴν τοῦτο συμβαίνειν εὐλόγων· ὥστερ γὰρ ὁ ἄνὴρ καὶ τὸ ὑδωρ, συνεχεῖ μὲν, μεμερισταὶ δ' ἀμφοτέρων ἡ κύρις. δ' καὶ ἐστὶ μὲν ὁ τοῦτο ἀκουεί ὁ πρῶτος καὶ ὁ υστερος καὶ ὁσφράιεται, ἐστι δ' ἂν οὖ. δοκεί δὲ τὶς τινὰ εἶναι ἀπορία καὶ περὶ τοῦτων. 20 ἀδύνατον γὰρ φασί τινες ἄλλου ἄλλῳ τὸ αὐτὸ ἀκούειν καὶ ὀράν καὶ ὁσφραίεσθαι· οὐ γὰρ οἷον τ' εἶναι πολλοὺς καὶ χωρίς ὄντας ἀκούειν καὶ ὁσφραίεσθαι· τὸ γὰρ ἐν χωρίς ἂν αὐτὸ αὐτὸ εἶναι. ἡ τοῦ μὲν κυνήγαιον πρώταν, οἷον τῆς κόδωνος ἡ λιβανωτοῦ ἡ πυρός, τοῦ

86 ARISTOTLE
evidently the case, e.g., with odour and sound; he who stands nearer perceives the odour earlier, and a sound reaches the ear after the blow is struck. Is the same thing true of the object of vision and light? Empedocles too had the very same theory; he says that the light coming from the sun penetrates the medium first before meeting our sight or reaching the earth. This looks like a reasonable account of the phenomenon, for when a thing moves it moves from starting point to terminus and hence there must be some lapse of time as well while it passes from the one point to the other. Now every lapse of time is divisible and so there was a moment when as yet the ray of light was not perceived but was still on its passage through the medium. Though, in every act, hearing and perception generally are complete as soon as exercised and there is no process in the establishment of the content of sense, yet sensation is not devoid of process on this account nor possesses it any the less; take for example the case of sound which does not meet the ear simultaneously with the striking of the blow. This is shown too by the distortion of the letters of a word when uttered, which is explained by their passage through the medium; we appear not to hear what has actually been said because the air in moving gets distorted. Does the same lapse of time in transmission occur in the case of colour and light? It is not, certainly, in virtue of some such modal determination as constitutes the relation of equality that subject and object in vision are related. If it were, they would not require both to be in a definite place; when things are equal it makes no difference to their equality whether they are near or far apart. In the case of sound and odour it is reasonable that this lapse of time during transmission should occur. Like the air and the water they are continuous, yet in both cases the motion of transmission falls into a number of parts. Hence too there is a sense in which it is the same thing which is heard by the person who stands nearest and by him who is farthest away and the same thing which is smelled by both; and there is a sense in which it is not. This seems to constitute a difficulty for some people; they say it is impossible that what is identical should be heard or seen or smelt by different persons and that they cannot hear and smell it because they are many and apart; if they could, what is one thing would itself become separated from itself.

The solution is, that all do perceive the numerically identical and self-same thing which is the originating cause of the movement, e.g. the bell, the frankincense, or the fire,
25 αὐτοῦ καὶ ἐνὸς ἀριθμὸς αἰσθάνονται πάντες, τοῦ δὲ δὴ ἱδίων ἐτέρου ἀριθμῷ, εἰδεὶ δὲ τοῦ αὐτοῦ, διὸ καὶ ἄμα πολλοὶ ὁρῶσι καὶ ὁρῶσινα καὶ ἀκούοντεν. ἦστι δὲ οὕτως σώματα ταύτα, ἀλλὰ πάθος καὶ κίνησις τις (οὐ γὰρ ἃν τοῦτο σωνεβαινεῖν), οὐδὲ ἂνεν σώματος. περὶ δὲ 30 τοῦ φωτὸς ἄλλος λόγος: τῷ ἑνείαν γὰρ τι φῶς ἑστίν, ἄλλ’ οὐ κίνησις. ὅλως δὲ οὐδὲ ὀρμώσει· ἔρχεται καὶ φορᾶς: αἱ μὲν γὰρ φορᾷ εὐλόγως εἰς τὸ μεταξὺ πρῶτον ἀφικόμεθαν (δοκεῖ δ’ ὁ ψόφος εἶναι 447 α’ θερμήνευσε των κίνησις), ὅσα δ’ ἀλλοιοῦται, οὐκέτι ὁρμώσει· ἐνδέχεται γὰρ ἀληθῶν ἀλλοιοῦσθαι, καὶ μὴ τὸ ἤμαλλον πρότερον, οἷον τὸ ὕδωρ ἄμα πᾶν πήγηνυθαί. οὐ μὴν ἄλλ’ ἢν οὐκ ἂν τὸ θερμαινόμενον ἢ πηγαῖνεν. 5 τὸ ἐκλευμένου ὑπὸ τοῦ ἐκχυμένου πάσχει, τὸ δὲ πρῶτον ὑπὸ αὐτοῦ τοῦ ἀλλοιούτως μεταβάλλει, καὶ οὐκ ἀνάγκη ἄμα ἀλλοιοῦσθαι καὶ ἀληθῶς. ἦν δ’ ἢν καὶ τὸ γεγένεσθαι ὅσπερ ἢ ὁμή, εἰ ἐν τῇ ἄρη ἦμεν καὶ πορρητώς πρὶν θυγεῖν αὐτοῦ ὑποθανόμεθα. εὐλόγως δ’ ἢν ἐστὶ μεταξύ τοῦ αἰσθητηρίου, οὐχ ἄμα πάντα χάσχει, πλὴν ἐπὶ τοῦ φωτὸς διὰ τὸ εἰρημένον. διὰ τὸ αὐτό δὲ καὶ ἐπὶ τοῦ ὅραν· τὸ γὰρ φῶς ποιεῖ τὸ ὅραν.

VII

"Εστι δὲ τις ἀπορία καὶ ἀλλή τοιάδε περὶ αἰσθήσεως, πότερον ἐνδέχεται δεινώς ἀμα δύνασθαι αἰσθάνεσθαι ἐν 15 τῷ αὐτῷ καὶ ἀπόμω χρόνῳ, ή οὐ, εἰ δὴ αἰτὶ ἢ μειζόν κίνησις τὴν ἐλάττων ἐκκρούει· διὸ τὸ ἐπιφερόμενον ἐπὶ τὰ ὀματα οὐκ αἰσθάνονται, ἢν τύχοις οὐδέρα τι ἐννοοῦτες ἢ φοβοῦμεν ή ἀκοῦοντες πολὺν ψόφον. τούτῳ δὲ δὴ ὑποκείομαι, καὶ ὅτι ἐκάστου μᾶλλον ἐστὶν αἰσθά-
but yet the stimulus peculiar to each is numerically different though specifically the same. We can hence explain how many people may see and smell and hear the same thing and do this at the same time too. Here we are dealing not with bodies, but qualities and motions (if this were not so the latter phenomenon could not occur), though they do not exist apart from body.

About light a different account must be given. Light is due to the presence of something but is not a motion. Universally speaking there is not even similarity between qualitative alteration and spatial transference; motions of translation, as one would expect, penetrate the medium first before reaching us (sound seems to be a motion of something which travels). On the other hand with things that suffer alteration this ceases to be true; they may be altered in one mass, and not one half before the other; for example water freezes all at one time. However if what is heated or frozen is great in bulk, one part is acted on by that which is contiguous to it, the change in the first being due to the agent itself which is the cause of the alteration; and the alteration does not necessarily take place at the same time and over the whole. Taste would be like odour if we lived in water and perceived things at a distance before touching them. It is reasonable to believe that in those cases where the organ of perception employs a medium the effects are not all simultaneously produced; but we except the case of light for the reason given and, on the very same account, sight too, for it is light which causes vision.

VII

There is a certain other problem also connected with perception—Can we perceive two things in the same individual moment of time, or can we not? Not, if it is the case that a stronger stimulus displaces one which is more feeble. This is the reason why one does not see things that directly meet the eyes, when one is in a state of profound meditation or of terror or when hearkening to a loud sound.

Let us posit this as true, and likewise the fact that any
20 νεσθαι ἀπλοῦ ὄντος ἢ κεκραμένου, οἶον οὐνὸν ἀκράτου ἢ κεκραμένου, καὶ μέλιτος, καὶ χρῶς, καὶ τῆς νυκτὸς μόνης ἢ ἐν τῷ διὰ πασῶν, διὰ τὸ ἄφαντεις ἄλληλα. τούτο δὲ ποιεῖ εἰ δὲν ἐν τῷ γίνεται. εἰ δὴ ἡ μείζων τῆς ἐλάττων κύνησιν ἐκκρούει, ἀνάγκη, ἄν ἄρα ὡς, καὶ 25 αὐτὴν ἦττον αἰσθητὴν εἶναι ἢ εἰ μόνη ἢν· ἀφρήτηται γάρ τι ἢ ἐλάττων μηνυμένη, εἰπερ ἄπαντα τὰ ἀπλά μᾶλλον αἰσθητά ἔστιν. ἔαν ἄρα ἢσι ὀσῶν ἐτέραν οὐσαί, οὐδέτερα ἢσται αἰσθητοὶ· ἁπαντεῖ γὰρ ἡ ἐτέρα ὁμοίως τῆς ἐτέρας. ἀπλῆς δὲ οὐκ ἢστιν αἰσθάνεσθαι· ὡστε 30 ἡ οὐδεμία ἢσται αἰσθήσεως ἢ ἄλλη ἢξι ἅμφων. ὀπερ καὶ γίγνεσθαι δοκεῖ ἐκ τῶν κεραννυμένων ἐν ὦ ἀν μιχθῶσιν. ἐπεὶ οὖν ἐκ μὲν ἐνών γίνεται τι, ἐκ δὲ ἐνών οὐ γίνεται, 447 β τοιαύτα δὲ τὰ ὑπ’ ἐτέραν αἰσθήσεως (μέγηται γὰρ ἄν τὰ ἐγκατα ἐνανία· οὐκ ἢστι δὲ ἐκ λευκοῦ καὶ ὀξέος ἐν γενέσθαι ἀλλ’ ἀπὸ κατὰ συμβεβηκός, ἀλλ’ οὐχ ὁς ἢ ὀξέος καὶ οἰκίας συμφωνοῦσι)· οὐκ ἢρα οἴδ’ αἰσθάνεσθαι 5 ἐνδέχεται αὐτῶν ἀμα. ἢσι μὲν γὰρ ὀσῶς ἢ ἀι κυνήσεως ἁπαντοῦν ἄλληλας, ἐπεὶ μία οὕν γίνεται ἢξι αὐτῶν· ἢν δ’ ἢνιος, ἡ κρείττων αἰσθήσεως ποιεῖ, ἢτε ἀπλῶν ἄμα δεν αἰσθοῦσα ἡν ἡ ψυχή τῇ μιᾷ αἰσθήσει ἢν μία αἰσθήσεως, οἴου ἢξεος καὶ οἰκίας· μᾶλλον γὰρ ἄρα ἡ 10 κύνησις τῆς μίας ταύτης ἢ τῶν δυο, οὐν ὅθεοι καὶ ἀκοῆς. τῇ μιᾷ δὲ ἄμα δυον οὐκ ἢστιν αἰσθάνεσθαι ἢν μεν μικρή· τὸ γὰρ μίγμα ἐν ἄνεξοι εἶναι, τοῦ δ’ ἢξος μία αἰσθήσεως, ἢ δὲ μία ἢμα αὐτῆς. ὡστ’ ἢς αἰάγκης τῶν μεμιγμένων ἢμα αἰσθάνεται, ὅτι μία αἰσθήσει κατ’ ἐνέργειαν αἰσθάνεται· ἢς μὲν γὰρ ἕρμοι ἢ κατ’ ἐνέργειαν μία, εἰδει δὲ ἡ κατὰ δύναμιν μία. καὶ εἰ μία τοῖς ἢ αἰσθήσεις ἢ κατ’ ἐνέργειαν, ἐν ἐκείνα ἐρεί. μεμιχθαὶ ἄρα ἀνάγκη αὐτά. ὅταν ἄρα μὴ ἢ μεμιγμένα,
single thing is more perceptible by itself than when in a compound. For example, a wine is more readily distinguished when pure than when mixed; so with honey and tint, and the tonic is more distinctly perceived when alone than when it is sounded along with the octave, as the two when together annul each other.

This result is produced by things out of which a unity is formed. If it is the case that the stronger stimulus displaces the weaker, it must, if they are simultaneous, itself be less distinct to sense than if it were alone, having suffered diminution to some extent by the admixture of the weaker, if the pure is always the more perceptible. So if two different stimuli are equal, neither will be perceived; either will annul the other to an equal extent. But they cannot be perceived as pure; hence either no sensation will result or another one derived from both, precisely as things when mingled yield something fresh so long as it is true mixture that takes place.

Thus in certain cases of the simultaneous presentation of sensation something derivative results, but in certain cases not, and such are instances of objects falling under diverse senses. (Mixture occurs with objects when their most extreme divergences of quality are related as contraries; white and shrill do not yield anything unitary except per accidens, but, quite otherwise, low and high yield a concord.) Since then this is so, neither will it be possible to perceive them together. If they are equal in intensity the stimuli will cancel each other, since no unitary sensation is derived from them, while if they are unequal the stronger will produce sensation, and both will not be perceptible, since consciousness would more readily distinguish two objects by a single sense and if they both belonged to a single sense, e.g. high and low, than it would these, for the stimuli are more closely located in the case of this selfsame sense than when we have two different senses, e.g. sight and hearing.

But by a single sense we cannot perceive two objects simultaneously unless they combine with each other. For the combination requires to be something unitary, and of a unitary object the perception is single and a single sensation is one possessing internal simultaneity. Consequently things in combination must be simultaneously perceived, because apprehended by a single act of perception. It is of what is numerically one that the explicit perception is single while it is of the specifically one that the implicit perception is unitary. Hence also, if the explicit perception is single it pronounces those objects to be numerically one. Hence they must have entered into combination, and so, when they are not combined,
δύο ἄσκονται αἰσθήσεις αἱ κατ’ ἐνέργειαν. ἄλλα κατὰ μίαν δύναμιν καὶ ἄτομον χρόνον μιᾶν ἀνάγκη εἶναι τὴν ἐνέργειαν· μίας γὰρ εἰσάγαγε μία κίνησις καὶ χρήσις, μία δὲ ἡ δύναμις. οὐκ ἀρκεῖ ἐνδεχεῖται δυνεῖ ἀμά αἰσθάνεσθαι τῇ μιᾷ αἰσθήσει. ἄλλα μὲν εἰ τὰ ὑπὸ τὴν αὐτήν αἰσθήσιν ἀμά αἴνωντον, εάν ἦ δύο, δῆλον ὅτι ἦτον ἐτί τὰ κατὰ δύο αἰσθήσεις ἐνδεχεῖται ἁμὰ αἰσθάνεσθαι, οἷον λευκὸν καὶ γλυκὸν. φαίνεται γὰρ τὸ μὲν τῷ ἀριθμῷ ἐν ἡ ψυχῇ οὐδενὶ ἐπέρω λέγειν ἀλλὰ ἡ τῷ ἁμα, τὸ δὲ τῷ εἶδε ἐν τῇ κρυοῦσῃ αἰσθήσει καὶ τῷ τρόπῳ. λέγω δὲ τούτῳ, ὅτι ἵππος τὸ λευκὸν καὶ τὸ μέλαν, ἐπέρων τῷ εἶδε ὅν, ἡ αὐτὴ κρίνει, καὶ τὸ γλυκὸ καὶ τὸ πικρὸν, ἡ αὐτὴ μὲν ἀνατῇ, ἔκείνῃς δ’, ἀλλὰ ἐπέρων ἐκάπερν τῶν ἐναντίων, ὥς δ’ αὐτῶν ἐναντίας τὰ σύντοιχα, οἷον 448 a ὡς ἡ γεύσις τὸ γλυκὸν, οὕτως ἡ ὄψις τὸ λευκὸν· ὡς δ’ αὐτὴ τὸ μέλαν, οὕτως ἔκείνῃς τὸ πικρὸν. εἶτε εἰ αἱ τῶν ἐναντίων κινήσεις ἐναντία, ἁμὰ δὲ τὰ ἐναντία ἐν τῷ αὐτῷ καὶ ἀτόμῳ οὐκ ἐνδεχεῖται ὑπάρχειν, ὅπο δὲ τὴν 5 αἰσθήσιν τὴν μίαν ἐναντία ἔστιν, οἷον γλυκὸν πικρόν, οὐκ ἀν ἐνδεχομενοῖς αἰσθάνεσθαι ἁμὰ. ὅμοιος δὲ δήλον ὅτι οὐδὲ τὰ μὴ ἐναντία· τὰ μὲν γὰρ τὸ λευκὸ τὰ δὲ τοῦ μέλανος ἔστιν, καὶ ἐν τοῖς ἀλλοίς ὁμοίοις, οἷον τῶν χυμῶν οἱ μὲν τοῦ γλυκεῶς οἱ δὲ τοῦ πικροῦ. οὔδε τὰ 10 μεμιγμένα ἁμα· λόγου γὰρ εἰσε ἀντικείμενοι, οἷον τὸ διὰ πασῶν καὶ τὸ διὰ πέντε, ἄν μὴ ὡς ἐν αἰσθάνηται. οὕτως δ’ εἰς λόγος ὁ τῶν ἀκρων γίνεται, ἀλλοι δ’ οὗ· ἐσται γὰρ ἁμα ὁ μὲν πολλὸν πρὸς ὁλίγον ἡ περιττοῦ πρὸς ἄρτιον, ὁ δ’ ὁλίγου πρὸς πολλὴ ἡ ἄρτιον πρὸς 15 περιττοῦ. εἰ οὗν πλεῖον ἐτί ἀπέχει ἄλληλοι καὶ διαφέρεις τὰ συντοιχίας μὲν λεγόμενα ἐν ἄλλῳ δὲ γένει τῶν ἐν τῷ αὐτῷ γένει λεγόμενων (οἷον τὸ γλυκό καὶ τὸ λευκόν ἀλλ’ ὡς σύντοιχα, γένει δ’ ἐτερα), τὸ γλυκὸ δὲ τοῦ μέλανος πλεῖον ἐτί τῷ εἶδει διαφέρεις ἡ τοῦ λευκοῦ, ἔτι ἐὰν ἦτον

there will be two explicit sensations. But when the faculty is single and the time individual, the activity of sense must be numerically one; the stimulation and exercise of a single faculty at a unitary time must be single; and the faculty is single.

Thus it is impossible to perceive two things simultaneously by a single sense. But certainly, when objects of the same sense, if dual, cannot be simultaneously perceived, it is clear that still less will this be possible in the case of objects of two different senses, e.g. white and sweet.

Consciousness appears to recognize numerical identity not otherwise than by the simultaneity of the perception, while specific unity is given by the unity of the sense which discriminates it and the manner in which the perception occurs. By this I mean that, though supposing it be black and white, objects specifically distinct, which the same sense discriminates, and sweet and bitter, which a sense that is self-identical, though different from the former, distinguishes, yet there is a diverse manner in which it perceives either contrary, and it is in the same manner as each other that the senses apprehend corresponding members of different pairs of opposites; e.g. sight perceives white in the same manner as taste does sweetness, and the former perceives black as the latter does bitter.

Further, if contrary sensibles give contrary stimuli and contraries cannot coexist in anything identical and individual, but under a single sense we find things opposed to each other, as, for example, sweet is opposed to bitter, it is impossible to perceive them simultaneously. Similarly it is clear that neither will things that are not opposites be simultaneously intuitable. Some of them fall within the province of white and others of black, and in the same way in other cases, e.g. flavours, some are assignable to sweet, others to bitter. Neither can composites be simultaneously perceived unless as forming a unity, for they are proportionate combinations of opposites, e.g. chords of the octave and of the fifth. If they are apprehended as one, a single ratio prevails between the extremes, but otherwise not, for that would require the simultaneous apprehension of the ratio of greater to less or odd to even on the one hand, and on the other that of less to greater or even to odd.

The consequence of all this is that, if there is a still greater remoteness and diversity between qualities which, though occupying corresponding positions in their respective genera, yet are heterogeneous, than between those ascribed to the same genus, e.g. sweet and white, which, though corresponding to each other, nevertheless are heterogeneous, and if sweet differs still more from black than from white in kind, then they, sweet and black, are still less capable of being
20 ἂμα ἐνδέχοιτο αὐτὰ αἰσθάνεσθαι ἢ τὰ τῷ γένει ταύτα.
21 ὡστ' εἰ μὴ ταύτα, οὐδ' ἐκείνα.
22 Ὡδ' δὲ λέγουσί τινες τῶν περὶ τὰς συμφωνίας, ὅτι οὐχ ἂμα μὲν ἀφυκνούνται οἱ ψύφοι, 
φαίνονται δὲ, καὶ λανθάνει, ὅταν ὁ χρόνος ἢ ἀναίσθητος, 
πότερον ὀρθῶς λέγεται ἢ οὖ; τάχα γὰρ ἂν φαίη τις καὶ 
25 νῦν παρὰ τοῦτο δοκεῖν ἂμα ὄραν καὶ ἀκούειν, ὅτι οἱ 
μεταξὺ χρόνων λανθάνουσιν. ἡ τοῦτ' οὐκ ἄλληθες, οὐδ' 
ἐνδέχεται χρόνον εἶναί ἀναίσθητον ἢ οὐδένα λανθάνειν,
 ctl ἀλλὰ πάντως ἐνδέχεται αἰσθάνεσθαι. εἰ γὰρ ὅτε αὐτὸς 
αὐτοῦ τις αἰσθάνεται ἢ ἄλλον ἐν συνεχείς χρόνοις, μὴ 
30 ἐνδέχεται τότε λανθάνειν ὅτι ἐστὶν, ἐστὶ δὲ τις ἐν τῷ 
συνεχεί καὶ τοσοῦτος ὤσος ὁ λοις ἀναίσθητός ἐστιν, ἐδιόν 
ὅτι τότε λανθάνοι ἄν ἐς ἐστὶν αὐτὸς αὐτὸν καὶ εἰ ὀρᾶ
448 b καὶ αἰσθάνεται· καὶ εἰ αἰσθάνεται ἐς, οὐκ ἂν εἰς ὀυτὲ 
χρόνος οὐτὲ πράγμα οὐδὲν ὁ αἰσθάνεται ἢ ἐς, εἰ μὴ 
οὕτως, ὅτι ἐν τούτῳ τινὶ ἢ ὅτι τούτῳ τι ὀρᾶ, ἐπερ 
ἐς τι μέγεθος καὶ χρόνου καὶ πράγματος ἀναίσθητον 
5 ὀλως διὰ μικρότητα· εἰ γὰρ τὴν ὅλην ὀρὰ, καὶ αἰσθάνε 
νται τῶν αὐτῶν συνεχῶς χρόνου, οὐ τῶν νῦν τούτων 
τινὶ. ἀφηρήσθω ἡ [τὸ] Β', ἐν ἡ οὐκ ἴσθανετο. οὐκοῦν 
ἐν ταύτῃ τινὶ ἢ ταύτῃ τι, ὡσπερ τὴν γην ὀρὰ ὅλην, 
ὅτι τοῦτο αὐτῆς, καὶ ἐν τῷ ἐπιατοῦ βαδιζέ, ὅτι ἐν τῷ 
τῷ μέρει αὐτοῦ. ἀλλὰ μὴν ἐν τῷ ΒΓ οὐδὲν αἰσθάνεται.
τῷ αρὰ ἐν τούτῳ τινὶ τοῦ ΑΒ αἰσθάνεσθαι λέγεται τοῦ 
οἷον αἰσθάνεσθαι καὶ τὴν ὅλην. ὁ δ' αὐτὸς λόγος καὶ 
ἐτὶ τῆς ΑΓ· αἰ γὰρ ἐν τῳ καὶ τινὸς, οἷον δ' οὐκ 
ἐστὶν αἰσθάνεσθαι. ἀπαντᾶ μὲν οὖν αἰσθητὰ ἐστὶν,
15 ἀλλ' οὐ φαίνεται ὅσα ἐστὶν· τοῦ γὰρ ἡλίου τὸ μέγεθος 
ὀρᾶ καὶ τὸ τετράγωνον πάροροθεν, ἀλλ' οὐ φαίνεται ὅσον, 
ἀλλ' ἐντὸς ἀδιάρετον, ὀρᾶ δ' οὐκ ἀδιάρετον, ἡ δ' αἰτία 
εἰρηται ἐν τοῖς ἐμπροσθέν περὶ τούτου. ὅτι μὲν οὖν 
οὐδεὶς ἐς τῷ χρόνος ἀναίσθητος, ἐκ τούτων φανερῶν·
19 ἄλλως ὐπερὶ ὁμισσο ἤ I S U Alex.
sense and its objects

simultaneously perceived than members of the same genus; hence, if in the latter case this is impossible, neither can it occur with the former.

There is a theory mooted by certain people about concords, that the sounds, though not arriving simultaneously, yet appear to do so, their lack of simultaneity being undetected, when the time between them is imperceptible.

Is this correct, or is it not? If true, one might readily assert that we also apparently see and hear at the same time because the intervening moments are undetected.

We answer that it is not true, and there can be no imperceptible time, none that escapes us; every moment can be perceived. For if, when one has consciousness of one's self or of another person during a continuous period of time, one cannot at that time be unaware that one exists, but there is within the continuous time a section of such minute size as to be wholly imperceptible, clearly one would then be unaware whether one was one's self and whether one saw or perceived; if one still perceived, there would be neither time in which nor thing of which one could be conscious except thus—by being percipient during part of the time or perceiving part of the thing, if there are magnitudes both in time and in things which their minuteness makes imperceptible. But this is not so, for if one sees a whole line and perceives a time continuously identical, one does not do so by means of one of the particular "now's" contained in it. Subtract, from AB the whole line, a part CB in which there is no sensation; then perception in one part of this whole or of one part of it gives consciousness of the whole, which is like seeing the whole earth because one sees this particular part of it, or walking a whole year because one walks during this part of it. Remember, in BC there is no consciousness; hence, by being conscious in part of this whole, AB, one is said to be conscious of the whole time and see the whole extent.

The same reasoning will hold with the part AC, for perception is always in a part and of a part, and it is impossible to perceive anything in its entirety. Hence, the above conclusion being absurd, everything is perceptible though its size is not apparent; we see the extension of the sun or a four-cubit measure from afar, though the determinate size is not apparent, and sometimes things seem not to have size but to be indivisible.

We cannot, however, see the indivisible; the reason for this was stated before. Hence from these considerations it is clear that no part of time is imperceptible.

But we have to discuss the problem raised before—whether
20 têis prôteron lexibèisis áporias sêkptêon, póteron èndèketai áma plevónon aiôsthánebhai ë or ëk èndèketai. 
tô d' áma légy èn èni kai atômo xróphi prôs ãllh-
la. prôton mên óv ãr, ódò èndèketai, áma mën, ètêro
de têis puxhês aiôsthánebhai, kai ou tô atômo, ouôw
25 d' atômo oui parî oui sunechei; ë or prôton mên tâ
kata têin mîn aiôsthêsou, ouv légy oui, ëi estai ãllh
aiôsthânovëni ãllon kai ãllon xrómatos, plevô ge mérh
èxei èidei tauta; kai ãr aiôsthánetai pálw tîw atôw
gênei. ëi de ëti ouv òv ou õmûma fâï tîs, ouôv en
kolûei.
30 ouôw kai en tê puxhêi, ëti ësos ëk mên touw tê
gînetai kai mîa ë kînryga aiôsthêsou. èidei dè ë\
h mên èn
tô d' ãrfôn, ën kai tî aiôsthânovëni estai, ëi de
xovrês, ouv õmûois èxei. ëti aiôsthêsou aî aitai plevôus
449a èstoueti, òswper ëi tîs èêisthmàs diafôròus fâï-
xûste gâr ë kînrygâ aiôsthêsou. èidei ëtou
448b, 24 ou tî atôma èt mox ð' om. LS U et Alex., qui autem pro ouôw
del habet et ouôw, quam Alexandri lectionem genuinam esse putant Thurot et
Bümker (Jahrb. fü Philol. 1886), praeferam quod pro kai Thurot facit vult
poni, Bümker autem ex, sed nihil eorum satisfacit; legendum videtur: ou tî
atôma, ñ ouôw atôma; verit vet. tr.: et non indissolubili, sic autem indissolubili, ut
omni existenti continuo. | ouôw de atôma E Y, atôma pro atôma M. 28 tauôta
É M et Biehl, tâvra reliqui omnes et scripti et edd. | gâr de LS U P et edd.
except. Biehl. | kôlêov E Y, kôlêov reliqui codd., etiam Alex. Ald. Basii.,
kôlêov Sylb. 31 atôma E Y | èdei ëk ã conicio, ëi ëk ã E Biehl, ëi ëk ã M Y,
èkai ëk ëi reliqui codd. et edd. etiam Alex. et vet. tr. 32 ëk kai Biehl, êkoi
LS U P Alex. vet. tr. et omnes reliqui edd. except. Biehl. 449 a, 1 diàfôròus
P vet. tr. 4 ëbiam Alex. desiderat, probant Biehl, Thurot, Bümker,
Neuhäuser, Poppelreuter. 7 ë om. Biehl.
it is possible or not to perceive several things simultaneously. By simultaneously I mean, in a time which, for the various things relatively to each other, is one and atomic.

Firstly, then, is the following solution possible—that they are indeed simultaneously perceived but by different psychical organs, not by an individual organ, though by one which is individual in the sense of forming a continuous whole? Or is it the case that if so, in a single sense, for instance sight, which will perceive different colours by something different in each case, these partitions will assuredly form a plurality specifically various? This is so, for it, again, perceives by means of generic identity.

If some one were to allege that there is no difficulty in the psychical faculties being like the two eyes, specifically alike, we may reply that perhaps in the case of the eyes there is a single product and the exercise of their function is unitary, and, so far as they yield a unitary result, specifically the sense-organs are also single, but when the sensations are diverse the case is different.

Further identical senses will be rendered multiple and distinct in the same sense as one talks of distinct sciences; for neither is there activity apart from its appropriate potentiality, nor without activity does sensation exist.

But if these contentions are correct and hence these qualities cannot be perceived in a single individual moment by means of a division in the organ of perception, it is clear that no other qualities can, for there was a better possibility of these in their severalness being simultaneously perceived than of qualities generically different. If it is really the case that the mind perceives sweet with one part, white with another, the product of these must be either one or not one. But it must be a unity because the sentient organ is a unity. What is the unity then which that perceives? There is no such unitary product.
10 ἐν. ἀνάγκη ἄρα ἐν τι εἶναι τῆς ψυχῆς, ὡς ἀποταλαι- 
νεται, καθὰπερ εἰρηται πρότερον, ἀλλὰ δὲ γένος δὲ ἄλλον. 
ἄρῃ οὖν ἂ μὲν ἄδιαίρετον ἐστὶ καὶ ἐνέργειαν, ἐν τῇ ἐστὶ 
τὸ αἰσθητικὸν γυλκεός καὶ λευκοῦ, ὅταν δὲ διαίρετον 
γένεται καὶ ἐνέργειαν, ἔτερον; ἡ οὕσπερ ἐπὶ τῶν πραγ- 
15 μάτων αὐτῶν ἐνδέχεται, οὔτως καὶ ἐπὶ τῆς ψυχῆς. τὸ 
γάρ αὐτὸ καὶ ἐν ἀριθμῷ λευκὸν καὶ γυλκὸν ἐστὶ, καὶ 
ἄλλα πολλά, εἰ μὴ χωριστὰ τὰ πάθη ἄλληλων, ἄλλα 
τὸ εἶναι ἔτερον ἐκάστῳ. ὅμοιος τοῖνυν θετέον καὶ ἐπὶ 
tῆς ψυχῆς τό αὐτό καὶ ἐν εἶναι ἀριθμῷ τὸ αἰσθητικὸν. 
20 πάντων, τῷ μέντοι εἶναι ἔτερον καὶ ἔτερον τῶν μὲν γένει 
tῶν δὲ εἰδεί. ὡστε καὶ αἰσθάνομαι ἃν ἄμα τῷ αὐτῷ καὶ 
22 ἐνί, λόγῳ δ' οὐ τῷ αὐτῷ. 
22 ὅτι δὲ τὸ αἰσθητὸν πάν ἐστὶ μέ- 
γεθος καὶ οὐκ ἐστὶν ἄδιαίρετον αἰσθάνεσθαι, δῆλον. 
ἐστὶ γάρ ὃθεν μὲν οὐκ ἂν ὁφθείη, ἀπεραιό τὸ ἀπόστημα. 
25 ὃθεν δὲ ὁρᾶται, πεπερασμένου· ὁμοίως δὲ καὶ τὸ ὅσ- 
φραντὸν καὶ ἀκουστὸν καὶ ὅσων μὴ αὐτῶν ἀπόμενοι 
αισθάνονται. ἐστὶ δὲ τῷ ἐσχατῶν τοῦ ἀποστήματος οὖν 
oῖχ ὁρᾶται, καὶ πρῶτον οὖθεν ὁρᾶται. τούτῳ δὴ ἀνάγκῃ 
αὐσταίρετον εἶναι, οὐ ἐν μὲν τῷ ἐπέκεισα οὖν ἐνδέχεται 
30 αἰσθάνεσθαι ὅντος, εν δὲ τῷ ἐπὶ ταῦτα ἀνάγκῃ αἰσθά- 
νεσθαι. εἰ δὴ τῇ ἐστὶν ἄδιαίρετον αἰσθητόν, ὅταν τῆς 
ἔπι τῷ ἐσχατῷ οὖθεν ἐστὶν ὡστάτον μὲν οὐκ αἰσθητὸν 
πρῶτον δ' αἰσθητῶν, ἀμα συμβησθεῖν ὁρᾶτον εἶναι καὶ 
adόματο τοῦτο δ' ἀδύνατον. 
449 b περὶ μὲν οὖν τῶν αἰσθητηρίων καὶ τῶν αἰσθητῶν 
tίμαι τρόπων ἔχει καὶ κοινή καὶ καθ' ἐκατόν αἰσθητήριον 
εἴρηται· τῶν δὲ λοιπῶν πρῶτον σκεπτέον περὶ μημής 
4 καὶ τοῦ μυθομονεύειν.
Hence there must be some unity in the soul by which we perceive all things, as before stated, though different genera are perceived by different organs. Is that, therefore, which apprehends sweet and white, a unit so far as it is actually indivisible, but diverse in so far as it is actually divisible? We answer that in the case of the soul it is the same as with things. An identical and numerically single thing can be sweet and white and have many other qualities, so long as its properties are not disunited from one another, though in aspect of existence each is diverse. Accordingly we must in the same way affirm that with the soul too, that, which is per-cipient of everything, is self-identical and numerically single, though, in apprehending objects now generically now in species different, it has a corresponding diversity in the aspect of its existence. Hence the mind may perceive things simultaneously by means of something selfsame and unitary though not notionally the same.

That every object is a magnitude and that the indivisible cannot be perceived, is clear. The distances from which an object cannot be seen are infinite in number, but the range from which it is visible is limited, and this holds true also for the objects of smell and hearing and all things perceived without actual contact. But there is a point which terminates the range from which vision is impossible and is the first from which the thing becomes visible. That indeed must be indivisible which, when at a distance beyond this point, cannot be seen, but must be seen when nearer. If, then, there is really anything indivisible which is an object of perception, when placed at the terminal point which, while the last at which it is not perceptible, is yet the first at which it is perceptible, it will turn out to be both visible and invisible at the same time, which is impossible.

This is our account of the sensoria and the objects of sense and the manner of their existence both generally and relatively to each sense-organ. Of the remaining subjects let us consider first memory and the act of remembering.
ΠΕΡΙ ΜΝΗΜΗΣ ΚΑΙ ΑΝΑΜΝΗΣΕΩΣ

I

4 Ἐπεὶ δὲ µνήµης καὶ τοῦ µνηµονεύειν
5 λεκτέον τί ἐστι καὶ διὰ τίν’ αἰτίαν γίγνεται καὶ τίνι
6 τῶν τῆς ψυχῆς µορίων συµβαίνει τούτο τὸ πάθος καὶ
7 τὸ ἀναµνηστικὸς; οὐ γὰρ οἱ αὐτοὶ εἰσὶ µνηµονικοὶ
8 καὶ ἀναµνηστικοὶ, ἀλλ’ ὡς ἐπὶ τὸ πολὺ µνηµονικὸν µὲν
9 οἱ βραδεῖς, ἀναµνηστικῶτεροι δὲ οἱ ταχεῖς καὶ εὐµαθεῖς.
10 πρῶτον µὲν οὖν ληπτέον ποιά ἐστι τὰ µνηµονεύτα·
11 πολλάκις γὰρ ἐξαπατάται τούτο. οὔτε γὰρ τὸ µέλλον
12 ἐνδέχεται µνηµονεύειν, ἀλλ’ ἐστι δοξαστόν καὶ ἐλπιστόν
13 (εἰ δ’ ἄν καὶ ἐπιστήµη τῆς ἐλπιστικῆς, καθάπερ τινὲς
14 φασι τὴν µαυτικήν), οὔτε τοῦ παρόντος, ἀλλ’ αἰσθήσεις.
15 ταύτη γὰρ οὔτε τὸ µέλλον οὔτε τὸ γενόµενον γνωρίζοµεν,
16 ἀλλὰ τὸ παρόν µόνον. ἦ δὲ µνήµη τοῦ γενόµενον· τὸ δὲ
17 παρόν ὅτι πάρεστι, οἷον τοῦτο τὸ λευκόν ὅτε ὅραν, οὕνεις
18 ἀν φαίη µνηµονεύειν, οὐδὲ τὸ θεωρούµεν, ὅτε θεωρῶν
19 τυχάνει καὶ ἐννοῶν· ἀλλὰ τὸ µὲν αἰσθάνεσθαι φησίν,
20 τὸ δ’ ἐπισταθαι µόνον· ὅταν δ’ ἄνευ τῶν ἐνεργειῶν
21 ἔχῃ τὴν ἐπιστήµην καὶ τὴν αἰσθήσειν, οὔτω µέµηται
22 [τὰς τοῦ τριγωνοῦ ὅτι δύο ὅρθαῖς ἐστιν], τὸ µὲν ὅτι
23 ἔµαθεν ἢ ἐθεώρησεν, τὸ δὲ ὅτι ἤκουσεν ἢ εἶδεν ἢ ὃ τι
24 τοιοῦτον· δεῖ γὰρ ὅταν ἐνεργῇ κατὰ τὸ µνηµονεύειν,
25 οὕτως ἐν τῇ ψυχῇ λέγει, ὅτι πρῶτον τοῦτο ἤκουσεν
26 ἢ ἤσθεν ἢ ἐνόησεν. ἔστι µὲν οὖν ἡ µνήµη· οὔτε
27 αἰσθήσεις οὔτε ὑπόληψις, ἀλλὰ τούτων τινὸς ἔξις.
I

We must define and account for memory and the act of remembrance and assign the psychical faculty which provides for this phenomenon and for the act of recollection. The two phenomena are not identical, for it is not the same people who have good memories and who have good powers of recollection; as a rule those people remember well who are slow-witted, while on the other hand those excel in powers of recall who are clever and quick at learning.

Hence as a preliminary to our argument the question arises—how are the objects of memory characterised? Mistakes are often made about this. Now the future cannot be remembered; it is rather the object of opinion and hope. (There might be a science which belonged to the province of hope; some people say that prophecy is such a science.) Nor does memory regard the present; it is perception which is concerned with this, for by perception we apprehend neither the future nor the past but the present only. Memory concerns the past; no one would say that he remembers that the present is present, e.g. this particular white object, when he is looking at it. Nor would he say that he remembers that the object of thought is present whensoever he chances to be engaged in thought or contemplation; in the one case he says he perceives, in the other merely that he knows. But when knowledge or perception is present without actual experience of the real objects, in those circumstances one remembers in the one case that he learned something or thought of something, in the other that he heard, or saw, or had some similar sense-experience. When one actually remembers, he must recognize in consciousness that previously he had heard or perceived or thought of the thing remembered.

Hence memory is neither perception nor conceptual
πάθος, ὅταν γένηται χρόνος. τού δὲ νῦν ἐν τῷ νῦν οὐκ ἔστι μνήμη, καθάπερ εἰρήται καὶ πρότερον, ἀλλὰ τοῦ 30 μὲν παρόντος αἰσθήσεις, τού δὲ μέλλοντος ἐπίσης, τοῦ δὲ γενομένου μνήμης. διὸ μετὰ χρόνου πᾶσα μνήμη. ὡσ扐 ὅσα χρόνου αἰσθάνεται, ταῦτα μόνα τῶν ζῴων μνημονεύει, καὶ τούτῳ ὃ αἰσθάνεται. ἐπεὶ δὲ περὶ φαντασίας εἰρήται πρότερον ἐν τοῖς περὶ ψυχῆς, καὶ νοεῖν οὐκ ἐστὶν ἄνευ 450α φαντάσματος: συμβαίνει γὰρ τὸ αὐτὸ πάθος ἐν τῷ νοείν ὅπερ καὶ ἐν τῷ διαγράφειν: ἐκεῖ τε γὰρ οὕδεν προσχρώμενοι τῷ τῷ ποσῶν ὀρισμένον εἶναι τοῦ τριγώνου, ὡμοὶ γράφομεν ὀρισμένων κατὰ τὸ ποσῶν· καὶ ὃ νοῦν ὡσαύτως, καὶ μὴ ποσῶν νοῆν, τίθεται πρὸ ὀριστῶν ποσῶν, νοεῖ δὲ οὕχ ἢ ποσῶν· ἄν δὲ ἡ φύσις ἢ τῶν ποσῶν, ἀφρίστων δὲ, τίθεται μὲν ποσῶν ὀρισμένον, νοεῖ δὲ ἢ ποσῶν μόνων· διὰ τίνα μὲν οὖν αἰτίαν οὐκ ἐνήξεται νοεῖν οὐδὲν ἄνευ τοῦ συνεχοῦς, οὐδὲ οἷς χρόνου τὰ μὴ ἐν χρόνω ὅστα, λόγος ἄλλος· μέγεθος δὲ ἀναγκαῖον γνωρίζειν καὶ κίνησιν ὃ καὶ χρόνον· καὶ τὸ φαντασμα τῆς κοινῆς αἰσθήσεως πάθος ἕστιν· ὥστε τούτῳ φανερῶν ὅτι τῷ πρώτῳ αἰσθητικῷ τούτῳ ἡ γνώσις ἕστιν· ἡ δὲ μνήμη καὶ ἡ τῶν νοητῶν οὐκ ἄνευ φαντάσματος ἕστιν· 15 ωστε τοῦ νοητικοῦ κατὰ συμβεβηκός ἃν εἰσὶ, καθ’ αὐτὸ δὲ τοῦ πρῶτον αἰσθητικοῦ. διὸ καὶ ἐτέρως τοιοῦ ὑπάρχει τῶν ζῷων, καὶ οὐ μόνον ἀνθρώπως καὶ τοῖς ἐξουσίος δόξαν ἡ φύσις. εἰ δὲ τῶν νοητικῶν τι μορίων ἢ, οὐκ ἄν ὑπάρχει πολλοῖς τῶν ἀλλών ζῴων, ἵστω δ’ οὐδεὶς τῶν 20 θυγατέρων, ἐπεὶ οὐδὲ νῦν πάσιν διὰ τοῦ μὴ πάντα χρόνου αἰσθήσεως ἐχεῖν· ἀλλ’ γὰρ ὅταν ἐνεργῆ τῇ μνήμῃ, καθάπερ καὶ πρότερον εἰσομέν, ὅτι εἴδε τούτο ἡ ἡκουσαν ἡ ἐμαθὲ, προσαυτάθηκαν ὅτι πρότερον· τὸ δὲ πρότερον καὶ

449 b 29 καὶ πρότερον om. L S U M Them. vet. tr., deleri volunt Freudenthal et Biehl.
450 a, 20 θυγατέρων] θηρίων Rassow et Biehl.
thought, but some permanent condition or modification attaching to them dependent upon lapse of time. What is now present we do not now in present time remember, as has been said before; with the present perception is employed, with the future hope, with the past memory. Hence all remembering implies lapse of time; and so, those that have a sense of time are the only animals that remember, and the organ of memory is that which enables us to perceive time.

Imagination has been already discussed in the Psychology. We cannot think without imagery, for the same phenomenon occurs in thinking as is found in the construction of geometrical figures; there, though we do not employ as a supplementary requirement of our proof a determinateness in the size of the triangle, yet when we draw it we make it of a determinate size. Similarly in thinking also, though we do not think of the size, yet we present the object visually to ourselves as a quantum, though we do not think of it as a quantum. If the nature of the object be quantitative but indeterminate, our presentation is of a determinate quantity, though we think of it as quantitative merely.

The reason why we can think of nothing apart from continuity and cannot think of objects not in time apart from time, belongs to a different inquiry from this, but we must apprehend magnitude and change by the same means as that by which we are conscious of time. Imagery is a phenomenon belonging to the common sense; so this is clear, that the apprehension of these determinations belongs to the primary organ of sensation: and memory, even the memory of concepts, cannot exist apart from imagery.

Hence since all this is so, indirectly it belongs to the noetic faculty, but in its essential nature to the primary principle of sensation. This is the reason why it is found in several of the other animals and not only in man or those possessing the power of entertaining opinions and endowed with intelligence. If it belonged to the conceptual faculties it would not be found in many of the other animals and perhaps in none that are mortal, since, as facts are, all living beings do not possess it, because not all have a sense of time. Always, when in the act of memory, as already said, we remember that we have heard or seen or learned this thing, we are conscious also that it was prior; now prior and posterior are distinctions in time.
ϊστερον ἐν χρόνῳ ἐστὶν. τίνος μὲν οὖν τῶν τῆς ψυχῆς 25 ἐστιν ἡ μνήμη, φανερῶν, ὅτι οὔπερ καὶ ἡ φαντασία· καὶ ἐστὶν μνημονεύτα καθ’ αὐτὰ μὲν ὅσα ἐστὶν φανταστά, κατὰ 27 συμβεβηκός δὲ ὅσα μὴ ἂνευ φαντασίας.

27 ἀπορήσειε δ’ ἂν τις πώς ποτὲ τοῦ μὲν πάθους παρόντος τοῦ δὲ πράγματος ἄποντος μνημονεύεται τὸ μὴ παρόν. δὴ λοι πῶς ὅτι δεῖ 30 νοῆσαι τοιοῦτον τὸ γιγνόμενον διὰ τῆς αἰσθήσεως ἐν τῇ ψυχῇ καὶ τῷ μορίῳ τοῦ σώματος τῷ ἔχοντι αὐτὴν, οἷον ξογράφημα τι τὸ πάθος, οὐ φαμέν τὴν ἐξίν μνήμην εἶναι· ἡ γὰρ γιγνομένη κίνησις ἐνυπημάνεται οἷον τύπον τῶν τοῦ αἰσθήματος, καθάπερ οἱ σφραγιζόμενοι τοῖς διακτύ- 450 βόλοις. διὸ καὶ τοῖς μὲν ἐν κινήσει πολλῇ διὰ πάθος ἢ δὲ ἠλικίαν ὃς ὁμοίως ὁ γίγνεται μνήμη, καθάπερ ἂν εἰς ὕδωρ ἰδέων ἐμπιπτόσθης τῆς κινήσεως καὶ τῆς σφραγίδος· τοῖς δὲ διὰ τὸ πῆχυσθαι, καθάπερ τὰ παλαιὰ τῶν οἰκο- 5 δομημάτων, καὶ διὰ σκληρότητα τοῦ δεχομένου τὸ πάθος οὐκ ἐγγίγνεται ὁ τύπος. δύσπερ οἱ τε σφόδρα νέοι καὶ οἱ γέροντες ἁμνήμονες εἰσὶν· μένοι γὰρ οἱ μὲν διὰ τὴν αἴξησιν, οἱ δὲ διὰ τὴν φθίνον. ὡμοίως δὲ καὶ οἱ λιαν 10 ταχεῖς καὶ οἱ λιαν βραδεῖς οὐδέτεροι φαίνονται μνήμονες· οἱ μὲν γὰρ εἰσὶν ύγρότεροι τοῦ δέοντος, οἱ δὲ σκληρό- 15 τεροί· τοὺς μὲν οὖν οὐ μὲνετ ὁ φάντασμα ἐν τῇ ψυχῇ, τῶν δ’ οὖν ἀπτεται. ἀλλ’ εἰ δὴ τοιοῦτον ἐστὶ τὸ συμ- βαίνον περὶ τὴν μνήμην, πότερον τούτῳ μνημονεύει τὸ πάθος, ἢ ἐκεῖνο ἄφ’ οὐ ἐγένετο; εἰ μὲν γὰρ τούτῳ, τῶν 15 ἀπότων οὐδὲν ἂν μνημονεύομεν· εἰ δὲ ἐκείνῳ, πῶς ἀισθανόμενοι τοῦτον μνημονεύομεν, οὐ μὴ αἰσθανόμεθα, τὸ ἀπόν; εἰ δ’ ἐστιν ὡμοίως ὅπερ τύπος ἢ γραφή ἐν ἡμῖν, τούτου αὐτοῦ ἡ αἰσθήσις διὰ τὶ ἂν εἶχ’ μνήμην εἶτέρου, ἀλλ’ οὐκ αὐτοῦ τούτου; ὁ γὰρ ἐνεργοῖς τῇ μνήμῃ 20 θεωρεῖ τὸ πάθος τούτῳ καὶ αἰσθάνεται τούτῳ. πῶς οὖν τὸ μὴ παρόν μνημονεύει; εἰ γὰρ ἄν καὶ ἄραν τὸ μὴ
MEMORY AND RECOLLECTION

Hence it is clear to what psychic faculty memory belongs; it belongs to that to which imagination must be assigned. To the class of objects of memory per se belong all things that can be imagined; to the indirect, all that cannot be divorced from imagination.

A difficulty might be raised as to how it can ever come about that, though contemporaneously with our present mental modification the real object is not present, yet it is the absent object which is remembered. But this is no impossibility, for it is clear that we must regard the modification arising from sensation in the soul and in that bodily part where sense resides, as if it were a picture of the real thing, and memory we call the permanent existence of this modification. When a stimulus occurs it imprints as it were a mould of the sense-affection exactly as a seal-ring acts in stamping.

This is the reason why memory does not occur in those who are in a rapid state of transition, whether owing to some perturbing experience or their period of life; it is as if this stimulus, like the seal, were stamped on running water. Again in others their worn-out condition—like that of old buildings—and the hardness of the receptive structure, prevent the sense-affection from leaving an impression. Hence we explain why the very young and the aged have no memory; in the former growth, in the latter decay, cause rapid transition. For like reasons, neither very quick-witted nor very slow people seem to have good memories; in the one class there is too much fluidity, in the other too much density, and hence the former do not retain the image in the mind, while in the latter it never gets fixed.

If these are indeed the facts with regard to memory, whether do we remember this resultant modification or that which caused it? If the former, there would be no such thing as memory of things absent. On the other hand, if it is the latter we remember, how, though perceiving the former, do we remember the absent object which we do not perceive? Once more, if what is retained is like the original in the fashion of an impression or copy, why is the perception of this very thing the memory of some other thing and not of it itself? It is this modification of consciousness which one engaged in remembering has present to his mind, and it is this that he perceives. How then can one remember what is
παρόν καὶ ἄκοινειν. ἦ ἐστιν ὡς ἐνδέχεται καὶ συμβαίνει τούτο; οἷον γὰρ τὸ ἐν τῷ πίνακι γεγραμμένον ξύόν καὶ ξύον ἐστι καὶ εἰκών, καὶ τὸ αὐτὸ καὶ ἐν τούτῳ ἐστὶν ἀμφοῖν, 25 τὸ μέστοι εἶναι οὐ ταύτην ἐστὶν ἀμφοῖν, καὶ ἔστιν θεωρεῖν καὶ ὡς ξύον καὶ ὡς εἰκών, οὔτω καὶ τὸ ἐν ἦµῶν φαντάσμα δεῖ ὑπολαβεῖν καὶ αὐτὸ καθ’ ἐαυτὸ εἶναι θεώρημα καὶ ἄλλου φαντασμά. ἦ μὲν οὖν καθ’ ἐαυτό, θεώρημα ἡ φαντάσμα ἐστιν, ἦ δ’ ἄλλου, οἷον εἰκών καὶ μημόνευμα.

30 ὡστε καὶ ὅταν ἐνεργή ἡ κίνησις αὐτοῦ, ἀν μὲν, ἦ καθ’ αὐτὸ ἐστί, ταύτη αἰσθητὴν ἡ ψυχή αὐτοῦ, οἷον νόημα τι ἡ φαντασία φαίνεται ἐπελθεῖν· ἄν δ’ ἦ ἄλλου, ὡστε ἐν τῇ γραφῇ ὡς εἰκόνα θεωρεῖ, καὶ μὴ ἐρακός τὸν Κορίσκουν ὡς Κορίσκον· ἐνταῦθα τε ἄλλο τὸ πάθος τῆς 451αθεωρίας ταύτης καὶ ὅταν ὡς ξύον γεγραμμένον θεωρη. ἐν τῇ ψυχῇ τὸ μὲν γίγνεται ὡστερ νόημα μόνον, τὸ δ’ ὡς ἔκει ὃτι εἰκών, μημόνευμα. καὶ διὰ τούτο ἐνίοτ’, οὐκ ἵσμεν, ἐγκυμονών ήµῶν ἐν τῇ ψυχῇ τουούτων κυη- 5 σεων ἀπὸ τοῦ αἰσθήσεως πρότερον, εἰ κατὰ τὸ ἕσσθησθαι συμβάινει, καὶ εἰ ἔστι μηµήν ἢ οὐ διστάζομεν· ὅτε δὲ συμβαίνει εννοηθήναι καὶ ἀναμνησθήναι ὃτι ήκούσαμεν τι πρότερον ἢ ἐδοµεν. τούτω δὲ συμβαίνει, ὅταν θεωρῶν ὃς αὐτὸ· μεταβάλλῃ καὶ θεωρῇ ὡς ἄλλου. γίγνεται δὲ 10 καὶ τούτωντοι, οἷον συνεβη Ἀντιφέρωντι τῷ Ὀρείτῃ καὶ ἄλλους ἐξισταμένους· τὰ γὰρ φαντάσματα ἔλεγον ὡς γενόµενα καὶ ὡς μημόνευτοις. τούτο δὲ γίγνεται, ὅταν τις τῆν μηµήν ὡς εἰκόνα θεωρῇ. αἱ δὲ μελέται τῆν μηµήν σώζουσι τῷ ἐπαναµµένους· τούτο δ’ ἐστὶν 15 οὐδὲν ἔτερον ἢ τὸ θεωρεῖν πολλάκις ὡς εἰκόνα καὶ μηµήν ὑπό αὐτό. τι μὲν οὖν ἔστι μηµήν καὶ τὸ µηµονεύειν, εἰρήται, ὃτι φαντάσματος, ὡς εἰκόνος οὐ φαντάσμα, ἕξις, καὶ τίνος μορίῳ τῶν ἐν ἦµῶν, ὃτι τοῦ πρῶτον αἰσθητικοῦ καὶ ὃ χρόνῳ αἰσθηνόµεθα.

450 b, 27 αὐτὸ καὶ ἐντὸ Ὕ αὐτὸ τι καθ’ αὐτὸ Νυ Biehl | om. θεώρημα L S U
Then. vet. tr. Biehl, θεώρ. ετ. φάντασμα deleri vult Freudth.
not present to one? One might as well see or hear what is not present.

But perhaps there is a way in which this can occur and it does really come about? That is so, for, as the animal depicted on the panel is both animal and representation, and, while remaining one self-identical thing, is yet both of these, though in aspect of existence the two are not the same, and we can regard it both as animal and as copy, so too the image in us must be considered as being both an object of direct consciousness in itself and relatively to something else an image; in its own nature it is an object of direct inspection or an image, so far as it represents something else it is a copy and a souvenir.

Hence when the change connected with it is actually experienced, if the mind perceives it in terms of its own proper nature, it appears to present itself to consciousness in the guise of an object of thought or an image; but when it is perceived as referring to something else, we regard it as the copy in the painting and as the picture of Coriscus although we have not then beheld him. Here this way of regarding the thing is an experience different from what occurs when we regard the object as an animal in chalk merely; in the latter case the psychical modification occurs merely as an object of thought, in the former as a memory, because there it is viewed as a representation.

Hence sometimes we do not know, when those psychical changes due to previous perception take place in us, if it is as connected with a previous perception that they occur, and we are in doubt whether it is a memory or not. Sometimes it chances that on reflection we recollect that we have heard or seen the thing previously; this takes place when, after regarding the object of consciousness in its own nature, we change and refer it to something else. The reverse of this also occurs, as befell in the case of Antiphon of Oreo and other ecstatics; they took their mental images to be objective and said they remembered the occurrences. This comes about when we take what is not a representation as though it were one. But exercise strengthens the memory through the repeated performance of the act of recollection, which is merely to view the image frequently as a copy and not in its own nature.

This is our account of memory and the act of remembering; it is the permanence of an image regarded as the copy of the thing it images, and the member in us to which it appertains is the primary seat of sensation and the organ employed in the perception of time.
II

20 Περὶ δὲ τοῦ ἀναμμηνήσκεσθαι λοιπὸν εἶπεν. πρῶτον μὲν οὖν ὅτα σὺν τοῖς ἐπιχειρηματικοῖς λόγοις ἐστὶν ἄληθῆ, δεῖ τίθεσθαι ὡς ὑπάρχοντα. οὔτε γὰρ μνήμης ἐστὶν ἀνάληψις ἢ ἀνάμνησις οὔτε λήψις· ὅταν γὰρ τὸ πρῶτον μάθῃ ἢ πάθῃ, οὔτ' ἀναλαμβάνει μνήμην οὐδεμιᾶν (οὐ-25 δεῖ μιὰ γὰρ προγέγονεν) οὔτ' ἐξ ἀρχῆς λαμβάνει· ὅταν δὲ ἐγγενεῖται ἡ ἐξίς καὶ τὸ πάθος, τότε ἡ μνήμη ἐστὶν. ὥστε μετὰ τοῦ πάθους ἐγγυμομένου οὐκ ἐγγύνεται. ἔτι δ' ὅτε τὸ πρῶτον ἐγγύνεται τῷ ἀτόμῳ καὶ ἑσχάτῳ, τὸ μὲν πάθος ἐνυπάρχει ἡδ' τῷ παθόντι καὶ ἡ ἐπιστήμη, εἰ δεὶ 30 καλεῖν ἐπιστήμην τὴν ἐξίν ὡς τὸ πάθος (οὔθεν δὲ καλύει κατὰ συμβεβηκός καὶ μνημονεύειν ἃνα ὧν ἐπιστάμεθα). τὸ δὲ μνημονεύειν καθ' αὐτὸ οὖχ ὑπάρχει πρὶν χρονισθῆναι· μνημονεύει γὰρ νῦν δ' εἶδεν ἡ ἐσπαθε πρότερον, οὖχ 451b δ' νῦν ἔσπαθε, νῦν μνημονεύει. ἔτι δὲ φανερὸν ὅτι μνη- μονεύειν ἐστὶ μὴ νῦν ἀναμμηνησθόντα, ἀλλ' ἐξ ἀρχῆς αἰσθάνομεν ἡ παθῶντα. ἀλλ' ὅταν ἀναλαμβάνει ἢ πρότερον ἐξεν ἐπιστήμην ἢ αἰσθήσιν ὡς τὴν 5 ἐξίν ἐλέγομεν μνήμην, τοῦτ' ἐστὶ καὶ τότε τὸ ἀναμμηνήσκεσθαι τῶν εἰρημένων τι. τὸ δὲ μνημονεύειν συμβαίνει καὶ ἡ μνήμη ἂνκολουθεῖ. οὖθε δὴ ταῦτα ἄπλως, ἐὰν ἐμπροσθεν ὑπάρχοντα πάλιν ἐγγένεται, ἀλλ' ἐστὶν ὡς, ἐστὶ δ' ὡς οὖ. διὰ γὰρ μαθεῖν καὶ εὑρέων ἐνδέχεται τὸν 10 αὐτὸν τὸ αὐτὸ· δεὶ οὖν διαφέρειν τὸ ἀναμμηνήσκεσθαι τούτων, καὶ ἐνοῦσης πλείονος ἀρχῆς ἢ ἐξ ὧς μανθάνουσιν 12 ἀναμμηνήσκεσθαι.

συμβαίνοντι δ' αἰ ἀναμνήσεις, ἐπειδὴ πέφυκεν ἡ κίνησις ἦδη γενέσθαι μετὰ τίμιδε· εἰ μὲν ἐξ ἀνάγκης, δῆλον ὡς ὅταν ἐκεῖνη κινηθῇ, τίμιδε τὴν

451, 28 τι post ἐγγέγονε inseri vult Freudenthal.
II

Recollection remains to be dealt with. First of all we must posit as fact all the conclusions come to in our "Tentative Reasonings" which were correct. Recollection is neither the recovery nor the acquirement of memory.

When, on the first occasion, one learns or experiences something, he neither reacquires a memory, for none has previously existed, nor does he acquire it initially then. But when a disposition as well as the experience has once been produced then memory is found; hence it does not come into being in conjunction with the origination of the experience in us.

Further, when memory first has been produced in the individual and ultimate organ of sensation, the experience and the knowledge in question (if it is proper to call the disposition or experience knowledge; but there is nothing to prevent our having indirectly remembrance also of some of the objects of knowledge) have already existence in the experiencing subject. But memory in the proper sense will not exist till after the lapse of time. We remember in present time what we have previously seen or heard, we do not now remember what we have now experienced. But further, clearly, we may remember, not in virtue of a present act of recollection, but by being conscious or feeling the experience from the start. On the other hand, when we reacquire the knowledge or perception or whatever it was, the permanence of which we called memory, here and now we have recollection of any of these. As a result we remember them and memory ensues; not that that can be said without restriction in all cases when previous experiences are repeated in consciousness; in some cases it is so but in others not, for the same man may learn or discover the same thing twice. Recollection then must differ from the latter operations; it requires a more considerable basis to start from than in the case of learning.

The occurrence of an act of recollection is due to the natural tendency of one particular change to follow another. If the sequence is necessary, it is clear that, on the former
κίνησιν κινηθήσεται· εἰ δὲ μὴ ἐξ ἀνάγκης ἀλλ' ἔθει, ὡς ἐπὶ τὸ πολὺ κινηθήσεται. συμβαίνει δ' ἐνίον ἀπαξ ἐνισθήμαι μᾶλλον ἢ ἄλλους πολλάκις κυνομένους· διὸ ἔνα ἀπαξ ἐνιστεῖ μᾶλλον μυθῳδεύομεν ἢ ἐτεροὶ πολλάκις. ὅταν οὖν ἀναμμηνησκόμεθα, κυνομέθα τῶν

προτέρων τῶν κινήσεων, ἐως ἂν κινηθόμεν μεθ' ἰν ἐκείνη εἰσώθηκα. διὸ καὶ τὸ ἐφεξῆς θηρεύομεν νοῆσαντες ἀπὸ τοῦ νῦν ἢ ἄλλου τινός, καὶ ἄφ' ὁμοίου ἢ ἐναντίου ἢ τοῦ σύνεγγυς. διὰ τούτο γίνεται ἢ ἀνάμνησις· αἱ γὰρ κινήσεις τούτων τῶν μὲν αἱ αὐταί, τῶν δ' ἀμα, τῶν

dὲ μέρος ἔχουσιν, ὡστε τὸ λουτόν μικρὸν ἢ ἑκατῆθη μετ' ἐκείνῳ. ζητοῦσι μὲν οὖν οὕτω, καὶ μὴ ζητοῦσι δ' οὕτως ἀναμμηνησκόμεντα, οἷον μεθ' ἐπέραν κίνησιν ἐκείνη γένεται· ὣς δὲ τὰ πολλὰ ἐτέρων γενομένων κινήσεων οἷον ἐπέμενεν, ἐγένετο ἐκείνη. οὐδὲν δὲ δὲ

σκοτεῖν τὰ πόρρω, πώς μεμνημέθα, ἀλλ' τὰ σύνεγγυς· δὴλον γὰρ ὅτι ὁ αὐτός ἐστι τρῶτος. λέγω δὲ τὸ ἐφεξῆς οὐ προνοηθέντα σοὶ ἀναμμηνησθεῖς. τῷ γὰρ οὗτος ἀκολοῦθον αἱ κινήσεις ἀλλήλαις, ἤδη μετὰ τήνδε. καὶ οὖν τοῖς ἀναμμηνησκέσθαι βούλεται, τούτῳ ποιήσει· ζητήσει σει λαβεῖν ἀρχὴν κινήσεως, μεθ' ἰν ἐκείνη ἐσται. διὸ

452a τάχιστα καὶ κάλλιστα γίνονται ἀπ' ἀρχής αἱ ἀναμμηνησθεῖς· ὡς γὰρ ἔχουσι τὰ πράγματα πρὸς ἄλληλα τῷ ἐφεξῆς, οὕτω καὶ αἱ κινήσεις. καὶ ἔστω εὐμηνιόνευτα ὅσα τάξιν τινὰ ἔχει, ὅσπερ τὰ μαθήματα· τὰ δὲ φαῦλα χαλεπῶς. καὶ τοῦτο διαφέρει τὸ ἀναμμηνησκεσθαι τοῦ πάλιν μαθάνων, ὅτι δυνήσεται πως δὲ αὐτοῦ κυνηθήσῃ ἐπὶ τὸ μετὰ τὴν ἀρχήν. ὅταν δὲ μὴ, ἀλλ' δὲ ἀλλού, οὐκέτι μέμνηται. πολλάκις δ' ἤδη μὲν ἀδυνατεί ἀνα-
change occurring, the second will be summoned into activity; when, however, the connection is not necessary but due to custom, the occurrence of the second process will take place only in most cases. It so happens that some people receive a greater bent from a single experience than others in whom the sequence has frequently taken place, and hence, in some instances, after seeing the things once, we remember them better than others who have seen them frequently. Thus, when we recollect, one of our previous psychic changes is stimulated which leads to the stimulation of that one, after which the experience to be recollected is wont to occur. Consequently we hunt for the next in the series, starting our train of thought from what is now present or from something else, and from something similar or contrary or contiguous to it. This is the means of effecting recollection; the change in those cases is now identical, now concomitant with, and now partially inclusive of the idea to be recalled, and hence the remainder formerly occurring subsequently to the rest is but small.

This is the way in which the search for the idea not present is carried out, and, even when there is no search, it is in this way that recollection occurs, when the one process occurs after the other; and in general it is after experience of other changes such as we have described that the process in question occurs. We must consider, not how we remember things remotely connected but those that are close to each other, for it is clear that the method is the same in both cases. I use the expression "next in order" without implying a prior search or act of recollection; for it is owing to the custom of their being experienced in sequence that one particular process follows another. Hence, when one wishes to recall something, this is what he does—he tries to find the starting point of a process after which the one in question will recur. This is why the swiftest and best way of recollecting is to start from the beginning; the subjective changes are related to each other in the same way as the facts remembered stand to each other in virtue of their place in the series. Those things are easily recalled which have an orderly arrangement such as we find in mathematics; but things wanting in exactitude are with difficulty remembered. To recollect and to learn a second time differ in this, that he who recalls a thing will be able by his own agency to pass to the process succeeding the starting point; when this is not so and the instrumentality of someone else is required, it is no longer a case of remembering.

Often when as yet unable to recollect, by searching one

manages to do so and finds what he was seeking. Here what happens is, that one initiates many processes before he arrives at the stimulation of that one on which the object sought will ensue. Remembering depends upon the potential presence in consciousness of the causal process, and upon this, on the condition that, as mentioned, the transition be effected by one's own agency and by means of processes that one already possesses.

A starting point from which to begin must always be found. Hence commonplaces seem to be often the initial point in the act of recollection. The reason why these are employed is that we pass quickly from one to another, e.g. from milk to white, from white to air, from this to wet, passing from which we call to mind the late autumn, which is the season we had in view.

It is true that in general the middle member also of a whole series of terms seems to be a starting point; if one does not recollect before, one will do so when he comes to it, or else there is no other point from which he can pass to the recollection of the thing in question. Suppose for instance one has a series of thoughts ABCDEFGH; if one has not remembered at H, one remembers at E, if he is seeking for G or F; for from that point we can go in either direction both towards D and towards F. But if we are not seeking for one of these members of the series, i.e. G or F, by going to C we shall effect recollection; if that is not so, by going to A we can. This is universally the process.

The reason why, though the same link is employed, recollection sometimes is and sometimes is not successful, is that we can pass to a further distance at one time than at another from the same starting point, e.g. from C to F or to D. Hence, if the transition is mediated by some connecting link which has not lately been employed, one passes to the more familiar consequent, for the newly acquired habit has become exactly like a natural disposition. It is thus that we explain why frequently we recollect quickly what we have been meditating upon. It is just in accordance with a natural tendency to follow one another in a particular order that things actually happen; and it is frequent repetition that produces a natural tendency. But since in the realm of Nature we meet with events contrary also to the order of Nature and due to chance, this is still more likely to occur in things due to custom, among which a natural order does
ὑπάρχει. ὡστε κινηθήναι ἐνότε κάκει καὶ ἄλλως, ἄλλως
τε καὶ ὅταν ἀθέληκη ἐκεῖθεν αὐτόσε πη. διὰ τούτο καὶ
ὅταν δὲν ὄνομα μημονεύσαται, παρόμοιον μὲν, εἰς δὲ ἑκείνῳ
σολομώξομεν. τὸ μὲν οὖν ἀναμμηνήσκεθαὶ τοῦτον συμ-
βαίνει τὸν τρόπον.

τὸ δὲ μέγιστον, γνωρίζειν δεῖ τὸν χρόνου,
ἡ μέτρω ἡ ἀορίστως. ἔστω δὲ τί ὥς κρίνει τὸν πλεῖον καὶ
ἐλάττων. εὐλογοῦν δὲ ὁσπερ τὰ μεγέθη: νοεῖ γὰρ τὰ
μεγάλα καὶ πορρω ὁ τῶν ἀποτείνων ἐκεῖ τὴν διάνοιαν,
ὁσπερ τὴν ὁπλας φασί τινες (καὶ γὰρ μὴ ὄντων ὀμοίως
νοῆσαι), ἀλλὰ τῇ ἀνάλογων κινήσει. ἐστὶ γὰρ ἐν αὐτῇ
τὰ ὀμοία σχήματα καὶ κινήσεις. τίνι οὖν διοίσαι, ὅταν
τὰ μείζονα νοεῖ, ἡ ὅταν ἑκείνα νοεῖ τὰ ἐλάττων: πάντα γὰρ
τὰ ἐντὸς ἐλάττων, καὶ ἀνάλογον καὶ τὰ ἐκτός. ἔστι δὲ
ἰσος ὁσπερ καὶ τοὺς εἴδεσιν ἀνάλογον λαβεῖν ἄλλα ἐν
αὐτῷ, οὕτως καὶ τοὺς ἀποστήμασιν. ὁσπερ οὖν εἰ τὴν
ἈΒΒΕΚ κυνεῖται, ποιεῖ τὴν ΓΔ. ἀνάλογον γὰρ ἡ ΛΓ
καὶ ἡ ΓΔ. τί οὖν μᾶλλον τὴν ΓΔ ἢ τὴν ΖΗ ποιεῖ;
ὁ ὁς ἡ ΛΓ πρὸς τὴν ἉΒ ἔχει, οὕτως ἡ [τῷ] Θ πρὸς
tὴν Ἡ ἔχει. ταύτας οὖν ἥμα κυνεῖται. ἂν δὲ τὴν ΖΗ
βούληται νοῆσαι, τὴν μὲν ΒΕ ὀμοίως νοεῖ, ἀντὶ δὲ
tῶν ΘΙ τὰς ΚΔ νοεῖ· ἀνταὶ γὰρ ἑχοῦσιν ὃς ΖΛ

ὁταν οὖν ἅμα ἡ τε τοῦ πράγματος γίνεται κίνησις
καὶ ἡ τοῦ χρόνου, τότε τῇ μνήμῃ ἐνεργεύει. ἂν δὲ οὐδέν}

---

typograph. 15 vulgo: νοεῖ; ἢ τὴν ἑκατον νοεῖ, ἢ τὰ ἐλάττων; δ' ἀντε δέ τοι om. ΕΜΥ,
ἐκεῖνα νοεῖ θ M, νοεῖ L S U, textum receptum de conjectura Freudenthali scripto
Biehl. 16 καὶ ΛΜΣΥ, ὁσπερ Biehl. 19 ΓΔ Biehl Μ Syllb., ΛΔ
reliqui coodd. et edd., etiam vet. tr. et Mich., qui autem γ θ Aristotelii scribendum
fuisse annotat, ΓΔ recte coni. etiam Freudenth. 20 ἢ τῶν om. ΕΜΥ.
not prevail to the same degree. Hence in some cases we are impelled to pass both to one point and to another, especially when something diverts us from the one to the other. Hence too, when we have to remember a name, we may recollect one like it and commit a verbal blunder as regards the proper one. This is the explanation of the way in which recollection occurs.

But there is a most important fact to be noticed—that we must have apprehension of time either determinate or indeterminate. Let us grant as real something by which we discriminate greater and less periods. It is reasonable that we should do so in the same way as we discriminate extended magnitudes; we know things that have great size and are at a distance, not by our thought reaching out to them there, as some say our sight does (for though they are non-existent they can equally be known), but by a psychic process analogous to them: there exist in the mind figures and changes similar to the external objects.

What then is the difference between knowing the objects of greater size (the objective) and knowing the other set (the subjective) which are smaller? All the inner are smaller and analogous to the outer, and probably, just as in the case of the knowable forms of things the subject has another corresponding one within him, so it is with distances. Thus, if AB, BE be the process, that produces AC, CD, for AC and CD are in the same ratio as AB and BE. Does not this then give AF, FG quite as much as AC, CD? No, for AC is to AB as H is to I. These processes, then, occur together, but, if one wants to think FG, while he equally at the same time thinks BE, instead of the ratio of H to I he thinks that of K to L, for the latter lines are in the same proportion as FA stands in to BA.

Hence when the process corresponding to the concrete object and that corresponding to the time are coincident we have an act of memory. If one thinks that they are coincident
μὴ τοιῶν, οίτε τι μημονεύειν· οὐθὲν γὰρ κωλύει δια-
ψευδήθηνα των καὶ δοκεῖν μημονεύειν μὴ μημονεύοντα.
30 ἑνεργοῦσα δὲ τὴν μνήμην μὴ οίεσθαι ἄλλα λανθάνειν
μεμημημένοις οὐκ ἔστων· τοῦτο γὰρ ἤν αὐτὸ τὸ μεμη-
μήσθηνα. ἀλλ’ ἂν ἡ τοῦ πράγματος γένηται χωρὶς τῆς τοῦ χρόνου
ἡ αὐτή ἑκεῖνης, οὐ μέμηνται. ἥ δὲ τοῦ χρόνου διατή
453α ἔστων· ὃτε μὲν γὰρ μέτρῳ οὐ μέμηνται αὐτὰ, οἶον ὃτι
τρίτη ἡμέρα ὁδήγητο ἐποίησεν, ὃτε δὲ καὶ μέτρῳ ἄλλα
μέμηνται καὶ έκατον μή καὶ μέτρῳ. εἰώθασι δὲ λέγειν
ὅτι μέμηνται μέν, πότε μέντοι οὐκ ἔστωσιν, ὅταν μὴ
5 γνωρίζωσι τὸν πότε τοῦ ποσὸν μέτρῳ.

ὁτι μὲν οὖν οὐχ οἱ αὐτοὶ μημονεῖκιν καὶ ἀναμνηστικοὶ, ἐν τοῖς πρότερον
εἴρθαι. διαφέρει δὲ τοῦ μημονεύειν τὸ ἀναμμήνησκε-
σθαι οὐ μόνον κατὰ τὸν χρόνον, ἀλλ’ ὅτι τοῦ μὲν
μημονεύειν καὶ τῶν ἄλλων χρόνων μετέχει πολλά, τοῦ
10 ἀναμμήνησκεσθαι οὐδέν ὡς εἴτε ὑπὸ τῶν γυναικῶν
χρόνων, πήναν ἀνθρώπος. αὐτοὶ δὲ ὃ τὸ ἀναμμήνησκεσθαι
ἔστων οἰον συλλογισμὸς τις· ὃτι γὰρ πρότερον εἶδον ἡ
ἔκουσιν ἡ τοιοῦτον ἐπαθεῖ, συλλογίζεται ὁ ἀναμμή-
νησκόμενος, καὶ ἔστωσιν οἰον ἐξήτησις τις. τοῦτο δὲ οἷς καὶ
15 τὸ βουλεύοντος ὑπάρχει, φύσει μόνοις συμβεβηκέν· καὶ
ὁγὰρ τὸ βουλεύεσθαι συλλογισμὸς τις ἔστων.

16 ὅτι δ’ ἐστὶ σω-
ματικὸν τὸ πάθος καὶ ἡ ἀνάμνησις ἐξήτησις ἐν τοιούτῳ
φαντασματος, σημείων τὸ παρενοχλεῖν ἐνίοτε, ἐπειδὰν μὴ
δύνωσαι ἀναμνησθήναι καὶ πάντα ἐπέχονται τὴν διάνοιαν,
20 καὶ οὐκέτ’ ἐπιχειροῦντας, ἀναμμήνησκεσθαι οὐδέν ἢττον,
καὶ μάλιστα τοὺς μελαγχολικοὺς· τούτους γὰρ φαντά-
ματα καὶ μάλιστα. αἱτίων δὲ τοῦ μη ἐπ’ αὐτοῖς εἶναι
τὸ ἀναμμήνησκεσθαι, ὅτι καθάπερ τοῖς βάλλουσιν οὐκέτι

453α, 19 ὑπέχωντα Christ, Biehl, ὑπέχωντα Bek. codd.
MEMORY AND RECOLLECTION

without securing that they really are so one thinks one remembers, for there is nothing to prevent one's being deceived and thinking one remembers when one does not. When, however, one actually remembers, it is impossible not to know it or to be unaware that that is so, for it is just in being aware of this that memory consists. But if the object-processes occur independently of that corresponding to the time, or the latter take place without the former, there is no memory.

The time-apprehending process is twofold; sometimes one does not remember the interval with exact precision, as e.g. 453 a that someone did something the day before yesterday, but sometimes our sense of time is accurate. All the same one remembers, though not aware of the exact interval; we are wont to say we do remember though we don't know when the thing happened, when we cannot tell what is the exact extent of the interval.

We have already asserted that it is not the same people who remember well and who recollect well. Recollection differs from remembering not merely in the superiority of the sense of time which it involves, but in the fact that, while many of the other animals possess memory, we may say that none of those now known, except man, share in recollection. The reason is that recollection is like a syllogism. One who recollects comes to the conclusion that he saw or heard or had some such experience previously and the process resembles a search and, owing to its nature, recollection accrues only to those that have the power of deliberation, for deliberation is a sort of syllogistic process.

Evidence that this experience is of a corporeal nature, and that in recollecting we search for an image in a corporeal organ, comes from the fact that it distresses some people when they cannot recall a thing though applying their mind hard in attempting to do so and, when they no longer try to recollect, none the less the disturbance goes on. This happens especially with liverish people, for they are the class most easily moved by images. The reason why recollection is not under their control is, that, just as when one has thrown a
ἐπ’ αὐτοῖς τὸ στῆσαι, οὕτως καὶ ὁ ἀναμμηνησκόμενος καὶ
25 θηρεύων σωματικοὶ τινὶ κινεῖ, ἐν δὲ τὸ πάθος. μάλιστα δ’
ἐνοχλοῦσθαι οἷς ἂν ἴγροτῆς τύχῃ ὑπάρχοντα περὶ τὸν
αἰσθητικὸν τόπον· οὐ γὰρ ῥξίδως παύεται κινηθεῖσα, ἔως
ἂν ἐπανέλθῃ τὸ ξητοῦμενον καὶ εὐθυπορήσῃ ἡ κίνησις.
διὸ καὶ ὀργαί καὶ φόβοι, ὅταν τι κινήσωσιν, ἀντικυνων-
30 τοῖς πάλιν τούτοις οὐ καθίσταται, ἀλλ’ ἐπὶ τὸ αὐτὸ
ἀντικυνοῦσιν. καὶ ἔοικε τὸ πάθος τοῖς ὄνομασι καὶ
μέλεσι καὶ λόγοις, ὅταν διὰ στόματος γένηται τι αὐτῶν
σφόδρα· παυσάμενοι γὰρ καὶ οὐ βουλομένοις ἐπέρχεται
πάλιν ἄδεων ἡ λέγειν. εἰσὶ δὲ καὶ οἱ τὰ ἄνω μεῖζω
453 b ἔχουσι καὶ οἱ νανόδεις ἀμυνομένοτεροι τῶν ἐναντίων
διὰ τὸ πολὺ βάρος ἔχειν ἐπὶ τῷ αἰσθητικῷ, καὶ μὴν
ἐξ ἀρχῆς τὰς κινήσεις δύνασθαι ἐμμένειν ἀλλὰ διαλύ-
εσθαι μὴν ἐν τῷ ἀναμμηνῆσκεσθαι ῥξίδως εὐθυπορεῖν.
5 οἱ δὲ πάμπαν νέοι καὶ λίαν γέρουσι ἀμυνόμενοι διὰ τὴν
κίνησιν· οἱ μὲν γὰρ ἐν φθίσει, οἱ δ’ εἰς ἀνυζόμεις πολλῇ
εἰσάν· ἐπὶ δὲ τὰ γε παιδία καὶ νανόδη ἐστὶ μέχρι πόρρω
τῆς ἡλικίας. περὶ μὲν οὖν μνήμης καὶ τοῦ μνημονεύειν,
τὸ τε ἡ δύνασιν αὐτῶν καὶ τίνι τῶν τῆς ψυχῆς μνημονεύει τὰ
10 ζῷα, καὶ περὶ τοῦ ἀναμμηνῆσκεσθαι, τί ἐστι καὶ πῶς
γίνεται καὶ διὰ τίνας αἰτίας, εἰρήται.
thing one can no longer check its course, so a man engaged in recollection and on the hunt for an idea stimulates into activity a bodily organ in which the experience is localised. Those feel the vexation most who happen to have fluid in the region of the sensory organ, for once the fluid substance is set in motion it is not easily brought to rest until the object sought for returns to mind and the process resumes its direct course. Hence, when they have set something in agitation, emotions of anger and fear, owing to the reaction of these organs, do not come to rest; on the contrary they react once more on them. The phenomenon resembles that which occurs when a name or a tune or a sentence has come to be much on one's lips; after one has stopped, and without one intending it, one is prompted again to sing or to speak.

Dwarfs and those who have a greater development in the upper parts of the body have poorer memories than those of the opposite type, because they have too great a weight pressing upon the organ of consciousness; the processes can neither persist in it from the time of the initial experience (on the contrary they are effaced), nor in the act of recollection can they easily take a direct course. The very young and the exceedingly aged remember badly because of their transitional state: the former are growing, the latter decaying rapidly; and besides, children are dwarf-like in type up to a considerably advanced time in their life.

This is our account of memory and remembering, the nature thereof and the psychical organ employed by animals in remembering; likewise of recollection, its nature, mode of occurrence, and causes.
COMMENTARY

DE SENSU

CHAPTER I.

436 a 1. περὶ αἰσθήσεως καὶ αἰσθητῶν. This is the common title of the treatise and that known to Alexander of Aphrodisias. As, however, the discussion is to be not about the soul per se, but in particular about its connection with the body, i.e. not merely psychological but especially physiological, Alexander suggests that περὶ αἰσθητηρίων τὲ καὶ αἰσθητῶν would be a more legitimate title. Sometimes αἰσθήσεως is used loosely instead of αἰσθητηρίων, even by Aristotle himself. Simon Simonius adopts this amended title, translating it ‘De Organis Sensuum et Sensilibus.’

This is evidently the investigation promised in De An. 1. ch. 1, 402 b 15, where Aristotle asks if the objects of sensation may not be more profitably treated of before the function of sensation itself. In the whole passage 402 b 5 sqq. he points out that a definition of soul in the abstract is not sufficient for a comprehension of what soul is, ἀλλὰ καὶ ἀνάπαλιν τὸ συμβεβηκότα συμβάλλεται μέγα μέρος πρὸς τὸ εἶδέναι τὸ τί ἐστιν. Thus we must proceed beyond our abstract definition and give an account of the various μόρα—faculties of soul, but these again cannot be understood apart from their ἐργα—functions, and, once more, point to an account of their ἀντικείμενα—objects. Aristotle doubts if these subjects should not be treated in the reverse order; to do so would be to begin with things ‘noticia nobis’; for, as later psychology also has pointed out, it is the things presented to our senses and not the psychical functions through which they are apprehended, which are in the order of time the primary objects of consciousness.

As a matter of fact, Aristotle does not adopt this reverse order in his exposition, thinking it sufficient to have pointed out the danger of resting content with a merely abstract treatment.
Thus we come finally to a discussion of ἀληθής, the objects of sense and the bodily organs through which they are apprehended. It is not to be thought, however, that the separation of topics in Aristotle's psychological writings is observed with perfect logical rigidity. The general outlines of what is here laid down have already been anticipated in De An. ii. chs. 7–11, and the detailed treatment of sound which is omitted from this treatise is to be found there in ch. 8.

What in particular distinguishes this treatise from the De Anima is the greater detail with which ἀληθής are treated and the attention devoted to the bodily organ of each sense.

διάρισται, διορίζειν is a technical term with Aristotle, almost equivalent to 'to define' (ὁρὸς, ὄργιμος = definition).

καθ' αὐτήν, another technical term; it is defined in Anal. Post. i. ch. 4, 73 a 34 sqq. Those characteristics of a thing without which it would be impossible for it to be that thing, belong to it καθ' αὐτό. They are stated in the definition. Cf. also Metaph. vii. ch. 5, 1030 b 23 sqq. It is assumed that a thing can preserve its individuality though stripped of certain qualities. These latter are συμβεβηκότα. When Aristotle says he has given a definition of the soul per se, he means that he has stated the ultimate attributes that everything psychical (or rather everything living, for plants have φύσις) must have. This definition appears in De An. ii. ch. 1, 412 b 5: τὸ δὲ ἐν εὐτελέχεια ἡ πρώτη σύμματος φυσικοῦ ὄργανοι.

The question is, whether the soul per se is here contrasted with its faculties, or whether—as Alexander suggests is also possible—he is opposing soul considered alone to soul considered in its relation to the body. To this it may be objected that Aristotle never does consider soul apart from body. It is clear that Aristotle here means just what he says, after a discussion of soul in general and its faculties he is to go on to investigate their ἔργα or, as he here calls them, the πράξεις of the living creatures. This is a progress in the direction of greater detail, for one and the same δύναμις is capable of being determined in various ways when it passes into activity or ἔργεια. This will involve the more detailed treatment of the bodily organ of each ἔργεια also. Hence the predominantly physiological character of this treatise.

For the reason why a definition of soul in general is not sufficient, see De An. ii. ch. 3, 414 b 20 sqq. Things ἐν τῷ ἐφεξῆς, like souls and figures, have no common nature which can exist apart from the
particular type, e.g. triangle, quadrilateral, etc. Such things have a nature, ‘media inter univocorum et equivocorum naturam.’

436 a 2. ἰδιωμα, ἰδιωτικός is the regular word for potentiality translatable by ‘faculty,’ by which term we also render μόριον. This latter term Aristotle inherited from the Platonic psychology. The word itself and the way in which Plato employs it suggest rather a theory of the separable and independent nature of the various faculties, the point of view, in fact, of ‘faculty psychology.’ Aristotle’s is, however, far removed from any such theory.

436 a 3. ἐπίστεφον ποιεῖται is an equivalent for θεωρίαν ποιεῖται: cf. Metaph. 1. ch. 8, 980 b 24–27.

τῶν ἰδίων ἰδιωτικῶν. This brings in plants, which also have φύσις, and to which some of the phenomena proposed for discussion belong (e.g. νεότης καί γήρας, ζωή καί βάναυσος).

436 a 4. ἰδῖος, ἰδιος is that which is the peculiar possession of any one species.

κοιναί, κοινός is the reverse of ἰδιος. Alexander points out that Aristotle desires not merely to classify the psychical functions of animals but to discuss the things classified.

Simon would make out that the distinction falls wholly within the functions of animals and that here ἰδιος and κοιναί mean respectively ‘belonging to them qua animal and qua living’ because there is no discussion of the functions of plants in the Parva Naturalia. However, the missing treatise De Plantis (cf. De Long. et Brev. Vit. 467 b 4) seems to have been intended to carry on the discussion of the most universal of all the conditions of life. Simon seems to be right in denying that by κοιναί Aristotle is referring merely to the functions which plants share with animals. But neither is it evident that the distinction falls wholly within the functions of animals as he asserts. As a matter of fact the Parva Naturalia though dealing chiefly with the functions of animals contain reference too to the phenomena of plant life. Possibly, however, Aristotle had no strict and complete classification in his mind, but merely wished to suggest that some functions might be the peculiar attributes of a certain species and of certain wider groups, as ἰδιμορφος of man and ἰδιομερής and ἰδιοφύς of animals with lungs. Simon’s view, however, derives confirmation from a passage further on (cf. note to 436 a 7).

436 a 5. πράξις, πρᾶξις is here employed in an unusual sense, as though it were a general term—action—used instead of the specifice,


\[ \text{DE SENSU} \]

\[ \varepsilon \nu \rho \gamma \nu \varepsilon \alpha \mu \alpha \eta \alpha \varepsilon \alpha \tilde{\iota} \nu \varepsilon \alpha \tilde{\iota} \nu \alpha \nu \varepsilon \alpha \theta \varepsilon \nu \eta \varepsilon \alpha \nu \varepsilon \alpha \eta \varepsilon \varepsilon . \] Alex. p. 4, l. 5 [W.]. But \( \nu \rho \alpha \varepsilon \xi \varepsilon \alpha \) has generally a very restricted
application, meaning as a rule distinctively human actions into which
deliberation and thought enter. Cp. \textit{passim} in the \textit{Ethics}, especially
i. ch. 1, 1094 a 1; vi. ch. 2, 1139 a 31 etc.

\( \nu \rho \kappa \iota \iota \theta \nu \omega \), \( \nu \rho \tau \iota \iota \sigma \iota \theta \nu \sigma \nu \) is to state as a \( \nu \rho \theta \varepsilon \omega \varepsilon \). This word
has both a technical and a general meaning. It is used to refer
(1) to certain of the undemonstrable but indubitable principles
which lie at the basis of the several sciences; this is its most
common technical meaning.

Again it may be used (2) to indicate a statement which is
assumed as an ultimate principle without proof for the purposes of a
particular discussion, but which is demonstrable and will be proved
when it is convenient to do so (cf. Alex. 4, l. 23 [W.]).

Alexander is wrong in saying that the \( \nu \rho \theta \varepsilon \omega \varepsilon \) which is an
indefinable principle of science is an \( \alpha \xi \omega \mu \alpha \). Aristotle (\textit{Anal. Post}. i. ch. 10)
distinguishes three classes of first principles, (1) the
\( \kappa \omega \nu \alpha \) \( \alpha \xi \omega \mu \alpha \eta \alpha \) of all science, \emph{e.g.} the \textit{Law} of non-contradiction,
(2) \textit{definitions} of the subject of demonstration (\( \tau \alpha \ \pi \rho \sigma \alpha \eta \ 76 \alpha 32 \) and
their properties (\( \pi \alpha \theta \eta \)), (3) \( \nu \rho \theta \varepsilon \omega \varepsilon \) which affirm the existence
of the subject to which the science is to attach predicates, \emph{e.g.} lines
and figures in geometry (76 b 5). These two latter classes of \( \alpha \nu \alpha \nu \rho \kappa \iota \iota \theta \nu \omega \alpha \kappa \iota \iota \) are \emph{\&c.}—appropriate to the science in question; they are both
species of \( \beta \varepsilon \omega \varepsilon \) (\textit{Anal. Post}. i. ch. 2, 72 a 15 sqq.). It is thus evident
that, according to this technical use, a \( \nu \rho \theta \varepsilon \omega \varepsilon \) is that which
\textit{renders conclusions unconditional and categorical} (Poste, \textit{Posterior Analytics}, Appendix B, p. 140). It corresponds to what Mill (\textit{Logic},
Bk i. ch. 8, §§ 6 and 7) calls a \textit{postulate}—the assertion that,
\emph{e.g.} the figure in geometry, the triangle, exists, which renders our
conclusions \textit{unhypothetical}. Without this postulate which asserts the
existence of the things defined there is no way of distinguishing
a science from any self-consistent system of mythology. Upon
definitions alone a science cannot be built.

There appears, however, to be another technical use of \( \nu \rho \theta \varepsilon \omega \varepsilon \) which was common in Greek geometry. The \( \nu \rho \theta \varepsilon \omega \varepsilon \) is the \textit{Q.E.F.}
of a problem or \textit{Q.E.D.} of a theorem, the proposition set up for proof.
This seems to be the sense in which it is employed in \textit{Eth. Nic. vii.}
ch. 9, 1151 a 17 (cf. Mr Burnet's note on the passage), though
Poste (\emph{op. cit.} p. 105 note) cites it as an instance of the former usage.
It is quite clear that here Aristotle uses ἐνοχεία in the wider sense of ἐνοχεία. The conclusions of the De Anima which can be proved are to be used as ἄρχαι in this treatise. These, therefore, though not indubitable first principles, are still certain; they are not ‘hypotheses’ in the modern sense, which are statements the certainty of which is still in doubt and which are assumed in a merely provisional way.

436 a 7. πρῶτον. In Posterior Analytics 1. ch. 4, 73 b 33 sqq. it is shown that what is a universal and peculiar attribute of a species belongs to it primarily, e.g. the equality of its angles to two right angles belongs to the species triangle primarily and not to figure, the genus (τὸ καθόλου δὲ ἐνόχεια τότε, ἦταν ἐπὶ τοῦ τυχόντος καὶ πρῶτον δεικνύοντα).

To be πρῶτος then is to be ιδιος, and πρῶτον will refer to the ιδιοι mentioned above, l. 4. To proceed from ιδιοι to κοινα is to follow the ‘ordo doctrinarum,’ while from κοινα to ιδιοι is the ‘ordo naturae,’ and this latter is the method which on the whole Aristotle follows in the De Anima in spite of his statement in De An. ii. ch. 2, 413 a 11 sqq.

Here, however, he is to begin with the ιδιοι which belong to animal quā animal (if we interpret ιδιαι as Simon will have it, cf. note to 436 a 4), e.g. Sense and Memory, and later he will go on to those functions which animals share with other living things.

The ‘ordo doctrinarum’ is also employed by him when he treats of sight before touch in the De Anima, and in treating of animals before plants; it often proceeds from the γνωριμότερα ημίν to the γνωριμότερα φύσις, cf. Physics 1. ch. 1. Perhaps, however, πρῶτον refers to ζώον as opposed to τῶν ζῴων ἐχόντων merely. This, which is Ziaja’s interpretation, makes the upshot of the whole matter that he is going to treat of animals and their functions first, as in fact he does. This interpretation relieves us from the necessity of limiting ιδιοι definitely to one or other of the two alternatives—peculiar to animal quā animal, and—peculiar to individual species.

436 a 8. κοινὰ τῆς ψυχῆς ἕντω. The most important both of the generic and specific functions of animals are functions both of the soul and the body, and hence (as Thomas says) the necessity of a separate treatise.

436 a 9. μνήμη. Memory does not belong to all animals, cf. De Mem. 450 a 16 and 453 a 9, also Metaph. 1. ch. 1, 98a a 29 sqq.; hence he says only that these functions belong to almost all animals (σχέδων, l. 11).
436 a 10. ὄρεξις or τὸ ὀρεκτικὸν (cf. Eth. 1. ch. 13, 1102 b 30) is the general name for the appetitive or conative element in the soul. It appears in three specific forms, ἐπιθυμία, θυμός, and βούλησις; the latter is a function of the rational soul. Cf. De An. 11. ch. 9, 432 b 5: ἐν τῷ λογιστικῷ ἡ βούλησις γίνεται καὶ ἐν τῷ ἀλόγῳ ἡ ἐπιθυμία καὶ ὁ θυμός.

The Aristotelian distinction between θυμός and ἐπιθυμία is not the same as the Platonic (cf. Republic. iii. and iv., especially 439 E sqq.), for Aristotle in Ethics 1. ch. 13, 1102 b 13 sqq. assigns both θυμός and ἐπιθυμία to that irrational part of the soul which truly is not absolutely irrational (κυρίως ἄλογον) in so far as it partakes in a way (μετέχει πῶς) in reason, but yet is irrational in so far as it opposes reason (ἀντιτέλει τῷ λόγῳ). According to Plato ἐπιθυμία belongs to the wholly irrational part of the soul. Nevertheless, according to Aristotle, ἐπιθυμία and θυμός belong to the same φύσις τῆς φυσῆς, yet they are distinguished in a way analogous to the Platonic; cf. Eth. vii. ch. 7, 1149 a 25 sqq. Ἐπιθυμία is a mere desire for what is pleasant as such, θυμός is passion acting without reflection, but not mere craving for pleasure, cf. Zeller, Arist. and Earlier Peripatetics ii. pp. 112–13. Anger is an inadequate rendering of θυμός, as the tenderer emotions are also ascribed to it by Aristotle, cf. Polit. vii. ch. 7, 1327 b 40. τὸ ὀρεκτικὸν has been already treated in the De Anima. The accurate distinction of θυμός and ἐπιθυμία really falls into the background in Aristotle, since their demarcation was not of importance for his psychology.

436 a 12. τῶν μετεχόντων ἐν, i.e. plants as well as animals. In addition to the above class there is second a class of ‘communissima’ such as νοήσις καὶ γνώσις, ἐνοικία καὶ πάθος, and a third class which are κοινὰ λόγων ἄνω, e.g. ἀναπτυγμένη καὶ ἐκτυγμένη. If by ἐνω in 1. 4 Aristotle means, as Simon maintains, peculiar to animal ἕνω animal, then the first list—ἀληθείας etc.—is the tale of the ἐνω, and the four συνεγχέα form the constituents of the two latter classes.

436 a 14. συνεγχέα. Simon says, ‘Est enim horum quasi privatio alterius.’ They are related as a positive quality, and its στάργος, i.e. the contradictory, within the same genus.

436 a 16. τί τι ήκαστον αὐτῶν. The τί ήκαστον of anything consists of the characteristics revealed in its definition—the scientific ‘connotation’ of the name, cf. Anal. Post. ii. ch. 3.

436 a 17. αἰσχρός. ἡ αἰσχρός or τὸ αἰσχρὸν is cause,—that, the existence of which entails the existence of the thing of which it is said to be
the cause. According to Aristotle’s logical theories it is impossible to prove the τί ἐστιν of anything; only its existence, i.e. that it occurs (ὑπάρχει), can be demonstrated; and this is done by giving its αἴτιον.

436 a 18. φυσικὸς. In De An. i. ch. 1, 403 a 29 sqq. there is a discussion of the spheres of the φυσικὸς and the διαλεκτικός, and it is first suggested that the physicist pays attention to the matter, the other to the λόγος or εἶδος (in his illustration the final cause) in natural phenomena. But the conclusion is come to, that the real φυσικὸς pays attention to both. Cf. also Metaph. vii. ch. 11, 1037 a 16 sqq.

περὶ ὑγίειας καὶ νόσου. This tractate, which should have followed the περὶ ἄναπνοῆς (cf. 480 b 22), is not extant.

436 a 19. ἀρχαί. the premisses from which deduction is made.

436 a 20. ἐστιν ἡμέρας. This word is applied both to those that lack and those that have been deprived of a quality. Cf. Metaph. v. ch. 22, 1022 b 22 sqq.

436 a 22. ἰατρικής. Aristotle cites a case in which we can explain a phenomenon in medicine by geometrical principles,—that circular wounds are slowest to heal (cf. Anal. Post. i. ch. 13, 79 a 15).

436 b 2. ἀρχαίοι, a reference to ἀρχαί (cf. l. 19 above).

436 b 4. μετὰ ἀλοιθήσεως. That sensation cannot exist apart from the bodily life is affirmed in De An. ii. ch. 2, 413 b 27. Ἦδου, λίπη, θυμός, ἐφθασία, and ὁμιλείς generally, occur along with sensation; it enters into their being: cf. loc. cit. 413 b 22–24.

436 b 5. δι’ ἀλοιθήσεως. μεμήκεν is due to ἀλοιθήσεως: it is a ἕξις φαντάσματος (cf. de Mem. 451 a 17) and a φάντασμα is a κίνησις ὑπὸ τοῦ ἀλοθήσεως, i.e. a psychical affection originating with, and being a persistence of, a sense stimulation; it is the μονὴ τοῦ ἀλοθήσματος talked of in Anal. Post. ii. ch. 19, 99 b 36 and De An. i. ch. 4, 408 b 18. Again the φάντασμα is called a ὑπόλειμμα τοῦ ἀλοθήσματος. Cf. De Mem. ch. 1, 451 a 4 and De Insom. 461 b 21, and also An. Post. ii. ch. 19, 100 a 3, ἐκ μὲν οὖν ἀλοθήσεως γίνεται μεμήκεν.

πάθος. A πάθος is (1) in its most general signification, any attribute of a thing whatsoever as opposed to the concrete reality itself (cf. De Gen. et Corr. i. ch. 4, 319 b 8 etc.). In accordance with the etymology of the word there is, however, generally the side implication of the πάθος, being a determination produced in a thing which is passive and suffers modification (πάνχει) by something else. Hence (2) πάθος, though often used indiscriminately, tends to be demarcated from a permanent quality and to refer to a more
temporary attribute: cf. Cat. ch. 8, 9 b 28. It is often indistinguishable from συμβαθέως.

If the subject—the thing which has the πάθος—is mind or one of its faculties, then the πάθος is some modification of consciousness. We must, however, distinguish as a special meaning that sense of πάθος (found in De Mem. ch. 1, 450 b 1), where it means mental perturbation.

For the use of πάθος cf. Burnet, Eth. Nic. p. 88. Here, according to Alexander, ἅπαν καὶ ἕρωτος come under the designation of πάθη τῆς αἰσθήσεως: cf. Comment. in De Sensu, p. 7 (Wendland), l. 25: πάθη γὰρ τὴν παραγωγήν ἢ ἅπαν. The explanation is that exhalations from food proceed upwards to the brain, condense and, descending once more, press upon the seat of consciousness (the heart), and so produce sleep. Cf. also De Somn. 454 a 22: ἀμφοτέροι γὰρ ἐστὶ τὰ πάθη ταῦτα περὶ αἰσθήσεως τοῦ πρώτου αἰσθήματος.

436 b 6. ζήσεως. A ζήσεως is a fixed and determinate disposition (merely temporary disposition is διάθεσις). Cf. Cat. ch. 8, 8 b 27. Aristotle seems here to be describing the character of the four συζυγίων mentioned above in 436 a 14 sqq. Hence by ζήσεως he can hardly be referring to memory, which indeed is a ζήσεως of the image left by sensation, not directly of sensation itself. Alexander thinks that by ζήσεως sensation itself is referred to. But, if we hold that one of the pairs of correlative is indicated, perhaps νεότης καὶ γήρως may be intended, though in what sense these are ζήσεως of αἰσθησιος is not clear; they belong rather to τοῦ θρεπτικοῦ—the 'nutritive soul.'

436 b 7. συντρίσαι. ἀναπνοή preserves the life because it cools the heart—the ultimate organ of sensation, and prevents it from destroying itself by means of its own heat. Cf. De Juvent. ch. 3, 469 a 5 sqq. and De Resp. chapters 1, 8 and 16. συντρίσαι. νίκος and βάναυσις are φθοραί and στερούσαι of life. στερεός is used here in the sense of deprivation (cf. note to 436 a 20).

436 b 8. διὰ τοῦ λόγου here is equivalent to 'deductively' as opposed to 'inductively'—δι’ ἐπαγωγής (cf. Phys. iii. ch. 3, 210 b 8 sqq.). No reference to ἀ πρíτη in the Kantian sense is intended.

436 b 9. αἰσθήσεως. The distinction between noun and verb seems here to correspond to that between faculty and function. Cf. ρημαί and ρημονοεῖν De Mem. passim. In the famous passage in Anal. Post. ii. ch. 19, 100 a 17 it is generally understood to be that
between content and function—καὶ ἀισθάνεται μὲν τὸ καθ’ ἴδιατον, ἢ δὲ ἀισθήσεις τοῦ καθέλου ἑστιν.

436 b 11–12. ταῖς ψυχῆς. The reference is to De An. II. chapters 2, 3, 5 etc. Cf. 413 b 1 sqq.

436 b 14. ἰδία. This supports Simon’s interpretation of ἰδιαὶ in 436 a 4 above. If touch belongs peculiarly to each and every species, that must mean that it is a peculiar property of that nature which they all have in common. It is something which they have quâ animal. The usual meaning of ἰδιαὶ is ‘belonging to a species exclusively,’ but as each species is here said to have the properties in question, the usual sense is out of the question.

436 b 15. Cf. De An. II. ch. 3, 414 b 2 sqq. By touch we discriminate dry and moist, hot and cold—the ultimate properties of things material and also important characteristics of τροφή (ἢ γὰρ ἵνα τῆς τροφῆς ἀισθήσεις). Compare also III. ch. 12, 434 b 9 sqq. Touch is necessary for the animal’s preservation.

In the former passage (II. ch. 3) we find that γεῦσις also discriminates characteristics of τροφή and cf. below ch. 4. Taste discriminates flavour, but χεῖρ is simply a ἥδισσα of the fundamental characteristics of τροφή—the tangible ones, and hence γεῦσις is a species of touch (441 a 3 below).

436 b 19. τοῦ θρηστικοῦ. The omission of μορίων (which is read by L S U P and Bek.) after θρηστικοῦ makes this passage intelligible. Aristotle here refers to that which nourishes, not to the ‘nutritive faculty’ of the soul. (1) In the first place, it is not χεῖρ that nourishes but γεῦσις which should be a πάθος of any of the faculties of the soul, and (2) that would be a πάθος, not τῆς θρηστικῆς ὑδάμεως, but τῶν αἰσθητικῶν.

The first of the above reasons makes us reject Alexander’s interpretation of τοῦ θρηστικοῦ μορίων as τοῦ γευστικοῦ, which wants explanation and besides makes this statement a tautology.

Alexander himself suggests that the meaning is τὸ μόριον τρέφειν δυνάμεως, i.e. the nutritive object. But μόριον is strange and is better omitted as in E M Y.

Hammond does not notice the importance of the alteration in Biehl’s text, and translates: ‘flavour is an affection of the nutritive soul,’ and explains that ‘flavour as a property of food affects the processes of growth or the nutritive soul.’

But τὸ θρηστικὸν here = τροφή.

436 b 20. Aristotle is clearly demarcating animals in general.
from the smaller number that possess local movement, by a distinction in their sensational consciousness also. In all animals we have touch and taste, but in those that have κινήσεις κατὰ τόσον we have also the senses which are stimulated by a medium external to the body (διὰ τῶν ἔξωθεν). The objects of touch and taste are external as well as those of the other senses, and hence it is no differentia of the senses of sight, hearing, and smell to be ‘excited by external objects’ as Hammond translates: cf. De An. iii. 12, 434 b 14: οἱ γὰρ ἄλλαι αἰσθήσεις δι’ ἄτερων αἰσθάνονται, δόν διψάρησις δόξαι ἄκοι.

For a discussion of the media (air, water, and τὸ διαφανὲς) cf. ch. 3–5, the discussion of the special senses, and Bäumker, Des Aristoteles Lehre von den Äussern und Innern Sinnesvermögen, pp. 38 sqq.


προφανεμένα, i.e. perceiving their food before they are in actual contact with it.

437 a 1. φρόνησις. φρόνησις is here used in a wide and general sense as equivalent to διάνοια—the faculty which gives us universals; but used more accurately, as in Eth. Nic. vi, it is περὶ ὅν ἐστι βουλεύσασθαι (1141 b 9), i.e. knowledge of τὰ πρακτικά. Cf. 1140 b 4: λαίπεσται ἄρα αὐτὴν (sc. φρόνησιν) εἶναι ἐξ ἀληθῆ μετὰ λόγου πρακτικῆς περὶ τὰ ἀνθρώπων ἀγαθὰ καὶ κακά.

The φρόνησις is able to determine what is good and profitable πρὸς τὸ εὖ καὶ ἀληθῶς, i.e. for his general welfare. φρόνησις is one of the ‘intellectual virtues.’ Some of the animals seem to have φρόνησις: cf. Metaph. i. ch. 1, 980 b 22, where some are said to be φρονόματερα than others.

437 a 3. νοητών. νοετά are the objective counterpart of νοήματα, which are concepts generally, the contents of νόησις or νοῦς, i.e. intellect. Cf. De An. i. ch. 3, 407 a 7: ἡ νόησις τὰ νοήματα, and Metaph. xii. ch. 7, 1072 b 22: τὸ γὰρ δεκτικὸν τοῦ νοετοῦ...νοες. φρόνησις τῶν νοητῶν is equivalent to θεωρία or ἐπιστήμη, which are regularly opposed to πράξεις as well as to a knowledge of τὰ πρακτικά. Cf. Eth. vi. ch. 5, 1140 b 1: οἷκ ἄν αἰὴ ἡ φρόνησις ἐπιστήμη, and cf. ch. 3, 1139 b 17 sqq. ἐπιστήμη concerns τὰ ἐξ ἀνέγκας φρόνησις; those things which ἐνδέχεται ἄλλως ἔχειν. Hence, in the strict sense of the terms, the expression φρόνησις τῶν νοητῶν contains a contradiction.

437 a 5. καθ’ αὐτῇ, i.e. sight in its own sphere, in the objects directly presented to it. To the sphere of sight belong colour and
the mathematical qualities of objects perceived by sight—

*ta koula aithanata* (cf. II. 9–10 below). Compare *De An.* II. ch. 6, 418 a 9, where the *koula aithanata* are said to be perceived *kath aute*. Besides those things which are thus perceived there are others that are perceived *kata sumbebechos*, e.g. we perceive by sight qualities referring to another sense, which are ‘complicated’ with the visual one in the same object, and again we can perceive all sorts of other determinations of the visible object, e.g. that such and such a white object is ‘the son of Diaries’ (418 a 21). Here some modification of the visual quality must pass as a symbol for or mean the other characteristics which we infer from it. But it is in the perception of these associated elements that hearing contributes more to intellectual life, for to the audible sounds we have by convention (*kata sumbebechos*) attached the concepts by which we think the whole of reality so far as it is known to us.

*pros de noo.* *noos* seems to be best described as the faculty of conceptual thought. Though sometimes defined so widely as to take in all mental activities superior to *aithanias* (cf. *De An.* III. ch. 4, 429 a 23: *leipo de noo o diadoitai kai eolaimbaini * phyke*: cf. also *De An.* III. ch. 3, 427 b 27–29), in its most characteristic application it refers to the highest faculty of all. That seems to be the apprehension of concepts in abstraction from the imagery, the sensory setting or *sklon* by which they seem generally to be attended. *De An.* III. ch. 4, 429 b 21 and Rodier’s notes to the preceding passage, also ch. 6, 430 b 30. Such simple concepts seem to form the starting point of all scientific knowledge, and in *Eth.* VI. ch. 6, 1141 a 7 *noo* is said to be the faculty for apprehending them, not a faculty of discursive thought. Cf. also *Anat. Post.* II. ch. 19, 100 b 12.

*kata sumbebechos.* Cf. above, note to *kath authen*. Aristotle does not mean to equate *kata sumbebechos* and *pros noo*; as we saw, by sight we may perceive objects *kata sumbebechos*. But it is audible sound alone which is elaborated into a system corresponding to the scheme of ideas and in each item suggestive of them.

437 a 8. *ta koula.* Cf. *De An.* II. ch. 6, 418 a 17, III. ch. 1, 425 a 14, III. ch. 3, 428 b 22, and also below ch. 4, 442 b 2 sqq. *hereia* is here omitted from the list, though codex L reads *stadois*.

437 a 11. *foinhes.* Cf. *De An.* II. ch. 8, 420 b 5 sqq. The general description of *foinhe* is *phofo tis estin emfainon*. The narrower usage appears in 420 b 32: *smyantikos gar di téis phofo...
It is sound which conveys a meaning. In 420 b 22 we find that it is φωνή which permits of the realisation of τὸ εὖ: cf. above 437 a 1. The ἀναγκαία (cf. 420 b 19, where γένος is said to be ἀναγκαῖον) are the things chosen σωρηδρὰς ἀνεξα. Aristotle means quite clearly that intelligence and the higher life generally depend upon ἀκοή and its special object φωνή. For the special reasons why sounds are best fitted to represent concepts, cf. Stout, Manual of Psychology, pp. 464 sqq.

437 a 15. σύμβολον. A σύμβολον is the token given by any of the parties to a compact (συμβήκῃ). Hence the apprehension of the meaning of a word is conventional and κατὰ συμβεβηκός, for φύσιν τῶν δυνάμεων οὐδὲν ἐστὶν (de Interp. 16 a 27). The opposite doctrine had been maintained in the Cratylus (ch. ix. sqq.). Cf. also 16 a 19. No sound is a word unless it become a conventional sign.
CHAPTER II.

437 a 19. δύναμις. δύναμις is the characteristic word for faculty or potentiality, not function (as Hammond has it), the appropriate word for which is ἔργον.

437 a 20. πρῶτον. In De An. 11. loc. cit.

437 a 22. στοιχεῖα. The four physical elements—the primary differentiations of πρῶτον ἄλη— are fire (πῦρ), water (ὕδωρ), earth (γῆ), and air (ἄηρ). Each has a pair of ultimate qualities one of which it shares with another of the elements and the other with another. Thus there are four ultimate qualities and those elements are most opposed to each other which have no qualities in common. Thus fire is hot and dry (θερμὸν καὶ ἐγρόν); water is cold and moist (ψυχρὸν καὶ ἔγρόν). These are contraries of each other. But fire and water share their heat and moisture respectively with air, their dryness and coldness with earth. Thus these latter two elements are relatively to each other contrarily opposed. Thus


437 a 23. τέταρτα. The traditional four elements were first distinguished by Empedocles. Cf. Burnet, Early Greek Phil. p. 59, also pp. 240 sqq. Empedocles referred smell to air also. Theophrastus, De Sensu, 7 (R. P. 177 b, 8th ed.), says he did not assign any particular element as connected with touch and taste. Aristotle’s statement here need not mean more than that there was a general
tendency to correlate each sense with a particular element, and that the disparity of the number of the senses and the elements respectively caused a difficulty when it was attempted to carry out the correlation completely.

437 a 24. πρότερη. Hearing and smell on the Empedoclean theory, touch and taste on the Aristotelian are grouped together.

437 a 25. θλιβομένοι. Apparently the sensation caused by concussion of the optic nerve owing to a blow in the region of the eye. The words used however do not convey a very graphic description of this experience. Perhaps Aristotle is here generalising so as to include such light sensations as are caused by chemical changes in the eye itself. The theory is to be referred to Alcmaeon of Kroton. Cf. Theophrastus, De Sensu, 26: ἐτι δ' ἔχει πῦρ (ὁ ὀφθαλμός), ἐν δέλμον ἐσιν: πληγόται γὰρ ἑλάμενειν.

437 a 31. οὐσία. Because in the dark no other object is visible, the eye, being of the nature of fire, will be visible. It should thus be visible at any time in the dark. As this is not the case, the theory is rejected.

Aristotle next goes on to give his own account of the phenomenon, which professes to explain why this sensation of light experienced in the dark occurs only when the eye moves rapidly.

437 a 34. λεία. Cf. 437 b 7, where he adds confirmatory instances. From Meteor. iii. ch. 4, 373 a 35: ἀκαλομένη μὲν ὄν πῆς ἐν πάντων φαίνεται τῶν λείων, and 372 a 31 we should infer that this was really a case of reflection. Though, however, smoothness is assigned as the source both of luminousness in the dark and of reflection generally, the two phenomena are never identified. Cf. De An. ii. ch. 7, 419 a 2 sqq., where fungi, horn and scales are enumerated along with the eye and the heads of fishes, as a class of ἀνάμνημα which are πυρίδης φανόμενα καὶ λάμποντα. Note πυρίδη φανόμενα is all he says. He would not allow that they were really πυρίδη, for in that case they would really produce light. Thus according to Aristotle these substances were not in the strict sense phosphorescent (Baümker, p. 26).

ϕός is the ἐνέργεια or ἐνελέξεια τοῦ διαφανοῦς (cf. De An. ii. ch. 7, 418 b 9, 419 a 11)—the proper function of the transparent medium.

Again, in ch. 3, 439 a 21 below, it is said to be the presence of something of the nature of fire in the transparent medium. Since, then, it requires something of the nature of fire to produce light and
the eye does not consist of fire, it cannot be said to produce light. Hence it would be suggested that the phenomenon is one of reflection, though where the light is to come from when the eyes are closed is not apparent.

437 b 2. φαινεται (2). There are many instances of φαινεται taking this sense (cf. 3, 440 a 8 etc.). But most interpreters take φαινεται de τούτῳ to mean 'This is evident,' i.e. what was said before about the eye not producing light is evident because of what follows. But that is not the sense required. The 'one becoming two' is not the reason why the eye does not emit light. But the eye is seen because, though really one, it appears when quickly moved to be two.

437 b 3. δόε γίγνεσθαι τὸ ἐν. This is very difficult to understand. Simon prefers to take Alexander's second interpretation, that one part of the eye sees the other—that which is 'in loco naturali' sees that which is not. But the interpretation does not explain why swiftness of motion is essential to the phenomenon. Probably Aristotle was thinking of common instances of a single object appearing to be made double by rapid motion (as e.g. a vibrating string) and applied this in a confused way to the present case. He apparently thought that the eye, when at the one position, could see itself at the other if the oscillation between the two was so rapid that it appeared to be at both points at the same time. It will not do to say, as Ziaja does, that the eye regains its former position before the light from it, when at the place from which it has moved, arrives. According to Aristotle the propagation of light is instantaneous and one must not read into his words a theory of light vibrations.

437 b 5. τὸ δρωμενον. The eye at the position to which it moves.

437 b 7. Cf. 437 a 34 above.

437 b 12. ἀνακλάσει. Aristotle does not mean to identify the present phenomenon with reflection but merely to adduce another instance illustrating the apparent duality of the eye by the apparent duality of seer and seen caused by reflection in a mirror.

ταινεικλάθε. Cf. Burnet, Early Greek Philosophy, pp. 264 sqq.,
Meno 76 c, and De Gen. Animal. v. ch. 1, 779 b 15.

437 b 13. Τειαίω. For the Platonic theory of sight-perception compare Timaeus ch. vii. 37 b and ch. xxx. 67 c sqq., and especially ch. xvi. 45 b sqq.

437 b 16. σ τειαίως. Cf. Timaeus, 45 d.
437 b 17. **κενὸν.** κενὸς and its adverb κενῶς are constantly used in the sense of 'irrelevant': cf. De An. i. ch. 1, 403 a 2 of definitions that are mere vague generalities.

Cf. also Eth. Nic. ii. ch. 7, 1107 a 30 etc.: but it may mean as well 'unfounded,' as in An. Post. i. ch. 3, 73 a 18. Here probably both implications are to be assigned to the word. The thought is, that it is absurd to talk of the ἀπόφασις of sight, because the notion of 'quenching' has nothing to do with the nature of light. Hence the theory is groundless because of the irrelevancy of the ideas to the phenomena in question. In addition, even if they were relevant, the theory would conflict with facts. The argument of the whole passage is that ἀπόφασις can be predicated only of τὸ πῦρ and ἡ φῶς, not of light, for, as we saw before (cf. note to 437 a 34), light is not fire though it requires the presence of πυρὸς τῆς. Plato and Empedocles, however, when alleging that the light which issues from the eye is quenched in darkness, imply that it is of the nature of fire which is ἑρμὸν καὶ ἐγρῶν and is quenched by either moisture or cold, the contrary qualities. (The Aristotelian theory is that things are neutralised by and pass into their opposites.) Now φῶς is not the nature of πῦρ and hence to talk of its ἀπόφασις is absurd.

Secondly, even if there were something of the nature of fire in light though imperceptible, it would be extinguished by wet and cold weather; which is not true.

For the distinction of πῦρ and φῶς cf. also Toph. v. ch. 5, 134 b 28.

437 b 20. τῷ φωτὶ. The mere bringing forward of the fact that light is not quenched by wet shows that Aristotle really means to deny that it is of the nature of fire.

Alexander, however, evidently troubled by the fact that light is warm and hence perhaps should be identified with fire, suggests an emendation or rather a reconstruction of the passage which would make out that Aristotle, while conceding that fire is 'dry' and 'warm,' points out that darkness which is supposed to extinguish it has neither of the opposed qualities and hence cannot do so. On this interpretation the rest of the passage would run—'but if darkness is really, though imperceptibly, cold and wet, we should expect the marked presence of those characteristics to make a difference to sight by daylight. But this is not found to hold good.'

437 b 22. ὕδατι. It would not be correct to say that light is not diminished when it penetrates water; ἱδρῷ frequently signifies rain or rainy weather.
Similarly πάγος must be here frosty weather, not ice.

437 b 25. τοιούτων, i.e. the behaviour of light in cold or damp weather.

437 b 27. οὖσα. Cf. R. P. 177 b. Burnet, Early Greek Philosophy, pp. 231–2. They are vv. (Stein) 316–23, Fr. 84 (Diels, Die Fragmente der Vorsokrakerker).

438 a 1. λουξάτο. ἐξεύρετο—suffused, is another reading which would make the construction easier.

438 a 3. δειθήσκον. διέσκον, suggested by Blass, N. Jahrh. f. Phil. u. Päd. 1883, p. 19, would improve the grammar of the passage. Translate ‘but they (ai ð’) let the fire through.’

438 a 4. ἄπορροαιν. Cf. Empedocles and Plato loc. cit. in note to 437 b 13. Aristotle’s words imply that Empedocles had no consistent theory but had recourse alternately to the doctrine that fire issued from the eyes and illuminated objects, and to that according to which effluences from bodies entered into the pores of the eye and so created perception.

The fact seems to be that Empedocles intended to account for vision by postulating that both those operations took place, but had great difficulty in reconciling them, and that thus at one time we hear more about the one than about the other.

The difficulties attending the acceptance of either one or both theories are pointed out below by Aristotle in 438 a 26 sqq.

We may conjecture as Hammond does, Aristotle’s Psychology, p. 152 note, that he imagined that the images of things entering by means of the pores through the outer covering of the eye are illuminated by the fire issuing from the pupil. But it is not clear that he said anything so definite unless Aristotle means (in ll. 29–30 below) that τὸ ἐν ἀρχήν συμφύσεται τοῦ ἄρματος was one of the positions held by Empedocles. It is manifest from what Theophrastus says (R. P. 177 b) that, according to the Empedoclean theory, fire existed both in the external world and in the eye, and that the effluences from things which produced the perception of visible objects consisted of fire. Fire was the finest of all substances and could thus penetrate the finest of the pores. Through the passages of the water we perceived dark objects.

This must surely mean that objects throw off effluences composed both of fire and water and that the fire penetrating through the fine pores is perceived by its ‘like’ fire, and the water, a crasser substance, can enter only by the wider pores and is recognised by its ‘like’ the
water in the eye; cf. R. P. 177 b. Of course it is quā light that objects are visible (dark being but a privation of light), and hence the really important part in vision is that played by the fire. Thus Aristotle is justified in regarding the Empedoclean theory as one which referred vision to fire.

438 a 5. Δημόκριτος. Cf. Zeller, Presocratic Philosophy, II. pp. 266 sqq., cf. p. 268. This doctrine was also shared by Leucippus and Epicurus.

The theory of Democritus was also one of διόπτους. Things threw off ἐξωλα which affected the sense organs. But in the case of sight it seems to have been not actually the ἐξωλον thrown off from the object but the impression caused by this in the air which was reflected in the eye. (Cf. Theophrastus, de Sensu, 50, Zeller, op. cit. II. p. 219.) This was connected with his doctrine that we did not perceive things as they were in themselves but only as they affected the senses. Nevertheless he seems to hold that the medium is at the same time affected by an effluence from the seeing eye, but how it is possible to reconcile this with any intelligible theory of reflection it is difficult to see.

It is noteworthy that Plato too had some such theory of interaction between the effluence from the eye and from the external object; cf. Timaeus, 45 c.

The effluences are, however, according to him, fire (cf. the comparison of the eye to the sun in Rep. vi. 508). But he also agrees with Democritus in holding that by like we perceive like and that perception takes place with the whole soul.

438 a 6. ἐφασεν. Cf. notes to 437 a 34 sqq. ἐφασεν means the appearing or being visible of one body in another: cf. Meteor. III. ch. 4.

438 a 8. ἐκεῖνο. The visibility or being seen of the reflected object exists not in the eye in which the reflection takes place but in the eye of the spectator who sees the reflection.

I have here followed Ziaja and Bender in opposition to Alexander, Simon, Thomas, St Hilaire and Hammond. Hammond appears to make τοῦτο refer to τὴν ἐφασαν and then to supply a new subject—τὸ ὅραν—as the subject of ἔστιν. This is surely in defiance of grammar.

If one took τοῦτο to mean τὸ τὴν ἐφασαν ὅραν the sense would be plain enough and would be exactly what we require. This is however to give a very liberal interpretation to τοῦτο which should mean
COMMENTARY

τὸ ἐμφανισθαί, which is the appearance of an ἑδωλον in a smooth surface. Now, though Aristotle could not say that the ἑδωλον (a special term used by Democritus) was not ἐν ἐκείνῃ (the reflecting eye), he can quite well maintain that the appearing of the ἑδωλον in the reflecting surface is not itself in the surface. Alexander also takes τὸ ὑμνό as the subject of ἄνιψω and interprets ἐν ἐκείνῃ as ἐν τῇ ἐμφάνισι. Simon and St Hilaire differ from him only in taking ἐν ἐκείνῃ to mean ἄνι ὑμνον λείων.

If, therefore, we were to follow Alexander we should render—

‘For reflection occurs because the eye is smooth; but vision does not lie in the reflection or take place by means of it, but occurs in the seer, i.e. is an affection of one who has the power of sight.’ According to Simon and St Hilaire we should turn the latter part of the sentence thus ‘but vision does not lie in this property of the eye, etc.’

In addition to the syntactical objections to these interpretations, they have the demerit of making Aristotle reason in a circle. In arguing against the theory that vision is reflection, to state as one’s reason that vision does not lie in the reflection of things in the eye and in its property as a reflecting structure, is merely to reiterate one’s objection without proving it. ἐκείνῃ must refer to τὸ ὑμμα and the argument is to the effect that reflection must presuppose vision, because the mirroring of anything is a fact not for the subject in whose eye it takes place but for a second person who sees it.

438 a 13. ὑμμα. Note that ὑμμα, the word for the sense-faculty, is used as though it referred to the sensordium. Cf. Neuhäuser, Aristoteles Lehre von den sinnlichen Erkenntnissvermögen und seinen Organen, p. 79, and cf. note to 438 b 22 below.

438 a 14. διαφανεῖ. The whole nature of τὸ διαφανεῖ will be treated below in ch. 3.

438 a 16. εὐπλησίωρον. εὐπλησίωτερον is the variant reading (L.S.U Alex.) which, if possible, only repeats the idea of εὐφαλκτότερον. With εὐπλησίωτερον the καὶ becomes epexegetic.

Aristotle is here referring to what are now called the aqueous and vitreous humours.

438 a 21. τοῖς ἔχονσιν αἷμα. The sanguineous and non-sanguineous animals were two main divisions in Aristotle’s Zoology. Cf. De Part. Anim. iv. ch. 5, 678 a 33. Insects and Crustaceans were placed in the latter class as the fluids in their bodies, not being red, were not thought to be blood.

The transition to this topic once more is probably to be explained by the fact that Democritus, too, held a theory according to which something emanates from the eye. Hence Aristotle first mentions the doctrine in its most general form (ἄλογο τὸ ἐξώντι τιν...όπως) and then glides on to discuss the specially Empedoclean and Platonic theories.

438 a 28. ἑμφανωθηλ. The fire from the eye unites with that which is the effluence from external bodies.

438 a 29. τινς. Probably the more scientific Platonists or interpreters of Empedocles.

ἐν ἄφρο. Alexander and Simon interpret as I have translated. Aristotle proposes to simplify the phenomenon by supposing that the union of fire with fire takes place in the eye itself _before_ the internal fire issues out, i.e. in the starting place of the internal fire according to the more complex theory. It will be easier, he thinks, to support the theory if one omits that part which makes the union of fire with fire take place outside the eye.

One must not translate with Hammond ‘It would be better to assume that the combination of the eye with its object were in the eye’s original nature.’

In the first place, this makes Aristotle propose to supersede the older theory by an explanation which merely shelves the difficulty and refers it to a ‘faculty.’ Secondly, Aristotle is talking not of a combination of eye with object but of fire with fire; as is apparent from the next sentence, apart from which this one cannot be understood.


438 a 31. φωτι πρὸς φῶς. Alexander affiliates this and the following statement—οὐ γὰρ τῷ τυχόντι κ.τ.λ.—to the doctrine expounded in _De Gen. et Corr._ i. ch. 10, where we find, 327 b 20: οὐ γὰρ ἄπαν ἄπαντι μικτὸν ἀλλ᾿ ἐπάρχειν δεῖ χωριστὸν ἐκάτερον τῶν μικρῶν, i.e. only concrete objects (χωριστά), i.e. σώματα, can be mixed; now light is a πάθος of the definite type ἔξω (cf. _De An._ iii. ch. 5, 439 a 15) and hence cannot experience μίσα. This explanation assumes that the σύμφωνος here talked about is a case of μίσα, which is not quite evident. Neither is it evident that the union of light
with light (συμπολύες γενόμενον) mentioned in Plato, Tim. 45 c, against which this argument is directed, is properly a case of μέξις. Plato uses the term συμφωνία below in 45 d probably hardly in the exact sense in which συμφωνΐα is here employed. It need mean no more than 'kindred.'

συμφωνία means no more than to grow together or unite, and not the union of two different substances which results in the production of a third distinct one, which is the sense in which Aristotle employs μέξις. Hence Alexander’s discussion of the blending of lights (he denies that they can be united) seems to be irrelevant, and whether συμφωνία can be brought under the category of μέξις is not clear.

Besides, if Alexander’s were the correct interpretation, a Platonist might still reply that according to his theory light is nothing ἀσώματον, and hence (according to Aristotelian principles) could combine with other light. Cf. Timaeus, 45 c: ἐν σώμα οἰκεῖοι συνέστη by the union of the internal and the external light.

Perhaps Aristotle need mean no more than that the union of light with light is on the Platonic theory quite unexplained. Compare next note.

438 b 1. τὸ τρχόν. The commonest interpretation and that in consonance with Alexander’s explanation (cf. above) is ‘Not everything will unite with anything else’ and that is referred to the doctrine ὅπερ ἄπνω ἀπαντήτω μετάτω in De Gén. et Corr. 1. ch. 10.

According to the translation I suggest the argument would run, ‘How will this unexplained “union” of the Platonists produce sight? When we see, we see something definite, i.e. it is not with τὸ τρχόν that the union is effected. The theory is not capable of explaining in detail how we see.’

438 b 3. ἐν ἄλλως. De An. 11. ch. 7, 418 b 1, 419 a 9, III. ch. 5, 430 a 16.

438 b 5. This seems to contradict what is said below in ch. 6, 446 b 31: ἄλλ’ ὅλ’ κύριες (το φῶς). It is true that κύριες is frequently used for all the four varieties of change and as equivalent to μεταβολή—change in general, not merely to φορά—local motion, which is its most characteristic sense. The four species of change are 1. (κατ’ ὁρισμόν) γένεσις καὶ φθορά: 2. (κατὰ τὸ ποιήσιν) αἰσθήσεις καὶ φθορά: 3. (κατὰ τὸ ποιήσιν) φορά: 4. (κατὰ τὸ ποιήσιν) ἄλλωσις. Hence, if light is an ἄλλωσις (qualitative change) and κύριες is here used vaguely as including it, there is no contradiction between the two
statements. We shall, however, maintain when we come to chapter 6, that in the Aristotelian theory the propagation of light is not even to be described as ἀλλοστέρος.

438 b io. ἦ ψυχή is wider than consciousness, but Aristotle, though of course meaning merely consciousness here, is forced to use the wider term for want of a special word to designate conscious life in general without suggesting any one special faculty. We shall be forced to translate ψυχή thus more than once.

438 b II. ἱπτό. This surely must mean ἱπτός τοῦ ἀγγείου. The faculty of ἀγγείον of the special sense of sight resides within the eye. If this statement is capable of being generalised at all, it can be extended only so far as to include the organs of the other two mediated senses (hearing and smell). This cannot be taken as a reference, as Alexander (p. 36) and Neuhäuser (pp. 65 and 127) seem to think, to the central sense, which resides further within the body (in the heart). It is not the function of this central faculty to discriminate the objects of the special senses. It is the seat rather of that self-consciousness which also discriminates the various special senses (cf. De An. III. ch. 2), and is generally the organ of κοινή αἰσθησις and φαντασία.

If the faculty of vision resided in the central organ then surely according to Aristotle's argument there would need to be a transparent medium extending through the body right up to it, and it itself would need to have the same property. Neuhäuser indeed maintains that something like this is, according to the Aristotelian theory, the case. But a much simpler explanation is possible.

Something internal is the organ, Aristotle says, and hence it must be transparent. The interior of the eye is that which fulfils the conditions. Why the organ should be transparent is due to his general theory that it should be capable of receiving the same determinations as those existing in the world outside, i.e. should be δεκτικὸν τοῦ ἐξωτερικοῦ of the external bodies (De An. II. ch. 12, 424 a 18). Cf. Introduction, sec. IV. pp. 7 sqq.

The statement that the sense faculty resides within is not a deduction from what is said in the De Anima about the internal or central sense; it is a truth said to be given by observation (ἀπειροι) and Aristotle at once proceeds to adduce a confirmatory instance.

If we hold with Neuhäuser that the seat of perception is really always a central organ—even in the case of the special senses—and that Aristotle held a theory according to which substance of the same
kind as that composing the peripheral organ extended along the πόροι up to the central chamber of the heart, then perhaps ἐν τῷ might mean ‘in the central region.’ Perhaps Alexander, when he says πόροις ἐν οἷς τὸ διάφανές, may also be referring to a similar theory. It seems an extraordinary hypothesis (cf. Introduction, sec. vi.) and it is not at all clear whether Neuhäuser has succeeded in substantiating it or merely in disproving the rival theory, viz. that the blood is, in Aristotle’s eyes, the medium of communication between the end organ and the central one. Cf. note to 439 a 2: Neuhäuser, Aristotelis Lehre von den sinnlichen Erkenntnissvermögen und seinen Organen, pp. 111–129.

438 b 14. τοῖς πόροις. Those who (e.g. Thomas, etc.) think that the reference is here to the central sense must hold that the πόροι are the optic nerves, which Aristotle imagined to be ducts leading to the brain and ultimately to the heart. Cf. Hist. Animal. iv. ch. 8, 533 a 13, De Part. Animal. ii. ch. 10, 656 b 17. Alexander, however, seems to understand them to be the πόροι of the older philosophers—the passages through which (according to their view) the eye’s internal fire issued. Cf. Theoph. De Sensu, 7 (R. P. 176 b) and Arist. De Gen. et Corr. i. ch. 8, 324 b 26.

Alexander says τοῖς πόροις ἐν οἷς τὸ διάφανές ἐστι and since the nerves are not (except on Neuhäuser’s theory) transparent we can assume only that he means the passages supposed to exist in the eye itself. Blindness ensuing on the cutting of the optic nerve would show rather that the sense was not localised in the eye, but we have seen reason (see previous note) for maintaining that this is not the Aristotelian view. Hence Aristotle is not here referring to such a serious wound as one which would sever the optic nerve but to a more superficial injury to the eye. This is also borne out by the simile which follows. You cut the wick and the flame goes out; and so you destroy the channel communicating the external light to the pupil and sight is destroyed. This interpretation also gives παρὰ its characteristic sense. On the other hand we must remember that παρὰ need mean no more than ‘on.’ To read ὧντε τῇ ἐπιθήμα in this line along with Mr Bywater (Journal of Philol. xxviii. p. 243) would probably be better.


438 b 22. ψόφων. Cf. De An. iii. ch. 1, 425 a 4: ἐν δὲ δικοῖ δέρως. πυρὸς ἐκ τῆς δειφήρ̄. This statement seems to contradict what is
said in *De An. III. ch. 1, 425 a 5*: ἡ ὅσπερ ὑπάρχει θατέρου τοῦ των (sc. ζῶσων καὶ ἀδεροὺ)...τῷ δὲ πῦρ ἡ οἰδενοσ ἢ κοινῶν πάντων. If then we take ὅσπερ to be the sense organ here (a very common use; cf. above 438 a 13, Bonitz, *Ind. p. 538 a 30*), the two passages are in disagreement. Again the statement in ll. 25–26 beneath ἡ ὅσμη καταιγίδης ἀναφηματίζει ἐστιν is in contradiction with ch. 4, 443 a 23 sqq., where it is denied that ὅσμη is of the nature of ἀναφηματίζει.

These considerations have led Alexander and most interpreters to maintain that here Aristotle is not putting forward his own theory (οὗ γὰρ ὃ ἄρκεσκοντα αὕτη λέγει, Alex. 38, l. 14 [W.]), but merely discussing the consequences and the detailed working out of the doctrine suggested by the earlier philosophers—namely the ascription of each sense organ to a separate element.

On this interpretation the reading of the majority of the codices ὡς εἶ δὲ in ll. 18–19 above, which Biehl adopts and Bäumker, p. 48, prefers, is particularly welcome. E M and Y read merely φανερὸν ὡς δὲ and Bekker follows.

Thus it is contended that Aristotle’s adoption of the correspondence of each sense organ to a separate element is merely hypothetical. Nevertheless it is strange that if this is so, Aristotle should go on to work out the connection between smell and fire by the aid of his own technical terms and connect it with his own theory of the excessive coldness of the brain. It almost looks as though the doctrine were one which had attractions for Aristotle and which was left as an unexpunged suggestion even after the possibility of reconciling it with the rest of his philosophy had been removed.

But, as it is stated, there are great difficulties to be overcome. The proof in ll. 22–25, as Alexander recognises, merely shows that the organ of smell is potentially (ἰδονίμαι) of the nature of fire and is actually cold. It is not on all fours with the former two sense organs which are actually (ἰνεργεία) water and air respectively.

Hence Hayduck (Proo. Kön. Gym. zu Meldorf, 1876–7) proposes not to take those lines (ὅ γὰρ ἱνεργεία κ.τ.λ.) as a proof of the previous statement and to read ὅ δὲ ἱνεργεία κ.τ.λ. He also proposes to omit l. 25 ἡ ὅσμη... l. 27 πυρὸν as being in hopeless disagreement with the other passage at 443 a 23 sqq. His explanation is that Aristotle, beginning with a discussion of the organs corresponding to each sensuous function, naturally mentions the act of smelling and so proceeds to discuss its peculiar organ, which, though not parallel to the organs of sight and hearing in that it does not
COMMENTARY

consist of any single element, he yet takes the opportunity of discussing. It seems however that Aristotle is really attempting to make the sense of smell in some way parallel to the other two and that ll. 22 sqq. are intended to prove this. Hence the elaborate doctrine about the coldness of the region in which the sense organ is situated and which is potentially warm; and we hear elsewhere that ἐὰν δέσμη δύναμις θερμή τῆς φύσις ἔστιν (444 a 27). So that, in spite of the fact that he has not proved the sense organ to consist of actual fire, Aristotle evidently wishes to establish some connection between fire and odour. Hence Zisja (De Sensu, p. 11) maintains that he does not intend here to discuss the nature of the sense organ of smell and that there is no conflict between this passage and any other. He points out how, when the brain is said to be ἀγρόστατος καὶ ψυχοστάτος τῶν ἐν τῷ σώματι μορίων, that agrees with the passage in De An. 425 a 3 sqq. where it is held that the sense organs are composed only of air and water. This latter statement however, it must be observed, is not perfectly unqualified, for Aristotle goes on to say that fire, though not a special ingredient of any one, may be said to exist in all (οἷς γὰρ ἄνευ θερμόστητος ἀλθητικῶν) and that earth is either in none or is specially incorporated in the organ of touch (cf. below ll. 32 sq.: τὸ δὲ ἀπτικόν γῆς). This passage (q.v.) shows the difficulty which there is in extracting a consistent statement from Aristotle as to the nature of the sense organs, and the fact that his theories on this subject seem to fluctuate makes it difficult to avoid thinking that here he at least starts with an attempt to work a parallel between the organs of sight and hearing on the one hand and that of smell on the other. It is quite evident, as Rodier, De An. II. p. 349, points out, that τῆς δασφαρίσαν must here mean τὸ τῆς δασφαρίσεως ἀλθητητοῦ, otherwise it could not support the statement φανερῶν ὡς εἶ δέι κ.τ.λ.; besides Aristotle plainly means the sense organs in the other cases—τὸ ὅρατικα, τὸ τῶν ψυχῶν ἀλθητικῶν, τὸ ἀπτικόν.

Hence, unless we adopt Hayduck’s bold emendations, we must conclude (1) that the doctrine here is a tentative construction of a parallel between the organs of smell, touch and taste and those of sight and hearing; (2) that the parallel consists in assigning each to a special element (touch and taste, being generically the same, share one between them); (3) that though Aristotle cannot work out the parallel in the case of smell and the attempt to do so endangers conflict with the rest of his teaching, the theory has attractions for him owing to its symmetry and the fact that in so far as it can be

R.
worked out it connects with his account of the nature of the brain; and hence it was not deleted, but became incorporated with the remainder of his preserved writings.

γὰρ. On Hayduck's suggestion this is changed to ἡ, and the following statement is not a reason for the preceding one but a new premise from which, in combination with the preceding one, διο καὶ κτλ., II. 27 sqq., is deduced.


The theory is, that the sense organ is potentially capable of receiving the 'form' i.e. the perceptible properties of the object of sense. In the act of perception object and sense are one, but, when the sense organ is not stimulated, it is only potentially percipient, the object only potentially perceived. Cf. 425 b 26: ἡ τοῦ αἰσθητοῦ ἐνέργεια καὶ τῆς αἰσθήσεως ἡ αὐτή ἐστὶ καὶ μία. In the act of perception the organ becomes like its object; previously to perception it is unlike; cf. 418 a 5, 6: πᾶσχε μὲν οὖν ὅμως ὧν, πεπαθὼς δ' ὀφειλομένη καὶ ἐστὶν οἷον ἐκαίνω.

Note that Aristotle has no need to assume that the sense organs consist of the 'elements' because like is perceived by like. The organ was not like its object in consisting of the same material but in receiving its ἐἴσος or λόγος—the pattern according to which it was constructed. Cf. Introduction, sec. iv.

438 b 24. τοιοῦ. The external object is the agent in perception; the sense organ is passive. Cf. De An. II. ch. 5, 417 b 20: τὰ πνευματικὰ τῆς ἐνεργείας ἐξουθεν, τὰ ὀρατὰ καὶ τῷ ἀκούστῳ, ὅμως δὲ καὶ τὰ λειτουργία τῶν αἰσθητῶν.

If we read ὅ in l. 25 below we cannot translate 'the latter (sc. the sensation) must have an antecedent potential existence,' as Hammond does, but 'the sensation is what it previously had the potentiality of becoming.'

438 b 27. τὸν ἐγκέφαλον. The brain was not the organ of sensation according to Aristotle but played a subsidiary part in the bodily economy as neutralising the heat of the heart. On the other hand excessive cold in the brain was tempered (at least in man) by the dry warmth of odours which were healthful and hence delightful. Cf. below ch. 5, 444 a 9 sqq.
438 b 29. This is an application of the general Aristotelian doctrine that opposites pass into each other. Things are only opposite in so far as they have the same ἔλη and it is through having the same ἔλη that they can pass into each other. Hence the ἔλη is potentially capable of being either. Cf. Phys. i. ch. 9, 192 a 21: φθαρτὰ γὰρ ἄληλων τὰ ἑνντία, and iv. ch. 9, 217 a 22: ἐστὶν ἔλη μία τῶν ἑνντίων, θεμοῦ καὶ ψυχροῦ καὶ τῶν ἄλλων τῶν φυσικῶν ἑνντίωσεως, etc.


τὸ δὲ γευσικὸν κ.τ.λ. Cf. 441 a 3 sq.: ἡ γεύσις ἄφη τις ἑστιν and De An. iii. ch. 12, 434 b 18. Comment on this doctrine will be postponed until we come to chapter 4, where taste is discussed at length.

439 a 2. πρὸς τῇ καρδίᾳ. It is true that the organs of taste and touch transmit κινήσεις—sense affections—to the heart, but we cannot translate πρὸς τῇ καρδίᾳ by ‘conduct to the heart,’ as Hammond does, because, according to Aristotle’s general theory, all sense organs should do so, and besides Aristotle is here not discussing the question of the communication of the exterior sense organs with the inner πρῶτον αἰσθητήριον, but the nature of the composition of those sensoria. It is true that Aristotle does not make clear how the κινήσεις from the special senses are conveyed to the heart (cf. Zeller, Aristotle ii. pp. 67–70, English Trans.). Alexander says that there are three πάρουs extending from the heart to the brain and then to the three sense organs of sight, hearing and smell respectively, but in the case of taste and touch the πάρουs communicate directly with the end organs; by these the κινήσεις are transmitted. For confirmation of this cf. De Juvent. ch. 3, 469 a 12 sqq.; De Insom. ch. 3, 461 a 1 sqq. The blood seems to some to be the medium of transmission but we cannot certainly say so. According to Neuhausser it certainly is not. The medium is a substance of the same nature as the end organ extending (in the case of the three senses of which the organs are localised in the head) along πάρου first to the brain and ultimately to the heart. Cf. Introduction, sec. vi. and Neuhausser, pp. 110 sqq. It is true also that the heart, which is the organ of the common sense (cf. De Juvent., De Insom. loc. cit. above and De Somno ch. 2, 455 a 21: τὸ κύριον αἰσθητήριον), seems to be also the special organ of touch (cf. 455 a 23: τούτο (τὸ κύριον αἰσθητήριον) τῇ
between which and its object the flesh seems to be the medium (cf. De An. ii. ch. 11, 423 b 26: τό μεταξύ του ἀπτικοῦ η σάρξ, and iii. ch. 2, 426 b 15: η σάρξ οὖν ἐκ τοῦ ἔσχατον ἀληθητήριον). But however that may be—and if the latter point is to be insisted upon we had better translate ‘their organ is situated in the region of the heart’—the question is here not one of communication, but of the origin of the organs in question. If the organ of smell is actually cold and potentially warm and apprehends what is in activity warm (δομητύ), so conversely the organ of taste and touch should be actually warm but potentially cold if it apprehends what is actually cold, viz. γῆ.

Alexander, however, will not allow that γῆ is the proper object of touch. Certainly it is the Aristotelian theory that touch perceives not merely the qualities of γῆ, i.e. τό ψυχρόν and τό ἔσχατον, but all the four ultimate (and primary in that sense) qualities of objects (cf. above note to 437 a 22) and others as well (cf. De Gen. et Corr. ii. ch. 2, 329 b 17 sqq.). Hence once more we have evidence that the above argument is at best only tentative.

If we take it that the organ of touch is actually of the nature of earth and has the characteristic qualities of earth, then it is impossible to see how it is connected with the heart, which is the seat of warmth. If it is potentially of the nature of γῆ then it will, like the heart, have actually the opposite qualities. But in that case we shall have failed to account for the perception of τό θερμόν, as well as other qualities, by it, in the sense of reconciling that to the general Aristotelian doctrine that the organ is unlike the object before sensation but in the act of perception becomes qualitatively identical with it, as is stated in De An. ii. ch. 5, 417 a 20.

Cf. also De Part. Animal. ii. ch. 10, 656 a 29: καὶ διότι αἱ μὲν δὲν φανερῶς ἡμεῖς ἴσιται πρὸς τὴν καρδίαν εἰσίν, ἤ τε τῶν ἀπτῶν καὶ ἥ τῶν χρημάτων.

Ἀληθητήριον. One more proof that the whole passage is a discussion of sensoria.
CHAPTER III.

(This chapter begins the treatment of the objects of the special senses. It treats of colour.)

439 a 9. ἐν τοῖς περὶ ψυχῆς. Cf. De An. i. ch. 7–12.
439 a 10. ἐργον. In De An. i. ch. 1, 402 b 12 Aristotle talks about the function (ἐργον) of the sense. The function of the sense is to perceive, that of the object to cause perception; but as we shall see (cf. note to 439 a 17–18), when functioning, sense and its object are qualitatively identical.

ἐνεργεῖν. This practically repeats the sense of ἐργον. ἐνέργεια contains more explicitly the notion of the realisation of an end than ἐργον, but the two are often almost identical and tend to replace each other in our texts, e.g. in De Mem. ch. 1, 449 b 20.

439 a 11. τὸ τι ἐστιν is the essential nature of a thing as revealed in its definition (without going on to state its additional properties). Aristotle is now to discuss what each object of sense is in its own objective nature apart from its action on the sense organs.


Similarly in De An. ii. ch. 5, 417 a 20, we learn that, in the act of sensation, object and sensorium are alike. Whatever is said in this connection of the sensorium holds of the sense faculty and, as we have seen, Aristotle often uses the name of the faculty interchangeably for that belonging to the organ. His theory shows in this respect what we might call a thorough-going psycho-physical parallelism.

It is by his distinction between the actual and the potential object of sense that Aristotle attempts to explain the problem about the independent existence of external objects of sense. Considered κατὰ δύναμιν or as ὑποκείμενα (cf. Metaph. iv. ch. 5, 1010 b 30 sqq.) they have an independent existence, καὶ ἐνέργειαν not. Apart from
actual perception the sense also is a δύναμις merely and, as potentialities, sense and its object are different and have different names—χρώμα and γεώτης, ψόφος and άκουστις, χρώμα and δόμης etc. But the ἐνδεχεστα of each is one and the same, e.g. ψόφησις and άκουστις are one and the same.

It is, however, impossible for Aristotle to maintain this attitude towards external reality consistently. If the sense is that which is receptive of the εἴδος of things, how can it be said to receive that which prior to this reception had no existence? It is not sufficient to say that its ὑποκείμενον existed; if we strip the external world of all εἴδος, nothing is left but the πρώτη ἐλλή and this, being perfectly undifferentiated, cannot account for the difference of the εἴδος which we apprehend at different times. Aristotle is forced to think of the εἴδος as existing antecedently to the perception of it, and consequently we find in De An. ii. ch. 5, 418 a 3: τό δὲ αισθητικών δύναμις ἐστὶν ὅν τό αισθητικὸν ἐγείρει εὔτελεχείς. Thus the object apart from perception, which is said (in Metaph., loc. cit.) to cause the perception and is yet called a ὑποκείμενον, cannot be regarded as a mere ὑποκείμενον, for to exist εὐτελεχείς is to have εἴδος (cf. Metaph. ix. ch. 8, 1050 b 2 and Bonitz ad 1043 a 18, cf. also Ind. p. 219 a 25). According both to ancient and modern physical atomism this ὑποκείμενον, which is yet something actual and not mere ἐλλή, would be described in terms of spatial configuration, mass and motion—the primary qualities from the atomistic point of view. This solution however could not be entertained by Aristotle, for whom the qualities relative to the special senses were as primary determinations of physical reality as motion, figure and mass (cf. notes to ch. 6, 445 b 6 sqq.). The atomistic solution is only a makeshift; but we are left with a bad contradiction in the Aristotelian theory.

439 a 20. περὶ φωτός. Cf. De An. ii. ch. 7, 418 b 11: τό δὲ φώς ὅν τό κρώμα ἐστὶ τῷ διαφανοῦς, διὰ τάς ἐντελεχείς διαφανές ὑπὸ τύρως ἢ τοιοῦτον ὅν τό ἄνω σώμα (τό ἄνω σώμα is the upper fire, the celestial ether).

tοῦ διαφανοῦς. For Aristotle's theory of τό διαφανές cf. Introduction pp. 20 sqq. At first sight it seems strange to define light as the colour of the transparent medium, especially as he goes on (in 439 b 11 below) to define colour as the limit of the transparent element in bodies. But that which renders bodies visible is colour and, though an object must have a definite boundary or surface for this colour to
be detected, still we are bound to assume that throughout, so far as it is a coloured thing, its nature is the same (439 a 35 below). This quality on which its colour depends and which transpires it through and through is light (φῶς), which is, however, but the activity or the proper function of that property—τὸ διαφανὲς—which permeates all bodies to a greater or less degree. Cf. De An. ii. ch. 7, 418 b 9: φῶς δὲ ἐστὶν ἤ τοῦτον ἐνέργεια, τοῦ διαφανοῦς ἤ διαφανὲς, and 419 a 11: ἢ δὲ ἐνεργεῖα τοῦ διαφανοῦς φῶς ἐστὶν.

Thus though φῶς is not χρώμα in the sense in which that is the πέρας of the transparent element in bodies, still it is the colour principle which transsubes all substances.

439 a 21. By κατὰ συμβεβηκός Aristotle means, not ‘casually,’ but ‘indirectly’ i.e. subject to some condition being fulfilled, not in its own nature without further determination. Relatively to the thing which has a certain attribute only upon the supervision of some condition, that attribute is contingent, and it seems to be with this in mind that Kant identifies the contingent and the conditioned in the proof of the antithesis in the fourth antinomy. But, from another point of view, when we take into account the dependence of this attribute upon its conditions it is seen to be necessary. κατὰ συμβεβηκός in Aristotle is by no means equivalent merely to ‘due to chance’ but in its general sense is used simply as opposed to καθ᾽ αὑτό, due not to the essence of the thing to which it belongs but to some external condition.

κυριϊκός. Cf. De An. ii. ch. 7, 418 b 12 quoted above in note to 439 a 20 and again 419 a 24: τὸ γὰρ διαφανὲς ὑπὸ τοῦτον (sc. πυρὸς) γίνεται διαφανὲς. It is fire, then, or anything of the nature of fire, the sun or the celestial ether (τὸ ἀνω σώμα), which raises the transparent medium from a state of mere potentiality in which it is ἀχρόνω—colourless and invisible (418 b 28)—to a state in which colour is actually visible. The fire evidently makes it actually transparent, and this state of actual transparency, this ἐνέργεια, is light. We cannot say with Hammond that ‘light is that which converts the potentially diaphanous into the actually diaphanous.’ It is fire which performs this function.

439 a 22. παρονοσίᾳ (cf. De An. 418 b 16 and 20) seems here to be reminiscent of its technical Platonic signification—immanence, and thus we could define light as ‘the immanence of fire in the transparent medium.’

But there are two points of view from which light can be
regarded, (1) as a state of illumination, cf. De An. iii. ch. 5, 430 a 15, and (2) as though it were the stimulation proceeding from the coloured object to the eye (cf. De An. ii. ch. 7, 418 a 31: πάν δὲ χρωμα κινητικόν ἔστω τοῦ καὶ ἐνέργειαν διαφανοῦς).

Yet according to this passage in the De An. it is implied that the state of illumination must be already realised for the stimulation which causes vision to take effect. Aristotle, though frequently asserting that there is a stimulation proceeding from object to eye and talking as though this were light, yet in chapter 6 below turns round and says that light is not a stimulation at all. According to the interpretation of that chapter which I adopt, it is not a stimulation of the type ἀλλοώσει even (i.e. qualitative change). Yet light is still said to cause us to see (447 a 12), and if it is not the stimulus through the medium, what is that stimulus? It appears as though Aristotle, influenced by the apparent instantaneousness of light transference, were trying to combine into one the notion of it (1) as a έξει, the state of illumination, and (2) as an action passing from the object to the eye, two notions which will not unite.

Compare chapter 6, 446 a 22—447 a 12, and Introduction, sec. vii.

439 a 23. τὸ διαφανές is no proprium of air or any one transparent substance.


439 a 26. Cf. below 439 b 10. τὸ διαφανές is found in all, not merely in certain bodies.

439 a 29. ἀφομιτη. φῶς as the general colour principle permeates bodies through and through in so far as they share in the material condition of colour phenomena.

439 a 31—32. ἐκ τῶν συμβαινόντων. Cf. 438 b 12—13 and note ἐπὶ τῶν συμβαινόντων δήλον.


439 a 34—35. The point is that colour is not the boundary or surface of the body but, as appears in 439 b 12 below, of the transparent element in the body.

439 b 2. We may supply ἐδαυ after ἐντός, not necessarily χρωμα-
COMMENTARY

Aristotle does not actually say that colour, in the sense of definite tint, pervades the body through and through. That resides in the surfaces. But the colour principle, which is made definite only when the body has a definite surface, must pervade the body in every part in so far as it is διαφανές. This colour principle can be nothing else than φῶς, and its opposite is σκότος.

Most of the commentators, however, will have it that here Aristotle is distinguishing bodies which are coloured ‘externally’ e.g. air and water, which have no proper colour of their own, and those coloured ‘internally’ i.e. with a proper colour of their own, opaque bodies, and that he here declares that it is an identical principle in each class that makes them receptive of colour. The difference between the two classes of objects is that the former set, having no definite surface, have no definite limit of the διαφανές in them and it is a definite boundary that gives definite colour. But it is solely the want of definiteness in their limits which causes the indefiniteness of the colour. Since they show colour of some kind, they must have the constitution which renders colour possible. This is their transparency, which we must hence ascribe to opaque bodies also.

If we accept this theory the translation will run as follows: ‘We must, however, believe that the type of construction which internally and of its own nature takes on colour is the same as that which receives its colour from without. Now air and water show colour, for the gleam they have betrays tint.’

The advantage of this interpretation is that it does not make Aristotle say that the colour pervades the whole of an opaque object. For this, unless we explain the distinction between definite and indefinite colour as above, seems to conflict with his statement that colour resides on the surface. Cf. also Tht. v. ch. 8, 138a 15.

Simon would translate ‘appear to be coloured,’ as though they really were not. But, though colour were held to pervade pellucid substances which have no definite surface, that would not entail as a consequence that it permeated opaque bodies as well—which is the conclusion against which Simon wishes to argue.

Thomas and Simon translate this by ‘aurora,’ on what grounds it is difficult to discover. Perhaps it means the ray e.g. of the sun falling upon these bodies.

Alexander says that Aristotle here means to indicate στερεά—solids, as though they were more properly σώματα
than air and water. But the distinction should properly be between pellucid and opaque bodies as in ll. 13–15 below. Aristotle had already, in De An. ii. ch. 7, 418 b 7, noticed that many οὐσίαι were transparent. Probably here he leaves this latter class out of account. (Cf. ch. 5, 445 a 17 sqq. and notes on σώμα and σωματοσθαι: cf. beneath 439 b 18.) The argument certainly requires σώματι here to mean definitely bounded or solid bodies. The omission of the class of transparent solids from consideration is simply a sign of the inadequacy of the theory.

439 b 10. τοῦ διαφανῆς is the ‘material’ cause of colour, i.e. it accounts for its possibility.

439 b 12. χρώμα κ.τ.λ. This is the definition, the τί έστιν of χρώμα per se, and, in stating this, the De Sensu makes an advance on the De Anima which defined it merely in reference to the organ of sight as κατ᾽ ένεργειαν διαφανώς.

439 b 14. άσοις κ.τ.λ. These are the ‘corpora terminata’ or οὐσίαι of the commentators, which have a colour of their own and έτός χρωματίζεται. Many interpreters, however, disjoining κατὰ τό ἐσχάτουν from ὑπάρχειν and uniting it with ὅμοιον, find themselves in a difficulty and identify those referred to by καὶ άσοι with αὐτῶν τῶν διαφανῶν!

439 b 20. διελομένους. διαιρείσθαι constantly means to break up a genus into species or to discriminate species from each other. But, as Aristotle has not yet given any classification of the ‘intermediate’ colours, i.e. those over and above black and white, we must interpret ἕφοι διελομένους (the reading of all mss. and edd.) as meaning merely ‘after recognising the distinction’ between the other colours and black and white. This is to take διελομένου in its vaguest sense. It is thus much better to read ἐδοθέν instead of ἕφοι. The phrase then becomes a common one and gives διελομένους its wonted sense. Cf. Polit. IV. ch. 10, 1295 a 8: τινώνδιος δὲ ἐδοθέν δίο μὲν διελομένων etc. It is true that, owing to the aorist διελομένους, we seem still to be committed to the promise of a preliminary classification of the species of colour which is not fulfilled. The full list of the colours appears only in ch. 4, 442 a 22 sqq. Thus a minor inaccuracy is left in any case, and it may be argued that ἕφοι διελομένους need give no more than this sense. But ἐδοθέν is a rather tempting emendation.

Aristotle's theory is that the chromatic tones are obtained by a mixture of substances which already have the basal tones of white and black. The chromatic tones are intermediate between black
and white, which appear to be regarded as lying at the two extremities of a continuum in the centre of which the other tints are found. Aristotle does not however attempt to assign its exact place in the scale to any one colour or state its affinity to either of the extremes. Each distinct colour depends upon the proportion in which the black and white, out of which it is formed, are mingled. But he does not venture to state the proportion which obtains in any one case. Cf. also Metaph. x. ch. 2, 1053 b 30.

439 b 26. μικτῶν. The doctrine of composition or mixture is referred to again directly: cf. especially 440 b 14 sqq.

439 b 29. A λόγος appears to be the relation which prevails between two numbers when a division of the greater by the less yields a rational quotient. Numbers that are not so related are said to be ὁχῦ ἐν λόγῳ (cf. 440 a 16). λόγος then is not ratio in general but commensurate ratio. The incommensurate is the irrational —ἀλογον. Thus we cannot translate ὁχῦ ἐν λόγῳ, μὴ ἐν ἀριθμοῖς etc. by ‘disproportionate,’ for that applies to a ratio when one of the terms is excessive, not to one where the quantities are incommensurate.

439 b 34. εὐλογίατοι—easily reckoned, from λογίζεσθαι to reckon. Cf. Metaph. xiv. ch. 6, 1092 b 27.

440 a 2. The reason is that the εὐλογιστοι ἀριθμοί, i.e. proportions where the division of one term by the other takes very little trouble, are few in number. The author of the Problems in 920 a 27 avers that the most agreeable harmony is that of the octave, and the reason for this is that the terms are whole numbers 2 and 1, or 4 and 2, and the division yields no remainder. The next harmony in order of pleasantness is that of the fifth, where the two notes are related as 1 to $1\frac{1}{3}$, and so on.

440 a 5. τεταγμέναι. The proportion of elements may be uniform in every part, i.e. the combination is according to a regularly recurring pattern, e.g. 3:1, 3:1, 3:1 etc., not 2:1, 4:1, 3:1 etc.

440 a 6. μὴ καθαράι. Some commentators (e.g. Simon, Hammond) identify the ἄτακτοι χρώμα with the μὴ καθαράί, but, unless we read τοιὸι ἀπὸ τοῦ βασιλεία before ἀριθμοῖς in i. 6 as Biehl suggests, this is impossible, for Aristotle has immediately before said that both the τεταγμέναι and the ἄτακτοι are ἐν ἀριθμοῖς.

The impurity referred to must be want of saturation, i.e. want of colour, if it is caused by absence of proportion between the elements,
and all chromatic colour involves a proportion between its components. But one may ask, why does impurity seem to occur only in the second class of colours—those due to an irregular structure? The reason I would suggest is this—Aristotle identifies the most pleasing colours with those which depend upon a regularly recurring structure in the combination of their elements. Relatively to these, other colours are not so pleasing and hence not regarded as so pure, καθαροί, if purity is a mark of excellence (as frequently in Plato, cf. *Philolaus* 57 a et passim); but the colours of this second class contain in themselves differences in purity. Their impurity we may assign to a total want of commensurate proportion in their composition. Unless some such explanation as this is adopted we shall have to make ἀναγνωρίσαται refer to both classes of colours; but this is to strain the Greek.

440 a 8. τό φαινόμενον κ.τ.λ. Literally ‘the shining of one colour through another.’

This second theory is, like the first, also rejected by Aristotle.

440 a 12. διὰ 8' ἀχλώσεως. The reason for this is discussed in *Meteorology* III.

440 a 16–21. It is difficult to see what connection this paragraph has either with what precedes or what follows. Thurot and Susemihl (*Philol. 1885*) think that it is misplaced in the text. It refers back to the theories of Empedocles and Democritus mentioned in chapter 2.


440 a 19. οὖν—directly, without the intervention of any intermediate steps in the argument.

440 a 21. ἄφην. Why was it necessary for the atomists to identify all sensation with touch? Surely because differences in sensation corresponded to differences in the tangible properties of things. Cf. chapter 4, 442 b 1 and 11: οἱ δὲ τὰ λεια δὲ τὰν ἀναγνωρίσαν κ.τ.λ. The argument runs—if sensation is to be effected by contact, contact with a medium which is sensitive to stimulation will explain perception better than a theory according to which the actual particles of the distant objects impinge upon the sense organs. On the other reading (L’SU Alex. vet. tr.) ἧ ἄφην καὶ ταῖς ἀπορροφοίσις there is no argument.

Thomas and Alexander try to connect this with what follows; but Aristotle goes on to talk of κατὰ σχέσιν impinging on the sense organ, not effluxes.
440 a 23. μέγας is almost always a spatial quantum, but cf. μέγας χρόνον ch. 7, 448 b 4. The discussion on the possibility of the existence of imperceptible quanta is contained in chapter 6, 445 b 3 sqq.

χρόνον ἀναλογητον. Aristotle argues at length against there being any such thing as an imperceptible time in ch. 7 below 448 a 21 sqq.

The two moments of time in which the two sensations arrive would, on this hypothesis, be indistinguishable as two distinct moments, but would appear as one single moment which had no parts. Now, as time is a continuum, each part of it must be capable of resolution into other parts. Hence the supposition of an atomic time is absurd, no part is imperceptible. Cf. notes to chapter 7, and Introduction, sec. viii.

440 a 26. ἀκίνητον—when not set in motion. The surface colour sets in motion the medium and so affects the sense (cf. De An. 11, ch. 7, 418 a 31: πάντα δὲ χρώμα κατηκτικών ἐστὶ τοῦ κατ’ ἐνέργειαν διαφανοῦσα). But Aristotle thinks that the action of the surface colour would be different if it itself were acted on by an underlying tint.

ΕΜΥ read κατηκτόν, which would imply that the surface colour was independently itself in motion; but this is not an Aristotelian doctrine.

440 a 30–31. The common reading is καὶ αὐτὴ τες ἀν ἐν χρωμάτων μίξη. Alexander interprets this to mean that Aristotle admits that the superposition theory is one which accounts for one way of mingling colours. But it is strange that, after rejecting the juxtaposition theory of mixture, Aristotle should say καὶ αὐτή—'this too is a theory which accounts for the mixture of colours.' Simon, thinking that the difficulty about μεγέθη ἄρατα still applies to the superposition theory, suggests the punctuation and accentuation I have adopted and contends that here Aristotle is calling in question this second theory as well. If this is not so, he says, Aristotle must be convicted of carelessness, for he nowhere else points out the defect in the theory.

Without accepting his argument (which seems to be unfounded) I think we can still accept his interpretation of the intention of the clause. Aristotle calls the ἐπιπλασίας theory in question because it really is not an account of the μίξη of the colours. The two colours are simply juxtaposed, in this case one on the top of the other instead of in minute parts side by side. This is merely a case of the σύνθεσις of the colours, not of their true mixture. We may
anticipate the doctrine which Aristotle refers to further down and
which is expounded in De Gen. et Corr. i. ch. 10, 327 b 32 sqq.

There are two spurious kinds of mixture, μείζον merely πρῶς
αἰσθήσεως, i.e. the substances appear to sense to be mixed but are
really not so. (1) First there is the juxtaposition of things that
can be resolved into ultimate individual parts, e.g. grains of corn,
men, etc. (eis τὰ ἐξάχρωστα 440 b 5 sq. below); ὅταν...οὕτως εἰς
μικρὰ διαμεθῆ τὰ μαγνῆμα, καὶ τεθῇ παρ' ἄλληλα τούτων τῶν τρῶπων
ὁσπο μὴ δήλω ἐκασπὴν εἶναι τῇ αἰσθήσει. This is the kind of
μείζον referred to in 440 b 4 below, which explains the χρῶν κοινὰν
(440 a 32) of distant objects, which vanishes when we approach
them. This is a case in which σύνθεσις and μείζον are identical in
the sense that σύνθεσις is the only μείζον of which the objects are
capable. (2) Secondly, when there is no limit to the minuteness
of the parts (e.g. in liquids), the mere juxtaposition of minute parts
is merely apparent mixture (πρῶς αἰσθήσεως). To more accurate
vision the appearance of mixture ceases to exist. In true mixture
(which seems to be analogous to what we should call chemical
combination; cf. Mr Joachim in Journal of Philol. xxix.) every
part of the compound produced by the union of two substances
must be homogeneous with the whole: cf. 328 a 10: τὸ μικρὸν
δυσουσκέψεις εἶναι and below 440 b 3: πᾶντες πάντως. Each part of the
one must completely interpenetrate the other, or rather, in union the
two substances must completely change their nature so as to be
incapable of being found in actuality in any part however minute.
(This implies a still closer union than that of chemical combination,
according to which the atoms are juxtaposed in the molecule, which
is not homogeneous in every part.)

Now superposition of colours one over the other does not imply
their mixture in the true sense.

440 a 31. κατελεῖν must mean 'on the former,' i.e. the juxta-
position, theory, not 'in this way' (referring to the ἐπισκέπτεσις account)
as Hammond has it.

The argument is, that the one colour shines through the other
and that at close quarters the duality of the tint can possibly be
detected, though at a distance the two produce a certain 'common'
(κοινὴ) tint. But, says Aristotle, this general indeterminate tint can
equally well be produced by the juxtaposition of parts of different
colour provided they are minute enough or we are far enough away.
But it is not this neutral tint, which varies with the accuracy of the
COMMENTARY

vision, that has to be accounted for. Composite colours are on a
different footing, and neither of the two theories has succeeded in
accounting for them, cf. 440 b 16-19 beneath.

440 a 33. There is no need for substituting δ' for γὰρ with
Susemihl (Philol. 1885).

The fact that no magnitude is invisible is the reason why we can
account for the juxtaposition of minute parts differently coloured
producing a common tint. If the parts were really invisible they
would not produce any colour sensation either alone or together.

Compare chapter 6 below and notes.

The theory of juxtaposition is then rejected in so far as it implies
the existence of invisible magnitudes, and retained to explain the
production of neutral tints relative to the keenness of our vision, in
so far as it is conceded that the parts do produce an effect upon our
sight. The parts, as we shall see, are perceived ἐν οἷς only in the
whole (ἐν τῷ δόλῳ); individually taken they are only δυνάμει perceptible.

440 a 34. From ἐν δ' 440 a 34 to b 14 is one long protasis.

to 440 a 30-31. τὰ ἐλάχιστα are not infinitely minute parts, but the
smallest parts that can be treated as individuals. Many things on
division do not present such parts, e.g. water and other continuous
substances are specially ἐν οἷς and prone to mix. Cf. beneath
ll. 10 sqq., De Gen. et Corr. 328 b 3: τὰ ἴχθυα μετὰ μάλλιστα τῶν
σωμάτων· ἐν οἷς περὶ μέσων. τὰ ἴχθυα are treated as individuals
since μέσων... μικρῶς παρατίθεμεν μέγαν μᾶλλον, 328 a 33.


ἐν τοῖς περὶ μέσων. Probably only the passages referred to above.

440 b 10. ὀστά μὲν κ.τ.λ. e.g. water. Cf. above.

The modern atomic theory holds that there is a limit to the pro-
cess of resolution and that that is found when the atom is reached.
But there is a difficulty here, for the atom, if anything occupying
space, must be divisible into smaller components.

440 b 16. κυρίον. This is the reason of the real constant
colour of objects.

440 b 22-23. τῶν αὐτῶν τρόπων κ.τ.λ. i.e. the mathematical de-
velopment of all three is alike.

440 b 25. ὀρμώμενα. How Aristotle reconciles this with the
undoubted continuous graduation between colour and colour will be
discussed when we come to chapter 6.

CHAPTER IV.

440 b 28. This is the only place where Aristotle mentions the omissions in the De Sensu. Hence Biehl conjectures ἀδής instead of φωνή (as otherwise the absence of any other treatment of touch will be unnoticed). φωνή is defined in De An. ii. ch. 8, 420 b 32 as σηματικός τεις ψόφος and again in 420 b 5 as ψόφος τεις ἐμφήκων. It is significant sound uttered by a living creature (cf. above chapter 1, 437 a 11 and note).

ψόφος, of which φωνή is thus a species, is defined in De An. 420 b 11 as ἀδής κινητές τεις: cf. below ch. 6, 446 b 34: διδάκα δ’ ὅ ψόφος εἶναι φερομένου τινὸς κίνησις. This movement of the air is of the nature of a rebound. The air rebounds when struck in the same way as smooth bodies rebound from a smooth surface (cf. De An. 420 a 21 sqq.).

440 b 29. ιν τοῖς περὶ ψυχῆς. De An. ii. ch. 8.

440 b 30. πάθος (cf. note to chapter 1, 436 b 5 above) may mean phenomenon or affection generally, though it is not phenomenon in the widest sense in which that term is employed by modern thought, viz. as including concrete substances. πάθος is phenomenon in the sense in which that means an affection, event or attribute ascribed to any concrete subject. Now πάθος is often used for a peculiarly psychical affection and so perhaps the subject to which, as πάθη, smell and taste are relative, is the perceiving soul. Hence it will be as subjective phenomena that they are almost identical. This seems to be borne out by a passage in the De An. ii. ch. 9, 421 a 31 sqq.: διὰ τὸ μὴ σφόδρα διαδήλωσ εἶναι τὰς ὑσμᾶς ὀπερ τοῖς χυμοῖς, ἀπὸ τοῦτων ἐλογεῖ τὰ ἀνώματα καθ’ ὁμοιότητα τῶν πραγμάτων: odours not being distinctly presented like flavours have borrowed their names from the latter owing to the resemblance of the actual experience in the two cases. This is to follow Alexander and render τῶν πραγμάτων by ‘the sensation.’ Cf. Rodier, Traité de l’Âme, Vol. ii. pp. 309–311.
COMMENTARY

For the connection between taste and smell cf. also De An. ii. ch. 9, 421 a 16: ἐοικε μὲν γὰρ ἀνάλογον ἐχεῖν πρὸς τὴν γεύσην καὶ ὅμοιον τὰ ἐξ ἐκ τῶν χυμῶν τοὺς τῆς ὀσμῆς and 421 a 26 ὀσπερ χυμὸς ὁ μὲν γλυκὸς ὁ δὲ πικρῶς, οὕτω καὶ ὀσμαί.

Alexander, Thomas and Simon, however, seem to interpret πάθος here not as subjective affection but as objective quality. It is true that this subjective similarity rests upon an objective foundation. Alexander explains the identity by means of the passage in ch. 5 beneath, 442 b 29 sqq. Odour is produced by the further modification of a substance in which flavour has been already developed; τὸ ἐγρῶν is needed as a basis for both and the effect produced in the first case by τὸ ἐγρῶν is obtained by dissolution (ἐναποπλάνων), the same process as that by which τὸ ἐγχρῶν ἔγρῶν produces odour both in air and water: cf. Rodier, op. cit. Vol. ii. pp. 309–316, Alex. De Sens. pp. 66, 67, 88–91 (W.).

But though the similarity has an objective foundation it does not cease to be a subjective phenomenon, and it is as such that we should infer τὸ αὕτο πάθος to be understood in antithesis to ὅν ἐν τοῖς αὐτοῖς, which must be interpreted as ‘non in eisdem subjectis,’ as Simon renders it, following Thomas and Alexander. The vehicle of taste is water, that of smell is air and water alike, or rather that common nature which both have, named by Theophrastus τὸ δεσμήν (cf. chapter 5 beneath). St Hilaire and Hammond think that ὅν ἐν τοῖς αὐτοῖς refers to the diversity of the organs of the two senses. But χυμὸς and ὀσμή could hardly be said to exist ἐν τοῖς ἀναθητηρίους, and if Aristotle meant here to refer to the organs his statement is singularly obscure.

441 a 1. αὕτοιν κ.τ.λ. This is the explanation of a difference in function by a difference in faculty, a method much derided in modern psychology. But when one remembers that the ‘faculty’ is a determinate structure or disposition of the sense organ, and was so to Aristotle, the explanation, though not a genetic one, is seen to be adequate to the purpose in hand.

441 a 3. ἀκριβεστάτην. ἀκρίβεια contains at once the notions of complexity and delicacy, or precision. The emphasis is probably on the former in the famous passage in De An. i. ch. 1, 402 a 2, where Psychology is said to rank among the first of the sciences in point of ἀκρίβεια. For the want of definiteness in our sense of smell cf. De An. ii. ch. 9, 421 a 9 sqq.: τὴν ἀναθητηρίαν ταύτην ὅν ἐχομεν ἀκρίβη, ἀλλὰ χείρῳ πολλῶν ζῴων. The reason is—φαίνεις ἀνθρώπος R.
σημάται, καὶ οὖθενος διαφθοιρεῖ τῶν διαφοραίτων ἄνω τοῦ λυπηροῦ ἢ τοῦ ἱδρύος. That is to say, where feeling-tone enters largely into the sensation there can be no exactitude in our perception, as modern Psychology teaches is in most cases true. But the final reason for both phenomena is the indefiniteness of the structure of the sense organ (ὡς οὖθεν διαφθορεῖ τὸν αἰσθητήριον). Compare De An. ii. ch. 9, 421 a 21: κατὰ δὲ τὴν ἀφάνη πολλὰ τῶν ἀλλῶν διαφοράτως ἀκριβοῦ.

The reason for the superiority of touch in man is the greater softness of his flesh. Softness of flesh is an index not only of tactual discriminativeness but of intellectual endowment. Cf. De An., loc. cit. 421 a 26 and De Part. An. ii. ch. 16, 660 a 11: μαλακωτάτη δ᾽ ἡ σύρξ ἢ τῶν ἀνθρώπων υπήρχει. τοῦτο δὲ διὰ τὸ αἰσθητικώτατον εἶναι τῶν ζώων τὴν διὰ τῆς ἀφάνος αἰσθήσεως.

Aristotle’s ideal of a εὖφοις would, on this showing, be the skillful surgeon or mechanician. But we must remember that τὸ θερμόν καὶ τὸ ψυχρόν were among τὰ ἄστα, and probably by softness of flesh he means sensitiveness to these influences as much as anything else and hence merely delicacy of constitution in general. At least so Alexander understands him. Would this be an argument for the mental superiority of the female sex? If so, Aristotle is forgetting himself.

441 a 3-4. ἢ δὴ γενόσις ἀφή τις ἕστιν, and hence is more ἀκριβῆς than smell. Cf. De An. ii. ch. 9, 421 a 18-20, also ch. 10, 422 a 8: τὸ δὲ γενοτομὸν ἐστὶν ἄστω τὶ καὶ De Sens. ch. 2, 439 a 1: τὸ δὲ γενοτομὸν ἐστιν τὶ ἀφῆς ἕστιν. Compare also De An. ii. ch. 5, 414 b 11 and iii. ch. 12, 434 b 18, likewise De Part. An. ii. ch. 10, 656 b 37 and ch. 17, 660 a 21.

The chief arguments to prove the identity of taste and touch are (1) that by taste we are sensible of the presence of food which is an object of tactual sensation (414 b 7 sqq., 434 b 18-19), (2) that τὸ τούτον is the ἄλη, the vehicle of taste, and it is ἄστω τὶ (422 a 11). But (3) Aristotle finds strong confirmation for his theory in the fact that neither requires an external medium for its operation as the others do (422 a 8 sqq.). The flavoured substance impinges directly upon the sense organ—the tongue. Again (4) the division into right and left parts, which is not to be detected in the case of the organ of touch, is almost unnoticeable in the tongue (656 b 33 sqq.) and (5) the softness of the human tongue causes its greater sensitiveness, just as softness of the flesh generally causes delicacy of touch (660 a, 17–21, cf. De An. ii. ch. 9, 421 a 20 sqq. and
COMMENTARY

last note). For this doctrine compare also the passage beneath, 441 b 26 sqq.

441 a 6-7. Cf. Zeller, Presocratic Phil. (Eng. Trans.), ii. p. 166, Burnet, Early Greek Phil. p. 231, Empedocles v. 312 (Stein). But cf. Theophrastus De Sens. 7 (Dox. 500, R.P. 177 b), who says that Empedocles did not push his investigation of taste or touch further than to say that in them too sensation was caused by particles fitting into the pores of the sense organ.

441 a 7-8. The meaning of πανόστρεφμα is best illustrated by a passage in the De Gen. Animal. iv. ch. 3, 769 a 26 sqq., where he explains a theory that the various qualities of animals all lie mingled in the semen which forms as it were a πανόστρεφμα of all characteristics, by comparing the γονή to a liquid in which many different flavours are dissolved. πανόστρεφμα then evidently means a substance in which the germs of all things lie.

Trendelenburg (De An. p. 214) thinks that the word is a Democritean term. It certainly is employed by Aristotle three times (Physics, iii. ch. 4, 203 a 21, De Coelo, iii. ch. 4, 303 a 16 and De An. i. ch. 2, 404 a 4) to describe the mixture of atoms out of which, Democritus asserted, the world was fashioned. It is however once employed with reference to the theory of Anaxagoras (cf. De Gen. et Corr. i. ch. 1, 314 a 18 sqq.), according to which bone and flesh were the simple elements out of which air, fire, earth and water were constructed: οἷς (sc. οἱ τοίς ἀναξιογόροις παντα ὡς δὲ ἀπλὰ καὶ σπασκόν (λέγωντες), γἳν δὲ καὶ τὸ πέρι καὶ ἑδῶρ καὶ ἑδρα σύνθετος πανόστρεφμα γὰρ ἄλοις τοῖσιν: i.e. ‘for they—flesh and bone—constitute that in which the latter all lie in germ.’ Cf. Zeller, Presocratic Phil. ii. p. 332, Burnet, Early Greek Phil. p. 290 and note. It is quite likely that the term originated with Anaxagoras, whose interests lay more in biological phenomena than those of his predecessors, but there seems to be no doubt that Democritus, however inconsistent it may have been with the general drift of his mechanical philosophy, also employed it.

This special theory—that water is οἷς πανόστρεφμα χρωμάτω—must be assigned to Democritus, at least in the first form in which it is stated (see next note). As Alexander (p. 68) points out, we must assume a spatial difference to be responsible for the difference of flavour in different parts, and this, says Alexander, stamps the theory as Democritean.

The first theory differs from the second in that it supposes that
flavours exist in water ἑρπετικὰ—in actual fact though imperceptible to sense, while the second gives them only potential existence; according to it they exist in water only in germ. This second theory is then contrasted with a third, according to which water is qualitatively identical in every part, and any flavour can be derived from any portion of it, the differences which we actually find being caused τὸ μᾶλλον ἢ ἴπτων θερμαίνειν—by the different amounts of heat to which different portions of water are exposed. Simon acutely conjectures that this third theory must be assigned to Anaxagoras owing to its compliance with his doctrine of πάντα ἐν πάσιν. It still comprises the doctrine that water is ὅλον πανσερμύλα in which tastes lie in germ, but assigns their actual differentiation out to an active external cause. (Note that Aristotle says τὸ ποιοῖν not ποιῶν τι. All theories may have recognised the agency of heat in producing taste but not in producing differences in flavour.)

441 a 14. This passage causes difficulty, for at first sight it seems strange that, if Aristotle meant that the fruits were plucked, he should not have said καρπῶν instead of περικαρπίων. Hence Thurrot and Susemihl (Philol. 1885) propose to read καρπῶν. But though the word properly means σκέπασμα καρπῶι, yet there are passages in which it can only mean the fruit as a whole, e.g. Meteor. iv. ch. 3, 380 a 11 and Problems, 25, 925 b 30, and cf. below 441 b 1. Alexander suggests that it is possible to use περικαρπίων in its literal sense and, in that case, the point will be that fruits change in taste independently of the removal or permanence of the husk or peel.

But this is hardly the meaning required. The other interpretation is possible, and the point is that, as the connection with the root has been severed, the water drawn up by the plant through its roots (τὸ ἐκτὸς ὀξύο) does not give the change in taste.

πυρομέμνων is the ms. reading, but it should mean, on the whole, 'ignited': cf. De Part. Animal. ii. ch. 2, 649 b 5, where πυροῦν is distinguished from θερμαίνειν and identified with φλόγα ποιεῖν. Where it does not mean actually to ignite, it at least denotes such intense heating as occurs in roasting or baking (cf. De Gen. Animal. iii. ch. 2, 753 b 4, and Problems, 927 b 39 sqq.). Now, here, in the case of the sun's action, no such intense degree of heating is involved. Hence I propose to read πυρομεμένων which means 'reddened,' and suggest that Aristotle is thinking of the reddening effect the sun produces on many fruits as it ripens them. He is here then referring to the ripening effect of the sun which actually makes fruits
become sweet. (Mere cooking without adding a sweetening ingredient does not.) In the next clause he contrasts it with the effect produced by drying and withering which makes them bitter (cf. *Problems* 925 b 36: ἐλάια καὶ βαλάνιοι παλαιώματα πικραὶ γένονται). It is in the final clause—καὶ ἑψωμένως κ.τ.λ.—that he talks of the effect of cooking.

441 a 20. The sense is the same whether we read πανσέρμιος (which is grammatically preferable) or πανσέρμιαν. The water is a material in which the germs of the flavours lie commingled.

441 a 21–22. ὃς τροφή. Alexander, who reads ὃς ἐκ τῆς αὐτῆς τροφῆς, explains that many tastes arise out of the same water, as many different parts of the body—bones, flesh etc., are formed out of the same nourishment, and again different trees are nourished by the same water; and thus similarly each part of the same tree, root, bark and fruit, has a characteristic flavour though feeding on the same moisture. He is followed by Thomas who nevertheless used the early Latin translation which gives the equivalent of our reading. Both readings no doubt render such an interpretation possible, but ours rather suggests the translation I have given. In that case the sense is simpler. There is no parallel between water and food in general. Aristotle simply says that different tastes are developed by plants that live upon the same water; he may mean either the different tastes found in bark and fruit or the different flavours of different fruits. The latter is more probable since he has just been talking of fruits. He means that the same water can be supplied to different trees, yet you get different flavours, which ought not to be the case if one definite flavour resides in one definite portion of water as the second—the Democritean—theory would make out. The πανσέρμια theory in its first form is thus refuted and Aristotle passes on to the opinion of Anaxagoras.

441 a 24. δύναμις, in this line and again in the next, is practically equivalent to φύσις; cf. above ch. 3, 439 a 25; κοινή φύσις καὶ δύναμις. Cf. also *De Men.*, ch. 2, 452 a 31 and note.

441 a 25. λαστότατον. The argument is directed merely against the proposition that water acted on by heat, without any other determinant, will develop flavour. Water alone when heated does not thicken, but all flavours reside in substances that show traces of thickening to a greater or less degree. Hence water plus heat is not alone the cause of flavours. That which causes the thickening in fluids must be the cause. This is earth (γῆ) or rather one of the
DE SENSU


The whole of the above discussion is a good example of the 'dialectical' development of an Aristotelian argument. Previous theories are dealt with in an order relative to the amount they contribute to the final solution of the problem. Though each is in turn set aside, some part of it remains unabrogated in the next, and the last to be discussed is that which approaches most nearly to the true account of the matter.

441 a 32. πάχος ἔχουσι. It is not sufficient for the argument to say that flavours thicken when heated, but that at all times they show traces of density.

441 a 33. συναίτατον. Cf. De An. ii. ch. 4, 416 a 14 where πῶρ is likewise said to be the συναίτατον of the growth of bodies. The aίτιον is φυσις. (συναίτατον μὲν πῶρ ἐστιν, οὐ μὴν ἄπλως γε αίτιον.)

Some translators render φαίνοντα 'apparently,' but with the participle it should mean 'evidently.' The sense also requires it, for this to Aristotle's mind is not merely an apparent fact, but a real fact which furnishes the proof positive that χῦνος is dependent on τὸ ἔφρον. The previous proofs have been merely negative and directed against the claims of other circumstances to fill the position of cause.

This reasoning will support the reading δίω εἰφλόγος in 441 b 8 below.

441 b 5. γῆς τι εἶδος. Cf. Meteor. iv. ch. 7, 383 b 20 sqq. The πολλά in 441 b 2 above are Metrodorus and Anaxagoras, according to Alexander.

441 b 8. δίω εἰφλόγος is the reading of mss. L S U and evidently of the ancient Latin translation. Alexander also interprets as though this were the reading: δίω τοίτω οἷν φησίν εἰφλόγος καὶ τοῖς χῦνοις ἐν τοῖς ἐκ τῆς γῆς φυσικόν, τοινήτων ἐν τοῖς φυσικόις, καὶ ταῦτα τρεφομένοι ἐγροτήσατε εὐγείρεσθαι μᾶλλον: the vet. tr. renders 'terra nascentibus' as though it actually read ἐκ τῆς γῆς. Whatever the reading, Alexander's must be the correct interpretation (cf. note to 441 a 33). It is on account of the savours being primarily in earth that they can enter into plants. Aristotle does not say εἰφλόγος without being able to produce reasons.

441 b 10. ὀστερό καὶ τάλλα. Aristotle is no doubt thinking in particular of the other elementary qualities—τὸ ἔφρον etc., but this statement is with him a universal principle.
COMMENTARY

The fuller discussion (ἐν ἐπίσω ἀδιαβροτοῖς, 329 a 27) referred to there seems to be lost, as all other references to the subject are more brief.

Up to this point the argument is clear. Aristotle is explaining what he has already proved as a fact. Earth in possessing the quality of dryness can act on τὸ ὑγρόν, since opposites modify each other. It is a case of explaining the qualities presented to the other senses by the interaction of the tactual properties of things. Cf. De An. ii. ch. 5, 417 a 6, where he talks of the other ἀλεθρία as the συνεπεικότητα of fire, earth, air and water. (Though he insists that in one way the former are prior to the latter, cf. De Gen. et Corr. ii. ch. 2, 329 b 14: καὶ τοῦ πρώτον ὁμοιός ἀφῆς.)

The difficulty which now ensues is in connection with the function of τὸ βερμόν in helping to produce flavour.

441 b 15. οὐδὲν πέφυκε τ. κ.λ. This statement seems to conflict with that in De Gen. et Corr. ii. ch. 2, 329 b 22: δὲ δὲ ποιητικὰ ἄλλατα καὶ παθητικὰ τὰ στοιχεῖα, μὲν γὰρ καὶ μεταβάλλει εἰς ἄλλατα. But probably there Aristotle is simply stating his doctrine in a rough provisional way. Really as σώματα and hence οὐσίαι the elements cannot be opposed to each other and act on each other. (So Alexander explains.) Cf. Categ. 3 b 24: ὑπάρχει δὲ ταῖς οὐσίαις καὶ τὸ μηδὲν αὐτάς ἐναρτιόν εἶναι, and it is ἐναρτιά that act on each other; οὐσία is merely ἐκτικὴ τῶν ἐναρτιῶν. The upshot of the matter is, that it is not as substances, but as possessed of opposite qualities, that the elements act on each other. This sentence is then inserted as a caution, but how it furthers the main argument here is not apparent, unless indeed we connect it with that preceding clause in which we find it stated that heat is the peculiar property of fire, dryness of earth. Liquidity (τὸ ὑγρόν) will thus be the special characteristic of water, and the implication will be that the latter element will be acted on in a more pronounced way by earth, the element which has in an especial degree the attribute most opposed to its most characteristic quality. Fire possessing τὸ ἔσχρον in a less marked degree will act upon it also, but not in the pre-eminent way in which ὑγρόν does.

When Aristotle says that τὸ βερμόν is the ἵδον of πῦρ, this cannot be in the full sense of ἵδον consistent with the rest of his doctrine, for τὸ βερμόν is also shared by ἀήρ and, as we have seen, πῦρ is also ἔσχρον. He must mean, as Alexander explains in conformity with De Gen. et Corr. iv. ch. 4, 382 a 3: τῶν στοιχείων ἰδιωτάτα ἔσχρον μὲν
γῆ, ἄρρητα δὲ έδωρ, that earth is the principal illustration of dryness or possesses dryness in a special degree, as fire does heat, and so on. Cf. Alex. De Sens. pp. 72–73 (W.). Cf. also De Gen. et Corr. iv. ch. 5, 382 b 3: ἄρρητα σῶμα ἐδωρ.

441 b 17–18. έναπτελόντες. A cognate word πλῶνε is used in 445 a 16 for the corresponding process which produces odour.

Susemihl (Philol. 1885 and Burs. Jahresb. 17) wishes to delete τοῦ χυμοῦ, but in mentioning flavours here Aristotle is not illustrating a thing by itself. He compares the solution of the primitive ἔρην which produces tastes to the solution of tastes actually produced.

441 b 19. ή φύσε. No personification of Nature is implied here. Aristotle merely means that this is a natural process. The function of πᾶρ in the process is obscure. Alexander makes it the cause of the percolation as well as of the κίνης which renders τὸ ψρὸν determinate in quality; κυοῦσα he renders by ἀλλοιωσά, i.e. changing qualitatively. But it is possible to understand it literally—of the motion involved in the percolation. Some, e.g. Hammond and St Hilaire, translating κυοῦσα in different ways, will have it to be concerned only with the former process. But, unless we adopt the conjecture that the function of τὸ θερμὸν is to act on τὸ γεώδες, we may as well understand it to bring about local motion in this case as beneath in 442 a 6, where it is said to cause the light particles in food to rise upwards.

441 b 23. Here πᾶσας is used in a wide sense, but still with the signification of being the attribute of a subject that is passively affected when it (the attribute) comes into being.

441 b 24. ἄλλοιωσάν. Cf. De An. ii. ch. 5, 416 b 34: δοκεῖ γὰρ (η αἰσθήσεις) ἄλλοιωσις τὸ εἶναι. ἄλλοιωσις is that kind of κίνης denoting qualitative change. ἄλλοιωσάνθαι is practically identical with πᾶσιν (cf. Phys. vii. ch. 3, 245 b 13: τὸ πετασθὲ καὶ ἄλλοιωσάνθαι προσαγωγοῖς: cf. Alex. De An. 84, 12), and both words are employed indifferently in the De Anima for psychical modifications (cf. ii. ch. 5, 418 a 2 and 417 b 14). But Aristotle points out that, though they both are used as though they were the proper terms (ὁι κυρίοις) for all psychical changes, there are some operations to which they are really not applicable.

1. In the first place, the transition from the state in which man possesses knowledge to the exercise of that knowledge is hardly a case of πᾶσιν or ἄλλοιωσάν in the usual sense. The change is not
COMMENTARY

produced by anything external. To exercise his intelligence is in a man's own power—εἰς ἀυτὸν—for the universals which are the objects of knowledge are in a way in the soul. Again it is a case not of φθορὰ ἐπὶ τοῦ ἐννιαῖον but of σοφηγία, i.e. the realization of a predetermined end.

2. Secondly, change such even as that from a state of ignorance to a state of knowledge, where the alteration is in a definite direction and towards the establishment of a definite higher development, towards the realization of the potentialities of the individual in question (ἐπὶ τὸς ἔξις καὶ τὴν φύσιν 417 b 16), is hardly ἀλλοίωσις proper, even though in the acquisition of knowledge one requires an external agent—the teacher.

With these reservations Aristotle proposes still to use the terms ἀλλοίωσις and πάρχειν. They are no doubt, in one way, specially applicable to sensuous processes, because there must be an external agent—the individual object (cf. 417 b 25: ἀναγκαίως γὰρ ὑπάρχειν τὸ αἰσθητών, and cf. 417 a 6 sqq.). But Simon points out that even sense perception cannot be properly a case of πάρχειν, for agent and patient must be in the same genus (De Gen. et Corr. 1. ch. 7, 323 b 32 sqq.), which the sense faculty and its object are not. Cf. Introduction, sec. iv.

441 b 25. It would be possible to make τροποπάρχον agree with the subject of ἔξις, namely τὸ...πάρχει, and this interpretation would give a meaning consistent with Aristotle's general doctrine, for previous to the act of perception the object is only δυνάμει αἰσθητών. The next clause, however, requires us to construe it with τὸ αἰσθητικῶν (as Hammond, Bender, St Hilaire do), or still better with τὸ... (Simon), for it is not the sense faculty which existed δυνάμει before the act of sensation, but its operation. The δύναμις, the faculty, actually exists before the sensational experience.

For the doctrine of this passage see De An. ii. ch. 5, 417 b 19: καὶ τὸ κατ' ἐνέργειαν (αἰσθ]. In knowledge (cf. last note) there is a two-fold transition, (1) from a state of ignorance to the acquisition of a definite body of knowledge, i.e. from mere indeterminate δύναμις to a determinate one or ἔξις; (2) there is also the change from the possession to the exercise of this ἔξις (ἐς ἐντελέχειαν, b 7). There is a corresponding double transition in sensuous process. The first is effected by the parent (ὑπὸ τοῦ γεννώτος, b 17) of the sensitive individual and is the creation of a being with fully developed sense faculties. The second, corresponding to the exercise of knowledge, is the actual exercise of the
sense faculty and is produced by the object of sense. In sense, then, the formation of a permanent psychical disposition is due to natural agency, in knowledge to instruction; actual exercise of a faculty is in both a higher process, originated in the first case externally, in the second internally.

441 b 26–27. οἱ παντὸς ἔργου. Alexander thinks that this statement is made in order to rule out odour, which also owes its existence to τὸ ἔργον. But, as δομή is produced by τὸ ἐκχυμὸν ἔργον, it is clear that those words are not used for the purpose of excluding it. By τὸ ἔργον Aristotle surely means dry substance, and it is the same substance as has flavour that is odorous. The intention is obviously to rule out all ἔργον that is not μεμομίαν, i.e. does not enter into a compound.

441 b 27–28. ἡ πάθος...ἡ στήρεσις. The positive modification is τὸ γλυκό, the negative τὸ πικρόν: cf. 442 a 7 sqq.

441 b 30. I read οὐχ ἐν μόνον instead of οὐδὲν αὐτῶν with Bekker and Biehl. Wendland restores οὐχ ἐν μόνον to the text of Alexander, p. 77, and the vet. tr. renders 'non est unum solum,' which, in spite of what Biehl says, can be a translation only of οὐχ ἐν μόνον. This version apparently read also οὐδὲ αὐτῶς τοῖς φυτοῖς after ἔρως for it inserts 'neque ipsis plantis.' οὐχ ἐν μόνον gives the best sense, but μόνον might be dispensed with.

441 b 31. τὰ μὲν ἄστα κ.τ.λ. Alexander points out that αἰτάνων and τρέφειν are not identical. Things so far as quantitative cause increase; only in so far as potentially capable of forming the substance of the body which they nourish are they said to be nutritive. Cf. De Gen. et Corr. i. ch. 5, 322 a 20 sqq. and also De An. ii. ch. 4, 416 b 12 sqq.: ἐστι δ’ ἐπερόν τροφή καὶ αἰτετική ἐστιν. γὰρ μὴ τούτοις τι τὸ ἐκχυμὸν αἰτετικὸν (sc. τὸ προστόν οἷ τὸ προσφέρόμενον: cf. Rodier, op. cit. ii. p. 242), ἡ δὲ τούτῳ τι καὶ ὀσία τροφή. That is to say, τροφή (the abstract term) or τρέφειν is the continuous renewal of the individual which preserves its identity as an individual of definite type, i.e. as an ὀσία; αἰτετική is that renewal in its quantitative aspect.

The point here, however, seems to be not to hold αἰτετική and τροφή apart, but to show that that which has the function of causing growth must also have the properties of nutritive food, and reciprocally τὸ προσφέρομεν is known to sense as τὸ γεννάν (442 a 2) and the fundamental positive characteristic of things that have flavour is sweetness.
But food, as that which causes growth, is that which can rise up (owing to the agency of heat—for fire is the lightest element) and so become incorporated in the body. Hence it is both warm and light (each of which is a tactual quality); but that which is light is sweet, and hence that which causes growth is just that which has the gustatory quality of nutriment.

The whole argument rests upon the identification of τὸ κοῦφον (one of the ἄστες) and τὸ γλυκόν, the basal quality of τὸ γενετῶν, and hence of τὸ τρόφιμον.

442 a 1. τρέφει κ.τ.λ. This is treated simply as a statement to be verified by observation. It is not a proposition established by any special proof elsewhere. It gives the first obvious definition of τὸ τρόφιμον.

For the facts cf. *Problems*, 930 a 34 and *Meteor.* 11. ch. 2, 355 b 7, also cf. note to l. 5 below.

442 a 3. ἡ ἀπλάς κ.τ.λ. We must not translate ‘whether pure or mixed,’ as thus we should assume that it was indifferent whether the sweetness was pure or mixed. As a matter of fact Aristotle, below in l. 12, says that pure sweetness makes the food indigestible.

442 a 4. ἐν τοῖς περὶ γενέσεως. *De Gen. et Corr.* 1. ch. 5, pp. 350-352. Alexander also refers to the *De Gen. Animal.*, but it is difficult to find any strictly relevant passage there.

442 a 5. αἰθέρνη must be used absolutely, much as it looks as though it should govern τροφῆν along with δημοφυγαί. Aristotle is discussing not the production of food but the growth of the body owing to feeding. For the process cf. *De Part. Animal.* 11. ch. 3, 650 a 2 sqq.: ἐπεὶ δὲ ἀνάγκη τῶν τοιαύταμην λαμβάνειν τροφήν, ἢ δὲ τροφή πάσον εἰς ύποροῦ καὶ ξηροῦ, καὶ τοῦτον ἡ τέλος γίνεται καὶ ἡ μεταβολή διὰ τῆς τοῦ θερμοῦ δύναμεως...διὰ ταύτην (τὴν αἰθέρνη) ἀναγκαῖον ἔχειν ἀρχήν θερμοῦ φυσικήν.

The ultimate ἀρχή of heat in the body of sanguineous animals is seated in the heart. Cf. *De Juvent.* ch. 4, 469 b 9: ἀναγκαῖον δὴ ταύτης τὴν ἀρχήν τῆς θερμόστητος ἐν τῇ καρδίᾳ τῶν ἀναιμίων εἶναι.

For Neuhäuser's theory, that this σύμφωνον θερμόν, which seems to be the ultimate substratum both of the sensitive and nutritive soul, is also to be identified as the central organ of sensation, cf. *Introduction,* sec. vi.

For the connection of lightness and sweetness, bitterness and weight, cf. *Meteor.* 11. ch. 2, 355 b 4 sqq.: τὸ μὲν ἀλρικὸν ὑπομένει διὰ
The bodily heat is, however, only the summa tōn in the production of τὸ ἑλεύθερος καὶ τρόφωσις. The natural process due to heat is indefinite and has no direction. Fire burns on until its material is exhausted. But in living organisms there is a πέρας καὶ λόγος μεγών τε καὶ αἰθήμων, i.e. there is a definite scheme and restriction in the development and this is due to ψυχή which is the real αἴτιον. Cf. De An. ii. ch. 4, 416 a 8–18.

In De Resp. ch. 20, 480 a 8 we hear that the blood ἐν τῇ καρδίᾳ ἐνομισθεὶς. Aristotle probably there refers to the very same process. We read in De Part. Animal. ii. ch. 4, 651 a 14: ὁ ἄμυς ἡ ἐσωτήρ τροφῆς.

442 a 8. ὁ ἐν τῇ φύσει. Cf. De Juvmen. ch. 4, 469 b 6 sqq.: πάντα δέ τὰ μόρια καὶ πάν τὸ σῶμα ἔχει τινὰ σύμφωνα θερμότητα φυσικήν: cf. also above and the passage there quoted from Meteor. ii. Aristotle is there talking to begin with of the evaporation from the sea, one of τὰ ἔξω σώματα. He expressly compares evaporation by the sun to the process of animal nutrition. The sea remains salt though the moisture which is evaporated from it and descends again in rain is not salt.

442 a 9. Cf. quotation in note to 442 a 5 above. He has now explained what was previously proved as a fact—that χῦμος τοῦ τροφίμος ἐστὶν, and he has done so by identifying flavour per excellence with sweetness. Positive flavour is sweetness, just as positive colour is white. Their opposites are στερήματει—defects of being.

442 a 11. ταῦτα must refer to the latter—τὸ ἀλμυρὸν καὶ δέχονται, or else it means simply 'this fact.'

442 a 13. There is no one English word which will translate ἐνηπολαστικῶν. It is almost the technical expression for 'indigestible,' but it implied a theory of indigestibility—that the food tended to rise too much. Cf. one of Aristotle's illustrations of final causality. The final cause of a walk after eating is τὸ μὴ ἐπιπολάζειν τὰ στήθι—An. Post. ii. ch. 11, 94 b 11 sqq.

Biehl's reading ἀντι πάντων in l. 12 instead of ἀντιστάτων τῷ is doubtless correct. It does not, however, alter the general meaning.

442 a 17. κύρησις. It is not clear what exactly κύρησις refers
COMMENTARY

173

to—the sense stimulus caused by χυμός or the κίνησις which produces χυμός.

442 a 18. L S U and all editions prior to Biehl's have οὖν εἰν ἀμφοτέροις μόνον· δὲ μὲν οὖν λευκάρως τῷ γλυκόν κ.τ.λ. But there is no reason for making Aristotle say that the pleasant flavours alone were due to proportionate combination. On the analogy of the corresponding theory about colours they would rather be the class where the ratio of the ingredients was a simple one. Cf. ch. 3, 439 b 33 sqq. above.

442 a 22. All mss. give ἑπτά but Susemihl (Philol. 1885) argues that it is quite impossible to reconcile this with the rest of the passage. Yellow is assigned to white, as oily is to sweet; hence, if the two lists are to square, the number must be either six or eight, as Alexander too maintains. (It is by distinguishing φαίνω from μέλαν and ἀμφωρίων from πικρόν that eight members are distinguished.)

Hence, followed by Biehl, he boldly substitutes ἔξι for ἑπτά. The difficulty, however, disappears, when we recognise that τὸ ἕκαθος is included in the list, though, as an afterthought, assigned to white.

In other passages the different position of grey from that of the true chromatic tones is not noticed. They are both said to be ἀνὰ μέσον τοῦ λευκοῦ καὶ μέλανος: cf. Categ. ch. 10, 12 a 18, Τυρφ. 1, ch. 15, 106 b 5, Metaph. x, ch. 5, 1056 a 27 sqq. The reason doubtless for ascribing grey to black rather than white when it is relative to both (cf. Physics, v, ch. 1, 224 b 31 sqq., and ch. 5, 229 b 17 sqq.) is that it is less positive than white, in a way a στερημός of white, as black also is.

442 a 24. θέριστην κ.τ.λ. The ascription of yellow to white seems to be a recognition of its higher luminosity than that of the other colours. Cf. Plato, Timaeus 68 b, who brings in τὸ λευκάρως into its composition. For the correspondence of the tastes and the colours generally and the ascription to sweet and bitter of τὸ λευκάρως and τὸ ἀμφωρίων respectively, cf. De An. ii, ch. 10, 422 b 10 sqq. The ground for the identification of τὸ λευκάρως and τὸ γλυκύ seems to be the lightness of both. Cf. De Part. Animal. iii, ch. 9, 672 a 8 sqq. τὸ λευκάρως κοῦφον ἐστὶ καὶ ἐπιστολάζει ἐν τοῖς ἀγράδις. τὸ λευκάρως is light because it is warm. Cf. also De Gen. Animal. ii, ch. 2, 735 b 25. Similarly τὸ ἀμφωρίων and τὸ πικρόν are both heavy.

442 a 25. θείακοι κ.τ.λ. Three of these are the colours of the rainbow (with ἕκαθος intermediate between θείακοι and πρόστατον: cf. Meteor. iii, ch. 2, 372 a 8 sqq.). They alone are said not to be
obtained by mixing (other chromatic tones presumably); κυανοῦ is
less frequently mentioned.

442 a 27. τῶν should naturally refer to τοῦ λευκοῦ καὶ μέλανος,
but it is generally held to signify the other colours. Both state-
ments would be in conformity with Aristotle’s teaching.

442 a 31. τὸ πότιμον. Cf. De An. 11. ch. 19, 422 a 31: τὸ ποτὸν
καὶ ἀποτρόπον are equivalents for γλυκό and πικρόν. For the doctrine

Zeller, Pre-Socratic Phil. ii. pp. 265–270. This is part of the doctrine
of ἀπόφορων; the atoms which emanate from bodies actually impinge
upon our sense organs and so cause sensation by contact. It is
against this that Aristotle wishes to argue in the first place.

The transition to this discussion is not mediated by the dis-
tinction between ἀλέξανεν and τρέφειν as Alexander thinks, but by
the connection between taste and touch which suggests the Demo-
critean theory that all sensation is effected by contact.

442 b 4. ἄδυνατον. Alexander (p. 83 [W.]) gives four separate
reasons which might be employed. But the most important
consideration is the fact that the other senses require an external
medium. It is the absence of this that makes taste a kind of touch.
The other senses do not act by contact (cf. De An. 11. ch. 7, 419 a 26:
οὐκ ἐάν γὰρ αὐτῶν (σ. ψόφων, ἄστρον κ.τ.λ. ἀπτόμενον τοῦ ἀλαθηγόρου
ποιέτω τὴν αὐθήραν).

τοῖς κοινῶσι. For the distinction between the κοινά and the ἑαυτά
aισθητά cf. De An. 11. ch. 6, 418 a 17, 11. ch. 1, 425 a 14, 11. ch. 3,
428 b 22 and above 437 a 8, etc. The former comprise motion and
rest, figure, magnitude, number and unity. The latter are the
qualities, e.g. colour etc., reported by the special sense organs. The
κοινά aισθητά are known however in modern philosophy as the
primary qualities of bodies (cf. Hamilton’s Reid, note D). They
must be distinguished from what the commentators call the ‘primae
qualitates’ in the Aristotelian scheme viz. θερμή, ψυχρή, ἐρέτηριον
ἐγράφην. It has been pointed out (e.g. by Hamilton, p. 829) that
these κοινά are hardly sense qualities at all and confirmation for
this contention is drawn from Aristotle himself (cf. De An. 11. ch. 6, 418 a
24: τὰ ἑαυτά κυρίων ἀστιαθήτα; and below b 14–15: ἡ αὐθηγήσεα…τὰ
κοινά γνωρίζεται). They may be all described as the mathematical
and dynamical qualities of body and, according to the Atomistic
philosophers, these were the only objective attributes of things, all
the rest being merely changes in our sensibility. (Cf. Theophrastus, De Sens. 63: τῶν δ’ ἄλλων αἰσθητῶν οὐδενὸς ἐστὶν φῶς, ἀλλὰ πάντα πάθη τῆς αἰσθήσεως ἀλλοιομένης.)

This holds good without qualification of four of the senses, but to some tactual qualifications they did assign objective existence, e.g. τὸ μαλακὸν, τὸ σκληρὸν, τὸ βαρὺ and τὸ κούφον, deriving these however ultimately from μέγεθος and σχῆμα; things that are light have more of void space in them than others. τὸ τριάχυ and τὸ λέὸν with τὸ ἀξίον and τὸ ἄμβλητον seem to have been modifications of σχῆμα. Here Aristotle also treats the latter four attributes as belonging to the category of τὰ κοινά. He takes care to define τὸ ἄξιον and τὸ ἄμβλητον as τὸ ἐν τοῖς ὀγκοῖς (the word commonly employed also for the atoms themselves as well as for mass in general) as these are also the names for determinations of such ἔδα as φως and χύμος. He commonly puts τριάχυς and λεωτής along with other σωματικὰ διαφορὰς in σωματικὰ πάθη as μαλακῶν and ἄκληρων which are consequent upon the primary determinations—βορμόν, ψυχόν etc. Cf. De Part. Animal. n. ch. 1, 646 a 17 sqq.: αἱ δ’ ἄλλαι διαφορὰς ταῦτας ἀκολουθοῦσαν, ὅλον βάρος...καὶ λεωτής κ.τ.λ.

Among such, even μέγεθος is included in 644 b 14; but this is simply one of his rough general classifications. Aristotle did not, of course, mean to imply that σχῆμα and μέγεθος are in themselves tactual differentiae of the same nature as hard and soft, but it was his view that you do not have the concept of body without some characteristically tactual datum. It is impossible to construct bodies out of merely mathematical determinations, a point which modern Atomists do not sufficiently consider. You cannot analyse body into something that has no sensuous qualities, not even tactual ones.

If μέγεθος and σχῆμα are to be regarded as the ultimate characteristics of bodies, they must be treated as though they already possessed a tactual content, as though they were merely tactual differentiae, and this is exactly Aristotle’s point here. The Atomists treat determinations of figure as though they in themselves contained a reference to tactual experience—as though they were given by one special sense, that of touch, whereas as a fact they, though given in connection with tactual experience, are not simply to be identified with it, and in fact can be discerned by means of other senses, notably that of sight.

In the De Anima, iii. ch. 1, 425 b 4 sqq., Aristotle points out
that it is owing to the fact that these mathematical and dynamical qualities of objects are given by more than one sense that they can be readily discriminated. Otherwise they would be confused with the special data of the single sense to which they were attached, just as he contends that, if the whole surface of the body gave the same sensations as the tongue (which discriminates both flavour and tactual properties) taste and touch would seem to be the same sense. For a discussion of ἀφή cf. De An. ii. ch. 11. Aristotle does not there fully debate the question of the plurality of the ἐνεστωτές, e.g. θερμόν and ψυχρόν, ἕρων and ἥρων, μαλαιὸν and σκληρόν, which touch presents to us, nor does he consider to what extent determinations like ἀξία and βαρύς, τραχύ and λείων, which appear in φωνή apparently as ἤδω, must be treated as κοινά in the case of touch. His definition of τραχύ and λείων in Categ. 8, 10 a 22 sqq. confirms his inclusion of them here in the list of the κοινά—λείων μεν τῷ ἐν ἐπιθέσεις πασ τὰ μόρα κεῖσθαι: τραχύ δὲ τῷ τὸ μὲν ὑπερέχειν τὸ δὲ ἐλλείπειν; i.e. these qualities are due to variations in figure.

442 b 8. οὐ δὲ μὴ πασῶν. Cf. De An. ii. ch. 6, 418 a 10 κοινά πασῶν, where however he illustrates only in the case of ἀφή and ἀφής. Number and unity seem to be given by the exercise of any sense (cf. 425 a 20 : ἐκάστῃ γὰρ ἐν αἰσθάνεται αἰσθήσει). On the other hand all are said to be perceived by means of κίνησις (425 a 17) and, in the case of the mathematical qualities such as are mentioned here, the κίνησις which discriminates them can be nothing else than the motion of the only two sense organs which have a surface continuously graded in sensitiveness, the eye and the surfaces of the bodily members. Aristotle does not work this out, but hence, probably, the reason why the discrimination of size and figure is limited to sight and touch.

442 b 9. Cf. De An. ii. ch. 6, 418 a 15; iii. ch. 3, 428 b 18, 25, where he qualifies the statement that ἤδω αἰσθήσεις is true, by the expression ἦ δὲ ἅλλας ἐκεῖσται τῷ ψείδος. Apparently he did not know of colour blindness.

442 b 11. οὐ δὲ cannot mean another set of people as Simon and St Hilaire think. It is part of the same doctrine as the preceding one to reduce the ἤδω to the κοινά. The error is (1) to assume that all sensation takes place by means of contact; (2) not to discriminate universal qualities of objects from the purely tactual, i.e. to treat them all as the data of a single sense; (3) to reduce all the sense qualities to these quasi-tactual determinations.
COMMENTARY

442 b 13. σχήματα. Cf. Theophrastus, de Sensu, 65: τὸν μὲν ὁδὸν ἐπὶ τῶν σχημάτων γνωσεῖν τε καὶ πολυμετῆ καὶ μικρῶν καὶ
λεπτῶν...τραχύν δὲ ἄντα καὶ γνωσεῖν...τὸν δὲ γλυκὸν ἐκ περιβεβην
συγκείοις σχημάτων, αὖ δὲν μικρῶν κ.τ.λ.

Angularity was a characteristic of the atoms which caused acid
and harsh tastes, roundness of those that caused the sensation of
sweetness; but their size and their difference of impact on the body
together with the heat supposed to be thus caused (vid. loc. cit.)
played a part also.

For the Democritean theory of colour cf. Theophrastus, 73
and 80. The behaviour of the atoms relative to the σάμη (cf. above
on Empedocles, ch. 2, 437 b 12) also was a determinant, as well
as the density of the atmosphere, according to Democritus.

442 b 14. Alexander says that the preference is given to sight
rather than touch because the latter does not perceive διάστημα
(distance outward) and πλῆθος (a multitude of units). But surely
the clause τὰ γαϊν κ.τ.λ. contains the reason. The illative force
of γαῖν is continually backwards. The clause τὰ γαῖν κ.τ.λ. cannot,
of course, be a consequence of εἰ δὲ ἀρα...τῆς γεώσεως μᾶλλον. It
must be the ground for it. Hence the construction is loose; after
μᾶλλον should follow ἐκρήγη without ὡστε and the τὰ γαῖν κ.τ.λ. clause
should succeed. But that would make the argument too long and
lumbering. Hence the τὰ γαῖν clause is brought up and has the
additional function of confirming the καϊν ἡ ὀθέματι κ.τ.λ. clause.
It is clear that if it confirm the εἰ δὲ ἀρα clause, it will, whether
intended or not, support the previous one. Aristotle argues ’if it
is the function of taste to discriminate the κοινά,’ and this we should
infer from the atomist theory that taste discriminates the most
minute spatial difference—τὸ τραχύ and τὸ λείω in particles
imperceptible to the other senses, then it must in addition to perceiving
the other κοινά be the best judge of figure.

But if the claim of taste to perceive best the κοινά rest on the
fineness of its discrimination (falsely asserted), surely the real
delicacy of the sense of sight is the cause of its justifiable claim.

The superiority of the sense of sight is as a rule assigned to its
intellectual character: cf. ch. 1, 437 a, Metaph. 1. ch. 1, 980 a 25,
De An. III. ch. 3, 429 a 3, ch. 13, 435 b 21. In the Problems, 886 b 35,
we read that sight is ἐναργατέρα than hearing, which comes to much
the same thing as ἀκριβοτέρα in the sense of distinct. It is not said
that touch generally is the most delicate of the senses; it is only
contended that relatively to the senses of the other animals it is most delicate in man (441 a 2–3).

It looks, of course, strange to assign the discernment of the common sensibles to one sense when they are said to be common. Aristotle no doubt means their accurate discrimination. Simple experience would show that this is best obtained by sight.

442 b 20. ἰσοτιμίων. Cf. De An. ii. ch. 11 and below ch. 6, 445 b 26 sqq.

442 b 22–26. Surely an account of proportionate elements in figure could be given analogous to the theory of proportionate numbers which he accepts.

442 b 28. Aristotle’s treatise on plants is not extant. Two by Theophrastus survive, De Causis Plantarum and Historia Plantarum.
CHAPTER V.

442 b 29. Τὸν αὐτὸν κ.τ.λ. Alexander maintains that this refers to ch. 4, 440 b 30, where smell and taste are said to be σχέσεων τὸ αὐτὸ πάθος. He is now to explain the analogy between the two. Its objective basis is the fact that the process involved in the genesis of each is the same; it is ὁ οἶνος βαφή τῆς καὶ πλάσματος (445 a 15); it is a process of infusion or solution. Add to this the fact that in both cases τὸ ἡμιόν is the agent, with the sole difference that in taste it is not already modified, but in producing odour it must have been previously mingled with liquid. Further, as the vehicle of taste is τὸ ἠμιόν, so that of odour is ὑγρόν, for, as pointed out in 443 b 6, air as well as water is ὑγρός. Heat also seems to be operative or rather co-operative in the production of both (cf. 443 b 17 and note).

Here Aristotle calls the agent operative in the production of odour τὸ ἡμιϊόν ὑγρόν. Elsewhere he names it τὸ ἡμιϊόν ὑγρόν, and cf. De An. ii. ch. 9, 422 a 6: ἔστι δ' ἢ ὑγρή τοῦ ἡμιϊον. Hence Thurot, Torstrik, De An. p. 158, and Neuhäuser (Aristoteles' Lehre von dem sinnlichen Erkenntnisvermögen und s. Organen, p. 25) propose to read ὑγρόν here instead of ὑγρόν, and Sussemlh (Burs. Jahresth. xvi. p. 266) has lent his support to this conjecture. But, as Alexander points out, it makes no difference whether we call the agent here ἡμιϊόν or ὑγρόν. We can call it either dry substance mixed with liquid or liquid mixed with dry. The main point is, that it must be μεμηγμένον τι, i.e. τὸ ἡμιϊόν ὑγρόν.

442 b 30–31. ἐν ἄλλῳ γίνεται. The new γίνεται is the identical element in air and water of which it is the function to form a vehicle and medium for odour. Alexander (p. 89, l. 2 [W.]) has named this τὸ διάφανον (following Theophrastus) on the analogy of the term τὸ διαφαρέτικα which is applied to the common constitution of air and water which enables them to form media for light. Cf. De An. ii. ch. 7, 419 a 22 sqq., where however he says (l. 32) that the medium of smell has no special name.

The expression ἐν ἄλλῳ γίνεται is, however, quite vague and may
mean merely en τῷ ὀσφραντῷ—‘in the domain of odorous quality.’

τό ὀσφραντὸν is the object of smell as τό ἄκοντὸν is the object of hearing.

443a 1—2. ἡ πλυστικὴ ἡ ῥύπτικὴ. Cf. ch. 4 ἐναπολύοντες
441b 17, and beneath 443b 8 ἐπολύοντος and 445a 16 πλύσει. πλύσει is to wash; ῥύπτειν seems to contain more definitely the idea of scouring; the Latin rendering for it is abstergere. In the examples of its use in Aristotle (e.g. Problems, 935b 35) it takes the accusative of the thing cleansed. Hence evidently ῥύπτικῶν ἐφροσύνης means ‘able to cleanse, by scouring off and absorbing the surface of dry substance.’ St Hilaire translates ἡ πλυστικὴ ἡ ῥύπτικὴ ‘en tant qu’il peut transmettre et retenir,’ Hammond, ‘by virtue of its capacity to exude and throw off (dry savour).’ But these renderings are impossible.

443a 3. καὶ ἐν ὀξυ. Cf. De An. ii. ch. 9, 421b 10: καὶ γὰρ τὰ ἐνδημα δοκοῦν δομῆς αἰσθάνεσθαι, and beneath passim.

443a 4. ῥυπακόρισμα. Testacea must not be taken as a modern zoological designation. Any animal with a shell from the turtle to the sea-urchin is ranked under the ῥυπακόρισμα: cf. Hist. Animal. viii. ch. 2, 590a 19 sqq. Aristotle is, no doubt, thinking here of shell-fish. An example is afterwards given in 444b 13—(αἱ τορφῆι) the purple-murex which, he asserts in Hist. Animal. viii. ch. 2, 590b, goes in pursuit of its prey and feeds on minute fishes.


443a 6. ὅτε ἀπῇ κ.τ.λ. Aristotle thought the motion fishes make with their gills was not breathing. It is the expulsion of the water, which is taken in with their food, and which performs the ‘cooling’ function effected in respiring animals by the air. Cf. Zeller, Aristotle, ii. pp. 43, 44, and Aristotle, De Resp. 476a 1 sqq. especially 10: τὰ δὲ βρῶχα πρὸς τὴν ἀπὸ τοῦ ὁφασίου καθάψεις.


443a 8. φύση. Cf. note to 442b 30—31. Mr Cook Wilson (Journal of Philol. xi. p. 119) conjectures πλείως instead of φύση. This is possible but not necessary. τὸ ὀσφραντὸν is indifferently the πάθος of the thing that smells and the odorous thing itself.

COMMENTARY

443 a 12. For the doctrine contained in this statement cf. De Gen. et Corr. ii. ch. 2, 329 b 11; the elements differ only κατὰ ἀπτὴν ἐννυτίσειν.

443 a 14. χυμὸν καὶ ἕψητην. Cf. De Gen. Animal. 761 b 9; ἤθαλαττα ψηρά τε καὶ σωματωθος. The dry element is of course the salt contained in it; cf. 441 b 4: οἱ γὰρ ἄλοι γῆς τι εἶδος εἶναι. The reference for λίθος below is Meteor. iv. ch. 7, 383 b 20: (λίθος) γῆς μᾶλλον, for ξύλα also ch. 7 and for χρυσός etc. chs. 8, 9, 10.

443 a 15. ἐλαιον. Either the oil said to be extracted from salt has more smell than that which comes from natron and so the previous statement is directly verified, or there is a greater quantity of this product derived from salt and thus the strong smell of salt is explained by the fact that it contains more ψηρον than the other substance.

What the process referred to is, one can hardly tell. Aristotle in Prob. 935 a 8, talks of τὸ ἐν τοῖς ἐλαιοι ψιγωτάμενον ἐλαιον, and this should mean a deposit or sediment. ἐξεικαμάζων should point to some process in which heat was employed. ψηρον was compounded with oil to form soap. Perhaps something similar was done with salt. Impure salt and oil may have been boiled together, and the product which distilled over collected. This would rather confirm the suggestion that Aristotle is referring to the stronger smell of the one compound than of the other.

ψηρον is any salt of sodium or potassium that has a strong alkaline reaction. It is not potassium nitrate—our salt-petre.

443 a 20. τὸ ψηρον. For ἄργυρος, κατάπτερος cf. Meteor. iv. ch. 10, 389 a 8. Anything that melted with heat was held to be aqueous. We must remember however that the concepts of τὸ ψηρον and ὠδόν are wider than what we understand by moisture and water. They correspond more nearly to the modern concept of the fluid state of matter. Hence Aristotle could talk of τὸ ψηρον in metals without meaning exactly that water, the actual particular substance known as such, was found in them. He was under the necessity of using popular terms with a more or less restricted denotation and a particular intension, for wide and far reaching scientific generalisations. To our mind this inevitably suggests both a fancifulness in the generalisation and a vagueness in the concept of the particular substance which permitted the name for it to be so widely applied. Both those characteristics are true of all primitive theories for, as Aristotle himself remarks (Phys. 1. ch. 1, 184 a 21): ἐστὶ δὴ ἡμῖν πρῶτον
443 a 23. Cf. above ch. 2, 438 b 26 sqq. and notes. ἀναθαμάσιας (cognate of Latin fumus) is used in two senses: (1) in its generic meaning it corresponds more exactly to our word reek; it is any vapour which rises up and is wafted upwards from a substance. As such it has two species (cf. especially Meteor. II. ch. 4, 359 b 27 sqq.) which are distinguished as being respectively moist and dry or at least as containing a greater proportion of ὑγρόν or ἐφρῶν respectively. The former is steam or moist vapour, the latter is more accurately described as smoke. Aristotle expressly proposes to use the general term to represent the latter variety (as he does in I. ch. 3, 340 b 27 sqq.) and this (2) is its second and more restricted meaning. Both species of ἀναθαμάσιας are hot by nature. The dryness of the smoky kind comes from the earth which enters into its composition (340 b 26).

443 a 24–25. καὶ πάντες...ἀφρῆς. This seems to be a case of dittagraphia of the passage beneath l. 27. In consequence of the scribe’s mistake l. 27 was mutilated and hence we must restore it, with Christ, the ἐπὶ τοῖς which appears here.

443 a 25. Heraclitus, fragment 37 in Bywater’s edition: cf. Burnet, Early Greek Phil. p. 136. Hence Heraclitus must have held that odour was smoke.


443 a 34. ἄρμαται κ.τ.λ. Cf. De An. II. ch. 9, 421 b 10 sqq.

443 b 2. ἀπορροῖαι. If the sense of smell were stimulated by effluxes it would be really a sense of touch, cf. 440 a 21 and note. Another reason against the efflux theory (noticed by Alexander) is given in Problems, 907 a 33. If that theory were true, odorous objects would evaporate away in time. Aristotle does not deny that smoke and vapour are odorous (cf. above ch. 2, 438 b 26 and Prob. 906 a 21 sqq. where he talks of the odorous qualities of θυμίζομαι); he only means that exhalations are not the mechanism for transmitting odour. The sensation of smell is not caused by the evapo-
COMMENTARY

rated substance impinging on the sense organs (cf. De An. 421 b 16). The μετάζωσις in respiring animals is the air, and when that enters the nostrils it can be described as an ἀναθύμιασις indeed, but it is πνευμάκωσις (cf. below 443 a 29)—a waft of air.

Aristotle has, however, great difficulty in not regarding odour as a gas or the analogous diffusion of a solid in a liquid. Cf. 438 b 26 and below ἀείμοδος 444 b 33, De An. 421 b 24, and below 444 a 24 sqq.

443 b 4. πνεῦμα—air or wind—is more especially the air we breathe.

443 b 7. ὑγιός. Between what is the similarity? Aristotle is explaining the correspondence between tastes and odours; he has already pointed out one identity—the ψυχή of the vehicle of both. Now he asserts that the process which generates the two is identical—ἀπόστροφώσις. The argument is ‘If in this case—the production of odour—the action of dry substance on moist is the same as in the production of taste—ἀπόστροφωσις, then we can explain the analogy of the two.’ He is not comparing the effect of τὸ ξηρὸν on air with its effects on the fluids proper, otherwise he would have said ἐν τοῖς ἄλλοις ψυχῶν after just pointing out that ἀνὴρ ψυχῆς τὴν φύσιν ἔστιν. He means τοῖς ἔρωσιν to include air and then gives air as the example of τὰ ψυχῶν which is most important for present purposes. It is a very common function of καί in Aristotle to coordinate the generic and the specific, the latter coming second and illustrating the former or defining it more exactly (cf. Bonitz, Ind. p. 457). Cf. in this treatise 439 a 18 sq.: τὴν οὐσίαν καὶ τὴν ἐνέργειαν, 441 a 10 sq.: τὸ βρέχον καὶ τὸ ἡλόω, 441 b 19 sq.: τὸ ξηρὸν καὶ τὸ γειώνει, etc.

The above is Alexander's interpretation, but he suggests that the argument may be intended to compare the action of τὸ ἐγχυμον ξηροῦ in producing odour in air and in the fluids proper. If it is the same, then, assuming already that odour is produced by flavoured substance, we could explain why the odours we are cognisant of (which are propagated in air) correspond singillatin to flavours (which exist in liquid), Alex. 94, l. 20 (W.): κατὰ γὰρ τὰς τῶν χυμῶν διαφορὰς ἔστωτα καὶ ἀείμοδος διαφοράι, ἐκ γε ὑπὸ τούτων ἐκεῖνοι γίνονται, ὡς ἐπικταί ἐκεῖνοι ὁ φίλον ἐκείνος, ἐκ σύντος ἔχων.

One thing seems certain, that Aristotle is not comparing the action of τὸ ξηρὸν in producing tastes in water, with its action in diffusing odours in air, for in that case all mention of the propagation of odour in water would be omitted, and it would be natural
to infer that it did not exist in water: but this is the reverse of the theory for which he contends.

443 b 8. ἀνάλογον κ.τ.λ. Cf. De An. ii. ch. 9, 421 a 16–18: ἦσσα μὲν γὰρ ἀνάλογον ἔχειν πρὸς τὴν γεύσιν καὶ ὁμοιός τὰ εἶδη τῶν χυμῶν τοῖς τῆς δομῆς. But further on (loc. cit.), in 26 sqq. he points out that though smells are distinguished as γλυκό, πικρό, ὀμφάλοι, τίμωρον, ἐτερετὴς, and elsewhere, the epithets applied to taste, yet not all objects have the taste and smell designated by the same name—τὸν ἀνάλογον δομῆς καὶ χυμῶν. Some are sweet, both to taste and smell, others not.

443 b 15–16. Cf. Meteor. iv. ch. 3, 380 b 2, where unripe flavours are said to be ἵππος εἰκαστικὸς. Cold generally is the principle which counteracts heat (ἀντιστροφὰς τῆς θερμότητας De Gen. Animal. ii. ch. 6, 743 b 28), which is the great principle of life or activity according to the Aristotelian philosophy.

443 b 17. κινοῦν καὶ δημιουργοῦν. Cf. the similar rôle played by heat in the development of taste and nutrition (chapter 4 especially 442 a 5). Its function in producing odour is not brought into such prominence; but cf. 444 a 26: ἦ γὰρ τῆς δομῆς δύναµις θερμῆ τῆς φύσιν ἐπικαταλίθων and 438 b 27 and also Problems, 906 b 37: ἦ δομῆς θερμάτης τῆς ἐπιπεδής, and elsewhere for the influence of heat in producing smell.

443 b 19. εἰδῆ...δῖόν. It is unlikely that Aristotle here refers to τὸ ἔνδο καὶ τὸ λυπηρὸν as Hammond (p. 173) thinks. If that were so it would mean that odour per se was exhaustively divided into two species, the pleasant and the unpleasant, but nothing is said to confirm this. Aristotle certainly implies that all odours are either pleasant or unpleasant, but he does not elevate those epithets into specific differences. Alexander (De Sens. p. 97, l. 23 sqq. [W.]) conjectures that perhaps τὸ ἔνδον and τὸ λυπηρὸν are the primary species of that kind of odour which is independent of taste, and that the other species are subsequent to them and, possessing no names of their own, correspond to the particular flavours and perfumes from which they originate.

This would make the classification of odours per se pleasant and the reverse correspond on the whole to the classification of the species of the other sense qualities. But it is hardly possible that τὸ ἔνδο καὶ τὸ λυπηρὸν can be regarded as objective determinations like γλυκό καὶ πικρό. Besides, it is clear from De Animal. ii. ch. 9, 421 b 1 sqq. that the same epithets mark the species of odour per se pleasant as those which distinguish the varieties dependent on taste. Among odours per se pleasant are included the scents of flowers.
COMMENTARY

(l. 30 below) and to these in the De Anima are applied the terms γλυκὺς, ὑμητή etc.—ἡ μὲν γὰρ γλυκεία [ἀπὸ τοῦ] κρόκου καὶ μέλιτος, ἡ δὲ ὁμίχλη θύμων καὶ τῶν τουοίτων.

The smell of honey is, no doubt, one of the class of odours which follow the taste. That of crocus or saffron is a scent per se pleasant, for the taste of the substance is not sweet. Probably Aristotle would have explained the phenomenon that many things did not have the corresponding odour and flavour by this distinction between the two different orders of smell. The problem is, however, not worked out.

Alexander, though lending some colour to the suggestion that τὸ ηῦδω καὶ τὸ λιπηρῶν are the species of odour per se pleasant and the reverse, yet does not hold that εἴδη...δῶ here refers to them. Aristotle is referring to the two great divisions of odour—ὄμητή καθ' αὐτὴν ἡδῶν, and that which is only κατὰ συμβεβηκὸς ἡδῶν. The latter is called τὸ θρεπτικὸν εἴδος in 444 b 10. It is true it should rather be a γένος and that term is employed in 444 a 32 and b 4, but Aristotle frequently uses γένος and εἴδος indifferently to designate a class.

Here it certainly looks strange that Aristotle after using εἴδος to denote a wide group should in the next line employ it to refer to infinitae species, but this is characteristic of the carelessness of his style. He says ‘There are two species of odour’ meaning by that two divisions, and then the word ‘species’ suggests to him the fact that some people have denied the existence of any species at all in odour.

443 b 23. κατὰ συμβεβηκός, i.e. indirectly: cf. note on κατὰ συμβεβηκός chapter 1, 437 a 5, 11.


Perhaps there may be a hit in comparing to φακῆ what would be left if the meretricious additions were removed. μελῶν is a perfume, not a spice. Cf. Cic. ad Att. 1. 19, 2.

Perhaps the force of the taunt may be thus rendered: ‘Don’t put hair-oil in your soup!’

444 a 1. νῦν. Aristotle is not necessarily to be regarded as mourning the degeneracy of his own time. The νῦν need not have that signification.

444 a 2. μέλισσαι. Anything contrary to nature (φύσις) is
\textit{βλάως}: cf. the famous \textit{βλάω τις} or \textit{βίος δότις} in \textit{Nic. Eth.} i. ch. 3, 1096 a 6.

The idea here seems to be that gourmands get a pleasure from odour which appears to arise from taste. It is in the exercise of the latter sense (along with that of touch) that men are intemperate. Cf. \textit{Prob.} 949 b 6, etc. and Sir A. Grant, \textit{Ethics of Aristotle}, ii. p. 49.

\textit{444 a} 4. \textit{Ων} here and in l. 9 below is interpreted as \textit{μάλιστα οὐν} by Alexander who, influenced by 21–24 below (q.v.), thinks that other respiring animals also perceived, though in a less degree, this kind of odour. But in 21–24 Aristotle is talking merely of odour in general and explaining why it is perceived by means of inhaling the breath. It is because of its higher function in man that odour is drawn in with the breath, and the same mechanism is provided for animals (in which the higher functions are lacking) in order that Nature might not have to devise a new organ for them (444 b 5).

Independently, however, of the influence of ll. 21–24, there was some reason for Alexander interpreting \textit{οὐν} as \textit{μαλιστα οὐν}, for otherwise Aristotle appears to make an absolute qualitative distinction in sensation depend upon a mere quantitative difference—the greater size of the human brain as compared with that of other animals.


\textit{444 a} 13–15. This is obviously the same account of the origin of catarrh as is given in \textit{De Somno}, ch. 3, 458 a 2. The \textit{αναθυμίασις} is not an exhalation from food as it exists outside the body; it arises from the food that has been eaten. The process by which the nutritive element in food is diffused into the blood is called by Aristotle an \textit{αναθυμίασις}—volatilisation—in 456 b 3. It is an excess of this exhalation which, when carried up to the brain, produces a flow of phlegm.

\textit{ψυγεα} is defined in \textit{Phys.} vii. ch. 3, 246 b 5; \textit{Prob.} 859 a 12, etc. as a \textit{συμμετρία}—balanced proportion—of heat and cold (cf. beneath l. 36).

\textit{444 a} 18 sqq. Cf. above ch. 4, 441 b 30. Food is always a mixture. Alexander explains that it is always the cold associated with the liquid element in food which is the cause of its unhealthiness. He, however, identifies the \textit{αναθυμίασις} from food which causes catarrh with the odour which is connected with taste. There is, however, nothing in the text to justify this and Aristotle has just refused to identify odour with \textit{αναθυμίασις}. Probably in
order to get my translation oσa should be inserted after ύρπι. This is ugly but possible. If we render ‘whether dry or cold’ there is no point and, indeed, there is disagreement with the doctrine that all food has both characteristics.

Aristotle is probably thinking of the supposed efficacy of some perfumes in expelling colds and warding off infectious diseases.

444 a 20. Ἡδέα must be understood, if not read, after ἦ καθ’ αὐτῆν. It appears after εὐωδὸς in mss. L S U. Alexander interprets  Ἡδέα δομή and Aristotle does not elsewhere talk of ἦ καθ’ αὐτῆν δομή, but of ἦ καθ’ αὐτῆν ἥδεα (δομή): cf. 443 b 30. Bekker’s text is ἦ δ’ ἀπὸ τῆς ὀσμῆς τῆς καθ’ αὐτῆν εὐωδοῦς ὑπωσών ἐκλ. If we retain this reading the missing substantive after εὐωδοῦς cannot be τροφή as Bonitz (Ind. p. 533 a 3) suggests. Aristotle is discussing not the food but the odour which is ωφελίμως. Hayduck (Prag. Kön. Gym. zu Meldorf, 1877) suggests ἕδος after εὐωδοῦς, as also does Mr Cook Wilson (Journal of Philol. xi. pp. 119–120); but it is doubtful whether ἕδος could designate the objective quality of odour which is supposed to promote health. The latter also suggests ἦ δ’ ἀπὸ τῆς ὀσμῆς τῆς καθ’ αὐτῆν ἥδεα εὐωδοῦς.

I suggest ἦ δ’ ἀπὸ τῆς ὀσμῆς καθ’ αὐτῆν εὐωδοῦς. Cf. 445 a 1: αὐτῆς δὲ καθ’ αὐτῆν τῆς δυνατοῦς οὐδὲν φροντίζουσιν.

Aristotle could quite well talk of εὐωδοῦς καθ’ αὐτῆν and δυνατοῦς καθ’ αὐτῆν. ἦ καθ’ αὐτῆν εὐωδοῦς would mean odour essentially pleasant, whereas ἦ καθ’ αὐτῆν ὀσμῆ would mean smell which is essentially pleasant. But Aristotle does not wish to show that the opposite kind of odour is not essentially odour, but that it is not essentially pleasant.

444 a 21. ἐὰν τοῦτο. Because of its function in maintaining health in man who is the final aim and end of all the endeavour of nature. Aristotle is talking of smell in general; he does not mean that its higher function is shared by any of the animals.

444 a 23. μετὰ κ.τ.λ. Aristotle seems to think of the air as entering into the constitution of the body. Certain organs e.g. that of hearing (cf. ch. 2, 438 b 21 and De Gen. Animal. v. ch. 2, 781 a 24 sqq.) seem to contain air. Animals that do not breathe have a σύμφωνον πνεῦμα which performs the same function as the breath. (Cf. De Somno, 2, 456 a 12.) The probably spurious writings περὶ πνεύματος and περὶ ζωῆς κινήσεως also declare that there is a σύμφωνον πνεῦμα in the lungs of respiring animals and in
the heart. This doctrine may be a legitimate deduction from such passages as the present. Cf. 481 a 1, 27, 482 a 34, 703 a 15 etc. Cf. Introduction, sec. vi. and the passage there quoted where the σύμφωνον θερμόν is also called πνεύμα.


444 a 27–31. There is no reason for considering that κατακέχομαι...κίνησιν should be postponed till 444 b 7 as Susenih (Philol. 1885) and Hammond think, or for deleting it as Hayduck (op. cit.) wishes. It is certainly better to postpone it than to delete it and it comes in quite well at b 7, but it may stand here quite well as a note to amplify what has been already said. It points out the double function of ἀναπνοή, the operation which has just been under discussion.

ἀσ παράγετε. Cf. De Resp. 473 a 24. The windpipe is the essential organ for conveying the breath. When it is closed death ensues. Not so in the other case.


444 a 35. χαίρει. St Hilaire (p. 61) has a marvellous notion that Aristotle in distinguishing the higher kind of odour is erecting a personal liking into a theory. But for evidence that the distinction was widely recognised cf. Eth. Eud. 111. ch. 2, 1231 a 11: διὰ ἐμελείας ἐφ' ἕκτα. Στρατόσυνος τὰς μὲν καλὰς ὄξεις, τὰς δὲ ἤδιοι.

444 b 3. Biehl and Bekker read διὰ τὸ ἀναπνεῖν which, of course, must be taken along with ὤσα πλείωνα ἔχειν. In that case we must understand διὰ τὸ ἀναπνεῖν to be equivalent to ἀναπνοῆς ἐνεκόν because we learn from De Resp. 476 a 7 that breathing is the final cause of the existence of the lung (ὁ μὲν πλείων τῆς ὑπὸ τοῦ πνεύματος καταφύγει τὸν ἐνεκόν ἀτιμάσθη); the determining cause in the ordinary sense both of the existence of the lung and of ἀναπνοή alike is rather the greater vital heat of respiring animals (cf. 477 a 14).

But if we take this reading, the sense becomes very difficult. The sentence τοὺς δ' ἄλλοις...διὸ ποιῇ ll. 2–5 will mean that Nature gave the rest of the respiring animals the kind of smell not necessarily connected (for health reasons) with the head, in order not to make two organs and one of them have no functions. The thought will be that the animals, having nostrils, may as well smell by them. This is to make ὤσα μὴ αλοιθήτιμα διὸ ποιῇ equivalent to the well known Aristotelian doctrine that Nature does nothing in vain. But this doctrine may be variously interpreted; here it would mean that,
COMMENTARY  

having once made a thing, Nature must assign it a use. But such a
maxim is hardly to be identified with the principle of parcimony
—‘entia non sunt multiplicanda praeter necessitatem’—which is
surely the true import of the Aristotelian doctrine. If Nature really
does nothing in vain and does not wish to make a superfluity of
organs, it would surely be better not to give the lower animals
nostrils at all if the species of smell connected with food has no
necessary connection with the upper part of the head. A still
greater objection to the above interpretation is, that αἰσθήθημα has
to be taken as referring (1) to the organ of smell and (2) to the
organ of breathing—the windpipe which is not an αἰσθήθημα at all
(Alexander notices this).

It is as above that St Hilaire, following most commentators,
takes this passage, but Simon proposes to detach διὰ τὸ ἀναπνεῖν
from what precedes and connect it with what follows translating
as I have done. The reading must thus, of course, be διὰ τοῦ
ἀναπνεῖν which is the version found in mss. P U pr. S. This is also
supported by Mr Cook Wilson (Journal of Philol. xi. p. 120).
Cf. De Resp. 475 b 19: (τὴν κατάφεσιν ποιεῖται) διὰ τοῦ ἀναπνεῖν καὶ ἐκπνεῖν. The argument then is, that Nature made respiration
the means of perceiving odour in the case of the other respiring
animals in order to avoid making a separate sense organ for them.
The αἰσθήθημα διὰ are the nostrils in man and the problematical
new organ of sensation in the other animals. Nature, in making
the lower respiring animals perceive odour by means of the nostrils,
avoided making a second sense organ of a new type—a type not
found in man, her chief creation. But in the case of the non-
respiring animals, as he goes on to say, probably some other
contrivance has to be resorted to. It is thus that Alexander
interprets from ἀναπνεῖν onwards; hence it is strange he does not
notice the ineptitude of the reading διὰ τὸ ἀναπνεῖν.

444 b 5. ἀναπνεῖν κ.τ.λ. Biehl, following E.M.Y, strikes out
ἐπεστρέφ before and ὅς after the καὶ which precedes ἀναπνεύσωσιν.
These stand in Bekker’s text, which if retained will hardly give the
sense required. St Hilaire renders—‘et il leur suffit, quoiqu’ils
respirent les deux espèces d’odeurs comme les hommes, d’avoir
uniquement la perception de l’une des deux,’—a mistranslation.

Hammond—‘It is enough for these respiring animals that they
have the sensation of only one class of smells’ etc. But this is
merely an obvious and insipid deduction from what has been said
about the greater size of the human brain, and besides it throws no light, as it should, on the previous clause.


444 b 13. κυτίας. Not the species known by the name κυτία in modern Zoology, which is a ‘beetle allied to the Cryptarcha.’ Cf. Hammond, p. 176.

444 b 13–14. αἱ πορφύραι. Not ‘purple sea-fish’ nor ‘les rougets de mer.’ Aristotle asserts in Hist. Animal. viii. ch. 2, 590 b 2 sqq., that η ἐντόφυτον is among the class of shell-fish that move and that it is caught by a bait, as it feeds on small fishes.


τοῦ γὰρ κ.τ.λ. Cf. De An., loc. cit. 21–23. It is strange that Wallace (Aristotle’s Psychology, p. 246) should think that Aristotle did not really mean that the manner of perceiving smells was different in respiring and non-respiring animals when he quotes (§ 7) the passage from the De Sensu here beginning οὗ τῶν αἰρέτων τρόπων.

By a difference in ‘manner’ Wallace must mean a difference in the quality of the sensation. He blames Aristotle for being ‘misled by language’ in assuming that odorous quality should be perceived by the sense of odour.

But Aristotle throughout proceeds on the principle that the only way for establishing the identity of sensations is the identity of their objective ground. It is really impossible to tell whether the qualitative character of the mere subjective affection is identical in any two people or any two species. We have to assume that, where the objective content is the same, the quality of the sensation is the same. Thus I believe that my sensation when I enjoy the perfume of a rose is the same as my neighbour’s. We apprehend something that is chemically identical.

Now, though Aristotle knew nothing of chemical qualities in our sense, he tries to prove the objective identity of that which is perceived both by respiring and non-respiring animals. He points
COMMENTARY

out in De An., loc. cit. 23, that it has the same physiological effect. Strong odours—and he meant by odours practically chemicals diffused either in air or water (cf. note to 443 b 2 and Introduction, sec. vii.) have a destructive action upon both classes alike and hence are the same. This inference was all the more easily made because he conceived their effect to be exercised upon the organ of smell or, at least the head, the region in which it is situated and out of the material of which it is formed (cf. beneath l. 34 καρμβαρδον). That there should be chemical qualities apart from taste or smell, and qualities of any kind which are not perceived by some of the senses, would have appeared strange to Aristotle and the normal Greek mind, for which had not been shattered the harmony between Nature and man, in whom evolution has developed senses to give warning of most of the ordinary collocations of qualities which affect his well-being. But, if Aristotle had discovered that any quality, not distinguishable directly by man, still had an effect upon the sentence of some other form of life (e.g. the ultra-violet rays on ants), he would have been bound by his own principles to assume the existence of a new sense in these creatures, if the quality which affected them had a sufficient amount of objective difference from the qualities which stimulate human sensibility.


μὴ ἀναπνέοντα Cf. De An. 421 b 14: μὴ ἀναπνέοντα δὲ ἄλλ’ ἐκπνέων ἢ κατέχων τὸ πνεῦμα οὐκ ἀσεβίζι.


Alexander and all other editors read ἐκ τοῦ διώνομον ἄραν αὐτῶν εὐθείας. In that case the meaning would be ‘from the possession of the faculty’ or ‘from the time when the faculty (of seeing) exists.’ The ancient Latin translation has ‘a facultate existente.’

444 b 31. δοιχιραίνει. In Hist. Animal. ix. ch. 40, 626 a 26 he points out that bees dislike unpleasant smells. He probably is thinking of this here and below in l. 35—θέων.

But in the De An. iii. ch. 13, we hear that excessively strong odours, colours, sounds do not destroy life except κατὰ συμβεβηκός, 435 b 10.

The flesh (cf. De An. ii. ch. 11, especially 423 b 26) really forms a medium for touch. But the difference between this and an external medium forms an important basis for classifying the senses. Cf. De An. iii. ch. 12, 434 b 15, and ch. 13, 435 a 16 sqq.

445 a 11. καὶ ἐν ἄρει κ.τ.λ. Because the objects of sight and hearing exist in air and water. Alexander says that so far as the γένεσις of δοµή is due to ἐξήρωσις it is related to taste and touch, so far as ἐν ὑγρωσίᾳ γίνεται it is related to the externally mediated senses.

Note below τῷ διαφανείᾳ = τῷ ὑδρατῷ: cf. chapter 3.

445 a 15. οἷον βαφή 

Note that Aristotle does not say that this is anything more than an analogue to the process which produces odour.


445 a 21. Alexander thinks that Aristotle means that, because περιττόματα (περίττωμα = excrement) are both dry and liquid, they show that the food from which they are secreted is composite, i.e. consisting of both γῆ and ἔδωρ. (This must be so indeed according to the doctrine of the Πρὶ μακροβιωτήτος, ch. 3, 465 b 18–19, where περιττόμα is said to be ύπόλεμμα τοῦ πρωτέρου, i.e. the food.)

But probably the argument does not run quite in this way. Aristotle says that food must be composite. But probably he means a little more than merely μεχρισμένον as in chapter 4, 441 b 30 sqq. σύνθετος when applied to the objects of sense tends to mean more than merely composite, but refers continually to things that have density: cf. Meteor. iv. ch. 5, 382 a 26 sqq.: ἀπαντά ἐν ἑν τὰ σώματα τὰ σύνθετα καὶ ἄϕαιναν οὐκ ἀνεν πῆξεν, τὸ σύνθετον = τὸ συνεστήμον. Cf. συνηθοῦς below. σῶμα once more tends to have the same application: cf. beneath l. 25: ἐπὶ πολὺ ἡ καὶ τὸν εἶδον τὸν ἄλομα ᾠγαπεῖται, and σωματόδες above. Though all the four elements, fire and air included, are σώματα, yet we hear in Prob. 932 b 2: των ἐς θάλατσα καὶ μᾶλλον σῶμα. σωματόδες and γεώδεσ are constantly conjoined: cf. Bonitz, Ind. p. 745 b 21 sqq.

Now δοµή is nothing crassly material in this sense; cf. Prob.
COMMENTARY

865 a 21: ἡ δαμῇ ὑ᾽ σωματώδης. Hence he must prove that γῆ, the most bodily of the elements, is an essential constituent of τροφῆ. Hence he is probably thinking of περίττωμα as something solid (it is the heavy element in food (cf. 442 a 7), and hence is to be identified with γῆ, the heaviest element; cf. De An. iii. ch. 13), and more or less γεώδες, and γῆ is ἔργα. The argument is—the excrement proves that in the compound of which food consists there must be solid matter. But it might be objected that the water in it (and water is one of the media of odour) is the really nutritive element. No, says Aristotle, water alone does not nourish; some of the more solid elements must be mingled with it and, if that is so, still less likely is it that air, which cannot be solidified, should support life. The reasoning is very much condensed. Water, ἀμωτον ὄν, cannot nourish a solid body. But cannot it be solidified? Not unless something γεώδες is mixed with it. This would be true (cf. 441 a 30: θραματιμένον οὐδὲν φαίνεται παχυμένον τὸ ὑδρά) except in the case of freezing, which would certainly not produce a nutritive solid! Still less likely is it that air could be solidified. On this interpretation there is no need to insert ἐν after ἔτη δ', l. 22, as Hayduck, op. cit., suggests.

The waste residue in plants is, Alexander explains, such substance as gum, the bark and in a way the leaves, etc.


445 a 29. ἀναθεμάτων. Cf. note to 443 a 23 and cf. 444 a 24. Aristotle allows the ἀναθημάτων theory in this modified form. The medium may be described as an ἀναθημάτων. Just as in the previous chapters, here also he adopts something from previous theories. The medium is a gas, in the case of breathing animals at least, but not an exhalation from the odorous substance. But he can only explain odour as a quasi-diffusion of substance in this gas. With Aristotle, however, it is difficult to distinguish medium and object (cf. above 445 a 14 where he identifies τὸ ὀρατόν and τὸ διαφανές), and so we should be bound to say odour was an ἀναθημάτων of some sort; cf. Introduction, sec. vii. That is however not quite accurate, as it is some nature common to both gases and liquids that is τὸ δύσεμον or the κοινὴ φύσις of the two to Aristotle.

He seems here to have in a way anticipated the discovery of the truth that the diffusion of a substance in a liquid is analogous to its behaviour as a gas. Once more he differs from modern theory in
regarding τὸ δύομον as a κοινὴ φύσις which had a permanent existence of its own instead of as a mere state, or disposition to act, of matter which may cease to be so characterized.

445 a 32. αἰσθήσεως. This perhaps points to some subjective experience of his own.

445 b 1. As Biehl suggests, περὶ τῶν αἰσθητῶν must have fallen out or must at least be presupposed before καθ’ ἑκαστὸν αἰσθητήμαν. Aristotle has not discussed the αἰσθητήματα since chap. 2, except incidentally in chap. 5, and at the beginning of chap. 3 (439 a 7) he proposes to give an objective account περὶ τῶν αἰσθητῶν τῶν καθ’ ἑκαστὸν αἰσθητήματον.
CHAPTER VI.

445 b 3. ἔ τὰν σώμα κ.τ.λ. This is a principle with Aristotle. Cf. De Coelo, i. ch. 1 ad init. σῶμα is μέγεθος ἐπὶ τρία—a tridimensional magnitude. More strictly μέγεθος is the quantitative determination that all bodies possess. μέγεθος is that which is divisible into continuous parts (cf. Metaph. v. ch. 13, 1020 a 11: μέγεθος δὲ τὸ ἐκ συνεχῆς (διαμέρεσθαι)). The continuous (τὸ συνεχὲς) is that which is infinitely divisible. Compare De Coelo, 268 a 6: συνεχῆς μὲν ἐστὶ τὸ διαμέρεσθαι ἀπὸ ἀπὸ διαμερίζεται, σῶμα δὲ τὸ πάντα διαμερίζεται. Cf. also Phys. iii. chs. 6, 7. There Aristotle tells us that μεγεθῆ are infinitely divisible only; i.e. though the process of division can be carried ad infinitum there are no actually existing infinitely small parts. Compare μέγεθος l. 10 below, συνεχὲς l. 29, etc.

445 b 4. παθήματα, a variant for πάθη: cf. Bonitz, Ind. p. 554. In De Coelo, i. ch. 1 Aristotle tells us that the objects of physical science are μεγεθῆ καὶ σώματα with their πάθη and κινήσεις, and the ἀρχαὶ, i.e. the elements.

445 b 7. ποιησίαι. Cf. ch. 3, 439 a 18: ποιήσει τὴν αἰσθησίαν etc. This is not intended as an argument for the alternative ἀδύναμον, but is rather a development of the positive thesis that infinite divisibility of the σῶμα entails infinite divisibility of the πάθος.

445 b 9. τὴν τε αἰσθήσιν. Infinite divisibility of the παθήματα αἰσθησία means infinite divisibility of the αἰσθήματα. Hence all bodies, however minute, will cause sensation and be perceptible.

445 b 10. ἀδύναμον κ.τ.λ. This looks as if it established not the proposition to be proved but its converse. But the reasoning no doubt is—'could we not have αἰσθήματα, extremely minute, which is not the perception of a body?' ‘No,’ says Aristotle, ‘we cannot have any perception, take colour for example, in which the content is not a quantum and hence a determination of σῶμα.’

Cf. below ch. 7, 449 a 22: τὸ αἰσθήματον πᾶν ἐστὶ μέγεθος κ.τ.λ.

445 b 16. τῶν μαθηματικῶν, e.g. lines, points, planes etc. It had been part of the Pythagorean doctrine to give these substantial existence and to make everything consist of them. (Cf. Metaph. i. ch. 8, 13—2
Aristotle distinguishes the objects of mathematics from those of physics in *Phys.* ii. ch. 2, and elsewhere. They are determinations of number and magnitude taken in abstraction from the concrete—τὰ ἡφαίστεια (cf. *De An.* i. ch. 1, 403 b 15) and more particularly considered apart from the motion or change of the objects to which they belong. Compare also *Metaph.* vi. ch. 1, 1026 a 7 sqq. They are not really separable from the things of sense like the object of metaphysics but are considered as such. Cf. *De An.* iii. ch. 7, 431 b 15: τὰ μαθηματικὰ ὁδὸν ἡλικομενά ἀο ἡλικομενά νοεῖ (ὁ μαθηματικὸς). The argument is that if the constituents of sensible objects are not themselves sensible, the only alternative left is that they are mathematical entities.

ἐν κ.κ.λ. We must take this as a further argument against the existence of imperceptible bodies.

It has been conceded that if sensation is not divisible *ad infinitum* the ultimate constituents of bodies are not objects of sense, and further they cannot be objects of consciousness at all, as they cannot be merely mental entities—νοητά. We know objects either by ἀναθετεῖ or by νοεῖ or, as in the case of mathematical entities (already ruled out of court), by a union of the two.

*445 b 17.* νοεῖ is that faculty of the soul which is peculiar to man among mortal creatures and which receives the ἐννοεῖ—forms or intelligible character—of things without their matter (ἐλην). Cf. *De An.* iii. chs. 4–8. The objects of νοεῖ are νοητά and these evidently are simply conceptual contents, as they are said to have their concrete existence in the sensible forms of things. Cf. *De An.* iii. ch. 8, 432 a 2 sqq. νοεῖ in operation (ἐργαία) is identical with its objects (431 b 17, *Metaph.* xii. ch. 7, 1072 b 21).

οὐκ ἐν νοεῖ κ.κ.λ. These insensible objects are the constituents of external bodies and hence must be external. They must be σώματα and contain ἐλην, and ἀναθετεῖ is indispensable for the apprehension of such objects. Cf. *Metaph.* viii. ch. 1, 1042 a 25: ἄλλο γὰρ ἀναθετεῖ αὐτοῖς πᾶσα ἐλην ἔχωσιν. They must be καθ ἐκκοσμίας, and these are the objects of ἀναθετεῖ: cf. *De An.* ii. ch. 5, 417 b 22, etc.

Though Aristotle does not employ this argument here against the existence of imperceptible magnitudes, it raises a difficulty which besets all modern theories of atoms, ether etc. Physical scientists of a certain school continually talk of the atom as a mere concept. They do not explain how it is possible for solid bodies to be composed of concepts. Cf. Karl Pearson, *Grammar of Science*, ch. vii. passim.
445 b 19. The theory of atoms lies at the basis of the doctrine of ἀπάρμαται previously discussed, chapter 4 ad fin. It consists in finding the reality of physical bodies not in their sensuous characteristics, but in some quantitative determination of their minute parts. But Aristotle refuses to entertain the theory that there are bodies with no sensible and only mathematical qualities, and in particular that they are atoms in the strict sense of bodies perfectly indivisible.

445 b 21. τοῖς περὶ κυκλήσεως. The reference is to the Physics—frequently styled τὰ περὶ κυκλήσεως, and in particular, as Alexander says, to the last books. Thomas is still more explicit and says the sixth, where indeed the chief discussion of the doctrine of indivisible magnitudes is to be found. The theory that magnitude is infinitely divisible will be found in the third book, chs. 6 and 7 (cf. note to 445 b 3) and the definition of continuity which, being the characteristic of all magnitude, entails its infinite divisibility, is to be found in Book V, ch. 3. Things that are continuous have a common boundary—ὅταν ταῦτα γένηται καὶ ἐν τῷ ἐκτίθεν πέρας ὡς ἀπτωτός (227 a 11). This is practically repeated in VI, ch. 1: συνεχῆ μὲν ἐν τῷ ἐγχάθα ἐν (231 a 22), where he goes on to show that nothing continuous can be made up of indivisible parts. Indivisible parts must be either entirely discrete or entirely coincident, and so cannot compose the continuous.

Hence Aristotle arrives at another definition of the continuous. It is that which is divisible into parts themselves infinitely divisible—λέγει δὲ τὸ συνεχές τὸ διαίρετον εἰς ὧδ' διαίρετα (232 b 24). Since continuity is the universal characteristic of magnitude, this yields us the further proposition that magnitude is that which is divisible into magnitudes—πάν μέγεθος εἰς μεγέθη διαίρετον (232 a 23). Aristotle shows in addition that, if magnitudes were composed of indivisible parts, motions would be impossible; every distance would be traversed as soon as entered upon if motion, like magnitude, were made up of indivisible parts. Motion is continuous and likewise time.

Those proofs, it is obvious, affect only atoms that are held to be spatially indivisible. To the modern theory which recognises that the atom must have a definite bulk and even a composite structure Aristotle's refutation does not apply. The atoms are only physically not spatially discontinuous, and there is no more difficulty in imagining minute discrete bodies than in the perception of discrete masses appreciable to sight. Aristotle's other objections to an
atomic theory are to be found mostly in the De Coelo and the De Generatione et Corruptione (cf. Zeller, Aristotle and the Earlier Peripatetics, Vol. i. pp. 430 sqq., pp. 445 sqq.). As Zeller says, without the modern theories of chemical, molecular and gravitational attraction, it was difficult to see how discrete atoms could cohere in a solid body, and hence Aristotle’s criticism of the ancient atomists was justified. At the same time also, the arguments in the Physics form a valuable corrective to such modern thought as regards all the individual things of sense as really discrete in structure and only apparently continuous. They are only discrete from one point of view; relatively to the molecule or the atom they are discrete, but relatively to other composite structures water and iron are continuous.

To be continuous is to be thought of merely as a magnitude so far as internal structure is concerned. So elastic balls may have many properties and many forms of action on each other and on other things; but these are relations to external things that affect them as a whole; when regarded in this way they are considered as being internally merely magnitudes, i.e. as continuous. The atom itself relatively to which they are discrete must itself relatively to them be regarded as merely a magnitude, i.e. as continuous. One does not inquire what makes the parts of the atom cohere together and, if one did, one would have to think of the atom as being composed of smaller atoms which again must be continuous. But there comes a point where this continual division and subdivision of matter ceases to have interest. Hence we cannot look to the discreteness of matter for its reality. The reality of objects must lie, as Aristotle said, in the ‘form’ or, as modern theory would put it, in the law of the combination of their elements and the qualitative difference to which that gives rise.

445 b 24. ὅν μὲν γὰρ κ.τ.λ. The passage where we find the doctrine expounded is in the Posterior Analytics i. ch. 20, 82 a 21 sqq. (Cf. also ch. 22, 84 a 29.) There, however, it is set forth in another connection. Aristotle shows that the number of terms to be interposed between the subject and predicate of any proposition which we desire to demonstrate, is not infinite. If it were, the proposition could never be proved, as it is impossible to traverse the infinite. All the terms in the series must be contiguous, with nothing intervening between them... ἕχοισα αὐτάληπον ὡστε μὴ εἶναι μεταξὺ (82 a 31). If there were an infinity of terms to be inserted at any point in the series, it would constitute a break and the terms would not be
contiguous. (For the definition of ἔχομαι cf. Phys. v. ch. 3, 227 a 6—ἔχομαι δὲ δὲν ἐφεξῆς δὲν ἀπτησαι, and 226 b 23—ἀπτησθαι δὲ δὲν τὰ ἄκρα ἁμα.)

There is some difference, however, between a series of terms bound together by the identity of the subject of which they are predicated and a number of specifically diverse but generically identical qualities. According to Aristotle, in both cases they are to be considered as a series arranged between two extremes. In the case of qualities these extremes are the members of the series with least specific resemblance and, if one takes seriously the spatial designation (τὰ ἐντὸς or τὰ ἀνὰ μέσον) applied to them, the intermediate members of the group must be thought of as being arranged in accordance with the amount of the resemblance they each possess to the extremes. We have seen, however, (chapters 3 and 4) that Aristotle does not prefer to think of them as forming a continuum like a line, but as being formed by different proportions in the admixture of the two fundamental extreme qualities, e.g. black and white, sweet and bitter. Though forming a linear series, they do not constitute a uniformly continuous line. Thus though he may, as here, talk of opposites (ἐναντία) in terms of spatial relation and call them ἔχομαι (cf. Catag. ch. 6, 6 a 17: τὰ πλείστων ἀλλάξων διαστημάτα τῶν ἐν τῷ αὐτῷ γίνει ἐναντία διαστημάτων) qualitative difference is really other than spatial diversity. It is this that causes the number of species in a genus to be limited in number. If a genus were really a spatial whole, its parts, the species, would need not merely to be ἔχομαι—contiguous, but συνεχῆ—continuous, and hence capable of resolution into an infinite number of subdivisions (cf. note to 445 b 21). If the members of the series were not merely contiguous but had a common boundary, as things continuous have, it would mean that there was no reason for drawing the boundary between any two at one point rather than another. The only common boundaries are spatial existences—point, line and surface, and these can be drawn anywhere. It is magnitude that is per se continuous, but in so far as genera are not magnitudes they are not per se continuous (καθ' αὐτὸ συνεχῆς, l. 30) and besides do not present this aspect of infinite divisibility.

445 b 25. ἔχομαι. Cf. notes to ll. 21 and 24 above.


445 b 28–30. Division into unequal parts is, Alexander tells us, progressive division of the parts which the first division yields into the same fraction as that which they are of the whole, e.g. the division
of a line into two and again of the half into two and so on. This is the special example of ‘unequal division’ which Aristotle, in *Phys*. viii. ch. 8, 263 a 3 sqq. in reply to Zeno, shows to be infinite—*ἐν δὲ τῷ συνεχεῖ ἕντον μὲν ἄπειρα ἡμέρα, ἀλλ' οἷκ ἐντελεχεία ἀλλὰ δυνάμει* (263 b 28). Any actual division of a continuum into distinct parts is finite. In order for the parts to be distinct the termini of adjacent parts must be, at least, reckoned as distinct. Hence the whole, which was continuous, by the division ceases to be so and *ipsa facta* loses that capacity for infinite division which, as continuous, it possessed.

True the parts again can be divided, but any division of them into distinct elements which can actually be realised is once more finite.

All this seems to point to the conclusion that the very spatial determinant by which we are able to construct a continuum, e.g. a line, and to consider it as resoluble into distinct parts, is itself a qualitative distinction (e.g. direction right or left) which exists over and above the characteristic of magnitude, which is the universal attribute of spatial quantity. Aristotle goes so far as to say (263 b 7) *συμβέβηκε γὰρ τῷ γραμμῷ ἀπειρὰ ἡμέρα εἶναι, ἡ δὲ οὐσία οὐτίν ἔτερα καὶ τὸ εἶναι. Thus, not only has a line (with all other figures) a non-quantitative aspect, but the possibility of determining it as a quantity depends upon this qualitative character. (Cf. also for the general doctrine iii. ch. 7, 207 b 10: ἀπειροὶ γὰρ αἱ διχοτομίαι τῶν μεγέθος.) The result, however, of this is that anything considered as a continuum divides into a limited number of units (*i.e.* can mean little else than units; all things considered as units are held to be equal) but an infinite number of diminishing fractions. Units are the constituents of a continuum, species of a genus.

445 b 30. τὸ δὲ μὴ κ.τ.λ. Cf. note to l. 24 above.


445 b 32 sqq. There is a somewhat similar passage in *Phys*. vii. ch. 5, 250 a 20 sqq. The sound which one single grain of millet makes in falling exists as a separate sound (*καθ' αὐτὸ*) only potentially in the whole, *i.e.* it is not actually a separate sound—οὐδὲ γὰρ οἰδέν ἐστιν ἀλλ' ἡ δυνάμει ἐν τῷ δικό (*250 a 24*). For the general question as to how far Aristotle by his distinction between potential
and actual settles the difficulty about petites perceptions and sub-

446 a 2. διόσω. A quarter of a tone was the least interval taken
notice of in Greek music. Hence, I fancy, ο ἐν τῷ διόσῳ φθόγγος
must be a sound with difference in pitch from that of the one before
it within, i.e. less than, a quarter-tone. Aristotle means that the
interval of a quarter of a tone is not thought of as resoluble into
parts, as larger intervals are. The parts of an interval are not
however sensations. Hence this phenomenon is hardly parallel to
that in the illustration from sight or that quoted in note to 445 b 32
above from the Physics. In those instances we have sensations
which per se are not actually appreciable when existing concomitantly,
being merged in the whole of which they are elements.

For διόσω cf. Anal. Post. 1. ch. 23, 84 b 38: ἡ ἀρχή (i.e. ultimate
simple (ἐπιλογῶν) constituent) ἐν μέλει διόσω. In Metaph. xiv. ch. 1,
1087 b 35 it is called ὑποκείμενον ἐν ἀρχῇ.

446 a 3. συνεχούς δότως. The notes are still continuous in time.

446 a 4. λαθάναι. Hence there seems to be no μεταξῆς; the notes
seem to be ἐχόμενα ἄλληλοι, i.e. contiguous but separate, and hence
the continuity of the scale is broken up.

446 a 6. συνήμα κ.τ.λ. The difficulty in this obscure passage is
increased by the discrepancy between the MSS. Ε Μ Y read ὅταν μη
χωρίς γ'; ὅταν χωρισθῇ is the reading given by most others and by
Alexander. I have followed that of E Μ Y, which is supported by
the ancient Latin translation, because of the difficulty of giving any
sensible interpretation to the following sentence, καὶ γὰρ...διεσχέσαι,
if we read χωρισθῇ; the sense it gives does not really conflict with
what is said later on.

Aristotle says that the very minute parts of the objects of sense,
if not separated, are perceived only potentially and not actually. But
this does not commit him to the statement that, if severed from the
whole, they are actually perceptible. This is no doubt the general
rule; an object like a one-foot measure which has only potential
existence in a larger whole is made actual by being marked off. It
then becomes an explicit object of consciousness, not merely a
potential one. But, he goes on to say, very minute fractions cannot
exist in isolation from the whole, as the larger parts of a whole can
when broken off. They lose their identity (cf. note to 446 a 9 below,
De Gen. et Corr. 1. ch. 10, 328 a 24 sqq.) and become parts of the
new substance into which they are absorbed, and increase its bulk.
As such they cannot be even merely potentially perceptible as parts of the substance to which they belonged originally. They are, no doubt, potentially perceptible parts of the new substance but, if they have lost their ἔδος, as Aristotle says in De Gen. et Corr., loc. cit., they cannot be on the same footing as elements which have entered into a true mixture and which, on resolution of the mixture, become actually what they were before.

These considerations make it clear that, when in l. II ἡ τῆς ἀναθήματος υπεροχή is mentioned, Aristotle means the minute sensation which can be even potentially per se perceptible only when coming from a part of the object which is not separated from the whole. He argues—the minute ἀναθήματος which has only existence in a more distinct sensation (ἐν τῇ ἀναθηματικῇ) and, as such, is only potentially in its individuality a sensation, is not per se actually perceptible and hence capable of isolation; hence the similarly minute object of sense (τὸ τηλακόντων ἀναθημάτων), which causes it, must be in the same case. It is not per se actually perceptible, but added to and taken along with the other parts of the whole it is actually perceptible and, since that is so, it, even in its individuality, must be thought of as being only potentially an object of sense.

It is, I suppose, προσγενόμενου (l. 16) which has prompted some interpreters to think that Aristotle is considering the fortunes of the minute part of the grain of millet in actual isolation. But, if it were per se potentially perceptible when in actual isolation from the whole to which it belongs, one would expect that the change caused by addition to the whole would be to raise it, as such, to actual perceptibility; but this Aristotle will not allow. προσγενόμενου, as we see from l. 20 below and Phys. 250 a 24, just means ἐν τῇ ὅλῃ. There is no reason why it should not be used of intellectual as well as of actual addition.

τὸ ἀναθηματῶν χωριστῶν ἀναθήματος (l. 14) does not imply that the ἀναθήματος exists χωρίς; it means, practically, to perceive it καθ' αὐτό, Similarly things that exist χωρίς—χωριστά—are identified with ὀνόματι, the independent existences which are the subjects of predication, and which Aristotle in Anal. Post. 1. ch. 4, 73 b 9 calls καθ' αὐτά. Cf. Metaph. vii. ch. 3, 1029 a 28: τὸ χωριστὸν καὶ τὸ τόδε τι υπάρχειν δοκεῖ μάλιστα τῇ ὀνόματι.

We can easily explain the substitution of χωριστῆς for μὴ χωρήσῃ by an editor who read on and found that χωρήσῃ the minute parts of objects were not actually perceptible, and indeed could not exist.
and retain their previous character, if his logic led him to believe that ‘if not separate then not actually perceptible’ contradicted the statement ‘if separate not perceived’ (χωρίζονται κ.τ.λ.). Such statements are only apparently in opposition. If we retain χωριζόμενοι, we shall have to translate ‘they are potentially perceptible but not, when in isolation, actually so. [This is different from the case of] the one-foot measure which exists potentially in the two-foot rule and actually when bisection is made.’ But the ellipse to be supplied is so extraordinary that one might justly, with Biehl, suspect the authenticity of the whole clause if χωριζόμενοί is to be read. Its genuineness, if we adopt the better attested reading, is confirmed by the force of καί γὰρ. Aristotle is pointing out that even in the case of large objects like the one-foot rule the same thing holds good as of τὰ μικρὰ πάμπαν.

446 a 8. διαιρεθέντα is here equivalent to ἀφαιρεθέντα if it is to make any sense. It is not the one-foot rule which is bisected but the two-foot measure. Hence one would expect διαιρεθενσε (Bywater, J. of P. xvi. p. 243) or διαιρεθείσης τοίνυς. But perhaps this sense of διαιρεθείσης is idiomatic. Cf. note to ch. 3, 439 b 20 διελομένους.

446 a 9. καί διαλύουσα. In addition to being so very minute as to surpass (ὑπερήχειν) the discrimination of the sense, these minute particles lose their self-identity on being isolated.

ὑπερήχει is, as the commentators notice, employed in rather a different sense from the usual. It naturally means excess in greatness: cf. chapter 3, 439 b 31.

For the doctrine cf. De Gen. et Corr. i. ch. 10, 328 a 74 sqq.: ὅσα εἴδαμεν, πολλὰ μὲν ὄλγοι καὶ μεγάλα μικρὰς συντιθέμενα ὁ τοιεὶ μεῖζον, ἀλλ’ αὔξησιν τοῦ κρατοῦσας μεταβάλλει γὰρ θάνετον εἰς τὸ κράτος, ὅσον σταλαγμὸς ὀρθὸς μιρίως χεῖρας ἔδαρσεν ὅσον μέγιστος λίπεται γὰρ τὸ εἶδος καὶ μεταβάλλει εἰς τὸ πᾶν ὑδάμα.

446 a 11. The minute fraction of substance in isolation from the rest is not perceptible at all. Aristotle goes on to discuss what happens when we do perceive it in some way—when ἐτελήθην ἡ ἄφεσ.

446 a 12. δυνάμαι γὰρ. We are not now discussing the separate existence, but the separate perceptibility of the object—τὸ αἰσθητόν, but in the sensation (αἰσθητός) to exist and to be perceptible is the same; hence it is indifferent which of the two we assert to be potential.

446 a 18. ἐνυπάρχειν means practically to form a constituent; cf. Metaph. v. ch. 13, 1020 a 7: ποσὸν λέγεται τὸ διαιρετὸν εἰς ἐνυπάρ-
χωντα and Anal. Post. i. ch. 22, 84 a 14 sqq.: 'odd' ἐνυπάρχει in the definition of number, while number ἐνυπάρχει belongs to, or is a predicate of, odd. Cf. also the definition of ἔλη—ἐξ ὁ θάνατος τι ἐνυπάρχωντος, etc., cf. Bonitz, Ind. p. 257. Hence it is probable that Aristotle is thinking of the μεγέθη which compose finite bodies as the subject here, as ἐνυπάρχει is generally used of that which stands to anything in the relation of ἔλη.

Perhaps, however, he is thinking of χρώματα etc. as the subject. In that case the translation will run—'But when determinations of colour, taste or sound, existing in the concrete are so related to each other as to be also actually perceptible and perceptible, not merely in the whole but individually, they must be limited in number.'

This would mean that he is talking once more of the πεπερασμένα σάδη of sense qualities. But they have already been accounted for, and this seems to touch on the only case left undescribed—the distinguishable parts of a continuum, which are ἐνεργείᾳ perceptible not merely in combination but in isolation. If this be the interpretation, the argument is that, in the case when the constituents of the objects perceived are distinct and individually perceptible and hence limited in number, the qualities presented by them must have the same limitation. χρώματα etc. are but items of sensuous determination, though, no doubt, Aristotle is thinking of the different colours and sounds etc., as presented in the form of segments in a continuum.

445 a 19 πρὸς αὐτα. Alexander reads τοσαίτα which perhaps, if understood as meaning 'of sufficient size or intensity,' i.e. τοσαίτα τὸ μέγεθος, improves the sense. We must not understand 'sufficiently numerous,' i.e. τοσαίτα τὸ πλῆθος, as no multiplication of the numbers of the insensible parts of objects makes the parts any the more perceptible per se. πρὸς αὐτα can, however, quite well mean 'in relation to each other.' Cf. ἐναύται below ch. 7, 447 b 32.

445 a 24. ὅταν ἐνεργείᾳ may be taken either with the clause before or with ἀφικνοῦνται.

τὸ μέσον = τὸ μεταξὺ, which is defined in terms of this phenomenon in local movement in Phys. v. ch. 3, 226 b 23: μεταξὺ δὲ εἰς δὲ πέφυκε πρῶτον ἀφικνέοντα τὸ μεταβάλλον, ὡς ἐς δὲ ἀσχολοῦν μεταβάλλει κατὰ φώσας συνεχῶς μεταβάλλον.

446 a 28. Ἐμπεδοκλῆς. Cf. De An. 11. ch. 7, 418 b 20: καὶ οὐκ ὅρθως Ἐμπεδοκλῆς...ὡς χρωμάτων τοῦ φωτὸς καὶ ταινιών ποτὲ μεταξὺ τῆς γῆς καὶ τοῦ περίχορος, ἡμᾶς δὲ λαμβάνοντος. 
COMMENTARY

Aristotle goes on to say that it is asking too much to wish us to believe that light passes from east to west across the whole sky without the movement being detected. It was, of course, impossible without modern scientific instruments and methods to discover the movement of light. For the Empedoclean theory cf. chapter 3. Cf. also R. P. § 177, Zeller's Presocratic Phil. (Eng. Trans.), ii. p. 158. According to Philoponus, on this theory light was a σώμα issuing from the illuminating body, vide below 446 b 30.


446 b 1. Time is infinitely divisible like motion and magnitude; cf. Phys. iv. chs. 11, 12; vi. 1, 2, 3 etc.; vii. ch. 8, 263 b 27: οὐκ οἷον τι ἐκ ἄτομων χρόνους διαιρεῖται τὸν χρόνον.

446 b 3. ἀμα κ.τ.λ. This is equivalent to saying it is instantaneous. An act of perception is in this characteristic distinct from local movement, which cannot be instantaneous: cf. Phys. vi. ch. 1, 231 b 30: εἰ θηβαίον τις βαδίζει, δὴναν ἄμα βαδίζειν θηβαίοι καὶ βεβαδίκεναι θηβαίοι. Perception is an ἐνέργεια, which as such has no γένεσις: cf. Alex. De Sens. p. 126 (W.) and above, Introduction, sec. iv.

446 b 5. The construction here seems to be defective. As I have translated, instead of ἀλλὰ δὲν ἔστων, ἀλλὰ μᾶλλον should have been written; but it was natural to say ἔστων when denying that they possessed the aspect of process any the less on account of the instantaneousness of the act of perception considered as a psychical event. Perhaps, indeed, Aristotle wrote μᾶλλον, for which by a blunder ἔστων was substituted; or he may have written ἄλλ' οὐκ οὖσιν.

Thomas and Simon, however, punctuate after ἔγνωσθαί, making the apodosis begin at ὰμως. In this case we must regard ἄλλα... ἀλλα, ll. 7–10, as a parenthesis and translate from l. 4 καὶ μὴ κ.τ.λ.—'and if sensations have no genesis, but exist without coming to be, yet, as sound, etc., is not the same true of colour and light?'

Cf. Phys. viii. ch. 6, 258 b 17, De Coelo, i. ch. 11, 280 b 27.

Aristotle means that the instantaneousness of the psychic act does not detract from the lapse of time in the physical process. Though there is no γένεσις in the former, there is in the latter. Hammond conjectures ὀμοῖως for ὰμως and translates, 'Also if everything at the same moment hears and has heard, and in a word perceives and has perceived, and there is no time process in sensa-
tions, nevertheless they lack this process in the same way in which sound, after the blow has been struck, has not yet reached the ear.' But I fail to see how a sound which is on its passage to the ear can be said to 'lack process' and how, if this were so, it would help Aristotle's argument. Moreover Aristotle does not say that we are unaware of the lapse of time which takes place while a sound is being transmitted. He implies the opposite. He only says that in the psychical act there is no process.

446 b 8. μετασχηματίζεται is a change of shape: cf. De Coelo, 11. ch. 7, 305 b 29 (γένεσθαι) τῇ μετασχηματίζεται, καθάπερ ἐκ τοῦ ἀυτοῦ κηροῦ γένοιτο ἀν σφαῖρα καὶ κύκλος. μετασχηματίζεται is also conjoined with (though differentiated from) ἄλλοισθαι. It consists in the rearrangement of elements which retain the same nature, while ἄλλοισθαι indicates qualitative change.

μετασχηματίζεται is that form of γένεσθαι that would specially suit an atomic theory and hence Aristotle applies it to the propagation of sound, which he conceives of in quite a mechanical way. He evidently thinks of the air taking on a different σχῆμα for every different articulate sound. These are subject to alteration in proportion to the distance we are from the person with whom we are talking. He is evidently thinking mainly of mistakes in following some one's words, not merely of inability to hear at all. That would rather be accounted for by the absence of definite σχῆμα than by change of σχῆμα in the air which communicates the motion or in the motion transmitted.

446 b 11. τῷ πνεύμα ἔχειν. Alexander interprets—τῷ κατὰ σχέσιν ἔχειν. He distinguishes three classes of relata:

(1) Those which are κατὰ σχέσιν, e.g. ἵσσα, ὀμοία etc., in which the mode of their relation (the σχέσις) does not depend upon their relative position in space.

(2) Those which are κατὰ σχέσιν, but where the σχέσις consists in spatial relation (ἐν τοῖς θύσεως), e.g. δεξιόν.

(3) Those, e.g. αἰσθησις and αἰσθητῶν, which, though requiring some σχέσις which consists in spatial relation (όχι... μὴν αὐτῇ (sc. τῇ ὀψι) διαφέρει τὴν θεσίν τῶν δρωμένων καὶ τὸ διάστημα πρὸς τὸ ὄραν) are not strictly ἐν σχέσις, like τὸ δεξιόν, but require a δέναιμα ἀντιληπτική on the part of the αἰσθησις. Light might travel from object to eye on account of the spatial relation of the two, but vision would not result unless the eye were endowed with a certain faculty. This, in the minds of certain other commentators, e.g. Simon and
Thomas, seems to connect with the distinction drawn between certain classes of relata in *Metaph.* v. ch. 15, 1020 b 26 sqq.

In this chapter there are likewise three main divisions of relata:

1. τὰ κατ’ ἄρθρωμα λεγόμενα, e.g. τὰ ἱσα. Things are equal of which the quantity is one (ἱσα δὲ διὸ τὸ ποσὸν ἓν, 1021 a 12).

2. τὰ κατὰ δύναμιν λεγόμενα, e.g. τὸ θερμαίον πρὸς τὸ θερμαίομενον.

3. Such as τὸ ἐπιστῆσιν and ἐπιστήμη, αἰσθητόν and αἰσθησίς.

In the first two classes (cf. Bonitz, *Metaph.* p. 261) the whole notion of the relata can be discovered in the relation. A is understood by being referred to B, and B by being referred to A. In the third class, however, the relation is not mutual; one of the terms requires independent explanation; τὸ αἰσθητόν can be explained by referring αἰσθησίς to it, but αἰσθησίς requires other definition than reference to τὸ αἰσθητόν. We advance no further by saying that vision is relative to those things of which there is vision, διὸ γὰρ ταῦτα εἰρημένα ἐν ἔν (1021 a 32).

Aristotle’s meaning, however, is no more than this, that ὅψις is not explained by being regarded as relative to τὸ ἄρθρωμον, but if we refer it to χρώμα it can very well be defined and we obviate any useless repetition. Hence the distinction does not affect the real relation of the object of vision (χρώμα) to vision (ὅψις), but only the mental way of relating them when the former is styled not χρώμα but the object of vision—τὸ ἄρθρωμον.

Thus there is no justification for Simon’s attempt to connect this distinction with that here. He says, the ‘ratio’ in a relation of this kind *pendet ab aliō,* and hence there must be activity on the part of τὸ αἰσθησίς which, hence, must be at a distance.

Nor is there necessarily a reference to the δύναμις ἀντιληπτικῆς of sense, as Alexander conjectures.

Aristotle simply states that seer and thing seen must occupy definite positions; their relation must depend at some extent at least upon their relative ὅψις. They are not like things of which the relation is purely non-spatial like equals. It is not the manner and mode of their being which relates them, as in the case of equal quantities, but something else which entails a definite spatial position.

We cannot translate πῶς purely indefinitely as ‘anyhow.’ Things that are equal do not exist ‘anyhow’ but ‘somehow.’

The result of the argument is to establish the necessity of determinate spatial position for seer and thing seen and hence it advances
a plea in favour of the transmission of light in the same way as sound is carried to the ear. The last argument had shown that the object which sounds and the hearer must be in determinate spatial positions.

446 b 12. If we do not read ἀν before ἔδει the clause will refer to οὖν not to τὸ ὁρῶν καὶ τὸ ὁρώμενον, and becomes identical in meaning with the following one and πῶς above will have to be translated as 'ut sequæ.' 'It is not by being anywhere etc.' But this is not possible.

446 b 16. The air which is ψαθυρός (as water also is: cf. above ch. 4. 441 a 28) is made continuous by being struck by an object that is smooth of surface and so continuous; it is thus that sound is transmitted: cf. De An. ii. ch. 8 passim. Sound is caused by a movement (a blow, which involves φορά or spatial movement, occasions it, cf. 419 b 10–13) which is quick enough to strike the air and make it continuous. If the movement is too slow the air disperses (419 b 20 sqq.). It is hard and smooth bodies which, when struck, have this effect upon the air, though apparently the air itself when imprisoned in any closed or partially closed space can function in the same way—as in the case of the echo (419 b 25 sqq.).

Sound is this movement (ἔστι γὰρ ὁ ψόφος κόρης τοῦ δυναμένου κίνειθαι τὸν πτόσιν θοῦτον ἀπερ τὰ ἀφαλλόμενα ἀπὸ τῶν λείων, ἢτὰς τις κρούσῃ, 420 a 21), or rather this movement is sound, for Aristotle does not, like the modern physicists, think of sound as being merely a movement when outside the ear; its peculiar quality seems to exist objectively though entirely relative to the act of hearing (cf. Introduction, sec. iv. and De An. iii. ch. 2, 425 b 26 sqq.).

At the same time it will not do to go so far as Rodier (Traité de l’Ame, Vol. ii. p. 286) and say that sound is not to be identified with the motion that causes it but is an objective quality in the same way as, according to Aristotle, colour is to be regarded, and that its transmission to the ear is not a movement any more than the transmission of light is.

(Rodier appears to me to misunderstand μετασχημάτως; it (cf. note to 446 b 8) is not qualitative change and, even if it were, his argument would not be advanced any the further. Aristotle distinctly says above (4. 10) that, in the transmission of sound, the air experiences φορά, and if in 7–10 Aristotle were describing the increase in faintness in sound (which he is not) it would be only
COMMENTARY

caused by a transition of the air from a state of motion to some other condition.

At the same time there is a difficulty here. In the De Anima Aristotle describes the φορά, the movement which causes us to hear, as a rebound and quivering of the air all in one mass—ὅστε τὸν ἄερα ἄθροιν ἀφάλλεσθαι καὶ στείρεθαι (420a 25) and again in 420a 1 he says τὸν δὲ (when struck) ἐὰs γίνεται ἄμα. That would make this φορά have the same characteristics as that species of ἀλλοίωσις which, below, in 446b 32 sqq., he wishes to distinguish from φοράϊ (and among them the φορά which constitutes sound) as being instantaneous—ἐνδέχεται γὰρ ἄθροιν ἀλλοιώσθαι, καὶ μὴ τὸ ἡμοῦ πρῶτον, δὲν τὸ ἑσπερινὸν πάντα περίγενεθαι (447a 2 sqq.). It seems then that in the De An. Aristotle is simply emphasising the assertion that the air is rendered one and continuous throughout the whole extent of the space between the sonorous object and the ear—ἐνθα ἄθροιν συνεχείς μέχρις ἄκοις. ἄθροιν need mean no more than this; but ἄμα, if by ἄμα is meant ‘at the same moment’ (vide Rodier, ad loc. cit.), is putting the point too strongly. Here he plainly affirms that though the medium is continuous, the movement (in which it becomes continuous) falls into successive parts, just as qualitative change may also betray succession, as appears from the passage below and Phys. vii. chs. 4 and 5 esp. 250a 31 sqq.: καὶ τὸ ἄλλοτε καὶ τὸ ἀλλοιωμένον ὡσαντος τι καὶ ποιεῖν κατὰ τὸ μᾶλλον καὶ ἃτον ἀλλοιώσται, καὶ ἐν ποσῷ χρόνῳ, ἐν διπλασίῳ διπλάσιον κ.τ.λ.

It is indeed necessary to grant this, as ὀσμή is an ἀλλοίωσις and occupies successive times in propagation.

446b 17–18. τὸ αὐτὸ κ.τ.λ. On a theory which reduced all the senses to ὀφθαλμόν this could not be so; each person would perceive only the tangible things that impinged upon his own sense organs.

ἔστι νῦν ὅτι...ἔστι δὲ τοῦτο. This continually means ‘in one sense...and another’ not ‘at one time and at another’ as Bender and Hammond take it. Cf. Meteor. iii. ch. 6, 378 a 32 and cf. πῶς ὁμιλοῦν...πῶς ὁμιλεῖ, Phys. iii. ch. 6, 206 a 13, πῶς...πῶς above 446a 17–18; cf. also Phys. viii. ch. 8, 263b 5, etc.

If the κίνησις has μέρη, then the πρῶτος is in contact with one μέρος, ὁ ἐστέρος with another. Hence in one sense it is not τὸ αὐτὸ which they perceive.

446b 19. ἀποστολή. Hammond seems to regard this as a new problem. But τοῦτο naturally refers to what has just been said.

R.
446 b 20. There is no need for adding ‘in the same way’ as Hammond does; ἄλλα cannot bear such a meaning. The doctrine controverted is the unqualified assertion that the same thing can be perceived by only one person. It seems to be an echo of nominalism. It was left to Aristotle to resolve the difficulty by pointing out that there are different ways of perceiving the same thing.

446 b 25–26. τοῦ εἰ δὴ ἰδέω. Alexander explains this as τὸ προσεχὲς καὶ ἰδέων μέρος τοῦ ἁρετοῦ ἢ τοῦ ἰδιαῖος, and so Simon also. It is the part of the medium in contact with the sense organ—what he might have called τὸ ἐσχάτον κυνόμενον (cf. De An. III. ch. 12, 434 b 33) as opposed to the sense object which is τὸ πρῶτον κυνόν (ἐσχάτον can, however, be used in both senses, that of nearest and of farthest; cf. Phys. VII. ch. 2, 244 b 1 sqq. and De Gen. et Corr. I. ch. 7, 324 a 26 sqq.). The meaning is, that this nearest part of the medium is numerically different in each case, though it is qualitatively identical in all; the qualitative change or motion produced in the medium by propagation outward from the sense object must be numerically a different πάθος or a different μέρος of the κίνησις when issuing to the right and to the left and when near and far, but it is of the same kind. Aristotle, it must be remembered, thinks of the sense quality, and that is to him an ἀλήθητος, as existing objectively in the medium. The word to be supplied after ἰδέω is no doubt ἀλήθητος and, as a sense quality is an ἀλήθητος to him, perhaps he is thinking of τοῦ ἰδέου more as quality—the quality relative to the special sense, than as the portion of the medium which is nearest. We might paraphrase his meaning thus—'The qualitative affection of sense proper (ἴδια ἀλήθησις) is numerically different for each person though specifically, i.e. quâ quality, identical, while an object numerically one and identical is perceived by all.' ἀρθυμός and ἐν are among the contributions of κοινῆς ἀλήθησις. Hence perhaps Aristotle is obscurely hinting that, as ἰδιὰ ἀλήθησις gives an object numerically different in each individual, it is the function of κοινῆς ἀλήθησις to introduce numerical identity and hence real objectivity into the perceptible world.

446 b 26–27. ἀμα τολλοὶ. This is an additional point; if perception is due to κίνησις of the medium, and numerical difference in the κίνησις directly affecting the sense does not necessitate difference of τὸ πρῶτον κυνόν, perception of it—τὸ πρῶτον κυνόν—may be simultaneous in different people.
446 b 28. If sound etc. were σώματα then, in perception, the object would really be ‘divided from itself’ as a body can only be in one place at the same time. According to the ἀπόρροια theory, the sound, scent and light are σώματα—material particles.

446 b 29. οὐδὲ ἰσοπάρεται, i.e. the κίνησις or ἀλλοίωσις which is propagated in different parts must be the πάθος of a σώμα (which has μόρα). The plurality of the sense experiences depends upon the medium having μόρα and hence being a σώμα. Thus this sentence refers merely to what goes before. As we shall see it makes no sense if taken with what follows.

446 b 30. τῷ ἐνείμαι γὰρ τι φῶς ἐστίν. I have here followed Alexander and cod. P, as no other reading seems to give an adequate meaning. Alexander connects this with the doctrine in De An. ii. ch. 7, 418 b 16 sqq. where light is defined as the παρουσία…πορός ἢ τουπίτου τούτος. Cf. also above ch. 3, 439 a 21 sq.: ὅταν γὰρ ἐνὶ τῷ παράδει τὸ διαφανεῖ, ἢ μὲν παρουσία φῶς. The argument, then, is, that though light is due to the presence of something, yet it is not, as one might expect, a movement set up by it. It is hence, if not a movement, an ἐνέργεια as said before (418 b 9). ἐνέργεια in the proper sense is not κίνησις (cf. De An. ii. ch. 5, 417 a 16) nor even ἀλλοίωσις. Compare also Phys. vii. ch. 3, 246 a 10 where it is said that bodily and mental ἔξεις are not ἀλλοίωσις. Light is described as a ἔξεις in De An. ii. ch. 7, 418 b 19 and iii. ch. 5, 430 a 15. The change from δύναμις to ἐνέργεια in the proper sense is not mere alteration from one quality to its opposite, but is a movement ἐπὶ τὸ έξεις καὶ τὴν φῶς. A positive ἔξεις like virtue is a τελείωσις, or state which reveals the true nature of the thing which possesses it. It is Alexander’s contention that light is something of this kind and is not to be described as an ἀλλοίωσις like odour. Hence it does not require time for its propagation. Cf. Introduction, sec. vii.

If we read τῷ ἐνείμαι we shall have to render with the vet. tr.—‘per esse enim aliquod lumen est’ which Thomas expands into—‘per unum aliquod esse, id est, per hoc quod totum medium sicut unum mobile, move tur uno motu a corpore illuminante.’ Or else we must suppose that there is some contrast between being and motion. This, however, is not an Aristotelian doctrine, though there were other theories which identified motion with τὸ μὴ ὅν: cf. Phys. iii. ch. 2, 201 b 20: ἔνας, ἐπερώτητα καὶ ἀνισότητα καὶ τὸ μὴ ὅν φάσκοντες εἶναι τὴν κίνησιν.
Bender (p. 29) renders ‘das Licht ist Licht durch ein gewisses Sein,’ which seems to require some such explanation as the above.

St Hilaire (p. 81) gives rather a different interpretation. Light exists because it is ‘un être particulier.’ Hammond (p. 184) seems to follow him in rendering ‘Light has a substantial nature.’ ἐναι τι may mean to be an οὐσία—something χωριστόν. Cf. Phys. iv. ch. 6, 213 a 31—οὐκον τοῦτο δὲ δεικνύει, ὅτι ἐστι τι ὁ ἄρρ. But, if it meant that here, it would imply that light was something concrete, a σώμα, which it is not. To imagine, then, that Aristotle here declares that light is a σώμα as opposed to sound and smell which he has just declared not to be σώματα, is quite unwarranted and besides it does not in the least help us to understand how the transmission of light is instantaneous.

Perhaps we might translate τῷ ἐναι (it should possibly be τῷ ἐναι) as frequently elsewhere (cf. 449 a 19) by ‘in aspect’ and render ‘In aspect light is something real’ i.e. ‘light may be regarded as something real’; it is not concrete—οὐσία—in the ordinary sense, but οὐσία ὡς ἔδος (as the soul is said to be in De An. ii. ch. 2, 414 a 13 sqq.). Light is an ἔδος or ἐνέργεια. If this be the interpretation and we adhere to the reading τῷ ἐναι it will give exactly the same meaning as Alexander requires, who gets it by other means.

The difficulty remaining, however, is how what is said in the first clause should lead one to expect that light is a movement. The presence of οὗ in the ἄλλα clause gives the Greek this sense. On Alexander’s reading there is some ground for expecting light to be a κίνησις, which it is then required to be; not so much according to my interpretation of the other reading.

I suggest τῷ κυνὲν γάρ τι φῶς ἵστιν τι, i.e. light shows its reality by stimulating something. Light κυνέ—stimulates—something—τι—viz. the sense, but is not a movement itself.

446 b 31. ἄλλ᾽ οὗ κίνησις. The question here is—What does Aristotle mean by κίνησις? Does he mean ‘un simple mouvement’ (St Hilaire) i.e. φορά, or motion generically, i.e. μεταβολή? It is quite impossible, from Aristotle’s use of the term, to decide whether he employs it here in its specific or its generic signification. In the Physica κίνησις is continually used in the sense of φορά but, where he has occasion to distinguish the various kinds of change, he employs the specific terms if there is any likelihood of confusion arising. Cf.
Phys. iii. ch. 1 for the distinction between the four kinds of change—γένεσις καὶ φθορά, ἀλλοϊωσις, αἰτίας καὶ φύσις, φορά. They are divided according to the categories respectively of οὐσία, ποιόν, ποιόν and ποῖ, which have nothing in common. Hence the diversity alluded to here—ὅλος κ.τ.λ. I. 31. If the light is to be identified as a kind of ἀλλοϊωσις, as Thomas thinks, then this latter statement is brought forward in support of the former. The argument runs—light is an ἀλλοϊωσις, which may be (cf. below 447 a 1–2) instantaneous, and hence not φορά and hence not κίνησις, for κίνησις proper is φορά. Cf. Phys. viii. ch. 7, where it is contended that φορά is πρῶτη τῶν κινήσεων.

On the other hand, as we have seen, if Aristotle is in earnest about light being an ἐνέργεια, it cannot be even ἀλλοϊωσις. This is Alexander’s contention and according to his interpretation, ὅλος… φορά must come as a reply to a possible objection—’Is it not true that ἀλλοϊωσις is different from φορά, i.e. κίνησις κατὰ τόπον, and that hence light may be an ἀλλοϊωσις?’ Aristotle replies ‘It is true that they are distinct, for ἀλλοϊωσις may take place in all parts at once; however (οὐ μὴν ἄλλα‘, 447 a 3 sq.), when the quantity is large (of substance to be changed) this is impossible. Hence light is not an ἀλλοϊωσις and hence not a κίνησις at all.’

As against this theory and in support of the former view we have these statements in the De Anima, viz.—the medium κάτιτα by the object of vision and again itself καί the sense. There κίνησις is apparently used vaguely in its generic sense without distinction from ἀλλοϊωσις, so that it seems necessary to hold that, if, in the stimulation of the sense by the object of vision, a κίνησις, in the strict sense of φορά, is not set up in the medium, at least ἀλλοϊωσις is. Cf. De An. ii. ch. 7, 419 a 13 sqq.: ἀλλά τὸ μὲν χρώμα καὶ τὸ διαφάνεια, δόν τὸν ἀέρα, ὑπὸ τοῦτον δὲ συνεχόμενον ὑπὸ καίνεται τὸ αἰσθητήριον; iii. ch. 12, 434 b 30 sqq.: ὁσπεῖρ γὰρ τὸ κυνῖν κατὰ τόπον…οὕτω καὶ ἐκ’ ἀλλοϊωσιῶν καὶ 435 a 4: ὅ θ’ ἄρ’ ἐπὶ πλεῖστον καίνεται καὶ σωτεὶ καὶ πάσχει…βλέπει…τὸν ἀέρα πάχιου ὑπὸ τοῦ αἰθήματος καὶ χρώματος…διὰ πάλιν ὁστὸς τὴν ὅψιν καὶ. Cf. also Phys. vii. ch. 2, 244 b 10 sqq. esp. 245 a 6.

The explanation of the difficulty seems to be that Aristotle regards light in two different ways which are not properly reconciled. (1) According to his own peculiar conception it is the ἐνέργεια τοῦ διαφάνους caused by the presence of fire. This is the concept of the objective nature of light. It is a qualitative determination of certain
DE SENSU

objects and, considered as such, it has absolutely no connection with any such thing as motion or transmission. Light is the colour of the medium realised, its true activity, just as the soul is the true activity of the body. This is its teleological definition. But (2) Aristotle likewise inherited from previous philosophy and popular thought the theory that light was something passing between seen thing and seer or vice versa. He allows that there must be some action whether mechanical or qualitative exerted by the object directly upon the medium and indirectly upon the sense.

According to the popular idea this exactly was light. So, when the question was raised—'does light take time to travel?,' Aristotle, if he had wished to identify light with the κίνησις or ἀλλοώσις that stimulates sense, should have answered in the affirmative or admitted that it was at least possible. But, instead, he recoils upon the teleological definition of light to which the notion of movement is irrelevant. Hence his doctrine really is, not that it is an 'instantaneous movement' but rather (what that really is) no movement at all.

But, as his opponents mean by light a movement between the eye and the object, it appears as if, in denying that light is a movement, he were denying his own theory that an actual movement of some kind did take place between object and eye. Without doubt too there was a confusion in his own mind on the subject. His raising it in connection with sound and odour shows this. Naturally the fact that there is no noticeable interval between the production of any object and our seeing it led him practically to contradict his previous assertions.


We cannot say that all qualitative change proceeds continuously (συνεφώ) or is συνεφή in the full sense of the word which is explained in Phæt. v. ch. 3, 226 b 27 sqq. It is not sufficient that the time should be continuous but that the action should be continuous also (μὴ τοῦ χρόνου (οὐδὲν γὰρ κωλύει διαλείποντα, καὶ εἰ δέ μετὰ τὴν ὑπάτην φθέγξασθαι τὴν νεάτην) ἀλλὰ τοῦ πράγματος, ἐν ψυχῇ).Themistius (Paraph. ad Phæt., loc. cit.) explains that movement such as the galloping of horses is not continuous, though the time in which the movement takes place is. Qualitative change seems to be more comparable to this and appears to take place by a series of
successive bounds. There seem to be ultimate sections in the process which are instantaneous and not divisible into smaller sections each diverse in point of time.

So it is too with \( \alpha \xi \rho \varepsilon \zeta \varsigma \kappa \iota \varphi \iota \alpha \varsigma \). If a drop wears away so much of a stone in a given time, the half of it does not perform so much of the attrition in half the time. It does it in no time. What is washed away is divisible, but its parts were moved not separately but all together.

In Phys. vii. ch. 5, 250a 28 sqq. it had been admitted (cf. above) that, in general, qualitative change falls into different time sections just like \( \kappa \iota \nu \iota \nu \iota \zeta \varsigma \) proper, yet the half of the cause of change need not cause a change of half the extent. But this is true also of \( \kappa \iota \nu \iota \nu \iota \zeta \varsigma \) proper. Though two men push a boat so far in a given time, one man need not be able to move it at all. The point here is different. It is, as said, that often change either in quality or bulk proceeds in sections.

447 a 3. \( \pi \xi \zeta \varsigma \) is congelation of any kind (cf. Meteor. iv. chs. 5–7) and is produced either by heating or cooling. \( \theta \varepsilon \rho \rho \alpha \iota \alpha \iota \varepsilon \varsigma \theta \varsigma \alpha \) and \( \psi \iota \chi \varepsilon \zeta \theta \varsigma \alpha \) are examples of \( \dot \alpha \lambda \lambda \omega \iota \omega \varsigma \iota \varsigma \) (cf. Phys. vii. ch. 3, 246a 7 sqq.). Compare also Phys. 253 b 25 quoted above. By \( \tau \delta \theta \varepsilon \rho \rho \alpha \iota \alpha \iota \varsigma \mu \nu \epsilon \mu \nu \eta \mu \nu \) (cf. note to 443 b 7 on the function of \( \kappa \alpha \iota \)) no doubt the thickening of milk or some such substance by heat is indicated.

447 a 8. \( \dot \alpha \nu \rho \eta \mu \) seems to be propagated by an \( \dot \alpha \lambda \lambda \omega \iota \omega \varsigma \iota \varsigma \) and is admitted not to be instantaneous (l. 10 beneath). The instantaneousness of the sections of qualitative change does not make the \( \dot \alpha \lambda \lambda \omega \iota \omega \varsigma \iota \varsigma \) as a whole instantaneous in this case. Obviously there is ‘much’ to be changed. If light is conceived of as an \( \dot \alpha \lambda \lambda \omega \iota \omega \varsigma \iota \varsigma \), then the whole distance from object to eye must be thought of as being one section. How this can be reconciled with \( \nu \iota \mu \nu \ \dot \alpha \lambda \lambda \nu \ \alpha \nu \ \dot \gamma \ \nu \nu \alpha \dot \iota \kappa \eta \lambda \lambda \alpha \lambda \varsigma \) it is difficult to see, for, if a considerable quantity of water cannot undergo qualitative alteration all in one moment, \( a \ f o r t i o r i \) the vast extent of medium intervening between eye and object should require a long time to transmit the light. If the words \( \nu \iota \mu \nu \ \dot \alpha \lambda \lambda \nu \ \kappa \eta \lambda \lambda \alpha \lambda \varsigma \), only affect such qualitative changes as \( \theta \varepsilon \rho \rho \alpha \iota \alpha \iota \varsigma \theta \varsigma \alpha \), Aristotle should have pointed out in what respect those differ from the \( \dot \alpha \lambda \lambda \omega \iota \omega \varsigma \iota \varsigma \) involved in light and should have ascribed the slowness of the change in these cases to those peculiarities. \( \gamma \varepsilon \iota \varsigma \varsigma \) is brought in as a qualitative change too which would be perceived in the same way as odour if we were surrounded by water.
As we have seen, Aristotle does not distinguish between the diffusion of a quality in that which serves it as a vehicle and its transmission through a medium. The difference between the mediated sense qualities and the others is, that in the former their vehicle is a medium always in contact with the sense organs, while in the other cases it is not so. Special contact has to be effected between the body possessed of the quality and the sense. Hence one reason why the latter are both called tactual senses.

Aristotle’s declaration here is interesting, because from it we may infer what we already know from ch. 4, 442 a 29 sqq., that he did not conceive even taste to be a diffusion of the actual particles of the flavoured substance, since he would not allow that to be the means of producing smell, and the only difference between taste and smell is due to the fact that we do not live in water.

Hence we must lay stress on the fact that diffusion is only a metaphorical term for the process by which odour and flavour alike are propagated; cf. 441 b 17: ὀνείροι ὁλοι τὸ ἐνυπολογιόντος; 443 b 7 sq.: ὁλον ἀποπλυόμενον; 445 a 15 sq.: ὁλον βαφή τις καὶ πλάσμα.

447 a 9. μεταβ. Cf. 445 a 8, 436 b 20, De An. III. ch. 12, 434 b 15: αἱ γὰρ ἄλλαι αἰσθήσεις δὲ ἑτέρων αἰσθάνονται, ὁλον ὀσφορήν ὁφεῖς ἱκονί, etc.

447 a 11–12. As we have seen, his customary way of stating the matter is, that χρώμα causes sensation, while without φῶς, which is the ἐνύψεια of the medium, colour cannot stimulate the sense (De An. II. ch. 7 passim). That τὸ διαφανές should be illuminated is a precondition of the perception of colour. (cf. Rodier, op. cit. Vol. II. p. 281.) In that sense it could be said τοιεὶν τὸ ὑπάρχει. From another point of view φῶς is the χρώμα τοῦ διαφανοῦς and as such is the object of sense itself and τοιεὶ τὸ ὑπάρχει. Thus Aristotle might use this expression without thinking of light exactly as the κύριος which produces sight (cf. above notes to 446 b 30 sqq.). τὸ αἰσθητοῦ means both the quality spread over the medium and τὸ πρῶτον κοιμὰν itself. Cf. above note to 446 b 25 sq. But in so far as the sense object which causes sensation is a quality and hence an εἶδος and hence also an ἐνύψεια, process cannot be imputed to it. Though due to an ἄλλωσις it is not, itself, an ἄλλωσις; it is an ἐνύψεια. But all sense qualities may be so regarded and hence there should be no grounds for supposing that in the case of one sense there was not to be found that process of transition by which the objective quality was realised in the particular consciousness in the case of the others.
CHAPTER VII.

447 a 15. ἀτόμω. Alexander explains that this is not an absolutely atomic time, for such according to Aristotle does not exist, but a time which, when divided, does not yield one part qualified by one sensation—another by another: cf. beneath 448 b 22.


447 a 19. Cf. note to ch. 1, 436 a 5 for the interpretation of ἐπικρατεῖν.

μᾶλλον κ.τ.λ. This seems to be a self-evident principle with Aristotle, but perhaps it might be held to be in antagonism to such passages as De An. i. ch. 1, 402 b 21 sqq.: ἀλλὰ καὶ ἀνάπαλν τὰ συμβαθηκότα συμβάλλειν μέγα μέρος πρὸς τὸ εἰδέναι τὸ τί ἐστιν. Aristotle would, however, distinguish between the two cases. The entering of one sensation into relation with another by means of combination alters the essential nature of the sensation. You no longer have the same sensation to investigate but a new one—a compound. Hence we may say that the original sensation may be more adequately perceived per se when in isolation than when in composition.

ἀνισθάνοντα. ἀληθής is a δύναμις κριτική (cf. Anal. Post. ii. ch. 19, 99 b 35) and by it we recognise a thing as what it is. We must, as Alexander points out, remember that ἀληθής has two aspects, one of πάθης the other of κρίσεως. Its function as κρίσις is the function of mind in general and hence, as e.g. above in ch. 6, 445 b 16 sqq., we get the terms applicable to mind in general (ἐρωτεύεσθαι, γνωσθεῖν) applied in the special case of sense perception. Cf. also De An. iii. ch. 9, 432 a 16: τῷ τε κριτικῷ, ὃ διανοοῦσα ἔργον ἔστι καὶ ἀληθής.

447 a 23. τόθα, i.e. in the case of harmony when the two tones combine to form a third thing—a concord. Aristotle is arguing against the simultaneous perception of two things which remain diverse. His point is that, if they are to be perceptible at one and
the same time, they must combine or, in some way, form a third thing. The combination is obvious in the case of harmonies.

447 a 30. ἄπερ κ.τ.λ. Aristotle goes on to argue that where the combination is not obvious, as it is in harmony, still the result of the simultaneous presentation of the two sensations must result in a modification of the stronger, if one is stronger than the other.

447 b 1. τοιοῦτα. Cf. below also in 449 a 6 sqq. esp. l. 9: οδέν γὰρ ἐκ τούτων ἐν.

τοιοῦτα = objects of different senses. There is no qualitative union such as occurs in the combination of tones and, on his theory, of colours, tastes etc.; the union is κατὰ συμβεβηκός—co-existence in one thing (τὸ αὐτὸ καὶ ἐν ἀρμόδιᾳ, l. 16). How the perception of such union is possible is discussed in that passage and in De An. iii. ch. 2, 426 b 8—427 a 16.


447 b 3. κατὰ συμβεβηκός. This is a case in which the perception of the object of one special sense may be effected indirectly, through the instrumentality of another. Cf. De An. iii. ch. 1, 425 a 30 sqq.: τὰ δ᾽ ἄλλα ὑδα κατὰ συμβεβηκός αἰσθάνονται αἱ αἰσθήσεις...οἷς χωλὴ ὑπὶ τινὲς καὶ ἔκαθη. The union is in one thing, not a qualitative union of the sensations.

447 b 4. αἰσθάνοντα. He is arguing once more from the absence of objective unity to the absence of subjective unity.

447 b 7. Reading ἔτει with Biehl we should have to regard this clause as an explanation of the reason why we can argue a fortiori from the case of objects falling under a single sense to the case of heterogeneous senses. It is not a confirmation merely of the previous clause.
COMMENTARY

If we read ἐν with Alexander and LSU, the sequence of the argument is not so clear, but the possibility of connecting this with the previous clause too intimately is removed.

447 b 10. κίνησις. By the κίνησις is indifferently meant either the sense affection or the stimulus. We may therefore translate—
`the stimuli are more closely located.' This clause forms a premiss on which the previous one rests. It, itself, seems to be an accepted topical maxim which connects the possibility of simultaneous functioning with the physical connectedness of the two elements; they are both κίνησις in the same organ and hence ἀμα in space. Aristotle means more than that they are similar, as Alexander interprets.

447 b 12. ἄν μὴ μιᾶ προτέρου. This contention—that if not combined two things cannot be simultaneously perceived, i.e. if simultaneously perceived then combined—is not proved by the clauses which immediately follow but by the section from καὶ εἰ μία 1. 16—αὕτα l. 18. Lines 12–16 rather prove the simple converse—that, if combined, sensations are perceived ἀμα.

The argument runs—A mixture is a unit. Perception of a unit is unitary and a unitary perception occurs in a unitary time, i.e. ἀμα. For support of the statement that perception of a unit is unitary (i.e. the last premiss) we get ἄτι μὴ…δύναμιν μία in lines 14–16. The perception of a unit with which we are concerned, the perception that occurs in unitary time, is explicit perception (ἐνίγμα) and the explicit perception of a unit is numerically one, i.e. unitary; it is of a specific unity that the potential perception is single.

(This is the very idea of ἐνίγμα—to be complete in one and the same moment, not to be a κίνησις which varies from moment to moment. Cf. De An. ii. ch. 5, 417 a 16–17 and Rodier, ad loc. cit.)

447 b 15. ἐνίσκες κ.τ.λ. By saying that it is of the specifically single that the implicit perception is one, Aristotle means that the perception of various white objects is specifically identical. It is the same qualitative affection; but actual perception is the perception of this particular white object here and now; it is numerically different from the perception of any other white object. It is only as a faculty that the sense of white colour is a unity and its unity is the specific unity of the various sensations of white. Again, relatively to black and white taken as numerical units the sense of sight itself is a specific unity.
447 b 16. καὶ εἰ. Here the proof of the argument first laid down begins. The sequence of the argument is best seen by beginning at the other end—l. 22, μία δὲ η ἄνωμι. We are, by agreement, considering the case of a single faculty, e.g. sight. The act of vision must occur in a unitary time—l. 21 μίας γὰρ κατὰ πᾶσας κ.τ.λ.; when the faculty is single and the time a unit, the act of sense or vision must be unitary—l. 19, ἀλλὰ κατὰ μίαν δύναμιν. Going back to l. 16, καὶ εἰ μία κ.τ.λ., we find it further stated that if the act is single the objects perceived by it must be single. We still lack the completing premiss that if two things are perceived as one they must be combined. This is not explicitly stated unless, instead of ἀρα before μή in l. 18, we read γὰρ. If we read γὰρ we make the train of reasoning complete and much improve what is at best a very ill-arranged argument.

447 b 24. ἄδινατον. Cf. above l. 7 and beneath 449 a 4.

447 b 27. Consciousness is here an adequate interpretation of ψυχή, though the term ψυχή has generally a wider meaning.

This sentence—φαίνεται γὰρ κ.τ.λ.—seems merely to support the argument generally or rather one of the previous statements viz., that if you perceive simultaneously it is a unit which must be perceived.

447 b 28. εἴση. Alexander will have it that here Aristotle includes generic identity. The different qualities falling under one sense are specifically distinct, merely generically identical (cf. l. 30), and according to Alexander it is these which have their relative identity recognised by the same sense, while it is a single sense functioning in a certain manner which recognises actual specific identity. This latter contention is correct, but Alexander can hardly be right in saying that here generic identity is included in specific.

The train of thought is rather as follows—Specific identity is perceived by a single sense functioning in a certain manner (cf. De An. III. ch. 1, 425 a 20: ἐκάστη γὰρ ἐν αὐτοδήνη αὐτηθησεῖ). ‘I add the latter qualification,’ says Aristotle, ‘because a single sense without specifying the manner of its functioning merely recognises generic identity (the identity e.g. of black and white) not specific; (the function of a single sense is to discriminate the specifically diverse.

Cf. De An. III. ch. 2, 426 b 8 sqq. esp. 10: καὶ κρίνει τὰς τοῦ ὑποκειμένου αὐτηθησιν διαφοράς); but, in recognising various white things as white, i.e. as possessing specific identity, it operates in a definite different mode, and one other than that by which it recognises the
There is a corresponding difference of mode in which each sense recognises the corresponding positive qualities e.g. white and sweet, and the corresponding negative qualities like black and bitter.'

Thus the conclusion is, that it is the same sense functioning in a definite manner which is different in the case of each of two contraries, though corresponding in the various senses according as the contraries are ἔξως or στερῆσις. As Alexander points out, numerical difference of the sensations can be discerned only by temporal difference of the perception, specific difference by the difference of the manner, generic by the difference of the sense faculty.

447 b 32. στοιχεῖα. Cf. beneath 448 a 17–18, cf. Bonitz, Ind. p. 736 b 61, στοιχεῖα 'ea sunt, quae in eadem serie continentur.' The 'series' (στοιχεῖα) need not be a genus; generally it is not. Aristotle here ranks the opposed qualities of all the generically different senses under the two heads of ἔξως and στερῆσις. It is these which form the titles of the two series. Cf. Metaph. iv. ch. 2, 1004 b 27: τῶν ἑαυτῶν ἢ ἐπίπεδα συνοχια στερῆσις. Cf. also the Pythagorean distinction of two συνοχία, the one headed by τὸ πέρας the other by τὸ ἀπερα. Metaph. 1. ch. 5, 986 a 23 sqq.

(The use of συνοχία in Metaph. x. 1054 b 35 and 1058 a 13 seems to be somewhat different.)

For the use of ἑαυτῶν cf. above ch. 6, 446 a 19: πρὸς αὐτὰ.

448 a 2. ἤτοι. This section further shows that the opposition of the κινήσεις of the respective sense affections which are specifically distinct makes simultaneous perception of them impossible.

448 a 3. ἄμα κ.τ.λ. Cf. De An. iii. ch. 2, 426 b 29: ἄλλα μὲν ἀδύνατον ἄμα τὰς ἑαυτῶν κινήσεις κυκλοφορεῖται τὸ αὖτε ἢ ἀδύνατον καὶ ἐν ἀδύνατον χρόνων. εἰ γὰρ γλυκέ, ὥστε κατὰ τὴν αὐθαίρεσαν ἢ τὴν νόημα, τὸ δὲ πικρὸν ἑαυτῶν. This comes in the De Anima in a different connection; there he is proving that there must be something unitary which distinguishes the opposed sense modifications, something which is only in aspect divisible (cf. beneath at the end of the chapter). Cf. also De Coelo, ii. ch. 13, 295 b 14: ἄμα δὲ ἀδύνατον ἐς γὰρ αὐθαίρεσαν τὴν κινήσαν.

Alexander understands χρόνων after αὐθαίρετος (l. 4). The whole discussion, he thinks, is one about time. We are not at present raising the question of the unity of what perceives as in the De Anima. But this restriction of τῶν ἁυθαίρετος to time is impossible. It must be one thing that is diversely affected if there is to be any
controversy as to the possibility of the two affections being simultaneous (ἀμα). Aristotle denies as a general principle that they can be so.

448 a 7. τὰ μὴ ἐναρτία. These are evidently the intermediate qualities. It is not quite clear whether the theory about them here is quite the same as that presented in earlier chapters. There they are held to be mixtures of the two extreme qualities and, if by saying that some can be assigned to one extreme, others to the other, Aristotle simply means that there is a greater proportion of the one element in one case, of the opposite one in another, then the two theories can be reconciled. This is Alexander’s explanation.

On the other hand τὰ μεμηγμένα seem to be introduced in l. 10 as a fresh class and are explicitly illustrated only by musical examples.

But probably there is no real discrepancy between this chapter and previous ones. By τὰ μὲν and τὰ δὲ in l. 7 he probably refers to τὸ ἄμιθον and τὸ φαιόν which are assigned to white and black respectively, ἀμφιφόρον and λεπαρόν which are claimed by πικρόν and γλυκό (cf. ch. 4, 442 a 18 sqq.); and by τὰ μεμηγμένα to the other qualities.

448 a 9–10. Though τὰ μεμηγμένα are illustrated only by musical examples, Alexander thinks that the words in which he describes the ratio between the components of these compounds make it evident that he is thinking of colours and tastes as being composed by the intermixture of various amounts of two original components. Cf. l. 13: ὁ μὲν πολλοῦ πρὸς δλέγον...14: ὁ δὲ δλέγον πρὸς πολύ. But this is to confuse the matter. When Aristotle says it is impossible to perceive τὰ μεμηγμένα ἀμα, unless as one, he does not mean to repeat that we cannot perceive their components simultaneously unless as one. He has already said that contraries cannot be perceived simultaneously unless perceived as one, i.e. unless they form an intermediate colour, taste, etc. Aristotle is here asserting that we cannot perceive two intermediate colours simultaneously unless they coalesce.

448 a 10–11. τὸ δὲ πασῶν κ.τ.λ. By this Aristotle surely means the harmony of the fifth with the tonic and of octave with tonic. It is difficult to see how the different notes of the scale could be regarded as mixtures.

This is, in fact, the case in connection with which a difficulty is raised beneath in 448 a 21 sqq.
The chords in question are, in modern terms, composed of two sets of vibrations, one of which is in the case of the octave concord, twice as rapid, in the case of the fifth, 1\(\frac{1}{2}\) times that of the other.

448 a 12. ὅσοι λόγοι. Aristotle’s point is that two blended sounds, e.g. the chord of the fifth or the octave, themselves depend upon a relation between tones of different pitch and hence cannot themselves be simultaneously perceived unless they form a new combination. If they do there is a single ratio formed once more, but if not we shall have the impossible task of presenting together two incompatible relations, that of the fifth—3 to 2—i.e. odd to even—and that of the octave—2 to 1 or even to odd, and this is impossible.

The only difficulty left is to explain why Aristotle seems to identify the former relation with that of much to little and the latter with that of little to much. But probably he does not mean to identify them. The explanation will be, as Alexander suggests, that by the mention of the ratio of much to little he is indicating the composition of some mixed colour, e.g. red, which contains a large proportion of one quality, e.g. white, and, by the relation of little to much, another colour, in which the proportion of white is small compared with the other component.

Alexander and most of the commentators seem to think that Aristotle is in this passage discussing, not the simultaneous perception of qualities themselves composite but of the components in composite qualities. This (cf. note to l. 9–10 above) is erroneous and makes them distort the sense and take ὅσοι γὰρ ἀρα κ.τ.λ., l. 13, as explaining the σεπτωμ...γενεται, l. 12, not the ἄλλως δ’ οὗ. They would translate ‘Thus and not otherwise we get a ratio between the extremes, for there will be in the one case the simultaneous presentation of the relation of odd to even, etc., in the other case of even to odd, etc.’ As Alexander explains, Aristotle is referring to the difference of the single ratio in each case. But the point is, that the simultaneous presentation of two such diverse ratios is impossible. Besides, the other interpretation requires us to take ἀμα as applying separately to both clauses ὃ μὲν κ.τ.λ. and ὃ δ’ ἀλίγου. But there is no sense in saying that the relation of odd to even is simultaneous; the simultaneity must apply to the two ratios.

In my interpretation I am on the whole in agreement with Hammond.

448 a 16. γένε. It is wrong to confuse specific and generic difference as Hammond does. The point is that, if specific diffe-
rence renders simultaneous perception impossible, *a fortiori* generic does.

448 a 19. *πλάνοι κ.τ.λ.* We now proceed to a still wider divergence. Sweet and white, though heterogeneous, are still in the same *συντονία*; sweet and black lack even that connection. Torstrik's conjecture of *τὸ λευκὸν* for *τὸ μέλαν* and *τὸ μέλαν* for *τὸ λευκὸν* weakens the sense. It makes this clause merely a deduction from the principle quoted above and not an advance on it. Bekker's reading of *τὸ λευκὸν* for *τὸ λευκὸν* brings a perfectly irrelevant premiss into the argument.

τῷ άνακ, deleted by Torstrik, is unnecessary and, if allowed to stand, can only be translated vaguely in the manner given. Still it is quite in Aristotle's manner to change readily from the restricted to the wider use of a technical term, and we must bear in mind the essential identity of the notion of *έδος* as species, and *έδος* as form. We might render—'in ideal content.'

448 a 21 sqq. The case cited is apparently not the simultaneous perception of two different chords but of the two tones in one concord. The theory put forward is that really the perception is not simultaneous but only apparently so. With the first part of the conclusion Aristotle does not disagree, if it be meant that the two tones cannot be heard together as two separate units. But, on the other hand, when they form a *συμφωνία* they have coalesced and are heard simultaneously. Thus his argument becomes an attack on the doctrine that the coalescence is not real but apparent merely.

448 a 23. *φαίνονται.* The contention is, that the union of tones is merely apparent, just as it was contended in the juxtaposition theory of colour in ch. 4. 445 a 22 sqq. that the union of elementary tints which produced an intermediate one was of the same nature—that it was effected by a mixture *πρὸς αὐτῶν* merely (cf. notes ad loc. cit.). The means by which such an apparent union can be obtained is in both cases the same; it is owing to the interval between the sensations being imperceptible that this happens. Without this being granted the theory will not hold, and, accordingly, Aristotle proceeds to argue against the existence of a *χρόνος ἄναξαθης*.

448 a 25. If the theory, that imperceptible moments of time exist, is true, it will be as possible to have simultaneous sensations of sound and colour as of different tones. But this conclusion is repugnant to Aristotle. Sensations of different senses cannot combine—hence cannot be simultaneously presented.
This is the first ground on which he rejects the theory.

448 a 26–28. We must remember the principle laid down in Physics iv. ch. 14, 223 a 16 sqq., that apart from ψηφίσμα time cannot exist. Hence a time in which we are not conscious is not time. A χρόνος ἄναίσθητος is strictly a time in which we are not conscious, for, as Alexander points out, time is not perceived καθ’ αὐτό but by means of the events which happen in it. Aristotle expresses this frequently when he says, e.g. De Gen. et Corr. ii. ch. 10, 337 a 23, that time does not exist apart from change.

The argument here is derived from the continuity of time (cf. Physics iv. ch. 11, 219 a 13, etc.), which itself depends upon the continuity of the change apart from which it cannot exist. If in a single continuous time there are sections in which no consciousness occurs, the continuity of the consciousness will be broken; but, when one is continuously conscious, one is not aware of breaks.

Alexander apparently reads εἰ ὅρατον καὶ οὐκ ἀισθάνεται (l. 32), the latter words merely repeating the sense of λαμβάνεται ἄν (l. 32).

Simon follows the reading καὶ οὐκ ἀισθάνεται καὶ ἀισθάνεται, which simply states more explicitly the contradiction implied above.

448 b 1. The ancient Latin version does not translate καὶ εἰ ἀισθάνεται (l. 33), nor does Alexander read it. It is probably a gloss. In that case we should have to remove the comma after εἰ, making the sentence start with that word.

If we retain the clause, the sense will be—"But if there are no breaks in our consciousness and we still perceive whatever object is before us during the whole of the time even though certain sections of it are imperceptible, then we shall have to say that perception throughout any whole time is really always effected by perception in some part of it only." Thus, as Alexander says, we do not perceive this time ἀπλῶς καὶ κυρίως, but only indirectly. We do not perceive a whole as a whole. The argument then goes on to show how by subtracting the χρόνος ἄναίσθητος from any whole and from the remainder successively ad infinitum, you could show that no time, however small, was, per se, an object of consciousness.

448 b 2. πράγμα. Bound up with and illustrative of the proof we have just outlined (note to 448 a 26–28) of the non-existence of insensible moments of time, there runs a parallel proof of the non-existence of insensible material magnitudes. Alexander explains their conjunction by making out that it is the supposed σώματα ἄναίσθητα καὶ ἀμερή which have motions in imperceptible times. These have
already been disposed of in chapter 6 and in the *Physics* etc. But it is obvious that this proof which shows that there are no *χρόνος ἄνωθεν*, will equally well get rid of *σώματα ἄνωθεν*, indeed of insensible magnitudes of all kinds, for the discussion is carried on wholly in terms of *μέγεθος*.

Here the two cases are argued out concurrently, and so closely interwoven that they seem to get confused.

448 b 5. *τὰν ἀλη*. It is absurd to make this refer to *τὴν γῆν* (l. 8) as Bender and Hammond do. How can CB be taken away from the whole earth? Alexander correctly explains that Aristotle is illustrating both magnitudes, the temporal and the spatial, by a line AB, and the feminine inflection here refers to the *γραμμή*.

The contention of the whole passage leads to the conclusion that here, as in many cases, our text consists of notes either written for or taken from a lecture in which there were many cursory explanations and asides, which have not come down to us. Probably by this stage in the proof Aristotle had already drawn the line on something analogous to our blackboard, and this explains the sudden appearance of the feminine inflection in the adjective without the previous introduction of any feminine substantive for it to agree with.

If we make the apodosis begin at *καὶ* we must say that Aristotle implicitly, if not explicitly, identifies perception of a whole time with perception during a continuous time, i.e. during the whole of it. That is in fact what he means by the latter, and what he frequently expresses, e.g. in 448 b 2 by *ἀισθάνομαι ἐν*: cf. also l. 9 ἐν τῷ ἐναντίῳ during a whole year, and ὃ ὁ ἐν τῇ ἑτοίμωτι l. 7, 448 a 29 ἐν συνεχέις χρόνοις.

For this way of translating τῶν νῦν τοίτων, cf. *Phys.* vi. ch. 6, 237 a 16, iv. ch. 10, 218 a 15.

448 b 7. In order to carry on the parallel proof affecting an extended magnitude he should have added to ἐν ὧ, ὧ ὧ. The reference to the extended magnitude appears once more, however, in the next clause—ὁ ταύτης τι.

448 b 8. ἐν ταύτῃ τῷ ὧ ταύτης τῷ. We must remember that the same line is representing indifferently either a temporal or a spatial magnitude.

*τὴν γῆν κ.τ.λ.* Simon and St Hilaire rightly say that this is the *reductio ad absurdum* of the theory that, by perceiving a part, we can perceive the whole. On this interpretation we must render ἐν τῷ ἐναντίῳ—during the whole year, 'totum annum,' Simon, p. 257.
Alexander does not give quite the same interpretation. He thinks that ἀστρεφτερ τὴν γῆν is an illustration of how we may have indirect (κατὰ μέρους) perception of a whole. We may, in an improper and unqualified way (ἀπλώς), say that we perceive the whole earth by perceiving a part, or assign the Olympic contest to such and such a year because it occurs in a certain time falling within the year.

Whichever interpretation we follow, the result is the same. Such perception is only indirect perception of a whole, not of a whole per se, and, if there are imperceptible moments, it alone is possible, and we can never have perception of a whole as a whole.

\[448\text{ b 10. ὁδεῖν αἰσθίνεται.} \] This is doubtless put in as a reply to an objection that the line AB by which he was illustrating was perceived as a whole

\[(A C \mid B).\]

He reminds the objector that they have agreed that CB shall represent an imperceptible part.

\[448\text{ b 14. ἀπαντα μὲν οὖν κ.τ.λ.} \] We must understand that the conclusion reached in the previous clause is rejected. For the doctrine cf. chapter 6, 445 b 30 sqq. where he shows that the minute parts of objects, though not per se actually perceptible, are still perceptible ἐνεργείᾳ in the whole, i.e. when taken in conjunction with the other parts, and that even per se they are potentially perceptible (446 a 15 sqq.: δυνάμει τε γάρ ἐστιν ἄρχη, καὶ ἐνεργείᾳ ἐσται προσεγγισμένων).

The doctrine involved in both passages is the same and the conclusion the same, viz. πᾶν μέγεθος αἰσθητών.

\[448\text{ b 16. ἄλλῳ οὗ φαίνεται ὅσον—ἀλλ’ ἔνιστε ἀδαιρέτων, ὥρᾳ δ’ οὐκ ἀδαιρέτων.} \] This should probably be connected with what is said in De An. iii. ch. 3, 428 b 29 sqq. about the falsity which may attach to φαντασία. Φαντασία may be exercised along with sensation (παραφύσις τῆς αἰσθήματος). In the case of the perception of size (and the other κατὰ αἰσθητά) which may itself be erroneous, the φαντασία which results from this perception may also be false, whether the perception is present or not, καὶ μάλλον ὅταν πόρρω τὸ αἰσθητῶς ἔστιν. If, with Freudenthal (Über d. Beg. d. Wort. faun. b. Arist., p. 12), we take πόρρω as referring to spatial distance, as πάρορθεν does here (but cf. Rodier, Vol. ii. p. 433), then Aristotle is instancing the error which attaches to our idea of distant objects. Cf. also 428 b 3: οὖν φαίνεται μὲν ὁ ἰλιος ποδαῖος and De Insom. ch. 1, 458 b 28, and ch. 2, 460 b 18. But though, in the above
passages, the discrepancy between ἡμερεῖα and belief (πίστις) is discussed, we nowhere meet with an explanation of any conflict between imagination and perception of the common sensibles which goes so far as to assert that something which is imperceptible is yet imageable.

Hence we may conclude that, when Aristotle says that magnitudes sometimes appear to be indivisible, he would not probably refer the act of mind to ἡμερεῖα in the strict sense defined in De An. iii. ch. 3 (κίνησις ἐπὶ τῆς αἰσθήσεως γεγομένη 429 a 1) or as the faculty of images (cf. 428 a 1). It is rather to be classed as a mistaken opinion and to be ascribed to δόξα. In fact ἡμερεῖα is here used vaguely, and κατὰ μεταφοράν (cf. 428 a 2), but in a sense which is very common (cf. above 448 a 23 and frequently elsewhere) as implying ‘appearance’ in the modern sense, as opposed to reality.

(For a discussion of the minimum visible cf. Introduction, sec. VIII.)

448 b 18. ἐν τοῖς ἑμπρόσθεν. I hold (following Alexander’s second alternative) that this refers to ch. 6, 445 b 11: δόξαν γὰρ λευκὸν μὲν ὅραν, μὴ ποσὸν δὲ, not to the subsequent discussion (cf. note to 448 b 14), for the principle involved is not πᾶν μὲγαθὸν αἰσθητὸν but πᾶν αἰσθητὸν μὲγαθὸς, the simple converse, which is also discussed at the end of this chapter, 449 a 22 sqq.

448 b 19. This passage from 448 b 19 to 449 a 22 presents very serious difficulty. In the first part of it the text has been practically reconstructed by Biehl, who attaches great authority to mss. E M Y. Consequently the interpretations of Alexander and most commentators who follow a very different version have to be in many places discarded. This in itself is small loss, as it can hardly be said that those interpretations were consistent either among themselves or with the previous part of the treatise. But the difficulty still remains of extracting the exact drift of the argument from the crabbed Greek of the reconstructed and, it is supposed, more ancient version. Down to 449 a 10 runs an argument to which we can find no strict parallel in the De Anima, and it is here that the textual reconstruction takes place. From this point onwards we can trace an identity between the reasonings here and those passages in De An. iii. ch. 2, 426 b 8—427 a 16 and ch. 7, 431 a 19 sqq., which are themselves already so famous for their obscurity. Consequently the advantage resulting from a greater unanimity as to the text is annulled by a greater divergence of opinion as to the purport of the argument.

In order to arrive at a conclusion as to the general meaning of
the passage we must, as it were, take our bearings and recapitulate the results attained in the previous part of the chapter together with the main conclusions arrived at in the *De Anima*.

The solution already given of τῆς πρῶτης λειτουργῆς ἀποφαίνει, that consciousness of two sensations simultaneously is only possible when the two combine to form a unitary product (447 b 11: τῇ μὴ δὲ [αισθήσεως] ἀμα διώκου ὁπλ ἔστω ἀισθάνεσθαι ἀν μὴ μυθῇ). Only sensations, however, belonging to the same sense can give a unitary product (447 a 32 sqq.), and, as an illustration of this unitary product, he gives the concord which two different tones compose and, though Aristotle does not explicitly mention them (cf. notes to 448 a 7 sqq.), everything points to his having in his mind the composite colours, odours and flavours which in previous chapters he asserted to be formed by the combination of the two qualities which in each sense are most opposed to each other (ἐκ μὲν ἐν τοῖς γένεσι καὶ ἐγνωστοῦ γὰρ ἑν τὰ ἐσχατα ἐναυτία). Qualities of diverse senses do not combine (ἐκ δὲ ἑνων οὐ γένεσα, τοιούτα δὲ τὰ ἐφ᾽ ἐτέραν αἰσθησιν...οὐκ ἔστι δὲ εἰκεκυ καὶ ἄξιος ἐν γενέσι καὶ ἐκ κατὰ συμβεβηχοῦς). This statement is repeated again in the passage we are to discuss 449 a 9–10: οὐδὲν γὰρ ἐκ τούτων [γλυκῆς καὶ λευκῆς] ἐν.

The conclusion then is, that sensations of different senses cannot be simultaneously present in consciousness, while those belonging to the same sense escape the same disability only by sacrificing their individuality and merging in a compound (μέγα) in which they are not ἐνεργεία, actually, discernible.

Now, in view of the opposition between this conclusion and the passages in the *De Anima* as well as the solution finally come to at the end of this chapter (ὡστε καὶ αἰσθάνεσθαι ἐν ἀμα τὰ αὐτὴ καὶ ἐν, 449 a 21), which is evidently Aristotle's final opinion, how are we to treat the arguments in the earlier part of the chapter? Are they merely dialectical? Or do they merely emphasise a point of view which, while so far legitimate, is modified and transcended by the final presentation of the subject? To us who have followed Aristotle's method of developing an argument in previous chapters, this seems the more likely answer, but whether he has made the relation between the two points of view quite plain, and whether indeed he was clear about it in his own mind, is another question.

In the passages in the *De Anima* there is no mention whatsoever of the sensations coalescing with each other. The question is raised how we distinguish the various sense qualities, and the word chiefly
used for this action is κρίνειν, which is paraphrased once (426 b 14) by αἰσθάνομαι ὅτι διαφέρει [τὰ αἰσθήματα]. The reply is, that they must be distinguished by something unitary and in a unitary moment of time (ἀμα). If the first condition were not fulfilled, consciousness would be divided into independent parts, separate like the minds of different individuals; if the moment of their distinction were not a unit, qualities could not be pronounced to be distinct at one and the same moment.

Obviously Aristotle is there not discussing qualities which have merged with each other and lie indistinguishably commingled in their product. It is noteworthy also that, apparently, he finds the greatest difficulty in explaining the simultaneous distinction of contrary qualities, not of those belonging to diverse senses. (Cf. Rodier, Vol. II. pp. 388 sqq. and pp. 501 sqq. On the whole I follow Rodier and Alexander.) (1) The first explanation proposed is, that what perceives is in aspect or mode of existence (τὰ ἄνω) diverse, though a numerical and spatial unit (τὸν δὲ καὶ ἄρθρω ἀδειπτον 427 a 5), just as things have various diverse qualities, but yet are numerically and spatially one (cf. beneath 449 a 16: τὸ γὰρ αὐτὸ καὶ ἐν ἄρθρῳ λεικὸν καὶ γλυκὸ ἐστι). (I agree with Rodier and Alexander in identifying the second solution in this chapter of the De Sensu with the former of the two explanations in the De Anima in III. ch. 2.)

But (2) it is only potentially that contrary qualities (as distinguished from those merely diverse) can form a unity. When actual they cannot be realised in the same subject. When forming a mixture they have potential existence and thus can be realised in the same subject. Hence we must think of the soul, not as being analogous in this case to a thing in which diverse qualities are combined, but rather to something incorporeal, e.g. a point, which is at one and the same time actually one or two, according to the way in which it is viewed. A point per se is a mere unit and indivisible, but, viewed as the end of one line and the starting point of another, it is two. In the line AB which is intersected at the point C

A | C | B

C is employed in two ways at the same time, as the terminus of AC and the starting point of CB (ὅς γὰρ τὸ αὐτὸ χρῆμα σημεῖα ἀμα 427 a 12).

This is, without doubt, the same solution as that mentioned briefly below in 449 a 12 sqq. 'In so far as that which perceives
COMMENTARY

sweet and white is actually indivisible it is one, in so far as actually divisible it is diverse.'

Note that in the De Sensu Aristotle applies the explanation, which he had reserved in the De Anima for contraries, to mere different like white and sweet, afterwards returning to the more general solution which he had given in the De Anima (ἡ ὁπότε ἐπὶ τῶν πραγμάτων αὐτῶν ἔνδεχεσθαι, οὕτως καὶ ἐπὶ τῆς ψυχῆς 449 a 14-15) and which seemed to be inadequate to account for the perception of contraries. This need not mean a recoil on Aristotle's part from the teaching in the Psychology. From the discussion there in iii. ch. 7, it appears that he thought the cases of contraries and of different not to be fundamentally diverse. (I follow here Rodier's text and interpretation.) Vide 431 a 21: ἐτοι γὰρ ἐν τι, οὕτω δὲ καὶ ὡς ὂρος. καὶ ταῖτα, ἐν τῷ ἀνάλογον καὶ τῷ ἀρμον ὁτ, ἔχει πρὸς ἐκάπετον, ὡς ἐκείνα πρὸς ἄλλα μα. τί γὰρ διαφέρει τὸ ἀπόροκα πώς τὰ μὴ ὄμορφα κρίνει ἢ τὰ ἐναρτία, οἷον λευκὸν καὶ μέλαν; κ.τ.λ.

Here we find (i) that which discerns the sensibles is ὡς ὂρος, as it were a limiting point (cf. πέρας in the previous passage); (2) that the sensations (ταῖτα) are, in virtue of this principle, related to each other as the qualities (ἐκείνα) are among themselves; (3) that this numerically identical consciousness relates the various pairs of ἐναρτία in an analogous fashion (as we can gather also from De Sensu, ch. 7, above 447 b 32 sqq.: ὡς δʼ αὕτως ἐναρτία τὰ σύντομα κ.τ.λ.). Hence, if white bears to black the relation that sweet bears to bitter, the proportion will be transposable, as we may say that white is to sweet as black to bitter. Here now we are relating to each other τὰ μὴ ὄμορφα and hence it follows that the mode of distinguishing them is not essentially different from the way in which we discriminate contraries.

It follows, then, that Aristotle's final opinion contained both elements and that the two are really complementary to each other (cf. Rodier ii. p. 501), viz., (1) that the relation of sensations in consciousness is the same as that of objective qualities in things, (2) that the only parallel we can find for the relating consciousness is the mathematical point with its double function of oneness and duality.

Notice that Aristotle is confident that this perception of two qualities is simultaneous, while it must be different from the only kind of simultaneous perception of qualities yet accounted for (up to 448 b 17) in the De Sensu. This was the perception of qualities in fusion; that is the distinction (κρίνεις) of the different sensations.
It is true that in *De Sensu*, ch. 7, 447 b 28 sqq. Aristotle says it is the function of a single sense to discriminate specifically different and opposite qualities like white and black. But there is no indication at that point that this discrimination must be instantaneous; the drift of the argument seems rather to be that what is perceived at a single instant must be a numerical unit. Alexander (*De Sensu*, p. 167, ll. 10 sqq. [W.], p. 352, ll. 10 sqq. [Thurot]) professes to find the account given of the perception of contraries here unsatisfactory. It is merely, he thinks, the same as that first hazarded in the *De Anima* and there set aside. The same thing cannot be both white and black, and hence, if the union of sensations in the soul is similar to the union of qualities in things, we have left the case of contrary sensations unexplained. Hence he thinks that either discrimination of contraries can only be effected by means of memory, not by present sensations, or that it is by the central organ (the heart) being affected in different parts simultaneously (just as it must be different parts of the same object that have contrary determinations) that we can at the same time distinguish different sensations. Hence, though the simultaneous experience (*πάθος*) of two opposite qualities is not possible, simultaneous discrimination (*κόπησις*) is.

This seems to me to be an untenable position. Though, in perception, there can be distinguished the two different aspects of discrimination and experience or reception of the sensations, yet they cannot exist apart from each other; at any rate the discrimination of the diversity cannot exist without the presentation of the different, and simultaneous discrimination of the different cannot exist without simultaneous modification of the same thing by the different.

Besides, this theory seems to be exactly that which Aristotle, in anticipation of his final solution, is going to disprove below in the passage from 448 b 19—449 a 9: ἄμα μὲν, ἐπείρω δὲ τῇς ψυχῆς αἰσθάνονται. This is impossible, he says, even though the different parts belong to one continuous whole—οὐδὲ ἄπόμορφος ὡς παρίε ὄντι σωματικὸν (*cf. infra* 23 sqq. and notes). This would be a good description of the central organ functioning by means of different parts.

The way out of the difficulty is found by paying close attention to the conclusion established in *De An.* iii. ch. 7.

There is no essential difference, Aristotle says, between the discrimination of different and of contraries. Similarly we might add there is no essential difference between the way in which both classes of qualities are realised in things. Incompatible qualities must, if
realised in one thing (by belonging to different parts of it), meet in a common point which is two or one according to the way of looking at it, just as much as a particle of matter which is both sweet and white has both a dual and a unitary aspect.

If this is Aristotle's final opinion, what is to be thought of the purport of the earlier part of this chapter? It might be suggested that in the De Sensu he is talking of αἰσθάνεσθαι in the sense of πάσχει, in the De Anima as κρίνει. But this can hardly be accurate; the final verdict in the De Sensu is the same as in the De Anima, while there is no indication that he is at the end thinking of αἰσθήσεις merely as κρίνεις. As we have seen, there cannot be simultaneous κρίνεις without simultaneous πάθος, while again sensation is always with him a δύναμις κριτική, always cognitive. Perhaps the meaning to be extracted from the discussion is as follows—Sense qualities as such cannot be perceived simultaneously. True, if the sensations they give rise to can combine, as they may do if they belong to the same sense (since the corresponding stimuli are in closer proximity than in other cases—μᾶλλον γὰρ ἀμα ἡ κίνησις 447 b 9 sq.), they can both be experienced. But in combination they cannot be discriminated, hence not perceived. But since, as we learn in the De Anima, to be discriminated they must be simultaneously apprehended, it is to their objective realisation in things, to their unity κατὰ συμβεβηκός, i.e. as accidents of the same substance, that we must look for the grounds of the possibility of their discrimination, while their discrimination is effected by a consciousness which has a unity, not like that of different spatial parts in a whole, but like that of the different qualities in one object.

If this be the meaning of our author, it forms a remarkable foreshadowing of the psychological doctrine that discrimination and objectification go together and, if objects can exist only in space, it is an argument for the necessity of the spatial form of things for the development of knowledge.

Aristotle says that this faculty which distinguishes the sense qualities belonging to the different genera is still a form of sense, for the qualities distinguished are sense qualities (αἰσθητὰ γὰρ έστιν, De An. iii. ch. 2, 426 b 15). Yet it cannot be ίδια αἰσθήσεις, which merely discriminates qualities belonging to a single sense. It is not located in the organ of any special sense, nor in the flesh. Its organ he calls τὸ κύριον αἰσθητήριον, which is evidently to be identified with what he elsewhere calls τὸ κύριον αἰσθητήριον, De Som. ch. 2,
DE SENSU

455 a 21 sqq., τὸ πρῶτον ἀλοθρητήρον ἰθ. 456 a 21, etc., and τὸ κοινὸν ἀλοθρητήρον De Juvet, ch. 1, 467 b 28, ibid. ch. 3, 469 a 12, namely the heart or some constituent found in it. This is the organ of the κόινα ἀλοθρητήρας, one function of which we have already discussed, namely the perception of the 'common sensibles,'—number, figure, magnitude, motion, and unity. If we look however to De Som. ch. 2, 455 a 13 sqq., we find that the faculty by which we distinguish the various genera of sensations, e.g. white and sweet, is also called a κόινα δύναμις ἀκολουθοῦσα πάσως, and this it is, too, which enables us to be not only conscious but self-conscious (ἢ καὶ ὁτι ὁρᾷ καὶ ἀκοέι διαθέσιμα). It resides in the κοινόν ἀλοθρητήρων (τοι κοινῷ μορφῶ τῶν ἀλοθρητήρων πάντων).

Hence we come to the conclusion that the faculty by which we discriminate and hence objectify sense qualities is also the same as that in virtue of which we are self-conscious, a striking anticipation of Kant’s doctrine of the objectifying function of the ‘transcendental unity of apperception.’ Cf. Introd. sec. ix.

448 b 22. ἀτόμῳ χρόνῳ. Cf. note to ἀτόμῳ above 447 a 15; this has been the sense in which Aristotle has used ‘individual time’ throughout. Cf. Phys. viii. ch. 8, 263 b 27: ὥθεν ὁλῶν τε ἐς ἀτόμους χρόνους διαμεικται τὸν χρόνον, cf. also vi. ch. 9, 239 b 8.

448 b 23. ἐρωμῳσι. This seems not to be exactly the theory rejected in De An. iii. ch. 2, 426 b 17 sqq.: ὅτι δὲ κεχωρισμένας ἔννοεις ἐνέχειται κρίνειν ὅτι ἔτερον τὸ γλυκὸν τοῦ λευκοῦ, κ.τ.λ.

There it was shown in general terms that it is not by separate organs or faculties that the soul discriminates diverse sensations. Here it is proved that not even though the different organs were to form a continuous whole could it be said that through them the distinction of the sensations is effected.

In short, both arguments are directed against the contention that it is by means of spatially different parts that the simultaneous presentation and discrimination of two different sense qualities is rendered possible. In the De Anima these different parts seem to be regarded as the various end organs, but as it might have been objected that they need not be regarded as separate in that way, since, on Aristotle's own theory, the various sense organs all connected with the heart, and the real organ of discrimination might hence be the various parts of that member, Aristotle here refutes this second version of the theory.

448 b 24. οὐ τῷ ἀτόμῳ. This is omitted by mss. L S U and
also by Alexander, who reads, instead of the subsequent ὀὖτος ἐ ἀτόμῳ, καὶ ὀὖτος ἀτόμῳ ὥσ πατὶ ὅτι συνεχεῖ. This he takes to refer to the ἀμα in l. 21 above and to be a second attempt to define the sense in which the organ is individual (Alex. p. 157 ll. 17 sqq. [W.], p. 331 l. 7 [Th.]). This reading and interpretation is supported by Thurol and also Bäumker (Jahrb. für Class. Philol. 1886, p. 319) who, of course, assign the ὀὖτος ἀτόμῳ to dittographia. But, if the interpretation is to be supported and ὀὖτος ἀτόμῳ is to be referred to time, we must read either καὶ ὃν ὀὖτος with Thurol or κἂν ὀὖτος with Bäumker. However, it is impossible that ὃς πατὶ ὅτι συνεχεῖ can elucidate the meaning of ἀμα or be a relevant description of the atomic time mentioned above (cf. previous notes). That is a time which relatively to the two sensations is atomic, which is such that the two sensations are not subsequent to each other, but both experienced concurrently throughout the whole duration of the time. But, though the time is continuous, one sensation may quite well be subsequent to another, for the time unifying two events in immediate succession is continuous.

It is true that the time in which the sensations are presented must be continuous, i.e. must be capable of resolution into still briefer times: cf. the general discussion of continuity in the notes to ch. 6, 445 b 3 and 28 sqq.

But to point this out in no way shows how the sensations are ἀμα; on the contrary, it would lead one to believe they were not really ἀμα, i.e. ἐν τῷ ἀδηφῷ χρόνῳ (Phys. iv. ch. 10, 218 a 25, Categ. ch. 13, 14 b 25) in the sense of being concurrently present in all parts of it, but that one was ὑστερον, the other πρῶτον. Cf. Phys. loc. cit.—ἀμα ἐστιν κατὰ χρόνον = μήτε πρῶτον μήτε ὑστερον τὸ ἐν τῷ ἀδηφῷ ἐστιν.

Hence, if it was said that the individuality of the time in which two sensations were presented consisted in its being composed of continuous parts and that they were ‘together,’ ἀμα, merely in the sense of occupying different parts of this continuous whole, this would contradict the definition of their simultaneity given above in l. 22, which Alexander explains as not being merely immediate succession in time.

In short, if it can be asserted that a time of continuous parts is atomic in a sense (i.e. in the sense that no division in it has been made), yet this is not the sense in which the time in which sensations are simultaneously perceived is atomic.
Hence if ὅτω ἀτόμω refers to time, it is a misleading irrelevancy. It must refer to the organ or faculty of perception. (For the sense in which τὸ συνεχές is a unity cf. *Metaph.* x. ch. 1, 1052 a 19 sqq.)

The ancient translation runs ‘et non indivisibili, sic autem indivisibili ut omni existenti continuo.’

Biehl’s conjecture καὶ ὅ ἀτόμω ἢ ὅτω[ς ἢ] ἀτόμω seems to give little visible improvement.

448 b 28. ταῦτα. All mss. except E M and all editors except Biehl read ταὐτά. Accordingly, following that reading we should have to interpret ‘there will be a plurality of organs specifically alike.’ Not only the interpretations but the readings also which we are to accept in the subsequent passage will depend upon our decision here.

Firstly, it is clear that whatever reading we accept we must not have the temerity to translate γένει in this line ‘species.’ Hammond reading ταὐτά renders: ‘it will then have parts specifically the same. For its repeated sensations belong to the same species.’ This is certainly to cut the knot and leave the difficulty unsolved.

Supposing that ταὐτά be read, then we may, throughout the subsequent lines also, follow pretty closely the version of the class of mss. which gives us that reading.

Bekker gives καὶ γὰρ ἀλοθάνεται, ἐν τῷ ἀλόθῳ γένει ἐστίν, which we may render ‘for the objects of a single sense belong to the same genus.’ This does not seem to be a confirmation of the ταὐτά unless we remember that, though the actual sensation is identical with the sense quality as actually perceived and that, hence, as qualities are specifically diverse so are sensations, yet as a δύναμις the sense is specifically a unit. The perception of black and of white is δυνάμει specifically one. What has a generic unity ἐνεργεία has specific unity potentially.

The senses considered as faculties are only specifically distinct. Now the sense faculty and the sense organ are from many points of view one and the same thing. They are, of course, relatively to each other σῶμα ἀργυρικῶν and ἥδις—the ἥδις of the particular organ; but they are often referred to by the same term; ἀλοθηρίῳ is often equivalent to ἀλοθηρίῳ (cf. above ch. 3, 440 a 25, and ὅψις is even used for ὅμα: cf. ch. 2, 438 a 13: τὸ μὲν οὖν τὴν ὅψιν ἐννε ἀθανὸς ἀλοθής μέν), and so ἀκοή for the ear, ὀσφήρις for the organ of smell (cf. *De An.* iii. ch. 1, 425 a 4: ἦ δ’ ἀκοή ἄφος, κ.τ.λ. and *De Sens.* ch. 2, 438 b 21–22 and note).
Hence we might argue that, corresponding to the specifically identical faculty which perceives objects specifically distinct, there is, if it requires a separate organ to apprehend every separate determination, a corresponding plurality of sense organs which yet are specifically identical, for, if the faculty is specifically one, so are the organs.

Hence we should have to interpret εἰ δὲ ὅτι ὁ δεύ θεος δύο ὄμματα, κ.τ.λ. l. 29 sqq. in some such way as this—¹ If it be said that this may very well be the case because (e.g.) the eyes are specifically alike, and so the soul may have a plurality of similar organs, it must be observed that the cases are not parallel.

¹The two eyes have an identical function, not two images but one alone is present when we see; but the case you try to explain is that of the perception of diversity.’ (This would require to be the sense to be arrived at, whatever reading we follow.)

Once more, if the organs are specifically alike, so will the faculty of perceiving black, white, etc., be specifically identical, i.e. you will have different sense faculties only numerically distinct (ἀντιθέτας αἱ αἵματα πλείων ἐσονται l. 33) which is like saying that there may be different sciences of the same subject.

But this last argument is sufficient to throw suspicion on the whole proof. If it is the case that, as the authors of this interpretation would themselves admit, the perception of black and the perception of white are only as actualised specifically different, and δύναμις, or as a faculty, they are specifically identical and only numerically to be distinguished as different possible acts of the same sense (cf. Alex. De Sens. p. 158, l. 15 [W.], p. 333, l. 6 [Th.]: τῶν γὰρ ἐν τῷ γένει ἡ αἰτία καὶ ἐδός αἰτθείς. Alexander, however, shows some perplexing hesitation between ὀμογενή and ὀμοειδῆ), then it is clear that Aristotle would not have the least objection to saying that the same sense faculty may be reduplicated, provided one understands what this means. If it mean, as is the only view consistent with the reading ταῦτα, that it is one sense faculty which is particularised and made determinate in the perception of black, white, etc., then this is precisely his theory.

(Compare 447 b 27 sqq. above. There he cannot maintain the unqualified assertion that, corresponding to a specifically identical object, there is a single (specifically identical) sense. A single sense corresponds to and discriminates specifically diverse objects (cf. 447 b 29). It is the single sense functioning in a determinate manner which gives specific identity in the object.)
Hence it would be Aristotle’s own theory that the different organs by which we perceived white and black, if there were any, must be specifically alike, just as the eyes are alike.

But his argument is this—If you postulate a diversity of organs, you will have to make them specifically unlike each other. Where we have different organs, as is the case with diverse senses, the unity of the senses is only generic; hence here too, within one sense, if you are to have separate organs, they will only have a generic resemblance to each other. You object and say there are the two eyes, specifically alike, but yet serving the one sense—sight. I reply that these have a single function; the sensations given by each combine to form one product. So too the different sensations mediated by specifically identical (ἔναί & ἡ l. 31) parts of the same organ may form a compound, e.g. black and white, and sounds of various pitch, which combine. But, when that is so, the different sensations are not discriminated. Your proposal was to account for the perception, i.e., discrimination of the sensations, by the diversity of the organs by which they are apprehended. If, as shown, a mere numerical difference in the organ does not render that possible, you will have to try specific disparity. The different organs must be specifically diverse.

1But, if so, contained within each sense there will be diverse faculties, distinct from each other as the various sciences are distinct and as the admittedly different senses are distinct. Distinct sciences have each an appropriate δύναμις and so have distinct senses. The perception, then, of (e.g.) different colours will, because each has, as shown, its appropriate δύναμις, be distinct in the way that the sciences are.’

This carries us down to 449 a 3, after which the argument takes a new turn.

448 b 28–29. τῷ αὐτῷ γένει. Cf. 447 b 29–30; where you have different organs you have only generic identity in the sense.

448 b 29. If we read ἀκολούθων in this way as governing ὅτι (see translation), we must supply λεγεῖν before ὅτι ἵσως in order to avoid an ugly anacoluthon. This, however, is very common in Aristotle. Cf. ἤ ὅτι πρῶτων l. 25 above. The ὅτι ἵσως clause can hardly be an argument against the suggestion that we may have different organs specifically alike, as in the case of the eyes; it will rather be in support of it. Alexander, however, wishes to take ὅτι ἵσως as an objection to a different thesis (cf. note to ταῦτα above).
COMMENTARY 239

If it is intended as an argument in support, it can only be the plea of an intelligent supporter. He (the supporter) says—‘here you have two eyes of identical construction functioning alike and cooperating in the act of perception.’ Aristotle in the next sentence replies ‘that is exactly the point, the objects they perceive are numerically one, not diverse as is required in the case of the organs which are to perceive both white and black simultaneously.’

448b 31–33. Bekker reads ἐκα δὲ, εἰ μὲν ἐν τῷ ἐξ ἀρµοῖν, ἐκεῖνο τὸ αἰσθανόµενον ἐστιν, εἰ δὲ χωρὶς, οὐχ ὁµοίως ἔστιν, following L S U P and Alexander.

Bieh'l's text is εἰ δὲ, ἤ μὲν ἐν τῷ ἐξ ἀρµοῖν, ἐν καὶ τὸ αἰσθανόµενον κ.τ.λ.; he bases his restoration on readings in E M Y. This would give us—‘But if that is so, then, consequent to the unity of the product, the perceptive organ (faculty?) is single, while again if the sensations are separate the case is altered.’ We may extract a meaning out of it somewhat like that which Alexander gets from the other reading—viz, that in the case of the eyes you have really a single psychic faculty functioning through the two organs and not two, as is claimed. This will give a sense satisfactory to our argument; but it is difficult to see how τὸ αἰσθανόµενον could be said to be numerically single when it is quite as naturally an epithet for the eye as for the faculty, and the eyes are manifestly double.

Hence I propose, while following Bieh'l and the older class of mss., to read ἐὰν δὲ εἰ instead of εἰ δὲ in 448b 31, and interpret as in note to 448b 28. The point is, that two perceptive organs specifically alike will account for the perception of a single object, but that to account for the perception of two things (simultaneously), the organs must be specifically unlike.

Hammond translates, following Bieh'l's text, “If, however, the continuation of both forms a unit, then that which is perceived will be a unit and, if they remain uncombined, then the result will likewise be uncombined.’

448b 33. ἤτι αἰσθήµατι κ.τ.λ. For Alexander's interpretation cf. note to b 28 above.

449a 3. It seems to be the universal practice to take ταῦτα as referring to ἐνέργεια in l. 2. We thus get a syllogism—if αἰσθήµατι then ἐνέργεια, if ἐνέργεια then ὁµεία δύναµις; hence all αἰσθήµατι have their ὁµεία δύναµις. But perhaps there was no need to prove this. Whether we read ταῦτα οτ ταῦτα in 448b 28, we might prefer αἰσθήµατι here to be taken in the sense which it has in 448b
as a distinct sense (not as sensation as I have translated). Now a sense is by definition a δύναμις (cf. De An. iii. ch. 9, 432 a 16) and more accurately a δύναμις in the sense of ἡ σωφροσύνη of the ένεργεία in each case. A sense is like a distinct science, a determinate potentiality; the actual exercise of both alike depends upon this, which may be called the 
ολεία δύναμις of the ένεργεία in each case. It may be of these principles that Aristotle reminds us here. It has already been shown that, if the organs by which we perceive white and black are distinct, they, and therefore the faculties which reside in them, must be distinct. Hence these latter will be distinct in the sense that sciences are distinct. The two clauses—οὐτέ...δυνάμεως, οὐτέ...ἀδικίας—will then form only a single premiss in the argument which proves that a distinct sense is like a distinct science.

449 a 4. Unless μη attraverso we get a shocking piece of bad reasoning; though if B can be perceived, a fortiori A can be perceived, we cannot infer that if A then B (B = τοῦ Ἐκάζων, Α = τά ένεργεία). Besides the presence of μη does not incommode the argument, in fact improves it.

The best defence of this emendation (which though authorised by no text is seen to be necessary by Alexander unless τούτων = ἐκάζων, i.e. heterogeneous objects, ἄλλων = ἄλλων). So St Hilaire and Leonicius) is by Bäumer in the Jahrb. für Class. Philol. 1886, p. 320. He points out that though in classical Greek if μη is read we should expect οὐδέ not καί after ὅτι in the next clause, yet we find instances of the contrary usage in Aristotle, e.g. De Cœle, i. ch. 11, 281 a 16: ὅτι δὲ μὴ ἐμφανίστηκε στάδιο μὴ δυνάμεως, δὴ λόγο 
οὐδέ καί ἐμφανίστηκε καί ἐν.

The presence of the καί, being so contrary to common usage, probably led to the omission of the μη.

For the principle compare above 447 b 7 sqq. and 448 a 15 sqq. έν ἐν καί άτιμος must refer to time (cf. 448 b 22–24 and notes). It is the simultaneousness of the perception which is under discussion, and which cannot be accounted for by the theory that the faculty or organ is diverse.

449 a 7. From ητοῦ, l. 7, to ἐκ τούτων ἐν, l. 9, the passage is almost hopelessly obscure.

τούτων, l. 7, must surely refer to γλυκέως and λευκοῦ. The phrase τó ἐκ τούτων continually refers to a compound. Cf. De An. ii. ch. 1, 412 a 9, where οὖσια συνθέσθη, consisting of ἡλιος and εἴδος, is so
designated, and *Metaph.* vii. ch. 3, 1029 a 3, etc. Thus if here τὸ ἐκ τοῖτων refers to the organ or faculty of perception, it can hardly imply that it is a substratum or ἔσοντος, as Alexander (*De Sensu*, p. 162, l. 23 [W.], p. 343, l. 6 [Th.]) and Rodier (p. 390) take it.

However, apart from this, all except Simon (Simon, *De Sensu*, p. 261) admit that (τὸ) ἐκ τοῖτων in l. 9 refers to a compound of qualities or sensations, and it is hardly likely that in three lines Aristotle would employ the same expression to refer to two different things. Moreover the meaning of τὸ ἐξ ἀμφοῦ in 448 b 32 above, as well as ἐξ ἀνώ 447 a 23, ἐκ...ἀνών 447 a 32, etc., all point to this phrase referring to a fusion of sensations, and so St Hilaire takes it. On the other hand, Alexander, Thomas, Simon, and Rodier wish to take it as referring to the soul or the central organ, the heart. The only advantage resulting from this is that the connection of ἀλλ' ἀνάγει ἐν and ἐν γάρ τι τὸ ἀληθητικόν ἐστι μέρος is quite clear, but it leaves the connection between the latter clause and those which follow it absolutely unexplained.

Simon is more consistent than others in thinking that the reference may be to the central sense and its organ throughout.

If we take τὸ ἐκ τοῖτων as referring on both occasions to a product of sensations, then the argument will be clear except as to the connection between ἀλλ' ἀνάγει ἐν and ἐν γάρ τι τὸ ἀληθητικόν ἐστι μέρος. The only way I can see for explaining this is as follows: 'It is claimed that we perceive black and white simultaneously by means of a single organ with spatially diverse though continuous parts. But in such a case the two sensations must coalesce and form a unity, and hence, if it is by the same means that we perceive sweet and white, then they too must form a unity. But such a unitary product does not exist. Hence it is not by the spatial diversity of the organ that those qualities are perceived simultaneously.'

The question is still as to the means of perceiving the two simultaneously (which he is sure can take place), and the objection to the solution proposed is that it postulates different organs, for he admits that such exist (ἀλλ' ὃς ἃς ἃς ἃς, l. 11), but that it is through a spatial diversity of the organ that they are supposed to be related in the same moment of time.

Thus, in the whole of this section from 448 b 19 onwards Aristotle has been working up to his own theory. He rejects the
solution proposed in the form in which it is offered but, *more suo*,
abstracts from it the legitimate part. There are different faculties, but
it is not *qua* located in different physical organs that they are able
to allow their different contributions to be correlated in a single
consciousness.

449 a 8. ἀλλ’ ἀνάγκη. If Aristotle is still discussing the solution
hazarded in 448 b 23–25, as he must be, this is proof positive that
according to that theory the soul must be a unity of a kind, and so
our interpretation of ὑπὸ στὸ ἀτόμον in 448 b 24–25 is confirmed. If it
were under dispute whether what perceives is something unitary or
not, Aristotle could not bring in without proof the very statement
which was denied—ἐν γὰρ τι τὸ ἀληθητικὸν ἐστὶ μέρος. Indeed if
he knew this to be true and to be excluded by the other theory
—ἀλλ’ ἐν γὰρ κακίᾳ ἀλλ’ ἐν λευκῷ αἰσθάνεται ὑψωτόν μέρος—he would
need to start with a direct proof of it.

449 a 10. Biehl proposes to read δὲ instead of ἄρα, no doubt
because, apparently, all that has been said is in opposition to what
follows. But, as we have seen (note to 449 a 7), what precedes is
directed not against the doctrine of a unitary principle (indeed
that has been affirmed in l. 8), but against the interpretation of
it given.

449 a 12. ἵνα μὲν ἀναίρετον κ. τ.λ. The meaning of this is
elucidated in *De An. III.* ch. 2, 427 a 10 sqq. Cf. note to 448 b 19
above.

449 a 17. Alexander reads, l. 17, εἰ γὰρ ὡς καρπιακόν κ. τ.λ.
The sense then is—‘One and the same thing numerically can
be white and sweet and have many other qualities, for, though the
qualities do not exist in separation from each other, yet in mode of
existence they are different from each other.’

Bekker and Biehl both reject γὰρ, though Rodier accepts it.
The latter also translates τὸ ἐναυ by ‘essence.’ Cf. next note.

449 a 18. τὸ ἐναυ. Alexander seems to countenance Rodier’s
translation of ‘essence’ by giving as equivalents λόγος and τὸ τι ἐν
ἐναυ. But, though not so far from λόγος in meaning, τὸ ἐναυ is
hardly as a rule equivalent to ‘essential nature’ or ‘real being,’
which is the special force of τὸ τι ἐν ἐναυ. It is rather ‘aspect of
existence’; we might almost say ‘existence for consciousness.’ τὸ
ἐναυ almost = ‘notionally’: cf. note to ch. 6, 446 b 30, and for a
typical case *De An. III.* ch. 2, 425 b 27, where it is said that though
the ἐναύγησι of the sense object and that of the sense faculty are one
and identical, yet in aspect of existence, i.e. as related to an external object in the one case and the human organism in the other, they are different—τὸ δ’ ἐστὶν οὐ τὸ αὐτὸ αὐτάς.

We may take λόγος in l. 22 (with Bonitz, Ind. p. 221 a 60) as equivalent to τὸ ἔστιν and translate ‘but notionally not the same,’ or we may take λόγος here as equivalent to ‘ratio’ and say ‘but not by means of an identical relation [to them],’ i.e. to the two sensations.

449 a 24. ἄπειρον. Aristotle cannot mean that the point from which a thing ceases to be visible is infinitely far away. Of course the point from which it ceases to be δεικτικός, i.e. potentially visible, is infinitely far away, i.e. is non-existent. This is a consequence of the doctrine, that every magnitude is sensible, discussed in the first part of chapter 6. But here we are discussing the converse proposition which answers the question raised in ch. 7, 448 b 17 and mentioned in ch. 6, 445 b 10. Simon (p. 256) is wrong in thinking that it is this issue which is raised in ch. 3, 449 a 29; it is the other statement, πᾶν μέγεθος ὑπάρχον.

Alexander at first takes ἄπειρον as τόλμε τε καὶ σχεδὸν ἄπειρον, but later on gives the correct interpretation: οὐ γὰρ ἐστιν λαβέτιν τὸ μέγεθος διά νύμμα ἂν οὐκ αἰνθανόμεθα (De Sens. p. 168, l. 27 [W.], p. 356, l. 6 [Th.]).

The argument is worked out in terms of sight, but applies to all other senses which employ a medium. It is—‘as the distance between object and seer increases, we arrive at last at a point beyond which the object is invisible, though short of it vision is still possible. This is a single mathematical point, and the object, as it diminishes, will, if indivisible to sight anywhere, be indivisible when this point is reached. But this point is the first in the series from which vision is possible, the last where it is impossible. Hence, when at this point, the object will be both visible and invisible; which is impossible.’

449 a 28. τότε. Alexander takes this to refer to the μεταχείρ, the mean point at which vision begins and invisibility ceases. Thus all others too. But, if we interpret it so, it is difficult to construe ὅτε, l. 30. The indivisibility of the point seems to be implied strongly enough in the last clause—ἐςτὶ δὲ τι ὅχλον κ.τ.λ., and, at any rate, whether expressed or not, it is a necessary part of the argument that an indivisible αἰνθανόν will be found at this point if anywhere.

449 b 2. κοιν. For this sense of κοινός cf. ch. 1, 436 a 7.

16—2
DE MEMORIA

CHAPTER I.

449 b 4. μνημονεύω is simply the verb corresponding to μνήμη, and means to have something (consciously and at the time) in one's memory. It is paraphrased by ἐνεργέω τῇ μνήμῃ in 450 a 21 beneath. It is to be distinguished from ἀμμυμνήσκεσθαι which implies the active search for the memory of some particular item of one's past experience. Though we employ 'to remember' for the former, 'to recollect' for the latter, the English words are hardly so sharply contrasted as the Greek; in fact, in ordinary use they are hardly to be distinguished, as is natural considering that both contain the prefix corresponding to the Greek ἀνά. But even in Greek, and sometimes in Aristotle himself, the terms are not used with perfect precision. Cf. Freudenthal in Rheinisches Museum, 1869, p. 403.

449 b 8. μνημονικός. This is one of the characteristics enumerated in Aristotle's hardly complimentary list of the peculiarly feminine qualities. Cf. Hist. Animal. ix. ch. 1, 608 b 13.

449 b 10. λαμβάνω = we must make an assumption. Aristotle is going to show grounds for this assumption, but he could not say ὑποκείσθαι, because that would imply that the grounds had been already shown. Cf. note to De Sensu, ch. 1, 436 a 5. This seems to be the distinction generally maintained between λαμβάνων and ὑποτίθομαι.

449 b 12. δοξάστω. δόξα, as a faculty, means generally the power of forming opinions and thinking, in the widest sense of the term. When defined more closely, however, it takes rank as the lowest of the rational faculties; it is practically equivalent to ὑπολογίζει in its most restricted application and is opposed to ἐπιστήμη, which has for its object necessary truth. Cf. De An. iii. ch. 3; Anal. Post. i. ch. 33; Metaph. vii. ch. 15, 1039 b 32 sqq.

449 b 14. There is a special treatise Περὶ τῆς καθ' ἄνων μαντικῆς 462 b 12 sqq., on supposed prevision of the future by means
of dreams. Aristotle accounted for the phenomena in question by means of natural agencies.

449 b 16. Here Aristotle agrees with Locke (Essay, Bk. iv. ch. ii. § 14 and ch. xi.) with whom ‘sensitive knowledge’ occupies pretty much the same place as ἀποθεωμεν with Aristotle.

Though only the present is known by perception, this does not mean that only perception knows the present. In l. 18 beneath, τὸ θεωροφέμενον is given as an example of τὸ παρὸν.

449 b 17. Bielh prefers ὅτι before πάραστην instead of ὅτε, the reading adopted by all other editors. The point to be made out is that quâ present an object of consciousness is not an object of memory. One might remember, while he was looking at a white thing, that he had seen it before; but he cannot remember that it is now present. This is the only point to be made out here, viz. that memory is the apprehension of a thing not as present but as past. How this is possible is discussed in 450 a 27 sqq. That which is present to consciousness when we remember, is not the object remembered but its copy (ἐκλώ). When the present object of consciousness is recognised as a representation of something in the past, then we have memory.

449 b 20. ἀνεύ τῶν ἐνεργειῶν. Themistius and Michael read ἐργαν. Themistius explains thus—ἐργα δὲ λέγω οἷν τοῦ τὸ ζῷον ἢ τοῦ τὸ λευκῶν καὶ τὸ ἐν τῷ βιβλίῳ τρίγωνων, i.e. as practically equivalent to πράξματα = the real things. Whatever the reading be, the sense must be the same; ἐνεργειῶν must mean the actual operation of the real objects, or something similar; ἀνεύ τῶν ἐνεργειῶν cannot mean ‘without actually having knowledge or perception,’ which would imply that only the ξένι providing for knowledge or perception existed, for these may persist throughout unconsciousness, e.g. in sleep. There really is perception or knowledge of something present whenever we remember; an ἐνεργεία is realised (cf. 450 b 30: ὅταν ἐνεργῇ ἡ κάνης αὐτοῦ κ.τ.λ.), but to be memory it depends upon whether or not this ἐνεργεία is referred to something else (ἄλλοι l. 32) existing in the past.

What is actually present in the act of memory we shall find to be a φαντασμα; a φαντασμα is a persisting sensation or sense content. Now, though it is true that this is in most cases the intermediary employed by memory, yet that intermediary might in certain cases be an actual perception, as e.g. when we see a thing for the second time and remember we have seen it before.
449 b 22. Biehl and Freundental (Rheinisches Museum, xxiv. p. 394) wish to delete τὰς τῶν τριγώνων...φαί, on the ground that if these words are left standing we shall have to translate 'he remembers that the angles of a triangle are equal to two right, in the one case because he learned or thought of it, in the other because he heard or saw it or had some sense knowledge of the fact.' But Freundental points out that we cannot have sensuous knowledge of any mathematical principle according to Anal. Post. 1. ch. 31, especially 87 b 34 sqq.: οὖν ἐπισταθαί δὲ αἰσθήσεως ἐστιν. ἀλλὰ δὴν ὅτι καὶ εἰ ἐν αἰσθάνεσθαι τὸ τρίγωνον κ.τ.λ.

Freundental quotes Themistius, who paraphrases 'he remembers that the angles of a triangle are equal to two right angles, and that Socrates is white, in the one case because he learned, in the other because he heard or saw it' (Themistius. Ἐφ. II. p. 233, ll. 12 sqq.). The writer of the paraphrase, he thinks, felt the same difficulty and accordingly inserted καὶ τῶν Σωκράτων ὅτι λευκὸς as an example of sensuous memory.

This, however, is not convincing; it is not a case of knowing in the full sense of having scientific knowledge of a fact but of remembering it. Perception is of the particular, but there is no reason why we should not perceive in a particular case and without proof that the angles of a triangle are equal to two right angles; cf. Anal. Post. loc. cit. infra: we can perceive that the moon is eclipsed without knowing the reason. However, there is an additional reason for rejecting τὰς...φαί (which is such a common Aristotelian example that it might easily have crept into the text); it is the necessity of translating ὅτι before ἔρωκεν and ἔσκυψεν by 'that,' not by 'because.' The point to be brought out is that memory refers to the past; we are not here explaining why memory takes place. Cf. next clause—δὲ γὰρ...λέγειν, ὅτι πρῶτον. The disputed words are probably a gloss that has crept in at the wrong place. Some such expression inserted after ἔθεσαν would be quite in harmony with the thought here.

449 b 27. ὑπόληψις is here used in its widest sense as equivalent to conceptual thought. It seems to include θεωρία: cf. l. 18 above and 450 b 25, 35 etc. The present objects of consciousness are objects either of αἴσθησις or ὑπόληψις, sense or thought, αἰσθήματα or νοηματα.

449 b 29. Freudenthal (cf. cit. p. 395) rejects καλὶ πρῶτον because these words cannot refer to a statement which immediately precedes, while here it is simply to the previous paragraph that reference is made.

Themistius, the ancient translation, and LMSU also omit the two words.

449 b 30. ἀισθήσεως. As we have seen above, ἔπόλυσις also deals with the present; but Aristotle is here talking generally and, in fact, a sensuous element is always involved in knowledge of the present, because the object of thought, as we shall see, is always accompanied by imagery which, again, depends upon sense.

449 b 33. τοῦτον. The heart (or according to Neuhäuser, cf. Introduction, sec. vi., the σύμφωνον πνεῦμα contained in it) is the organ of the κοινὴ ἀισθήσεως: cf. De Juvent. ch. 3, 469 a 11, cf. also beneath 459 a 11 sqq. and notes.

At ἀπό τιν δὲ begins a protasis, the apodosis corresponding to which is not reached till 450 a 15: ὡστε τοῦ νοητικοῦ κτλ. Φαντασία is treated in De An. III. ch. 3. There it is defined as a (psychic) change due to sensation (κίνησις ὑπὸ τῆς ἀισθήσεως τῆς καὶ ἐνέργειαν γεννούσην 429 a 1). Again we find in ch. 8, 432 a 9: τὰ γὰρ φαντασματα ὡστε αἰσθηματα ἢστι, πλὴν ἄνευ ἔλης, ἢκο: an image is identical in character with a perception except that in the former case the real concrete thing which contains ἔλη is absent; only the εἴδως of the sensible object is present. As Themistius (Ση. II. p. 237, l. 18) says, it is that which is left over (after perception), and remains even though the sense object is not present, which is called φαντασία. Besides the fact of the absence of the real object in φαντασία, the only other difference between it and sensation seems to be its greater liability to error (428 a 26 sqq.), and that it is weaker in intensity: cf. Ῥητ. I. ch. 11, 1370 a 28: ἢ δὲ φαντασία ἐστὶν αἰσθήσεως τις ἀπειθής. It is like Hume's 'idea' as opposed to his 'impression.'

On the other hand it does not seem to be perfectly necessary that the real object should cease to be present; e.g. in 428 b 2 the appearance of the sun as of a foot in diameter is given as a case of φαντασία, and again, from 428 b 28, it is clear that φαντασία and αἰσθήσεως can synchronize. But the φαντασία is probably to be distinguished as the κίνησις which has penetrated to the heart—the ἄρχη; cf. De Insom. ch. 3, 461 b 12, 461 a 6; cf. also ch. 2, 459 a 23 sqq.: at least special emphasis is laid on this aspect. Sensations
or stimuli travel from the end organ to the central one and persist after the exciting object is removed, καὶ ἐν βάθει καὶ ἐν πολλῇ. It must be the former which is the φάντασμα proper, for we hear in 450 a 11 sq. below that it belongs to the κοινὴ ἀσθητήσις and the πρῶτον ἀσθητήριον (cf. note to 450 a 11).

This all goes to emphasize the sensuous character of imagination, but however they are to be related to each other, we must not go so far as Themistius, who practically makes φαντασία a genus, which is known as ἀσθητής if the object is present, as μνήμη if it is absent, and makes the φαντασία in both cases the presentation of a τύπος or imprint left by the external object in the sensorium—the heart. But, after all, τύπος is only a metaphor to Aristotle. The ἀσθητήμα (sensation) is not strictly a τύπος; it is rather the λόγος of the ἀσθητήτων, and the φάντασμα present in memory is not per se a τύπος, but only in so far as it represents the original perception. Even then it is only οἷον ἡμιγράφημα. Themistius himself sees that, according to his theory, only the very vaguest sense could be given to τύπος (238, l. 10: χωρὶς δὲ κοινοτερον τοῦ τύπου ἐπὶ τῆς φαντασίας ἑκατέρων).

449 b 34. νοεῖν οὐκ ἑστιν κ.τ.λ. Cf. De An. iii. ch. 7, 431 a 16: δῶ οὐδὲνον νοεῖ ἀληθεύματος ἡ ψυχὴ and 431 b 2: τὰ μὲν οὖν εἰδή τῷ νοητικῷ ἐν τοῖς φαντάσμασι νοεῖ, also ch. 8, 432 a 8: ὅταν τε θεωρήτω, ἀνάγκη ἐμα φαντάσματα θεωρῆν.

The reasons which Aristotle adduces for this contention seem to be twofold, (1) firstly that brought forward in chapter 8 of De Anima iii., that nothing self-dependent or 'isolated' (εξωφυσικόν 432 a 4) exists beyond the extended things given by sense perception; knowledge can occupy itself only with the εἴδη forms of or concepts realised in sense objects. Hence, when the actual object is not present, thought is possible only if the φάντασμα originated by perception is present to the mind. Secondly (2) there is the reason obscurely implied in ch. 7, which culminates in the statement in 431 b 10 that truth and falsehood, the distinctions applicable to theoretical consciousness (cf. 431 a 14: τῇ διανοητικῇ ψυχῇ) are generically the same as good and evil, the objects of pursuit and avoidance in the practical life (cf. also Eth. Nic. vi. ch. 2, 1139 a 26); cf. Rodier, ii. p. 515; affirmation and negation are at bottom the same as pursuit and avoidance (the germ of Pragmatism). Now, it is by means of sense that animals are able to distinguish between the pleasant and the unpleasant (cf. 431 a 10). Hence the pursuit of truth, which is distinguished from the quest of the good merely by
having an absolute as opposed to a relative end (431 b 12), will employ the same sensuous images as the latter. This doctrine seems to be implied in Aristotle’s statements, and we must remember that it in no way conflicts with what he elsewhere teaches—that there are entities capable of existing in isolation from the things of sense. There are τα ἄκινητα του οὐρανοῦ ἐνθ— the intelligible natures of the heavenly bodies (cf. Alexander ap. Simp., De An. 284, 23; Rodier, 11. p. 524) which seem to be referred to by τα μη ἐν χρόνῳ ὑπαρχεις beneath (450 a 9–10). Again νοης—Reason—is said to be ξυμμετοχής, and we need not understand this of the human reason, but as applying to the mind of God, who is held to exist beyond the confines of the world and to stand to it in the relation of το πρῶτον κύνον— the ultimate source of change in it. His activity is νομισματική, and, if he exists in isolation from things sensible, one would expect that the contents of his thought would be likewise transcendent, and would not exist merely as realised or realisable in the world of change and decay. (Whether, if that is so, the object of the divine consciousness is a differentiated scheme of distinct intelligible entities existing apart from the material world, or whether the activity of God, the νομισματική νοσεως, is merely the affirmation of a blank identity—the eternal assertion of ‘I am I’—it would be difficult to decide.)

But such statements constitute no assertion of the real separability of certain concepts, the Platonic doctrine of transcendent ἐνθ, which is so consistently attacked by Aristotle. Though he continually talks of κεχωρισμένα or ἄκινητα και χωριστά as being the objects of metaphysical science (De An. 1. ch. 1, 403 b 15; Metaph. vi. ch. 1, 1026 a 8 sqq.), ἡσυχία may be necessary for the realisation of such science in the mind of man. (In the passage in De An. iii. ch. 8, where Aristotle says, ‘as it appears no objects but sensible magnitudes exist,’ we need find no denial of the objective existence of χωριστά, but merely his reiterated doctrine, that for human reason, which is not ἀπαθής, there are no objects of thought not realised in a sensuous material.)

450 a 9. ἄνευ τοῦ συνεχείας. Quantity, το ποιόν, which is either discrete (as in number) or continuous (as in space or time) is here alluded to in the latter form, in which indeed it has been illustrated just above. It is the continuity which forms the perceptual element in the concepts of mathematical objects. We read in De An. iii. ch. 8, 432 a 5 that concepts, including those belonging to mathe-
matics, exist in the perceptual forms of things (ἐν τοῖς εἴδοσι τοῖς ἀληθητοῖς τὰ νοστή ἐστι) which, therefore, when we think, form the total object of consciousness from which the mind disengages the higher concept or νόμος. τοῖς εἴδοσ εἴδον, whereas perception (as actualised) is the εἴδος ἀληθητῶν. The perceptual setting, as opposed to the higher concept, will form the ἐλή νοστή of which Aristotle tells in *Metaph.* vii. ch. 11, 1037 a 4 and ch. 10, 1036 a 9 sqq. : ἡ β' ἢ μὲν ἀληθητῆ ἑστιν ἢ δὲ νοστή, ἀληθητῆ μὲν όλον χαλκός καὶ ξύλον καὶ ὅση καρφιτὴ ἐλή, νοστή δὲ ἢ ἐν τοῖς ἀληθητοῖς ὑπάρχουσα μὴ γ' ἀληθητά, όλον τὰ μαθηματικά. (Cf. the discussion of *De An.* iii. ch. 4, 429 b 10–22 in Rodier, ii. p. 442 sqq. The ἐλή ἀληθητή is the actual matter of the physical substance apprehended. It is not this which gets into the soul when we perceive, but the εἴδος of the thing; cf. *De An.* iii. ch. 8, 431 b 29: ὁ γὰρ ὁ λίθος ἐν τῇ φυσικῇ ἄλλᾳ τὸ εἴδος.) But this perceptual form itself supplies a matter for the higher concept, e.g. in mathematics. The pure mathematical concept is not τὸ εἴδος or τὸ κόλιν, the straight line or the curved, but τὸ εἰθώ εἶναι καὶ κολλώτης—straightness or curvature (cf. *loc. cit.* 429 b 18 and ch. 7, 431 b 12, also *Metaph.* vi. ch. 1, 1025 b 30 sqq., x. ch. 8, 1058 a 23, etc.). But these concepts cannot exist apart, though they are for mathematical purposes assumed to exist apart (τὰ ἕξ ὕφαινους)—τὰ μαθηματικὰ ὁι κεχωρισμένα ὡς κεχωρισμένα νοεῖ. The general expression for this matter, ‘matière logique,’ without which these concepts cannot exist, is τὸ συνεχές (cf. 429 b 19: μετὰ συνεχόν γὰρ, and Philop. *De An.* 531, 15, ἡ γάρ ἑστιν, ὡς φησιν, τῶν σχημάτων τὸ συνεχές).

ἀνυ ἥριν. Aristotle here mentions a different class of objects from the mathematical entities referred to in the last clause. He seems in particular to mean the heavenly bodies (cf. note to 449 b 34), which he continually refers to as ἄλωδα and ἄφθαρτα (cf. *Phys.* iv. ch. 12, 221 b 3), and as not being in time. They differ from other bodies in not having a ἐλή which admits of growth and decay, but one which admits of motion only. Cf. *Metaph.* viii. ch. 4, 1044 b 7.

One may say with Freudenthal (*op. cit.* p. 396) and Hammond that Aristotle here refers also to ‘eternal laws’; they must be those of existence generally, and not merely the laws governing the motions of the heavenly bodies, as is implied by Hammond, for we hear in *Phys.* iv. ch. 12, 222 a 5: τὸ ἀπόμετρον ἐναι τὴν ἀπόμετρον ἀεὶ ἑστιν. He does not, however, talk of laws or principles as existing apart
from the objects which obey them. They at least are not on the same level of objectivity as the objects.

To suppose him to do so would be to impute to him the Platonic theory of ἐιδὴ χωριστά. The concepts involved in thinking of the things of sense are not ὀνόμα, e.g. neither the point (στεγή, cf. Metaph. viii. ch. 5) nor the infinite (τὸ ἀπειρον, cf. Phys. iii. ch. 5, 204 a 23, and Metaph. xi. ch. 10, 1066 b 13 sqq.) are ὀνόμα. Again, τὸ ἀγαθὸν and τὸ καλὸν are not ἐιδὴ χωριστά. Though in the case of some concepts their essence and their existence is identical (De An. iii. ch. 4, 429 b 12, and Rodier, ad loc. pp. 442 sqq.) this does not mean that these are to be regarded as substances (e.g. that their essence involves their existence, as according to Spinoza’s definition of substance), but that their existence is a purely conceptual one. The ἄσω ἄνευ ἔλθες mentioned in De An. iii. ch. 6, 430 b 39, which are the ultimate simple constituents of intellect or objects of νοῦς (ἄδαιρητα, τὸ ἄνευ συμπλοκῆς, πρῶτα νόημα, De An. iii. ch. 8, 432 a 12) and which are to be identified in part with the categories (cf. Rodier, ii. p. 474, and Metaph. viii. ch. 6, 1045 a 33 sqq.) partly with vague conceptions like the Good, Being, and the One, or again with τὸ ἀπειρον, στεγή, μοιά, etc., are not to be regarded as existing apart from sensible things. If Aristotle says that they have neither ἔλθη νοητὴν ἡ δὲ αἰσθητὴν (Metaph., loc. cit.), that simply means that they are ultimate and simple and are not formed by a complex of constituents, even mental constituents. These concepts must in fact be the constituents out of which the complex ones are formed. In that sense they themselves must be ἄνευ ἔλθες but they are not χωριστά πό συνάντη in the sense in which the individual is ὀνόμα.

The connection with the thought here and the main contention—that thought cannot function apart from φαινομένα—is not quite plain. Why should the impossibility of a thing being thought apart from time require the presence of a φαινομένα when it is apprehended? Doubtless it is because of the continuous nature of time which accrues to it owing to its connection with change. Cf. Phys. iv. ch. 11, 219 a 12: διὰ γὰρ τὸ τό μέγατον ἐίναι συνήθης καὶ τὸν κίνησιν ἄτο συνήθης, διὰ δὲ τὴν κίνησιν ὁ χρόνος ἐστὶ synexhs, τὸν γὰρ ἡ κίνησις, τοσοῦτος καὶ τὸν χρόνους ἐν τούτῳ γεγονότα. ‘Time is the ‘measure’ or ‘number’ of change; cf. ch. 12, 220 b 8 sqq. (though not number in the proper sense, for that implies discreteness); and change is the great characteristic of the sensible world. No doubt it is because the heavenly bodies are μεγάλη and participate in κίνησις, though merely
κίνησις κατ' τόπον, that they must be represented as in time—a characteristic of the sensible world, and that they too can be apprehended only by means of φαντασία (cf. note to 449 b 34).

450a 11. Ἀριστότελεῖον refers indifferently to the faculty or the organ and there is no ground for Freudenthal's refusal to think that the organ is here referred to. μέγεθος is certainly here not the simple equivalent of τὸ ποσόν above; it is, rather, a particular example of quantity. Aristotle in this clause merely particularises what he had said before more universally of ποσόν in general, and at the same time the mention of κίνησις and χρόνος carries us beyond the particular example of spatial quantity which was indicated by the triangle. μέγεθος, κίνησις, and χρόνος, are all united (cf. previous note) as species of τὸ συνεχεῖς, and it is pointed out that, in consequence, it must be the same function (and hence faculty and organ) which apprehends them all. If we keep the following sentences in the order given in the text, the argument will then be, "Magnitude, motion and time are perceived by the same faculty. But they (being continua, cf. previous note) form the sensuous and hence imageable element in consciousness. Now imagery belongs to the sensus communis. Hence the apprehension of these determinations of quantity belongs to the organ of the common sense—the primary sensorium. But memory, even that which deals with concepts, implies imagery. Hence it is a function of the primary organ of sensation directly, though indirectly it concerns the faculty of thought."

The whole argument as it stands is not well arranged and hence Freudenthal proposes to remodel it, but it is not much more confused than many others in the Partiv Naturalia and the want of order can be explained. There are two conclusions to prove, (1) the minor premiss of the final conclusion—that thought must employ imagery, enunciated first in 449 b 34 sq.; (2) that, since that is so, even the memory which deals with the objects of thought must be a function of the organ to which imagery is due. Involved in all this there is also the briefer argument that memory in general, employing imagery, must be attributed to the primary organ of sensation.

It is the involution of these three difficult discussions which causes the apparent want of coherence. There is moreover one premiss which is merely implicit and never formulated—that which identifies the imageable element—τὸ φανταστὸν—with τὸ συνεχεῖς. Aristotle simply assumes their identity as obvious, and any arrange-
ment of the passage would have to fall back upon this principle as a constituent in the proof. Freudenthal proposes (op. cit. p. 397) to pass from χρόνος, l. 11, to άστρε, l. 12, and insert the clause και τó φάντ. ...
πάθος εστίν after φαντάσματος εστίν, l. 14. For this he has the support of Themistius. Accordingly he gives the following as the sketch of the argument—"Every memory is bound up with a perception of time, every concept accompanied by a φάντασμα. To perceive time is identical with the perception of magnitude and motion, and is provided for by the πρότον αἰσθητικόν. Memory also uses concepts, but not apart from imagery, and this belongs to the πρότον αἰσθητικόν. Hence, memory belongs to it also."

But this does not do justice to the real complexity of the argument or bring out the main point—that even conceptual memory is a function of the primary sensorium. To prove that memory which does not specially deal with νοητά is a sense function would not cost so much argument.

Freudenthal seems to have been led astray by his misunderstanding of the reference to χρόνος in ll. 9 and 11. He thinks that there Aristotle refers to memory as a sense of time, as in 449 b 31. But there is no particular reference to this here. Aristotle is forced to talk of χρόνος because he wishes to illustrate the objects of thought which cannot be apprehended without an image in the mind, not only by the concepts of mathematics, τά εις ἀφροτήτως, e.g. τό τρίγωνον, the scientific interest in which does not affect the matter in which they are realised, but by the eternal substances, which, though appearing in time, are not conditioned by it.

450 a 15. The texts all have νοομένον, which must be a mistake instead either of νοητικόν or of διανοομένον (Bywater, J. of Philol., xxvi. p. 243). Biehl relying on the vet. tr. "intellectivi" has νοητικόν.

450 a 16. καί ἔτερος. Cf. De An. iii. ch. 3, 428 a 10, 11, where φαντασία is attributed to the ant and the bee but not to the worm. Themistius brings in the dove (προστερέ) also.

450 a 20. The reading of all mss. is θηρίων, but Rassow, Frag. d. Joachimsth. Gym. 1858, suggests θηρίων, which Biehl accepts. Most of the commentators certainly take θηρίων as referring to the lower animals. Themistius writes ἄλογων. If Aristotle meant to refer to them, certainly θηρίων is the more suitable term.

But Simon (p. 287), who also leans to the view that by θηρίων "bruta" are meant, suggests as an alternative an interpretation which gives its proper sense to θηρίων.—If Memory belonged to the faculty
of pure thought it would not belong to many animals (for few possess reason), and perhaps to none that have a perishable body (which requires their thinking to be mediated by imagination). Relying on the famous passage at the end of De An. iii. ch. 5, where the impassivity of the eternal νοῦς is set forth, and it is declared that we have no memory of a previous state of existence, because our thought depends upon the perishable reason which alone can experience impressions, he contends that, in Aristotle’s opinion, memory does not belong to the superior and divine reason but only to the human, being exercised by the latter only through the instrumentality of φαντασία.

Whatever be the exact interpretation of the passage in the De Anima referred to, it is clear that, according to the Aristotelian teaching, νοῦς, in the sense of a faculty of pure thought, cannot exercise memory. Its function is the ἀδιακόπτων νόησις (De An. iii. ch. 6, 430 a 26) which must be something totally different from the apprehension of time in which there is no part which is indivisible. Again, in its characteristic sense, it is not a faculty of synthesis (iūdem) such as human thought and memory must be. (When we remember we must affirm that the image is like the real object, i.e. there must be synthesis: cf. below.)

Simon, however, takes the next clause (ἐπεί οὐδὲ νῦν πᾶσι, κ.τ.λ.) to refer to the lower animals which have not even got φαντασία (cf. De An. ii. ch. 3, 415 a 10: ἄλλα τοὺς μὲν οὐδὲ φαντασία); but, if that is so, it is difficult to see what it has to do with the previous statement. Even though we read θηρίων or interpret θηρίων as θηρίων, we should have to render—“If memory were an affair of the intellect not many, perhaps none, of the lower animals would possess it, and, as a fact, as things are (memory being not an affair of the intellect), not all the lower animals do possess it, seeing that they do not all have the sense of time.” But ἐπεί can hardly carry this meaning, and, even if it did, the latter clause adds nothing to the argument. That some animals, being without φαντασία, do not remember, does not in the least show why, if memory were a matter of pure thought, none would remember.

Yet it must be in some such way that Rassow and Biehl, reading θηρίων, take the sentence; and Simon, taking the last clause as he does, rather inclines to give up his first interpretation and follow the other commentators.

Hammond (p. 198) translating Biehl renders “perhaps in none
of the brutes, seeing that they do not, as a matter of fact possess it, because they all lack the sense of time." This is an impossible rendering of οὐδὲ τίνι πάσιν and διὰ τὸ μὴ πάντα...ἔχειν, and, besides, contradicts ll. 16–17 immediately above, where memory is said to be found in certain other animals—διὸ καὶ ἑτέρως τοιάν ὑπάρχει τῶν ἐφών.

Rassow, defending his emendation, maintains that it could not be said that if memory depended on thought it would be absent in man, one of the θερά. But that is not so: memory exists in man only because he possesses the faculty of φαντασία; if he were a being whose sole activity was pure thought he would not remember. It should be clear that, if memory depends solely upon the τοῖς παρθενικῶς (which involves φαντασία and αἰσθήσεις), a being whose reason is not similarly to be described as passive will not remember.

Hence the solution of the difficulty is to take ἐπεί οὐδὲ τίνι πάσι, κ.τ.λ. as referring to that being or those things whose sole activity is the exercise of τοῖς—θεωρία, i.e. θεός—God, or perhaps to the heavenly bodies. Hence, after πάσι we are not to understand τοῖς θεωρίας but τοῖς ἐφών.

It is not at all unprecedented for ἐφών to refer to living beings generally, nor is it impossible for it in this wide acceptation to include θεός and the heavenly bodies. Cf. De An. ii. ch. 3, 414b 15 sqq.: τῶν ἐφών...διός δὲ...ὑπάρχει καὶ τὸ κατὰ τόπων καθηκον, ἑτέρως δὲ καὶ τὸ διανοητικὸν τε καὶ νοῦς, οἷον θεωρικοὺς καὶ τοῦ κατὰ τόπων ἔφων ἑτερῶν ἐστιν ἡ τιμιώτερον. By the latter Simplicius (De An. 106, 27) tells us the stars are meant; cf. also De Caelo, ii. 12, 292 a, 20 sqq. and ch. 8, 290 a 32. The stars are in the last passage called ἐφών. Cf. De An. i. ch. 1, 402 b 7, where it is implied that θεοὶ is a species or particular example of ἐφών. Cf. also Metaph. xii. ch. 7, 1072 b 28: ἄφριν δὲ τῶν θεῶν ἐστιν ἐφών ἄδικον ἀρμοστόν, also xiv. ch. 1, 1088 a 10. Since the activity of God is νόησις (1072 b 18), and since, being ἄδικος and ἀρμόστος, he is not in time, it would be a safe deduction that he has not the χρόνον αἰσθήσεων which is indispensable to memory.

Hence, the sense of the passage is clear—"Memory is not a function of pure thought for, if it were, none of the living creatures that are mortal, i.e. have perishable bodies and think by means of the sensuous images which are bound up with bodily changes would have memory. (Cf. De An. i. ch. 1, 403 a 13 sqq. The psychical changes we experience are λόγοι ἐνυλοὶ 403 a 25.) In fact certain
living beings, which are freed from the conditions of human life, do not possess it."

450 a 22–23. Rassow (op. cit.) proposes to read ἣ ἐμαθεῖ πρότερον, ἀληθάνεται and make ἀληθάνεται govern ὅτι εἶδε κ.τ.λ. The chief ground for the change is that προσομοθάνεται seems to be a ἀπαξ λεγόμενον. But Biehl lets it stand, reading ἐνεργῇ τῇ μνήμῃ as equivalent to μνημονεύει and as governing ὅτι εἶδε.

450 a 27. ὅσα μὴ ἄνευ φαντασίας. The question is whether there are any concepts which can be divorced from all imagery. Cf. previous notes.

450 a 32. Freudenthal (op. cit. p. 401) proposes either to omit τὸ πάθος or to read it after τοιοῦτον, l. 30. Certainly the words seem out of place and Rassow, who proposes either to delete τὸ after τοιοῦτον or to read τί, interprets the sentence following an order which places τὸ πάθος, δὲ...ἐναί after νοήσαι l. 30.

450 a 34. Aristotle uses the metaphor of the seal-ring in another connection in the De Anima, iii. ch. 12, 435 a 2. The object as it were stamps an impression on the air which as it were transmits it onwards until it meets the sensory organ. Again in ii. ch. 12, 424 a 19 the impression on the organ produced by the sense object is compared to the impression left by a seal-ring on a surface. But cf. above note to 449 b 33.


450 b 2. κ’ ἡλικίαν. This, in consonance with the common use of ἡλικία (cf. Bonitz, Ind.), seems to refer both to the aged and the young. In both the mind seems to be too "fluid" to retain impressions, cf. πέινων, l. 7 beneath.

450 b 4. τὸ ψηφισθαλ. This may be another simile for the minds of the aged, and Aristotle may have in view the crumbling condition of an old stone surface. But in the light of its conjunction with σκληρότητα l. 5, perhaps it refers to the inner walls of a building that had originally a prepared surface in which a design was cut, but which gets worn off and leaves nothing but the hard layer beneath. This is suggested by a perusal of the famous passage in the Theaetetus (191 c sqq. especially 194 c sqq.) from which Aristotle seems to have drawn almost all the illustrations here employed. There the heart is compared to a waxy tablet (τῆμων ἄκουσκον) on which impressions are stamped. The surface must be neither too soft nor too hard, for, in the former case, the mind, though easily receiving
an impression, soon loses it (ὡν μὲν ἐγρόν, εὔμαθεῖς μὲν, ἐπιλήφοιμεν δὲ γύρωνται), while, with the hard surface, the opposite is the case. For a mind of good capacity, the waxen surface must be not only of the proper consistency but deep (βαθὺς τε καὶ πολὺς καὶ λεῖος καὶ μετρωπὸς ψηφησμένος). People with such an organ are both εὔμαθεῖς and μνήμονες.

Now an ἐκμαγεῦσι of prepared surface need not be composed of wax; it may consist of gypsum (cf. L. and S.), and probably the decorated parts of Greek houses and buildings (where marble was not employed) may have had a layer of plaster imposed on the stone, with bas-reliefs cut thereon.

450 b 6–7. Cf. also ch. 2, 453 b 5.

450 b 18. Freudenthal proposes to read ἥ τοῖν τὸι αἰσθήματα instead of τοῖν τότε ἄτοι ἡ αἰσθησία with Themistius (ὁμ. II. p. 239, l. 25). The change is not important.

450 b 27. Biehl brackets θεώρημα, while Freudenthal (op. cit. p. 401) deletes both it and φάντασμα, on the ground that if we read αὐτό τε καθ' αὐτό ἐστι θεώρημα the next line ἥ μὲν οὖν καθ' ἑαυτῷ, θεώρησιν ἢ φάντασμα ἐστιν forms a tautology and, if we read ἄλλον φάντασμα, is contradictory.

Biehl has the support of LS U, Themistius and the ancient translation, in omitting ς θεώρημα. If we read θεώρησιν it will be better to follow E Y and read καὶ αὐτὸ καθ' ἑαυτῷ ἐστι θεώρησιν καὶ ἄλλαν φάντασμα—"is both an object of consciousness per se and the image of something else." Then the next sentence goes on to explain and correct this statement. "Per se it is an object of consciousness or an image; so far as it is the appearance of something else it is a copy and souvenir."

The contradiction, or rather the duality, in the use of φάντασμα here, which causes Freudenthal to expunge it from the former clause, is really one which goes right down into the heart of the concept of φαντασία and φάντασμα as used by Aristotle. A φάντασμα is at once a sensuous image posited like a simple sensation or a fundamental concept before the mind, and at the same time it claims to represent something objective. In its first aspect, as a simple element in the content of consciousness, it has nothing to do with either truth or falsity; in its second capacity it falls within the domain of synthesis, in which truth and error reside. (Cf. note on φαντασία above 449 b 33.) Here Aristotle uses it first in the second of the two above senses, but immediately reminds us that properly and per se the
φάντασμα has no reference to the object, that, so far as it has this, it is considered in a new light—as an εἰκὼν.

Hence, if Aristotle is in the second sentence really guarding his former statement, it would not be out of place to repeat that part of the former statement with which part of the second is identical. Hence, we may retain θεώρημα; it is no doubt used to signify the direct, immediate object of consciousness, something that is present as if to the senses (cf. Bonitz, Ind. p. 328). It would include a present perception and so cover the case, never separately treated by Aristotle, of the recognition that an object in present perception has been seen before.

On the other hand νόμα is substituted in 451 a 2, which rather makes it appear as though θεώρημα meant a concept specially. But probably this change is not significant.

450 b 29. Freudenthal proposes to omit καί after εἰκών, tr. "a memorial after the fashion of a copy." μνημόνευμα is a ἀπαξ λεγόμενον in Aristotle.

450 b 33. μὴ ἱωρακῶς. It is not hereby implied that we can remember without a prior sensuous experience. That would contradict what has been already said (cf. 449 b 24 sqq. above). μὴ ἱωρακῶς must mean—without having then had present to vision the veritable Coriscus.

450 b 34. οὖν ἅπαξ κ.t.l. All commentators from Michael Ephesius to Freudenthal notice that this paragraph is mere repetition. If more condensed and obscure it is not thereby less Aristotelian.

CHAPTER II.

451 a 21. εν τοις ἐπιχειρηματικοῖς λόγοις. Themistius (§ i. ii. p. 241, l. 7) says ἐπιχειρηματικός καὶ προβληματικός, and, if we trust Diogenes Laertius, R. V. § 23–24, there was more than one work falling under the first title, viz. έπομνήματα ἐπιχειρηματικά γ' and ἐπιχειρημάτων α' β'. Hence it is probably to them that we are here referred. Michael Ephesius thinks rather that the Problems are indicated, but in the extant Problems no such discussion is found.

An ἐπιχειρημα is defined in Topics, vii. ch. ii. 158 a 16 as συλλογισμὸς διαλεκτικός, and ἐπιχειράν very often means to discuss controversially (cf. Bonitz, Ind. p. 282 b 59). Now Aristotle frequently, even in the same book, prefaces his proper scientific treatment of a subject with a 'dialectical' account. This seems to be necessary in his view in order to attain a preliminary clearing up of notions, and hence we may conjecture that he wrote several popular tentative tractates (the literal sense of ἐπιχειράω, to attempt, seems to linger about ἐπιχειρημα) on various matters, and that these, owing to their tentative character, have been dropped out of the canon. Certainly we cannot here translate with Hammond 'treatise On Argumentation.' A reference to recollection could occur only as an illustration in a logical work, and λόγοι ἐπιχειρηματικοί could not be discussions on dialectical argumentation but discussions of a dialectical nature.

451 a 23 sqq. We may set aside Simon's theory that by λήψις is here meant not λήψις μνήμης but the acquirement of fresh knowledge. There is no evidence that that is an Aristotelian usage, nor will the Greek bear the interpretation.

At the same time it is difficult to see what relation this statement bears to the following one. Having asserted that recollection is neither the reacquirement nor the first acquirement of memory, he goes on to point out that in μάθησις—the first acquirement of
knowledge, there is no such thing as recovery or acquisition of memory.

The doctrine that recollection is to be thus described is, as Freudenthal, *Rheinisches Museum*, p. 404, points out, not a Platonic one; but, of course, the teaching that μάθησις is ἀνάμνησις is the famous tenet set forth in the *Meno* and other dialogues; cf. esp. *Meno*, 85 D: τὸ δὲ ἀναλομβάδων αὐτὸν ἐν αὐτῷ ἑπαρκήμων οὐκ ἀνάμνησις; Πάνω γε. *Phaedo*, 72 E sqq. Hence the tortuous argument here seems to be...‘When you recollect, you do not reacquire or acquire memory. If you take ἀνάμνησις with the Platonists as equivalent to μάθησις it is certainly not so (ὅταν γὰρ l. 23...ἐγγίνεται l. 27), nor when taken in the ordinary sense, as the remembering again of something forgotten, is it strictly defined either as the acquisition or reacquisition of a memory’ (ἐτὶ δὲ ἐτέ κ.τ.λ. l. 27 sqq.).

Freudenthal (*loc. cit.* p. 403) points out that Plato really anticipated the Aristotelian distinction between ἀνάμνησις and μνήμη (cf. *Phaedo*, 77 C sqq.). Recollection is a knowing again of what has been forgotten. It is to be reminded of something by oneself or by another; cf. *Phaedo*, 73 B, ἀναμνησθήσας = commoneferi: μνημήσας = meminit. Recollection implies ἔγγραψη *Meno*, 81 D. But the scientific discrimination of the two functions belongs to Aristotle.

(Plato also noticed the three ways in which ideas may be associated; cf. 451 b 22 sqq. *infra*, contiguity, similarity, and contrast. Cf. *Phaedo*, 73 (1) A lyre or garment belonging to the beloved one puts the lover in mind of him and from seeing Simmias you may remember Cebes. (2) From seeing the picture of Simmias you may remember him. (3) Recollection may be derived from things unlike as well as from similar things.)

451 a 25. If we translate ἔκ ἀρχῆς as ‘at the beginning,’ then this argument becomes practically identical with the next, and Freudenthal will be right in saying that we have here the same thought as is repeated in ἐτὶ δὲ κ.τ.λ. ll. 27 sqq.

But perhaps the sense is rather...‘when we learn, we neither have a memory reinstated in us, nor derive it (as a memory) from some origin, i.e. some other experience. Once the present experience is produced you may remember it; quid present experience it is not remembered. To start memory you need present experience, and hence you cannot derive the present experience from the memory.’

Aristotle is thus dealing here not with the temporal but the
logical priority of present experience. It is in the next paragraph that he goes on to show that memory requires, in addition to the originating experience, a period of time to have elapsed before it can be called memory. In addition, this is now brought in when he is dealing with ἀνάμνησις in the customary sense, not as identical with μάθησις, and hence the point of view is different.

But without adopting this hypothesis we may detect a note of individuality in the present passage. Perhaps in ἄραν δὲ κ.τ.λ. (l. 25–27) the emphasis is on the necessity of there being a ἔξος—a disposition to remember—as well as an experience (πάθος) which is to be remembered, while in the next paragraph the lapse of time necessary becomes more prominent.

451 a 26. ἔξος. As I take it, this means the permanent disposition which itself is memory; it is not to be identified with τὴν ἑξον in l. 30 beneath, which is a disposition produced by learning regarded as a source of memory. It is, however, somewhat misleading to think of that as being a source of memory in the same way as a πάθος is. Quæ ἔξος nothing is an activity (ἐνέργεια) of consciousness and all memory must start from a present activity.

451 a 28. τὸ πρῶτον ἐγγέγονε, Biehl and Bekker; τὸ πρῶτον ἐγγεγέγονε ἐν, L.S.U.

Freudenthal proposes to insert τι after ἐγγέγονε in order to provide it with a subject, τὸ πρῶτον being taken adverbially.

τὸ ἀνόμῳ καὶ ἐσχάτῳ. All commentators take this as referring to time, and that would be the most likely meaning of the Greek if we read ἐν τῷ ἀνόμῳ with L.S.U. But the dative which ἐγγεγέγονε governs should rather indicate the real ὑποκέματος in which the πάθος originates, not the time. Hence perhaps we should interpret τῷ ἀνόμῳ κ.τ.λ. as referring to the αἰσθητήριον which is the primary seat of sensation and which, we learn in De Sensu, 7, is αὐτὸ καὶ ἐν ἀνόμῳ and is also elsewhere called τὸ ἐσχάτων αἰσθητήριον, De An. 111. ch. 2, 426 b 16 and 7, 431 a 19. This is also Neuhäuser’s interpretation: cf. Introduction, sec. vii.

The argument then is, that the mere realisation of the impression in the primary organ of sensation—the heart or its σύμφωνον πνεύμα—is not memory. There must be lapse of time before it can function as an εἰκώς of the absent object.

If we take ἀνόμῳ καὶ ἐσχάτῳ as referring to time, it is difficult to interpret ἐσχάτῳ. We should have to translate ‘in the same individual and proximate moment of time.’ But the proximate is
not the same moment, unless in the improper sense in which the
same thing may be said to be proximate to itself.

Michael Ephesius thinks that the reference here is to the
moment after complete perception and that this is here distinguished
from the moment of perception mentioned in the last sentence.
Freudenthal finds this too ‘spitzendig’ and accordingly chooses to
regard this passage as another version of the former one (cf. note
to l. 25 above).

451 a 31. κατὰ συμβαίνων. Cf. ch. 1, 450 a 15–16.
451 b 2. Unless we accent ἐστι with Freudenthal the sentence
will not construe.

The interpretation of τῷ ἀφθῆνε here confirms our rendering of
the same phrase in 451 a 25. The ἀφθηνε is the starting point in time
rather than the original experience from which the continued con-
sciousness known as memory is derived.

451 b 3. άλλη ὅταν κ.τ.λ. Here at last is the distinction between
ἀνάμνησις (in the proper and customary, as distinct from the Platonic
sense) and μνήμη.

Recollection is the reproduction of a previous experience (apart,
of course, from renewed sense perception or repetition of the ex-
perience, whatever its nature, afresh), which has passed out of the
mind, and a revival—ἀνανάκτησις (Themistius)—qui experience,
not qui memory. The memory, holding the present experience
as the εἰκὼν of the past, can be produced either by the continued
presence in consciousness of the previous experience or by its
restatement through recollection. It is a consequence (συμβαίνει l. 6)
that, when we reinstate an experience identical in character with the
previous one, we should remember, i.e. that it is an εἰκὼν of the
previous one. But it is the act of reinstatement which is accurately
to be described as ἀνάμνησις, not the referring of the reinstated
experience to the past.

451 b 6–7. Michael (132 a), Simon (p. 301) and Gesner,
apparently (cf. Freud. Rh. Mus.), read τῷ δὲ μνημονεύειν συμβαίνει
καὶ μνήμη ἐκκολοθεῖν. This Freudenthal (p. 407) approves of,
objecting to the absolute use of συμβαίνει in the other reading
and trying to make out that we should, if we kept it, have to
distinguish as different from each other, (1) ἀνάμνησις, (2) μνημονεύειν
and (3) μνήμη. That is surely captious and, on the reading which
he approves, we should have (with Gesner) to interpret μνημονεύειν as
COMMENTARY

of recollection, however much he may depart from this rule on other occasions.

Themistius says—ἔπεται δὲ τῇ ἀναμνήσει εἰς ἀνάγκης ἢ μνήμη, understanding by ἔπεται apparently (and if there is any sense in his explanation) mere logical implication. He explains ‘recollection implies memory because, to recollect, you must remember something connected with the thing which you are trying to recollect...the starting point in the ἔγγεντα which is recollection’ (cf. infra 26 sqq.). Not only, however, is this a strange interpretation of συμβαίνουσα and ἀκολουθεῖν, but, if recollection may start ἀπὸ τοῦ νῦν (l. 22 infra) it is not necessary for its starting point to be an object of memory.

451 b 7. τὰῦτα refers vaguely and inclusively to ἀναμνήσκεσθαι and μνημονεύειν. The sense is...‘you do not get recollection and memory every time an experience which has lapsed from the mind is repeated. It may be repeated without your remembering you had it before. In such cases the repetition of the experience is not recollection.’ This is pretty nearly Simon’s interpretation. St Hilaire, evidently basing upon Themistius’s interpretation of the preceding sentence, thinks that here Aristotle is making explicit his distinction between the revived and the non-revived elements in consciousness in the act of recollection. (St Hilaire, p. 123): ‘Ce ne sont pas du reste des choses antérieures qui se reproduisent complètement de nouveau dans l’esprit; mais il y a alors une partie des choses qui se reproduit et une partie qui ne se reproduit pas; car la même personne pourrait très bien deux fois découvrir et apprendre la même chose.’ But this interpretation can only be come at by reading ἔγγεντα l. 8 (impossible Greek) or by supplying it after ἔγγεντα; further τὰῦτα would have to refer to ἔποντίζετο etc., l. 4, which is rather too far back and would suggest the use of έκλειπε; thirdly the thought is still more elliptical and loosely arranged than on the interpretation I give. ‘The previous experience is not wholly reinstated for, if it were, it would be a case of μαθησι not ἀνάμνησιν.’ This renders ἀλλ’ ἔστιν...ἔστι δ’ equivalent to ‘partly ...partly’ and makes us refer δ’ τι γὰρ μαθεῖν not to the clause immediately before it but to the previous one.

Hammond (p. 204) gives a totally new rendering, ‘Neither do the phenomena of recollection, if their occurrence is the repetition
of a previous recollection (sic), follow absolutely the same order, but sometimes they occur in one way, sometimes in another. It is possible for the same individual to learn and discover the same thing twice. Recollection then must differ from learning and discovery, and there is need of greater initial latitude (sic) here than is the case with learning.’ He elucidates this in a note, ‘In the case of learning and discovery there is a definite and exact process by which a given result may be twice arrived at.’ (What Aristotelian doctrine is this?) ‘...In the case of recollection, on the other hand, there is not the same fixity of procedure. There are not only many forms of suggestion and association, but a given suggestion may not effect the same result in two instances.’ This is to introduce a point mentioned in 452 a 27 below but not relevant here. It is in no way apparent that Aristotle ever meant to compare the acquisition and the revival of knowledge with regard either to the relative fixity of the processes or the fixity of the starting point.

St Hilaire quite fails to see that τόνυν (l. 11) refers to μαβέν καὶ ἔρευν, and so he completely distorts the sense.

451 b 11. καὶ Εὐνόστης κ.τ.λ. On the whole this favours my interpretation of the previous passage rather than St Hilaire’s. On his theory, relearning a thing implies complete reinstatement of everything in consciousness and it is difficult to see how there would be any ἀρχή at all in that case.

It is Aristotle’s theory that in learning (either for the first or second time) as well as in recollection there is an ἀρχή from which we set out. We find no contradiction to this in 451 a 25 above; there he simply says that in the process of learning memory does not begin concurrently with the initial step. Here he merely distinguishes learning and recollection according to the amount of the ἀρχή involved; but we can gather his doctrine from other passages. We learn either by deduction or induction (Anal. Post. 1. ch. 18, 81 a 38 sqq.) and, in either case, we must have some previous knowledge which is the starting point of our deduction or our induction. (Cf. Anal. Post. 1. ch. 1, 71 sqq. and Metaph. 1. ch. 9, 992 b 30 sqq.) In the one case we must know the premises of any particular conclusion and ultimately the constituents of the definitions of the terms (which enter into our premises); δεῖ γὰρ ἐξ ἕν ὁρισμός προειδέαν καὶ ἐναὶ γράφμα (992 b 32). In the latter, the knowledge of particular cases which are given in perception (τὰ καθ’ ἐκαστα, τὰ ἐγγύτερον τῆς αἰσθήσεως Anal. Post. 1. ch. 2, 72 a 2, 3) and which are
less intelligible naturally (τῶν ἡπτον γνωρίσμων φώτων Metaph. vii. ch. 4, 1029 b 4), is required before we can gather from them the universal law. But in learning by induction we do not have previous knowledge of the universal law, nor in deduction have we a prior acquaintance with the particular case. (It is only in so far as the particular is implicit in the universal that it is previously known. In its particularity and in the full sense of the word it is not known: ἀπλοῦς δὲ οὐκ ἐπιστάτης 71 a 28.) If it had been explicitly thought of previously, then we should have a case of recollection not of μνήμησις, which must be distinguished from ἀνάμνησις and is thus to be distinguished.

Another point of difference is that mentioned below in 452 a 5 sqq. Learning requires a teacher; the process of recollection is self-originated.

There is also a sense in which the act of learning is not a process. Cf. Phys. vii. ch. 3, 247 b 10 sqq. and also De An. i. ch. 3, 407 a 32. This however comes to no more than the familiar doctrine that per se the intellectual life is not a συμβαίνειν πάθος like memory and recollection. But in this sense it cannot apply without qualification to the functioning of the νοεῖν παθητικὸς which is realised in finite individuals.

451 b 14. ἢ ἀνάμνησις. Hamilton (Reid, p. 894) points out that Locke too, in Essay II. ch. 33 § 5, distinguishes between those ideas which are naturally connected by a ‘union and correspondence which is founded in their peculiar beings’ and those that are associated ‘through chance or custom.’ By those necessarily connected Aristotelian means notions which objectively imply one another, like centre and circumference. As Hamilton indicates, it was typical of members of the empirical English school (other than Locke) to ascribe all collocations of ideas to custom.

451 b 16–17. Freudenthal’s reading (op. cit. p. 407)—συμβαίνειν δ’ ἐνάσ μᾶλλον ἢ ἐμφάνης πολλάκις καθομισθαι—seems unnecessarily to anticipate the doctrine of 452 a 3 sqq. infra.

451 b 20. Freudenthal’s conjecture of τίνας instead of τινά makes the reading smoother, ‘we experience a number of previous changes conducting to the stimulation of that one’ etc.

451 b 22. τῶν νῦν ἢ ἄλλον τινά. By this Aristotle cannot mean merely ‘a time present or otherwise.’ It is difficult to see how one could start a process of reflection otherwise than from the present time. The idea is that the object, the thought of which starts the
train of recollection, can be given either in present perception or in memory.

ἀπ' ὁμοίου κ.τ.λ. This describes the character of the object or content of the notion which starts the process.

It is the first recorded formulation of the celebrated laws of association, though they are all to be found instanced in the Phaedo.
Cf. above note to 451 a 23.

451 b 24. τῶν δ' ἀμα. This evidently is capable of being illustrated by the ἑνάνθια κατηφρος which, being affections of a single sense organ, must be ἀμα; cf. De Sens. ch. 7, 447 b 9 sq.: μᾶλλον γὰρ ἀμα ἡ κατηφρος τῆς μᾶς ταίνης (αλεθήσεως) ἢ τῶν διον. Here of course the κατηφρος seem to be regarded as existing in the central not in the end organ, but evidently the characteristic of being ἀμα, which distinguishes ἑνάνθια κατηφρος in the end organ, is regarded as attaching to them when they are transferred to the heart.

If this interpretation be correct ‘Association by Contrast’ is to be assigned to ‘Contiguity.’

451 b 27. δ' οὖν. δ' ὅμως Freudenthal, G. A. Bekker. The change is immaterial unless with Themistius, Leonicus, and Simon we take the οὖν with ἐγγαίνεις and translate ‘and we recollect, even though we do not search in this way.’ But we see from 453 a 18 sqq. below, that Aristotle does not limit ἀνάμνησις to the volitional process which reinstates an idea. Recollection is there said in some cases not to be ἐπι αὐτῶν, i.e. subject to the will.

Cf. also Hamilton op. cit. p. 902, note.

451 b 30. μεμνήμεθα here must be used inaccurately for ἀναμμυροκόμεθα; cf. 452 a 8, 11.

τὰ πάροι. Hamilton, op. cit. p. 903, takes this as ‘things remote and irrelevant to our inquiry’ and (apparently) not as the object of μεμνήμεθα. This is surely very unnatural; the use of τὰ πάροι and τὰ συνεγγυς to denote something else than objects and processes which are connected in the train of recollection, just where the series has been described in terms of similar notions, would be a most flagrant instance of slipshod writing on the part of Aristotle. Hamilton translates, ‘Nor is there any necessity to consider things remote [and irrelevant] how these arise in memory; but only the matters coadjacent (and pertinent to our inquiry). For it is manifest that the mode is still the same—that, to wit, of consecution,—[in which a thing recurs to us, when] neither pre-intentionally seeking it, nor voluntarily reminiscent. For [here too], by custom, the several
movements are concomitant of one another—this determinately following upon that.' Hamilton, reading τρόπος τῶς (λέγω δὲ τὰ ἔφεξε) ὁδὸς κ.τ.λ., thinks that reference is still being made to the case of voluntary and involuntary reminiscence, and that it is the manner of occurrence of these two which is said to be identical. But προβληθής and ἀναμνησθείς cannot distinguish intentional as opposed to unintentional recollection. (What can 'pre-intentionally' mean?) It is the method of recalling τὰ πόρρω and τὰ σύνεργα which is the same. As the remoteness of two distantly connected ideas can be bridged over by inserting intermediate ones, it is the mode of connection of these latter we have to consider.

451 b 31–32. λέγω δὲ ἀναμνησθείς. A gloss according to Freudenthal. But, if we let it stand, it simply points out the fact that he refers to the order of a series of psychic changes determined, not by any previous act of recollection, but by the way in which they are accustomed (τῷ γὰρ ἔθει l. 32) to be experienced together.

451 b 35. ἀρχὴ κύριας. This is simply the term for efficient cause used in Phys. ii. ch. 7, 198 b 1, Metaph. i. ch. 3, 984 a 27, etc. Here we are dealing with that class of efficient causes or sources of change which are themselves motions or changes. The series of changes in conscious process is conceived by Aristotle quite in the same way as all other changes occurring in the world of generation and decay. The whole series is a κύριας which is made up of parts which are themselves κύριες. Hence Themistius’s illustration of the series of mental sequences by a chain in which, if one link be lifted, the next will also be moved (Σφ. ii. p. 245, l. 12) is inadequate. The links in the series are themselves nothing static but processes also.

So far as we have gone, the κύριες which are stimulated in the act of recollection seem to be dormant in the soul or its organ the heart prior to stimulation, and this is apparently the view maintained through the De Memoria. In De An. i. ch. 4, 408 b 15 sqq., however, a rather different attitude is taken up. In recollection the κύριας is said to pass from the soul to the affections (also κύριες) or their traces (μνήμες) existing in the sense organs; this is opposed to what occurs in sense perception, where the κύριας proceeds in the reverse way. In neither case is the process in the soul.

By this however Aristotle probably means no more than to emphasize the fact that in the higher faculties the mind is an originating cause. Of course, in all cases the soul is an ἀρχή (cf. De An. i. ch. 1, 402 a 7) and to be regarded as an efficient as well as a final
cause (De Part. Animal. 1. ch. 1, 641 a 27). But, just as none of its modifications, even a primitive one like perception, is mere passivity (cf. De An. 11. ch. 5) so we seem to find a progressively greater absence of passivity as we pass from lower to higher faculties; e.g. scientific knowledge—ἐπιστήμη—is not passive change of the type ἀλλοιωμα in the proper sense at all (417 b 6). A mechanical determination of psychic processes by each other may go on and be beyond the control of the individual in whom they occur (cf. 453 a 18 sqq. infra). This is held to show the corporeal nature of such changes, or rather their dependence upon corporeal conditions. Hence it is suggested by implication that a function which was exclusively psychical would not be determined in this mechanical way but would be completely under control (ἐπ’ ἄλλως : 453 a 22). Notwithstanding Aristotle’s determination to make out all human faculties to be conditioned by the bodily organism, and thus establish a thorough-going parallelism of psychical and corporeal changes, notwithstanding the fact that he declares the human νοῦς to be παθητικός, there seems to be this tendency to free itself from bodily conditions which is always manifested by that which is most characteristically psychical. It is significant that in this passage where Aristotle talks of the process in recollection proceeding outward from the soul, he immediately goes on (as if impelled by association of ideas) to talk of the νοῦς which is impasive and imperishable, and practically identifies ψυχή with it. The decline of the mental faculties is just like the dimness of sight in an old man, due to the bodily organ becoming impaired. It is not the ψυχή which suffers change but its organ (ὡς τὸ γῆρας ὦ τῷ τῆν ψυχήν τι πετωθεῖναι, ἀλλ’ ἐν φ., 408 b 22). Hence the ultimate core of the ψυχή seems to consist of this imperishable νοῦς, which, no doubt, relatively to the body will be like the divine νοῦς in its relation to the world, the prime source of movement—τὸ πρῶτον κύνην.

Aristotle, however, does not state this explicitly, and though, indeed, he tells us that the νοῦς enters the living being from outside and its activity has nothing in common with that of the body (De Gener. Animal. 11. ch. 3, 736 b 28) yet the relation of this to the other mental faculties is most obscure in his philosophy, and really leads to difficulties much the same as those surrounding the relation of the Platonic ἰδέα to the things of time and sense.

452 a 2. τὰ πράγματα (the facts) may be either static elements, e.g. contiguous objects or different parts of a mathematical theorem, or events themselves. The series may be either temporal or not.
COMMENTARY 269

452 a 4. φαῦλα is the version of L S U. Themistius and Michael read φαῦλος καὶ χαλεπὰ. For φαῦλος in the sense of inexact cf. Thuc. vi. 18. Cf. also Metaph. vii. ch. 4, 1029 b 10.

452 a 8. μνημην. Referring a reinstated process to the past is a characteristic of rememering as distinct from learning a second time: cf. 451 b 6. Hence Aristotle is justified in using memory here as the generic term to include recollection.

452 a 10. κινούντων πολλά. This surely refers to many different starts not to many different items in a single series.

452 a 11–12. τὸ γὰρ μνημήθαι κ.τ.λ. The act of memory cannot be the merely potential existence of a process in the mind.

δυνάμει. δύναμιν L S U, Themistius, vet. tr. But we do not elsewhere hear of a special δύναμις κινοῦσα in the mind. It is an actual process which functions in recollection.

452 a 14. ἀνὰ τόπων. This, surely, as the illustration below bears out, refers to the τόποι—commonplaces of thought in general which Aristotle defines in their most universal sense in Rhet. i. ch. 2, 1358 α 12: (οἱ τόποι) εἰσὶν οἱ κοινῆ περὶ δικαιῶν καὶ φυσικῶν καὶ περὶ πολεμικῶν καὶ περὶ πολλῶν διαφερόντων εἰδεῖ, οὗν ὁ τοῦ μᾶλλον καὶ ἕττων τόπος: cf. also l. 32. The τόπος is a rule or general statement that will readily recur to one and hence it may be used as the ἀρχή of a train of ideas in recollection. E.g. it is a τόπος of the Aristotelian philosophy that air is damp, and apparently from Meteor. iii. ch. 4, 374 a 2 that it is λευκὸς; that milk is white and the autumn damp are given by ordinary perception.

Unfortunately Aristotle in illustrating the use of τόποι in recollection by those drawn from his own philosophy gives a series of ideas which would hardly with plausibility be used in the purposive recall of an idea. Hence Hamilton (followed by St Hilaire) proposes to read ἀνὰ ἀτόπων. But if the series is an absurd one still less likely is it to be employed in voluntary recollection, which is now being discussed. Themistius (Sp. ii. p. 247, ll. 8 sqq.) gives a variety of alternative explanations to τόπων. τόπους δὲ ἢ ἂς ἀρχής ἐνίσχυε δεῖ τῷ ψυχῆς λέγωμεν, ἢ τοὺς κατὰ τὰ στύπτουσα καὶ δόμου καὶ ἀντικέμενα ὡς ἐν τῇ διαλεκτική ἐφήμε, ἢ τοῖς σωματικοῖς καὶ ταῖς ἐν τῷ ἀνθρώπῳ ἀρχαῖος. Thomas interprets it as meaning the last merely. In that case, the reference would be to the art of memorising objects by attaching each to a special point in a spatial series—an art said to have been discovered by Simonides of Ceos and referred to by Cicero in De Oratore, ii. ch. 86.
So Hammond and Freudenthal, loc. cit. p. 409 (who indeed in consequence wishes to read τάχυστα instead of κυρίες in l. 15). But it is strange that Aristotle after mentioning this method of memorising should give an example which has no reference to it.

452 a 18. τὸ καθόλου is read by L S U Y, Themistius and Michael. Both those commentators, however, render it by ὅς ἐν τῷ τὸ πολὺ, a meaning which, according to Freudenthal (Archiv für Gesch. d. Philos. II. 1887, p. 11) καθόλου can certainly have. They thus interpret τὸ καθόλου as though the τὸ were inessential. Siebeck however in Philol. 1881, pp. 350–2, and his Untersuchungen zur Philosophie der Griechen, p. 155, wishes to retain τὸ and to make it essential. He thinks that here Aristotle identifies the middle of a series of terms employed in reminiscence with the μέτα of logical inference which is a universal and furthest from sense. The connecting bond in recollection is a universal concept which binds together various particulars by means of their implication in it.

This comes to pretty much the same as Mr Bradley’s doctrine that ‘Association marries only Universals,’ or more simply, that there is a bond of identity between the thing remembered and the thing that brings it to mind. This however has been already made clear enough in 451 b 21–26 above, and it is strange that Aristotle should confuse that implication of a predicate in the middle term of a syllogism, which accounts for the truth of the conclusion, with that relation between psychical states which causes the presentation of the one to entail the presentation of the other. In the latter case you are accounting for a process, in the former for a connection which is independent of process. Moreover the ‘universal’ which connects different ideas in reminiscence is hardly the universal of logic—that which is ‘furthest from sense’; it is often of the most sensuous character. Once more, it would be unfair to represent it as a separate member in the train of connected ideas; it is rather the identical element pervading any two.

In the details of the subsequent passage Siebeck’s interpretation is beset with at least no fewer difficulties than Freudenthal’s.

Cf. also next note sub fin.

452 a 21. ὧς ἐν ΑΒΓΔΕΖΘ Κ.Τ.Λ.

Biehler’s text, which I print, follows Freudenthal’s reconstruction of the passage. I have translated it as it stands. But it can hardly be said that all difficulties have been removed even by this radical alteration of Bekker’s text. The general drift seems to be that the
middle term of a series of connected ideas is of unique importance because from it you can go in either direction to the other members. If you have a series of ideas A B C D E F G H and want to remember F or G and are not able to do so when you think of H, by thinking of E you may be able to recall them. Then from E you can get either to D or F, or from C you can pass to B, the term before it.

But this is not at all persuasive. Why should the final possibility of recall be the starting from A, which is an extreme in the series, if it is the employment of the middle term which Aristotle is illustrating? Besides, as Freudenthal himself points out, there is no single middle term in a series of eight.

Again, Freudenthal does not seem to give sufficient weight to the objection that this makes Aristotle talk of recollection as proceeding in a reverse order with equal facility.

Bekker's text is as follows (l. 21): εἰ γὰρ μὴ ἔπι τοῦ Ε ἐμνησθῇ, ἐπὶ τοῦ Ε Θ ἐμνησθῇ· ἐντείθην γὰρ ἐπ’ ἄρφῳ κινηθῆναι ἐνδέχεται, καὶ ἐπὶ τὸ Δ καὶ ἐπὶ τὸ Ε. εἰ δὲ μὴ τοῦτων τι ἐπιζητῇ ἐπὶ τὸ Γ ἐλθὼν μνησθῆναι, εἰ τὸ Η ἢ τὸ Ζ ἐπιζητῇ. εἰ δὲ μὴ, ἐπὶ τὸ Α (l. 19–23, Bek.).

Now, perhaps Aristotle only means that, after all, it is the connecting link, the intermediate term, which accounts for and must universally account for the recollection. If one does not remember by thinking of another term in the series one does so by coming to it. It is the proximate and universal (καθόλον, l. 18) cause of the recall of the idea in question. Hence I propose to read and translate as follows, 452 a 21 sqq.:

\[
\begin{align*}
&\text{(A B C D E Z H \Theta)} \\
&\text{(A B C D E F G H)}
\end{align*}
\]

εἰ γὰρ μὴ ἔπι τοῦ Ε ἐμνησθῇ ἐπὶ τοῦ Η τὸ (τοῦ?) \(\Theta\) ἐμνησθῇ· ἐντείθην γὰρ ἐπ’ ἄρφῳ κινηθῆναι ἐνδέχεται, καὶ ἐπὶ τὸ H καὶ ἐπὶ τὸ Z. εἰ δὲ μὴ τοῦτων τι ζητῇ, ἐπὶ τὸ Γ ἐλθὼν μνησθῆναι, εἰ τὸ \(\Delta\) ἢ τὸ E ἐπιζητῇ· εἰ δὲ μὴ, ἐπὶ τὸ \(\Lambda\) καὶ οὖν ἰδεῖ.

‘If one has not remembered at E, at G one does remember H. The reason why one does not remember at E is that from that point one can pass to both G and F. If one does not want to remember these he will remember by going to C if he is seeking for D or E; if he is not seeking for these he goes to \(\Lambda\). This is universally the process.’

ms. Y reads τοῦ H\(\Theta\) (l. 20, Bek.). The omission of the τοῦ before \(\Theta\) would easily occur. For the other changes of letter no ms. authority is available, except that the vet. tr. reads Z in l. 23 (l. 22, Bek.).
a change approved by both Siebeck and Freudenthal. The other alterations are mild in comparison with those made by Freudenthal.

The point is that it is the term just before the one to be recalled that you must get. There is no intention of dealing with a fixed middle term of the whole series. When Aristotle says the middle term may be considered as the ἄρχη, he means that in a way it is really πρῶτον. It is πρῶτον in the sense of being the proximate cause. Now it is anything πρῶτον in this way that is universally (καθόλου) a cause.

Hence καθόλου may be read in l. 18 and its normal meaning ‘universally’ given to it, if my conjecture as to the meaning of the subsequent passage is adopted. It is the intermediate link between any two terms which is universally the cause of the transference from one to the other, just as it is the proximate cause which universally produces an effect, or as it is quā triangle, the middle term, that we can universally predicate equality of the angles of any figure to two right angles. Cf. Anal. Post. 1. ch. 4, 73 b 25 sqq.

But another interpretation has been suggested to me (by Mr W. D. Ross, of Oriel College). It is proposed to adopt the following text instead of that of Bekker:

452 a 21 sqq. ei γὰρ μὴ ἔπι τοῦ Α μέμνησαι ἐπὶ τοῦ Ε ἐμνήσθη ἀνείθεν γὰρ ἐπὶ ἄρματο καυχήθη καὶ ἐπὶ τὸ Δ καὶ ἐπὶ τὸ Ζ. ei δὲ μὴ τῶν τῶν τὰ ἔξησε, ἐπὶ τὸ Ζ ἔλθον μεμνημένος, ei τὸ H ἦ τὸ Θ ἐπίζηται ei δὲ μὴ, ἐπὶ τὸ Δ.

The only changes here for which there is no ms. authority are Α instead of Ε in l. 22 (l. 20, Bek.) and Ζ instead of Γ in l. 24 (l. 22, Bek.), while the other variations from Bekker and Bichl follow the best ms.

The translation will then be as follows:

‘If one does not remember at A he remembers at E, for from that point he can pass in both directions—both to D and to F. But if he is not searching for one of these (D or F), by going to F he will remember, if he is looking for Α or H; while if he is not (looking for Α or H, but those in the other direction—C and B) he goes to D.’

In explanation of this interpretation it is maintained that A is not included in the series of terms of which τῶ μελῶν πάντων is said to be the ἄρχη (hence they form an odd number and Ε becomes a real middle term). A is rather a term immediately outside the group in which the idea to be recalled is contained.

Aristotle is held to be illustrating the well-known process of recall
COMMENTARY

in which, when we wish to revive an idea, we pass first of all to the group of former presentations within which we must already know it to lie. E, then, will symbolize the central idea or nucleus of this group from which it is possible to pass, in more than one direction, to the idea lying in the outskirts of the group.

This interpretation is ingenious and gets rid of minor difficulties, e.g. it does not require that Aristotle should be held to commit himself to the statement that we can recall ideas by proceeding backwards among terms experienced in a linear series like the letters of the alphabet. Though Aristotle symbolizes his terms by the letters of the alphabet he is thinking not of a series following the direction of the time process but of a set of notions formed by those notions being frequently thought of together and grouped round one striking topic.

452 a 28. Freudenthal, in conformity with his interpretation of the above passage, proposes to read E instead of Ε (C). The associative process may go in either direction. But the meaning is quite satisfactory and does not involve the special difficulties of this contention if we keep the ms. version. Aristotle has just before said that the intermediate term is universally the ground of recollection. But it is objected that from a given term sometimes you pass to a certain other one and sometimes not. That will be true, he says, of the remoter terms in the series, for sometimes from C we pass all the way along to F, sometimes to the next member D only. Again, the particular series CDEF may become obliterated and the association branch off in some other direction that has become more familiar. Hence, though starting from C, we may not arrive at F.

452 a 28–29. ἄν οὖν δὲ ἀ πάλαι οὖ κατηφῆς. All editors except Biehl, following LSU, read ἄν οὖν ψηδά διὰ παλαιοῦ κατηφῆς and Freudenthal wishes to follow the same text with the omission of ψηδά. All difficulties, however, vanish when we take πάλαι as ‘lately,’ a sense which it often bears in Aristotle (cf. Bonitz, Ind. p. 559 a 19: ‘τὰ πάλαι λεξεθέτα, οἱ πάλαι λόγοι refertur ad ea quae ante in codem libro exposita sunt’) and in other writers.

One may not have lately experienced the succession CDEF, and hence when C occurs one goes off on some more familiar route.

452 a 30. πολλάκις ά: LSU and all editors before Biehl read ἀ πολλάκις, especially since the explanation is based upon the frequency of the repetition; cf. 452 b 1 below: τὸ δὲ πολλάκις φύσιν.
σω ἢ. But the idea of frequency or continued action is contained in the imperfect tense ἐνονέμεν.

452 b 1. ἐνεργεία. Mr Cook Wilson (Journal of Philol. xi. p. 120) conjectures σωματεία; but this makes the sentence simply a repetition of ll. 29–30 above. Though Themistius reads σῶμα καὶ θέου, that is no guide. It is just the practice of that commentator to reduce significant statements to idle repetitions.

Every one of those who read ἐνεργεία will have it that the reference is to the activity of mind and, as it is the function of intellect which is most appropriately styled an ἐνεργεία, the term may perhaps be used absolutely as referring to that without further qualification. But the meaning will not be, as some think, that the order of connection of things in nature must be reproduced in the mental process of recollecting. That would only be the case if the order of recall was always identical with the order of notions in science, which is admittedly a reproduction of the objective order. (Cf. De Interp. ch. 9, 19 a 33: άρμοσι πάντα λόγοι ἀληθείας διάφυσ τὰ πράγματα and Metaph. ix. ch. 10, 1031 b 3.) It is only the order of experience, though at times that might coincide with the scientific order, which is reproduced in association, and it is doubtful if it could be said that that takes place φύσε. The meaning would then rather be that, just as in the order of nature things succeed in a definite sequence, so it is in the functioning of thought. It is the occurrence of a particular order which is common to both.

Perhaps, however, the meaning is much wider than this. One of the mss. (M) inserts ἂ δύναμεν after φύσε and this, which seems to be a gloss, may, however, give us a clue to an interpretation—‘Things when actually produced in a definite order do so by virtue of a natural disposition (or δύναμις) to do so. Now frequency of repetition produces this φύσις, and hence you explain the way in which we actually associate such and such ideas, since the ὁς produced by frequent repetition is a kind of φύσις.’ This φύσις might well have been called a ζῆς, as the tendency to virtuous action produced by practice is called in the Ethics. This ζῆς is, it must be noticed, a δύναμεν, though determinate, and from φύσις you can never dissociate the idea of potentiality. Thus it can quite well be opposed to ἐνεργεία. In fact φύσις as the world of Nature is, apart from actual sensation, merely the potentiality of a sensible object, a ὑποκείμενον. Cf. Metaph. iii. ch. 5, 1010 b 31 sqq.: τὸ μὲν οὖν μήτε τὰ αἰσθήματα ἐμά τὰ αἰσθήματα ἐστὶς ἀληθεῖς..., τὸ δὲ
COMMENTARY

452 b 2. ἑπάρα φύςιν. Cf. Phys. i. ch. 8, 198 b 35 sqq. and iii. 215 a 2, etc. τὸ αὐτόματον or τύχη is the source of what we should call exceptions to the laws of Nature. Those deviations from the normal which we should ascribe to the operation of special subsidiary and counteracting laws Aristotle did not regard quite in the same light. As the action of Nature is not merely according to law, but purposive, Aristotle seems to consider these deviations from the general rule as being opposed to this purpose which aims for the best and as thwarting it. Hence the expression ἑπάρα φύςιν. Cf. Zeller, Arist. 1. pp. 465 sqq. (τὸ αὐτόματον and τύχη may be distinguished, the former being specially the tendency to produce the unexpected found in natural phenomena). Cf. Bonitz, ad Metaph. xi. ch. 8, 1065 a 30.

452 b 5. ἀφέλεκης, which Christ suggests, would make the reading smoother. But Aristotle continually works with an exceedingly indefinite subject, especially when discussing mental phenomena (cf. Rodier, ad De An. iii. ch. 5, 430 a 25); it is, indeed, possible for the subject to be changed between κινηθῇ and ἀφέλεκης.

452 b 6. δει ὄνομα: ἐπίγραφο: Y Υ have ἐπίγραφο μόνον.

452 b 8. γνώριζεν βιν τὸν χρόνον. This is not a special characteristic of recollection, but is common to it and memory: ch. 1, 449 b 32 et passim. From here up to 453 a 5 Aristotle deals with the perception of time, a common function of both activities, and thereafter he goes on once more to contrast the two.

452 b 9. τι. This is evidently the common sense or its organ, the ἐν τῷ τῆς ψυχῆς mentioned in De Sensu, 449 a 10. To perceive time is a function of the common sense: cf. above, ch. 1, 450 a 11 and notes.

452 b 10. τὰ μεγίθη. Compare the way in which the perception of time is illustrated by the perception of a spatial magnitude in De Sensu, ch. 7, 448 b 3 sqq.

18—2
This would be a device for effecting thought by contact. Plato suggests in the *Timaeus* that thought is effected by contact (cf. *De An.* l. ch. 3, 406 b 26 sqq., and Rodier, *ad loc.*). But thought would thus be itself a μεγαθος. Cf. *Timaeus*, 34 c sqq. and especially 37 a. Aristotle, however, does not disdain to speak of the activity of intellect as a contact with its object—which is itself. Cf. *Metaph.* xii. ch. 7, 1072 b 21: θυγγάνων καὶ νοῶν (ὁ νοῦς).

Plato, though making thought to be effected by contact, does not suggest that it issues from the body and reaches out to the things thought of, but as we see in *De Sensu*, ch. 2, he, along with Empedocles, holds this to be true of sight.

Bekker reads τίνι οὖν διοίκητι, ὅταν τὰ μεῖζω νοῆ; ἢ ὅτι ἐκεῖνα νοίς, ἢ τὰ ἑλάττω; πάντα γὰρ τὰ ἐντὸς ἑλάττω, ἀντικρ ἀνάλογων καὶ τὰ ἐκτός. This is pretty nearly the traditional version of the commentators and it seems to have given rise to the interpretation descending from Themistius, which is to the effect that Aristotle is comparing the relation of external magnitudes and objective time to subjective processes by some relation between a whole and its parts. The inner processes in the subject are ἑλάττω, but so are the parts contained in a whole. Themistius takes the ἐντός as referring to the parts which are contained in the whole, not, apparently, as referring to ἐν αὐτῷ (sc. τῆς διαφορᾶς), l. 13. Nevertheless, τὰ ἐντός—the parts contained in the whole—do correspond to the subjective processes but, when they are described as ἑλαττω, that primarily characterises their relation to the whole (τὰ μεῖζω) and only secondarily the relation of inner process to the external reality.

The argument then is (Themistius, *Sp.* ii. p. 250) that, if you know the whole, the knowledge of the part is annexed to it, but that knowledge first attaches to the parts (τὰ ἐντός) and then, because they are analogous to each other, and to the whole, proceeds to the whole. The relation between whole and parts is like that in the *Timaeus* between the demiurge, or rather the animal of perfect figure which is to contain all others (*Timaeus*, 33 a), and the created gods which are within it and yet like to it.

It looks as though Themistius, having consulted the *Timaeus* in connection with the passage above, has been led on by some similarities of expression in the two works (τὰ ἐντός, ὁμοιότης and the notion of figures containing one another) to introduce as a parallel
something perfectly irrelevant. As Freudenthal points out, though a whole contains its parts, the parts do not contain the whole and it is impossible merely from the relation of part and whole to understand how a part can represent a whole. Among the commentators Simon and Thomas dismiss all this construction and take τὰ ἐντὸς as referring simply to the inner psychic affections which correspond to the external objects and periods of objective time.

It might seem at the first glance that τὰ ὀμοια σχῆματα which reside within the soul or its organ are what corresponds to the external spatial magnitudes, the κυψέους what answers to the periods of real time; but this distinction can hardly be maintained. All internal affections must be κυψέους and those by which time is apprehended must themselves be spatial, i.e. capable of being represented by figures (cf. De Insom. ch. 3, 461 a 8–11). The relation of inner to outer is represented by similar triangles (cf. 18–19 below). Though Themistius employs such triangles (the one including the other) in his elucidation of the passage, the one does not, according to him, represent the psychic states, the other the external realities, but one is held to symbolize time, and its smaller parts the subjective processes apprehending time, the other the objective thing, with its parts representing the concepts by which we know the objective, and what is asserted is not merely a proportion between the inner elements of each triangle and the whole, but between the two triangles as a whole and consequently between the inner elements of each triangle. Cf. Themistius, Ὁφ. 11. p. 250, l. 23: ὡς τὸ ἐλάσσων πράγμα πρὸς τὸ μεῖζον ἔχει, καὶ ὁ ἐλάσσων χρόνος πρὸς τὸν μεῖζον ὀμοίως ἔχει, καὶ ἐναλλάξει, ὡς τὸ πράγμα πρὸς ἄπαντα τὸν χρόνον ἔχει καὶ τὰ μέρη πρὸς τὰ μέρη. (Spengel conjectures πρὸς before ἄπαντα.) But Themistius has completely missed the point, which is—how can the internal represent the external? He is continually using νόημα and πράγμα as interchangeable (cf. l. 21, loc. cit.); but the question is—how is it possible to use the νόημα (in the sense of psychic process) instead of being in actual contact with the πράγμα? How are they related to one another?

Freudenthal, in Rheinisches Museum, xxiv. p. 415, conjectures practically the identical reading which Biehl reproduces and which makes quite plain to what τὰ ἐντὸς and τὰ ἐκτὸς refer. We must, however, depart from Biehl to some extent and delete before ἀνάλογον in l. 16 the ὅστπερ which obscures the sense and may have easily crept in from the subsequent line. We read καί with Freudenthal.
452 b 17. St Hilaire and Hammond take ἐνδον to mean figures (mathematical); 'just as a figure may contain a proportionate one within it, so with distances.' But ἐδος is never used as identical with σχήμα—figure, though σχήμα may be regarded as an instance of ἐδος in the most general sense; and besides, since the sides of geometrical figures are ἀπορετήματα, in comparing the relations of ἀπορετήματα to those which exist between proportionate figures, Aristotle would only be comparing a thing with itself.

Bender translates ἐνδον by 'Bildern,' and this may be founded on an illustration which Simon gives when he compares the psychic states to statuettes of equal size reproducing on the small scale the lineaments and features of two different men. Simon, however, seems to agree with Thomas that ἐν ἀντί (ll. 17-18) refers not to the ἐδος as Bender seems to take it (—'in der Sache'—but that would rather be ἐν αἰτει or ἐν αἰτῶς) but to the perceiving subject—'in ipso cognoscente,' and he thinks that Aristotle is comparing the function of the internal quantum in representing external quantity to the function of the internal ἐδος in representing that which exists in the objective universe. In both cases the internal is analogous to the external. This account of the ἐδος in the soul is rather different from the usual one. Aristotle generally says that the ἐδος of the object gets into the soul. For example, sense is a faculty for receiving the ἐδος—the form without the matter; cf. De An. ii. ch. 12, 424 a 18, and so of νοεῖ in iii. ch. 4, 429 a 15, but again in 429 a 27 the soul is said to be the τόπος ἐδοσ. Now, if the ἐδος of the sensible object only exists actually (ἐνεργεία) when it is perceived or thought of, the ἐδος in the soul will be identical both numerically and specifically with that in the object so far as the latter exists ἐνεργεία, and this seems to be from one point of view the Aristotelian theory: cf. De An. iii. ch. 2, 426 a 15 sqq., and Metaph. iii. ch. 5, 1010 b 30; but here we seem to have the more common-sense position that the ἐδος exists realised in the external object independently of the percipient mind and that what exists in the mind is at least numerically different from the objectively existing one. Here indeed Aristotle would seem to go so far as to suggest that the ἐδος in the mind is only analogous to that existing in the external world.

In this passage, then, Aristotle's purpose is to illustrate the representation of an external ἀπορετήμα by an internal σχήμα, by the function which the ἐδος of an external object communicated to the sense organs has in giving us knowledge of that object. He refers
to the latter operation as to something already agreed upon. Cf. De Interp. ch. 1, 16 a 6: παθήματα τῆς ψυχῆς, καὶ δὲν ταῦτα δρομάτα, πράγματα κ.τ.λ.

452 b 18. In the following lines, while I adhere to one of the emendations which Biehl adopts from Freudenthal (ΓΔ for ΑΔ in l. 19), I disagree with the latter in his interpretation of the passage. My interpretation enables us to read AG with Bekker and all other editors and mss. instead of AZ in l. 21, and I instead of M in l. 22, a lection supported by mss. E M Y.

The figure I give in illustration of the text (for which, along with this interpretation, I am indebted to Mr W. D. Ross of Oriel College) differs from that suggested by Freudenthal as much as from the one found in Themistius; it will be found to be simpler than either and open to fewer objections. My contention is that Aristotle's sole point is to show how external ἀποικία and κύρισις may be reproduced in parvo in the psychical organs. His explanation is that the internal στήματα and κύρισις are analogous to the external ones, just as the sides of a small triangle are in the same proportions as those of one any number of times larger, obtained by producing the sides to any distance and drawing the base parallel to the base of the small one.

He accordingly draws the triangle AGΔ with BE near the apex and parallel to ΓΔ. (That this is the first figure to be drawn is evident from the fact that the letters round it succeed each other in the order of the alphabet.)

The internal στήμα or κύρισις then represents the external just as the sides AB, BE represent AG, ΓΔ by being proportional to them.

But the question arises, why should the internal στήμα or κύρισις symbolized by AB, BE represent the external AG, ΓΔ rather than AZ, ZH (obtained by producing AG and ΔΔ and drawing ZH parallel to ΓΔ), which are equally proportional to AB, BE?
Will not an internal σχήμα which represents a length of six feet at a certain distance represent one of twelve feet at double the distance? Aristotle replies that this is so, but that in the two cases we are conscious of a different proportion between the external and the internal. We have some standard by which we measure real size. We are conscious of the real distance from the eye outwards of the various objects, and hence (to state the case in modern terms) we know that an affection of the retina, which may mean a size of two inches in a near object, may mean two miles in a distant one. This is what Aristotle means when he says that $\Delta \Gamma$ is to $AB$ in the proportion of $\Theta$ to $I$, but $AZ$ is to $AB$ in the ratio of $K$ to $\Lambda$.

This interpretation requires us to regard $\Theta$, $I$, $K$ and $\Lambda$ as the names of single lines, not as referring to points at the ends of lines as Freudenthal and Themistius would have it. This usage is common in Euclid. On the other hand it is impossible that $\tau \omega \nu \Theta I$ or $\tau \delta \kappa \Lambda$ could refer each to single lines as Freudenthal maintains; nor is there anything in the passages he quotes (Phys. viii. ch. 10, 266 a 16, Meteorol. iii. ch. 5, 6, 7, 8, 9, 11) to show that Aristotle could, by $\Theta$ or $M$ (I) in l. 22, be referring to a single line by means of a point at one end of it, if the point at the other end is denoted by another letter. The difficulty is increased by the fact that his interpretation requires the full designation of the former line to be $[M] \Theta$, of the latter $[K] M$. There is nothing to show that $M$ was in Aristotle’s original scheme; it seems to have crept into some of the MSS. from the figure of Themistius where it is found along with several other superfluous letters. For further criticisms of the figure of Themistius, cf. Freudenthal in Rheinisches Museum, loc. cit.

Freudenthal’s text is as follows: 452 b 18 sqq.:—δισσερ ὁδρ εἰ τῇ $AB \ BE \ κενάται, \ ποιεῖ \ τῇ \ ΓΔ. \ ανάλογον \ γὰρ \ Σ \ ΑΓ \ καί \ Σ \ ΓΔ, \ τί \ οὖν \ μᾶλλον \ τῇ \ ΓΔ \ Σ \ τῇ \ ΖΗ \ ποιεῖ; \ õς \ Σ \ ΔΖ \ πρὸς \ τῇ \ AB \ ξεῖ, \ οὕτως \ Σ \ θ \ πρὸς \ τῇ \ Μ \ ξεῖ. (The rest is identical with the version followed here.) He constructs two diagrams.

1. $\alpha \gamma$ and $\mu \theta$ are two similar triangles one inscribed in the other and both are intersected by a
line \( \kappa \beta \lambda \) drawn parallel to \( \theta \) or \( \zeta \eta \) so that \( \mu \kappa : \kappa \theta :: \alpha \beta : \beta \zeta \). \( \gamma \delta \) is also drawn parallel to \( \zeta \eta \).

Then the following result will hold:

\[
\begin{align*}
\frac{a_k}{\gamma \delta} &= \frac{a \beta}{\beta \varepsilon} = \frac{a \zeta}{\xi \eta}.
\end{align*}
\]

Also

\[
\frac{\alpha \beta}{\mu} = \frac{\theta}{\mu} \quad i.e. \quad \frac{a \mu}{\kappa \mu}.
\]

Finally

\[
\frac{\xi \eta}{\beta \varepsilon} = \frac{\theta \alpha}{\kappa \lambda} = \frac{\xi \alpha}{\beta \alpha}.
\]

According to Freudenthal, \( a \beta, \beta \varepsilon \) represent inner affections; \( a \gamma, \gamma \delta \) concepts; \( a \zeta, \xi \eta \) are objective magnitudes, while \( \mu \kappa, \kappa \lambda \) represent our idea of time, \( \mu \theta, \theta \alpha \) actual objective time.

This scheme is not wholly unlike that of Themistius whose outer triangle represents time and its subjective apprehension, while the inner one symbolizes objects and the ideas by which they are thought.

But, as the whole point of the argument is, that the internal \( \sigma \chi \nu \varsigma \alpha \) and \( \kappa \iota \nu \sigma \rho \varsigma \varsigma \), though much smaller, are still analogous to the external magnitudes and periods of time, it is strange to find the internal \( \kappa \iota \nu \sigma \rho \varsigma \varsigma \), which is the means of apprehending time, symbolized by lines in the external triangle. If there is any point at all in drawing inserted triangles to represent the relation in question, the inner one should certainly represent the subjective and ‘smaller’ process. A series of similar triangles, the one enclosing the other, would be a much better means of bringing out Aristotle’s contention. It would thus be shown that differences in magnitude are non-essential; the proportions in the sides of the smallest interior triangle are still analogous to those of the largest exterior one. There is no need for Aristotle to represent objective time by different lines and symbols from those which represent external spaces (cf. De Sensu, ch. 7, quoted above), nor need the internal \( \kappa \iota \nu \sigma \rho \varsigma \varsigma \) be distinguished by different letters from the internal \( \sigma \chi \nu \varsigma \alpha \). In fact, the internal state corresponding to both spatial and temporal magnitudes must be a \( \kappa \iota \nu \sigma \rho \varsigma \varsigma \) (and perhaps it is this that Aristotle means when he says in De An. III. ch. 1, 425 a 17–18, that we know both figure and magnitude by means of \( \kappa \iota \nu \sigma \rho \varsigma \varsigma \)). But this \( \kappa \iota \nu \sigma \rho \varsigma \varsigma \) can be represented by a figure, \( i.e. \) it is spatially determined, it is a kind of \( \phi \sigma \rho \alpha \), and it
is as such that it can represent the objective magnitudes whether of time or space. What the difference is between the κίνησις which represents a magnitude which is itself a κίνησις (as in time) and that which represents a space, Aristotle does not say; he seems merely to be bent on describing everything internal in terms of κίνησις.

Again, it is difficult to believe that here Aristotle is distinguishing inner affections ('innern Affectionen,' Freudenthal in Rheinisches Museum, p. 417) from concepts (Begriffe). In the previous sentence (ll. 16–18) he had (by implication) distinguished the apprehension of ἐνθά from that of ἀποστάσις, holding that in both cases there is something analogous in the soul which corresponds to the objective ἔδος or ἀποστάσις. Now the distinction between ἔδος and ἀποστάσις —magnitude or spatial figure generally—is quite different from that between inner affection (φάντασμα?) and concept. Further, ἔδος is not a psychological term; it could not be used to mean concept as opposed to image. Though the ἔδος of a thing means the concept or knowable character of a thing, it is used only in the epistemological reference not in the psychological. The appropriate term to designate the concept as a psychical entity is νόημα not ἔδος. Compare the usage all through this treatise as in De An., especially 432 a 12, 430 a 28. Further, even though one did take ἔδος in the sense of νόημα and held that the lines αγ. γδ. represent νοήματα or ἐνθά, yet, as they are not of the nature of spatial quantity, what is here said about their analogy to the objects they represent will be the merest metaphor. A concept represents the external reality by having the same λόγος, or in fact being the λόγος of the external thing (cf. De An. 11. ch. 12, 424 a 24); but that λόγος is not a spatial proportion, neither in the external object (for that would be the Democritean theory) nor, consequently, in the soul. On the other hand the φάντασμα is spatial in character; as we saw in ch. 1, 450 a 9, not to be able to think without φαντάσματα is just the same as not being able to think ἄνω τῶν συνεχῶν. (This συνέχεια, as we saw, forms the ἐνθά νοητή of the concept.) Hence the analogy between the φάντασμα (or ἀποστάσις which is equally a spatial κίνησις) and the objective magnitude whether temporal or not, can be adequately symbolized by spatial figures, e.g. by the identical ratios which may be found in similar triangles of diverse magnitudes, whereas the analogy between the νόημα proper and its external object must be something very different.
Hence, even though we were to keep Freudenthal's figure, we need not appropriate special lines to the symbolization of particular classes of psychical states. The point seems to be merely that within a triangle of the same apex the shorter lines may be proportional to those obtained by producing the sides.

2. Freudenthal gives another illustration with three triangles, the smaller progressively inscribed in the larger, but the alteration is not material.

The only reason for following Themistius's explanation of the passage—the alleged correspondence of the 'triangulum rei' and 'triangulum temporis'—would be the difficulty of accounting for οὐν at the beginning of the next paragraph (l. 26) by any other. 'Hence, (since the process corresponding to the time and that corresponding to the thing may themselves correspond), we may explain memory. When they occur together we remember, etc.' But the alleged correspondence of time-apprehending and object-apprehending processes does not account for the fact of remembering. It is their coincidence that does so. It is also difficult to see what sense there is in making out a correspondence between an object and the time in which it is apprehended or between the subjective processes produced by each. Both may be illustrated by the same lines and figures as above, but that need not imply an analogy other than generic between the two classes of processes. The οὐν does not imply that the act of memory is explained by the previous passage; all that has been accounted for is the possibility of an internal process representing external reality, whether that be spatial magnitude or temporal process. Memory, as such, is accounted for by the coincidence merely of the two subjective processes.

(In l. 22 γὰρ instead of οὐν would give a smoother sense, but the change is not necessary.)

453 a 1–2. Bekker reads οὖν ὅτι τρίτην ἡμέραν ὄντος ἐποίησεν, ὅτι δὲ καὶ μέτρῳ. This gives no material difference. But Freudenthal, (op. cit. p. 419) pointing out that τρίτην ἡμέραν makes one think of an exact interval of time, and hence can hardly be employed as an instance of indeterminate time, wishes to read οὖν ὅτι τρίτην ἡμέραν, ὅτι μέντοι πολὺ ἐποίησεν· ὅτι δὲ καὶ μέτρῳ. ὅτι μέντοι is read by LS Michael and vet. tr.

The change is surely not essential. I take ὅτι τρίτην ἡμέραν ὄντος ἐποίησεν to be an example of remembering μέτρῳ. Aristotle says
that sometimes one does not remember the exact interval, as e.g. that it was an interval of three days, but at other times one does.

Freudenthal's objection against δδήπορε is not convincing. The indefiniteness of the subject acting need not entail any indefiniteness in the act performed.

453 a 7–8. Evidently to have recollection proper one must remember μέρη.

453 a 10. γνωριζόμενον. The reading of I.S.U γνωρίμων is perhaps a little smoother.

453 a 12. οὖν συλλογισμός τις. This would point either to Siebeck's theory or to the one I have given as to the meaning of 452 a 18 sqq. Beginning with your present thought, as it were with a minor premise, you develop it further by a series of middle terms which finally lead to the idea you are in search of, just as your middle terms in a deduction finally bring you the ultimate predicate which is to be attached to the subject.

Here Aristotle lays emphasis on the purposive character of ανάμνησις. He treats it as a ζητησις depending on will. It is evidently as such only that it is the exclusive possession of man. But ανάμνησις is not in all cases purposive: cf. 451 b 26, and l. 28 below.

453 a 14. βουλευόμενος is also a species of ζητησις: cf. Eth. Nic. vi. ch. 10, 1142 a 32, and again we have in 1142 b 1: δ δι βουλευόμενος ζητάναι καὶ λογίζεται. Cf. also III. ch. 5, 1112 b 20 sqq. It is a search for means to an end and for means which are in our power. There is another kind of ζητησις—theoretic, such as in mathematics is a kind of ανάλυσις. Aristotle calls it in Metaph. IX. ch. 9, 1051 a 22 sqq., διάφορα (at least he says διαφοράντες γάρ εύρεσιν). This is of course not the Platonic διάφορα). The process involved is thus explained by Mr Burnet in The Ethics of Aristotle, p. xxxv. 'Figures are resolved by making actual the divisions into other figures which are there potentially. If they were already actually divided the proof would be plain; as it is, we must make a construction which is always in the long run some form of division. For instance, why are the angles of a triangle equal to two right angles? It is because the angles about one point are equal to two right angles. If the line parallel to the side were already drawn, the truth would be plain at first sight.'

This process is obviously just απόδειξις—demonstration, or συλλο-
COMMENTARY

γερμός—the finding of the middle term. Scientific analysis and demonstration are just the same thing, as is borne out by the name of the treatises on demonstration—τὰ ἀναλυτικά. Recollection is then like a syllogism in being an analysis, though a psychological one, corresponding to the logical analysis involved in scientific reasoning.

453 a 16–17. σωματικῶν τὸ πάθος. σωματικῶν τὶ πάθος is read by L S U, the commentators and all editors other than Biehl.

ἐν τοιούτῳ. Cf. De An. 1. ch. 4, 408 b 17 and above, note to 451 b 35, ἀρχὴν καίνησινς.

453 a 19. ἐπέχοντες. For this Christ is responsible. If we read ἐπέχοντας with the mss. and Bekker we must place a comma after ἀναμνησθέναι and, taking the ἐπέχοντας along with ἐπιθυμοῦντας, translate it ‘and though they restrain their thoughts.’ The vet. tr. however, though taking it along with ἐπιθυμοῦντας, has ‘adhibentes intelligentiam.’

453 a 20. After οὐδὲν ἦττον I understand with Simon παρεισθειόλει. It is this which is the purpose of the proof to maintain. So Thomas also. Themistius explains that the search still goes on. This is not far wrong though it is difficult to see how what is against one’s will can be a ἔθνης (cf. Themistius, ὁρ. II. p. 253, l. 29). Hammond and Bender wish to have it that people remember when they are not trying and in fact trying not to. This does not suit the Greek so well and is hardly the point. Aristotle does not attempt to show the bodily nature of recollection by its occurring involuntarily (though that it does so is also implied, cf. ll. 27 sq.). In fact he has lately understood by ἀνάλυζοντας the voluntary recall of an idea. He wishes rather to show its corporeal connection by pointing out that it may stimulate bodily disturbances beyond the control of the will. This is the meaning of τοῦ μὴ ἐπ’ αὐτός εἶναι τὸ ἀναμνηστικὸν (ll. 22 sq.) and the subsequent illustration.

453 a 25. σωματικῶν τὶ. The heart, according to everyone but Neuhäuser: cf. Introduction, sec. vi. In De An. 1. ch. 4, 408 b 18 Aristotle talks of the κινήσεις stimulated in recollection as being in the sense organs (ἐν τοῖς ἀισθητήριοις), but that is probably only a vaguely worded statement.

We have seen above in ch. 1, that the organ of κοινὴ ἀισθησις and φαντασία is the heart, or is situated in it. Cf. also De Juv. ch. 3, 469 a 12. These κινήσεις or πάθη are φαντάσματα.
453 a 28. ἐπανλήθη L S U. Michael, Themistius, and almost all editors read ἐπέλθη, which does not give the sense of returning which is involved in ἐπανλήθη and seems to be required.

453 a 34. ἐν ή κ. τ.λ. Another proof of the bodily nature of memory and recollection. Dwarfs are people with the upper parts of their bodies more developed than the lower extremities just like young children.

453 b 5–6. διὰ τὴν κόψεων. Cf. ch. 1, 450 b 7 sqq.
APPENDIX I.

THE ARISTOTELIAN THEORY OF LIGHT.

It is difficult to reconcile Aristotle's doctrine that light is a ἐξή (cf. pp. 211-14 above) with his other statements which imply that, if not a motion, it at least has direction in space.

We must, indeed, disregard those passages (e.g. Meteorol. i. ch. 8, 345 b 10 and ii. ch. 9, 369 b 13-14) where his use of language which has such an implication is due to the fact that some Empedoclean doctrine is under discussion; and again in Anal. Post. ii. ch. 11, 94 b 29 sqq., where he talks of the passage of light through the enclosing walls of a lantern, he expressly safeguards himself by saying ἐπεξεργασμένον ἐκ τῶν διανύσεων. Once more, statements in the Problems (e.g. 904 b 17: τὸ μὲν φῶς καὶ ἐκθεῖται φέρεται) may be set aside as not being of necessity genuinely Aristotelian.

Nevertheless, in Meteorol. iii. ch. 4, 374 b 4, Aristotle speaks of rays proceeding from the sun, and the whole of his account of the phenomena of eclipse and illumination rests on the assumption that light has direction; in De An. ii. ch. 8, 419 b 29 sqq. he explains the diffusion of daylight by the reflection of the sun's light from the spots directly illuminated.

It is noteworthy, however, that when he talks of the formation of images in mirrors and tries to show that rainbows, haloes, etc. are due to reflection (e.g. in Meteorol. iii. ch. 1, 371 b 17 sqq.) he always speaks of the reflection of sight, not of the reflection of light. Moreover it is evident that he was as far as his predecessors from understanding that the visibility of an object which is not self-luminous is a phenomenon of reflection.

It is precisely when he comes to explain the perception of such an object that his theory, like that of prior philosophers, breaks down. The perception of anything which is a source of light (τὸ πυρώδες) is relatively a simple matter. The luminous body, by
producing a ζησ in the medium intervening between it and the eye, is enabled to act upon the organ of vision and so cause perception of itself. But the non-luminous object must also act upon the eye, if it is to be seen, and yet, not being of the nature of fire, it cannot produce a ζησ in the medium. The fact that it is illuminated, \textit{i.e.} endowed with the ζησ produced in the transparent medium (which penetrates it to a greater or less extent) by the presence of a source of light, may be a prior cause of its visibility (τὸ γὰρ φῶς ποιεῖ τὸ ἀφέω), but does not explain how it acts upon the eye. Light can be the proximate cause of vision only in the case of a self-luminous body. We may think it strange that Aristotle, whose general doctrine of perception involved the action of all visible objects upon the eye, and who in \textit{De Sensu}, ch. 2, 438 b 5, is content to call this a κινητικός, did not leap to the conclusion that illumination is itself due to a κινητικός which is identical with this. As things stand, his theory of the perception of bodies which are not self-luminous is left incomplete and is not reconciled with the rest of his teaching. It can only be described as an advance upon the Empedoclean doctrine, which made the act of vision a phenomenon of illumination—the illumination of an object \textit{by the eye}, and thus took as obvious the fact most in need of explanation, namely the perception of an illuminated object.
A tentative rendering of the difficult passage 452 b 8–25 (Bek. 7–22) has been suggested to me by Mr J. A. Smith and Mr W. D. Ross. The same figure is retained in illustration of the text and the explanation is of the same general type as that which I have adopted in pp. 279 sqq. But the reading in ill. 14–16 (Bek. 13–15) is altered to—τίνι οὖν δοιομε, ὅταν τὰ μείζονα νομῇ, ὅτι ἐκεῖνα νοεῖ ἡ τὰ ἐλάττων; πάντα γὰρ τὰ ἐντὸς ἐλάττων, ὅσπερ ἀνάλογον καὶ τὰ ἐκτός. 'When one thinks of the greater (and more distant) objects, what is the difference between thinking of them and of the smaller (and nearer)? For all the internal (subjective) are smaller (than the external) as it were in proportion to the external (objective).'

The internal $AB$, $BE$ is smaller than $AG$, $GD$, but preserves the same proportion as $AG$, $GD$, and also as $AZ$, $ZH$. What then is the difference between interpreting $AB$, $BE$ as meaning $AG$, $GD$ and interpreting it as meaning $AZ$, $ZH$? The difference lies in the power (assumed by Aristotle [1, 9 above—ἔστω δὲ τὶ ὁ κρίνει τὸν πλέον καὶ ἐλάττων) of knowing the distance in space or time of the object for which our mental object stands, and knowing, therefore, by what to multiply $AB$ and $BE$—whether by $\frac{\theta}{I}$ or $\frac{K}{A}$. This tells us (to take the case of $μεγάλη$) whether the image in us stands for a cat at ten yards' distance or a tiger much farther away. Similarly it enables us to say whether the $ὅπως$ in us represents an event which took ten minutes a week ago or twenty minutes a fortnight ago. When the image is multiplied by us in the same ratio as that in which its distance from us is multiplied, we think of (or recollect) the right object at the right distance of space or time. When different ratios are used we get a false thought or a false recollection.

According to this interpretation $AB$ is the $ἀπόστημα$ of the image from us, $AG$ and $AZ$ the $ἀπόστηματα$ (in space or time) of the objects.
from us. \( \text{BE} \) represents our subjective image or \( \kappa \kappa \nu \rho \eta \alpha \), \( \Gamma \Delta \) and \( \text{ZH} \) the objects (spatial or temporal) which we think of. If you wish to think of \( \text{ZH} \) rather than \( \Gamma \Delta \) you must think of the \( \delta \pi \sigma \sigma \tau \mu \alpha \tau \alpha \) as being different too, and multiply \( \text{AB} \) by \( \frac{K}{A} \) not by \( \frac{\Theta}{I} \).

The chief objection to this interpretation is that it implies that Aristotle thought of the image in the mind as existing at a distance from us, as though there were within us an inner spectator (the real self) whose relation to mental images merely reproduced on a small scale the relation between a percipient being and the spatial objects external to his organism. In fact we have the scholastic and Cartesian theory of the relation of the soul to the motions in the 'animal spirits.' But surely such a doctrine is definitely non-Aristotelian. Further if \( \text{AI} \) and \( \text{AZ} \) can be interpreted as being designed to represent distances in time of past events, \( \text{AB} \) will also (when compared with these) represent an \( \delta \pi \sigma \sigma \tau \mu \alpha \) in time. But how can a present image of \( \kappa \kappa \nu \rho \eta \alpha \) (\( \text{BE} \)) be said to be distant from us in time? It will thus be seen that there are difficulties in working out the consequences of this tempting and ingenious theory. I myself cannot believe that Aristotle meant his symbols to be anything more than a general illustration of the relation which internal \( \kappa \kappa \nu \rho \eta \alpha \) bear to external \( \kappa \kappa \nu \rho \eta \alpha \) and \( \mu \gamma \epsilon \theta \nu \). The fact that motion always implies extension made it possible for the former class to symbolize both the latter.
APPENDIX III.

LIST OF PRINCIPAL AUTHORITIES REFERRED TO

TEXTS:
Bekker's Aristotel, Berlin, 1831.

TRANSLATIONS:
Barthélemy St Hilaire: Psychologie d'Aristote—Opuscules—Paris, 1847.
Bender: Parva Naturalia, Stuttgart.
Hamilton: Note D** in Reid's Works (Commentary on and translation of part of the De Memoria).
Hammond: Aristotle’s Psychology, 1902.
Ziaja: De Sensu 436 a 1—439 b 18, Breslau, 1887 (Prog.).

COMMENTS:
Maynetius: De Sensu, Florence, 1555.
Michael Ephesius: De Memoria (Aldine).
Simon Simonius: De Sensu et De Memoria, Geneva, 1556.

WORKS BEARING ON THE SUBJECT:
Bäumker: Des Aristoteles Lehre von den äussern und innern Sinnesvernögen, Paderborn, 1877.
Bonitz: Index Aristotelicius; Aristotelis Metaphysica, Bonn, 1848.
Burnet: Early Greek Philosophy, 1892; The Ethics of Aristotle, 1900.
APPENDIX III

Freudenthal—in *Rheinisches Museum*, 1869; *Archiv für Geschichte der Philosophie*, 1889.
Rodier: *Traité de l’Âme*, Paris, 1900 (2 vols.).
Siebeck—in *Philologus*, 1881; *Untersuchungen zur Philosophie der Griechen*.
Torstrick: *De Anima*, Berlin, 1862.
Trendelenburg: *De Anima*, Berlin, 1877.
Wallace: *Aristotle’s Psychology*, 1882.
INDEX I (GREEK)
INDEX I (GREEK)

ἐντέρων 438 b 14
θλοιον 441 a 26
θλοιον 441 a 15
θλοιον των μελιτων ἐστιν 449 b 30
ἐκκυκλουσκον 449 b 13
ἐμεθαυν 453 b 3
Ἐκκυκλουσκον 437 b 12, 25; 441 a 6, 11, 12;
446 a 38
ἐμφασισθαι 438 a 9, 12
ἐμφασις 438 a 6
ἐναταις 441 b 10 sqq.; 448 b 32. τα ἐναταις b 25. αι των ἐναταις κυψεις
448 a 3
ἐναταις 441 b 16
ἐναταις 442 b 20; 445 b 26
ἐναταις λουσκον 441 b 17
ἐναργης 440 a 10, b 31
ἐνδα κοιτ. κυψεως 437 a 17
ἐνεργεια; cf. ὠμαμεν. ἐνεργεια ὑπογ. φιλος 452 b 1. θεου των ἐνεργων
449 b 30
ἐνεργων 446 a 24. ἐνεργων τη μυθη
452 b 36, 30; cf. 440 b 24
ἐννοιων σφαλμα τι 447 a 18
ἐννοιων 453 a 36
ἐννοιωθησθαι 450 a 33
ἐξαπατη 449 b 11
ἐξεται. ἐξουσιος τοι φωτος 437 a 26;
cf. 438 a 26 sqq.
ἐξερχομαι 441 a 10; 442 a 31; 443 a 15
ἐχετ. ἐχετ. της αἰσθησεως 436 b 6.
ἐχεταμενος ζημιστα 451 a 17; 450 a 31;
451 b 5. την ζημιν τη περι των ἐγκεκελ
φῶνων 444 a 10. ζημιν η παθος 449 b
37; 451 a 30. η ζημια το παθος
451 a 36. το παθος. οι φαινον την
ζημια μηπον ειναι 450 a 32
ἐξετασθαι 451 a 11
δοκει νεαροτατη 437 b 25. δοκει ἄρχη
και τη μετον 452 a 18
ἐπικλεφθης 440 a 10
ἐπαναμυρηθης 451 a 14
ἐπεκεκλεα 441 a 27
ἐπέχεσθαι 450 b 31; 438 a 10; cf.
453 a 28. ἐπεκλεαθην η δειξ 446 a 16
επεκεχαρην την δαιμονιαν 453 a 19
ἐπετη διην πειρατης ειναι τη ἀρχηματ
ἐκκυκλουσκον 438 a 22
ἐπετηθαι 452 a 18, 21, 25
ἐπεκαλυσθαι 437 a 28
ἐπιπολαζον. ἐπιπολαζον δ οἶχον 443 a 5
ἐπιπολαζον (χρυσωτων) 440 b 17
ἐπιπολακυκλουσθαι 443 a 13
ἐπιπολαθην 440 a 15 sqq.
ἐπισκεψεις 436 a 3
ἐπιστασθαι 451 a 31
ἐπιστασθαι 449 a 11; 451 a 29. 30
ἐπιστηθαι 437 a 33
ἐπιστηθαι 447 a 16; med. 443 a 24, 27
ἐπιθεν (Strattis) 443 b 34
ἐπιθεται 453 a 20
(οι) ἐπιθεταις λογιστη 451 a 21
ἐργαν. ἐπι αυτων των έργων δηλον
438 a 18. έργων διστ. πάρερον 444 a
28, 17
ἐσχατον 449 a 26, 32. το άτομον και
εσχατον 451 a 28. τα έσχατα 445 b
34, 35; 447 b 21; cf. επαναι
tοι, τοι εις ένηκα 437 a 1
εὑρεθη 438 a 30
εὑριστερον 453 a 38, b 4
εὑριστερον 439 b 34
εὑριστερον 445 a 18. εὑριστερον 438 b 6;
441 b 8; 445 a 19
ἐμαθης 449 b 9
ἐμαθησθης 453 a 3
ἐμπιστευθαι 438 a 16
ἐμπιστευθαι 443 b 23
ἐμπιστευθαι 441 a 12
ἐμπιστευθαι 438 a 15
ἐμπιστευθαι 444 a 13
ἐμπιστευθαι 444 a 19
ἐμπιστευθαι 441 a 19; (Strattis) 443 b 34
ζητει 451 b 26; 452 a 24
ζητεται. οινος ζητοται τα (η αρματης)
453 a 14, 17
ζητη 436 a 16
ζητη. ζητη το ζητη τον 439 b 12. πιστα
τα το ζητη 445 a 26. τα Θελα ζητη
444 a 5-445 a 4; 450 a 16 sqq.
τα γνωριζομενα ζητη 453 a 11
ζητη 442 a 17; 444 a 2; 436 a 10
ζητει. το ζητει και το λυπηρον 443 b 23
ζητει. το ζητει και το λυπηρον 444 a 20.
τα ζητητα χρωματα 440 a 1
ζητομα 442 a 11
ζητομα. δι' ζητομα 450 b 2. μεγα
πολη ζητομα 453 b 8
ζητομα 440 a 11. το απο τον θεου φευ
446 a 29. ζητομα το θεου 441 a 14
ζητομα 437 a 31
ζητομα 437 b 5. 443 a 13
ζητομα 444 b 13
ζητομα 436 a 15
ζητομα 450 a 11
ζητομα. το ζητομα και το άρσαλον 444 b
35
ζητομα. 441 a 30
ζητομα 441 b 33. ζητομα της φοβης (η της
άμωμη διναι) 444 a 27. το θεουρ
441 b 13; 442 a 5
ζητει. η παρ άλλα ζητει 440 b 8,
17
ζητεται 450 b 20, 25; con. ζητεται 449 b
17
INDEX I (GREEK)
INDEX I (GREEK) 299

παρασκευήν 443 b 21; 445 a 7, 29
παρασκευήν 443 a 7, 30
παράκλητον κρίνει τήν τροφήν 443 b 32
παρασκευήν 441 b 21
παρασκευήν 445 a 14
παρασκευήν 453 a 18
πάροικον 444 a 19
πάροικον 444 a 30
πάροικον 442 b 6
παράπτωσις 439 a 29
παράπτωσις 447 a 22, πώτερ
πάστες 440 b 3
πάστες 441 b 10, 15
πάστες 441 a 32
πατέρος 441 a 30
πατέρος 443 b 25, πατέρανιαν εἰσάγει, μετέχει 445 b 30; 446 a 20
πέρας (τοῦ σώματος) 439 a 32 sqq.
πέρας 439 b 6; 446 a 9
πέρας 441 a 14, 16, b 1
πέρας 445 a 7; 448 a 15
περίτεχνον 445 a 21
περίτεχνον 442 b 23
περίτεχνον 442 b 3
περίτεχνον 442 b 5
περίτεχνον 447 a 3, 4
περίτεχνον 443 b 11, 18
περίτεχνον 442 a 2, 7, 15, 19, 29
περίτεχνον 450 b 23
περίτεχνον 439 b 25
περίτεχνον 438 b 13
περίτεχνον 438 a 1
περίτεχνον 438 b 16
περίτεχνον 439 b 4; 1 = κυνομάναδόν 439 b 9
437 b 31; 444 b 23
περιπετείαν 445 a 29
περιπετείαν 444 a 7
περιπλανάντας 439 b 10, 20. οι τά ἄτομα τούτον βουλεύεται μετέχει 445 b 15; cf. 437 a
περιπλανάντας 445 b 24
περιπλακτόν 442 b 22
περιπλακτόν 444 a 1
περιπλακτόν 441 b 3
περιπλακτόν 444 b 13
περιπλακτόν 444 b 11, ὑμεῖς δὲν κατά τό ποιμένα 450 a 3 sqq.
περιπλακτόν 444 a 31
περιπλακτόν 444 a 32
παράγει, ἐπὶ τῶν πραγμάτων οπρ. ἐπὶ τὴν ζωήν 449 a 14; cf. 450 a 28; 452 a 1, 11, b 26. πράγμα καὶ χρόνος 448 b 2, 4; 452 b 26, 32
πράξεις = ἐνέργειας 438 a 5
πράξεις 444 a 26
πράξεις 436 b 22
πράξεις (Emped.) 437 b 28
πράξεις 450 a 23
πράξεις 446 a 16
πράξεις, ἡ προφητεμένη τροφή 441 b 31; 442 a 2
προφητεμένης 447 b 25
(οἱ) Πασαγέριου 439 a 33; 445 a 18
πόρος, ὁ τοῦ πόρου σύνες 441 b 12 sqq.; 437 a 24 sqq.; 438 b 22 sqq.
πολύτεχνον 437 b 24
πολύτεχνον 441 a 14
πολύτεχνον 439 a 21
πολύτεχνον 444 b 24
πολύτεχνον 450 b 3, 7
πολύτεχνον 444 a 15
πολύτεχνον 443 a 2
σάρκος 443 b 12
σάρκων 437 b 18
σάρκων 437 b 8
σάρκων 438 a 26
σάρκων 448 b 20; 449 b 3
σάρκων 442 b 27
σάρκων 438 a 25
σάρκων 444 b 28
σάρκων 452 b 30
σάρκων 439 a 22, b 18. ἐν σάρκε 437 a 27, 34, b 6, 7
σάρκων 443 b 34
σάρκων 443 b 34
σάρκων 439 a 15
σάρκος 436 a 20; 439 b 17
σάρκως 436 b 7; οππ. παραπλακτόν 439 a 22; οππ. παράγει 441 b 32
στοιχείον 437 a 23; 443 a 11. το περὶ στοιχείων 441 b 14
Στρατήγων 443 b 34
Στρατηγών 442 a 20; 443 b 11
Στρατηγών 445 b 15
Στρατηγών 436 a 14
Στρατηγών 443 a 13
Στρατηγών 453 a 15. 16
Στρατηγών 439 b 6; 437 b 3. ἐπὶ τῶν συμβασιλεύσεων (ὅδοις) 436 b 13; cf. 439 b 32
Συμβασιλεύσεας 443 b 32; 445 a 31
Συμβασιλεύσεας 438 a 28, 29, 30
Συμβασιλεύσεας 439 b 33 sqq.; 447 b 41
Συμβασιλεύσεας 448 a 27
Συμβασιλεύσεας 437 a 23
Συμβασιλεύσεας 441 a 33
Συμβασιλεύσεας 445 b 32
Συμβασιλεύσεας 446 b 16; 448 b 25. το συμβασιλεύσεας 445 b 20, 30; 450 a 9
Συμβασιλεύσεας 444 a 2
INDEX I (GREEK) 301

χάλκος 443 a 19
χειμερινή διά νύκτα (Empedol.) 437 b 29
χρήσα 447 b 21
χρόνος σενηχρος (cf. χρόνια) 439 b 28; 440 a 9, 17, b 17, 20, 28
χροιστήθηκα 451 a 32
χρύσα 450 a 22. χρύσου αληθείας 450 b 18; 450 a 11; 451 a 19; 452 b 8 sqq.
χρυσός του χρυσού κόσμου 452 b 27 sqq.
χρυσός κατά του χρυσού 453 a 9; το μήνυεν χρυσόν οντα 450 a 10 sqq.
χρυσός αληθείας (οικ. οτιτων) 440 a 23;
χρυσός 448 b 19. οι κατακόλα της χρυσούς (λανθανομενος) 448 a 26 sqq.
χρυσόν εν θεότητι των κοινομενων 446 a 32
χρυσά 443 b 19
χρυσά: cf. χρυσα. περι χρυσους 439 a 13 sqq. το ενεργεια χρυσα 439 a 15.
χρυσατος μετέχειν 439 b 10; 437 a 8.
χρυσατος του χρυσού 439 b 20 sqq.; 442 a 13 sqq.
το δικαίωμα των χρυσατων 440 a 1.
τα γένεσις των χρυσατων 440 a 7 sqq.; τα παρ' ἄλληλα τιθέμενα χρυσατα 440 a 27, b 23. το ευτυχείται ...
το ἐνεργεια χρυσα 440 a 15, 26.
τα εἶδος των χρυσατων 440 b 35; 445 b 23 sqq.; 446 a 21
χρυσατισθαι 439 b 1, 2
χρυσος 440 b 39 sqq. το των χρυσων γένε 440 b 32; 441 b 9. το γένε
των χρυσων 441 a 6. οι χρυσων 441 a 23, 442 a 14 sqq.
το εἶδος των χρυσων 440 b 36; 445 b 23. οι προηγηθηκαν χρυσων 442 a 17.
ἀναλογον εἶναι τας διαμικτος των χρυσων 443 b 9
χυτών cons. ἴππων 445 a 16
χυτές 446 a 8
χυτες 446 a 6, b 22, 23
χυτέται 439 a 25; 446 a 12, 14; 449 a 17
ψαραδός 441 a 28
ψάρισμα 450 b 4
ψάρος 446 a 25 sqq.; 446 b 35. αι των
ψάρων διαφοραι 437 a 10. το των
ψάρων αλήθειαν 438 b 22
ψάρι 443 b 18
ψέφος. ο ψέφος αληθείας 450 b 31.}

λέγειν ἐν τῇ ψυχῇ 449 b 25. μενον ἐν τῇ ψυχῇ 450 b 11. γέροντος ἐν τῇ
ψυχῇ 450 a 30. τα της ψυχῆς μόρα 436 a 1; 449 b 6; 450 a 18,
τα 451 a 18; 453 a 17, b 11. το της
ψυχῆς τα αληθείαν 438 b 10. ἐν τῃ
ψυχῇ, ο ἄνθρωπος αληθείαν 449 a
10, 19. cf. 448 b 24 sqq. τα περὶ
ψυχῆς 435 a 5, b 12, 16; 439 a 9;
449 b 34. το εὐτυχεῖ της ψυχῆς οντα
cαι τον σύμπαντα 436 a 8, b 3. περὶ
ψυχῆς καθ' αὐτῆς και περὶ των δυνά
μεων αὐτῆς 436 a 1
ψυχή των (Empedol.) 437 b 24

ὡς ητο μηδ' ἄτι αὐτῆς... ἐπετ' ἠτὶ?
ὡς ἄτι 446 b 17−19. ἐκ τον αὐτοῦ ἄτι
tριφθη 441 a 22. ὡς εἶναι 441 a 19;
444 a 21. ἤτε κατὰ μέγεθος 444 a 34.
ὡς τα πολλα 451 b 28. ὡς εϊ ντo
το πολλ 449 b 8
INDEX II (English).

Alcmaeon, 134
Alexander of Aphrodisias, 131–286 passim
Aristotle, 163, 166
Apperception, 30–33
Association, 38–40, 266 sqq.
Atomists, 36, 150, 175
Atoms, 197 sqq.
Baumker, 11, 15, 130, 235, 240
Bender, 138, 169, 209, 215, 278
Bonitz, 144, 150, 183, 187, 207, 221, 243, 273, 275
Bradley (F. H.), 270
Burnett (Professor), 128, 133, 137, 163, 182, 284
Bywater, 132, 253
Christ, 275, 285
Chromatic tones, 23, 154 sqq.
Cicero, 269
Colour, 30–33, 149–159
Cratylius, 133
Crustaceans, 139
Democritus—see Greek Index
Ear, 9, 144 sqq.
Elements, 16, 133
Empedocles—see Greek Index
Eye, 11, 143 sqq.
Faculty-Psychology, 113
Flavour, 24, 160–178
Freudenthal, 237, 244–288 passim
Gesner, 262
Grant (Sir A.), 186
Hamilton (Sir W.), 174, 268, 266, 269
Hammond, 137–288 passim
Hayduck, 144, 145, 187
Heart, 15 sqq., 147, 248
Heraclitus, 73, 183
Hume, 247
Hypotheses, 124
Insects, 139, 191
Joachim (H. H.), 158
Kant, 151, 234
Leonidas, 240, 266
Lewes, 11
Light, 30–33, 134 sqq., 150 sqq., 205 sqq., 287–288
Locke, 265
Meno, 260
Metrodorus, 166
Michael Ephesus, 228 sqq. passim
Mill (J. S.), 124
Nature, 168, 275
Neuhäuser, 15–20, 33, 39, 142 sqq., 171, 179, 247, 261, 285
Odour, 25–27, 179–194
Pearson (Professor Karl), 196
Phaedo, 260
Philebus, 126
Philoponus, 205
Physiology (Aristotle’s), 9–20
Plato, 37, 126, 135, 137, 138, 249, 260
Poste, 124
Potentiality, 8
Rassow, 206, 253, 255
Rodler, 33, 131, 161, 170, 208, 230, 244, 242, 251, 276
Ross (W. D.), 272, 279, 289
St Hilaire, 138–286 passim
Siebeck, 270 sqq.
Simon Simonius, 131–286 passim
Simonides of Cos, 269
INDEX II (ENGLISH)

Simplicius, 255
Smith (J. A.), 289
Sound, 24, 266 sqq.
Spinoza, 251
Susemihl, 156, 159, 164, 168, 173, 188

Theaetetus, 37, 256
Themistius, 214-286 passim
Theophrastus, 133, 137, 138, 163, 174, 175, 177, 181
Thomas Aquinas, 138-286 passim
Thurot, 156, 164, 179, 235

Timaeus, 135, 138, 141, 173, 276
Torstrik, 179
Touche, 11, 143, 999
Trendelenburg, 193

Wallace (E.), 190
Wendland, 170
Wilson (Professor J. Cook), 180, 187, 189, 274

Zeller, 126, 130, 147, 163, 180, 205, 275
Ziaja, 135, 138, 144
This book is a preservation photocopy. It is made in compliance with copyright law and produced on acid-free archival 60# book weight paper which meets the requirements of ANSI/NISO Z39.48-1992 (permanence of paper)

Preservation photocopying and binding by
Acme Bookbinding
Charlestown, Massachusetts

2002
II

Recollection remains to be dealt with. First of all we must posit as fact all the conclusions come to in our "Tentative Reasonings" which were correct. Recollection is neither the recovery nor the acquirement of memory.

When, on the first occasion, one learns or experiences something, he neither reacquires a memory, for none has previously existed, nor does he acquire it initially then. But when a disposition as well as the experience has once been produced then memory is found; hence it does not come into being in conjunction with the origination of the experience in us.

Further, when memory first has been produced in the individual and ultimate organ of sensation, the experience and the knowledge in question (if it is proper to call the disposition or experience knowledge; but there is nothing to prevent our having indirectly remembrance also of some of the objects of knowledge) have already existence in the experiencing subject. But memory in the proper sense will not exist till after the lapse of time. We remember in present time what we have previously seen or heard, we do not now remember what we have now experienced. But further, clearly, we may remember, not in virtue of a present act of recollection, but by being conscious or feeling the experience from the start. On the other hand, when we reacquire the knowledge or perception or whatever it was, the permanence of which we called memory, here and now we have recollection of any of these. As a result we remember them and memory ensues; not that that can be said without restriction in all cases when previous experiences are repeated in consciousness; in some cases it is so but in others not, for the same man may learn or discover the same thing twice. Recollection then must differ from the latter operations; it requires a more considerable basis to start from than in the case of learning.

The occurrence of an act of recollection is due to the natural tendency of one particular change to follow another. If the sequence is necessary, it is clear that, on the former