

Messengers, Mirrors and Light

Alexander of Aphrodisias on Visual Perception

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I, Emily Crampton confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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ABSTRACT

This is a study of Alexander of Aphrodisias' writings on visual perception. It focuses on the way in which, for Alexander, the medium and eye are changed by the objects of visual perception. The main claim is that, according to Alexander, the eye and medium are changed in a genuine and physical way through their reception of light and colour. This claim constitutes a rejection of certain recent interpretations of Alexander on vision, most significantly Richard Sorabji's. Sorabji has claimed that Alexander presents a non-physical, 'spiritualist' view of the way in which the eye and medium are changed by the objects of perception.

The thesis highlights two significant ways in which Alexander's view goes beyond mere interpretation of Aristotle's texts. The first is that, for Alexander, the mirror images perceptible in the eye play a role in perception. This is an explicit divergence from Aristotle's view. The second is Alexander's introduction of the concept of change by virtue of relation to explain the way in which the eye and medium receive colour. The task of the latter chapters is to explain Alexander's concept of change by virtue of relation, which has been understood, falsely, as equivalent to the concept of mere Cambridge change. Change by virtue of relation ought to be understood, not in terms of the distinction between relative and intrinsic properties, but rather in terms of Alexander's distinction between receiving forms *as matter* and receiving forms *not as matter*.

The thesis also presents Alexander's solutions to the problem of simultaneous perception and argues that these solutions do not involve the medium or the sense organs receiving the forms of perceptible objects in a non-physical way.

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INTRODUCTION

The purpose of this thesis is to present Alexander of Aphrodisias's interpretation and development of Aristotle's theory of visual perception. The focus, specifically, will be on Alexander's account of the changes in the eyes and in the transparent medium for perception. These changes are brought about by the objects of perception and are that by means of which perception of these objects occurs. Alexander claims that the changes in the eye and medium are changes *by virtue of relation*. Interpreting this claim and analysing this notion of change by virtue of relation will be one of the major tasks of the thesis. Change by virtue of relation is a special kind of change distinct from alteration, the precise formulation of which seems unique to Alexander. I argue that this special kind of Alexandrian change ought to be understood as a genuine, physical change. The changes brought about by the objects of visual perception in the eye and the medium are, on Alexander's account, genuine, physical changes in which the eye and medium take on colour. Alexander's view is distinctive and differs in many ways from contemporary interpretations of Aristotle on visual perception.

It is unclear whether we ought to refer to the theory Alexander presents as an interpretation of Aristotle or as Alexander's own theory devised from the claims Aristotle makes about visual perception. It is at the least a significantly developed version of Aristotle's view. The theory of visual perception Alexander presents goes beyond what we find in Aristotle's text in at least two significant ways. The first is the claim that the mirror images we are able to perceive in the eyes of others play a crucial role in perception. On this point Alexander goes not only beyond Aristotle's claims but directly against them since Aristotle in *de Sensu* denies that the images in the eye have any role to play in perception. However, we need not view this so much as a major divergence from Aristotle's theory but rather as what Alexander would have seen as a minor correction. Nevertheless, that Alexander saw fit to alter and develop Aristotle's theory in this way says much about the way in which he read that theory. The role played by the images in the eye on Alexander's view form part of a

body of evidence, which I will present over the course of the second and third chapters, supporting the claim that Alexander understood those changes brought about in the medium and the eye by the objects of visual perception as physical as opposed to so-called ‘spiritual’ changes.

Discussion of Aristotle’s theory of perception has in recent years centred on the question of whether the objects of perception bring about physical changes in the perceiver - changes which bear either a constitutive or a causal relation to the exercise of the soul’s capacity to perceive - or whether instead the only change brought about by the objects of perception is a non-physical or ‘spiritual’ change, which may be specified only in perceptual or cognitive terms. According to the latter interpretation, the only effect the object of perception has on the perceiver is to cause that perceiver to perceive it. I ought to clarify, however, that my aim in this thesis is not to make a contribution to the debate surrounding whether Aristotle ought to be read as a ‘spiritualist’ or as a ‘literalist’ with regards to the taking on of perceptible form. I use the debate more to frame my presentation of Alexander’s theory since, as I will mention in chapter one and discuss in more detail in chapter five, it has been claimed that Alexander holds that the changes brought about in the eye by the object of perception are non-physical. One of my aims is to refute this claim. My current intention is not to take a position in the spiritualist or literalist debate over the correct interpretation of Aristotle. Nevertheless, given Alexander’s status as a faithful, perceptive and arguably the greatest commentator on Aristotle, those involved in the debate may take my reading of Alexander’s theory to count against the spiritualist interpretation of Aristotle’s view.

The second way in which the theory of visual perception Alexander presents goes beyond the claims we find in Aristotle’s texts, is his use of the notion of change by virtue of relation. This special kind of change plays a significant role in Alexander’s theory of visual perception and forms a fascinating part of the way in which Alexander develops and makes sense of Aristotle’s theory of perception. However, Alexander’s concept of change by virtue of relation is the source of the most significant misunderstandings of Alexander’s view. The misunderstandings centre on the interpretation of the concept of change by virtue of relation itself and the related concept of receiving form *‘not as matter’*. A key purpose of this thesis is

to address these misunderstandings and to clearly present what Alexander means when he claims that the medium is changed by virtue of relation and that form is received *not as matter*.

Alexander derives the concept of change by virtue of relation, I will argue, from Aristotle's definition of light as 'the *presence* of fire or something resembling fire in what is transparent' (*de Anima* 418b14-15). Yet the concept itself does not seem to be in Aristotle's texts, at least not explicitly. These ways in which Alexander makes additional claims and devises new concepts in order to present a full and coherent Aristotelian theory of perception are what makes Alexander's theory of perception so interesting.

I have not attempted in this thesis to assess the extent to which Alexander's theory of perception can be taken to be a faithful development of Aristotle's view. I do not intend here to defend Alexander's theory as a plausible, if embellished, reading of Aristotle (although my inclination is to take it as such). The task of deciding on issues such as to what extent Alexander consciously diverges from Aristotle, whether his theory may be defended as a plausible reading of Aristotle, where Alexander may or may not be mistaken in his reading of Aristotle and the extent to which his theory has been influenced by post-Aristotelian sources, is an important and interesting one but not one I have undertaken here. I have chosen to interpret and present Alexander's theory in its own right, not as a possible interpretation of Aristotle's.

The texts I have drawn on the most are Alexander's commentary on *de Sensu*, which I refer to as *de Sensu Comm.* in order to distinguish it from Aristotle's *de Sensu*, and Alexander's treatise *On the Soul*. I refer to this treatise by the English title to distinguish it from Aristotle's treatise, which I will refer to as *de Anima*. Alexander's commentary on Aristotle's *de Anima* is lost, but his own treatise is based very closely on the structure of Aristotle's text.¹ I also refer to Alexander's commentary on Aristotle's *Metaphysics*. Whilst I refer to the text of the

¹ For comment on the relation between Alexander's *On the Soul* and Aristotle's *de Anima* see Victor Caston, Alexander of Aphrodisias *On the Soul. Part 1*, (London: 2012), p.1-3; Bergeron and Dufour, *Alexandre d'Aphrodise: De l'âme* (Paris : Librairie Philosophique J. Vrin, 2008), p.15-18.

Quaestiones and the *Mantissa*, and occasionally use them for my suggestions of how Alexander's view can be understood and developed, I have not relied on these texts for my interpretation since their authorship is uncertain.²

The thesis is structured as follows. I begin with a broad, introductory overview of Alexander's theory of perception. Chapter one introduces Aristotle's notion, adopted by Alexander, of visual perception via a medium. For Aristotle and Alexander it is not the case that we see by means of corporeal effluences travelling from object to eye, nor do we see by means of travelling rays of light, rather perception occurs by means of a medium. The medium for visual perception is the air or water which stretches between the object of perception and the perceiver. In this first chapter I discuss the role the medium plays in Aristotle and Alexander's account of visual perception and begin to discuss the way in which it performs this role. For Alexander the medium serves as a messenger between the object of perception and the eye, and it performs this function through undergoing a kind of qualitative change, brought about by the object of perception. This change consists in the receiving of colour. The medium, once it has received colour in this way, in turn changes the eye of the perceiver.

In addition the first chapter presents an overview of what happens after the eye receives colour as a result of being changed by the medium. For Alexander, perception does not consist in the reception of colour by the eye. In fact, perception does not occur in the eye at all. In order to be perceived, colour must be transmitted through transparent-filled passages to the heart. It is also not the case, however, that perception consists in the reception of colour by the heart according to Alexander. Whilst this reception of colour by the sense organs is necessary for visual perception to occur, perception itself on Alexander's view consists in the exercise of the soul's capacity for perceptual judgement, a capacity which is situated in the heart. In the final section of the first chapter I outline Myles Burnyeat's spiritualist interpretation of the way in which, for Aristotle, the objects of perception change the eye and medium. This interpretation serves to contrast with Alexander's physical view

² For a discussion of the status and possible authorship of these latter texts see, for example, R. Sharples, 'The School of Alexander?' in Richard Sorabji (ed.) *Aristotle Transformed* (London: Duckworth, 1990).

of the way in which the objects of perception change the eye and medium as I present this view over the subsequent chapters.

From chapter two onwards, I begin to fill in the details of Alexander's theory. For Alexander and Aristotle the medium can only be changed by the object of perception, and so can only serve its function, when it is illuminated. In the second chapter I discuss Alexander's view of light and illumination. Light, for Aristotle and Alexander, does not travel. Illumination is a special sort of qualitative change in a transparent body. I present Alexander's notion of transparency and his claim that there are two kinds of transparent body: unlimited and limited. Limited bodies are solid, opaque bodies with their own proper colour. Unlimited transparent bodies are those without a fixed spatial boundary, in other words fluids or liquids. These do not have a proper colour and it is these which are able to be illuminated and changed by the coloured objects of perception. I discuss what it means for a subject to have or not to have a proper colour in this sense in the second part of chapter two.

In this chapter I also present evidence that, for Alexander, the medium sometimes becomes perceptibly coloured when changed by the objects of perception. This supports the claim that for Alexander the change brought about in the medium is a physical change. The notion of change by virtue of relation is also introduced in this chapter alongside the key feature of this change: In cases of change by virtue of relation when the object to which the changed subject is related in the relevant way is removed, the changed subject reverts back instantly to its former pre-change state. On Alexander's view the change in a transparent body when it is illuminated or when, once illuminated, it is changed by the objects of perception, is a change by virtue of relation.

In the third chapter, I move from a consideration of the changes undergone by the medium to a consideration of the changes undergone by the eye. The eye, like the medium, receives colour when it is changed, via the medium, by the object of perception. Unlike the medium, however, the eye always becomes perceptibly coloured when it receives colour. This provides further proof that the eye and medium are changed by colour in a physical way. The focus of the chapter is on Alexander's claim that the mirror image perceptible in the eye

plays a role in perception. In this chapter I argue that this is Alexander's view and demonstrate that, in holding this view, Alexander diverges from Aristotle.

The eye is able to display a mirror image on account of the fact that the eye consists of water, the density and smoothness of which give it this appearance-making ability. In most cases the medium does not possess this ability and so the colour is not visible in the medium. To perform its function, it is sufficient that the medium is able to transmit colour to the eye. It need not take it on in such a way that the colour is visible. In the case of the eye, on the other hand, according to Alexander it is necessary that colour is received in such a way that it is displayed in the eye. Only if it is received in this way, can the colour be transmitted to the heart and perceived.

The foundation of this aspect of Alexander's account is his particular understanding of mirror images. In the second part of the third chapter, I outline this view. For Alexander an image does not appear in a mirror on account of a ray of light or an effluence from the object of perception rebounding from the mirror's surface. Rather, the mirror receives colour form by virtue of relation. It undergoes the same kind of change as is undergone by the eye and medium. On Alexander's understanding of mirrors, when an image appears in a mirror, this is because the mirror has received colour form. On Alexander's view colour is not only apparently in the mirror, it is really present in the mirror.

In the fourth chapter I present my account of Alexander's notion of change by virtue of relation. This kind of change has been referred to up to this point but not fully explained. The account of change by virtue of relation completes the presentation of Alexander's view of the way in which the eye and medium are changed in visual perception. I begin by arguing against a view on which change by virtue of relation is understood as mere Cambridge change. This view has been suggested by Victor Caston and Robert Sharples. I argue that we ought instead to understand the changes in the eye and medium as genuine changes. Light and colour, as they are received by the eye and the medium, are not relational properties and when light and colour are taken on by the eye and medium, these undergo a genuine change. I then develop an account of what change by virtue of relation is

for Alexander, through considering his claim that to be changed by virtue of relation is to receive a form *not as matter*.

Alexander's notion of receiving form *not as matter*, is related to Aristotle's claim that 'sense is what has the power of receiving into itself the sensible forms of things without the matter' (*de Anima* II.12 424a17-21). Whereas Aristotle uses this notion of receiving form without matter in his account of actual perception, Alexander uses the notion both in his account of how form is grasped by the perceptual and intellectual capacities, and in his account of the way in which form is received by the eye and medium. For Alexander, at least, these are very different things. Nevertheless, for Alexander it is true of both the perceptual capacity and the eye and medium that they do not receive form *as matter*.

Change by virtue of relation is just one class of change in which the form or property received is received *not as matter*. However, in understanding this broader class of change – changes in which form is received *not as matter* – we can better understand what it is for a subject to be changed by virtue of relation. In order to grasp what it is to receive form *not as matter*, I draw on Aristotle's notion of a material cause. For a subject to receive a form *not as matter* is for no part of the subject to stand to the form received as the material constituent of a hylomorphic compound. There is no material cause, in this sense, of the fact that the subject possesses the property. In cases of change by virtue of relation, then, no part of the changed subject stands to the form received as the material constituent of a hylomorphic compound. Instead, the subject possesses the property by virtue of relation to that which causes it to have the property: the source of light in the case of illumination and the coloured object in the case of the taking on of colour. This is an unfamiliar kind of change, even for those who know Aristotle's texts well. I suggest it is a distinctively Alexandrian kind of change introduced to explain certain features of visual perception.

The final chapter contains an analysis of a passage from Alexander's *On the Soul*. The passage contains the claim that, in perception 'the eye does not become black or white' (*On the Soul*, 62, 4-5). This passage has been taken by Richard Sorabji as demonstrating that, on Alexander's view, the changes brought about by colours in the eye are non-physical. In

order to defend my view that these changes are in fact genuine and physical I argue that Sorabji is mistaken in his reading of this passage. When Alexander claims that the eye does not become black or white, he simply means that the eye, in receiving black and white, does not do so *as matter*. The passage is thereby consistent with my reading of Alexander as presented over the course of the thesis.

The passage forms part of Alexander's discussion of the problem of simultaneous perception. I outline this problem and then present Alexander's two suggested solutions to the problem, neither of which rest on the idea of the sense organs receiving form non-physically or 'spiritually'. In this way, I argue against Sorabji's claim that Alexander is led to a spiritualist position regarding the changing of the eye and the medium, through a consideration of the problem of simultaneous perception. The passage has presented readers of Alexander with several problems. It has seemed to commentators such as Victor Caston, Richard Sorabji, Bergeron and Dufour to present claims seemingly inconsistent with what Alexander states elsewhere, or to contain sections which seem out of place. A strength of my reading of this passage is that, on this reading, it is both internally coherent with no extraneous sections, and it is consistent with claims made elsewhere.

CHAPTER 1

Colour from the Object to the Heart

The role of this first chapter is to present Alexander's theory of perception in broad outline, to show how, for Alexander, the object of visual perception, situated at a distance, comes to be perceived. The focus of this chapter, as of the thesis as a whole, is on the role of the eye and the medium for visual perception. The chapter introduces the concept of perception via a medium and contrasts it with another way in which perception at a distance was explained in antiquity: the effluence theories of the atomists. The key claim of this chapter is that the transparent medium for perception, which extends from the object of perception to the eye, serves as a messenger between these two bodies and performs this function through receiving colour. Determining the specific sense in which the eye and medium receive colour on Alexander's view, will be the work of the rest of the thesis. I also present Alexander's more cursory claims as to what happens after colour reaches the eye and discuss what, for him, constitutes actual perception. After presenting this outline, I discuss the view of a contemporary commentator on Aristotle, Myles Burnyeat. His interpretation of Aristotle's theory of perception will serve as a contrast with Alexander's, as I will present it over this and subsequent chapters.

1.1 Object to Eye

The main focus of Alexander's account of visual perception is on the role of the medium for visual perception. The medium is a transparent body - in the case of human perception this is most commonly air - which stretches from the object of perception to the eye of the perceiver. It is this medium which enables the objects of perception to act on the perceiver and so to be perceived.

On Aristotle and Alexander's accounts a medium is essential for visual perception to occur. It is not possible for an object to be perceived if the object is in direct contact with the sense organ, but nor would it be possible for an object to be perceived if there were a void between the object and perceiver. Since something must act on the perceiver and action requires contact, a medium is required. Consider the following passage from Aristotle's *de Anima* II.7,

The following makes the necessity of a medium clear. If what has colour is placed in immediate contact with the eye, it cannot be seen. Colour sets in movement what is transparent, e.g. the air, and that, extending continuously from the object to the organ, sets the latter in movement. Democritus misrepresents the facts when he expresses the opinion that if the interspace were empty one could distinctly see an ant on the vault of the sky; that is an impossibility. Seeing is due to an affection or change of what has the perceptive faculty, and it cannot be affected by the seen colour itself; it remains that it must be affected by what comes between. Hence it is indispensable that there be *something* in between – if there were nothing, so far from seeing with greater distinctness, we should see nothing at all (*de Anima* II.7 419a,11-21 trans. Smith).³

³ σημείον δὲ τούτου φανερόν· ἐὰν γάρ τις θῇ τὸ ἔχον χρῶμα ἐπ' αὐτὴν τὴν ὄψιν, οὐκ ὄψεται· ἀλλὰ τὸ μὲν χρῶμα κινεῖ τὸ διαφανές, οἷον τὸν ἀέρα, ὑπὸ τούτου δὲ συνεχοῦς ὄντος κινεῖται τὸ αἰσθητήριον. οὐ γὰρ καλῶς τοῦτο λέγει Δημόκριτος, οἰόμενος, εἰ γένοιτο κενὸν τὸ μεταξύ, ὡραῖσθαι ἀνὰ ἀκριβῶς καὶ εἰ μύρμηξ ἐν τῷ οὐρανῷ εἴη· τοῦτο γὰρ ἀδύνατόν ἐστιν. πάσχοντος γάρ τι τοῦ αἰσθητικοῦ γίνεται τὸ ὡραῖον· ὑπ' αὐτοῦ μὲν οὖν τοῦ ὡραμένου χρώματος ἀδύνατον λείπεται δὴ ὑπὸ τοῦ μεταξύ, ὥστ' ἀναγκαῖον τι εἶναι μεταξύ· κενοῦ δὲ γενομένου οὐχ ὅτι ἀκριβῶς, ἀλλ' ὅλως οὐθὲν ὄφθήσεται.

Here we find the claims that colour sets in movement the transparent medium, which in turn sets in movement the eye. Colour is the object of visual perception (*de Anima* II.7 418a26).⁴ In *de Anima* Aristotle defines colour in terms of its ability to change the medium between itself and the perceiver (*de Anima* 418a31-418b3; 419a9-11). For colour to be seen, it must change the medium between itself and the eye.

The word Smith translates as ‘sets in movement’ in the above passage is κινεῖ. As we shall see, the kind of movement at issue in the context of colour changing the transparent medium is not locomotion. The coloured object does not set the medium in motion as a cue moves a snooker ball, but rather it causes the medium to take on a quality. The effect is less like the cue’s effect on the ball and more like the effect a hot stove has on a pan of water, causing it to become hot. As we shall see in the next chapter, however, the effect of colour on the medium is not quite the same kind of change as is involved in this latter example. For now, the key point is that the medium is not moved in the sense of locomotion. Κίνησις and κινέω may be translated either as movement and set in motion respectively or as change. Hereafter, I will refer to colour *changing* the transparent, as opposed to colour moving the transparent, in order to indicate that this change is not to be understood as locomotion.

In the *de Anima* II.7 passage above we find the claim that, ‘seeing is due to an affection or change of what has the perceptive faculty, and it cannot be affected by the seen colour itself; it remains that it must be affected by what comes between.’ Since the organ of perception cannot be acted on directly by the coloured object, it must be acted on by the medium. At work here is a principle found in Aristotle’s *Physics*:

⁴ Aristotle states that the object of perception is colour ‘and a certain kind of object which can be described in words but which has no single name’ (*de Anima* 418a27, trans. Smith). Later he elaborates, stating that, ‘Not everything that is visible depends upon light for its visibility. This is only true of the ‘proper’ colour of things. Some objects of sight which in light are invisible, in darkness stimulate the sense; that is, things that appear fiery or shining. This class of objects has no simple common name, but instances of it are fungi, horns, heads, scales and eyes of fish. In none of these is what is seen their own proper colour. Why we see these at all is another question’ (*de Anima* 419a1-6, trans. Smith). The reason why such things are seen would require a different account to that Aristotle provides for the perception of colours through an illuminated medium. Neither Aristotle nor Alexander provide such an account.

That which is the first mover of a thing – in the sense that it supplies not that for the sake of which but the source of the motion – is always together with that which is moved by it (by ‘together’ I mean that there is nothing between them) (*Physics* VII.2, 243a32-34 *trans.* R.P. Hardie and R.K Gaye).⁵

The principle states that something cannot be moved or changed when the agent is separated from the patient. They must be joined in some way. Applying this principle to perception and its object, Aristotle writes:

In a way even the senses undergo alteration, since actual perception is a motion (κίνησις) through the body in the course of which the sense is affected in a certain way... Since the alteration of that which undergoes alteration is caused by sensible things, in every case of such alteration it is evident that the extremities of that which causes and that which undergoes alteration are together. For the air is continuous with the one and the body with the air. Again, the colour is continuous with the light and the light with the sight. And the same is true of hearing and smelling; for the primary mover in respect to the moved is the air... Thus there can be nothing between that which undergoes and that which causes alteration (*Physics* VII.2, 244b10-245a11 *trans.* R.P. Hardie and R.K Gaye).⁶

In this passage we find the claim that the objects of perception (sensible things) cause alteration, in a way, in the perceiver. (The qualification ‘in a way’ (πως) will be significant in later chapters. We shall see that, at least according to Alexander, it is not the case that the objects of perception cause alteration in the perceiver in the ordinary sense). Given that sense and sense-object are situated at a distance from each other when such a change occurs,

⁵ Τὸ δὲ πρῶτον κινοῦν, μὴ ὡς τὸ οὖ ἔνεκεν, ἀλλ' ὅθεν ἡ ἀρχὴ τῆς κινήσεως, ἅμα τῷ κινουμένῳ ἐστί (λέγω δὲ τὸ ἅμα, ὅτι οὐδέν ἐστιν αὐτῶν μεταξύ).

⁶ ἀλλοιοῦνται γάρ πως καὶ αἱ αἰσθήσεις· ἡ γὰρ αἰσθησις ἡ κατ' ἐνέργειαν κίνησίς ἐστι διὰ τοῦ σώματος, πασχούσης τι τῆς αἰσθήσεως... εἴπερ οὖν ἀλλοιοῦται τὸ ἀλλοιούμενον ὑπὸ τῶν αἰσθητῶν, ἐν ἅπασι γε τούτοις φανερὸν ὅτι ἅμα ἐστὶ τὸ ἔσχατον ἀλλοιοῦν καὶ τὸ πρῶτον ἀλλοιούμενον· τῷ μὲν γὰρ συνεχῆς ὁ ἀήρ τῷ δὲ ἀέρι τὸ σῶμα. πάλιν δὲ τὸ μὲν χρῶμα τῷ φωτὶ, τὸ δὲ φῶς τῇ ὄψει. τὸν αὐτὸν δὲ τρόπον καὶ ἡ ἀκοὴ καὶ ἡ ὄσφρησις· πρῶτον γὰρ κινοῦν πρὸς τὸ κινούμενον ὁ ἀήρ... ὥστ' οὐδὲν ἐσται μεταξὺ τοῦ ἀλλοιούμενου καὶ τοῦ ἀλλοιοῦντος.

it may seem that the changes undergone by the organs of hearing, smell and vision provide counter examples to the rule that change cannot occur when the agent is separated from the patient. Aristotle here denies that these cases are in breach of the general rule through referring to the role of the medium. Sense organ and sense object are in fact joined by the medium. Here Aristotle describes the medium for visual perception simply as 'light' but we may read Aristotle's reference to light as a reference to the illuminated transparent medium. On Aristotle and Alexander's view, the medium for visual perception must be illuminated in order for perception to occur. I discuss Aristotle and Alexander's notion of light in the next chapter. The illuminated medium is continuous both with the coloured object and the sense of sight, and so the object is able to act on the sense of sight indirectly, by means of acting on the medium.

The idea of perception occurring by means of a medium continuous both with the object of perception and with the eye does not originate with Aristotle. The view seems also to be in Plato's *Timaeus*. In the *Timaeus* Plato outlines a view on which the eye emits light which then fuses with the light external to the eye, creating a continuous illuminated body. The objects of perception, when they come into contact with this illuminated body, are then able to act on it and in this way are able to be perceived. Here is the relevant passage from the *Timaeus*:

The eyes were the first of the organs to be fashioned by the gods, to conduct light. The reason why they fastened them within the head is this. They contrived that such fire as was not for burning but for providing a gentle light should become a body, proper to each day. Now the pure fire inside us, cousin to that fire, they made to flow through the eyes: so they made the eyes - the eye as a whole but its middle in particular - close-textured, smooth, and dense, to enable them to keep out all the other, coarser stuff, and let that kind of fire pass through pure by itself. Now whenever daylight surrounds the visual stream, like makes contact with like and coalesces with it to make up a single homogeneous body aligned with the direction of the eyes. This happens wherever the internal fire strikes and presses against an external object it has connected with. And because this body of fire has become uniform throughout and thus uniformly affected, it transmits the motions of whatever it comes in contact with

as well as of whatever comes in contact with it, to and through the whole body until they reach the soul. This brings about the sensation we call “seeing.” At night, however, the kindred fire has departed and so the visual stream is cut off. For now it exits to encounter something unlike itself. No longer able to bond with the surrounding air, which now has lost its fire, it undergoes changes and dies out. So it not only stops seeing, but even begins to induce sleep (Plato, *Timaeus*, 45b2 –d7, trans. Zeyl).

This passage describes a kind of light or pure fire emanating from the perceiver’s eyes to create a visual stream. In the daytime, the visual stream coalesces with the daylight. When the visual stream meets an object of perception, or an object of perception comes into contact with the visual stream, the object produces some kind of change or motion which is transmitted back through the visual stream to the perceiver. The function of the visual stream, merged with the daylight to form one homogenous body, seems to have a parallel function to Aristotle and Alexander’s transparent medium. There is, however, a crucial difference between Plato’s account and Aristotle’s. For Aristotle the medium for visual perception just is an illuminated transparent body such as the air in the day time. The medium is not created through any kind of fiery emission from the eyes.⁷

Besides the medium, there are two other mechanisms introduced by ancient theorists of visual perception to explain how we are able to perceive objects at a distance. I mention these in order to situate Aristotle’s medium-dependent view amongst the other views of perception available at the time. The first is the positing of the emission of something from the eye, for example a ray of light which alights on the objects of perception and causes them to be perceived.⁸ The second is the positing of corporeal effluences, emitted from the object

⁷ For Aristotle’s criticism of Plato’s view see, *de Sensu* 437b11-23; 438a25-438b3. For Alexander’s commentary on this criticism see his *de Sensu Comm.*, 20,14-23, 4; 27,20-34, 21.

⁸ David Lindberg in his overview of ancient theories of vision notes that, ‘The theory of a visual current coming from the eye has commonly been associated with the Pythagorean School, and in particular with Alcmaeon of Croton’ (D. C. Lindberg, *Theories of Vision from Al-Kindi to Kepler* (The University of Chicago Press, 1976), p. 3.) Plato’s theory, as outlined above involves a fiery emission from the eyes. In addition, that a visual ray comes out from the eye is an assumption in Euclidean optics, as I will explore in more detail in chapter 3.

of perception, which enter the eye and cause the object to be perceived. Theories of vision which explain vision by this latter mechanism are referred to as intromission theories. Empedocles and Democritus were amongst those who held intromission theories of perception. Some theorists utilise just one of these three mechanisms – emission, intromission, and perception via a medium - in their explanations, whereas others used them in combination.⁹ Plato, for example, seems to use at least two of these mechanisms in his explanation: the fiery emission from the eye, and perception via a medium.¹⁰

On Aristotle and Alexander's view, nothing travels out of the eye and nothing travels into the eye. Rather, the object of perception changes the medium which in turn changes the eye, but without light or a corporeal efflux moving. Aristotle describes the atomist view as absurd (*de Sensu* 440a15-16). Alexander, in his commentary on *de Sensu*, writes:

[Aristotle] opposes an opinion presupposed by the ancients concerning seeing, that seeing comes about in accordance with an efflux from the <bodies> seen. For they held certain images responsible for seeing, <images> which flow continuously from the <bodies> that are seen, being similar <to them> in shape and falling on the sight. Their number included Leucippus and Democritus and their followers...But Empedocles also says that seeing comes about in this way, as <Aristotle> mentioned a little earlier [437b23-438a5] (Alexander, *de Sensu Comm.*, 56,10-16, trans. Towey).¹¹

⁹ See D. C. Lindberg, *Theories of Vision from Al-Kindi to Kepler* (The University of Chicago Press, 1976), p.1-18 for a brief overview of these different kinds of ancient theories of vision.

¹⁰ Empedocles provides another example of a theorist using a combination of these mechanisms in his explanation. Empedocles seems to posit both effluences from objects, and a fiery emission from the eye. For a discussion of this view, and an excellent suggestion as to how a theory which explains vision by both emission and intromission can be consistent, see A. A. Long, 'Thinking and Sense-Perception in Empedocles: Mysticism or Materialism', *The Classical Quarterly* 16 (1966), 256-276.

¹¹ δοκεῖ ἐν ᾧ ἡν δόξα προκαταβεβλημένη περὶ τοῦ ὄρᾶν ὑπὸ τῶν ἀρχαίων, ὡς ἄρα τοῦ ὄρᾶν κατὰ τὴν ἀπὸ τῶν ὄρωμένων ἀπόρροιαν γινομένου εἰδωλα γάρ τινα ὄμοιόμορφα ἀπὸ τῶν ὄρωμένων συνεχῶς ἀπορρέοντα καὶ ἐμπίπτοντα τῇ ὄψει τοῦ ὄρᾶν ἥτιῶντο. τοιούτοι δὲ ἦσαν οἵ τε περὶ Λεύκιππον καὶ Δημόκριτον, οἵ καὶ ἐκ τῆς τῶν ἀοράτων διὰ μικρότητα παραθέσεως τὴν τῶν μεταξὺ χρωμάτων φαντασίαν ἐποίουν ἀλλὰ καὶ Ἐμπεδοκλῆς οὕτω τὸ ὄρᾶν γίνεσθαι λέγει, ὡς πρὸ ὀλίγου ἐμνημόνευσεν.

Alexander supports Aristotle's position regarding the absurdity of the atomist view (and in doing so asserts the superiority of Aristotle's own view) through presenting a huge number of criticisms of the atomist position. Here are a few of these criticisms:

If there is a continuous efflux from the <bodies> being seen how is it that <these bodies> are not quickly consumed when there is so much bodily separating off coming about from them? If other <bodies> are added to them in exchange firstly why does this fail to come about in their case all the time, so that they remain equal? Also what is the cause of their growing in a determinate way and diminishing back in a determinate way? Secondly, how do they remain similar in shape? For the <bodies> flowing from <them> are similar in shape <to them> (at any rate this is why <on this view> sight apprehends colours.) But why is this true of the <bodies> being added <to them>? Also, if the efflux from each <body that is seen> is continuous and corresponds to all of <its> parts, how is it that the <bodies> being separated off will not impede those that are travelling <towards the body that is seen> so that they may not be added <to it>? Or <how is it that> those ones <will not impede> these so that they may not travel <away>? And how, being fine, will they not be scattered when there are winds? For we see even if there is an intervening wind (*de Sensu Comm.*, 57, 1-11, trans. Towey).¹²

The criticisms are aimed at a view on which we see by means of corporeal effluxes which are peeled off from the objects of perception. Since they are fine corporeal bodies, Alexander asks how they are not scattered by the wind. Since they are fine bodily parts of the object of perception, Alexander asks how, when enough of these effluxes have peeled off the main

¹² ἔτι εὶ συνεχῆς ἀπὸ τῶν ὁρωμένων ἀπόρροια, πῶς οὐκ ἀναλίσκεται ταχέως τοσαύτης σωματικῆς ἀποκρίσεως ἀπ' αὐτῶν γινομένης; εἰ δὲ ἀντιπροσκρίνεται αὐτοῖς ἄλλα, πρῶτον μὲν διὰ τί τοῦτο οὐκ ἀεὶ γίνεται ἐπ' αὐτῶν, ὡστε ἵσα [τε] αὐτὰ διαμένειν; τίς τε αἰτία τοῦ ὡρισμένως αὔξεσθαι καὶ πάλιν ὡρισμένως μειοῦσθαι; ἐπειτα πῶς ὅμοιοσχήμονα διαμένει; τὰ μὲν γὰρ ἀπορρέοντα ὅμοιόμορφα (διὰ τοῦτο γοῦν καὶ χρωμάτων ἡ ὄψις ἀντιλαμβάνεται) τὰ δὲ προσκρινόμενα διὰ τί τοιαῦτά ἔστι; καὶ εἰ συνεχῆς ἡ ἀπόρροια ἀφ' ἑκάστου καὶ κατὰ πάντα τὰ μόρια, πῶς οὐκ ἐμποδίσει τὰ ἀποκρινόμενα τοῖς φερομένοις, ἵνα <μὴ> προσκριθῆ, ἡ ἐκεῖνα τούτοις, ἵνα μὴ φέρηται; πῶς δὲ λεπτὰ ὄντα οὐ σκεδασθήσεται ἀνέμων ὄντων; ὁρῶμεν γάρ, κανὸν ἀνεμος ἡ μεταξύ.

body and been sent out, the object does not get smaller. He then shows various problems with the view that new bodies replace the ones sent out.

On Aristotle and Alexander's view, the objects of perception do not emit bodily effluences, but rather they bring about a change in the transparent medium. There is nothing which travels from object to eye, rather the medium, through being changed and in turn changing the eye, allows the object of perception to be seen. Alexander describes the medium as serving as a messenger for the object of perception and the eye.

The term used most frequently by Alexander when describing the function of the external medium is 'διακονεῖσθαι'. Consider these two examples from his *On the Soul*:

Air, water, and any solid which does not have a colour of its own, are transparent, and when they are changed in a certain way by colours, they are able to transmit (διακονεῖσθαι) to sight so that there is awareness of [colours] (Alexander, *On the Soul*, 42,6-8 trans. Caston).

The medium through which there is awareness of perceptibles must also be in a suitable condition for transmission (διακονεῖσθαι) to the perceptual organs (*On the Soul*, 41,19-20, trans. Caston).¹³

The latter claim is made in the context of discussing the conditions which must obtain for objects of perception to be perceived.

In Caston's commentary on *On the Soul* he notes that 'the Greek *diakonos* and its cognates are often used elsewhere simply to indicate a servant or the functions a servant performs taken quite broadly... But *diakonos* can also refer to a specific kind of servant, a messenger (LSJ cite Aesch. *PV* 942 and Soph. *Phil.* 497). This sense predominates in Alexander's works, especially where the transmission of perceptible forms is concerned, often through an

¹³ For further examples of the use of the term 'διακονεῖσθαι' in this context, see *On the Soul*, 52,20; 62,5; 62,12.

external medium.¹⁴ Caston translates *diakoneisthai* as ‘to transmit’. Robert Sharples, in his translations of the *Quaestiones* and the *Mantissa* translates *diakoneisthai* as ‘to serve as a messenger for’, for example, in the following line from *Quaestiones* 1.2: ‘for as long as it is possible for them [i.e. the objects of perception] to be seen through the movement which is brought about in it [i.e. the transparent medium] by the colours that those things possess, it serves as a messenger (*διακονεῖται*) for those living creatures that are able to see, so that they apprehend the colours through it’ (*Quaestiones* 1.2, 6, 12-15 *trans.* Sharples). It is important to note that the way in which the medium transmits the colour, or serves as a messenger for it, is not by allowing colour to somehow move through it from object to eye. I will now consider how the medium serves as a messenger on Alexander’s view.

The change brought about in the medium by the object of perception, on Alexander’s view, is a receiving of colour. In what sense colour is received, is yet to be determined. Consider the following two passages:

For the transparent in actuality, being moved in a way and disposed by the visibles, transmits their form (*τὸ εἶδος αὐτῶν διαδίδωσι*) to the pupil, in the same way as it took it, the pupil also being transparent (Alexander, *de Sensu comm.* 59, 10-12, *trans.* Towey).¹⁵

The perception and cognition of colours occurs because (i) what is actively transparent – that is, what is illuminated – is first modified by the colour since colour is able to change it, and then (ii) the eye is modified by this [sc. what is transparent], since the eye itself is also transparent...For light, which has been tinged anew by each visible thing along a straight line to the eyes aligned with it, relays the exclusive modification, since it was itself modified due to them; and [the eyes] in turn are also able to receive a reflected image (*δέχεσθαι τὴν ἔμφασιν*) themselves because they are both smooth and transparent. So given that seeing occurs because the perceptual organ received the

¹⁴ Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1* (London: 2012), p. 146 n.362.

¹⁵ κινούμενον γάρ πως καὶ διατιθέμενον τὸ κατ’ ἐνέργειαν διαφανὲς ύπὸ τῶν όρατῶν τὸ εἶδος αὐτῶν διαδίδωσι τῇ κόρῃ, ὁμοίως ὡς ἔλαβεν, οὕση καὶ αὐτῇ διαφανεῖ.

colour ($\tau\bar{\omega}\delta\acute{e}\xi\alpha\sigma\theta\alpha\iota\tau\bar{o}\chi\varrho\bar{\omega}\mu\alpha$) and in some way becomes likened to it... (*On the Soul* 43,12-44,3, trans. Caston).¹⁶

In these passages the term ‘transparent in actuality’ or ‘actively transparent’ (*τὸ κατ’ ἐνέργειαν διαφανὲς*) is used. This description of the illuminated medium is discussed in the next chapter, but for now it may be understood simply as ‘illuminated transparent’ or ‘actually see-through’. In the passage from Alexander’s commentary on *de Sensu*, we have the claim that the medium (referred to here as the ‘transparent in actuality’) transmits the form of the object of perception to the pupil of the eye ‘in the same way as it took it (*όμοίως ως ἔλαβεν*), the pupil also being transparent.’ From this passage we may infer that the way in which the transparent medium serves as a messenger is through taking on the form of the object of perception in such a way that it is able to transmit this form to the eye.¹⁷ There are many ways in which the phrase ‘the form of the visible object’, taken out of context, could be understood. Alexander, however, makes it clear that what is received by the medium and the eye, is colour. The best way to make sense of the text is to take ‘form’ in this context to refer to the form of a coloured object *qua* coloured. To receive the form of the coloured object, in this sense, is then to receive colour.

In the passage from *On the Soul*, medium is said to be changed by the object of perception and then to pass on this change to the eyes.¹⁸ The eyes are said to receive an image or

¹⁶ τῷ γὰρ τὸ κατ' ἐνέργειαν διαφανές, τοῦτο δ' ἐστὶ τὸ πεφωτισμένον, πρῶτον πάσχειν ὑπὸ τοῦ χρώματος (τούτου γὰρ τὸ χρῶμα κινητικόν), τὴν δὲ ὄψιν ὑπὸ τούτου, οὖσαν καὶ αὐτὴν διαφανῆ, τούτῳ ἡ τῶν χρωμάτων αἰσθησίς τε καὶ κρίσις γίνεται...ἀφ' ἐκάστου γὰρ τῶν ὄρατῶν ἀνακεχρωσμένον τὸ φῶς κατ' εὐθυωρίαν τεταγμένον ταῖς κατὰ τοῦτο οὖσαις ὄψεσιν. διαδίδωσιν τὸ ἴδιον πάθος, ὃς ἀπ' ἐκείνων ἔπαθεν αὐτό, λείαις τε οὖσαις καὶ διαφανέσιν καὶ αὐταῖς καὶ προσέτι δυναμέναις δέχεσθαι τὴν ἔμφασιν. ἐπεὶ δὲ τῷ δέξασθαι τὸ χρῶμα τὸ αἰσθητήριον καὶ ὁμοιωθῆναι αὐτῷ πως τὸ ὄραν γίνεται.

¹⁷ See also *Quaestiones* 1.2, 6,19-24 for a similar description of the effect of the coloured object on the medium, and the effect of the medium on the eye.

¹⁸ In this passage Alexander uses the verb ‘πάσχειν’ to refer to the way in which the illuminated transparent is changed by the coloured object. The verb maybe translated as to suffer or to be affected. Caston translates it as ‘to be modified’. We will see in the next chapter, however that Alexander claims elsewhere that the transparent is changed and receives colours ‘οὐ παθητικῶς’, not in a way which involves it being affected. There need not be a contradiction here. Alexander is just using πάσχειν and its derivatives in two different ways. In the passage here he is using it broadly to denote

appearance (εμφασιν) and to receive colour and in some way become likened to it.¹⁹ I discuss the nature of the change in the eye in chapter three, in particular the claim that the eye receives an image or appearance. For now, I will just note that the change in the eye consists in a receiving of colour. Through the messenger function of the transparent medium, the eye receives colour. The medium performs this function through itself receiving colour. In the passage from the *de Sensu Commentary*, this receiving of colour is referred to as the receiving of the form of a coloured object and in the passage from *On the Soul* Alexander refers to the medium as ‘tinged anew’ (ἀνακεχρωσμένον) by coloured objects. As I will show in the next chapter, on Alexander’s account, sometimes the medium will be visibly tinged by coloured objects. Under ordinary circumstances, however, the colour will not be seen in the medium itself. Victor Caston notes in his commentary on *On the Soul* that Alexander uses the term tingeing (ἀνακεχρωσμένον) here to indicate, ‘a general phenomenon and that colour affects the transparent medium in this way not only when the effect on the medium is itself visible but also in quite ordinary cases when it is not visible, unlike the distal object.’²⁰ I discuss the sense in which the medium can be said to receive colour, even in those cases in which the colour is not visible, in the next chapter.

The medium functions as a messenger, then, not by carrying or allowing through a corporeal efflux, but rather through taking on colour in a way similar to, but as we shall see not the same as, the way in which a subject receives a new quality when it undergoes alteration. The specific way in which the medium takes on colour will be the topic of subsequent chapters. I will leave the medium for now and next consider what happens, according to Alexander, when colour is received by the eye.

any kind of change undergone. When, in a different context, Alexander claims that the transparent is changed ‘οὐ παθητικῶς’, he is using the term in a specific way in light of the distinction between genuine alterations and changes by virtue of relation, a distinction we will come to in the next chapter.

¹⁹ It is clear from the context of this passage that the ‘perceptual organ’ referred to near the end of this passage ought to be understood as the eye.

²⁰ Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1*, (London: 2012), p.160 (n. 385).

1.2 Eye to Heart

For Alexander, the receiving of colour by the eye is not the end of the perceptual story. Alexander is clear that the faculty of sensation is not located in the peripheral sense organs, such as the eyes, but is located in the heart.²¹ Consider, for example, the following passage from Alexander's commentary on *de Sensu*:

It is reasonable that seeing comes about not because of effluxes from the visibles but in this way by means of the <pupil> admitting (δεχομένης) the form of the <visible> seen through the intermediate transparent and transmitting (διαδιδούσης) it as far as the primary perceptive part (πρώτου αἰσθητικοῦ), because the intermediate passage (πόρον) is full of a body of this sort (*de Sensu Comm.*, 59, 12-15, *trans.* Towey).²²

The eye is said to receive the form of the coloured object and to transmit it to the primary perceptive part. It does so by means of intermediate passages which, like the eyes and medium, are filled with transparent material. The 'primary perceptive part' is elsewhere described as the primary sense organ (πρῶτον αἰσθητήριον) (*On the Soul* 60,6), 'the primary body which has the soul for perceiving (Caston *trans.*)' (τῷ πρώτῳ τὴν αἰσθητικὴν ψυχὴν

²¹ Most contemporary commentators agree that, for Aristotle too, the primary faculty of sensation is in the heart. See C.H. Kahn, 'Sensation and Consciousness in Aristotle's Psychology', *Archiv für Geschichte der Philosophie* 48 (1966), 43-81, for an excellent and influential discussion of the common sense and faculty of sensation and of the status of the individual sense organs for Aristotle. Myles Burnyeat, however, with his claim that the change in the transparent in the eye is identical to colour perception, appears to hold the view that, in *de Anima* at least, the text on which he focuses, change in the eye alone is sufficient for perception, so long as that eye is part of a whole living body. Irving Block, in a series of papers, argues that Aristotle puts forwards two different views: in *de Anima* there are individual sense faculties in the peripheral organs and in the *Parva Naturalia* there is a central faculty of sensation located in the heart. He takes it that the *Parva Naturalia* view supersedes the *de Anima* view (I. Block, 'The Order of Aristotle's Psychological Writings', *The American Journal of Philology* 82 (1961), 50-77; I. Block, 'Three German Commentators on the Individual Sense and the Common Sense in Aristotle's Psychology', *Phronesis* 9 (1964), 58-63; I. Block, 'Aristotle on the Common Sense: A reply to Kahn and Others', *Ancient Philosophy* 8 (1988), 235-49).

²² καὶ οὕτως διὰ ταύτης δεχομένης διὰ τοῦ διαφανοῦς τοῦ μεταξὺ <τὸ> εἶδος τοῦ ὄρωμένου καὶ μέχρι τοῦ πρώτου αἰσθητικοῦ διαδιδούσης αὐτὸ τῷ τὸν μεταξὺ πόρον τοῦ τοιούτου σώματος είναι πλήρη, τὸ ὄρᾶν γίνεσθαι εὔλογον, καὶ ὅτι οὐ κατὰ τὰς ἀπὸ τῶν ὄρατῶν ἀπορροίας.

ἔχοντι σώματι) (*On the Soul* 39,18) and the ultimate sense organ (ἔσχατον αἰσθητήοιο).²³ I will refer to it from now on as ‘the ultimate sense organ’. This organ is, or is in the region of, the heart (*Alexander, On the Soul*, 39,18-22; 97,4-6).

Alexander provides an argument for why the faculty of sensation cannot be located in the eye. This argument draws on a passage from Aristotle’s *de Anima* III.2. On Aristotle’s view, it is the perceptual faculty, not the intellectual faculty, by which we judge that various objects of perception are different. In this passage Aristotle observes that we perceptually discriminate not only between objects of perception which fall under one sense, for example black and white, but also between objects of perception which belong to different senses, for example white and sweet or soft and bitter. He claims that for this to be possible both perceptible qualities, for example sweet and white, must be present to a single, unified sense faculty (*de Anima* 426b8-426b22). Alexander takes Aristotle’s claim that the distinct perceptible qualities must be present to a single unified sense faculty and uses it to deny that the faculty of sensation is located anywhere in the eye.

He writes,

The soul and the visual capacity are not in the eye... For, <if it were>, the same would be true of the other sense-organs also. But if this were the case there would not be any joint perception coming about, since different parts of the soul would be in different <places> and ordered in different directions, and we would not be able to judge that the things which we perceive with the different sense-organs are different from each other, since we would not possess one thing which apprehends them, as he said in *On the Soul*. For that which perceives things also judges their differentiations. For just as, if one person were hearing and another person seeing, the person seeing would be unable to judge the <perceptibles> of the person hearing, so too in our case the

²³ See *On the Soul* 63,15; *de Sensu* comm. 168,3 and *Quaest. 3.9* 97,5-7.

capacities would have been detached from each other (*de Sensu comm.*, 36, 9-19, *trans.* Towey).²⁴

Alexander argues that if there were distinct perceptive capacities for taste, touch, vision, sound and smell, each of which is located in their respective sense organs, it would not be possible to judge that the things which we perceive with the different sense-organs are different from each other. This is because the parts of the soul would be separate from each other. The situation, Alexander claims, would be analogous to one person seeing white, for example, and another tasting sweet, insofar as there is no common faculty to which the two objects of perception are presented. In such a case no one of these people would be able to perceptually judge the difference between sweet and white since they would only be presented with one of these qualities. He reiterates Aristotle's claim that for a perceiver to judge that white is different from sweet, both white and sweet must be presented to a single, unified sense faculty. Granting the claim that we do perceive that white is different from sweet, Alexander infers that there are not distinct perceptive capacities for taste, touch, vision, sound and smell, each of which is located in their respective sense organs. The soul and visual capacity, then, are not in the eye.²⁵

Regarding the nature of the passages (the *poroi*) which run from the eye and the other peripheral sense organs to the heart, Alexander presents only a vague picture. In Aristotle's *de Sensu*, the *poroi* are referred to in the context of the following claim: it may be observed that war-injuries which lead to a severing of the passages connected with the eye, result in the cessation of visual perception for the persons who sustain those injuries. Aristotle attributes this to the fact that the pupil is somehow cut off from the perceptive soul and takes this observation as evidence for his claim that the perceptive soul is not located on the

²⁴ μή ἔστιν ἡ ψυχὴ καὶ ἡ ὄρατικὴ δύναμις ἐν τῷ ὀφθαλμῷ...ἢν γὰρ ἂν καὶ ἐπὶ τῶν ἄλλων αἰσθητηρίων ὁμοίως· οὔτως δὲ οὐκ ἀν ἦν συναίσθησίς τις γινομένη, ἄλλου μορίου τῆς ψυχῆς ἐν ἄλλῳ ὅντος καὶ ἐπ' ἄλλου τεταγμένου, οὐδ' ἀν ἐδυνάμεθα ὅτι ἔτερα τὰ ὡν αἰσθανόμεθα ἀλλήλων τοῖς διαφόροις αἰσθητηρίοις κρίνειν, μὴ ἔχοντες ἐν τῷ ἀντιλαμβανόμενον αὐτῶν, ὡς εἴπεν ἐν τοῖς Περὶ ψυχῆς· τοῦ γὰρ αἰσθανομένου τινῶν τὸ καὶ τὰς διαφορὰς κρίνειν αὐτῶν. ὥσπερ γάρ, εἰ ἄλλος μὲν ἤκουεν, ἄλλος δὲ ἔωρα, οὐχ οἶόν τε ἦν κρίνειν τὸν ὄραντα τὰ τοῦ ἀκούοντος, οὔτως δὲ καὶ ἐφ' ἡμῶν ἀπηρτημέναι ἀν ἥσαν αἱ δυνάμεις ἀλλήλων.

²⁵ See also *On the Soul* 60,19-61,2.

surface of the eye (*de Sensu* 438b 8-16). In Aristotle's text, the nature and location of the passages referred to is unclear and a subject of debate amongst interpreters.²⁶ Robert Sharples notes that in Alexander's commentary on this piece of text, no explicit reference is made to the location of the passages either and his repetition of Aristotle's claim that perception does not occur on the *extreme part* or surface of the eye may seem to suggest the interpretive option that the transparent filled passages are located within the eye and not between the eye and the heart. Sharples explores this suggestion but ultimately rejects it in light of the fact that the claim that perception does not occur on the surface of the eye is made immediately after Alexander's rejection of the claim that the perceptive capacity is located in the eye at all. We may infer then that the transparent-filled passages extend to the heart, where the primary perceptive capacity is located.²⁷

Other than the fact that they are filled with transparent material and somehow connect the eyes and heart, Alexander gives little information as to the precise location and nature of the passages (*poroi*). The way in which they function is also unclear, beyond the fact that they somehow carry the perceptible forms from the peripheral sense organs to the heart. For the most part, Alexander uses different language to describe the function of the external medium and to describe the function of the internal passages. Whereas 'διακονεῖσθαι' is the verb most frequently used to describe the function of the external medium, Alexander most frequently uses 'διαδίδωσιν' and 'διάδοσις' to refer to the function of the eye and internal passages.²⁸ This could suggest that, despite both being transparent, they function in a

²⁶ See for example G.E.R. Lloyd, 'The Empirical Basis of the Physiology of the Parva Naturalia', in G.E.R. Lloyd and G.E.L. Owen (eds.). *Aristotle on Mind and the Senses*, (Cambridge: Cambridge University Press, 1978), 215-39 at 219-20. Lloyd argues that the passages are structures behind the eye, possibly identical with the optic nerve. Ross argues that the passages are not nerves at all but openings at W.D. Ross, *Aristotle: Parva Naturalia* (Oxford: Clarendon press, 1955), 192-3. See also C.H. Kahn, 'Sensation and Consciousness in Aristotle's Psychology', *Archiv für Geschichte der Philosophie* 48 (1966), 43-81.

²⁷ R. Sharples, 'Alexander of Aphrodisias on the Nature and Location of Vision', in Ricardo Salles (ed.) *Metaphysics, Soul, and Ethics in Ancient Thought* (Oxford: OUP, 2005) 354-355.

²⁸ 'Διαδίδωσιν' and 'διάδοσις' are used to describe the function of the sense organs and internal passages at: *On the Soul* 39, 20; 41, 5; 64,8; *de Sensu Comm.* 59,13-15 *Quaest. 3.9* 97, 5; 97,12. Very occasionally Alexander uses forms of διακονεῖσθαι to describe this function (*On the Soul*, 39,19; 59,14), but for the most part he reserves this term to describe the function of the external medium.

different way. Little more can be said, however, without entering the realm of speculation. Regarding the change brought about by the objects of perception in the external medium, Alexander provides us with sufficient information to construct a detailed picture as to the nature of these changes. Regarding the part of the perceptual process which takes place behind the eye, by contrast, we are given very little information. Alexander, seemingly, was much more interested in the former. Robert Sharples notes that, 'the possibility remains that Alexander may not himself have had a very clear conception of exactly how [the *poroi*] function'.²⁹

1.3 The Heart and the Perceptive Capacity

Alexander also does not present a clear view of what happens when the perceptible forms reach the heart. Once the colour of the perceptible object is taken on by the eye, it is somehow transmitted via the passages to the heart. It is then received by the heart, but Alexander does not give us any information as to the nature of this reception. For example, we are not told whether the heart becomes perceptibly coloured or whether it undergoes ordinary alteration when it receives the colour. Alexander does, however, make one striking claim regarding the reception of perceptible forms by the heart, which I will now discuss. The claim is that the receiving of perceptible forms by the heart is necessary for but does not constitute perception.

The claim is striking since it demonstrates a divergence between Alexander and several prominent contemporary commentators on Aristotle's text. These prominent contemporary commentators, in different ways, attribute to Aristotle the position that the reception of colour by the bodily sense organ constitutes perception, either wholly or in part. The early proponents of a functionalist interpretation of Aristotle on perception, for example, held the view that perception is a psychological state constituted or realised in bodily matter.³⁰ On

²⁹ Ibid. p. 357.

³⁰Martha C. Nussbaum and Hilary Putnam, 'Changing Aristotle's Mind' in *Essays on Aristotle's de Anima*, M.C. Nussbaum and A.O. Rorty eds. (Oxford: OUP, 1992), pp. 27-56.

this view the transition to the state of perceptual awareness (i.e. actual perception), is constituted by a physical change in the sense organ which stands to this awareness as matter to form. Thus they take perception to require a dual explanation, parallel to those given for anger in *de Anima* 403a29-403b3. Anger is both a desire for retaliation (this is the form of anger), and a boiling of blood around the heart, (this is the matter of anger). Perception, on this interpretation, is both the psychological awareness of colour and a physiological change in the sense organ. Richard Sorabji, whilst rejecting the functionalist interpretation, agrees with Nussbaum and Putnam that perception for Aristotle involves a physiological process which stands to the cognitive awareness of the object perceived, the 'intentional' aspect of perception, as matter to form.³¹ For Sorabji too, the physical taking on of colour by the sense organ is constitutive of perception.

Myles Burnyeat, whilst taking a view of Aristotle's text opposed to that of Sorabji and the functionalist interpreters, also views the change in the sense organs as constitutive of perception. Burnyeat, in contrast to Sorabji and the functionalists, claims that we ought not to view the bodily changes in the sense-organs as distinct from perception considered as a cognitive event. He claims that it is incorrect to attempt to apply the Cartesian division of mind and body to Aristotle's text.³² Instead he claims that 'the physical material of which Aristotelian sense-organs are made does not need to undergo any ordinary physical change to become aware of a colour or a smell. One might say that the physical material of animal bodies in Aristotle's world is already pregnant with consciousness, needing only to be awakened to red or warmth.'³³ For Burnyeat, perceptual awareness and the change in the body of the perceiver do not stand to each other as form to matter, rather the change in the sense organ is identical to perceptual awareness. The change in the sense organ just is the colour appearing to the eye of the subject who perceives it and this is identical to the

³¹ See R. Sorabji, 'Intentionality and Physiological Processes: Aristotle's Theory of Sense-Perception', in Nussbaum and Rorty (eds.), *Essays*, 195-225 and 'Aristotle on Sensory Processes and Intentionality: A Reply to Myles Burnyeat', in D. Perler (ed.), *Intentionality*, 49-61.

³² See M.F. Burnyeat, 'Aquinas on "Spiritual Change" in Perception', in D. Perler (ed.), *Intentionality*, 146-149, 152.

³³ Burnyeat, M.F., 'Is an Aristotelian Philosophy of Mind Still Credible? (A Draft)', in Nussbaum and Rorty (eds.), *Essays*, p. 19.

perceiving of the colour. I discuss Burnyeat's view further below, but the essential point for now is that, for Burnyeat, as for Sorabji and the functionalists, the change in the sense organ is constitutive of the transition to perceptual awareness.

On Alexander's view the change undergone by the sense organ is not constitutive of perception. Neither changes in the peripheral sense organs, such as the eyes, nor changes in the ultimate sense organ, the heart, constitute perception. Perception occurs by means of the changes in the sense organs, but is itself an activity of soul which Alexander treats as distinct from such bodily changes. Alexander classifies the activity of soul which constitutes perception as a sort of perceptual judgement (*krisis*).³⁴ The heart houses the perceptual capacity and the exercise of the perceptual capacity depends on changes in the heart, but these changes do not constitute the exercise of the perceptual capacity.

On Alexander's view, the ultimate sense organ is changed in some way by the sensible objects. It is said to 'receive the affections' ($\tau\alpha\ \pi\acute{a}\theta\eta\ \delta\epsilon\chi\omega\mu\epsilon\nu\omega$) produced by the sensible objects.³⁵ In referring to the affections, *ta pathē*, Alexander simply means the properties which are gained by the organ as a result of its being changed by the objects of perception. The organ is home to the perceptive capacity and the exercise of this capacity is the judging of the affections held by the organ. Alexander identifies perception with this perceptual judgement, the exercise of the perceptive capacity, not with the receiving of the affections by the sense organ. Alexander writes, 'when the sense organ is affected in each of its parts, it [the perceptive capacity] perceives the affection through being the capacity and limit of each

³⁴ Alexander claims that perception is *κρίσις*, which Towey translates as 'judgement'. It would be wrong to infer from Alexander's use of the term *κρίσις* that the exercise of the perceptive faculty involves the kind of judgement which requires input from the intellectual faculty. Rather we should conceive of this *κρίσις* as a purely perceptual judgement involving the perceptual capacity alone. In his translation of Aristotle's text, Smith uses the verb 'discriminate' to translate forms of *κρίνειν* in a perceptual context. I will continue to follow the translators of Alexander in using 'judge' and 'to judge' to translate *κρίσις* and *κρίνειν*, but it may be useful to bear this alternative translation in mind.

³⁵ For example, *On the Soul* 64,5.

part' (*On the Soul*, 63, 21-23).³⁶ He writes that, 'perception, even if it seems to come about by means of an affection, is nevertheless itself a judgement' (*de Sensu comm.*, 167,21-22).³⁷

Despite the fact that the perceptive capacity is located in a sense organ and perception occurs by means of the body, perception strictly speaking is identified with the exercise of the capacity for perceptive judgement alone and so seems to be an activity of soul alone. There is much of interest to consider here. However, a detailed consideration of the relationship of body to soul for Alexander is beyond the scope of this thesis. The details of the bodily processes involved in perception beyond the peripheral sense organs are left vague by Alexander and there are unanswered questions as to how Alexander conceives of the relationship between these bodily processes and perception itself. Since my focus is on the way in which coloured objects of perception affect the eye and medium, I will leave these issues aside.

1.4 A Spiritualist Interpretation

So far we have a picture of a theory of vision on which the coloured object changes the medium, which in turn changes the eye. This change is then somehow passed on to the heart, where the perceptive capacity is located. According to Alexander, the change in the medium and the eye consists in a receiving of colour. To say, however, that the eye and medium receive colour can mean several different things, and interpreters of the corresponding claims found in Aristotle's texts have taken this claim in several different ways. In subsequent chapters I will outline the specific sense in which the eye and the medium can be said to receive colours on Alexander's view. In chapters 2 and 3 I will argue that, on Alexander's view, the receiving of colour is a physical event. In chapters 2 and 4 I

³⁶ τῷ καθ' ἔκαστον μέρος τοῦ αἰσθητηρίου πάσχοντος αἰσθάνεσθαι τοῦ πάθους διὰ τὸ εῖναι δύναμις τε καὶ πέρας ἔκαστον See also n.12 above: It cannot be inferred from Alexander's use of πάσχοντος here, that on Alexander's view the ultimate sense organ is affected in the sense of undergoing alteration. Alexander sometimes uses forms of the verb πάσχειν in a broad sense to denote any kind of change.

³⁷ ή αἰσθησις, εἰ καὶ δοκεῖ διὰ πάθους τινὸς γίνεσθαι, ἀλλ' αὐτῇ γε κρίσις ἐστίν.

discuss the particular kind of physical change of which the receiving of colour is an instance. I specify the sense in which I use the term ‘physical’ below. For now, in the final part of this chapter, I will outline an interpretation of Aristotle’s view, which, I will argue, serves to contrast with Alexander’s version of Aristotle’s view. This is Myles Burnyeat’s ‘spiritualist’ interpretation of Aristotle’s theory of perception.

Stephen Everson gives a succinct account of the question at the heart of the debate between contemporary spiritualist and literalist interpreters of Aristotle. He writes,

What one wants to know is whether the sensible objects bring about changes which can be specified only in perceptual or cognitive terms (so that it might be just the change precisely of coming to perceive the object) or whether they also produce changes which are describable in physical terms (so that perceiving something would either be or would involve some change which is specifiable using descriptions which can also be satisfied by inanimate substances).³⁸

The debate is between those who hold that, for Aristotle, the objects of perception bring about physical changes in the perceiver and environment, and those who hold that, for Aristotle, the objects of perception do not cause physical changes and instead only bring about perceptual awareness of themselves. Those who hold that the objects of perception cause physical changes (and this is the view I will be attributing to Alexander), believe these changes either to constitute the perceiver’s coming to perceive, standing to perceptual awareness as matter to form, or to play some part in a physiological process which results in the perceiver’s coming to perceive. The key contemporary figures in this debate are Myles Burnyeat, who holds the spiritualist interpretation, and Richard Sorabji, who takes the view that, for Aristotle, objects of perception bring about physical changes in the perceiver. Sorabji’s position is termed the literalist position, on account of the fact that according to this interpretation the physical change which takes place in visual perception is a literal

³⁸ S. Everson, *Aristotle on Perception*, (Oxford: Clarendon Press, 1997), 56.

colouration of the sense organ, i.e. the sense organ comes to be perceptibly coloured. On this interpretation, when a perceiver perceives a red object his or her eye turns red.³⁹

A ‘spiritual change’ is a change which can be specified only in perceptual or cognitive terms. An example of a spiritual change would be the transition from having no perceptual awareness of an object to having perceptual awareness of that object. Opposed to this sort of change are physical changes, which in Everson’s words are ‘changes specifiable using descriptions which can also be satisfied by inanimate substances’. Sarah Broadie notes that ‘it is not easy to give a non-question-begging sense of “physical” in this context, but at least it implies “publicly observable.” An act of perceptual awareness is not, as such, physical in that sense.’⁴⁰ We have here then two characteristics of a physical change: they are publically observable, i.e. potentially apparent to persons other than the perceiver, and they are changes which may be undergone by animate and inanimate substances alike. In the context of a discussion of an Aristotelian theory of perception, we may take it that physical changes, as opposed to spiritual changes, are not acts of perception but are rather themselves objects of perception. This is the sense in which I will use the term physical for the remainder of this thesis.⁴¹

³⁹ For Burnyeat’s position see, M. F. Burnyeat, ‘Is an Aristotelian Philosophy of Mind Still Credible? (A Draft)’, in Nussbaum and Rorty (eds.), *Essays*, 15-26; M.F. Burnyeat, ‘How Much Happens when Aristotle Sees Red and Hears Middle C? Remarks on De anima 2.7-8’, in Nussbaum and Rorty (eds.), *Essays*, 421-34; M.F. Burnyeat, ‘Aquinas on “Spiritual Change” in Perception’, in D. Perler (ed.), *Intentionality*, 129-53; M.F. Burnyeat, ‘De Anima II 5’, *Phronesis* 47 (2002), 28-90. For Sorabji’s position see, R. Sorabji, ‘Intentionality and Physiological Processes: Aristotle’s Theory of Sense-Perception’, in Nussbaum and Rorty (eds.), *Essays*, 195-225 and ‘Aristotle on Sensory Processes and Intentionality: A Reply to Myles Burnyeat’, in D. Perler (ed.), *Intentionality*, 49-61. For alternative spiritualist and literalist interpretations see S. Everson, *Aristotle on Perception*, (Oxford: Clarendon Press, 1997), who gives a literalist interpretation, and T.K. Johansen, *Aristotle on the Sense-Organs* (Cambridge, 1998), who has a spiritualist interpretation. For a helpful overview of the spiritualist-literalist debate, see Victor Caston, ‘The Spirit and the Letter: Aristotle on Perception’, in Ricardo Salles (ed.) *Metaphysics, Soul, and Ethics in Ancient Thought* (Oxford: OUP, 2005), 245-263.

⁴⁰ S. Broadie, ‘Aristotle’s Perceptual Realism’, in J.Ellis (ed.), *Ancient Minds = Southern Journal of Philosophy*, Supp. Vol. 31 (1992), 141.

⁴¹ It ought to be noted that Myles Burnyeat objects to this distinction between perceptual changes such as the transition to seeing, and physical changes in the context of Aristotle’s theory. He objects on the grounds that for Aristotle those events which we would conceive of as mental or exclusively psychological post-Descartes, for Aristotle fell within the realm of his physics (M.F. Burnyeat, ‘Aquinas on “Spiritual Change” in Perception’, in D. Perler (ed.), *Intentionality*, 146-149, 152.) On

The focus of my thesis is not the contemporary spiritualist-literalist debate, although it forms a key part of the back-drop to my presentation of Alexander's interpretation of Aristotle. I present an interpretation of Alexander, on which the eye and medium undergo a physical change when they receive colour. This sets my interpretation apart from that of certain recent interpreters of Alexander. The spiritualist position has been attributed to Alexander with regards to his theory of vision, most notably by Richard Sorabji. (To avoid confusion, it is worth clarifying that Sorabji gives a literalist interpretation of Aristotle and a spiritualist interpretation of Alexander. Sorabji's view is that Alexander does not faithfully present Aristotle's theory in this regard.) Sorabji argues that Alexander, along with the commentators Themistius and Philoponus, 'sought to give Aristotle's account of sensory processes a less material interpretation'.⁴² He claims that Alexander denies that the eye is literally coloured and that Alexander, at least in *de Anima*, 'understands the reception of form non-physiologically'.⁴³ I will argue that Alexander's view, across his texts, is that the reception of colour by the sense organs is physical and not spiritual. In the final chapter, chapter 5, I specifically consider the grounds on which Sorabji attributes the spiritualist position to Alexander and argue that the passages Sorabji uses to support his reading can instead be read in line with my interpretation. I now present the most significant contemporary example of a spiritualist interpretation of Aristotle, Myles Burnyeat's. This

Burnyeat's view the transition to perceptual awareness, even considered apart from any physiological process, is itself a physical change and to treat the class of psychological events as wholly distinct from the class of physical events is to misrepresent Aristotle's view. Nevertheless, the narrower use of 'physical' employed by Broadie and Everson which excludes conscious perceptual or cognitive activity is useful in this context, and I will continue to use it.

⁴² Richard Sorabji, 'From Aristotle to Brentano: the development of the concept of intentionality', in *Aristotle and the Later Tradition, Oxford Studies in Ancient Philosophy* supp vol. 1991, p. 227.

⁴³ Ibid. p.235. Sorabji restricts his claim that Alexander holds a spiritualist view of the changing of the transparent to Alexander's *On the Soul*. Whilst Sorabji understands Alexander's solution to the problem of simultaneous perception of contrary properties to involve a denial of literal colouration, he claims that, 'in other works Alexander does not apply the contraries problem to the organ, and is consequently free to take a more ambivalent, or even favourable, attitude towards the view that colours show in the eye [i.e. that the eye takes on colours in a literal, physiological way]. So the dematerialisation evident in this one text [i.e. de Anima] is not quite steadily maintained' (Sorabji, *Aristotle to Brentano*, p.230). On my interpretation Alexander is consistent across his texts.

will serve as a contrast to my interpretation of Alexander's version of Aristotle's theory, as I present it over the next few chapters.

On Burnyeat's interpretation of Aristotle, coloured objects change the perceiver only insofar as the colour appears to the eye of the perceiver. Colour's appearing to the eye of the perceiver is an event identical to the perceiving of that colour. Burnyeat claims that for Aristotle, 'the alteration of the eye *by* a sensible quality is (i) a quasi-alteration only and (ii) identical with the perceiving *of* the sensible quality in question.'⁴⁴ He claims that this 'quasi-alteration', the appearing of colour to the perceiver, is not accompanied by any physical changes.⁴⁵

Burnyeat uses the term 'quasi-alteration' to distinguish the kind of change a perceiver undergoes in perception from genuine alteration. In cases of genuine alteration a subject loses a quality such as cold and gains another quality from the same range, such as hot or warm.⁴⁶ The genuinely altered subject becomes F, for example hot, having previously been not-F. According to Burnyeat, the change brought about by the coloured object in Aristotle's theory of perception is colour's appearing to the perceiver at the eye and through the medium, nothing more. When colour appears, the eye and medium retain all the same qualities as before colour appeared in them and through them. Crucially, they retain their colourlessness. They are not, then, genuinely altered. Colour appearing to the perceiver through the medium is a 'quasi-alteration' only and no colouration of the illuminated transparent in the eye or medium occurs. Summarising his position in a later paper, Burnyeat writes, 'suppose Aristotle sees a red object. The effect of the red colour is a 'quasi-alteration' in which neither the medium (obviously) nor the eye (*pace* Sorabji) turns red, but red appears to Aristotle through the medium at his eye.'⁴⁷

⁴⁴ M.F. Burnyeat, 'How Much Happens when Aristotle Sees Red and Hears Middle C? Remarks on *De anima* 2.7-8', in Nussbaum and Rorty (eds.), *Essays*, 429.

⁴⁵ On the use of the term 'physical' in relation to Burnyeat see n.41 above.

⁴⁶ For Aristotle on alteration, see *On Generation and Corruption*, I.7 324a 5-14; *Physics*, V.2, 226b 1-8.

⁴⁷ M.F. Burnyeat, 'De Anima II 5', *Phronesis* 47 (2002), 75.

Burnyeat's view attributes significant weight to a passage in *de Anima* III.2. In this passage Aristotle takes the principle that the actuality or activity (*energeia*) of that which moves or changes is one and the same as the actuality or activity of that which is moved or changed, and applies it to sense and the perceptible object.⁴⁸ The general principle is stated in *Physics* Book III.3:

Motion (ἡ κίνησις) is in the moveable (τῷ κινητῷ). It is the fulfilment of this potentiality by the action of that which has the power of causing motion; and the actuality (ἐνέργεια) of that which has the power of causing motion is not other than the actuality of the movable; for it must be the fulfilment of *both*. A thing is capable of causing motion because it *can* do this (τῷ δύνασθαι), it is a mover because it actually *does* it (τῷ ἐνέργειν). But it is on the movable that it is capable of acting. Hence there is a single actuality (ἐνέργεια) of both alike, just as one to two and two to one are the same interval, and the steep ascent and the steep descent are one – for these are one and the same, although their definitions are not one. So it is with the mover and the moved (*Physics* III.3 13-20, trans. R.P. Hardie and R.K Gaye).

An example Aristotle employs frequently is that of the builder building. A builder is a mover or agent of change, specifically a person with the capacity to build. When he or she

⁴⁸ The appropriate translation of *energeia* and its partner *dunamis* is a subject of much debate (see, for example, Aryeh Kosman, *The Activity of Being: An Essay on Aristotle's Ontology* (Harvard University Press, 2013); Stephen Makin (ed.), *Aristotle: Metaphysics Theta: Translated with an Introduction and Commentary* (Oxford University Press, 2006); Jonathan Beere, *Doing and Being, An Interpretation of Aristotle's Metaphysics Theta* (Oxford: Oxford University Press, 2009); Michael Frede, 'Aristotle's Notion of Potentiality in Metaphysics Θ' in T. Scaltsas, David Charles & Mary Louise Gill (eds.), *Unity, Identity, and Explanation in Aristotle's Metaphysics* (Oxford University Press, 1994), 173-193.) In the translations of Aristotle given below both 'activity' and 'actuality' are used to translate *energeia*, whilst some translate *dunamis* as 'potentiality', some as 'power' and others as 'capacity'. For the purposes of this thesis, there is no need to take a position on this. There is little role in Alexander's text for the subtleties of Aristotle's *dunamis-energeia* distinction. In fact considering the prominence Aristotle assigns to this distinction, Alexander uses the terms remarkably little. I will therefore, when quoting Aristotle, use whichever translation of *dunamis* and *energeia* is given by the translator of the text quoted. Sometimes this will be actuality and potentiality, and sometimes this will be activity and capacity. Whilst Aristotle's use of the terms is extremely nuanced, it is sufficient for the purposes of this thesis to understand *dunamis* and *energeia* as a power or capacity and the exercise of this power or capacity.

exercises this capacity there is actual building, that is, bricks being put on top of one another in such a way that will eventually lead to a house. A pile of bricks is that which undergoes the change, the moveable. They have a capacity to be built. The exercise of this capacity is their being-built, that is, their being placed on top of one another in such a way that will eventually lead to a house. Whilst we may give different accounts of the exercise of the builder's capacity (i.e. building) and the exercise of the capacity of the bricks (i.e. being-built), these are in fact one and the same activity: bricks being placed on top of each other in a way that will lead to a house.

In *de Anima* III.2 Aristotle applies this principle to sense and the object of sense. He claims that the exercise of the capacity to perceive is one and the same as the exercise of the capacity belonging to the object of perception. He writes,

The activity of the sensible object and that of the sense is one and the same activity, and yet the distinction between their being remains. Take as illustration actual sound and actual hearing: a man may have hearing and yet not be hearing, and that which has sound is not always sounding. But when that which can hear is actively hearing and that which can sound is sounding, then the actual hearing and the actual sound come about at the same time (these one might call respectively hearkening and sounding) (*de Anima*, 425b26-426a2, *trans.* Smith).

It is unclear however, how we are supposed to understand the exercise of the capacity belonging to the object of perception (the 'activity of the sensible object' in the translation above). In the case of colour and visual perception, Burnyeat reads the III.2 passage in light of *de Anima* II.7. In *de Anima* II.7 Aristotle defines colour in terms of its ability to change the transparent medium between itself and the perceiver:

Every colour has in it the power to set in movement what is actually transparent; that power constitutes its very nature (*de Anima* 418a31-418b2, *trans.* Smith).⁴⁹

⁴⁹ πᾶν δὲ χρῶμα κινητικόν ἐστι τοῦ κατ' ἐνέργειαν διαφανοῦς, καὶ τοῦτ' ἐστὶν αὐτοῦ ἡ φύσις.

Its being colour at all means precisely its having in it the power to set in movement what is actually transparent (*de Anima* 419a10-11, *trans.* Smith).⁵⁰

In the next chapter I will discuss what is meant by ‘actually transparent’, but for current purposes the phrase may be understood as equivalent to ‘the medium for visual perception’. Colour, the object of visual perception, has the capacity to change the medium for visual perception. As discussed, by means of this, the eye is also changed. The exercise of colour’s capacity, understood in this way, is the changing of the eye and medium. Burnyeat reads the III.2 passage, with its claim that the activity of the object of perception is one and the same as the activity of sense, in light of the II.7 claim that colour changes the eye and medium. He takes it then that the changing of eye and medium, referred to in II.7, is one and the same event as actual perception. He does not take it that the changing of the eye and medium is a physical precursor to actual perception. In fact his view is that there are no physical processes in the sense organs or medium by means of which visual perception occurs. The way in which colour changes the eye and medium, on Burnyeat’s view, is that it causes colour to appear at the eye and through the medium and nothing more.

But there are other ways of understanding the exercise of the capacity belonging to the object of perception, and so other ways of taking the claim that this exercise is an activity that is one and the same as the activity of actual perception. Everson, for example, claims that there is a distinction to be made between what it is to be a colour and what it is to be a proper object of sight. He claims that the above passage applies only to the coloured objects, considered as objects of sight. The exercise of the coloured object’s capacity to be perceived, is actually being perceived. This is identical to the exercise of the perceiver’s capacity to perceive. The exercise of colour’s capacity *qua* colour, on the other hand, is the changing of the transparent medium and in turn the eye, which Everson denies is identical with actual

⁵⁰ τοῦτο γὰρ ἦν αὐτῷ τὸ χρώματι εἶναι, τὸ κινητικῷ εἶναι τοῦ κατ’ ἐνέργειαν διαφανοῦς.

perception. He claims that 'we should regard the passage from *DA* III.2 as incautiously expressed rather than as the statement of official doctrine.'⁵¹

On Burnyeat's view, then, the only change brought about in the eye and medium by a coloured object, is that colour appears to the perceiver at the eye and through the medium. There is no literal colouration of the eye and no genuine alteration of the eye or medium occurs. We shall soon see that there is agreement between Alexander and Burnyeat over the claim that coloured objects do not cause genuine alteration in the eye and medium. Their positive stories, however, diverge significantly. Whereas, for Burnyeat, the only change in the eye and medium is a spiritual change, the appearing of colour to the perceiver, I will argue that for Alexander the change is physical. It is a physical colouration of the eye by means of the medium. However, for Alexander, it is nevertheless not a genuine alteration, i.e. it is not a case in which a subject which is not F, becomes F, in the ordinary way. Alexander's particular notion of a kind of physical change which is not an alteration will be introduced in the next chapter.

In this chapter I have presented an outline of Alexander's theory of visual perception, from the changing of the medium by the object of perception, to the changing of the heart and the exercise of the perceptual capacity. I have begun a discussion of the role played by the eye and medium in this theory of visual perception, and established that the change undergone by the eye and medium consists in a receiving of colour. Having presented the spiritualist interpretation of the claim that the eye receives colour, in the next chapter I will begin to outline my interpretation of Alexander's view, on which the eye receives colour in a physical sense. In addition, in the next chapter I will provide more detail as to the nature of the medium for visual perception. The medium, in order to play its role and be changed by the object of visual perception, must be both transparent and illuminated. It is not possible to see through an opaque body or through dark air. In the next chapter I will explore Alexander's view of light and transparency.

⁵¹ S. Everson, *Aristotle on Perception*, (Oxford: Clarendon Press, 1997), 113.

CHAPTER 2

Light and Colour

A coloured object is perceived, on Aristotle and Alexander's view, by means of its changing the transparent medium between itself and the eye of the perceiver. This medium, in order to be changed by the object and perform its function of transmitting colour to the eye, must be illuminated. In Aristotle's words,

Without the help of light colour remains invisible. Its being colour at all means precisely its having in it the power to set in movement what is actually transparent, and the actuality of what is transparent is just light (*de Anima* 419a9-11, *trans.* Smith).⁵²

In this chapter I will be exploring Alexander's view of the nature of this change brought about by colour in the illuminated transparent, and the nature of the necessary prerequisite for this change: light. I will first discuss Alexander's interpretation of three claims Aristotle makes about light before turning to the question of the way in which the transparent, once illuminated, is changed by colour.

This chapter introduces a key component of Alexander's version of Aristotle's view, the notion of change by virtue of relation. Alexander's use of the concept of this special kind of change to explain how visual perception comes about is the most novel and, for me, the most interesting part of Alexander's development of Aristotle's view of visual perception.

⁵² οὐχ ὁρᾶται ἀνευ φωτός· τοῦτο γὰρ ἦν αὐτῷ τὸ χρώματι εἶναι, τὸ κινητικῷ εἶναι τοῦ κατ' ἐνέργειαν διαφανοῦς· ή δ' ἐντελέχεια τοῦ διαφανοῦς φῶς ἔστιν.

2.1 Light, ‘Presence’ and Change by Virtue of Relation

A central tenet of Aristotle’s own view of light is that light does not travel. Criticising Empedocles, he writes,

Empedocles (and with him all others who used the same forms of expression) was wrong in speaking of light as ‘travelling’ or being at a given moment between the Earth and its envelope, its movement being unobservable by us; that view is contrary both to the clear evidence of argument and to the observed facts; if the distance traversed were short, the movement might have been unobservable, but where the distance is from extreme east to extreme west, the strain upon our powers of belief is too great (*de Anima* II.7 418b21-26, trans. Smith).⁵³

Rather than something that moves, Aristotle instead describes light as a sort of ‘presence’ (*παρουσία*). In *de Anima*, he gives the following account of light:

Light is neither fire nor any kind whatsoever of body nor an efflux from any kind of body (if it were, it would again itself be a kind of body) - it is the presence of fire or something resembling fire in what is transparent. It is certainly not a body, for two bodies cannot be present in the same place. The opposite of light is darkness; darkness is the absence from what is transparent of the corresponding positive state (*ἔξεως*) above characterised; clearly therefore, light is just the presence of that (*de Anima* 418b13-20).⁵⁴

⁵³ καὶ οὐκ ὁρθῶς Ἐμπεδοκλῆς, οὐδὲ εἴ τις ἄλλος οὕτως εἰρηκεν, ως φερομένου τοῦ φωτὸς καὶ γιγνομένου ποτὲ μεταξὺ τῆς γῆς καὶ τοῦ περιέχοντος, ήμᾶς δὲ λανθάνοντος· τοῦτο γάρ ἐστι καὶ παρὰ τὴν τοῦ λόγου ἐνάργειαν καὶ παρὰ τὰ φαινόμενα· ἐν μικρῷ μὲν γὰρ διαστήματι λάθοι ἀν, ἀπ’ ἀνατολῆς δ’ ἐπὶ δυσμάς τὸ λανθάνειν μέγα λίαν τὸ αἴτημα.

⁵⁴ ὅτι οὕτε πῦρ οὔθ’ ὄλως σῶμα οὐδὲ ἀπορροή σώματος οὐδενός (εἴη γὰρ ἀν σῶμά τι καὶ οὕτως), ἀλλὰ πυρὸς ἡ τοιούτου τινὸς παρουσία ἐν τῷ διαφανεῖ· οὕτε γὰρ δύο σώματα ἄμα δυνατὸν ἐν τῷ αὐτῷ εἶναι, δοκεῖ τε τὸ φῶς ἐναντίον εἶναι τῷ σκότῳ· ἐστι δὲ τὸ σκότος στέρησις τῆς τοιαύτης ἔξεως ἐκ διαφανοῦς, ὥστε δῆλον ὅτι καὶ ἡ τούτου παρουσία τὸ φῶς ἐστιν.

Light is, for Aristotle, ‘the presence of fire or something resembling fire in what is transparent’ and darkness is the absence of fire or something resembling fire in what is transparent. But the meaning of these claims is unclear.

By ‘fire or something resembling fire’, Aristotle means anything that we would refer to as a source of light, for example the sun or a flame.⁵⁵ I will go into more detail as to what Aristotle and Alexander mean by ‘transparent’ below, but in this context Aristotle is referring to potentially see-through bodies such as air and water in his use of the phrase ‘what is transparent’. Aristotle is clear that light is not fire, but claims that light is the presence of fire in the transparent body. What could this mean?

Immediately before this passage Aristotle writes that light ‘exists whenever the potentially transparent is excited to actuality by the influence of fire or something resembling “the uppermost body”; for fire too contains something which is one and the same with the substance in question [i.e. the uppermost body]’ (*de Anima* II.7 418b11-13, *trans.* Smith).⁵⁶ It seems that the fire (or the fiery substance fire contains), when present in a transparent body, brings about a change in this transparent body. It causes the transparent body to become illuminated, or ‘actually transparent’. We shall see that to describe a body as ‘actually

⁵⁵ Richard Sorabji provides more detail on how we ought to understand these sources of light. He writes, ‘But besides ordinary fires, there are many things that are firelike. The fifth element that makes up the celestial bodies will also serve to create light throughout the celestial region (*On the Soul* 2.7, 419all-13). Fire itself is of different kinds. The fires familiar to us on the earth are a kind of extreme or boiling of the transparent smokelike exhalation, which constitutes the sphere of much purer fire beneath the moon (*On Generation and Corruption* 2.3, 330b29; *Meteorology* 1.3 and 4, 340b23; 341b21-2). Our fires are treated as something that is not transparent and cannot contain light at *de Sensu* 438b5. But elemental fire, which is most fully concentrated in the sphere of purer fire above, is merely like these fires (*On Generation and Corruption* 2.3, 330b24) and we do see through it to the celestial bodies beyond. Sometimes it erupts into flames at various places (*Meteorology* 1.3 and 4). And when Aristotle wants to avoid the celestial bodies possessing self-destructive qualities like heat, he suggests an awkward theory that they too ignite the lower atmosphere by friction and transmit heat (*Meteorology* 1.3, 341a12-36), and even light, (*On the Heavens* 2.7, 289a20), to us by that method. Whichever of Aristotle’s theories we pursue, there seem to be plenty of sources of light in the universe (‘Aristotle on Colour, Light and Imperceptibles’, *Bulletin of The Institute of Classical Studies* 47 (2004), 132).

⁵⁶ τὸ δὲ φῶς οἷον χρῶμα ἔστι τοῦ διαφανοῦς, ὅταν ἡ ἐντελεχείᾳ διαφανὲς ὑπὸ πυρὸς ἡ τοιούτου οἷον τὸ ἄνω σῶμα· καὶ γὰρ τούτῳ τι ὑπάρχει ἐν καὶ ταῦτόν. See n. 55 above for discussion of fire and sources of light.

'transparent', implies that the body is illuminated. Aristotle, then, seems to describe light both as the presence of fire in the transparent body and the state of the transparent body which is brought about by fire.

However, the description of light as the presence of fire in the transparent seems to preclude our understanding light as caused by fire or the fiery substance in an ordinary way. Consider this example of ordinary causation: fire on a stove causes water to become hot. The fire alters the water and imparts its heat. But we would not define the property heat, as it exists in the water, as the presence of the fire on the stove. Rather the fire and the water share the property heat. Whilst the heat of the fire caused there to be heat in the water, once the water is hot, the water has the property hot (at least for a while) independently of the presence of the fire. The fire can be put out and the water retains its heat. The presence of the fire is causally necessary, but certainly not an essential part of what it is for the water to be heated. In the case of light, on the other hand, Aristotle claims both that the state of illumination is brought about (the potentially transparent is excited to actuality) as a result of fire's influence, and that the state of illumination *is* the presence of the fire. It does not seem that fire alters the transparent in an ordinary way. Aristotle's claims are mysterious. It is far from clear how we ought to make sense of them.⁵⁷ I will now present Alexander's innovative reading and development of these claims.

To explain what light is and how it comes about Alexander introduces a new concept, the concept of change by virtue of relation. This notion will be central to the remainder of my

⁵⁷ One recent interpretation of these claims is put forward by Mark Kalderon in his *Form without Matter: Empedocles and Aristotle on Colour Perception*, (Oxford: OUP, 2015), 43-46. He begins with the suggestion that we understand fire as an intrinsically active thing, 'a dynamic kind'. He suggests that Aristotle's view of illumination is grounded in the premise that 'the being and continued existence of fire depends upon its activity', that the 'being of fire depends upon its distinctive activity, that a fire would cease to be should it cease to burn' (p. 44). For fire to be present in the transparent, then, is for fire to be active in the transparent. Light, on Kalderon's interpretation, is this activity of the fiery substance. He writes, 'Suppose that Heraclitean metaphysics is right to the extent that for fire, at least, to be is to burn. Putting this together with Aristotle's denial that the fiery substance is a body, we arrive at a conception of the fiery substance as an incorporeal activity. The presence of the fiery substance in a potentially transparent medium, be it air or water, just is the occurrence of this incorporeal activity, a kind of rarefied burning that instantaneously pervades the medium insofar as it is a unity' (p. 44).

thesis. For Alexander, when a source of light such as a fire or the sun is present, the potentially transparent body – the dark air or the water – undergoes a change by virtue of relation to the source of light. It becomes actually transparent or illuminated. I suggest that Alexander's notion of change by virtue of relation is his way of making sense of Aristotle's claim that light is the presence of a source of light (fire or something resembling fire) in the transparent. In order to examine further how Alexander arrives at the notion of change by virtue of relation, I now turn to his commentary on Aristotle's *de Sensu* chapter 6.

In chapter 6 Aristotle raises the question of whether light reaches a halfway point between its source and the organ of perception prior to reaching the organ of perception. In other words he asks whether light takes time to propagate, i.e. whether it travels or affects the transparent body part by part. He refers to Empedocles' view, which answers this question affirmatively:

Empedocles, for example, says that the light from the sun arrives first in the intervening space before it comes to the eye, or reaches the Earth. This might plausibly seem to be the case. For whatever is moved, is moved from one place to another; hence there must be a corresponding interval of time also in which it is moved from the one place to the other. But any given time is divisible; so we should assume a time when the sun's rays were not as yet seen, but were still travelling in the middle space (Aristotle, *de Sensu* 446a25-446b3, trans. J.I. Beare).

Here Aristotle sets down the premise that if something moves, in the sense of travelling or locomotion, it takes time to move from one place to the other. As we have seen Aristotle denies that light takes time to propagate and so rejects the view that light moves or travels. Having denied that light moves and takes time to propagate, Aristotle's next step is to explain how instantaneous propagation of light over a certain area is possible. He does this through contrasting motion, in the sense of locomotion, with qualitative change or alteration. Whilst in the case of locomotion an object must take time to travel from A to B, in the case of alteration the change can take place over a certain area all at once:

And in general, even in qualitative change the case is different from what it is in local movement. Local movements, of course, arrive first at a point midway before reaching their goal... But we cannot go on to assert this in like manner of things which undergo qualitative change. For this kind of change may possibly take place in a thing all at once, without one half of it being changed before the other; e.g. it is possible that water should be frozen simultaneously in every part. But still, for all that, if the body which is heated or frozen is extensive, each part of it successively is affected by the part contiguous, while the part first changed in quality is so changed by the cause itself which originates the change, and thus the change throughout the whole need not take place simultaneously and all at once (Aristotle, *de Sensu* 446b28-447a6, trans. J.I. Beare).⁵⁸

There are broadly two ways in which the discussion of alteration here may be understood. Either it could be the case that Aristotle discusses alteration here because the transition from dark to light is itself an alteration or, alternatively, he could be discussing alteration to compare and contrast this kind of change with the distinct kind of change undergone by the transparent body when it is illuminated. Alexander takes the latter view. Alexander claims in his commentary on *de Sensu*, that Aristotle mentions alteration here in order to provide an example of a kind of change which can occur throughout a body at the same time, thereby showing that it is possible for a body to change all at once as opposed to part by part. Alexander denies, however, that Aristotle understands illumination to be a case of alteration. Illumination is a different kind of change which is also able to occur throughout a body all at once.⁵⁹ As we shall see, Alexander's denial that a body undergoes alteration when it is illuminated is central to his view. In support of Alexander's claim that Aristotle does not mean to class illumination as a type of alteration, is the fact that Aristotle observes in the above passage that in cases of alteration, such as heating and freezing, if the area over which

⁵⁸ ὅλως δὲ οὐδὲ ὄμοιώς ἐπί τε ἀλλοιώσεως ἔχει καὶ φορᾶς· αἱ μὲν γὰρ φοραὶ εὐλόγως εἰς τὸ μεταξὺ πρῶτον ἀφικνοῦνται..., ὅσα δ' ἀλλοιοῦται, οὐκέτι ὄμοιώς· ἐνδέχεται γὰρ ἀθρόον ἀλλοιοῦσθαι, καὶ μὴ τὸ ἥμισυ πρότερον, οἷον τὸ ὕδωρ ἄμα πᾶν πήγνυσθαι. οὐ μὴν ἀλλ' ἂν ἡ πολὺ τὸ θερμαίνομενον ἡ πηγνύμενον, τὸ ἔχομενον ὑπὸ τοῦ ἔχομένου πάσχει, τὸ δὲ πρῶτον ὑπ' αὐτοῦ τοῦ ἀλλοιοῦντος μεταβάλλει καὶ ἀνάγκη ἄμα ἀλλοιοῦσθαι καὶ ἀθρόον.

⁵⁹ Alexander, *de Sensu* comm. 133, 13-22.

the change takes place is very large, the change does not in fact take place all at once. Illumination, on the other hand, does take place over vast areas, 'from extreme East to extreme West,' and still, according to Aristotle, the change occurs all at once.

If we accept, with Alexander, that illumination is not an alteration, this prompts two further interpretive questions. Firstly, there is the question of what distinguishes the kind of change to which illumination belongs from an alteration, and secondly the question of what kind of change illumination is an instance of, if not alteration. I will briefly mention one way in which these questions have been answered, before moving on to Alexander's view which opposes the notion of alteration with the notion of change by virtue of relation. G.R.T Ross, who shares Alexander's view that the transparent body does not undergo alteration when it is illuminated according to Aristotle, answers these questions by drawing on Aristotle's claim that light is an actuality (*energeia*) and his claim that light is a state (*hexis*).⁶⁰ I discuss Aristotle's claim that light is an actuality, specifically the actuality of a transparent body insofar as it is transparent, below. Ross draws a connection between these three claims – i.e. the claim that light is an actuality, the claim that it is a state and the denial that for a body to be illuminated is for it to undergo alteration – and a much discussed claim concerning potentiality and actuality made at the end of *de Anima* II.5.

In *de Anima* II.5 Aristotle claims that the transition from potentiality to actuality in the sense of *hexis*, for example the transition undergone by a potential knower from the state of ignorance to the state of possessing knowledge, is not an alteration, or at least is not alteration in the ordinary sense. Aristotle claims in II.5 that the person who, 'starting with the power to know learns or acquires knowledge through the agency of one who actually knows and has the power of teaching either (a) ought not to be said 'to be acted upon' at all (οὐδὲ πάσχειν) or (b) we must recognize two senses of alteration (δύο τρόπους εἶναι ἀλλοιώσεως), viz. (i) the substitution of one quality for another, the first being the contrary of the second, or (ii) the development of an existent quality from potentiality in the direction

⁶⁰ Ross, G.R.T., *Aristotle de Sensu and de Memoria: Text and Translation with Introduction and Commentary* (Cambridge: CUP, 1906), p. 211-214. Aristotle refers to light as a state at, for example, *de Anima* III.5 430a15 ('...a sort of positive state like light').

of fixity or nature ($\dot{\epsilon}\pi\dot{\iota}\tau\dot{\alpha}\varsigma\ \dot{\xi}\xi\dot{\epsilon}\iota\varsigma\ \kappa\dot{\alpha}\ \tau\dot{\eta}\nu\ \phi\dot{\nu}\sigma\iota\nu$) (*de Anima* II.5, 417b12-16, trans. Smith).⁶¹ Aristotle claims here that the transition from potentially being in a certain state to actually being in that state, in cases where the subject's possessing the state constitutes a kind of perfection or fulfilment of its nature (as is the case with human beings and the having of knowledge), either should not be classed as an alteration at all or else we need to distinguish between two senses of alteration.

The first of these senses of alteration is simply the substitution of one quality for a contrary quality, such as a something cold becoming hot. This is ordinary alteration. The second is the fulfilment of a potential in the direction of the perfection of the subject. Ross takes the grounds for Aristotle's denial that the transition of a body from dark to light is an alteration to be the fact that that light is an *energeia*. He claims that as an *energeia* it does not come about by alteration, at least not in the ordinary sense, since, 'the change from *dunamis* to *energeia* in the proper sense is not mere alteration from one quality to its opposite, but is a movement $\dot{\epsilon}\pi\dot{\iota}\tau\dot{\alpha}\varsigma\ \dot{\xi}\xi\dot{\epsilon}\iota\varsigma\ \kappa\dot{\alpha}\ \tau\dot{\eta}\nu\ \phi\dot{\nu}\sigma\iota\nu$ '.⁶² So for Ross the relevant distinction we ought to bring to bear when considering Aristotle's account of light is that between ordinary alteration and the transition to *energeia*.

Whilst Alexander follows Aristotle in describing light as the actuality of the transparent body, *qua* transparent (again, more on this below) and even the culmination (τελειότης) of the transparent body *qua* transparent, these are not the grounds on which he distinguishes the transition from dark to light from a case of alteration.⁶³ The relevant distinction for

⁶¹ τὸ δ' ἐκ δυνάμει ὄντος μανθάνον καὶ λαμβάνον ἐπιστήμην ὑπὸ τοῦ ἐντελεχείᾳ ὄντος καὶ διδασκαλικοῦ ἡτοι οὐδὲ πάσχειν φατέον, [ώσπερ εἰρηται] ἡ δύο τρόπους εἶναι ἀλλοιώσεως, τὴν τε ἐπὶ τὰς στερητικὰς διαθέσεις μεταβολὴν καὶ τὴν ἐπὶ τὰς ἔξεις καὶ τὴν φύσιν.

⁶² Ross, G.R.T., *Aristotle de Sensu and de Memoria: Text and Translation with Introduction and Commentary* (Cambridge: CUP, 1906), p. 211. Ross also draws on *Physics* VII, chapter 3 to make this point, in which it is claimed that 'states (hexeis), whether of the body or of the soul, are not alterations' (ἀλλὰ μὴν οὐδ' αἱ ἔξεις οὐθ' αἱ τοῦ σώματος οὐθ' αἱ τῆς ψυχῆς ἀλλοιώσεις) (246a10-11, trans. R.P. Hardie and R.K. Gaye). In this chapter of the *Physics* Aristotle also makes a general claim that when a subject is perfected, or achieves its culmination, this is not an alteration.

⁶³ 'For light is activity and culmination of transparent [material] insofar as it is such (ἔστι γὰρ φῶς ἐνέργεια καὶ τελειότης τοῦ διαφανοῦς καθὸ τοιοῦτον)' (*On the Soul*, 43, 7-8, trans. Caston).

Alexander is not between an alteration and the attainment of *energeia*, but rather between alteration and change by virtue of relation. Consider the following passage in which the term ‘movement’ covers both locomotion and alteration:

For the air and the transparent is illuminated not by means of a movement (κινήσεως), but immediately ($\alpha\theta\varrho\sigma\sigma$) from being potentially transparent it becomes actually transparent and illuminated, becoming that which possesses it from that which had not possessed it, not because it takes it and is moved. For it is *by the relation and the presence* ($\sigma\chi\acute{\epsilon}\sigma\epsilon\gamma\grave{\eta}$ καὶ $\pi\alpha\varrho\sigma\sigma\acute{\epsilon}\alpha$) of that which illuminates to that which is by nature illuminated that light is generated, as has been stated in the treatise *On the Soul*. For this is what is described there as the ‘presence of fire or that which naturally illuminates is in the transparent’, the presence which he indicated by the expression, ‘is in’ ($\grave{\epsilon}\nu\epsilon\tau\sigma\sigma\acute{\epsilon}\alpha$). For that which is on the right of something comes to be on the right not by means of a movement or a coming to be but rather not being on the right before, it comes to be on the right all together by virtue of some kind of relation to it of that which it is on the right of. So too that which is potentially transparent comes to be actually such, changing all together by virtue of some kind of relation to it of that which naturally illuminates. For everything which can come to be actually transparent and illuminated because of such a relation with that which illuminates, is illuminated all together, not beginning first from the <part> near that which illuminates and proceeding by means of transmission and movement in time to the parts that are farther away, as was the case with sound and smell (Alexander, *de Sensu Comm.*, 132,2-132,16, *trans.* Towey).⁶⁴

⁶⁴ οὐ γὰρ διὰ κινήσεως ὁ ἀλλὰ καὶ τὸ διαφανὲς φωτίζεται, ἀλλ' ἀθρόον ἐκ δυνάμει διαφανοῦς ἐνεργείᾳ διαφανὲς γίνεται καὶ πεφωτισμένον, ἔχον ἐξ οὐκ ἔχοντος γινόμενον, οὐ διὰ τὸ λαμβάνειν τε καὶ κινεῖσθαι. σχέσει γὰρ καὶ παρουσίᾳ τῇ τοῦ φωτίζοντος πρὸς τὸ πεφυκός φωτίζεσθαι τὸ φῶς, ὡς ἐν τοῖς Περὶ ψυχῆς εἴρηται. τοῦτο γάρ ἐστι τὸ εἰρημένον ἐκεῖ τὸ ‘παρουσίᾳ πρὸς ἡ τοῦ φωτίζειν πεφυκότος ἐν διαφανεῖ’, ἣν παρουσίαν διὰ τοῦ ἐνεῖναι ἐδήλωσεν. ὡς γὰρ τὸ δεξιόν τινος οὐ διὰ κινήσεως δεξιὸν γίνεται οὐδὲ διὰ γενέσεως, ἀλλὰ τῇ τοῦ πρὸς ὃ δεξιόν ἐστι ποιᾶ σχέσει πρὸς αὐτὸν ἀθρόως οὐκ ὅν πρότερον δεξιὸν γίνεται δεξιόν, οὕτω καὶ τὸ δυνάμει διαφανὲς ἐνεργείᾳ γίνεται τοιοῦτον ἀθρόως μεταβάλλον τῇ τοῦ φωτίζειν πεφυκότος αὐτὸν πρὸς αὐτὸν σχέσει ποιᾶ. πᾶν γὰρ ὅσον δύναται ὑπὸ τῆς τοιαύτης σχέσεως τοῦ φωτίζοντος ἐνεργείᾳ γενέσθαι διαφανὲς καὶ πεφωτισμένον ἀθρόως φωτίζεται, οὐκ ἀρξάμενον πρῶτον ἀπὸ τοῦ πλησίον τῷ φωτίζοντι καὶ κατὰ διάδοσιν καὶ κίνησιν ἐν χρόνῳ ἐπὶ τὰ πορρωτέρω μέρῃ διεξιόν, ὡς εἶχεν ἐπὶ τοῦ ψόφου καὶ τῆς ὄσμῆς.

Taking the beginning of the passage, in which Alexander denies that illumination occurs by means of movement and claims instead that the air immediately from being potentially transparent becomes actually transparent and illuminated, one may think that Alexander is drawing a distinction between a movement (*kinesis*) and an actuality (*energeia*) as Ross suggests. Quickly, however, he shifts his focus to the fact that illumination comes about by virtue of relation between the illuminated body and the source of illumination. He then draws comparisons not between illumination and other transitions to actualities, but rather between illumination and the gaining of relational properties such as 'being to the right of'. Just as something comes to be to the right of something else not by means of movement but by virtue of relation to a distinct object, so too the transparent comes to be illuminated by virtue of relation to a source of light.

The term Alexander uses for 'relation' is *skhesis*. It is clear that Alexander is using *skhesis* in the sense of relation from the way in which he uses it with two terms. He writes of the *skhesis* of the air, *to* the source of illumination. It is also clear from the comparisons he uses between the state of illumination and the having of relational properties such as 'being to the right of something'. I say more about these comparisons in chapter 4. When *skhesis* is used by Alexander in the context of discussing light, air and the source of illumination it ought to be read as 'relation', and so it is translated by both Caston and Towey. *Skhesis*, however, also means state or condition and is specifically used for temporary or passing states or conditions. *Skhesis* can be used in opposition to *hexis*, where *hexis* means a stable or settled condition of something and *skhesis* a temporary condition. As we shall see, understanding *skhesis* as a relation, with shades of the meaning 'temporary condition' (as most relations are), fits well with Alexander's usage of the term.

In addition to the fact that changes by virtue of relation occur all at once and not part by part (which is arguably also true of some cases of alteration), there is a key feature of changes by virtue of relation which distinguish them from alterations. When the object to which the changed subject is related ceases to stand in the relevant relation to the subject, the subject immediately loses the property or state it had gained. In a case of alteration, when a subject

is altered, for example when water is heated and changed from cold to hot, the new property is not immediately lost when the agent of the change, in this case the source of heat, is removed. When I remove my pan of water from the stove, it does not immediately revert back to being cold. By contrast, if a room is illuminated by a lamp and then that lamp is removed or turned off, the light immediately vanishes from the room and the air becomes dark. Similarly, if my computer has the property ‘being to the right of my cup of tea’ and then the cup of tea is removed, the computer immediately loses the property of being to the right of the cup of tea.

Alexander frequently emphasises this feature of change by virtue of relation, the fact that the property gained through the change is immediately lost when the object to which the changed subject is related is removed. For example, consider the following passage from his commentary on *de Sensu*:

That light depends on a relation (*ἐν σχέσει τὸ φῶς*) but not on an alteration is clear from the fact that, whereas things which are altered have not ceased from the affection that is generated in them by that which alters <them> immediately on its departure (for when that which heats departs, that which is heated by it does not immediately cease from the heat that is generated in it by <that which heats>), things that are such by virtue of their relation to something cease to be in relation to that thing in conjunction with its departure. For the father has ceased being a father when the son has died, and when that which is on the left has departed, that which is on the right is on the right no longer. The same is true of light. For it departs all together in conjunction with the departure of that which naturally illuminates (Alexander, *de Sensu Comm.* 134, 11-19, *trans. Towey*).⁶⁵

⁶⁵ Ότι δὲ ἐν σχέσει τὸ φῶς, ἀλλ' οὐκ ἐν ἀλλοιώσει, δῆλον ἀπὸ τοῦ τὰ μὲν ἀλλοιούμενα οὐκ εὐθὺ τῷ τὸ ἀλλοιοῦ ἀπελθεῖν πεπαῦσθαι τοῦ ἐγγενομένου πάθους ἐν αὐτοῖς ὑπ' αὐτοῦ (οὐ γὰρ τοῦ θεομαίνοντος ἀπελθόντος εὐθὺς καὶ τὸ θεομαίνομενον ὑπ' αὐτοῦ τῆς ἐγγενομένης ὑπ' ἔκείνου θεομότητος αὐτῷ παύεται), τὰ δὲ κατὰ τὴν πρός τι σχέσιν ὄντα τοιαῦτα, ἀπελθόντος τοῦ πρὸς ὃ ἡ σχέσις, συμπαύεσθαι καὶ ταῦτα τοῦ ἔτι εἶναι ἐν τῇ πρὸς ἔκείνοι σχέσει· υἱοῦ γὰρ ἀποθανόντος πέπαυται καὶ ὁ πατήρ πατήρ ὁν, καὶ τοῦ ἀριστεροῦ ἀπελθόντος ὁ δεξιὸς οὐκέτι δεξιός ἐστιν. οὕτω δὲ ἔχει καὶ τὸ φῶς· συναπέρχεται γὰρ ἀθρόον τῷ φωτίζειν πεφυκότι. (cf. also *On the Soul* 42,20-43,4, *On the Soul* 45,3-5, *Mantissa* 143, 4-19.)

This is how Alexander takes Aristotle's claim that light is the presence of a source of light in the transparent. The state of illumination in the transparent body is caused by the source of illumination. However, it is not caused in the ordinary way and the transparent body does not undergo alteration. The light in the transparent *is* the presence of the source of light in the sense that it is never independent of this source. The transparent body does not have the property 'illuminated' independently of the presence of the source of light. When this source is removed, the light in the air goes with it. However, one may think this is a weak reading of Aristotle's claim 'light is the presence of fire or something resembling fire'. The 'is', on Alexander's view, is not the *is* of identity. I suggest that light can only be said to be the presence of fire or the source of light on Alexander's view in the sense that we can say life is the beating of the heart. These things are not identical, but if the heart ceases to beat, life is extinguished. I discuss Alexander's concept of change by virtue of relation in more detail in chapter four.

2.2 Light as Accidentally the Colour of the Transparent

I now turn to Alexander's take on another of Aristotle's descriptions of light. In *de Sensu* Aristotle claims that light is the colour of the transparent accidentally (ἐστὶ χρῶμα τοῦ διαφανοῦς κατὰ συμβεβηκός).⁶⁶ Alexander develops this claim into a distinction between a subject's being coloured accidentally, which is the case if the colour is acquired by virtue of relation, and something's possessing its own proper colour.

Before turning to this distinction between having a colour accidentally and having a proper colour, the description of light as a colour needs some comment. Aristotle and Alexander do distinguish between coloured objects in the sense of the objects of visual perception and the illuminated bodies through which we see these coloured objects. Nevertheless, light is also conceived of by Aristotle and Alexander as a kind of colour, albeit colour in a broad sense.

⁶⁶ Aristotle, *de Sensu*, 439a18-19.

Aristotle and Alexander use colour in a narrow sense to refer to the object of visual perception which has the power to change the illuminated transparent. Aristotle gives both a functional and a material definition of colour in this narrow sense. The functional definition is found in *de Anima*: 'every colour has in it the power to set in movement what is actually transparent; that power constitutes its very nature' (418a31-418b3, *trans.* Smith). As I have mentioned, and will explore in the next section, the actually transparent is the illuminated transparent. Colour then is given a functional definition in terms of its ability to change an illuminated transparent body. Illuminated bodies and coloured bodies are not equated here, rather the one is defined in terms of its ability to act on the other. In *de Sensu* Aristotle provides a material definition of colour in the narrow sense: 'the limit of the transparent in determinately bounded body' (*de Sensu* 439b11, *trans.* J.I. Beare). I will explore the meaning of this latter claim shortly, where it will be seen that the definition excludes light. Unless stated otherwise, when I use the term 'colour', I use it in this narrow sense.

The term colour, however, is also used by Aristotle and Alexander in another broader sense, a sense which covers both light and ordinary colours. Alexander in places makes the unqualified claim that light is a colour (*de Sensu Comm.* 43,12-17, *On the Soul* 44,16) and elsewhere qualifies it, taking account of the fact that elsewhere the term colour is used and defined in the narrower sense (*de Sensu Comm.* 42,26-27; 52, 1-3; 52,9; *On the Soul* 42,7-8; 45,1).⁶⁷

To understand why light is sometimes classed as a colour in this broader sense, we ought to consider the fact that there is strong evidence that the ancient Greeks conceived of the different colour hues in terms of degrees of luminosity or brightness. Aristotle understood the different colours to be produced by certain ratios of *leukon* and *melan*. These two terms in this context are often translated as white and black, but can also be translated as light and dark.⁶⁸ The state of illumination could be understood as the colour of the transparent insofar

⁶⁷ See also *Quaest.* 1.2, 6, 16-17; 1.21, 35, 14-15; *Mant.* 144, 5-6; 144, 16; 150, 2.

⁶⁸ For discussion of the ancient concept of colour variation understood in terms of degrees of luminosity, see, for example, Mark Kalderon, *Form without Matter: Empedocles and Aristotle on Colour Perception*, (Oxford: OUP, 2015), chapters 5 and 6, and H. Osborne, 'Colour Concepts of the Ancient Greeks', *British Journal of Aesthetics* 8 (1968), 269-283.

as light is bright and in this sense a chromatic quality. It is, however, a colour of a special sort. Alexander says of light that it is 'visible in the highest degree and pre-eminently, since it is through light that the perception of the other colours is generated' (*de Sensu Comm.* 43 13-15). Whereas bright, coloured objects such as snow or a painted statue are themselves seen, an illuminated body enables this sort of coloured object to be seen. On this point it should also be noted that, for Aristotle and Alexander, both light and colours, such as the red, blue and green found in opaque perceptible objects, have the same material basis. They both are properties of transparent bodies, but transparent in a different and, again, broader sense to the way in which I have used it so far. Before discussing the distinction between the proper and accidental having of colours, I will first outline Alexander's view of transparency.

So far I have been using the term transparent to refer to see-through bodies such as air and water. This is how Aristotle uses the term in *de Anima*.⁶⁹ But there is a broader sense of transparent used by Aristotle in his *de Sensu* and picked up by Alexander. In his *de Sensu* Aristotle says the following about the transparent:

What we call transparent is not something peculiar to air, or water, or any other of the bodies usually called transparent, but is a common nature and power, capable of no separate existence of its own, but residing in these, and subsisting likewise in all other bodies in a greater or less degree (*de Sensu*, 439a20-25, *trans.* J.I. Beare).⁷⁰

Transparency (*diaphanes*), in the technical sense introduced in *de Sensu*, is not only a property of see-through substances such as air, water and glass. It is also a property of opaque, coloured objects. Transparency is that which makes certain bodies 'see-through' but only

⁶⁹ 'Now there clearly is something which is transparent, and by "transparent" I mean what is visible, and yet not visible in itself, but rather owing its visibility to the colour of something else; of this character are air, water, and many solid bodies' *de Anima*, 418b3-5, *trans.* Smith. The 'many solid bodies' Aristotle refers to here are glass, see-through stones, and other see-through solids.

⁷⁰ ὁ δὲ λέγομεν διαφανὲς οὐκ ἔστιν ἴδιον ἀέρος ἡ ὕδατος οὐδὲ ἄλλου τῶν οὕτω λεγομένων σωμάτων, ἀλλά τίς ἔστι κοινὴ φύσις καὶ δύναμις, ἡ χωριστὴ μὲν οὐκ ἔστιν, ἐν τούτοις δὲ ἔστι, καὶ τοῖς ἄλλοις σώμασιν ἐνυπάρχει, τοῖς μὲν μᾶλλον τοῖς δὲ ἄττον.

bodies of a certain kind. These bodies are ‘ἀόριστος’, or without a determinate boundary, for example air or water. In a different sort of body, bodies which have a determinate boundary, the property of transparency does not make them see-through but rather is that which makes them coloured.⁷¹

Aristotle describes transparency as ‘a common nature and power’ (κοινὴ φύσις καὶ δύναμις) present in all bodies to some degree or other. Alexander explains this power as analogous to capacities to partake of ‘heat or cold, moisture or dryness, and rarity or density to a greater or lesser degree’ (*de Sensu Comm.* 44,23-24, *trans.* Towey). Alexander notes that, as with these capacities, transparency is a capacity or power which is not separable from the body to which it belongs (44,25). Transparency is a property not a substance. There is no transparency apart from the body to which it belongs. Just as there is a capacity which allows something to receive hot and cold, to be heated and cooled, transparency is the power or capacity to receive colour in the broad sense of the term, that is, it receives ordinary colours and light (44,22). Alexander writes,

For all <qualities> which are by nature generated and exist in something else there is something underlying which possesses a suitability for being given a form in respect of <those qualities>, and it is their matter. (For some matter underlies heavy and light, large and small, hot and cold, and the other <qualities> that are analogous to these.) In the same way <there is something underlying> colours too, and the opposition in respect of them. (For colours are included in the <qualities> which by nature are generated in something else.) And this is the transparency in bodies. Bodies, insofar as they are transparent, both possess and admit colour (Alexander, *de Sensu Comm.* 44,25 - 45,5, *trans.* Towey).⁷²

⁷¹ See Aristotle, *de Sensu*, 439a18-33.

⁷² ὡς γὰρ πᾶσι τοῖς ἐν ἄλλῳ πεφυκόσι γίνεσθαί τε καὶ εἶναι ἔστι τι ὑποκείμενον ἐπιτηδειότητα ἔχον πρὸς τὸ κατ’ αὐτὸν εἰδοποεῖσθαι καὶ ὑλὴ ἔστιν αὐτῶν (καὶ γὰρ βαρεῖ καὶ κούφω καὶ μεγάλῳ καὶ μικρῷ καὶ θερμῷ καὶ ψυχρῷ καὶ τοῖς ἄλλοις τοῖς ἀνάλογον τούτοις ἔχουσιν ὑλὴ τις ὑπόκειται), οὕτω δὲ καὶ τοῖς χρώμασι καὶ τῇ κατὰ ταῦτα ἐναντιώσει (καὶ γὰρ ταῦτα τῶν ἐν ἄλλοις γίνεσθαι πεφυκότων), καὶ ἔστιν αὕτη ἡ ἐν τοῖς σώμασι διαφάνεια. καὶ τὰ σώματα, καθό ἔστι διαφανῆ, καὶ τὸ χρῶμα ἔχει τε καὶ δέχεται.

Transparency, then, is that which underlies, or the capacity to possess and receive, colour. It is not just or even primarily, however, the capacity to receive colour in the ordinary sense of colour belonging to an opaque coloured object. It is also the capacity to receive light. Whether a body receives light or colour (in the ordinary sense), depends on what sort of body it is, whether it is a limited or determinately bounded body, or whether it is an unlimited body without a determinate boundary.

This distinction between limited and unlimited bodies is found in Aristotle (*de Sensu* 439a18-33), but is developed and assumes greater importance in Alexander.⁷³ The term used by Aristotle and Alexander to refer to unlimited bodies such as air and water is ἀόριστος, which Beare and Towey translate as ‘indeterminate’. Forms of the verb ὁρίζω are also used to mark the distinction between limited and unlimited transparency.⁷⁴ Ορίζω ought to be understood in this context as ‘to limit’, ‘provide a boundary’ or ‘make determinate’. Αόριστος bodies are those without an intrinsic limit or boundary. In this sense, they are not determinate.

It is not clear from Aristotle’s text what the nature of the limit or boundary he refers to is, but Alexander is clear that we ought to understand the boundary as a fixed spatial boundary. Limited bodies would then be solid bodies, those with a fixed spatial boundary, whereas unlimited bodies would be fluid bodies, those for which their boundary is not determined intrinsically but instead is determined by other bodies. In his commentary on *de Sensu*, Alexander writes the following:

⁷³ Bergeron and Dufour comment on this development by Alexander of the concept of the unlimited transparent which exists only in bare outline in Aristotle’s texts. M. Bergeron and R. Dufour, *Alexandre d’Aphrodise: De l’âme* (Paris : Librairie Philosophique J. Vrin, 2008). Commenting on 44,5 : ‘Première mention du diaphane <<indéfini>>. Il s’agit de corps qui n’ont pas de limites définies, comme l’air et l’eau. Ces expressions qui deviennent très techniques chez Alexandre sont à peine esquissées par les traités que l’on connaît d’Aristote.’

⁷⁴ Aristotle also once uses the phrase τι εἶναι ἔσχατον (439a26) when referring to the limited transparent, meaning by this that the body he is referring to has an extremity, i.e. is limited or bounded.

<The> indeterminate transparent is that which is fluid and does not possess a limit proper <to itself>; by this he [Aristotle] distinguishes the solid body from <the fluid>... This is how he shows the differentiation between light and colour, and between the transparent <bodies> in which these <are present>. For light is in the transparent <body> which is indeterminate and does not possess an end proper <to itself>. For just as bodies of this sort, in so far as they are bodies, do not possess a boundary proper <to themselves> but are always being defined and bounded by another <body>, so too they do not possess a colour proper to themselves. This is because the colour of the body is its boundary, in so far as <the body> is transparent and able to admit colour and visible, whereas <indeterminate bodies> do not possess the boundary proper <to themselves> (*de Sensu Comm.* 48,17-49,5, trans. Towey).⁷⁵

It is clear from this passage that Alexander is understanding the limit of a body in this context, as a fixed spatial limit. Colour (being used now in the narrow sense) is that which is found in solid bodies, those bodies with their own boundary. Light is found in fluid bodies, those bodies which are only limited by other solid bodies. For example, a body of water may be limited by the jug it is in or a body of air may be limited by the walls of a room. Alexander claims that such bodies, bodies without their own boundary, do not possess a colour proper to themselves.

Alexander's explanation, an explanation not found in Aristotle's texts, for why unlimited transparent bodies such as air or water do not have their own proper colour is based on Aristotle's claim that 'we may define colour as the limit of the transparent in determinately bounded body' (*de Sensu* 439b11-12, trans. J.I. Beare).⁷⁶ Aristotle stresses that colour is the limit of the transparent and is careful to distinguish between the limit of the transparent and

⁷⁵ Αόριστον μὲν γὰρ διαφανὲς τὸ ύγρὸν καὶ μὴ ἔχον οἰκεῖον ὅρον, ὃ ἀντιδιαιρεῖται τὸ στερεὸν σῶμα...τὴν διαφορὰν δὲ φωτός τε καὶ χρώματος καὶ τῶν ἐν οἷς ταῦτα διαφανῶν δείκνυσι διὰ τούτων. τὸ μὲν γὰρ φῶς ἐν τῷ ἀορίστῳ διαφανεῖ καὶ οἰκεῖον οὐκ ἔχοντι τέλος. ὡς γὰρ οὐκ ἔχει τὰ τοιαῦτα σώματα, καθὸ σώματα, οἰκεῖόν τι πέρας, ἀλλ' ἀεὶ ύπὸ ἄλλου ὁρίζεται καὶ περατοῦται, οὗτος οὐδὲ χρῶμα οἰκεῖον ἔχει τῷ τὸ μὲν χρῶμα πέρας καὶ τοῦτο εἶναι τοῦ σώματος, καθὸ διαφανές τε καὶ χρώματος δεκτικὸν καὶ ὄρατόν, ταῦτα δὲ μὴ ἔχειν οἰκεῖον πέρας.

⁷⁶ ὥστε χρῶμα ἀν εἴη τὸ τοῦ διαφανοῦς ἐν σώματι ὠρισμένω πέρας.

the limit of a body, *qua* spatially extended body (*de Sensu* 439a31-33). Whilst these two limits occur at the same place (in opaque solid objects at least), they are not the same. Colour is not the surface or limit of the body *qua* spatially extended body, although it occurs here, it is rather the limit of the body *qua* transparent. Alexander infers from the claim that colour is the limit or boundary of the transparent body *qua* transparent, that non-solids, transparent bodies without a fixed spatial limit or boundary, cannot possess colour.⁷⁷ In this there is the assumption that the limit of a body *qua* transparent and the surface of a solid body cannot come apart. To not possess a fixed limit *qua* spatially extended body is to not possess a limit *qua* transparent and therefore not to possess a proper colour.⁷⁸

There is a problem with Alexander's claim that unlimited transparent bodies are to be understood as fluid bodies and limited transparent bodies are to be understood as solid bodies since this ought to entail that all solid bodies are opaque with their own proper colour and all fluid bodies are light-receiving and therefore see-through. And yet Alexander acknowledges that there can be solid, see-through bodies, for example transparent stones (*de Sensu* comm. 26,27-27,1). It also seems that there are fluid bodies which are opaque with their own proper colour, for example, milk. However, I will set this problem aside and turn to Alexander's distinction between the proper and accidental having of colours.

Alexander connects Aristotle's claim that light is 'accidentally (κατὰ συμβεβηκός) the colour of the transparent' (*de Sensu* 439a18), with the claim that the transparent does not undergo alteration when it is illuminated. Another way Alexander expresses the claim that a subject does not undergo alteration, is to say that it is not affected. It receives a property but μὴ παθητικῶς, i.e. not in a way which involves its being affected. When a subject undergoes change by virtue of relation, so Alexander claims, it receives a property μὴ παθητικῶς. In the passage below Alexander understands the claim that light is accidentally the colour of the transparent, in terms of his claim that the transparent, in receiving light, is not altered or affected but rather undergoes change by virtue of relation. The mark of a change by virtue of

⁷⁷ Specifically, they cannot possess a colour *of their own*, or 'proper colour'.

⁷⁸ See also *Quaest.* 1.2 5,11-15.

relation as opposed to an alteration, as noted above, is that the subject does not remain in the changed state after the object to which it bears a relation is removed. Alexander writes,

[Aristotle] reminds us of what was said about light in *On the Soul*, namely ‘that it is accidentally <the> colour of the transparent’. For it was shown in that work that light is <the> actuality of the transparent, *qua* transparent, and as it were <the> colour of the transparent, not without qualification but accidentally, because the transparent does not take on light in a way that involves its being affected ($\mu\eta\pi\alpha\theta\eta\tau\iota\kappa\omega\varsigma$). Rather it is illuminated at some times but not at others depending upon the sort of relation to it of that which illuminates by nature. For this reason light is not a colour that is proper (*oiketion*) to <the transparent> in the way that <the colours of> the other <bodies>, those that are coloured, are proper <to them>. For in them their colour remains, because it is proper to them, but this is not the case with light (Alexander, *de Sensu Comm.* 42,23-43,4, *trans.* Towey).⁷⁹

The distinction is between colours proper to the transparent, i.e. the colours of opaque solid objects, and colour (in a broad sense) accidental to the transparent such as light.⁸⁰ It is the unlimited transparent bodies which acquire colour in this latter way and such bodies do not have their own proper colours. In chapter four, I will be further exploring change by virtue of relation and hence exploring what it is to receive a colour accidentally without being altered or affected. For now, I will examine what Alexander means by proper colour, to get more of a sense of what change by virtue of relation is not.

The following passages are revealing as to what Alexander means by ‘proper colour’. In these passages Alexander introduces another way to draw the distinction between the way

⁷⁹ Υπομιμήσκει ἡμᾶς τῶν ἐν τοῖς Περὶ ψυχῆς εἰρημένων περὶ φωτός, ὅτι ἐστὶ χρῶμα τοῦ διαφανοῦς κατὰ συμβεβηκός. ἐδείχθη γὰρ ἐν ἐκείνοις ὅτι τὸ φῶς ἐστιν ἐντελέχεια τοῦ διαφανοῦς, ἡ διαφανές, καὶ ὥσπερ χρῶμα τοῦ διαφανοῦς, οὐχ ἀπλῶς, ἀλλὰ κατὰ συμβεβηκός, ὅτι μὴ παθητικῶς ἀναδέχεται τὸ διαφανὲς τὸ φῶς, ἀλλὰ κατὰ σχέσιν τὴν πρὸς αὐτὸν ποιάν τοῦ φωτίζειν πεφυκότος ποτὲ μὲν πεφώτισται, ποτὲ δὲ οὐ. διὸ οὐκ οἰκεῖον αὐτοῦ χρῶμα τὸ φῶς ὥσπερ τῶν ἄλλων τῶν κεχρωσμένων· ἐν ἐκείνοις μὲν γὰρ μένει τὸ χρῶμα ὡς οἰκεῖον ὅν, ἐπὶ δὲ τοῦ φωτὸς οὐχ οὕτως.

⁸⁰ See also Alexander, *de Sensu Comm.* 43, 20-23; *On the Soul* 44, 3-4, 46, 7-9.

in which light is in unlimited transparent bodies and the way in which colour is in solid bodies. He describes unlimited transparent bodies as illuminated ‘from outside’ ($\xi\xi\omega$) or by something external to them ($\upsilon\pi\tau\omega\tau\iota\nu\omega\varsigma\ \acute{\epsilon}\kappa\tau\omega\varsigma$). This is another way of making the claim that they are illuminated by virtue of relation. The contrary to this is to be coloured ‘inside’ ($\acute{\epsilon}\nu\tau\omega\varsigma$) or to have the colour ‘inside, co-mingled and compresent’ ($\acute{\epsilon}\nu\tau\omega\varsigma\ \kappa\acute{a}\ \mu\epsilon\mu\gamma\mu\acute{e}\nu\omega\varsigma\ \kappa\acute{a}\ \sigma\upsilon\eta\omega\varsigma\ \acute{\epsilon}\chi\acute{e}\iota$). Here are the passages:

[Air and water] are coloured outside because they are illuminated and coloured by something from outside, not possessing *a colour* proper *to themselves*. (For he describes the *bodies* which possess colour from themselves and *possess* one proper *to themselves* as coloured inside because they possess as something proper *to themselves* and within themselves their colour and that which is responsible for their colour) (*de Sensu Comm.* 50, 4-7, *trans.* Towey).⁸¹

Transparent [material] without a definite shape... is coloured by something external [to it]... Hence, it is illuminated when they are present, but when they leave, the light departs together with them. The transparency in solids, in contrast, has the colour inside, co-mingled and compresent. Hence, it is not present in it at one time and not another, as happens with light in transparent [materials] without a definite shape (*On the Soul* 44, 23-45, 7, trans. Caston).⁸²

For an object to have its own proper colour, is for it to have the colour ‘inside’. Of course this does not mean ‘inside’ as opposed to on the surface. We get a sense of what is meant by having the colour ‘inside’, from the additional claim that the objects contain within themselves that which is responsible for their colour, and the claim that the colour is co-

⁸¹ ἔξω δὲ εἶπε ταῦτα χρωματίζεσθαι, ὅτι ὑπό τινος ἔξωθεν φωτίζεται τε καὶ χρώννυται οἱκεῖον οὐκ ἔχοντα <χρῶμα> (τὰ γὰρ ἐξ αὐτῶν καὶ οἱκεῖον ἔχοντα χρῶμα ἐντὸς κεχρῶσθαι λέγει, διότι οἱκεῖον ἔχει καὶ ἐν αὐτοῖς τὸ χρῶμα καὶ τὸ αἴτιον τοῦ χρώματος).

⁸² τὸ μὲν οὖν ἀόριστον διαφανές...ύπο τινος ἐκτὸς ὅντος χρωματίζεται...διὸ καὶ παρόντων μὲν αὐτῶν πεφώτισται, ἀπελθόντων δὲ συναπέρχεται καὶ τὸ φῶς. ή δὲ ἐν τοῖς στερεοῖς διαφάνεια ἔντὸς καὶ μεμιγμένον καὶ συνὸν ἔχει τὸ χρῶμα. διὸ οὐ ποτὲ μὲν πάρεστιν αὐτῇ, ποτὲ δ' οὐ, ὡς τοῖς ἀορίστοις διαφανέσιν τὸ φῶς.

mingled with the solid body. That which is responsible for the colour of a solid object is part of the material composition of that object. In this sense, the colour is intrinsic to the body, just as the hardness or softness would be intrinsic to the body, as these properties also depend on its material constitution and are not determined ‘from outside’.

This reading of ‘coloured inside’ is confirmed by the passage in which Alexander gives his commentary on Aristotle’s explanation of the differentiation of colours in bodies. Alexander explains that the hue of a particular coloured object is dependent on its material constitution, specifically the proportion of different elements which compose it. The most important element in this regard is the bright and fiery nature (*de Sensu Comm.* 52,16) or that which ‘by nature illuminates’ (53,11-12). This fiery element is described as ‘that by which the transparent is naturally coloured’ (*de Sensu Comm.* 52,15, *trans.* Towey) and ‘that which provides and is responsible for the colour’ (52,18). Those bodies which possess the greatest proportion of this fiery element are white, bodies which possess none or very little of this fiery element are black. The intermediate colours are created by different proportions of the fiery element on a scale from white to black.⁸³

According to Alexander, it is this same bright and fiery nature which is responsible for light in the unlimited transparent and ordinary colour in solid bodies. Without a source of light, a fire or fire-like body, the indefinite transparent is dark. Analogously, without this fiery element within it, a solid body is the colour black. The difference between these cases however, is that, whereas in the case of the unlimited transparent a fire-like body is present and illuminates it by virtue of relation, in the case of solid bodies the fiery element is mixed in with the other elements which compose the body. In this sense the colour, or what is responsible for the colour, is ‘inside’ the coloured object and that which is responsible for light in the unlimited transparent is outside. This is what it means to say that solid bodies

⁸³ This supports a popular theory, mentioned above (n. 68), that the ancient Greeks understood different colours in terms of relative brightness as opposed to different hues. Richard Sorabji, for example, writes ‘Aristotle’s words *melan* and *leukon* are inevitably translated as black and white, but hue was not sharply distinguished by the Greeks from brightness and darkness’ (*Aristotle on Colour, Light and Imperceptibles* *Bulletin of The Institute of Classical Studies* 47 (2004), 130). For more on this see H. Osborne, ‘Colour concepts of the ancient Greeks’, *The British Journal of Aesthetics* 8 (1968), 269-83.

have a proper (*oiketiov*) colour and unlimited transparent bodies do not.⁸⁴ Again, I will return to these issues in chapter four.

In this section, I have introduced the broader technical meaning of transparency found in the *de Sensu* and Alexander's commentary: transparency as the power to receive colour and light. For the remainder of the thesis, however, I will use transparency in the narrower sense where to be transparent is to be actually or potentially see-through.

2.3 Light as the Actuality of the Transparent, *qua* Transparent

The final description of light I will discuss is the definition of light as 'the actuality of what is transparent *qua* transparent' (Aristotle, *de Anima* 418b10-11). I will begin by discussing what Aristotle means by transparent in this context. Aristotle writes that transparency is to be understood as 'what is visible, and yet not visible in itself, but rather owing its visibility to the colour of something else' (*de Anima* 418b3-5, *trans.* Smith). This definition is different from the definition found in *de Sensu*, on which transparency is a capacity found in all bodies to receive colours. Aristotle makes it clear that the *de Anima* definition covers only the property belonging to see-through bodies such as air, water and certain solids such as glass. In *de Sensu* Aristotle is concerned with the nature of light and colour, and uses the broader notion of transparency in order to explain this. In *de Anima*, he is concerned with vision and the medium for visual perception, and discusses transparency only insofar as the property enables perception to occur through a body such as air or water.

On the *de Anima* definition of transparency, to be transparent is to be visible but to owe this visibility to the colour of something else. But what does it mean in this context for the transparent body, the air or water for example, to owe its visibility to something else? One suggestion which receives support amongst contemporary commentators is that to define light in this way is to define it in terms of its role in allowing perceptible objects to be seen. Richard Sorabji describes it as Aristotle's 'functional' definition of light and writes that '[light] is defined by reference to its function...as the state in which the transparent is

⁸⁴ On this point see also *On the Soul* 45, 17-20.

actually, not just potentially seeable through. That commonsensical idea is all that is meant by the sonorous phrase ‘actualization of the transparent’.⁸⁵ Mark Kalderon expresses a similar idea, suggesting that ‘the sense in which [light] is visible at all depends upon and derives from the visibility of things that appear in it and through it’.⁸⁶ To define light as the actuality of the transparent, in this sense of transparent, is to say that to be illuminated is to be actually visible but to owe this visibility to the colour of something else. Kalderon and Sorabji understand this visibility as the ability of the transparent to make it that *other things* appear to a perceiver. Things can be seen through it, or, put in terms which fit better with the Aristotelian picture of visual perception, things appear through it to a perceiver.

Alexander seems to take the same view. On light as the actuality of the transparent, Alexander writes the following:

Now illuminated things, as I said, are actively (*κατ' ἐνέργειαν*) transparent. For when something can actively appear through (*diaphanesthai*) them, they are actively transparent (*diaphane*) in the fundamental sense (*On the Soul* 43, 4-6, trans. Caston).⁸⁷

The first thing to note is Caston’s translation of *kat’ energeian* as ‘actively’. I have so far been referring to the ‘actually’ transparent as opposed to the ‘actively’ transparent. As mentioned in a note to the previous chapter (Chapter 1, n. 48), for the purposes of this study a position need not be taken on whether or when *energeia* ought to be translated as actuality and whether or when it ought to be translated as activity. I stated in this note that, given the fact that the subtleties of Aristotle’s *dunamis-energeia* distinction play little role in Alexander’s account of visual perception, it is sufficient to understand *dunamis* as a power or capacity and *energeia* as the exercise of this power or capacity. We need not take a position on

⁸⁵ R. Sorabji, ‘Aristotle on Colour, Light and Imperceptibles’ *Bulletin of The Institute of Classical Studies* 47 (2004), 131-132.

⁸⁶ *Form without Matter: Empedocles and Aristotle on Colour Perception*, (Oxford: OUP, 2015), p.41.

⁸⁷ ἔστιν οὖν κατ’ ἐνέργειαν, ὡσπερ εἶπον, διαφανῆ τὰ πεφωτισμένα. ὅτε γὰρ δύναται διαφαίνεσθαι τι κατ’ ἐνέργειαν δι’ αὐτῶν, τότε ἔστι κυρίως τε καὶ κατ’ ἐνέργειαν διαφανῆ.

whether it is best to class the capacity as a capacity to be or to do, or whether it is best to class the exercise as an actuality or an activity.

When it comes to the claim light is the *energeia* of the transparent, the translations I am primarily drawing on (Hamlyn and Smith for Aristotle, Caston and Towey for Alexander), all use ‘activity’ or ‘actively’ to translate *energeia* and *kat’ energian*. I prefer actuality and actually in this context since what is described by the transparent *kat’ energian* on Sorabji and Kalderon’s reading of Aristotle and on Alexander’s view is a temporary state of the transparent body in which coloured objects may appear through it to a perceiver. The role of the transparent medium is to an extent a passive, enabling role. The coloured objects act on the illuminated medium and by means of it they are able to be seen. To be transparent *kat’ energian*, is not necessarily to actively do anything, but to have the ability to be acted on by coloured objects and to enable them to be seen. I feel this notion of an enabling temporary state is captured better by ‘actuality’ than ‘activity’. However, whilst I prefer actuality for these reasons, I am not claiming that it is necessarily inappropriate to describe the state of illumination as an activity. I do not intend here to make substantive claims about the metaphysical status of the state of illumination. For the remainder of this section, when quoting the text, I will give the translation of *energeia* the translators provide, but for consistency will place ‘actuality’ or ‘actually’ in brackets afterwards.

Returning to Alexander’s view, in the above passage he states that transparent bodies are actually transparent ‘when something can actively [actually] appear through them’. Like Kalderon and Sorabji, he links actual transparency (*diaphanes*) to the ability for things to appear through (*diaphanesthai*) the transparent body. Alexander draws a distinction between transparency in the broad sense of the capacity in a body to receive colour (or light), and things which are ‘transparent in the highest degree’ (μάλιστά ἔστι τε καὶ καλεῖται διαφανές) or ‘peculiarly transparent’ (ἰδίως δὲ διαφανῆ). He refers here to unlimited transparent bodies. Something qualifies as transparent in this special sense because ‘it receives...light and is responsible for other things’ appearing’ (*On the Soul* 44, 23-25, trans. Caston).⁸⁸ These claims are also made in his commentary on *de Sensu*. Alexander writes,

⁸⁸ τουτέστι τὸ φῶς δέχεσθαι καὶ τῷ τοῖς ἄλλοις αἴτιον τοῦ φαίνεσθαι εἶναι.

Bodies whose colour is light are peculiarly transparent. For bodies which admit light (*phaeos* or *phos*), through which all visible bodies are seen, I generally described as transparent for both reasons, because they admit light (*phos*), i.e. *phaeos*, and because they are responsible for the fact that all other bodies come to light (*phainesthai*) and are seen. For colours are seen through this (i.e. the transparent body) and cause movement in this...We call the body through which colours appear (*phainetai*) peculiarly transparent (*diaphanes*) (*de Sensu comm.* 45, 9-21).⁸⁹

In this passage, we see Alexander employing the term transparent both in the sense of that which receives colour or light and in the sense of that which enables other bodies to appear through it and be seen. Alexander interprets Aristotle as claiming that light is the actuality of the transparent in the latter sense. A transparent body without light, such as dark air or water, is potentially but not actually transparent. Dark air does not allow the colours to appear through it, and so the perceiver cannot see in darkness. Dark air, however, as opposed to an opaque screen, has the potential to allow colours to appear through it. All it requires is to be brought to actuality through illumination, the taking on of light. When illuminated, a transparent body such as air is actually transparent. It actually allows colours to appear through it. Frequently Aristotle refers to light simply in this capacity, as that which is necessary in order for a coloured object to be seen (see *de Anima* II.7 418b3-4, 419a7-8, III.3 429a4-5, *de Sensu* 6, 447a12).

So far I have discussed Alexander's understanding, as I see it, of three claims made by Aristotle concerning light: that it is the presence of fire or something resembling fire in what is transparent, that it is accidentally the colour of the transparent and that it is the actuality of the transparent *qua* transparent. The first two of these claims concern what light is and the last claim concerns its function. In the final part of this chapter, I will discuss what happens, according to Alexander, when coloured objects change the illuminated transparent.

⁸⁹ ὅν δὴ τοῦτο χρῶμα, ταῦτα ιδίως διαφανῆ. τὰ γὰρ δεχόμενα τὸ φάος ἔτοι φῶς, δι' οὐ πάντα τὰ οὐράμενα όρᾶται, ταῦτα λέγεται συνήθως διαφανῆ κατὰ ἄμφω, ὅτι τε τὸ φῶς δέχεται, ὁ ἐστι φάος, καὶ διότι τοῖς ἄλλοις πᾶσιν αἵτια ταῦτα τοῦ φαίνεσθαι τε καὶ όρᾶσθαι τὰ γὰρ χρώματα διὰ τούτου όρᾶται καὶ τούτου κινητικά...δι' οὐ δὴ ταῦτα φαίνεται, τοῦτο δὲ ιδίως καλοῦμεν διαφανές.

2.4 The Changing of the Illuminated Transparent

In the previous chapter, I noted that for Alexander the medium serves as a messenger, transmitting colour from the object of perception to the eye. For colour to be seen, it must change the medium between itself and the eye. This change consists in the receiving of colour, not as the receiving of a corporeal efflux, but rather as the receiving of form. We are now in a position to examine in what way the illuminated transparent medium is changed by colours and in what sense it receives colour.

Alexander claims that coloured objects produce the same kind of change in the illuminated transparent as a source of light produces in the potentially transparent, and the kind of change a source of light produces in the potentially transparent is a change by virtue of relation. Alexander writes,

The movements (*κινήσεις*) from the colours come about in that which is transparent in actuality in the same way as light comes about in the transparent (*de Sensu Comm.*, 135 18-19, *trans.* Towey).⁹⁰

That which is transparent does not admit (*δέχεσθαι*) any colour in itself in a way that involves it being affected, because it does not admit even light in this way at all. When light is removed from the transparent it ceases in conjunction with that which naturally illuminates (*de Sensu Comm.*, 19, 5-7, *trans.* Towey).⁹¹

This point is made too in the *Quaestiones*:

⁹⁰ αἱ γὰρ ἀπὸ τῶν χρωμάτων κινήσεις ἐν τῷ διαφανεῖ τῷ κατ' ἐνέργειαν ὄμοίως γίνονται, ὡς τὸ φῶς ἐν τῷ διαφανεῖ.

⁹¹ τῷ μηδὲν χρῶμα τὸ διαφανὲς παθητικῶς ἐν αὐτῷ δέχεσθαι, ὅτι μηδὲ τὴν ἀρχὴν τὸ φῶς· καὶ γὰρ ἐκεῖνο ἐκ <στὰν> τοῦ διαφανοῦς συμπαύεται τῷ φωτίζειν πεφυκότι.

By being receptive of and a messenger for the colour of other things, it [the unlimited transparent medium] does not take on any of these in a way that involves it being affected. Rather, it is moved by them according to the presence and sort of relation to this [the unlimited transparent medium] of the bodies which possess their own proper colour...So for as long as it [the unlimited transparent medium] is illuminated, it receives the qualities and differentiations of other colours too, just as [it does] the light, and acts as a messenger (*διάκονον*) for the visual senses (*Quaestiones* 1.2, 6, 9-21 *trans.* Sharples).⁹²

The illuminated transparent is changed by the coloured object and yet it is not altered or affected, and when that which causes the change is removed, the changed subject immediately reverts back to its pre-change state. (I examine the notion of change by virtue of relation in more detail in chapter 4, and in that chapter will show the sense in which something may be said to be changed and yet not to be altered or affected.)

It may be remembered from the previous chapter that Burnyeat too denies that the change undergone by the illuminated transparent when acted on by colours is a case of genuine alteration. But Alexander's change by virtue of relation is very different from the spiritual kind of change Burnyeat understands Aristotle's view to involve. This is evident from the fact that the kind of change undergone by the transparent on Alexander's view sometimes results in the transparent medium becoming perceptibly coloured.

In certain cases on Alexander's view, when the transparent medium is acted on by particularly bright and vivid colours, these colours are visible in the medium. Consider the following passage from *On the Soul*,

For colour is what is capable of producing change in that which is actively transparent.
Air, water, and any solid which does not have a colour of its own, are transparent, and

⁹² τῷ δ' ἀλλοτρίων χρωμάτων γίνεσθαι δεκτικόν τε καὶ διάκονον οὐδὲν μὲν αὐτῶν παθητικῶς ἀναλαμβάνει, κινούμενον δ' ὑπ' αὐτῶν κατὰ τὴν παρουσίαν τε καὶ ποιὰν σχέσιν πρὸς ταῦτα τῶν ἔχοντων χρῶμα οἰκεῖον σωμάτων ...ἔστ' ἀν οὖν ἡ πεφωτισμένον καὶ τὰς τῶν ἄλλων χρωμάτων ποιότητάς τε καὶ διαφορὰς ὁμοίως δεχόμενον, ὡς καὶ τὸ φῶς, διάκονον γίνεται ταῖς ὁρατικαῖς αἰσθήσεσιν.

when they are changed in a certain way (*κινούμενα δέ πως*) by colours, they are able to transmit to sight so that there is awareness of [colours]. They become actively transparent whenever they are illuminated, for colours can produce change (*κινητικά*) in them if they are in this condition. For it is clear that light and transparent [materials] that have been illuminated are changed in a certain way by colours, from the fact that in many cases when colours are seen through the light, one sees the [transparent material] come to be the same colour and carry the colour along with it. For it itself appears golden from the presence of gold, purplish from murex dye, and greenish from foliage. Often one can see facing walls or the ground to be this sort of colour, as though they were tinged with the colour of these things, or even people, if they happen to be standing nearby, because what is illuminated relays this particular type of colour from one set of things to the other by being modified. For the colour comes to be present in (*γίνεται ἐν*) what is illuminated and in light in the same way that light comes to be present in what is transparent, though what is transparent does not receive (*δεχομένου*) light or light colour in virtue of an effluence or in the way matter [receives something]. In fact, when the things that produce these [effects] have gone away, the colour immediately leaves the light as well (in the case where the things that tinge it go away) and light leaves the transparent (in the case where what illuminates is not present). The sort of change that arises from both sources occurs in what receives them in virtue of a presence and a particular sort of relation, much as [the reflections] in mirrors come to be present in them (*On the Soul*, 42,19 - 43,4, trans. Caston).⁹³

⁹³ χρῶμα ἔστι τὸ κινητικὸν τοῦ κατ' ἐνέργειαν διαφανοῦς. ἔστι δὲ διαφανή μὲν ὅ τε ἀήρ καὶ τὸ ὕδωρ καὶ ὄσα τῶν στερεῶν οἰκείω οὐ κέχοηται χρώματι, κινούμενα δέ πως ὑπὸ τῶν χρωμάτων διακονεῖσθαι τῇ ὄψει δύναται πρὸς τὴν ἀντίληψιν αὐτῶν. ταῦτα δὲ κατ' ἐνέργειαν γίνεται διαφανῆ, ὅταν ἡ πεφωτισμένα. οὕτως γὰρ ἔχόντων αὐτῶν κινητικὰ τὰ χρώματα. ὅτι γὰρ τὸ φῶς καὶ τὰ πεφωτισμένα τῶν διαφανῶν ὑπὸ τῶν χρωμάτων κινεῖται πῶς, δῆλον ἐκ τοῦ πολλοῖς τῶν χρωμάτων τῶν διὰ τοῦ φωτὸς ὁραμένων ὄμόχροον ὄρᾶν γινόμενον αὐτὸ καὶ συναναφέρον αὐτῷ τὸ χρῶμα. ἀπὸ γὰρ χρυσοῦ χρυσοειδές καὶ αὐτὸ φαίνεται καὶ ἀπὸ ἀλουργοῦς πορφυροειδές, καὶ ἀπὸ τῶν χλωρῶν ποῶδες. πολλάκις δὲ ἔστιν ἰδεῖν καὶ τοὺς καταντικὸν τοίχους τοῦ τοιούτου χρώματος καὶ τὸ ἔδαφος ὥσπερ χρωννύμενα τῷ ἐκείνων χρώματι, καὶ εἴ τινες δὲ παρεστῶτες τύχοιεν, ὡς τοῦ πεφωτισμένου τῷ πάσχειν ἀπ' αὐτῶν διαδιδόντος καὶ ἐπὶ ταῦτα τὸ τοιόνδε χρῶμα. γίνεται δὲ τὸ χρῶμα ἐν τῷ πεφωτισμένῳ τε καὶ φωτὶ οὕτως ὡς καὶ τὸ φῶς ἐν τῷ διαφανεῖ, οὔτε κατὰ ἀπόρροιάν τινα, οὔτε ὡς ὑλῆς ἡ τοῦ διαφανοῦς δεχομένου τὸ φῶς ἡ τοῦ φωτὸς τὸ χρῶμα (ἀπελθόντων γοῦν τῶν ταῦτα ἐμποιούντων εὐθὺς συναπέρχεται τὸ μὲν χρῶμα ἐκ τοῦ φωτός, εἰ τὰ χρωννύντα αὐτὸ ἀπέλθοι, τὸ δὲ φῶς ἐκ τοῦ διαφανοῦς, εἰ τὸ φωτίζον αὐτὸ μὴ παρείη), ἀλλ' ἔστι τις ἡ ἀπ' ἀμφοτέρων κίνησις ἐν τοῖς δεχομένοις αὐτὰ γινομένη κατὰ παρουσίαν τε καὶ ποιὰν σχέσιν, ὡς γίνεται καὶ ἐν τοῖς κατόπτροις τὰ ἐν αὐτοῖς ὄρῶμενα.

In the second half of this passage we again find the claim that colour comes to be in the illuminated transparent in the same way that light comes to be in the potentially transparent. The final line makes explicit that the change produced in the transparent and the illuminated transparent by the source of light and the coloured object respectively ('from both sources'), occurs by virtue of 'a presence and a particular sort of relation'.⁹⁴ As such, neither effect remains when the source of the change is removed. Alexander then draws a comparison between these changes and reflections coming to be present in mirrors. This comparison is revealing and will be discussed in the next chapter. In this passage we also find the claim that the potentially transparent does not receive light and the illuminated transparent does not receive colour 'as matter' ($\omega\varsigma \tilde{\nu}\lambda\eta\varsigma$), a phrase translated by Caston as 'in the way matter receives something'. This phrase is crucial for the understanding of change by virtue of relation and I discuss it in detail in chapter four.

In this passage, Alexander claims that 'in many cases when colours are seen through the light, one sees the [transparent material] come to be the same colour and carry the colour along with it'. He cites cases of air becoming golden from the presence of gold, purplish from murex dye, and greenish from foliage. These bright colours tinge the air, making the transparent medium perceptibly coloured. This idea of the medium becoming perceptibly coloured in some way had a significant place in ancient and late ancient theories of perception. Rudolph Siegel discusses a view attributed to Democritus that corporeal

⁹⁴ The meaning of this final line is worth spelling out as, in my view, and in the view of Caston, it has been interpreted wrongly by Frederic Schroeder in his 'The Analogy of the Active Intellect to Light in the "De Anima" of Alexander of Aphrodisias', *Hermes* 59 (1981), 215-25. The relevant section is found at 217-218. Schroeder takes 'both sources' ($\alpha\pi'\ \alpha\mu\phi\tau\epsilon\varrho\omega\nu$) in the final sentence to refer to the coloured object and the illuminated transparent in the case of the change brought about by colours, and the source of light and the potentially transparent in the case of illumination, as opposed to referring just to the coloured object and the source of light respectively. There is no reason here to take Alexander, as Schroeder does, to be referring to the transparent itself as a source of change as opposed to simply that which undergoes change. On this point Victor Caston writes, 'Alexander has been treating the two cases [colour and light] in tandem from 42,19 on and is using 'both' here to refer back directly to the 'things that produce these effects' ($\tau\tilde{\omega}\nu\ \tau\tilde{a}\tilde{u}\tau\alpha\ \tilde{\epsilon}\mu\pi\tilde{o}\iota\tilde{o}\tilde{u}\nu\tau\omega\nu$, 42,22) a few lines before, which are explicitly identified as the colour (42,23) and the light (43,1)' (Caston, V., Alexander of Aphrodisias *On the Soul. Part 1*, (London: 2012), p. 156 n. 376.)

emanations from visible objects form a kind of imprint in the air which would be the immediate object of perception. Siegel puts forward the interesting suggestion that, 'this strange idea of imprints in the air may have had its origin in the observation of reflections in countries near sea or desert. Occasional occurrence of so called *fata morgana* is the pictorial appearance in the air due to some reflection.'⁹⁵ Victor Caston notes that Galen also discusses the phenomenon of tree foliage colouring the air and brightly coloured objects causing facing objects to become coloured, and suggests that Alexander in the above passage is drawing on Galen or possibly a common source, since these phenomena are not mentioned in Aristotle's texts.⁹⁶

Some may question whether the change which in certain cases results in a perceptible tinging of the transparent medium, ought to be understood as the same change which in these cases brings about perception of the coloured objects. Is it the case, on Alexander's view, that the change in the medium by means of which perception of coloured objects occurs is, in certain cases, a perceptible change? Alternatively, is the change by which colour appears in the medium distinct from the changing of the transparent medium by means of which perception occurs?

It is clear, however, that the changes are not distinct but rather the change in the medium by means of which perception occurs is sometimes itself perceptible. Alexander's discussion of the perceptible tingeing of the transparent medium occurs in the context of a wider discussion of perception and the changing of the medium by coloured objects. Alexander introduces the visible phenomenon as evidence for the general claim that perception occurs by means of colours changing the illuminated transparent. Alexander supports his claim

⁹⁵ Rudolph E. Siegel, 'Theories of vision and colour perception of Empedocles and Democritus; some similarities to the modern approach' in *Bulletin of the History of Medicine* 33 (1959), 146.

⁹⁶ Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1*, (London: 2012), p.154 (n. 374). Caston refers to Galen, *On the Doctrines of Hippocrates and Plato*, 7.7.1-2, 470.5-11, which reads 'The organ of sight, for example, since it had to discriminate colours, was made luminous, for only such bodies are by nature capable of being altered by colours. The surrounding air shows this: when it is especially clear, then it is altered by colours. Thus when a person reclines under a tree in such air as that, you can see the colour of the tree enveloping him. And often when bright air touches the colour of a wall, it receives the colour and transmits it to another body, especially when the wall is blue or yellow or some other bright hue.' (*trans.*, De Lacy).

that colour changes the transparent medium, and perception occurs by means of this, with the observation that in certain cases one can see this very change. He clearly does mean us to understand tingeing as a change of the same kind as the more common, non-visible change brought about in the transparent medium by a coloured object, through which we see that coloured object.

Alexander also mentions a second phenomenon in support of his claim that colour changes the transparent medium: the fact that the objects facing brightly coloured objects, for example a white wall facing a green plant, can in certain cases be seen to be tinged with these colours. Alexander explains the phenomenon with the claim that ‘what is illuminated relays this particular type of colour from one set of things to the other by being modified’. In such cases, as in most cases of colour changing the medium, we do not perceive the colour in the medium. We can perceive, however, the result of the change in the medium: the facing wall becomes coloured. The change in the medium, whilst in this case not itself perceptible, has brought about a perceptible result.

Whilst it is the case that to undergo change by virtue of relation, is not to undergo alteration, the former kind of change is clearly very different from the spiritual kind of change Burnyeat understands Aristotle’s view to involve. Burnyeat’s spiritual change, brought about by the object of perception, constitutes the act of perception but could not be itself an object of perception. On the other hand Alexander’s change by virtue of relation is in certain cases perceptible, as when the medium becomes coloured, or it brings about perceptible results, such as the colour on the wall facing the green, gold or purple objects. The latter example shows also that change by virtue of relation can bring about results in inanimate objects. There is also the fact that not only is the changing of the illuminated medium by the objects of perception a change by virtue of relation, but the illumination of the transparent is too.

Illumination is both a perceptible change and one that occurs in an inanimate body. All this shows that Alexander’s change by virtue of relation is a physical change in a sense that Burnyeat’s spiritual change is not. For Burnyeat the change in the eye and the medium is just

colour appearing to the perceiver at the eye and through the medium and nothing more. This change constitutes perception. Alexander's changes by virtue of relation are, in Everson's words, 'changes specifiable using descriptions which can also be satisfied by inanimate substances', and are also themselves perceptible in certain cases.⁹⁷

The illuminated transparent, then, undergoes change by virtue of relation to the coloured objects of perception. It receives colour, not in being altered, but by virtue of relation. In order to demonstrate the physical nature of this change, I have so far discussed those special cases in which the change in illuminated transparent is visible and colour can be seen in the medium. In the majority of cases, however, colour is not visible in the medium when the medium is changed by the coloured objects of perception. This raises the following question: If colour is not visible in the medium, in what sense can the medium be said to have received colour?

I suggest that in those cases in which the medium is changed by the coloured object but the colour is not manifest in the medium, the medium may still be said to receive colour on account of its transmission function. The transparent medium is able to take on the form of the coloured object in such a way that it is able to transmit it to a body in which the colour will be manifest, whilst not being manifest in the medium itself. In the next chapter, we shall see that one of the kinds of body which receives colour and so becomes visibly coloured, is the eye of the perceiver. Another kind is inanimate bodies which act as mirrors. These kinds of bodies – eyes and mirrors – possess the strong form of the ability to receive colour, an ability which means that when they receive colour that colour is manifest. The medium in ordinary circumstances, I suggest, may be understood as possessing a weaker form of this ability. It receives colour to the extent that it is able to pass the colour on, but not to the extent that the colour may be seen in the medium. I will say more about these weak and strong abilities to receive colour in the following chapter. In that chapter, I explore Alexander's view that whether a body has the weak or strong ability depends on the kind of material it consists in.

⁹⁷ S. Everson, *Aristotle on Perception*, (Oxford: Clarendon Press, 1997), 56.

In this chapter I have examined Alexander's view of light and have begun an investigation into the way in which coloured objects change the illuminated transparent. I have introduced the crucial notion of change by virtue of relation, to be examined more fully in the fourth chapter. I have also drawn attention to the physical nature of the changes brought about in the transparent medium by colour. These changes, in certain circumstances, not only bring about perception but are themselves perceptible. In other circumstances colour cannot be seen in the medium but the change in the medium brings about a further perceptible change in an appropriate object. In the next chapter, I will be considering Alexander's view of the change which comes about in the eye in perception. I will argue that the change in the eye for Alexander is also a physical change and, unlike the change in the medium, is always perceptible. The medium receives and transmits colour to the eye, or other appropriate body, and in the eye or other body the colour may be seen.

CHAPTER 3

Mirroring and the Images in the Eye

This chapter explores a feature of Alexander's theory of perception which constitutes a significant departure from Aristotle's stated position. For Alexander, and not for Aristotle, the mirror image in the eye plays a crucial role in a perceiver's coming to see. In addition to arguing for this claim, I will also present Alexander's theory of mirroring which explains how he could take the images in the eye to play the role he assigns to them. For Alexander the images in the eye are manifestations of the change brought about by the medium, which has itself been changed by the objects of perception. The mirror images perceptible in the eyes are, for Alexander, manifestations of the change by means of which perception occurs.

3.1 The Appearance-Making Eye

On Aristotle and Alexander's view, the transparency of the medium and of the material which composes the eye is essential for visual perception to occur. In *de Sensu* Aristotle claims that it is necessary for the eye to be filled with transparent material since the perceptive capacity is not located on the surface of the eye (Aristotle, *de Sensu* 438b 8-16). As we saw in the first chapter, on Alexander's view the perceptive capacity is not located in the eye at all, but in the heart. So not only is it the case that the eye must be filled with transparent material, but the passages between the eye and the heart must be filled with transparent material as well (Alexander, *de Sensu Comm.*, 59, 12-15). The fact that the eye and the passages contain transparent material means that the colour received from the

illuminated external medium may be relayed to the heart where it is perceived. Whilst, as was also mentioned in the first chapter, the mechanism of transmission between the surface of the eye and the heart may be different from the mechanism of transmission between the object of perception and the eye, and whilst it is unclear from Alexander's texts what the mechanism of transmission from eye to heart is, it is at least clear that both transmissions require the transparency of the body doing the transmitting. This is because it is transparent bodies, specifically unlimited transparent bodies, which are able to take on colour in the way required to pass it on. It is only transparent bodies through which colours appear.

Alexander writes in *On the Soul*,

The perception and cognition (*αἴσθησίς τε καὶ κρίσις*) of colours occurs because (i) what is actively transparent – that is, what is illuminated – is first modified by the colour (*πάσχειν ύπὸ τοῦ χρώματος*), since colour is able to change it (*τούτου γὰρ τὸ χρῶμα κινητικόν*), and then (ii) the eye is modified by this [sc. what is transparent], since the eye itself is also transparent (*On the Soul*, 43, 12-15, trans. Caston).⁹⁸

In this passage the eye is said to be modified by the transparent medium 'since the eye itself is also transparent'. The transparency of the eye is required, since coloured bodies (in this case the external medium which has been itself changed by the coloured object), are able to change transparent bodies and the eye must be changed in this way by the external medium in order for the perceiver to perceive. (Just to reiterate, I am using the term 'transparency' here, and will continue to use it, to mean 'unlimited transparency').

It is not only, however, transparent bodies such as the eye, or bodies of water, which can be changed by the presence of colour in the transparent medium in this way. In the previous chapter, we discussed Alexander's example of a wall or the ground being tinged by brightly coloured nearby objects. He even said nearby people could be affected in this way (*On the Soul*, 42,19-43,4). In addition, in this same passage, Alexander draws comparisons between

⁹⁸ τῷ γὰρ τὸ κατ' ἐνέργειαν διαφανές, τούτο δ' ἐστὶ τὸ πεφωτισμένον, πρῶτον πάσχειν ύπὸ τοῦ χρώματος (τούτου γὰρ τὸ χρῶμα κινητικόν), τὴν δὲ ὄψιν ύπὸ τούτου, οὖσαν καὶ αὐτὴν διαφανῆ, τούτω ἡ τῶν χρωμάτων αἴσθησίς τε καὶ κρίσις γίνεται.

the way in which light comes to be in the potentially transparent and colour comes to be in the illuminated transparent and the way in which images come to be present in mirrors. Mirrors are another kind of body which are changed by the presence of colour in a transparent medium. These bodies – mirrors, people, walls - are not transparent and yet it seems that, on Alexander's view, they can receive colour in the same temporary way as the transparent medium or the eye.

As we shall see, it is not just transparent bodies which, for Alexander, receive colour by virtue of relation, but also dense, smooth bodies. These dense, smooth bodies have the ability to be changed by virtue of relation and to receive colour whether they are opaque or transparent. The ability to receive colour and the ability to transmit colour are, however, different. Transparent bodies do both. They receive and pass on the colour, causing the colour to appear through them. Opaque, smooth bodies, such as mirrors, on the other hand do not pass on the colour but rather would, if positioned between the perceiver and the object, block direct perception of the object. Mirrors allow us to perceive images of the object, if we are situated at the correct angle, but do not allow us to see through to the image itself in the way a pane of glass would.

Both Alexander and Aristotle claim that the eye is not only transparent, but it is also smooth, and so receives colour in the way a mirror does. This is why small images are perceptible in the eyes of others. But here is a rare occasion on which Alexander diverges knowingly from Aristotle's text. For Aristotle the image in the eye occurs because the eye happens to be smooth, but this image plays no role in the perception of the viewer to whom the eye belongs (*de Sensu* 438a5-17). For Alexander, on the other hand, the image in the eye is necessary for perception.

The image in the eye is discussed by Aristotle in the context of rejecting a claim he attributes to Democritus. The claim is that the act of seeing is constituted by the presence of the mirror images perceptible in eyes. According to this claim we see the objects which produce these images on account of there being these images in our eyes. The presence of the images in our eyes is sufficient for visual perception.

One argument Aristotle gives against this view is as follows:

But it is strange that it never occurred to him [Democritus] to wonder why the eye is the only thing which sees, and why none of the other things in which images appeared do so (*de sensu* 438a10-12)⁹⁹

If it is sufficient for sight that the image comes to be in the eye, then there needs to be an explanation for why it is not the case that anything in which an image appears, for example a calm body of water or a mirror, perceives the object which produced the image.

Alexander too rejects the view that the image in the eye is sufficient for perception. As we saw in the first chapter, for Alexander perception does not take place in the eye but in the heart. Even when the form reaches the heart by means of the passages, for Alexander, the change in the heart does not constitute perception. Perception, it may be remembered, is rather identified with the exercise of the perceptive capacity. This exercise of the perceptive capacity is a perceptual judgement which is not identical with the receiving of affections by the heart. Alexander could explain why mirrors and other inanimate objects do not see when they take on an image by the fact that such objects possess no perceptive capacity.

However, while, like Aristotle, Alexander rejects the view that the taking on of an image by the eye is sufficient for perception, unlike Aristotle, he does not claim that the taking on of an image by the eye plays no role in perception. On Aristotle's view, the fact that a mirrored image is observable in the eye is irrelevant to the fact the perceiver is able to see. For Alexander it is not.

That Aristotle takes the mirrored image in the eye to play no role in perception is evident from the explanation he provides for why the eye is composed of water rather than air. Water has a mirroring ability that air lacks and yet Aristotle claims that the eye's power of

⁹⁹ ἀτοπὸν δὲ καὶ τὸ μὴ ἐπελθεῖν αὐτῷ ἀπορῆσαι διὰ τί οὐ φθαλμὸς ὁρᾷ μόνον, τῶν δὲ ἄλλων οὐδὲν ἐν οἷς ἐμφαίνεται τὰ εἶδωλα.

vision does not rest on its being water - the substance able to produce mirror images - but rather on its being transparent, a property shared by air and water (*de Sensu* 438a13-15). The fact that the eye is composed of water not air, and therefore has a mirroring ability, does not, according to Aristotle, affect the eye's ability to see.

Given that, according to Aristotle, the necessary requirement for visual perception is transparency, and that this is a quality possessed both by water and by air, an explanation is needed for why the eye is composed of the former not the latter. This is the explanation Aristotle gives, and it is nothing to do with the mirroring ability of water:

True, then, the visual organ proper is composed of water, yet vision appertains to it not because it is water, but because it is transparent- a property common alike to water and to air. But water is more easily confined (*εὐφύλακτος*) and more easily condensed than air (*εὐπιλητότερον*) (Aristotle, *de sensu* 438a12-16, trans. J.I. Beare).¹⁰⁰

The reason the eye is composed of water, as opposed to air, for Aristotle is that on account of water's density, it is easily kept within the eyeball, whereas air would perhaps have leaked out. The images in the eye, then, for Aristotle, occur on account of the fact that the eye is composed of water, and yet these images and the mirroring ability of water are irrelevant to the perceiver's ability to see.

It is evident from Alexander's commentary on these passages that he takes a different view. He understands the images in the eye and the mirroring ability of water to play a fundamental role in perception. Here is his commentary on Aristotle's view of why the eye is composed of water:

Next [Aristotle] adds the explanation why, given that what we see with is obliged to be transparent, and given that air is transparent to no lesser degree than the water, the eye consists of water. For he says: because water is more easily confined than air and more

¹⁰⁰ τὸ μὲν οὖν τὴν ὄψιν εἶναι ὕδατος ἀληθὲς μέν, οὐ μέντοι συμβαίνει τὸ ὄραν ἡ ὕδωρ ἀλλ' ἡ διαφανές· ὁ καὶ ἐπὶ τοῦ ἀέρος κοινόν ἔστιν. ἀλλ' εὐφυλακτότερον καὶ εὐπιλητότερον τὸ ὕδωρ τοῦ ἀέρος.

able to be preserved in whatever it is shut up in (for air easily leaks out and is hard to shut up because it leaks out easily), <the eye> would consist of water, and <this is also true> because water is more preservative of its place than air and has greater consistency (*συνεστάναι*)... For water possesses consistency (*σύστασιν*) to a greater degree, since air is unstable. Also air, because of its fine nature, is merely transparent but water is both transparent and appearance-making (*ἐμφανές*). And so it is sufficient if that through which we see is transparent, but that with which we see must be appearance-making and such as to be able to admit (*δέχεσθαι*) and preserve (*σώζειν*) the forms of the <bodies> seen (*τὰ τῶν ὄρωμένων εἴδη*). Alternatively the appearance contributes nothing to seeing but the transparency is sufficient, as he [Aristotle] said (Alexander, *de Sensu Comm.* 26, 13-26, trans. Towey).¹⁰¹

In addition to faithfully presenting the reason provided by Aristotle for why the eye is made of water, Alexander gives his own reason: the fact that the eye is appearance-making. This property also is possessed by water on account of its density. Air is said not to be appearance-making on account of its fine nature (*λεπτότητα*); it is not sufficiently dense to receive a mirrored image. ‘Appearance-making’ is Towey’s translation of *emphanes*, the adjective associated with the noun *emphasis*, which means image or appearance, and in this context means mirrored image. The implication is that the mirroring ability of water is vital to the function of the organ of sight.

Significantly, in the above passage Alexander is explicit about the fact that not only is the claim that the organ of sight is composed of water on account of the fact that it must be appearance-making not in Aristotle’s text, but it goes against Aristotle’s claim that the image perceptible in the eye contributes nothing to seeing. This is evident from the last line of the

¹⁰¹ έξῆς δὲ προστίθησι καὶ τὴν αἰτίαν δι' ἦν, ὀφείλοντος διαφανοῦς εἶναι τούτου ὡς ὄρωμεν, ὅντος δὲ διαφανοῦς οὐκ ἔλαττον τοῦ ἀέρος ἢ τοῦ ὕδατος, ἐστιν ὕδατος ὁ ὄφθαλμός. λέγει γάρ· διὰ τὸ εὐφυλακτότερον εἶναι τὸ ὕδωρ τοῦ ἀέρος καὶ δύνασθαι μᾶλλον σώζεσθαι ἐν ὡς ἀν ἀποληφθῆ (ό γὰρ ἀήρ εὐδιάπνευστός τε καὶ δυσαπόληπτος τῷ διαπνεῖσθαι ὁφδίως) εἴη ἀν ἐξ ὕδατος, καὶ διὰ τὸ φυλακτικώτερον εἶναι τοῦ τόπου τὸ ὕδωρ τοῦ ἀέρος καὶ μᾶλλον συνεστάναι...σύστασιν γάρ μᾶλλον ἔχει, εὐρίπιστος γὰρ ὁ ἀήρ. καὶ ἐστιν ὁ μὲν ἀήρ διαφανῆς μόνον διὰ λεπτότητα, τὸ δὲ ὕδωρ καὶ διαφανὲς καὶ ἐμφανές. δι' οὐ μὲν οὖν ὄρωμεν ἀρκεῖ τοῦτο διαφανὲς εἶναι, ὡς δὲ ὄρωμεν, τοῦτο καὶ ἐμφανὲς καὶ τοιοῦτον οἷον δέχεσθαι δύνασθαι τε καὶ σώζειν τὰ τῶν ὄρωμένων εἴδη· ἢ οὐδὲν ἡ ἐμφασις πρὸς τὸ ὄρᾶν συντελεῖ, ἀλλ' ἵκανὴ ἡ διαφάνεια, ὡς εἴπεν.

above passage: ‘alternatively the appearance contributes nothing to seeing but the transparency is sufficient, as he [Aristotle] said’. This being a commentary on Aristotle’s text, Alexander presents his own view as a possible alternative to Aristotle’s stated view on this point. But it is clear from other of Alexander’s texts that this is the view he stands by.

Consider the following passage from *On the Soul*:

light, which has been tinged anew (ἀνακεχρωσμένον) by each visible thing along a straight line to the eyes aligned with it, relays the exclusive modification, since it was itself modified due to them; and [the eyes] in turn are also able to receive a reflected image (ἔμφασιν) themselves because they are both smooth (λείαις) and transparent...The interior of the eye is composed of water, for the following reason. Of the transparent [materials] that lack a definite shape, water straight off can retain (στέγειν) the modification (πάθος) produced in it by colour, because of its density (παχύτητα) and consistency (σύστασιν); for air is not like this (Alexander, *On the Soul*, 43,19-44,9, *trans.* Caston).¹⁰²

There are two relevant claims here. First is the claim that, on account of the fact that the eyes are smooth, they are able to receive a reflected image. Second, we have Alexander’s reason that the eyes are made from water as opposed to air: ‘water straight off can retain (στέγειν) the modification (πάθος) produced in it by colour, because of its density (παχύτητα) and consistency (σύστασιν).’

According to Caston, these claims, the claim concerning the images in the eye and the later claim concerning water’s ability to retain the modification produced in it by colour, are unrelated and Alexander here does not stray beyond Aristotle’s stated theory. This does not seem to be right. Commenting on the first claim, the claim that the eyes are able to receive an image on account of the fact that the eyes are smooth, Caston writes, ‘the reflection one sees

¹⁰² ἀφ' ἐκάστου γὰρ τῶν ὄρατῶν ἀνακεχρωσμένον τὸ φῶς κατ' εὐθυωρίαν τεταγμένον ταῖς κατὰ τοῦτο οὖσαις ὄψεσιν. διαδίδωσιν τὸ ἴδιον πάθος, ὡς ἀπ' ἐκείνων ἔπαθεν αὐτό, λείαις τε οὖσαις καὶ διαφανέσιν καὶ αὐταῖς καὶ προσέτι δυναμέναις δέχεσθαι τὴν ἔμφασιν...ἐξ ὕδατος γὰρ ἡ κόρη, ἐπεὶ τοῦτο τῶν ἀορίστων διαφανῶν ἥδη καὶ στέγειν οἶον τε τὸ πάθος τὸ ύπὸ τοῦ χρώματος γινόμενον ἐν αὐτῷ διὰ παχύτητά τε καὶ σύστασιν.

in another's eyes might seem irrelevant here... but it is explicitly part of the dialectical context for the parallel passage at *de Sensu Comm* 25, 21-6, which criticises Democritus for in some way identifying sight with the reflection of an object in the eye.¹⁰³ Caston explains Alexander's mention of the images in the eye here through reference to the discussion in Alexander's *de Sensu* commentary and specifically the claim made there, that the reflection in the eye does not constitute seeing. On Caston's reading Alexander mentions the images here simply as a reminder that they not to be identified with perception.

Regarding the second claim - the claim that the eyes are made from water rather than air since water can retain the modification produced in it by colour on account of its density and consistency - Caston understands the reference to density and consistency to do no more than endorse Aristotle's claim that the eye is made of water because, on account of its density, it may be retained within the eye ball. He does not explain, however, how we may read Alexander's claim that water 'can retain the modification produced in it by colour', as simply reducible to the claim that water does not escape from the eye.

There is a better way to take this passage in light of Alexander's discussion in his commentary on *de Sensu*. In mentioning the density and consistency of water and its ability to retain the modification, Alexander does not refer to the reason provided by Aristotle for why the eye is composed of water. Instead he refers to his own. He states here that the density of water explains, not the fact that the water can be kept within the eye (whilst Alexander agrees with this, he does not mention it here), but rather the fact that water itself can keep in the modification or affection ($\piάθος$) produced in it by the coloured object. In the previous chapters I explained that the modification or affection produced in the eye by the coloured object is to be understood as the taking on of colour. The claim is then, that on account of its density, water can hold onto, in some sense, the change consisting in the taking on of colour. As we shall see, this retention of the change produced by the coloured object manifests as an image in the eye.

¹⁰³ Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1*, (London: 2012), p.160 (n.386).

Alexander's explanation then, for why the eye is composed of water rather than air, is that the eye is able to retain the modification produced in it by colour. This ability, differently expressed, is the ability to receive a mirrored image. The implication is that this ability, and the images found in the eye as a result of its exercise, are necessary for perception. The eye is the organ for visual perception and, as with most Aristotelian explanations for why an organic entity is as it is, the function it performs explains its material composition. On Alexander's view, it is necessary that the eye is composed of water rather than air since, in order to perform its function, it must be both transparent and appearance-making. That this is his view explains why, at the beginning of the above passage Alexander notes that the eyes are 'able to receive a reflected image (*εμφασιν*) themselves because they are both smooth (*λείας*) and transparent.' Alexander's reference to the fact that the eye is smooth and able to receive images, is not a reference to Aristotle's rejection of the position he attributes to Democritus, but instead a key part of Alexander's explanation of how vision occurs.

I will briefly address an objection to this reading, and in doing so will say something about the material conditions for the appearance of mirror images for Alexander and Aristotle. My reading of the passage from *On the Soul* requires that we take the eye's ability to retain the modification produced in it by colour as the ability to receive mirrored images. So when Alexander states that the eye is made of water on account of water's ability to retain the modification, he refers to the fact that water possesses the ability to receive a mirrored image, as mentioned at the start of the passage. However, it may be noted that the earlier claim, the claim explicitly concerned with the mirrored image, refers to the fact that the eye is smooth, whereas the later claim, which refers to the eye's ability to retain the modification produced by the coloured object, refers to the fact that water, which makes up the eye, is dense. This may suggest that two distinct properties are responsible for the ability to receive a mirrored image and the ability to retain the modification respectively, from which we could infer that the abilities are themselves distinct.

In response we may note that whereas smoothness is frequently cited as necessary for the receiving of images, Alexander also claims that a smooth body can only hold a mirrored

image if it is sufficiently dense. For example in his commentary on *de Sensu*, he explains that the reason air is not appearance-making is on account of its fine nature (*λεπτότητα*) (Alexander, *de Sensu Comm.*, 26, 22-23).

In listing both smoothness and density as requirements for the possession of the ability to receive a mirrored image, Alexander does no more than follow Aristotle. Consider the following passages from Aristotle's *Meteorology* book III:

Sight is reflected from all *smooth* surfaces, such as are air and water among others. Air must be *condensed* (*συνιστάμενος*), if it is to act as a mirror...But things are best reflected from water, and even in process of formation it is a better mirror than air (*Meteorology* 373a35-373b16, trans. E. W. Webster).¹⁰⁴

The mock sun appears when the air is very uniform, and of the same density throughout. This is why it is white: the uniform character of the mirror gives the reflection in it a single colour, while the fact that the sight is reflected in a body and is thrown on the sun all together by the mist, which is *dense* (*πυκνός*) and watery though not yet quite water, causes the sun's true colour to appear just as it does when the reflection is from the *dense* (*πυκνότης*), *smooth* (*λεῖος*) surface of copper. So the sun's colour being white, the mock sun is white too (*Meteorology* 377b15-24, trans. E. W. Webster).¹⁰⁵

Both Alexander and Aristotle observe that the reflected image appears in things which are both smooth and dense. However, whereas Alexander in the passages we have considered, draws a clear distinction between water which receives mirrored images and air which does

¹⁰⁴ ἀνακλωμένη μὲν οὖν ἡ ὄψις ἀπὸ πάντων φαίνεται τῶν λείων τούτων δ' ἐστὶν καὶ ἀήρ καὶ ὕδωρ. γίγνεται δὲ ἀπὸ μὲν ἀέρος, ὅταν τύχῃ συνιστάμενος...ἀπὸ δὲ ὕδατος μάλιστα ἀνακλᾶται, καὶ ἀπὸ ἀρχομένου γίγνεσθαι μᾶλλον ἔτι ἡ ἀπ' ἀέρος.

¹⁰⁵ οὐ δὲ παρήλιος, ὅταν ὅτι μάλιστα ὁμαλὸς ἡ ὁ ἀήρ καὶ πυκνὸς ὁμοίως· διὸ φαίνεται λευκός. η μὲν γὰρ ὁμαλότης τοῦ ἐνόπτηρου ποιεῖ χρόνιαν μίαν τῆς ἐμφάσεως· η δ' ἀνάκλασις ἀθρόας τῆς ὄψεως, διὰ τὸ ἀμαρτητικόν προσπίπτειν πρὸς τὸν ἥλιον ἀπὸ πυκνῆς οὔσης τῆς ἀχλύος, καὶ οὕπω μὲν οὔσης ὕδωρ ἐγγὺς δ' ὕδατος, [διὰ] τὸ ὑπάρχον τῷ ἥλιῳ ἐμφαίνεσθαι χρῶμα ποιεῖ, ὥσπερ ἀπὸ χαλκοῦ λείου κλωμένην διὰ τὴν πυκνότητα. ὥστ' ἐπεὶ τὸ χρῶμα τοῦ ἥλιου λευκόν, καὶ ὁ παρήλιος φαίνεται λευκός.

not on account of the fact that it is not sufficiently dense, Aristotle claims in these *Meteorology* passages that air, when sufficiently condensed and on its way to becoming water, can also receive mirrored images to a certain extent. Dry air, however, is not sufficiently dense and so cannot receive mirrored images at all. In order for a body to be appearance-making, then, for Alexander, just as for Aristotle, it must be both smooth and of a certain density.

The fact that in the passage from *On the Soul*, the ability to receive an image is attributed to water's smoothness, and the ability to retain the modification produced by the coloured object is attributed to water's density, then, does not entail that each ability is grounded in a single distinct property of water. Rather, we may take it that the ability to retain the modification produced by the coloured object is one and the same as the ability to receive a mirror image, and that this ability is grounded in both the smoothness and the density of water.

Bergeron and Dufour, in their notes to Alexander's *On the Soul*, share my view that water's ability to keep in the modification produced by the coloured object, an ability it possesses on account of its density, is the same ability as the ability to receive a mirror image. They take Alexander's claim - that the eye is made of water since, on account of its density and consistency, it can retain the modification produced in it by colour - and gloss it as the claim that the eye is made of water since, on account of its density and consistency, it can retain an image. As a result, they claim that this passage finds no parallel in Aristotle's text.¹⁰⁶

I will end this section by considering a passage from the *Mantissa*. The authorship of the *Mantissa* is uncertain.¹⁰⁷ However, if this passage is considered authentic or written by someone from Alexander's school with a good understanding of his teacher's work, it

¹⁰⁶ Bergeron, M. and R. Dufour, *Alexandre d'Aphrodise: De l'âme* (Paris : Librairie Philosophique J. Vrin, 2008), p. 283 (commenting on 43,12-44,9): On peut se demander d'où Alexandre tient l'idée que l'œil se compose d'eau parce que cet élément possède la densité et la consistance requise afin de conserver une image. Il n'y a aucun parallèle chez Aristote.

¹⁰⁷ For discussion of the status of the *Mantissa*, *Quaestiones* and other collections of short texts attributed to Alexander, see Robert W. Sharples, 'The School of Alexander?' in Richard Sorabji (ed.) *Aristotle Transformed*, (London: Duckworth, 1990).

further supports my view that the ability to receive images and the ability to retain the modification produced by colour is one and the same ability. The passage below states very clearly that water is able to receive images on account of its smoothness and its density. In addition it explains the presence of the images in the eye in terms of water's ability to 'hold' (*στέγειν*) the image. The same term is used by Alexander in *On the Soul* when he describes the eye's ability to (on Caston's translation) 'retain' (*στέγειν*) the modification produced in it by colour on account of its density. Here is the passage,

The colour does not appear (*ἐμφαίνεται*) as being in the air, but it is in the pupil, because some transparent things are just transparent, while others, in addition to being transparent, are also reflective (*ἐμφανῆ*), through their smoothness (*λειότητα*) and density (*πυκνότητα*) being able to hold and collect together (*ἀθροίζειν*) the reflection (*ἐμφασιν*). So the things which are just transparent do not preserve (*σώζει*) in themselves what is seen in such a way that it appears (*ἐμφαίνεσθαι*) in them (and like this are as many of transparent things as are rare (*λεπτά*), [such] as air), but as many as share in a certain density (*πυκνότητος*) and solidity (*στερρότητος*), these display in themselves (*διαδείκνυσιν*) and preserve (*σώζει*) the image and shadow from what is seen. And like this among transparent things are mirrors and glass and transparent stones and, indeed, water; for it is more solid (*στερεώτερον*) and dense (*παχύτερον*) than air and more able to hold (*στέγειν*) and collect together (*ἀθροίζειν*) the images and shadows from the things that are seen (*Mantissa*, §15 142,21-31, trans. R. W. Sharples).¹⁰⁸

In this passage, the presence of a mirror image is understood as the mirroring subject 'holding and collecting' together the image and 'preserving' in itself what is seen in such a

¹⁰⁸ τὸ δὲ χρῶμα ἐν μὲν τῷ ἀέρι οὐκ ἐμφαίνεται ὅν, ἐν δὲ τῇ κόρῃ, ὅτι τῶν διαφανῶν τὰ μέν ἔστι διαφανῆ μόνον, τὰ δὲ πρὸς τῷ εἶναι διαφανῆ καὶ ἐμφανῆ ἔστιν, διὰ λειότητα καὶ πυκνότητα στέγειν καὶ ἀθροίζειν τὴν ἐμφασιν δυνάμενα. τὰ μὲν οὖν διαφανῆ μόνον οὐχ οὔτως ἐν αὐτοῖς σώζει τὸ ὄρωμενον, ὥστε καὶ ἐμφαίνεσθαι ἐν αὐτοῖς (τοιαῦτα δέ ἔστιν, ὅσα λεπτὰ τῶν διαφανῶν, ὡς ὁ ἀήρ), ὅσα δὲ πυκνότητος τίνος καὶ στερρότητος μετέχει, ταῦτα διαδείκνυσιν ἐν αὐτοῖς καὶ σώζει τὴν ἀπὸ τοῦ ὄρωμένου εἰκόνα καὶ σκιάν. τοιαῦτά ἔστι τῶν διαφανῶν τά τε κάτοπτρα καὶ αἱ ὕελοι καὶ αἱ διαφανεῖς λίθοι καὶ δὴ καὶ τὸ ὑδωρ. στερεώτερον γάρ καὶ παχύτερον τοῦτο τοῦ ἀέρος καὶ μᾶλλον στέγειν τε καὶ ἀθροίζειν τὰς ἀπὸ τῶν ὄρωμένων εἰκόνας τε καὶ σκιὰς δυνάμενον.

way that it appears in it. It is easy to understand this holding and preserving the image or what is seen as the same as the holding of the modification produced by colour. It is easy since, as seen in previous chapters, the modification produced by colour consists in the subject being changed by the object of perception, the change consisting in the receiving of the colour of that object. The receiving of colour in this way may naturally be expressed, it seems, as a receiving of an image or what is seen.¹⁰⁹

I have presented evidence that, for Alexander, the eye's ability to retain the modification produced by a coloured object is the same ability as the ability to receive a mirror image. This modification occurs in the transparent medium as a result of being changed by the coloured object of perception, and the transparent medium in turn changes the eye, causing it too to be modified. It is by means of this modification of the eye and medium that perception comes about. In identifying this modification, as it occurs in the eye, with the receiving of a mirror image, I claim that the images seen in the eye are, for Alexander, the perceptible result of that changing of the eye and medium by means of which perception occurs.

In the passages by Alexander considered so far in this chapter, a distinction has been made between the respective capabilities of air and water. Air, in the majority of circumstances, is not sufficiently dense to retain ($\sigma\tau\acute{\epsilon}\gamma\epsilon\iota\nu$) the modification brought about by the coloured objects of perception. Water on the other hand is. What this difference amounts to is that, when the air is changed by coloured objects, it receives colour but not in such a way that this colour is manifest. In most cases colour is not seen in the medium between object and perceiver. In the eye on the other hand, since it is composed of water, the colour received on account of the eye's being changed by the perceptible object is visible. It is visible in the form of the tiny images we are able to perceive in the eyes of others.

¹⁰⁹ There are, however, some differences between the *Mantissa*'s discussion of images and the changing of the eye by coloured objects and the texts attributed to Alexander with confidence. We find the claims that the eye not only holds images but collects them together ($\alpha\theta\varphi\iota\zeta\epsilon\iota\nu$), and that it not only holds and collects images but also their shadows. These claims are not found in Alexander's *On the Soul*, or in his commentary on *de Sensu*. The claim that the eye collects images together could suggest some kind of fusion, possibly by a follower of Alexander's, combining Alexander's doctrine with elements of an atomist view on which effluences, invisible when taken singly, are collected together in the eye and rebuilt to form an image.

In the next section, I will be considering Alexander's theory of mirroring, which enables the images in the eye to play the role he claims they do. In the final section, I will attempt to answer the question of why Alexander believes the appearance-making ability of the eye to be necessary for perception to occur.

3.2 Explaining Images: Alexander on Mirroring

In simple terms, modern optical science understands reflected images as coming about on account of rays of light being reflected from a smooth surface. Ancient theorists working in the field of geometrical optics (or *catoptrics* - the study of reflection) employed an assumption similar insofar as it involves a ray coming into contact with a smooth surface and changing direction, in a way analogous to a tennis ball being thrown against a wall and bouncing off in a different direction. The most influential figure in the field of ancient geometrical optics was Euclid. Euclidean optics employs the simplifying assumption that we see through the emission of rays of light from the eyes. This assumption was adopted by several of those working subsequently in optics and catoptrics, who were interested not so much in the psychology of vision, but more in its mathematical principles.

The use of Euclidean principles can be found even in Aristotle, whose own view - that vision comes about through the changing of the transparent by a coloured object – is incompatible with the Euclidean assumption that vision comes about through the emission of light from the eyes. Nevertheless, in the *Meteorology*, Aristotle adopts the Euclidean assumption in his explanation of certain weather phenomena.¹¹⁰ Aristotle clearly is not endorsing the view that vision occurs through the emission of light from the eyes. However, in this text, which is concerned with weather phenomena and not with psychology and perception, he appears to have adopted the Euclidean assumption for convenience. It enables him to discuss reflection

¹¹⁰ 'We must accept from the theory of optics the fact that the sight is reflected from air and any object with a smooth surface just as it is from water' (ὅτι μὲν οὖν ἡ ὄψις ἀνακλᾶται, ὥσπερ καὶ ἀφ' ὕδατος, οὕτω καὶ ἀπὸ ἀέρος καὶ πάντων τῶν ἔχοντων τὴν ἐπιφάνειαν λείαν, ἐκ τῶν περὶ τὴν ὄψιν δεικνυμένων δεῖ λαμβάνειν τὴν πίστιν). (Aristotle, *Meteorology*, 372a29-32, trans. Webster)

and the weather phenomenon arising as a result by drawing on existing optical theory, without having to begin from a restructuring of the foundations of this theory to fit his own view of how perception occurs.

Aristotle's adoption of the Euclidean assumption is evident in the passage from the *Meteorology* quoted below which contains the phrase 'sight (οψις) is reflected':

Sight is reflected from all smooth surfaces (ἀνακλωμένη μὲν οὖν ἡ ὄψις ἀπὸ πάντων φαίνεται τῶν λείων), such as are air and water among others. Air must be condensed if it is to act as a mirror, though it often gives a reflection even uncondensed when the sight is weak. Such was the case of a man whose sight was faint and indistinct. He always saw an image in front of him and facing him as he walked. This was because his sight was reflected back to him. Its morbid condition made it so weak and delicate that the air close by acted as a mirror, just as distant and condensed air normally does, and his sight could not push it back (*Meteorology* 373a35-373b9 trans. Webster).

This passage clearly employs an emission view of perception, on which we see through light or a visual ray emanating from our eyes and coming to meet an object. In the example, the ray emitted from the eyes of the weak-sighted man is not strong enough to penetrate through the air, so the ray is bent back and falls on him rather than objects in front of him. This causes him to see an image of himself in front of him. In the case of the person with normal vision, their sight, whilst able to penetrate through uncondensed air, is bent back by distant and condensed air and other bodies which may serve as a mirror.

All those explanations of mirror images which rely on the idea of something – be it a ray or an effluence - changing direction at the place on the reflective body where the reflected image appears, I will term 'rebound explanations.' On such theories the image in the mirror is explained in terms of the ability of the body in which the image appears to turn around or throw back a light ray or effluence. On such theories the light ray or effluence rebounds from the smooth surface. As we shall see, Alexander does not hold a rebound explanation of the images which appear in mirrors.

In this broad group ‘rebound explanations’, I include not only those explanations of reflected images built on emission theories, in which vision is explained through positing rays of light emitted from the eyes, but also certain explanations built on intromission theories. So long as the reflected image is explained through the effluences bouncing off the mirror and then entering the eye, the explanations will belong to this group, since this is also a case in which something is turned around or thrown back from a smooth surface.

Consider, for example, this passage from Lucretius’ *de Rerum Natura* which explains reflected images in terms of effluences:

Lastly those images
Which to our eyes in mirrors do appear,
In water, or in any shining surface,
Must be, since furnished with like look of things,
Fashioned from images of things sent out.
There are, then, tenuous effigies of forms,
Like unto them, which no one can divine
When taken singly, which do yet give back,
When by continued and recurrent discharge
Expelled, a picture from the mirrors' plane.
Nor otherwise, it seems, can they be kept
So well conserved that thus be given back
Figures so like each object.

(Lucretius, *de Rerum Natura* 4.98-109, trans. W. E. Leonard)

According to Ivars Avotins, this passage contains a view of mirroring on which the effluences, ‘when hitting a shiny surface, are bounced back by it undeformed’.¹¹¹ If this

¹¹¹ Ivars Avotins, ‘Alexander of Aphrodisias on Vision in the Atomists,’ *Classical Quarterly*, 30 (1980), 452.

interpretation is correct, then Lucretius' explanation of reflected images falls into the category of rebound explanations. The effluences are sent out by the objects of perception, rebound from the smooth surface of the mirror and then enter the eyes of the perceiver.

An interesting alternative atomist view of mirrors is presented in *Mantissa* §11, which is entitled 'Against those who say that seeing comes about through the entry of images' (*Mantissa*, 134,28-29, *trans.* Sharples). 'Images' here does not refer to the mirror image or *emphasis* we have been concerned with so far, rather it translates *eidôla* which refers to the corporeal effluences which on atomist theory are sent out by the objects of perception. One of the objections put forward by the author of the *Mantissa* against such atomist theories concerns how such theories deal with the phenomenon of mirror images:

How, if what is in the mirror is an image (*εἰδώλου*), do so many images (*εἴδωλα*) again stream off from it, and why are the images (*εἴδωλα*) in mirrors denser, so that so much streaming off comes from them? Why do these remain and not move? Why, since they do remain, do they not also remain even for a short time when the person who sees them has gone away? Why are the images (*εἴδωλα*) not on the surface of the mirrors but in their depth? (*Mantissa*, 135, 27-32, *trans.* Sharples).

The author assumes that on the atomist theory, the mirror images come about through the *eidôla* emitted from the objects of perception sticking to the mirror and then, once a mirror image is formed, this image sends out its own *eidôla*, as an ordinary object of perception would, so that it itself can be perceived. Such a theory is problematic as the author observes. That atomists did conceive of mirror images in this way is contested by Avotins.¹¹² But if an atomist theorist had understood mirror images in this way, in terms of stationary *eidôla* on the surface of the mirror, such a view would not fall into my category of 'rebound explanations' but would belong to another group of explanations I will term 'presence explanations'. Such explanations explain the appearance of images in mirrors, not in terms of something rebounding from the surface of the mirror, but instead in terms of something

¹¹² Ibid., 452-453.

being present in or on the surface of the mirror. I will argue that Alexander holds a presence view of mirror images, which could perhaps partially explain why he, or if not him the author of the *Mantissa* influenced by him, interpreted the atomist view in the way presented in the passage above.

The difference between presence and rebound explanations can be seen in the difference in language Alexander uses when discussing his own theory and the rebound theories of others. As we have already seen, when Alexander discusses the image seen in a mirror he uses the term ἔμφασις. ἔμφασις, which may be translated simply as ‘image’, refers to that which is seen in the mirror. When discussing rebound views of reflection, on the other hand, as we will see below, the term ἀνάκλασις is used. The verb ‘κλάω’ means ‘to break’ or in geometry ‘to deflect’ and ἀνάκλασις, whilst used as a general term to refer to reflected images or the process of reflection, carries the meaning ‘a bending back’.¹¹³ Like the English term ‘reflection’, ἀνάκλασις, while it can refer to the reflected image, i.e. the appearance in the mirror, also refers to the process of reflection, in most cases understood as the bending back of light from a smooth surface. On rebound explanations of reflection, we see an image in a mirror on account of a process, the rebounding of something from the mirror. On presence explanations, we see an image in the mirror because there is something in or on the mirror that we are seeing.

Compared to Aristotle, Alexander presents a much more developed theory of how reflected images arise. The only point in Aristotle’s texts which expresses his own view of reflection is a small comment in *de Anima* III.12, in which he gives a brief, non-Euclidean explanation of reflection:

In the case of reflection it is better, instead of saying that the sight issues from the eye and is reflected, to say that the air, so long as it remains one, is affected by the shape and colour. On a smooth surface the air possesses unity; hence it is that it in turn sets the sight in motion (Aristotle, *de Anima*, 435a5-9, trans. Smith)

¹¹³ LSJ Online, p. 956.

This passage seems to provide no evidence that Aristotle believes anything is taken on by the mirror and so no evidence that, like Alexander, Aristotle has a presence explanation of reflected images. Instead Aristotle's view seems to be that the mirror changes the pathway along which the coloured object changes the transparent. With a mirror in the way, the coloured object changes the air between itself and the mirror, and then, since the air is not dispersed, the air between the mirror and the perceiver of the reflected image is also changed.

I will now outline Alexander's view of mirror images. Alexander claims that a mirror image (ἐμφασις) 'is an affection which comes about by virtue of reflection in things, like the eye, that are smooth and which possesses certain constitution, so as to be able to preserve what appears when it is generated through the transparent medium' (*de Sensu Comm.*, 25,11-13, *trans.* Towey).¹¹⁴ He then writes, being more specific this time, the following:

[Aristotle] uses the word reflection (ἀνάκλασεως) as a more common alternative to appearance (ἐμφάσεως), since it is used in everyday speech to refer to <reflections.> For in fact these things do not come about by virtue of reflection (κατ' ἀνάκλασιν), as seems <to be the case> to the mathematicians, but because of the messenger service of the transparent (τῇ τοῦ διαφανοῦς διακονίᾳ), which, being affected in some way by the <body> being seen, transmits (διαδίδωσιν) the affection which it undergoes to things that are smooth (λείοις) and able to keep it in (στέγειν) and preserve it (σώζειν), whenever these are placed in a straight line to the <body> being seen, and being affected in turn from these things as if from a starting point, it transmits the affection to the things from which it took the affection in the first place (*de Sensu Comm.* 25, 18-26, *trans.* Towey).¹¹⁵

¹¹⁴ ή γὰρ ἔμφασις πάθος τί ἐστι κατὰ ἀνάκλασιν γινόμενον ἐν τοῖς λείοις τε καὶ σύστασιν τινα ἔχουσιν, ὡς δύνασθαι σώζειν τὸ ἔμφαινόμενον διὰ τοῦ μεταξὺ διαφανοῦς γινόμενον, ὅποιόν ἐστι καὶ ὁ ὄφθαλμός.

¹¹⁵ κοινότερον δὲ χρῆται τῷ τῆς ἀνάκλασεως ἐπὶ τῆς ἔμφάσεως ὀνόματι, ὡς καθωμιλημένῳ ἐπὶ τούτων· ἐπεὶ ὅτι γε οὐ κατ' ἀνάκλασιν ταῦτα γίνεται, ὡς δοκεῖ τοῖς ἀπὸ τῶν μαθημάτων, ἀλλὰ τῇ τοῦ διαφανοῦς διακονίᾳ, ὃ πάσχον πως ὑπὸ τοῦ ὄρωμένου διαδίδωσιν ὃ πάσχει πάθος τοῖς λείοις τε καὶ στέγειν αὐτὰ καὶ σώζειν δυναμένοις, ὅταν ἐπ' εὐθείας ἥ ταῦτα τοῦ ὄρωμένου κείμενα, ἀπὸ

In the previous section, I argued that the reference in Alexander's *On the Soul* to 'water's ability to retain (*στέγειν*) the modification produced in it by colour', is also a reference to water's ability to receive a reflected image. The receiving of a reflected image consists in the retention of the modification produced by colour. In other words receiving a reflected image consists in a receiving of colour as a result of being acted on by the transparent medium (which has been itself acted on by the object of perception), and in addition holding onto or keeping in this change. In the passage directly above, Alexander describes the eye and other appearance-making bodies as possessing the ability to 'preserve (*σώζειν*) what appears when it is generated through the transparent medium' and the ability to 'keep [the affection] in (*στέγειν*) and preserve it (*σώζειν*)', 'affection' being Towey's translation of *πάθος*, which Caston translates as 'modification'. A little later in the *de Sensu Commentary* Alexander writes 'that with which we see must be appearance-making and such as to be able to admit (*δέχεσθαι*) and preserve (*σώζειν*) the forms of the <bodies> seen (*τὰ τῶν ὄρωμένων εἴδη*). (*de Sensu Comm.* 26, 23-25, trans. Towey).

For Alexander, then, a mirror image appears in a body as a result of a coloured object, positioned in a straight line from the mirroring body, changing the transparent medium, which passes on this change to the mirroring body. The change consists in the receiving of colour. The mirroring body too then receives colour. For a body merely to receive colour, however, is not sufficient for a mirror image to be displayed in that body. In most cases the

τούτων πάλιν πάσχον ως ἀπ' ἀρχῆς τίνος τὸ πάθος διαδίδωσιν ἐπὶ ταῦτα ἀφ' ὃν τὴν ἀρχὴν ἔπαθεν.

It is also worth noting that the passage concludes with the phrase '<Aristotle> has stated this when he described how we see in *On the Soul*' (*de Sensu Comm.* 25, 26). I noted earlier that there is no evidence in Aristotle's texts to suggest he shared Alexander's account of mirror images. I noted that the brief passage in *de Anima* in which Aristotle puts forward his own explanation of reflection, seems to suggest that Aristotle's view is that the mirror changes the pathway along which the coloured object changes the transparent but without the mirror itself taking on the colour. Alexander cannot mean then that 'Aristotle has stated this precise view of reflection' when he claims that 'Aristotle has stated this when he described how we see in *On the Soul*'. I suggest instead that we understand Alexander as referring to Aristotle's more general claim that reflection is not to be explained by positing something which is emitted from the eye and then is reflected by a mirror, but rather, like vision, it is explained by the fact that the transparent medium is changed by the object of perception (Aristotle, *de Anima*, 435a5-9).

transparent medium receives colour, and yet no mirror image is seen in the medium. In order for a body to be ‘appearance-making’, it must keep in ($\sigma\tau\epsilon\gamma\epsilon\iota\nu$) and preserve ($\sigma\omega\zeta\epsilon\iota\nu$) the colour it receives.

But this raises the question, what does keeping in and preserving mean in this context? The qualities of a body required in order to possess the ability to keep in and preserve colour in this way are smoothness and density. Air in most cases, as we have seen, is not sufficiently dense to possess this ability but water is. What the ability to keep in and preserve colour cannot mean is the ability discussed in the previous chapter for a body to possess its own proper colour. As discussed in the previous chapter, if a body possesses its own proper colour, as opposed to possessing a colour accidentally and by virtue of relation, its colour does not disappear when the body’s relationship to other objects changes. As discussed in the previous chapter, the distinguishing feature of bodies which possess their own proper colour as opposed to those which do not, for Alexander, is the fact that the former bodies are limited, possessing their own fixed spatial boundary. Air and water, not possessing their own fixed spatial boundary but rather falling into the class of unlimited transparent bodies, do not possess their own proper colour. Instead they are coloured by virtue of relation, with the result that when that to which they are related departs, they lose their colour.

Whilst it is true of both air and water that they do not possess a proper colour, the possession or non-possession of the ability to retain and preserve colour in the sense under discussion is an ability which water possesses and which in most circumstances air does not. A body’s ability to retain and preserve colour, cannot then be understood as the same ability as the ability to possess its own proper colour since water has the former ability and lacks the latter. What is more, the qualities required for the possession of the respective abilities are different. For Alexander, whether a body possesses its own proper colour or possesses colour by virtue of relation depends on whether the body is limited or unlimited. By contrast, the ability to retain and preserve colour in the sense under discussion depends on completely different qualities. It depends on whether the body is sufficiently dense and smooth. Certain unlimited bodies, such as air, do not possess this ability, whereas certain

unlimited bodies, such as water, do. Certain limited bodies, such as the rough surface of a tree trunk, do not possess this ability, whereas certain limited bodies such as mirrors, do.

Before answering positively the question of what does it mean to keep in and preserve a colour in the context, I will briefly mention one more way in which this should not be understood. The language of keeping in and preserving a sensible quality, when this language is applied to a sense organ such as the eye, could suggest to some readers that we ought to be thinking about the mechanisms by which a perceiver is able to remember and imagine as a result of their sensory experiences. However, it is important to keep the kind of keeping in and preserving under discussion distinct from the kind of preserving of sensible qualities involved in *phantasia* and memory. When discussing the latter preservative ability, Alexander makes it clear that it is possessed only by ensouled matter, whereas the ability to keep in and preserve matter under discussion is possessed also by inanimate objects such as mirrors and smooth walls.¹¹⁶ Crucially, and I will come to this shortly, the possession of the ability to keep in and preserve colour under discussion does not entail that the colour remains in the body after the object which produces the change is removed. This is not the sense in which the colour is retained. By contrast, to possess the ability to preserve a sensible quality in the way required for *phantasia* and memory, is precisely to continue to have the sensible quality available after the sensory stimulus has been removed.¹¹⁷

I think it is helpful to understand the sense in which mirrors, water and other appearance-making bodies keep in and preserve colour through contrast with the way in which air does not. When air receives colour, in most circumstances, the colour cannot be seen in the air. In the previous chapter I claimed that the air may be said to receive colour, despite colour not being perceptible in the air, on account of its transmission function. Air is able to take on

¹¹⁶ See *On the Soul*, 62,22-63,5 : ‘what is more if a body with a psychic power is changed in this way, it seems to preserve a trace of the change produced by the sensible object, by means of the imagination, even though the sensible object is departed and no longer present. In any case, those who look at an extremely bright object have in their eye a residue of the change produced by these objects, even if these are no longer present. For the change produced by sensible objects is not the same in inanimate bodies and animate bodies.’

¹¹⁷ See n. 109 above: ‘Still if a body with a psychic power is changed in this way, it seems to preserve a trace of the change produced by the sensible object, by means of the imagination, even though the sensible object is departed and no longer present.’

colour in such a way that it is able to transmit it to a body in which the colour will be manifest, whilst not being manifest in itself. I described air as possessing a weak ability to receive colour, meaning that it receives colour to the extent that it is able to pass the colour on, but not to the extent that the colour may be seen in it. In his commentary on *de Sensu* Alexander writes that the water which constitutes the eye is, compared to air, able to ‘receive to a greater degree the forms of the visibles (ώς μᾶλλον τὰ εἴδη τῶν ὄφατῶν δέχεσθαι)’ (*de Sensu Comm.* 36, 2-3, trans. Towey). Water and mirrors possess a strong ability to receive colour, meaning that when that colour is received, it is manifest. It is manifest in the form of a mirror image. Whether a transparent body has a weak or strong ability to receive colour depends on the material constitution of that body. Smooth and dense bodies have the strong ability, transparent but rare bodies have only the weak ability.

From the fact that density and smoothness give a body the ability to keep in and preserve colour, with the result that the colour is visible in that body, whereas a rare body receives colour but only to the extent that it can pass it on, we get a good sense of what it means to keep in and preserve a colour in this context. The water keeps in or retains (στέγειν) and preserves (σώζειν) the colour, in the sense that it does not merely pass it on. When the transparent medium receives colour, it acquires the ability to transmit colour to another body such as the eye or a mirror. The water in the eye, by contrast, both transmits the colour through the passages to the heart, but it also retains it, in the sense that it displays it. The mirror does not have the ability to transmit colour in this way, but does retain it in this same sense. The contrast is between keeping or holding something, and merely passing it on.

On this interpretation, the sense in which water retains colour and air does not, is to an extent metaphorical. The language suggests the colour moves through the air without the air being able to grasp hold of it, whereas when the eye or mirror receives this colour, it is able to hold it, display it and keep it from escaping. Since, for Alexander colour does not move, this can only be a metaphor. What really happens is the coloured object changes the transparent medium, with the medium receiving colour. Since the medium is not sufficiently dense to possess the colour in such a way so as to display the colour, all it can do is in turn affect the eye or mirror, causing these to receive colour. When the eye or mirror receives

colour, due to the material constitution of these bodies, the colour can be seen in the eye and mirror. These latter bodies, however, literally retain the colour no more than the air does. In the case of air, mirrors and water, they have the colour for as long as the object of perception is present and the colour disappears as soon as the object of perception is removed.

The previous chapter dealt with the medium, and the changing of the medium by virtue of relation to the coloured object. It is worth noting that when the medium in turn changes the eye or mirror, these receive colour in the same way as the medium received colour.¹¹⁸ When discussing change by virtue of relation, Alexander focuses on the medium and states that bodies changed in this way are those without a fixed spatial boundary and with no colour of their own. The eye is composed of water, which, like air is an unlimited transparent body, but smooth walls and mirrors may receive colour too and these are solid bodies with fixed spatial boundaries. However, it is evident that these bodies behave in the same way as the air, insofar as the instant the object of perception is removed from the vicinity, an image of that object can no longer be perceived in the mirror and when the plant is removed from its position facing the wall, the wall is no longer tinged with green. In fact, Alexander compares the way in which light and colour are in the transparent medium, with the way in which images come to be present in mirrors.¹¹⁹

If it were not the case that mirrors took on colour in the same way as the transparent medium, the same charge could be levelled against Alexander as he, or the author of the *Mantissa*, levels against the atomists. The mirror would receive colour, but the theory would struggle to explain why the image does not remain in the mirror after the object which produces the image is removed. It must be the case that the medium acquires colour by

¹¹⁸ See *de Sensu comm.* 59, 10-12: 'For the transparent in actuality, being moved in a way and disposed by the visibles, transmits their form to the pupil, *in the same way as it took it*, the pupil also being transparent.'

¹¹⁹ 'In fact, when the things that produce these [effects] have gone away, the colour immediately leaves the light as well (in the case where the things that tinge it go away) and light leaves the transparent (in the case where what illuminates is not present). The sort of change that arises from both sources occurs in what receives them in virtue of a presence and a particular sort of relation, much as [the reflections] in mirrors come to be present in them' (*On the Soul*, 42,22 - 43,4, *trans.* Caston).

virtue of relation, and in turn changes the eye, mirror or whichever other body is able to receive colour. When the medium changes the eye, mirror or other appearance-making body, it must cause it to take on colour in the same way that it, the medium, has colour, with the result that the eye or mirror is unaffected. The colour disappears from these bodies as soon as the object of perception is removed and the colour disappears from the medium. I will be considering in more detail the way in which the medium, the eye and mirrors possess colour in the following chapter.

Returning to the passage from Alexander's commentary on *de Sensu*, I will now say something about the fact that whilst Alexander begins with the claim that a mirror image ($\xi\mu\phi\alpha\sigma\iota\varsigma$) is an affection which comes about by virtue of reflection ($\kappa\alpha\tau\grave{\alpha}\ \grave{\alpha}\nu\alpha\kappa\lambda\alpha\sigma\iota\varsigma$) in things, he then corrects himself with the following statement:

[Aristotle] uses the word reflection ($\grave{\alpha}\nu\alpha\kappa\lambda\acute{\alpha}\sigma\epsilon\omega\varsigma$) as a more common alternative to appearance ($\grave{\epsilon}\mu\phi\acute{\alpha}\sigma\epsilon\omega\varsigma$), since it is used in everyday speech to refer to <reflections.> For in fact these things do not come about by virtue of reflection ($\kappa\alpha\tau'\ \grave{\alpha}\nu\alpha\kappa\lambda\alpha\sigma\iota\varsigma$), as seems <to be the case> to the mathematicians (*de Sensu Comm.* 25, 18-21, *trans. Towey*).

I mentioned above that $\xi\mu\phi\alpha\sigma\iota\varsigma$, which may be translated simply as 'image', refers simply to that which is seen in the mirror. $\grave{\alpha}\nu\alpha\kappa\lambda\alpha\sigma\iota\varsigma$, on the other hand, means 'a bending back' and refers to the process of reflection, in most cases understood as the bending back of light from a smooth surface. Alexander and Aristotle do not understand the images in mirrors to arise in this way. Alexander justifies Aristotle's use of the term and his own initial claim that the $\xi\mu\phi\alpha\sigma\iota\varsigma$ is an affection which comes about $\kappa\alpha\tau\grave{\alpha}\ \grave{\alpha}\nu\alpha\kappa\lambda\alpha\sigma\iota\varsigma$, by stating that the term is used in everyday speech to refer to reflections and so need not be taken in a theoretically laden way. He claims that Aristotle uses the term ' $\grave{\alpha}\nu\alpha\kappa\lambda\alpha\sigma\iota\varsigma$ ' at *de Sensu* 438a7 in a non-technical sense, since in fact the images in mirrors do not come about through the bending back of light. The 'mathematicians' Alexander refers to are those adopters of Euclidean geometrical optics.

On Alexander's 'presence explanation' of mirror images, we see colour in the mirror because the mirror has received colour through being changed by the transparent medium, which has been itself changed by the object of perception. In Alexander's words, images in the mirror come about 'because of the messenger service of the transparent ($\tauῇ τοῦ διαφανοῦς διακονίᾳ$), which, being affected in some way by the <body> being seen, transmits ($\deltaιαδίδωσιν$) the affection which it undergoes to things that are smooth ($\lambdaείοις$) and able to keep it in ($στέγειν$) and preserve it ($σώζειν$), whenever these are placed in a straight line to the <body> being seen' (*de Sensu Comm.* 25, 21-24, *trans.* Towey). Note that the way in which mirror images are produced in eyes and other mirroring bodies, is by the same mechanism that colour is transmitted through the transparent medium in order for us to perceive it. The colour is taken on by the eye and mirror, and so is really in the eye or mirror (albeit in a temporary way, on account of its being taken on by virtue of relation). Since it is really in the eye or mirror, the colour in the mirror is perceived in the same way as any coloured body is perceived: it changes the transparent between itself and the perceiver. Take the case of a mirror image in someone's eye. There are two people, and one of these people – person B - is seeing the image in the eye of the other, person A. The image in the eye of person A is perceived by person B, who is standing in an appropriate relation to person A. Person B perceives the image by means of the image in person A's eye changing the transparent medium between itself and the eye of person B. In Alexander's words, the transparent medium is affected in turn by the mirror images 'as if from a starting point' (*de Sensu Comm.* 25, 25).

3.3 The Role of the Images in Perception

According to Alexander 'it is sufficient if that through which we see is transparent, but that with which we see must be appearance-making and such as to be able to admit and preserve the forms of the <bodies> seen' (*de Sensu Comm.* 26, 22-25 *trans.* Towey).¹²⁰ So far in this chapter, I have shown that for Alexander the images in the eye are necessary for perception, and presented his explanation of what these images are and how they come about. In this

¹²⁰ δι' οὐ μὲν οὖν ὄρῳμεν ἀρκεῖ τοῦτο διαφανὲς εῖναι, ὃ δὲ ὄρῳμεν, τοῦτο καὶ ἐμφανὲς καὶ τοιοῦτον οἷον δέχεσθαι δύνασθαι τε καὶ σώζειν τὰ τῶν ὄρῳμένων εἴδη.

section, I will address the question of *why* the images in the eye are necessary for perception. Alexander does not explicitly state a reason for this and it is not obvious why the images would be necessary. The external medium between the eye and the object of perception is transparent, as is the interior of the eye and the passages which run between the eye and the heart. It is unclear why the transparency of these parts is not sufficient for perception to occur. As we have seen, perception occurs when the form of the object of perception is transmitted to the heart via the individual sense organs. Since, in the case of visual perception, what is required for the transmission of form is the transparency of a body, it is unclear why the eye must be appearance-making as well. Why could it not be the case that the external medium passes the colour to the eye, which in turn transmits it via the internal passages to the heart, without the colour being displayed in the eye? Whilst Alexander does not provide a clear answer to this, we may speculate as to the kind of thoughts which lead him to posit the necessity of the appearance-making ability of the eye.

It is useful first to consider a particular feature of Alexander's account of sound and hearing. According to both Aristotle and Alexander, sound is produced when two solid objects of a certain sort strike against each other and against the air. Sound is only produced when the air is not dispersed by the blow but remains a continuous mass. Aristotle writes, 'That is why it must be struck with a sudden sharp blow, if it is to sound – the movement of the whip must outrun the dispersion of the air, just as one might get in a stroke at a heap or whirl of sand as it was travelling rapidly past' (*de Anima* II.8, 419b18-25, *trans.* Smith). The ear contains air and the movement produced in the external air by the sounding objects affects the air within the ear. Aristotle writes,

The organ of hearing is physically united with air, and because it is in air, the air inside is moved concurrently with the air outside...Air in itself is, owing to its friability, quite soundless; only when its dissipation is prevented is its movement sound. The air in the ear is built into a chamber just to prevent this dissipating movement, in order that the animal may accurately apprehend all varieties of the movements of the air outside (*de Anima* II.8, 20a3-11, *trans.* Smith)

In order for the movement in the air produced by one object hitting against another to constitute a sound, the air which is moved must not be dispersed. In the medium between the sounding objects and the ear, this is achieved through the speed and force with which one object hits the other. Within the ear the air is enclosed and so cannot be dispersed, which, Aristotle claims, allows the movements produced by the sounding objects to be accurately perceived.

Alexander, in his treatise *On the Soul*, stresses the function played by the enclosed air in the ear.¹²¹ He claims that the force of the movement from the sounding external air causes the air within the ear to receive a figure. I understand the term ‘figures’ (*σχήματα*) to refer to auditory appearances. Alexander, like Aristotle, states that the enclosed air enables these figures or auditory appearances to be received precisely (*ἀκριβῶς*). Once received by the ear, the figures are relayed to the primary sense organ by means of passages extending from the ears to the heart where they are perceived. Alexander adds that, in this way, the trapped air within the ears is responsible for the perception and discrimination of sound by the perceptive soul (*αἴτιος γίνεται τῇ ἐν ἐκείνῳ αἰσθητικῇ ψυχῇ τῆς ἀντιλήψεώς τε καὶ κρίσεως τῶν ψόφων*).

I suggest that we understand the appearance-making ability of the eye as performing a parallel function to the enclosing of the air within the ear. The free external air, when struck

¹²¹ See *On the Soul* 50,11-18. Here is the passage in full :

οὐ ἐναπειλημμένος τε καὶ ὡς φησιν Ἀριστοτέλης ἐγκατωκοδομημένος τοῖς ὡσὶν ἀήρ κινούμενος ὑπὸ τοῦ ἐπεισόντος ἔξωθεν καὶ ὑπὸ τῆς πληγῆς ἐσχηματισμένου πως ἀέρος, ἀθρυπτος μένων διὰ τὸ πάντοθεν περιέχεσθαι, καὶ διὰ τούτο ἀκριβῶς δεχόμενος τὰ τοῦ κινοῦντος αὐτὸν σχήματα, παραπέμπων ταῦτα μέχρι τοῦ πρώτου αἰσθητικοῦ διὰ τῶν ἀπ' αὐτοῦ μέχρι τῶν ὥτων διατεινόντων πόρων, αἴτιος γίνεται τῇ ἐν ἐκείνῳ αἰσθητικῇ ψυχῇ τῆς ἀντιλήψεώς τε καὶ κρίσεως τῶν ψόφων.

Bergeron and Dufour translate this passage as follows: ‘L’audition se produit de la manière suivante : il y a de l’air qui est retenu et, comme le dit Aristote, qui est <<prisonnier>> des oreilles. Lorsqu’il est mis en mouvement par l’air qui s’introduit du dehors et qui le choc lui donne en quelque manière une figure, cet air demeure ferme, parce qu’il est entouré de toutes parts, et il reçoit alors avec précision les figures de ce qui le meut. Il transmet ces figures jusqu’au premier corps sensitif au moyen de conduits qui s’étendent de ce corps jusqu’aux oreilles. De cette manière, l’air qui est prisonnier des oreilles devient cause de la perception et de la discrimination des sons pour l’âme sensitive qui réside dans le premier corps sensitif.’

by colliding objects, is able to transmit the form to the ear. Only enclosed air, however, has the ability to receive the movement transmitted to it from the external air in such a way that the sound constituted by this movement is accurately received. If the ear were damaged, so that the air within the ear is not fully enclosed, then when the movement were transmitted to the ear from the external air, the figure received would be distorted on account of the fact that some of the air within the ear would disperse. The figure that would then be transmitted through the passages to the heart would not be the sound as produced by the sounding objects. If a perceiver's ears were so damaged that no air was enclosed at all, then the perceiver would be completely deaf. The implication of Aristotle and Alexander's treatment of the trapped air within the ear seems to be that free air is able to transmit sound but it is not able to capture it in the way required for that sound to be perceived.

In a parallel way, the transparent medium is able to receive colour in such a way that it is able to transmit it, but it is not able to keep it in and preserve it in such a way that the colour is displayed. Just as the sound needed to be captured in order to then be transmitted through the passages to the heart and perceived, so too the colour must be preserved by an appearance-making body to then be transmitted to the heart and perceived. In addition to being transmitted to the heart, the colour in the eye also changes the external transparent so that it may be seen in the eye by other perceivers.

In this and the previous chapter I have argued that, for Alexander, perception comes about by means of the object of perception changing the transparent medium and the eye. This change consists in a physical receiving of colour, which is occasionally perceptible in the medium and always perceptible in the eye. The colour received by the eye takes the form of mirror images. In the previous chapter I introduced Alexander's claim that the change undergone by the medium and eye is not an alteration but is rather a change by virtue of relation. The next chapter will be dedicated to exploring in detail what this means.

CHAPTER 4

Change by Virtue of Relation and Receiving Form *oὐχ ώστε* *ὕλη*

Over the course of the previous three chapters I have discussed Alexander's theory of visual perception, with an emphasis on the changes in the eye and the medium by means of which perception occurs. I have argued that these are physical changes, which involve the receiving of light and colour by the eye and medium. These changes are sometimes perceptible in the medium and are always perceptible in the eye. However, the changes undergone by the eye and the medium are a special kind of change distinct from ordinary alteration. This special kind of change Alexander refers to as *change by virtue of relation*. In order to understand Alexander's account, we must grasp what is meant by change by virtue of relation.

The purpose of this chapter is to explore Alexander's claims regarding change by virtue of relation and to put forward an account of how we ought, and how we ought not, to understand this special and unfamiliar kind of change. I find Alexander's notion of change by virtue of relation and his use of it in his explanation of visual perception the most interesting feature of his account. Alexander, in the extant texts, offers no clear explanation of what he means by his claim that the transparent body is illuminated and receives colour,

not through alteration, but rather by virtue of relation. However, in this chapter I will demonstrate that we may arrive at an understanding of this notion through considering the related claim that the transparent body receives light and colour ‘not as matter’. I will put forward a view of how we ought to understand the notion of change not as matter and argue that change not as matter is a broader class of change to which change by virtue of relation belongs.

4.1 Change by Virtue of Relation and Mere Cambridge Change

In this first section, I will address an important way in which I believe Alexander’s concept of change by virtue of relation has been misunderstood. Several contemporary scholars of Alexander have understood change by virtue of relation as close to or equivalent to the contemporary notion of mere Cambridge change. Victor Caston and Robert Sharples have both, in footnotes, briefly explained Alexander’s notion of change by virtue of relation in this way. In a note to his translation of Alexander’s *On the Soul*, Caston writes that the state of illumination and the taking on of colour by the illuminated transparent ‘come about solely in virtue of the relation of the medium to the illuminant or colour and so are at best “mere Cambridge changes” much like something’s coming to be to the right of something as a result of the other thing’s being moved’.¹²² Sharples similarly notes,

‘The treatment of light as a relation is Alexander’s standard doctrine, used to explain the allegedly instantaneous nature of illumination and vision. Illuminating and ceasing to be illuminated depend on the presence or absence of the light source just as being or not being on the right may depend on the movement of the person on the left. In other words, becoming illuminated is what philosophers would now call a Cambridge change, and this can be used to explain the instantaneous nature of illumination and vision.’¹²³

¹²² Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1*, (London: 2012), p.156 (n.376).

¹²³ Robert Sharples, ‘Alexander of Aphrodisias on the Nature and Location of Vision’, in Ricardo Salles (ed.) *Metaphysics, Soul, and Ethics in Ancient Thought* (Oxford: OUP, 2005), p.346 (n.6).

The term Cambridge change was applied initially to a particular linguistic understanding of change on which something could be said to change if and only if there is a predicate which is not true of it at t_1 but is true of it at t_2 (or if there is a predicate which is true of it at t_1 and is not true of it at t_2).¹²⁴ The problem with this as an account of change was that its extension seemed to many to be too broad. On this account an object can be changed merely by its being seen or known, or by another object coming to bear a particular relation to it. It is possible that the predicate ‘is seen by Emily’ could be not true of the book at t_1 but true of it at t_2 , when I shift my gaze from the computer to the book. The book, in this example, undergoes a Cambridge change, but many would object that just because I am looking at it does not mean *the book* is genuinely changed. Similarly ‘is to the left of the coffee cup’ could be true of the book at t_1 and not at t_2 as a result of the coffee cup being moved while the book remains in the same place. As a result of the worry that these types of Cambridge change were not genuine changes, the term *mere* Cambridge change came into use. A subject undergoes mere Cambridge change when it is changed in the sense that a predicate that was not previously true comes to be true of it or vice versa but where the subject undergoes no intrinsic change.

What constitutes an intrinsic change is a contentious philosophical issue, and so the scope of mere Cambridge change is not well defined. However, there is a certain kind of change which seems obviously to fall into the category of mere Cambridge change. This kind of change comes about when a subject gains a relational property, such as ‘being to the right of x ’, solely as a result of a change in the subject’s relation to something else. Such relational properties, when they belong to a subject, consist in that subject’s relation to something else. For a subject to have such a property is just for that subject to bear a relation to another object. This fact is reflected in grammatical rules concerning the predicates which attribute such properties to a subject: ‘is larger than’ or ‘is to the right of’ are necessarily two-place predicates. To attribute such a property to a subject, both the subject and the object to which it is related must be mentioned. The statement, ‘the cup is to the right of’ makes no sense.

¹²⁴ The term Cambridge change is thought to originate with P.T. Geach in his *God and the Soul* (London: Routledge & Kegan Paul, 1969), 71-2.

The statement must be completed through stating what it is the cup is to the right of. It follows from this that it is not possible to observe that a subject has such a property through observing the subject in isolation. If I see just the cup and none of its surroundings, I cannot observe that it has the property ‘to the right of x ’, where x is a particular object. I can only observe that the subject has this kind of property through observing the subject and that to which it is related.

This notion of a property consisting in a relation in this way seems present in Aristotle and Alexander’s texts. This notion of relational properties - properties which consist in a relation in the sense outlined above – is arguably the idea expressed in Aristotle’s second definition of relatives in the *Categories*:

Those things are relatives for which being is the same as being somehow related to something (*Categories*, 7, 8a31-2, trans. J.L Ackrill).¹²⁵

Consider also this passage from the *Quaestiones*, which draws heavily on chapter seven of Aristotle’s *Categories*:

Things that are relative to something are those whose [very] being is the same as being in a certain state in relation to something...What is similar, *qua* [being] similar, and equal, *qua* [being] equal, does possess its being in its relation to the things in relation to which it is spoken of, and does not indicate anything other than the relation to the things in relation to which it is spoken of (*Quaestiones*, 2.9 54, 23-29, trans. Sharples).¹²⁶

Aristotle, and there is evidence to suggest Alexander too, shared with many contemporary metaphysicians the view that the gain or loss of such properties alone, properties which consist in a relation in this way, does not constitute a genuine change in the subject. The gain

¹²⁵ ἔστι τὰ πρός τι οἷς τὸ εἶναι ταῦτόν ἔστι τῷ πρός τί πως ἔχειν.

¹²⁶ πρός τι γάρ ἔστιν οἷς τὸ εἶναι ταῦτόν ἔστι τῷ πρός τί πως ἔχειν...τὸ μὲν γάρ ὅμοιον καθὸ ὅμοιον, καὶ τὸ ἵσον καθὸ ἵσον ἐν τῇ πρός ἀ λέγεται σχέσει τὸ εἶναι ἔχει, καὶ οὐδὲν ἄλλο παρὰ τὴν πρός ὁ λέγεται σχέσιν δηλοῖ.

and loss of such properties is a change in the subject's relation to other things, but this does not mean that the subject itself is necessarily changed. Aristotle writes in the *Physics*:

Nor is there motion in respect of relation; for it may happen that when one correlative changes (*μεταβάλλοντος*), the other, although this itself does not change, may be true or not true, so that in these cases the motion (*κίνησις*) is accidental (*κατὰ συμβεβηκός*) (*Physics*, 225b11-13, trans. R.P. Hardie and R.K. Gaye).¹²⁷

By correlatives Aristotle refers to, for example, the larger and the smaller or the subject on the right and the subject on the left. When just one of these correlatives changes, for example, if the previously larger object were to shrink, the smaller may cease to be the smaller without undergoing any intrinsic change.

This idea that something may gain a property and nevertheless be unchanged is introduced by Plato in the *Theaetetus*:

Within the space of a year, I (a full-grown man) without having been either increased or diminished, am now bigger than you (who are only a boy) and, later on, smaller – though I have lost nothing and it is only you who have grown. For this means that I am, at a later stage, what I was not before and that too without having become – for without becoming it is not possible to have become, and without suffering any loss in size I could never become less. (Plato, *Theaetetus* 155b6-c4, trans. Levett)¹²⁸

Regarding Alexander on this point, we have the following passage from Simplicius. In this passage Simplicius gives Alexander's view of Aristotle's second definition of change ('change is the actualisation of what is changeable qua changeable' (Aristotle, *Physics* III.2

¹²⁷ οὐδὲ δὴ τοῦ πρός τι ἐνδέχεται γὰρ θατέρου μεταβάλλοντος <ἀληθεύεσθαι καὶ μή> ἀληθεύεσθαι θάτερον μηδὲν μεταβάλλον, ὥστε κατὰ συμβεβηκὸς ἡ κίνησις αὐτῶν.

¹²⁸ ἐμὲ τηλικόνδε ὅντα, μήτε αὐξηθέντα μήτε τούναντίον παθόντα, ἐν ἐνιαυτῷ σοῦ τοῦ νέου νῦν μὲν μείζω εἶναι, ὕστερον δὲ ἐλάττω, μηδὲν τοῦ ἐμοῦ ὄγκου ἀφαιρεθέντος ἀλλὰ σοῦ αὐξηθέντος. εἰμὶ γὰρ δὴ ὕστερον ὁ πρότερον οὐκ ἦ, οὐ γενόμενος· ἀνευ γὰρ τοῦ γίγνεσθαι γενέσθαι ἀδύνατον, μηδὲν δὲ ἀπολλὺς τοῦ ὄγκου οὐκ ἀνποτε ἐγιγνόμην ἐλάττων.

202a7-8)). According to Simplicius, Alexander claims it is superior to the first definition (the first being, ‘change is the actualisation of the potential, as such’ (*Physics* III.1 201a10-11)) because it excludes the gaining of a relational property from the class of change in a way that the first definition did not. The implication is that the loss or gain of a relational property should not be classed as a change.

‘And it seems’, says Alexander, ‘that he now says more clearly what change is than when he said that it was the actualisation of the potential *qua* potential. For, indeed, while the potential is in all the categories, not all the actualisation of the potential *qua* potential is change. At any rate relations are potential insofar as potentiality becomes actuality, as for example the potentially double becomes actual and there is no necessity for it to be changed, but it does so through that of which it is double being set beside it’ (Simplicius, *in Phys.* 436,26-32).¹²⁹

The claim here, as reported by Simplicius, is that if a subject actualises its potential to possess a relational property, for example its potential to be on the right or to be double something else through a smaller object being placed to its left, the subject is not really changed. Illumination and the taking on of colour are sometimes described by Alexander as changes $\pi\omega\varsigma$, changes ‘in a way’, for example: ‘it is clear that light and transparent [materials] that have been illuminated are changed in a certain way ($\pi\omega\varsigma$) by colours...’ (*On the Soul*, 42,11-12, trans. Caston). Caston suggests that this use of $\pi\omega\varsigma$ indicates that these changes are mere Cambridge changes, i.e. not genuine changes.¹³⁰ The use of $\pi\omega\varsigma$, however, does not imply that the receiving of colour and light by the transparent do not qualify as genuine changes. Instead, I suggest that it serves to remind the reader that the changes under discussion here are not ordinary changes. They are changes of a different sort to ordinary alteration but they are nevertheless genuine changes. There are also examples in the text of Alexander using *kinesis* without the qualification $\pi\omega\varsigma$ to describe the gaining of

¹²⁹ “καὶ δοκεῖ, φησὶν Ἀλέξανδρος, σαφέστερον νῦν λέγειν τί ποτέ ἐστιν ἡ κίνησις ἥπερ ὅτε ἔλεγεν αὐτὴν ἐντελέχειαν τοῦ δυνατοῦ ἡ δυνατόν. καὶ γὰρ τὸ μὲν δυνάμει ἐν πάσαις ἐστὶ ταῖς κατηγορίαις· οὐ πᾶσα δὲ ἡ τοῦ δυνατοῦ ἡ δυνατὸν ἐντελέχεια κίνησις ἐστι. τὰ γοῦν πρός τι δυνάμει μέν ἐστι, καθὸ δυνάμει ἐνεργείᾳ γίνεται, οἷον διπλάσιον δυνάμει δύν ἐνεργείᾳ γίνεται, καὶ οὐκ ἀνάγκη αὐτὸν κινεῖσθαι, ἀλλὰ τῷ οὗ διπλάσιον ἐστι παρατίθεσθαι αὐτῷ.”

¹³⁰ Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1*, (London: 2012), p.156 (n.376).

colour or light by the transparent. For example: 'If colour is visible in light, then it is also able to change it. For, as has been shown in the inquiries into how we see, the perception and cognition of colours occurs because what is actively transparent – that is, what is illuminated – is first modified by the colour, since colour is able to change it, and then the eye is modified by this [sc. what is transparent], since the eye itself is also transparent' (*On the Soul*, 43, 11-16, trans. Caston).

When Caston and Sharples claim that illumination and the taking on of colour by the illuminated transparent are mere Cambridge changes, they attribute to him the view that the transparent body, when illuminated or coloured, changes *only* insofar as its relation to another object (the source of light and the opaque coloured object respectively) changes. This makes light and colour, when the latter is in the illuminated transparent, relational properties akin to 'being to the right of' and 'being larger than'. On this interpretation they are properties which consist in a relation.

One need not look far to discover why this view has been attributed to Alexander. The claim itself that these changes – the illumination and colouration of the transparent – are not alterations but instead are changes by virtue of relation may suggest that we are dealing with a distinction between the gaining of an intrinsic property and the gaining of a relational property. Indeed, Alexander draws explicit comparisons between illumination and the taking on of colour by the illuminated transparent and changes which do in fact consist in the gain or loss of a relational property. Consider these passages:

That light depends on a relation but not on alteration is clear from the fact that, whereas things which are altered have not ceased from the affection that is generated in them by that which alters <them> immediately upon its departure (for when that which heats departs that which is heated by it does not immediately cease from the heat that is generated in it by <that which heats>), things that are such by virtue of their relation to something cease to be in the relation to that thing in conjunction with its departure. For the father has ceased being a father when the son has died, and when that which is on the left has departed that which is on the right is on the right no

longer. The same is true of light. For it departs all together in conjunction with the departure of that which naturally illuminates (Alexander, *de Sensu Comm.* 134, 11-19 *trans.* Towey).¹³¹

For it is by the relation and the presence of that which illuminates to that which is by nature illuminated that light <is generated>...For that which is on the right of something comes to be on the right not by means of a movement or a coming to be but rather not being on the right before it comes to be on the right all together by virtue of some kind of relation to it of that which it is on the right of (Alexander, *de Sensu Comm.* 132,5-12, *trans.* Towey).¹³²

In these passages coming to be to the right of something and ceasing to be to the right of something are given as examples of change by virtue of relation. Alexander places coming to be to the right and ceasing to be to the right in the same category of change as illumination and the gaining of colour by the illuminated transparent. Coming and ceasing to be to the right of something is a paradigmatic example of a gain and loss of a relational property. Since we are familiar with changes which consist in the gain and loss of a relational property and Alexander has provided an example of such a change in order to illustrate his notion of change by virtue of relation, it is extremely tempting to infer that we ought to understand change by virtue of relation in terms of the gain and loss of relational properties.

There is, however, an alternative way in which to take the fact that Alexander classes illumination and the receiving of colour by the illuminated transparent as the same kind of change as a subject coming to be to the right of something else. Instead of taking the salient

¹³¹ Ότι δὲ ἐν σχέσει τὸ φῶς, ἀλλ' οὐκ ἐν ἀλλοιώσει, δῆλον ἀπὸ τοῦ τὰ μὲν ἀλλοιούμενα οὐκ εὐθὺ τῷ τὸ ἀλλοιοῦ ἀπελθεῖν πεπαῦσθαι τοῦ ἐγγενομένου πάθους ἐν αὐτοῖς ύπ' αὐτοῦ (οὐ γὰρ τοῦ θεομαίνοντος ἀπελθόντος εὐθὺς καὶ τὸ θεομαινόμενον ύπ' αὐτοῦ τῆς ἐγγενομένης ύπ' ἐκείνου θεομότητος αὐτῷ παύεται), τὰ δὲ κατὰ τὴν πρός τι σχέσιν ὄντα τοιαῦτα, ἀπελθόντος τοῦ πρός ὃ η σχέσις, συμπαύεσθαι καὶ ταῦτα τοῦ ἔτι εἶναι ἐν τῇ πρός ἐκεῖνο σχέσει· νίοι γὰρ ἀποθανόντος πέπαυται καὶ ὁ πατήρ πατήρ ὅν, καὶ τοῦ ἀριστεροῦ ἀπελθόντος ὁ δεξιὸς οὐκέτι δεξιός ἐστιν. οὕτω δὲ ἔχει καὶ τὸ φῶς· συναπέρχεται γὰρ ἀθρόον τῷ φωτίζειν πεφυκότι.

¹³² σχέσει γὰρ καὶ παρουσίᾳ τῇ τοῦ φωτίζοντος πρὸς τὸ πεφυκός φωτίζεσθαι τὸ φῶς... ὡς γὰρ τὸ δεξιόν τινος οὐ διὰ κινήσεως δεξιὸν γίνεται οὐδὲ διὰ γενέσεως, ἀλλὰ τῇ τοῦ πρὸς ὃ δεξιόν ἐστι ποιᾶ σχέσει πρὸς αὐτὸν ἀθρόως οὐκ ὅν πρότερον δεξιὸν γίνεται δεξιόν.

feature of the latter example to be the fact that it involves the gaining of a relational property, and therefore inferring that this is what characterises change by virtue of relation, it is possible to find another feature which unifies the group and in terms of which change by virtue of relation ought to be defined. I will argue that in order to understand change by virtue of relation, the latter route must be taken. I discuss the alternative feature which unifies the group, and in terms of which I suggest Alexander understands change by virtue of relation, below. First I will argue that light and colour when taken on by the illuminated transparent should not be understood as relational properties and therefore that change by virtue of relation should not be understood as mere Cambridge change, where this is understood as the mere gaining of a relational property.

4.2 Change by Virtue of Relation as Genuine Change

If we consider Alexander's view of light and colours in the medium and eye, as I have presented it over the previous chapters, it becomes evident that these cannot be understood as properties which consist in a relation and that, therefore, change by virtue of relation ought not to be understood as mere Cambridge change in the sense outlined above. Let us first consider colour, as it is taken on by the transparent medium and the eye.

Colour, when taken on by the transparent medium, is in certain cases perceptible in the medium. This was noted in chapter two. When taken on by the eye, which on account of its smoothness and density is able to keep in and preserve the colour, it is always perceptible. The mechanism through which colour appears in the eye through the medium is the same as that through which colour appears in a mirror. On a certain understanding of mirror images, the colour in the mirror is understood as the mere appearance of colour. On such a view, the mirror could be understood as gaining a relational property which grounds its colour appearance. On Alexander's view of mirroring, the colour in the mirror (and so also in the eye) cannot be taken in this way.

Take the atomist view of mirror images where the mirror appears coloured on account of effluences emitted from the objects of perception, rebounding from the mirror and entering

the eye of the perceiver. The colour is seen at the point where the effluences rebound from the mirror's surface. However, when the effluence reaches the eye and so is seen, it has come from the mirror but it is no longer in the mirror. It is also not the case that the effluence peeled off from the mirror as it peeled off from the object of perception with which it is qualitatively identical. The mirror merely changed the course of the effluence's travel. The colour as seen in the mirror, then, is only apparently in the mirror. On this view the property which grounds the mirror's red appearance could be analysed as a relational property. Just as the property 'being to the right of' consists in the subject's spatial relation to another object, a mirror's 'being such as to appear red' for example, could on this account be understood to consist in the mirror's relation to both a red object and a perceiver. It is so situated that the effluence from the red object bounces off the mirror's surface and enters the eye of the perceiver, with the result that the mirror itself appears red. On this account to say that the mirror 'is red' is to say that the mirror bears a certain relation to a red object and a perceiver. In addition the mirror *appears* red, but if we wanted to say the mirror has really and not just apparently gained a property when it comes to appear red, this property gained could be understood as a relational one.

On Alexander's view the mirror or eye appears coloured, not because the mirror or eye possesses a certain relational property, but because the mirror or eye *is coloured*, i.e. it possesses colour form. The colour is taken on by the mirror or eye, and on account of its density and smoothness, is displayed there. Just as colour is not a mere appearance when it inheres in the object of perception, it is not mere appearance when found in the mirror or eye. A colour in a mirror or eye is in fact an instance of the same property as is found in the opaque solid object which, via the medium, produced the colour in the mirror or eye.

Since for Alexander the colour taken on by the eye is perceptible (and in some cases is perceptible in the medium), and since this colour is not mere appearance but is in fact a colour property in the same sense as the colour properties which inhere in solid, opaque coloured objects, it cannot be a relational property. Just as colour which inheres in a solid, opaque object is not a relational property, neither is colour as received by transparent bodies or mirrors.

For a subject to really possess, and not merely to apparently possess, a colour is not to possess a relational property. The following considerations make this clear. To start with, as noted above, it is not possible to know or observe that a subject possesses a relational property without knowing or observing that to which it is related. One cannot know that something is to the right, without knowing what it is to the right of. It is, however, possible to know or observe that a mirror appears red (and on Alexander's view the mirror appears red because it is red) without knowing or observing the opaque, solid object which is the cause of this appearance. On a certain theory of reflection, this claim may be contentious, since some may claim that to see a mirror image is to see the object the image is of directly, but on Alexander's theory of mirroring, this is not the case. For Alexander a mirror image appears on account of colour being taken on by the mirror. This colour then moves the transparent medium 'as if from a starting point' (Alexander, *de Sensu Comm.* 25, 24), just like the colour of the original object did. When the perceiver sees the image in the mirror, it is as a result of the colour in the mirror changing the transparent between itself and a perceiver.

Since the colours inhere in the mirror in a different way to the way in which they inhere in the coloured object, it is true that in a sense, on Alexander's view, when a perceiver looks in the mirror and sees the image, they see the coloured object. As I discussed in chapter 2, and will return to below, the colours which compose the image belong to the mirror only accidentally, while different instances of these same colours are proper to the object which produced the image. It is still the case, however, that on Alexander's view the perceiver only sees the object in this sense indirectly, by means of seeing the object's colours in the mirror. The colour as it is present in the mirror - even if it is in a sense the object's colour and not the mirror's - is still an instance of the colour property distinct from the particular instance of the colour as it is present in the opaque, solid object. As stated above, it is possible to observe the instance of the colour property in the mirror without observing the instance of the colour property in the coloured object.

The degree of independence the colour in the mirror has from the colour in the opaque, solid object is also reflected in the language which may be used to speak about it. It is not possible

to meaningfully and non-elliptically say ‘the cup is on the right’. We must also provide the answer to the question ‘the cup is on the right relative to what?’ It is, however, meaningful to say the mirror displays red or there is a red thing in the mirror. There is no need to answer the question ‘the mirror displays red relative to what?’ in order to create a meaningful statement. We may be curious as to where the object is, which possesses the red as its own proper colour and which has caused the mirror to take on the red accidentally, but it is not necessary to add ‘the mirror displays the red *of the lamp*’ in order to make meaningful the statement ‘the mirror displays red’.

Light in a transparent body, similarly, does not behave as a relational property. An illuminated transparent body is observably different from a dark transparent body. The state of illumination is itself observable. It may be remembered that Alexander and Aristotle treat light as a colour in a broad sense, but a colour of a special sort. Rather than being seen itself, as would be the case with ordinary colours, light is visible through allowing ordinary coloured objects to be seen. A perceiver may observe this qualitative difference between light and dark, being able to see objects through the transparent body in the former case and not in the latter case, without observing the source of light to which the transparent body is related. Again, whilst a perceiver may wonder what has produced this state of illumination, they do not need to know this in order to perceive that the transparent is illuminated. The statement, ‘the air is illuminated’ is meaningful as a non-elliptical statement. Whilst it may be of interest, there is no semantic need to add to this statement the phrase *‘by the light of the sun’*.

Another key way in which light and colour, as the latter appears in an illuminated transparent body or mirror, differ from relational properties is that when a transparent subject is illuminated, or when an illuminated transparent subject or mirror takes on colour, the subject gains a new causal power. The causal power is gained not merely as a result or consequence of taking on light or colour, rather to gain the causal power is part of what it is to take on light and colour. We may recall from chapter two that when the transparent body is illuminated it gains the causal power to enable other coloured objects to be seen. This was one of the ways in which Alexander and Aristotle defined light. Similarly we may recall

Aristotle's functional definition of colour, which defined colour in terms of a causal power: 'Its being colour at all means precisely its having in it the power to set in movement what is actually transparent' (*de Anima* 419a10-11, *trans.* Smith).¹³³

On Alexander's view, when the mirror or eye takes on colour, it acquires the power to change an illuminated transparent body. The medium transmits the colour to an appearance-making body, such as the mirror or eye, and then the medium is again changed by the colour in the mirror or eye 'as if from a starting point' (Alexander, *de Sensu Comm.* 25, 24). The ability of the mirror or eye to change the transparent, when it has taken on colour, is how the image is seen in the mirror or eye by an external perceiver. By contrast, for a subject to gain a relational property such as 'being to the right of' or 'being larger than' is not to gain a causal power, since all these properties consist in a relation to another object. Any relations a subject may bear to other objects are distinct from the causal powers it may possess.

I conclude that when a transparent subject is illuminated, or when an illuminated transparent subject or mirror takes on colour, the subject acquires a non-relational property. Illumination and the taking on of colour are not mere Cambridge changes, but are rather genuine physical changes. It is worth remembering at this point that, whilst I have argued that the class of change by virtue of relation and the class of mere Cambridge change are not co-extensive groups and that the former should not be understood as the latter, it is the case that these groups overlap. A case in which a subject comes to be on the right of something else, for example, is classed by Alexander as a change by virtue of relation, and yet this is also a clear case of mere Cambridge change. My claim is that the feature which unifies the group 'changes by virtue of relation' (a feature to be discussed below) is distinct from the feature which unifies the group 'mere Cambridge changes'. Changes such as a subject coming to be on the right of something else fall into both groups as they possess both features. In fact I suspect all mere Cambridge changes would also qualify as a change by virtue of relation.

¹³³ οὐχ ὄραται ἀνευ φωτός· τοῦτο γὰρ ἦν αὐτῷ τὸ χρώματι εἶναι, τὸ κινητικῶς εἶναι τοῦ κατ' ἐνέργειαν διαφανοῦς· ή δ' ἐντελέχεια τοῦ διαφανοῦς φῶς ἔστιν.

Those changes by virtue of relation which are not mere Cambridge changes (i.e. illumination and the taking on of colour by a transparent body or mirror), are of course distinct from alterations but they also have much in common with alterations. They are like alterations insofar as they involve a qualitative change brought about by an agent with the causal power to bring about this change. A hot object has the power to heat another object which has the capacity to be heated. Once the subject with the power to be heated has been acted on by the hot object, it too is hot. Similarly, a source of light such as a flame has the power to illuminate another body which has the capacity to be illuminated. The only kind of body which has such a capacity according to Aristotle and Alexander is a transparent body. Once the transparent body has been acted on by the source of light, it becomes illuminated. Similarly again, the mirror or the eye is coloured through being acted on, via the medium, by the coloured object of perception which has the power to change the transparent medium.

Light and colour, as found in a transparent body or mirror, do not consist in the relation between the subject to which they belong and another object, rather they are caused by something with the ability to bring about change. However, as discussed in chapter two, unlike properties acquired through ordinary alteration, these properties do not remain in the subject when the agent of change is removed. When the kettle is taken off the hot stove, for example, the water within remains hot, at least for a while. In the case of change by virtue of relation, by contrast, when the object to which the changed subject is related is removed, the subject immediately reverts back to its pre-change state.

This feature holds for all cases of change by virtue of relation, both illumination and the taking on of colours, and changes such as coming to be to the right of or coming to be larger than. In the latter cases, those changes which are not only changes by virtue of relation but are also mere Cambridge changes, it is possible to explain this feature through reference to the fact that the property gained in the change consists in the subject's relation to another object. When the other object is removed, it no longer bears this relation to the object, so of course the property is immediately lost. In the case of those changes by virtue of relation

which are not also mere Cambridge changes – i.e. illumination and the taking on of colour by the transparent – the properties acquired by the changed subject do not consist in the subject's relation to the object, so another explanation is needed for why the subject reverts back to its pre-change state as soon as the object to which it is related is removed. In the next section I will argue that such an explanation may be found by examining Alexander's notion of change *not as matter*. Having argued that change by virtue of relation ought not to be understood as mere Cambridge change, it remains to be established how it should be understood. I will argue that it is the fact that in change by virtue of relation properties are received *not as matter*, which distinguishes all such changes from ordinary alteration. It is also this way of receiving a property which is shared by all cases of change not as matter, from illumination to coming to be on the right of, and which unifies the group.

4.3 ‘What is Transparent does not Receive Light, or Light Colour, ως ὑλη’

In *On the Soul* Alexander claims not only that light is received by the transparent and colour by the illuminated transparent by virtue of relation, he also claims they are received ‘not as matter’. Consider the following passage:

For the colour comes to be present in what is illuminated and in light in the same way the light comes to be present in what is transparent, so what is transparent does not receive light or light colour in virtue of an effluence or in the way matter [receives something] (οὐτε ως ὑλης ή τοῦ διαφανοῦς δεχομένου τὸ φῶς ή τοῦ φωτὸς τὸ χρῶμα). In fact, when the things that produce these [effects] have gone away, the colour immediately leaves the light as well (in the case where the things that tinge it go away) and light leaves the transparent (in the case where what illuminates is not present). The sort of change that arises from both sources occurs in what receives them

in virtue of a presence and a particular sort of relation, much as [the reflections] in mirrors come to be present in them) (*On the Soul*, 42,19-43,4, trans. Caston).¹³⁴

Most of the claims contained in this passage are by now familiar: (i) the transparent does not receive light and the illuminated transparent does not receive colour in virtue of an effluence, i.e. light and colour are not corporeal effluxes somehow taken on by the transparent body; (ii) the light and colour immediately leave the transparent body as soon as the source of light and coloured object are removed; (iii) the changes are by virtue of a presence, i.e. the presence of the source of light and a coloured object, and a relation to the source of light and the coloured object.¹³⁵ I have saved discussion of this fourth claim, however, the claim that the transparent body does not receive light, and the illuminated transparent body does not receive colour, ‘as matter’ until this point. By understanding Alexander’s use of the phrase ‘to receive not as matter’, I suggest we are able to more fully understand his category of changes by virtue of relation. In this section, I discuss this phrase as used by Alexander.

Alexander’s claim that the transparent body does not receive light or colour *as matter*, is the claim that the transparent body does not receive light or colour in the way that matter *receives something*. In Caston’s notes to the text he glosses the claim as a dismissal, by Alexander, ‘that the transparent takes on light or light takes on colour in the way that matter takes on a form’.¹³⁶ Before presenting my interpretation of what Alexander means by

¹³⁴ γίνεται δὲ τὸ χρῶμα ἐν τῷ πεφωτισμένῳ τε καὶ φωτὶ οὔτως ὡς καὶ τὸ φῶς ἐν τῷ διαφανεῖ, οὔτε κατὰ ἀπόρροιάν τινα, οὔτε ὡς ὅλης ἢ τοῦ διαφανούς δεχομένου τὸ φῶς ἢ τοῦ φωτὸς τὸ χρῶμα (ἀπελθόντων γοῦν τῶν ταῦτα ἐμποιούντων εὐθὺς συναπέρχεται τὸ μὲν χρῶμα ἐκ τοῦ φωτός, εἰ τὰ χρωννύντα αὐτὸ ἀπέλθοι, τὸ δὲ φῶς ἐκ τοῦ διαφανοῦς, εἰ τὸ φωτίζον αὐτὸ μὴ παρείη), ἀλλ’ ἔστι τις ἡ ἀπ’ ἀμφοτέρων κίνησις ἐν τοῖς δεχομένοις αὐτὰ γινομένη κατὰ παρουσίαν τε καὶ ποιὰν σχέσιν, ὡς γίνεται καὶ ἐν τοῖς κατόπτροις τὰ ἐν αὐτοῖς ὄρώμενα. See also, *On the Soul* 62,3-4; 62,12-13.

¹³⁵ It may be recalled that in chapter two I suggested that Alexander introduces the notion of change by virtue of relation in response to Aristotle’s claim that, ‘light is neither fire nor any kind whatsoever of body nor an efflux from any kind of body (if it were, it would again itself be a kind of body) - it is the *presence* of fire or something resembling fire in what is transparent’ (Aristotle, *de Anima* 418b13-15).

¹³⁶ Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1*, (London: 2012), p.155 (n.375).

receiving light and colour *not as matter* in this context, in order to avoid misunderstandings I will first discuss a very similar and much discussed phrase found in Aristotle. This is the claim that: ‘sense is what has the power of receiving into itself the sensible forms of things without the matter (*ἄνευ τῆς ὕλης*)’.¹³⁷

The first thing to note about Aristotle’s use of *ἄνευ τῆς ὕλης*, compared to Alexander’s οὐτε ώς ὕλης in the passage above, is the difference in context. In the passage above the phrase is used in the context of discussing the receiving of light and colour by the transparent medium. Alexander uses the phrase in the context of discussing changes by means of which perception occurs, not perception itself. Aristotle’s phrase, by contrast, is used in the context of describing what the perceptive capacity and perception itself is. Alexander also, however, elsewhere uses the phrase ‘not as matter’ and the similar phrase *χωρὶς τῆς ὕλης*, which I will translate as ‘separate from matter’, in a similar context. Setting aside for now the usage I am primarily interested in, i.e. the usage in the context of describing the changing of the transparent medium, I will first discuss the use of the phrases ‘not as matter’ and ‘separate from matter’ in the context of the discussion of perception itself.

Aristotle writes that sense (*αἰσθησίς*) is that with the power to receive form without matter. The exercise of this power is actual perception. Actual perception, for Aristotle, consists at least in part in receiving form without matter. Alexander too makes this claim, for the most part using *χωρὶς τῆς ὕλης* (‘separate from matter’) or *not as matter* as opposed to Aristotle’s *ἄνευ τῆς ὕλης* (60, 3-6; 66,14-15; 78,6-8; 92,21-22).¹³⁸ An exception to this is found in the following passage in which Alexander echoes Aristotle’s precise phrase:

¹³⁷ ‘Generally, about all perception, we can say that a sense is what has the power of receiving into itself the sensible forms of things without the matter, in the way in which a piece of wax takes on the impression of a signet-ring without the iron or gold; what produces the impression is a signet of bronze or gold, but not *qua* bronze or gold’ (*de Anima* II.12 424a17-21, trans. Smith).

Καθόλου δὲ περὶ πάσης αἰσθήσεως δεῖ λαβεῖν ὅτι ἡ μὲν αἰσθησίς ἐστι τὸ δεκτικὸν τῶν αἰσθητῶν εἰδῶν ἄνευ τῆς ὕλης, οἷον ὁ κηρὸς τοῦ δακτυλίου ἄνευ τοῦ σιδήρου καὶ τοῦ χρυσοῦ δέχεται τὸ σημεῖον, λαμβάνει δὲ τὸ χρυσοῦν ἢ τὸ χαλκοῦν σημεῖον, ἀλλ’ οὐχ ἡ χρυσὸς ἢ χαλκός.

¹³⁸ Caston translates this phrase in the same way as Aristotle’s *ἄνευ τῆς ὕλης*: without matter. I have translated this phrase differently (‘separate from matter’) in order to differentiate between Aristotle’s phrase and Alexander’s.

'Now just as actual sensation takes place by means of (διὰ) the apprehension (λήψεως) of the forms of sensible objects without their matter (ἀνευ τῆς ὕλης)...' (*On the Soul*, 83, 13-14, trans. Fotinis)

I ought to note that whilst I have been describing Alexander's view of perception as consisting in *receiving* form not as, without or separate from matter, it is unclear whether the terms Alexander uses in the context of actual perception ought always to be translated as 'receive.' In the above passage Alexander uses the term 'λήψεως.' Aristotle, when he claims that sense receives form without matter, sometimes uses the term 'τὸ δεκτικόν', translated by Smith as 'the power to receive'. Δεκτικόν and the associated verb δέχομαι unequivocally concern receiving.¹³⁹ When Alexander uses the phrase 'separate from matter' (χωρὶς τῆς ὕλης) in the context of actual perception, he sometimes, like Aristotle, uses δεκτικόν, the power to receive separate from matter (60, 3-6; 66, 14-15). Specifically Alexander uses the phrase δεκτικὸν τε καὶ κριτικόν, receiving and judging forms separate from matter. Once Alexander writes that the forms separate from matter *come to be in* that which is capable of perceiving (γινόμενον ἐν τῷ αἰσθητικῷ):

Actual perception is the form of the sensible object without matter (χωρὶς τῆς ὕλης) coming to be in that which is capable of perceiving (*On the Soul*, 39,13-14, trans. Caston).¹⁴⁰

Forms of δέχομαι are also used by Alexander when he uses the phrase 'not as matter' (μὴ ως ὕλη) in the context of the reception of light and colour by the transparent. However, when Alexander uses the phrase 'not as matter' in the context of actual perception Alexander does not use δέχομαι, but another verb λαμβάνω (83, 13-23, 87,4-5). Λαμβάνω has both an active and passive meaning. It can mean to receive but it can also mean to take

¹³⁹ LSJ Online, 382-383 (entry for δέχομαι).

¹⁴⁰ τὸ γὰρ εἶδος τοῦ αἰσθητοῦ χωρὶς τῆς ὕλης γινόμενον ἐν τῷ αἰσθητικῷ ή κατ' ἐνέργειάν ἔστιν αἰσθησις.

or grasp. In a cognitive or perceptual context it may be translated as to apprehend.¹⁴¹ In the passage above ‘λήψεως’ is used with the phrase ἀνευ τῆς ὕλης. Alexander also occasionally uses λαμβάνω with the phrase ‘separate from matter’ (χωρὶς τῆς ὕλης) (78, 6-8).

It may be remembered that, for Alexander, visual perception occurs by means of the ultimate sense organ – the heart – receiving the affections transmitted from the eyes via the transparent-filled passages. Strictly speaking, however, as discussed in chapter one, perception consists in the exercise of the soul’s capacity for perceptual judgement. This choice of λαμβάνω to describe the action involved in actual perception makes it unclear whether Alexander refers to the receiving of the form by the heart or the judging (or grasping or apprehending) of the form by the perceptual capacity. The phrase ‘δεκτικὸν τε καὶ κριτικόν’, which Alexander also uses to describe the action which constitutes actual perception clearly means both: the form is received and judged. It is possible that Alexander deliberately uses λαμβάνω, with its two possible meanings, so that it may be taken either to refer to the receptive action of the sense organ or to the judging or grasping action of the perceptive capacity. Alternatively, he could just have intended the latter, since for him perception strictly speaking is the judging activity of the perceptive capacity.

Before returning to the main point of this section - the meaning of ‘not as matter’ in the context of the changing of the transparent medium and the eye - I will say one more thing specifically about Alexander’s use of the phrase ‘separate from matter’ (χωρὶς τῆς ὕλης). This phrase, in addition to being used to describe the way in which that which is capable of perceiving receives forms, is also used several times in Alexander’s discussion of intellect. Alexander claims that the forms are thought, understood or grasped separate from matter (see 86,29; 85,13-19; 91, 8).

Consider the passage from *On the Soul*, quoted at length below. In addition to providing an example of this use of ‘separate from matter’ (χωρὶς τῆς ὕλης) in the context of intellectual apprehension, the second half of the passage also includes Alexander’s explanation of what

¹⁴¹ LSJ Online, 1026-1027 (entry for λαμβάνω).

he means by ‘not as matter’ ($\mu\bar{\eta}$ $\omega\bar{s}$ $\bar{\nu}\lambda\eta$). I will discuss this explanation shortly. Here is the first half of the passage:

Now just as actual sensation takes place by means of ($\delta i\bar{a}$) the apprehension ($\lambda\bar{h}\psi\omega\bar{s}$) of the forms of sensible objects without their matter ($\bar{\alpha}n\bar{e}v\ t\bar{h}\bar{s}$ $\bar{\nu}\lambda\eta\bar{s}$), so intellectual activity (\bar{h} $v\bar{o}\bar{n}\sigma\bar{i}\bar{s}$) is the apprehension of forms without matter ($\chi\bar{w}\bar{o}\bar{r}\bar{i}\bar{s}$ $\bar{\nu}\lambda\eta\bar{s}$). But it differs from sense perception in that sensation, even though it does not grasp ($\lambda\bar{a}\mu\bar{b}\bar{a}\bar{n}\bar{e}i$) sensible form as matter [receives form] ($\mu\bar{\eta}$ $\omega\bar{s}$ $\bar{\nu}\lambda\eta$), nevertheless perceives them as existing in matter ($\omega\bar{s}$ $\bar{\delta}\bar{o}\bar{n}\bar{t}\bar{a}\bar{w}\bar{o}$ $\bar{e}\bar{n}$ $\bar{\nu}\lambda\eta$). The common sensibles that are everywhere interwoven with our perception of proper sensibles are witnesses to the fact that in sensation we perceive the object under its material conditions; for when we see colour we apprehend along with it, and in the same sensory act, extension and shape, motion and rest, and the like, and these added qualities are evidence that colour exists in a subject. Intellect ($\bar{o}\ v\bar{o}\bar{u}\bar{s}$), however, not only grasps its forms in a different way than matter [receives form], but has for its object forms that do not exist in matter nor under any material conditions ($o\bar{u}\bar{t}\bar{e}$ $\omega\bar{s}$ $\bar{\nu}\lambda\eta$ $t\bar{a}\bar{e}\bar{e}\bar{d}\bar{h}$ $\lambda\bar{a}\mu\bar{b}\bar{a}\bar{n}\bar{e}i$, $o\bar{u}\bar{t}\bar{e}$ $\omega\bar{s}$ $\bar{e}\bar{n}$ $\bar{\nu}\lambda\eta$ $\bar{\delta}\bar{o}\bar{n}\bar{t}\bar{a}\bar{w}\bar{o}$ $\kappa\bar{a}\bar{i}\bar{l}$ $\mu\bar{e}\bar{\theta}\bar{'}$ $\bar{\nu}\lambda\eta\bar{s}$) (*On the Soul*, 83, 13-23, trans. Fotinis).¹⁴²

In this passage Alexander draws a parallel between actual perception and intellectual activity. Just as actual perception comes about through the apprehension of forms without matter ($\bar{\alpha}n\bar{e}v\ t\bar{h}\bar{s}$ $\bar{\nu}\lambda\eta\bar{s}$), so intellectual activity is the apprehension of form separate from matter ($\chi\bar{w}\bar{o}\bar{r}\bar{i}\bar{s}$ $\bar{\nu}\lambda\eta\bar{s}$). Alexander then highlights the following difference. Whilst neither sense nor intellect receive forms *as matter*, sense perceives forms as existing in the matter of the object of perception whereas, for intellect, it does not grasp the form as existing *in or with* the matter of the object of thought.

¹⁴² $\bar{\omega}\bar{s}\bar{p}\bar{e}\bar{q}$ $\bar{d}\bar{e}$ \bar{h} $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\sigma}\bar{i}\bar{s}$ \bar{h} $k\bar{a}\bar{t}'$ $\bar{\epsilon}\bar{n}\bar{e}\bar{q}\bar{g}\bar{e}\bar{i}\bar{a}\bar{n}$ $\bar{\delta}\bar{i}\bar{a}$ $t\bar{h}\bar{s}$ $t\bar{a}\bar{w}$ $\bar{e}\bar{i}\bar{d}\bar{a}\bar{w}$ $t\bar{a}\bar{w}$ $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\tau}\bar{a}\bar{w}$ $\lambda\bar{h}\psi\bar{e}\bar{w}\bar{s}$ $\bar{\alpha}n\bar{e}v\ t\bar{h}\bar{s}$ $\bar{\nu}\lambda\eta\bar{s}$ $\bar{g}\bar{y}\bar{i}\bar{v}\bar{e}\bar{t}\bar{a}\bar{i}$, $o\bar{u}\bar{t}\bar{a}\bar{w}$ $\bar{d}\bar{e}$ $\kappa\bar{a}\bar{i}\bar{l}$ \bar{h} $v\bar{o}\bar{n}\bar{\sigma}\bar{i}\bar{s}$ $\lambda\bar{h}\psi\bar{i}\bar{s}$ $t\bar{a}\bar{w}$ $\bar{e}\bar{i}\bar{d}\bar{a}\bar{w}$ $\bar{e}\bar{o}\bar{s}\bar{t}\bar{i}$ $\chi\bar{w}\bar{o}\bar{r}\bar{i}\bar{s}$ $\bar{\nu}\lambda\eta\bar{s}$, $t\bar{a}\bar{u}\bar{t}\bar{h}\bar{e}$ $t\bar{h}\bar{s}$ $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\tau}\bar{i}\bar{k}\bar{\eta}\bar{s}$ $\bar{\alpha}\bar{n}\bar{t}\bar{i}\bar{l}\bar{\lambda}\bar{\psi}\bar{e}\bar{w}\bar{s}$ $\bar{d}\bar{i}\bar{a}\bar{f}\bar{e}\bar{d}\bar{o}\bar{u}\bar{s}\bar{a}$, \bar{h} \bar{h} $\bar{m}\bar{e}\bar{v}$ $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\sigma}\bar{i}\bar{s}$, $e\bar{i}$ $\kappa\bar{a}\bar{i}\bar{l}$ $\mu\bar{\eta}$ $\omega\bar{s}$ $\bar{\nu}\lambda\eta$ $t\bar{a}\bar{e}\bar{a}\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\tau}\bar{a}$ $\bar{e}\bar{i}\bar{d}\bar{h}$ $\lambda\bar{a}\mu\bar{b}\bar{a}\bar{n}\bar{e}i$, $\bar{a}\bar{l}\bar{l}'$ $o\bar{u}\bar{t}\bar{a}\bar{w}$ $\gamma\bar{e}$ $a\bar{u}\bar{t}\bar{a}\bar{w}$ $p\bar{o}\bar{i}\bar{e}\bar{\iota}\bar{t}\bar{a}\bar{i}$ $t\bar{h}\bar{s}$ $\bar{\alpha}\bar{n}\bar{t}\bar{i}\bar{l}\bar{\lambda}\bar{\eta}\bar{\psi}\bar{i}\bar{w}$ $\bar{\omega}\bar{s}$ $\bar{\delta}\bar{o}\bar{n}\bar{t}\bar{a}\bar{w}\bar{o}$ $\bar{e}\bar{n}\bar{\nu}\lambda\eta$ ($t\bar{a}\bar{g}\bar{\lambda}\bar{d}\bar{o}$ $k\bar{o}\bar{i}\bar{n}\bar{a}$ $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\tau}\bar{a}$ $s\bar{u}\bar{m}\bar{p}\bar{e}\bar{p}\bar{l}\bar{e}\bar{g}\bar{m}\bar{e}\bar{n}\bar{a}$ $t\bar{h}\bar{t}\bar{a}\bar{w}$ $i\bar{d}\bar{i}\bar{w}\bar{a}\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\tau}\bar{a}$ $\bar{\alpha}\bar{n}\bar{t}\bar{i}\bar{l}\bar{\lambda}\bar{\mu}\bar{b}\bar{a}\bar{n}\bar{e}\bar{s}\bar{t}\bar{a}\bar{i}$ $\bar{\alpha}\bar{m}\bar{a}$ $\bar{g}\bar{\lambda}\bar{d}$ $\bar{\chi}\bar{o}\bar{w}\bar{m}\bar{a}\bar{t}\bar{a}\bar{w}$ $\bar{\delta}\bar{\psi}\bar{i}\bar{s}$ $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{a}\bar{m}\bar{e}\bar{n}\bar{e}\bar{h}\bar{e}\bar{v}\bar{i}\bar{s}$ $\bar{s}\bar{u}\bar{n}$ $a\bar{u}\bar{t}\bar{a}\bar{w}$ $\bar{\delta}\bar{o}\bar{n}\bar{t}\bar{a}\bar{w}\bar{o}$ $\bar{e}\bar{n}\bar{\nu}\lambda\eta$ $t\bar{h}\bar{s}$ $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\eta}\bar{s}\bar{i}\bar{s}\bar{a}\bar{w}$ $\bar{\eta}\bar{\delta}\bar{\varrho}\bar{e}\bar{m}\bar{i}\bar{a}\bar{s}$ $a\bar{i}\bar{s}\bar{\theta}\bar{h}\bar{\eta}\bar{s}\bar{i}\bar{s}\bar{a}\bar{w}$ $\bar{\lambda}\bar{a}\bar{m}\bar{b}\bar{a}\bar{n}\bar{e}\bar{v}\bar{e}\bar{i}$, $\bar{\alpha}$ $m\bar{a}\bar{r}\bar{t}\bar{u}\bar{r}\bar{a}\bar{w}$ $t\bar{h}\bar{t}\bar{a}\bar{w}$ $\bar{p}\bar{e}\bar{r}\bar{i}\bar{t}\bar{u}\bar{r}\bar{a}\bar{w}$ $\bar{\nu}\bar{p}\bar{o}\bar{k}\bar{e}\bar{m}\bar{e}\bar{n}\bar{v}\bar{e}\bar{n}\bar{a}\bar{t}\bar{u}\bar{r}\bar{a}\bar{w}$ $\bar{e}\bar{\iota}\bar{n}\bar{a}\bar{t}\bar{u}\bar{r}\bar{a}\bar{w}$ $\bar{t}\bar{o}\bar{d}\bar{h}$ $\bar{\chi}\bar{o}\bar{w}\bar{m}\bar{a}\bar{t}\bar{a}\bar{w}$), $\bar{o}\bar{u}\bar{t}\bar{e}$ $\bar{\omega}\bar{s}$ $\bar{\nu}\lambda\eta$ $\bar{\delta}\bar{o}\bar{n}\bar{t}\bar{a}\bar{w}\bar{o}$ $\kappa\bar{a}\bar{i}\bar{l}$ $\mu\bar{e}\bar{\theta}\bar{'}$ $\bar{\nu}\lambda\eta\bar{s}$.

I take it that the difference between intellectual and perceptual apprehension referred to here, a difference expressed by the phrase ‘not in or with matter’, is, briefly stated, as follows. On the one hand, we perceive perceptual forms, such as the colour of a particular coloured object, along with qualities which belong to the particular hylomorphic compound to which the form belongs. When we perceive red, for example, we do not perceive an abstract redness but a redness belonging to an object, a redness with extension, shape and which we perceive as moving or remaining still. On the other hand, to grasp an intellectual form, is not to grasp the form as it exists in a concrete particular object, i.e. it is not to grasp form in matter. Instead it is to grasp the universal, which belongs to multiple particular objects.

Whatever precisely is intended by Alexander’s phrase ‘in or with matter’, it is clear that only the perceptual faculty grasps forms in this way. The intellectual faculty does not. On the other hand, when it comes to grasping forms ‘as matter’, neither the intellectual faculty nor the perceptual faculty grasp forms in this way. ‘Separate from matter’ ($\chiωρὶς τῆς ὕλης$) is used by Alexander in different parts of his texts to describe both the way in which the perceptual faculty grasps form, and the way in which the intellectual faculty grasps form. I now turn to the second half of the passage in which Alexander explains what he means by the qualification ‘not as matter’.

This passage below contains the most detailed explanation of what Alexander means by the phrase *not as matter* in the extant texts. However, the explanation occurs in the context of describing the way in which the intellectual and perceptive faculties grasp intellectual and perceptual form. Ultimately, the aim is to discover what it means to say that the eye and medium receive light and colour *not as matter*. The faculties of the soul, and the transparent body which constitutes the medium, are very different kinds of thing and one would expect the way in which they receive or grasp form to be very different. Indeed, positively described, the way in which the soul and the medium receive or grasp form will be very different. To state that they receive form *not as matter*, however, is to make a negative claim and it is a negative claim that is true both of the way in which the soul grasps form (or does

not grasp form) and the way in which the medium receives light and colour (or does not receive light and colour). There is no reason to think that Alexander is not using the phrase in the same way in both contexts, to make the same negative claim. In fact, there is evidence that he is using the phrase consistently across these contexts. In both contexts, as we shall see, he contrasts a subject receiving form *not as matter* with a subject undergoing alteration.

Here is the second half of the passage:

To receive a form as matter, is the same thing as becoming the matter for that which is received (ἔστι δὲ τὸ μὲν ὡς ὑλὴν εἶδός τι λαμβάνειν τὸ αὐτὸν <τῷ> ὑλὴν γίνεσθαι τῷ λαμβανομένῳ). This sort of reception is found amongst the affections which do not come about by virtue of the soul (οὐ ἐπὶ τῶν παθῶν τῶν οὐ κατὰ ψυχὴν γινομένων ἰδεῖν ἔστι). For the things which are affected in a simple sense become the matter of the affections (τὰ γὰρ ἀπλῶς πάσχοντα ὑλαὶ γίνονται τῶν παθῶν). That which is heated, when it becomes itself hot, itself becomes the matter for this affection [i.e. heat]. But this is not the case in perception or intellection. Although perception comes about through certain bodily affections, perception itself is not affection but judgement (οὐ πάσχειν ἔστιν, ἀλλὰ κρίνειν). The intellect does not take on forms, by becoming matter (ὡς ὑλὴ) of the forms therefore... (*On the Soul*, 83, 23-84,7).¹⁴³

¹⁴³ For the first half of this passage (83, 13-23) quoted above, I used Fotinis' translation. For the second half quoted here (83, 23-84,9), I have provided my own translation, since Fotinis' strays a little from the text and is too infused with his own interpretation for my purposes. In translating this second half, I consulted Fotinis' English translation, but my translation is largely based on the French translation by Bergeron and Dufour, which adheres to the text more closely (M. Bergeron and R. Dufour, *Alexandre d'Aphrodise: De l'âme* (Paris : Librairie Philosophique J. Vrin, 2008)).

Here is the second half of Fotinis' translation, and the Greek text:

'By 'receiving a form as matter does', I mean the case wherein the recipient becomes an actual material principle with respect to that which is received. Observable instances of this sort of reception are those wherein a subject is acted upon in a purely extrinsic way, and not in virtue of an intrinsic principle of movement such as the soul. For subjects that are merely acted upon become the actual matter of the effects which they undergo: thus a body that is heated becomes, when it is hot, the matter [which supports] the quality "heat." But neither the senses nor the intellect "receive their forms" in the way just described. For although it is true that sensation comes about through the instrumentality of affections which the body undergoes, the act of sensing itself is not one of being acted upon, but of judging. And certainly, so far as the intellect is concerned, it does not become matter with respect to its forms in order to receive them...'

The first thing to note is that in this passage we find confirmation that to receive a form not as matter, for Alexander, is for the subject which receives the form not to become matter for that form. The claim is not that the subject receives form without also receiving matter, it is rather that the subject does not come to stand as matter to that form. In order to understand what it would mean for a subject *not to become* the matter for a form, it helps to consider what it means for a subject *to become* the matter for a form. In the above passage Alexander explains the meaning of the claim that sense receives forms *not as* matter, through explaining what it is to receive a form *as* matter.

For a subject to receive a form *as* matter, is for that subject to undergo ordinary alteration. To receive a form, in this context, is just to receive a quality, such as colour, and to receive a form *as matter* is to do so in the ordinary way. Alexander gives the example of an object being heated. If a fire heats a kettle full of water, the water becomes the matter for the form ‘heat’. I suggest we can determine what it means for a subject to become the matter for a form or quality (and so what it means for a subject not to become the matter for a form or quality) through considering Aristotle’s notion of a material cause and the role this plays in ordinary alteration.

The material cause (*αἰτία*) is one of Aristotle’s four causes as introduced in *Physics* II.3. Aristotle introduces the four causes in the context of the claim that a person can have knowledge of a thing only when they ‘have grasped the “why” of it (which is to grasp its primary cause’ (Aristotle, *Physics*, 194b18-19, trans. Hardie and Gaye). A point frequently made in the literature is that the four causes are best understood not as causes in the modern sense of the term (or at least, not all of them ought to be understood as causes in this way)

ἔστι δὲ τὸ μὲν ὡς ὑλην εἶδός τι λαμβάνειν τὸ αὐτὸν <τῷ> ὑλην γίνεσθαι τῷ λαμβανομένῳ, ὁ ἐπὶ τῶν παθῶν τῶν οὐ κατὰ ψυχὴν γινομένων ιδεῖν ἔστι. τὰ γὰρ ἀπλῶς πάσχοντα ὑλαι γίνονται τῶν παθῶν. τὸ γὰρ θεομαινόμενον θεομόν γινόμενον αὐτὸν ὑλη τῷ πάθει γίνεται, ὁ οὔτε ή αἰσθησις οὔτε οὐ νοῦς ἔχουσιν. καὶ γὰρ εἰ διά τινων παθῶν σωματικῶν τὸ αἰσθάνεσθαι γίνεται, ἀλλ’ αὐτό γε τὸ αἰσθάνεσθαι οὐ πάσχειν ἔστιν, ἀλλὰ κρίνειν. οὔτε οὖν ὡς ὑλη γινόμενος οὐ νοῦς τῶν εἰδῶν οὕτως αὐτὰ λαμβάνει.

but as types of explanation.¹⁴⁴ The term *aitíā*, whilst translated as ‘cause’, carries the meaning ‘the thing responsible for’ or ‘that which is to blame’.¹⁴⁵ Aristotle’s claim, stated simply, is that one needs to know what makes a thing what it is, in order to have knowledge of that thing.

Matter is one of the things responsible for making a thing what it is. Aristotle writes, ‘that out of which a thing comes to be and which persists is called a cause, e.g. the bronze of the statue, the silver of the bowl, and the genera of which the bronze and the silver are species’ (*Physics*, 194b24-26). Aristotle refers to this cause as a material cause in the following passage:

‘As things are called causes in many ways, it follows that there are several causes of the same thing (not merely accidentally), e.g. both the art of the sculptor and the bronze are causes of the statue. These are causes of the statue *qua* statue, not in virtue of anything else that it may be – only not in the same way, the one being the material cause, the other the cause whence the motion comes (ἀλλὰ τὸ μὲν ὡς ὕλη τὸ δὲ ὡς ὄθεν ἡ κίνησις)’ (*Physics*, 195a4-8, trans. Hardie and Gaye)

The two causes referred to here are the efficient cause, i.e. that which produces the item under consideration, and the material cause, i.e. that which makes the item what it is, as that item’s constituent matter. That which produces the statue is, strictly speaking, the form of the statue or the art of statue making, which is known by the sculptor and which informs his sculpting activity. In one sense, it is the art of statue-making which makes the statue what it is. In another sense, it is the bronze out of which the statue is composed which makes the statue what it is. The bronze is that out of which the statue comes to be and is that which functions as the material constituent in the resultant hylomorphic compound ‘bronze-statue’.

¹⁴⁴ See, for example, Gail Fine, ‘Forms as Causes: Plato and Aristotle’ in *Mathematics and Metaphysics in Aristotle*, ed. Andreas Graeser, (Stuttgart: Haupt, 1987); Julius Moravcsik ‘What Makes Reality Intelligible? Reflections on Aristotle’s Theory of Aitia’, in *Aristotle’s Physics: A Collection of Essays*, ed. Lindsey Judson (Oxford: Clarendon Press, 1991).

¹⁴⁵ LSJ Online, 44 (entry for *aitíā*).

These examples – the sculpting of the bronze statue or the silver bowl – are examples of generation as opposed to mere alteration. The making of a statue or bowl is a case of artificial substantial generation - a new substantial entity, for example the statue, comes to be. Ordinary alteration, on the other hand, for the most part involves the gain or loss of a non-essential quality by a pre-existing substance. The making of the statue is a case of substantial generation (or at least an artificial analogue to cases of substantial generation), whereas if the statue, once made, were to change its colour, this would be an example of ordinary alteration. The notion of material cause can however be applied both to the matter which stands to substantial form (as in these examples), but also to the matter which stands to the non-essential qualities of a subject, for example the subject's colour.

Alexander discusses the material cause in his commentary on chapter two of Aristotle's *Metaphysics Δ* (*On Aristotle Metaphysics 5*, 348,27-349,2). However, the most interesting chapter of Alexander's commentary on *Metaphysics Δ* with regards to determining the meaning of 'to receive form not as matter' and 'change by virtue of relation' is his commentary on chapter 18. In chapter 18 of Aristotle's text, Aristotle discusses the phrase 'that in virtue of which' ($\tauὸ\ καθ' ὁ$). Aristotle writes that, 'in general "that in virtue of which" will be found in the same number of senses as 'cause' ($\tauὸ\ αἰτίον$)' (*Metaphysics Δ*, 1022^a19-20, *trans.* W.D. Ross). On one sense of 'that in virtue of which', that in virtue of which something is the case is the matter of that thing. That in virtue of which something is the case, in this sense, is the material cause of that thing. Consider the following passage:

'That in virtue of which' has several meanings, (1) the form or substance of each thing, e.g. that in virtue of which a man is good is the good itself, (2) the proximate subject in which an attribute is naturally found, e.g. colour in a surface. 'That in virtue of which', then, in the primary sense is the form, and in a secondary sense the matter of each thing and the proximate substratum of each (Aristotle, *Metaphysics Δ*, 1022^a14-19, *trans.* W.D. Ross).

I am interested in the second meaning of ‘that in virtue of which’, the meaning which corresponds to material cause. The example Aristotle gives of something in virtue of which something is the case in this sense is highly relevant to our purposes. He gives the example of a surface in which colours are naturally found. That in virtue of which an object has a certain colour, in this sense of ‘that in virtue of which’, will be the object’s surface. The surface is the matter or proximate subject of the colour. Aristotle uses the example of colour in a surface again when, later in the chapter, he discusses what it is for something to be ‘in virtue of itself’ ($\tauὸ\ καθ' \alphaὐτὸ$). He claims that a surface is white by virtue of itself. Since the surface is responsible for its being white, in the sense that it functions as the material constituent of its own whiteness, we may say that the surface is white by virtue of itself (Aristotle, *Metaphysics Δ*, 1022^a30-32).

I now turn to Alexander’s commentary on chapter 18 of *Metaphysics Δ*, in which he discusses further the notion of the matter as that by virtue of which something is the case, and continues to use the example of colour in a surface. Commenting on the meaning of ‘that in virtue of which’, Alexander writes:

[Aristotle] says that ‘that in virtue of which’ means [2] the proximate subject in which something naturally comes to be for [an attribute] is said to exist in virtue of its subject. The body, for instance, is said to be coloured in virtue of its surface, because the surface is the first recipient of colour...Aristotle says that in the proper and primary sense, ‘that in virtue of which’ is the form, for each existent has its being in virtue of its form, but secondarily too in virtue of its matter and proximate substrate ($\kappaατὰ\ τὴν\ ūλην\ καὶ\ τὸ\ πρῶτον\ ὑποκείμενον$), which he called ‘the first recipient’ ($\piρῶτον\ δεκτικόν$); for colour is in the surface as in a proximate matter ($ὡς\ γὰρ\ ἐν\ ūλῃ\ πρώτῃ\ τῇ\ ἐπιφανείᾳ\ τὸ\ χρῶμα$). For each of the things that exist, whether naturally or through art, exists and is said ‘to be’ not only in virtue of its form but in virtue of its matter as well ($\kappaατὰ\ τὴν\ ūλην$); thus the man is said to be a man not only in virtue of his form but also in virtue of the matter that underlies his form ($ἀλλὰ\ καὶ\ κατὰ\ τὴν\ ὑποκειμένην\ αὐτῷ\ ūλην$), and a statue is a statue not only in virtue of the form but also in virtue of the bronze; and this is the case with every composite substance.

Aristotle probably includes even the first recipient under [the term] ‘matter’, for he is speaking of matter in a general sense [as] the proximate subject in which something inheres as in a substrate. And the surface is the proximate subject in which colour inheres, and [thus] surface would be analogous to matter, but colour to form’ (Alexander, *On Aristotle Metaphysics* 5, 414,36-415,12, trans. Dooley).¹⁴⁶

Later Alexander comments on Aristotle’s discussion of the meaning of ‘that in virtue of itself’, again using the example of colour and surface:

‘Now that he has stated and shown that ‘that in virtue of which’ is expressed in various ways, Aristotle says that for this reason ‘that in virtue of itself’ must also be expressed in various ways...He says that another meaning of ‘in virtue of itself’ is [3] that a thing be, either in itself or in something that belongs to it, the first to receive [an attribute], for the surface is coloured in virtue of itself because it is the first recipient of colour, as Aristotle said when speaking about that in virtue of which; and what is ‘in virtue of’ in this way would be such in virtue of matter (*καὶ εἴη ἀν τὸ οὔτως καθ’ ὅ κατὰ τὴν ύλην*)’ (Alexander, *On Aristotle Metaphysics* 5, 415,34-416,9, trans. Dooley).¹⁴⁷

Alexander describes the surface of a body as the matter of colour in the sense of ‘first recipient’ (*τὸ πρῶτον δεκτικὸν*) or ‘proximate subject’. The proximate subject is anything in which a form or property directly inheres. The bronze is the proximate subject of the statue,

¹⁴⁶ ἄλλον δὲ τρόπον τὸ καθ’ ὅ λέγεσθαι φησιν, ἐνῷ πρώτῳ πέφυκέ τι γίγνεσθαι· κατὰ γὰρ ἐκεῖνο λέγεται ύπάρχειν. οἷον τὸ σῶμα λέγεται κεχρῶσθαι κατὰ τὴν ἐπιφάνειαν, ὅτι πρώτη ἡ ἐπιφάνεια χρώματός ἐστι δεκτική...τὸ μὲν κυρίως καὶ πρώτως λεγόμενον καθ’ ὅ τὸ εἶδος λέγει εἶναι· ἐκάστῳ γὰρ τῶν ὄντων κατὰ τοῦτο τὸ εἶναι ἐστιν· δευτέρως δὲ καὶ κατὰ τὴν ύλην καὶ τὸ πρῶτον ύποκείμενον, ὁ εἶπε πρῶτον δεκτικόν· ὡς γὰρ ἐν ύλῃ πρώτη τῇ ἐπιφανείᾳ τὸ χρῶμα. ἔκαστον γὰρ τῶν φύσει ὄντων, ἀλλὰ καὶ τῶν τέχνης, οὐ κατὰ τὸ εἶδος μόνον ἐστι τε καὶ εἶναι λέγεται, ἀλλὰ καὶ κατὰ τὴν ύλην· ὁ τε γὰρ ἀνθρωπὸς οὐ κατὰ τὸ εἶδος μόνον ἀλλὰ καὶ κατὰ τὴν ύποκειμένην αὐτῷ ύλην εἶναι λέγεται ἀνθρωπός, ὁ τε ἀνδριὰς οὐ κατὰ τὸ εἶδος μόνον ἀλλὰ καὶ κατὰ τὸν χαλκόν ἐστιν ἀνδριάς. ὄμοίως καὶ πᾶσα συναμφότερος οὐσία. ἔοικε δὲ καὶ τὸ πρῶτον δεκτικὸν τῇ ύλῃ ύπάγειν· καθόλου γὰρ ύλην εἶπεν, ώς πρώτως τι ύπάρχει ὡς ύποκειμένω. καὶ τῇ ἐπιφανείᾳ δὲ πρώτη τὸ χρῶμα ύπάρχει, καὶ εἴη ἀν ύλῃ μὲν ἀνάλογον ἡ ἐπιφάνεια, εἴδει δὲ τὸ χρῶμα.

¹⁴⁷ Εἰπὼν δὲ καὶ δείξας τὸ καθ’ ὅ πολλαχῶς λεγόμενον, λέγοι ἀν ὅτι ἀνάγκη διὰ τοῦτο καὶ τὸ καθ’ αὐτό πολλαχῶς λέγεσθαι...ἔτι δέ φησι τοῦ καθ’ αὐτό σημαινόμενον εἶναι τὸ ἐν αὐτῷ δέχεσθαι πρώτῳ ἡ τῶν αὐτοῦ τινι· καθ’ αὐτὴν γὰρ ἡ ἐπιφάνεια κέχρωσται, ὅτι πρώτη τὸ χρῶμα δέδεκται, ὡς εἶπε λέγων καὶ περὶ τοῦ καθ’ ὅ· καὶ εἴη ἀν τὸ οὔτως καθ’ ὅ κατὰ τὴν ύλην.

for example, and the body is the proximate subject of the soul. Alexander also, however, uses the term ‘first recipient’. This is that which receives a form or property directly. Unlike the bronze which constitutes the statue, the entire body to which the colour belongs does not constitute the colour. (The inside of the coloured object is not coloured, although it may be potentially coloured). The colour, rather, inheres only in the object’s surface. The body, on account of its surface, may be said to receive colour, but only the surface is the ‘first recipient’ of the colour in this sense. Alexander notes that the first recipient of a property like colour, is understood by Aristotle here as standing to the property as matter and as responsible for colour in the sense of material cause. The surface, *qua* first recipient or proximate subject, is that by virtue of which a body is coloured. The surface, or the body to which the surface belongs, can also said to be coloured *by virtue of itself* since it is, or has as a part, the first recipient or proximate matter of colour. This first recipient or proximate matter is responsible for the fact that the body is coloured, as material cause.

Returning to our question, this is what I suggest it is for a subject to receive a form *as matter*: For a subject to receive a form as matter is for that subject, or part of that subject, to be responsible as material cause for the fact that it comes to have that property. The subject or part of the subject must be that by virtue of which it has the property, in the sense of proximate subject or first recipient. In other words, the subject or part of the subject, once the form is received, functions as a material constituent in a hylomorphic compound and is thereby explanatory of the compound in this way. This is what happens in ordinary alteration.

An example of ordinary alteration is the skin-colour of a person changing through exposure to the sun. The person gains a darker skin colour by virtue of the sun, as efficient cause, and by virtue of their surface (the surface of their skin), as material cause. The matter of the person, specifically that part of their matter which constitutes the surface of their skin, is explanatory of the fact that the person has the darker colour. The surface of the skin is that which receives the new colour, standing to it as proximate subject, and it functions as the material constituent of the hylomorphic compound ‘dark-skin’.

It may be recalled that Alexander distinguishes between limited and unlimited transparent bodies. This distinction was discussed in chapter two. Limited transparent bodies are opaque, solid bodies which have their own proper colour. Unlimited bodies, such as air and water, receive light and colour by virtue of relation and do not have their own proper colour. Alexander describes light and colour, as found in the unlimited transparent, as accidentally the colour of the transparent. It may also be remembered that Alexander explains the fact that the one kind of body has its own proper colour, and the other does not, by the fact that the one kind of body has its own fixed boundary (or surface) and the other does not. Since ‘the colour of a body is its boundary’ (*de Sensu Comm.* 49,3), if a body does not have its own boundary or surface, it does not have its own colour. We may now put these claims in terms of material cause, or the material constituent of a hylomorphic compound.

The surface or boundary of a body stands to that body’s colour as matter to form. It functions as the material constituent of the hylomorphic compound composed of the surface and the colour. Alexander writes, as quoted in chapter two, that Aristotle

‘describes the <bodies> which possess colour from themselves and <possess> one proper <to themselves> as coloured inside because they possess as something proper <to themselves> and within themselves their colour and that which is responsible for their colour’ (*de Sensu Comm.* 50, 5-7, *trans.* Towey).

In chapter two, I explained what it is for an object to be coloured inside and to possess that which is responsible for colour in terms of Aristotle and Alexander’s material explanation of colour. For Alexander and Aristotle the colour of an object is determined by the proportion of different elements which compose it. Those bodies which possess the greatest proportion of the fiery element are white, bodies which possess none or very little of this fiery element are black. Now we see that, specifically, what is responsible for the colour of an object is the proportion of elements at the object’s surface and that the surface functions as the material cause of the fact that it is coloured. Solid opaque objects receive their colour *as matter*, since they possess a surface which is the material cause of its being coloured.

We are now in a position to understand what it is to receive a colour or other form *not as matter*. The transparent medium, a body of air or water, is unable to possess colour *as matter*, since it does not have its own boundary. In other words it does not possess a surface as a part of what it is in itself. It therefore cannot possess its own colour by virtue of itself, since surfaces function as the material constituent of coloured objects. More generally, to receive a form *not as matter* is for a subject to receive a form without the subject or any part of the subject standing to the form as the material constituent of a hylomorphic compound. This is the sense in which the subject does not become the matter for that form. No part of the subject functions as the material cause of the fact that the subject possesses the form.

To clarify, it is not that corporeal subjects such as the medium or the mirror are not still in some sense the first recipient of the colour they receive *not as matter*. It is also not that the matter is irrelevant to the fact that the subject acquires the form. After all, the medium must be transparent and the mirror must be smooth and dense. If they did not have these material qualities they would not have the ability to receive the form. Rather, to claim that a subject does not provide the material cause of the fact that it possesses a form, and that the subject is not that by virtue of which it has the form in the sense of proximate subject, is to make the narrow claim that no part of the subject stands to the form as the material constituent of a hylomorphic compound. The matter still can be, and in the case of the receiving of colours by the medium and mirrors is, causally responsible for the reception of form in some other way.

We are now also in a position to understand the claims, introduced in chapter two, that the medium is unaffected when it receives colour and light, and that it possesses these accidentally. It is unaffected insofar as its own proper colour (or, more accurately, lack of colour) remains unchanged. In other words, it does not undergo alteration or change *as matter*. It possesses colour accidentally (*κατὰ συμβεβηκός*) in the sense that the colour received by the medium does not stand to the matter of the medium as colour stands to matter in a hylomorphic compound. In this sense the colour is an incidental quality of the

subject, distinct from any element of the hylomorphic compound which constitutes the subject.

It is not difficult to see why Alexander would use the term *not as matter* in this sense to describe the way in which the perceptual and intellectual capacities grasp or receive form. The perceptual and intellectual capacities of the soul do not stand to the forms they receive as the material constituent of a hylomorphic compound. When these capacities grasp form, they will not become the material cause of that form, as a corporeal subject which has undergone alteration would become the material cause of its newly acquired form. As a brief suggestion: If the perceptive capacity did somehow become the material cause of the objects it perceives, then perhaps the result would be replicas of the objects perceived coming to be in the soul, as opposed to awareness of the objects perceived. This is perhaps the point Aristotle makes when he states that 'it is not the stone which is present in the soul, but its form' (*de Anima*, 431b29, trans. Smith).

In describing what it is to receive a form *as matter*, Alexander notes in the passage above that this sort of reception is found amongst the affections which do not come about by virtue of the soul. The grasping of form by the perceptual and intellectual capacities, on the other hand, does come about by virtue of soul. The perceptive and intellectual capacities, do not receive form *as matter*, rather they receive form *as soul*. Since my focus is on the way in which the eye and the medium receive colour, and the way in which the eye and medium receive colour is certainly not *as soul*, I will leave this discussion of the way in which the perceptual capacity receives form here. I will just note that to receive or grasp form *as soul* in this way, is to actually perceive.

4.4 Change by Virtue of Relation: the Conclusion

We may now turn to the meaning of change by virtue of relation and the positive way in which the receiving of light and colour by the transparent body is described. When a quality is taken on *as matter*, the subject, or part of the subject, is the material cause of the fact that the subject possesses the quality. In this way the subject possesses the quality by virtue of

itself. When a subject takes on a quality *not as matter*, the subject does not possess the quality by virtue of itself in this way. In the case of transparent bodies and mirrors, when they acquire colour, and in the case of all other changes by virtue of relation, they possess the quality by virtue of their relation to something else.

It may be recalled that Alexander describes the medium as changed by virtue of relation, but also as illuminated ‘from outside’ ($\xi\xi\omega$) or by something external to it ($\upsilon\pi\acute{o}\ \tau\iota\nu\sigma\acute{e}\ \acute{e}k\tau\acute{o}\zeta$).¹⁴⁸ By contrast Alexander describes objects with their own proper colour as coloured inside. In the case of objects with their own proper colour, it is the material surface of the object which is responsible for the colour in the sense of material cause. In the case of transparent bodies and mirrors, it is the relation to the source of light or the coloured object which is that by virtue of which they possess light and colour.

In a case of ordinary alteration, for example, the person’s skin becoming darker on account of the sun, the efficient cause of the change is the sun and the material cause is the surface of the skin. In the case of illumination or the taking on of colour by a transparent body, there is also an efficient cause: the source of light in the case of illumination and the coloured object in the case of the taking on of colour by the transparent body. There is, however, no material cause since the light and colour are taken on *not as matter*. Instead of a material cause to explain why the transparent body is illuminated or coloured, there is the relation to the efficient cause, i.e. the relation to the source of light or the coloured object. The same is true in the case of opaque but appearance-making bodies such as mirrors. A mirror may have its own proper colour. It may, for example, be made of bronze and so appear the corresponding colour. It can in addition, however, on account of its density and smoothness, take on colours by virtue of relation. The particular colours in the mirror which compose the images are in the mirror by virtue of relation to the coloured object situated at a distance from the mirror. The matter of the mirror does not stand to these colours as the material constituent of a hylomorphic compound.

¹⁴⁸ *de Sensu Comm.* 50, 4; *On the Soul* 44, 25.

That the transparent body or mirror is illuminated or coloured in this way explains the key feature of change by virtue of relation: the fact that the light or colour disappears from the transparent or mirror as soon as the source of light or coloured object is removed. The matter of the transparent body or mirror does not stand to the form as the material constituent of a hylomorphic compound and is not the cause of the fact that the body is coloured in this way. The transparent body or mirror is not then coloured by virtue of itself or any part of itself in this sense. Instead, it is by virtue of the relation between the transparent body or mirror and the source of light or colour that the transparent body or mirror is illuminated or coloured. Once this relation is broken, the light and colour disappear from the transparent body or mirror.

The kind of change involved in illumination and the taking on of colour by a transparent body or mirror is certainly a strange and unfamiliar kind of change for the modern reader of Alexander to grasp. It involves a corporeal subject – the transparent body – acquiring a physical, non-relational property, which, once acquired, cannot be given a material explanation in terms of the arrangement or composition of the matter. However, I do not think that its strangeness is sufficient justification for doubting that this is Alexander's view. It is after all difficult to avoid attributing to Aristotle notions of change with which modern metaphysics is unfamiliar, especially on Alexander's interpretation but also on contemporary interpretations such as Myles Burnyeat's, with his notion of spiritual change. The way in which the perceptive capacity receives or grasps form, not as matter but rather as soul, is one unfamiliar kind of change which in one way or another seems present in both Aristotle and Alexander's texts. For Alexander at least, the way in which the transparent medium and eye receives light and colour is another.

After this discussion of change by virtue of relation in the context of transparent bodies and mirrors, it may be useful to note once again that Alexander also classes changes such as something coming to be on the right of something else, or something coming to be larger than something else, as changes by virtue of relation. Whilst I have argued that some changes by virtue of relation, like illumination and the taking on of colour, are genuine

changes, others are in fact mere Cambridge changes. We may now see why these two very different kinds of change are placed in the same group by Alexander.

To qualify as a change by virtue of relation, the changed subject must acquire a new property but without the subject being the material cause of the having of the new property. The property is instead possessed by the subject by virtue of relation to another object. Changes such as coming to be to the right of something, and the gaining of other relational properties, clearly meet this criteria. When the book comes to be to the right of the coffee cup, through the coffee cup changing position, the book gains the new property 'to the right of the coffee cup'. The book is the subject of this new property. However, no part of the matter of the book stands to the property 'to the right of the coffee cup' as the material constituent of a hylomorphic compound. Instead, that by virtue of which the book is to the right of the coffee cup is the relation between the book and the coffee cup. It is the relation between the book and the coffee cup which explains and is responsible for the book's being to the right of the coffee cup.

It is clear that both the taking on of light and colour by transparent bodies and mirrors, and mere Cambridge changes, belong together in Alexander's category of change by virtue of relation. Nevertheless, I do not think it unfair to accuse Alexander of misleading his readers when he explains change by virtue of relation, and the way in which the transparent body receives light and colour, through reference to the gaining of relational properties. In Plato and Aristotle, and there is evidence that in Alexander too, a distinction is drawn between genuine changes and changes which consist in the gaining of relational properties. This distinction seems to be a version of the modern distinction between genuine change and mere Cambridge change. It is all too easy to assume, since this distinction is recognised, and since Alexander claims that illumination and the taking on of colour are changes like something coming to be to the right of something else, that Alexander is claiming that illumination and the taking on of colour are instances of mere Cambridge change. However, as I have argued, in fact when Alexander makes this comparison between illumination and the taking on of colour and cases in which a relational property is gained, he has in mind not the distinction between genuine change and mere Cambridge change, but rather his

distinction between receiving a property *as matter* and receiving a property *not as matter* in the sense outlined above. Whilst illumination and the taking on of colour by the transparent are genuine changes, and coming to be to the right is a mere Cambridge change, both these changes are changes in which a property is received by a subject *not as matter* but rather by virtue of relation.

I will end this chapter by highlighting a possible interesting and significant explanatory advantage of Alexander's account. Interpretations of Aristotle's theory of perception which involve the medium or sense organ taking on colour in a physical way have been criticised on the grounds that, if this were the case, then what would be perceived is the colour in the sense organ or the medium, not the colour of the perceptible object. If the red book turns the medium red, then all that could be seen is the red medium, not the red book. Thomas Johansen puts forward a version of this criticism of 'literalist' interpretations of Aristotle. His argument focuses on the change in the medium between the object of perception and the eye. Johansen begins by noting that the role of a medium for visual perception should be to allow us to see through to the object of perception, not to occlude it from view. He writes,

The presence of something transparent in between you and an object allows you to see that object through it, for the transparent will not introduce anything else in between you and the object so that you will see *it* rather than the object. Aristotle considers the proper object of sight colour. So when you see the red flag it is the redness of the flag that affects your sense of sight as such. Now it is clear that if what is in between you and the red flag in your line of vision also has a colour then that will be the colour that affects your sense of sight, rather than the redness of the flag.¹⁴⁹

Johansen claims that if the illuminated transparent medium becomes coloured, then it will be the colour of the medium which affects our sense of sight and we will see the colour of the medium, not the colour of the perceptible object which caused the medium to become coloured. He concludes that we cannot then see coloured objects by means of the literal

¹⁴⁹ Johansen, T.K., *Aristotle on the Sense-Organs* (Cambridge, 1998), p.117.

colouration of the medium. The literal colouration of the medium would in fact prevent us from seeing coloured objects.

Along the same lines as Johansen's criticism, someone could also make the following objection to Alexander's view. Since colour is taken on by the eye and transmitted to the heart where it is grasped or judged by the perceptual capacity, someone could object that the colour grasped or judged by the perceptual capacity is not the colour of the external perceptible object but rather the colour of the perceiver's sense organs. The external perceptible object has caused the perceiver's sense organs to take on colour and it is by means of this colour that we see. The objection would run that, on Alexander's account the perceiver would not see the colour *of the object* but rather would see the colour as it is taken on by the perceiver's own sense organs.

I suggest that Alexander's notion of change by virtue of relation provides a way of meeting this objection. Consider the experience of viewing a coloured object in a mirror, for example a red lamp. When I look in the mirror, I do not see the red of the mirror, since the mirror itself is not responsible for the red colour as material cause, instead I grasp that the mirror is red on account of a relationship between the mirror and the red lamp. In this way I experience the lamp as red. When the eye or medium take on colour, the matter of the eye and medium is not the material cause of the fact that they are coloured. The eye does not have the colour as its own proper colour, or by virtue of itself, but rather has it by virtue of relation to the perceptible object. As a result, when the perceptive capacity grasps this colour, once it has been transmitted to the heart, there is a sense in which what it grasps is not the colour of the sense organs, since these do not stand to the colours as the material constituents of a hylomorphic compound. Instead, since the sense organs are coloured by virtue of relation to an object of perception, this could provide the explanation for why the perceiver grasps the red of the external object of perception when it grasps the red present in his or her own sense organs.

This chapter completes my account of Alexander's view of the changes in the eye and medium brought about by the objects of perception. In the final chapter, I will further

defend this account through discussing a passage from Alexander's *On the Soul*. This passage has been taken, contrary to my interpretation as I have presented it over these four chapters, to show that Alexander understands the changes in the eye and medium as non-physical. I will argue that the passage ought not to be read in this way, and instead may be read in a way which is consistent with my reading of Alexander.

CHAPTER 5

The Problem of Simultaneous Perception

At the beginning of this thesis, I mentioned that Alexander has been read as holding a ‘spiritualist’ view of the way in which colour changes the transparent medium and the eye, by which I mean that these changes have been understood as non-physical. In this chapter I will address the text which provides the basis for this interpretation. This text consists in a possible solution, presented by Alexander, to the problem of simultaneous perception.

On my reading of Alexander, as I have presented it over the previous four chapters, the changes in the eye and medium are physical changes of a special sort. They are changes *not as matter* but are instead *by virtue of relation*, in the sense outlined in the previous chapter. They are also genuine physical changes. I will argue that the text which has been used to support the claim that Alexander understands the changes in the eye and the medium to be non-physical, can instead be read in a way consistent with Alexander’s view as I have presented it. I will argue that taking the passage in a way that is consistent with understanding the changes in the eye and the medium as physical changes in fact makes better sense of the text.

5.1 ‘The sense of sight does not become white or black’: A Non-Physical Solution to the Problem of Simultaneous Perception?

Richard Sorabji has claimed that Alexander provides a solution to the problem of simultaneous perception which relies on the claim that the changes brought about in the eye

and the medium by the objects of perception are non-physical. The starting point for the problem was mentioned in the first chapter of this thesis, in relation to Alexander's argument against the claim that the perceptive capacity is located in the eye. On Aristotle and Alexander's view, we judge that the various objects of perception are different from each other by means of the perceptual faculty. We judge both that objects of perception which belong to different senses, for example white and sweet or soft and bitter, are different from each other, and we also judge that objects of perception which belong to the same sense are different from each other, for example white and black. In order for it be possible that we judge the difference between the objects of sense in this way, multiple perceptible qualities, for example white and sweet, or black and white, must be present, simultaneously to a single, unified sense faculty (Aristotle, *de Anima*, 426b12-29).

However, there is a problem with the claim that multiple perceptible qualities must be present to sense simultaneously. It seems to conflict with the principle that a single unified subject cannot be the subject of contrary properties at the same time. This principle is found in both Plato and Aristotle's texts. For example, consider these passages from Aristotle's *Metaphysics* θ and Plato's *Republic*:

'Everything of which we say that it can do something, is alike capable of contraries, e.g. that of which we say that it can be healthy is the same as that which can be ill, and has both potentialities at once; for one and the same potentiality is a potentiality for health and illness, for rest and motion, for building and throwing down, for being built and being thrown down. The capacity for contraries is present at the same time; but contraries cannot be present at the same time, and the actualities also cannot be present at the same time, e.g. health and illness' (Aristotle, *Metaphysics* θ, 1051a5-14, trans. W.D. Ross).

'It is obvious that the same thing will not be willing to do or undergo opposites in the same part of itself in relation to the same thing at the same time. So, if we ever find this happening in the soul, we'll know we aren't dealing with one thing but many' (Plato, *Republic* IV, 436b8-c1 trans. Grube).

In the passage from the *Metaphysics*, Aristotle states that whilst something may be capable of being in two contrary states, for example an animal is capable of both health and illness, it cannot actually be in these contrary states at the same time, since it is not possible for contraries to be simultaneously present in a subject. Plato, in discussing the parts of the soul, offers the more nuanced version of this principle, stating that contraries may not be simultaneously present in a subject in the same part and in relation to the same thing. The purpose of the final qualification, that contraries may not be present 'in relation to the same thing', is to account for the possibility that, for example, someone may be simultaneously taller and shorter, but in relation to different people. It is not possible that they are taller and shorter in relation to the same person.

On Aristotle and Alexander's account of perception, the perceiver is changed by the objects of perception. Distinct objects bring about distinct changes and contrary objects bring about contrary changes. In the case of visual perception, a white object will change the medium and the eye, causing them to take on white. A black object will change the medium and the eye, causing them to take on black. On Alexander's account, at least, these contrary properties are then transmitted to the heart where they are judged by the perceptive capacity. But since perception involves this taking on of properties, and, as Aristotle states, it must be the case that contrary properties are perceived simultaneously by a unified subject, a problem arises. It seems that perception must involve a single subject receiving contrary properties simultaneously, and this, so the principle states, is impossible.

In *On the Soul* Alexander suggests two ways of solving this problem. I will argue that his second suggestion, which I discuss in the final section of this chapter, is the one he takes ultimately to provide a solution to the problem. The first, I will argue, is according to Alexander ultimately insufficient. It is the first of Alexander's suggested solutions to the problem of simultaneous perception that has been used by scholars to support the view that Alexander, at least here, understands the taking on of colour by the medium and the eye to be a non-physical change. Here is the relevant passage, which I quote at length. The section in italics will be my main focus:

'It seems impossible that something that is one in number could be changed, in one undivided moment of time, with changes that are several, different and even contrary, or be assimilated to several different things at the same time. But this situation would result if sensation comes about in the way described earlier, and if from contrary objects of sense, contrary changes come about. Thus there is a problem, not only with a single sense being able to judge sensible objects which are different in respect of kind (*κατ' εἶδος*) [e.g. white and sweet], but also, and foremost, in the case of sensible objects which are objects of a single sense, such as in the case of colours, which are apprehended by sight. How is it possible for sight to know the difference between white and black, if sight must perceive these simultaneously and perception comes about through assimilation to sensible objects, and yet it is impossible for the same thing to be assimilated simultaneously to contraries? *If sight were changed in this way, by being affected (ώς πάσχειν), receiving (δέχεσθαι) black and white, it would simultaneously take up the contraries, which is impossible. But if another kind of change is produced in the sense by sensible objects and if the sense organs (τὰ αἰσθητήρια) did not receive (δέχεται) the affections (τὰ πάθη) from sensible objects as matter (ώς ὕλη), there would not be the same problem. For it is obvious that it is not as matter (ώς ὕλη) that the eye receives (δέχεται) the affections, for we see that the eye does not become black and white when it perceives these colours (οὐ γίνεται).*

Not even the illuminated air, even though it acts as a messenger for sight in its perception of colours through first being changed itself by colours, achieves this through *itself* becoming black or white. So for example nothing prevents, across the same air, one person perceiving black and the other white. This happens when a black object and a white object have been placed in front of the perceivers of the objects and each of the two people looks not at the colour in front of them, but the colour in front of the other. Even if the viewers are themselves black and white respectively and are looking at each other, there is nothing to prevent the air between them from acting as a

messenger for both of them at the same time since it is not changed by being affected, nor by standing to them as matter' (Alexander, *On the Soul*, 61,19-62,13).¹⁵⁰

Prior to this passage, Alexander has been discussing the problem of simultaneous perception in terms of the perceiving of perceptible objects which belong to more than one sense, such as white and sweet. Alexander then introduces what he takes to be the even greater problem that contrary perceptible qualities, qualities belonging to a single sense, are perceived simultaneously. Using sight as an example, he states the problem in terms of the impossibility of receiving both black and white simultaneously. The solution Alexander suggests is that if the kind of change undergone by sense, the sense organs and the medium, did not involve receiving the perceptible qualities *as matter*, i.e. if the kind of change were other than ordinary alteration, then the problem would not be the same. The implication is that it is not impossible for a subject to receive contrary sensible qualities, so long as those qualities are received *not as matter*. The principle that a single subject may not simultaneously possess contrary qualities does not hold in such a case. Alexander then

¹⁵⁰ Translations of *On the Soul* given in this chapter are based on the French translation by M. Bergeron and R. Dufour. I have also consulted A. Fotinis' English translation.

ἀλλὰ μὴν ἀδύνατον δοκεῖ τὸ αὐτό τι ὃν κατ’ ἀριθμὸν ἐν τῷ αὐτῷ καὶ ἀδιαιρέτῳ χρόνῳ πλείους τε καὶ διαφερούσας, ἔτι τε ἐναντίας κινήσεις κινεῖσθαι καὶ ἄμα πλείουσιν ὁμοιοῦσθαι. τοῦτο δ’ ἀν γίνοιτο, εἰ οὕτως μὲν ἡ αἱθησίς ὡς προείρηται γίνεται, αἱ δὲ ἀπὸ τῶν ἐναντίων αἰσθητῶν γινόμεναι κινήσεις ἐναντίαι. γίνεται τε οὕτως οὐ μόνον ἀπορὸν τὸ τῶν διαφερόντων κατ’ εἶδος αἰσθητῶν μίαν εἶναι κριτικὴν αἰσθησιν, ἀλλὰ καὶ πολὺ πρότερον ἐπὶ τῶν μιᾶς αἰσθήσει ὑποκειμένων, οἷον ἐν χρώμασιν, ὃν ἡ ὄψις ἀντιληπτική, πᾶς ἡ ὄψις δυνήσεται τὰς τοῦ λευκοῦ τε καὶ μέλανος γνωρίζειν διαφοράς, εἴ γε δεῖ μὲν αὐτὴν ἄμα αὐτῶν ποιεῖσθαι τὴν ἀντίληψιν, ἡ δὲ ἀντίληψις διὰ τῆς πρὸς τὰ αἰσθητὰ ὁμοιώσεως, ἀδύνατον δὲ ἄμα τὸ αὐτὸ τοῖς ἐναντίοις ὁμοιοῦσθαι; ἡ εἰ μὲν οὕτως κινοῖτο, ὡς πάσχειν τε καὶ δέχεσθαι τὸ λευκὸν καὶ τὸ μέλαν, ἄμα ἀν ἀναλαμβάνοι τὰ ἐναντία, ὃ ἐστιν ἀδύνατον, εἰ δὲ ἄλλος ὁ τρόπος τῆς ὑπὸ τῶν αἰσθητῶν κινήσεως τῇ αἰσθήσει καὶ οὐχ ὡς ὑλὴ τῶν αἰσθητῶν τὰ πάθη δέχεται τὰ αἰσθητήρια, οὐκέτ’ ἀν ὁμοίως ἀπορὸν εἴη. ὅτι γὰρ οὐχ ὡς ὑλὴ δέχεται τὰ πάθη ἡ ὄψις ἐναργές. ὁρῶμεν γὰρ ὅτι οὐ γίνεται ἡ ὄψις μέλαινα καὶ λευκή, ὅταν ἐκείνων αἰσθάνηται.

ἀλλ’ οὐδὲ ὁ πεφωτισμένος ἀήρ, καίτοι διακονούμενος τῇ ὄψει πρὸς τὴν ἀντίληψιν τῶν χρωμάτων διὰ τοῦ αὐτὸς ὑπ’ αὐτῶν πρώτος κινεῖσθαι καὶ μέλας αὐτὸς ἡ λευκὸς γίνεσθαι τοῦτο ποιεῖ. οὐδὲν γοῦν κωλύει διὰ τοῦ αὐτοῦ τὸν μὲν μέλανος ἀντιλαμβάνεσθαι τὸν δὲ λευκοῦ, ὅταν κειμένων τοῦ τε λευκοῦ καὶ τοῦ μέλανος ἐπ’ εὐθείας τῶν ὄρωντων αὐτὰ μὴ τὸ κατ’ αὐτὸν ἐκάτερος αὐτῶν κείμενον χρῶμα βλέπῃ, ἀλλὰ τὸ κατὰ τὸν ἔτερον. ἀλλ’ οὐδὲ εἰ μέλας καὶ λευκὸς ἀλλήλους ὄρων, κεκώλυται ὁ μεταξὺ ἀήρ ἀμφοτέροις αὐτοῖς ἄμα διακονεῖσθαι τῷ μὴ παθητικῷ μηδὲ ὡς ὑλὴ γινόμενος αὐτῶν ὑπ’ αὐτῶν κινεῖσθαι.

claims that it is in fact true that the eyes, at least, do not receive form as matter. He justifies this claim with the observation that ‘we see that the eye does not become black and white when it perceives these colours’.

Interpreters such as Sorabji have read Alexander’s claim that the eye does not receive colours *as matter*, in light of this claim, found in the above passage, that ‘the eye does not become black and white’. If taken in isolation, the simplest way to take Alexander’s claim that we *can see* that the eye does not become coloured is as the claim that the eye does not become black and white in the sense that black and white are not visible in the eye. Whilst the claim that something is coloured may not be reducible to the claim that, under ordinary conditions, something appears coloured to a perceiver, it entails it (with the notable exception of the way in which the medium takes on colour for Alexander).¹⁵¹ For a subject to possess a colour is for that subject to appear coloured to a perceiver in the appropriate circumstances.

It is reasonable, then, to infer from the claim that black and white are not visible in the eye, that the eye is not coloured in a physical sense. If the claim that the eye does not become black or white is understood to entail that the eye is not coloured in a physical sense, then, since this claim was presented as evidence for the claim that the eye does not receive colours *as matter*, it seems we ought to understand this latter claim also to mean that the eye is not coloured in a physical sense. The solution to the problem of simultaneous perception, on such a reading, relies on the assumption that whilst it is impossible for a single subject to receive contrary properties simultaneously in a physical way, it is not impossible for a single subject to receive contrary properties in a non-physical or ‘spiritual’ way.

On the basis of the above passage Richard Sorabji claims that Alexander, along with the commentators Themistius and Philoponus, ‘dephysiologized Aristotle’s theory of the reception of form without matter’. He continues: ‘Their motive was not to give the most

¹⁵¹ In fact, given this, in cases where the medium acts as a messenger for colour, but cannot be seen to be coloured, it is perhaps more accurate to say that the medium is not strictly speaking coloured, but receives colour and is coloured only insofar as it is able to pass on colour to an appropriate body or surface.

straightforward reading of the text, but to rescue Aristotle from certain particular problems in physics and logic. If literal coloration was transmitted to the eye, we might get different colours colliding in the same place.¹⁵² Elsewhere he claimed that these three commentators ‘sought to give Aristotle’s account of sensory processes a less material interpretation’.¹⁵³ Specifically, Sorabji claims that Alexander ‘uses the contraries problem’, that is the problem of the simultaneous perception of contraries, ‘to deny the colouration of the organ of sight’.¹⁵⁴ According to Sorabji, Alexander, at least in *de Anima*, ‘understands the reception of form non-physiologically’.¹⁵⁵

Victor Caston also comments on this passage. As a gloss on the passage, he writes: ‘Our sense, [Alexander] reasons, must be affected by the perceptible *in some other way*, so that the organ does not receive the perceptible qualities “as matter does”. And in fact the eye does not literally turn white or black when one looks at these colours, as we readily observe. Nor does the medium.’¹⁵⁶ Here Caston is discussing Alexander’s position in the context of a broader discussion of scholastic thought on the problem of simultaneous perception. He claims that this problem is that which leads those in the scholastic tradition ‘to posit “spiritual” changes in cognition’.¹⁵⁷ Caston makes the negative claim that, according to Alexander, the eye does not become literally coloured, i.e. coloured in a physical way, but, unlike Sorabji, he does not go as far as the positive claim that Alexander holds that the eye undergoes a non-physical or spiritual change. Instead Caston states that Alexander’s negative claim that sense changes ‘in some other way’ leaves it open as to what that way is. I

¹⁵² Richard Sorabji, ‘Intentionality and Physiological Processes: Aristotle’s Theory of Sense-Perception’ in Martha C. Nussbaum and Amélie Okkenberg Rorty eds. *Essays on Aristotle’s de Anima* (Oxford : OUP, 1995), p. 224

¹⁵³ Richard Sorabji, ‘From Aristotle to Brentano: the development of the concept of intentionality’, in *Aristotle and the Later Tradition, Oxford Studies in Ancient Philosophy* supp vol. 1991, p. 227

¹⁵⁴ Ibid. p.229

¹⁵⁵ Ibid. p.235.

¹⁵⁶ Victor Caston, ‘The Spirit and the Letter: Aristotle on Perception,’ in R. Salles (ed.), *Metaphysics, Soul, and Ethics in Ancient Thought: Themes from the Work of Richard Sorabji* (Oxford: OUP, 2005), p. 258.

¹⁵⁷ Ibid. p. 257

take it he has in mind his own suggestion regarding a possible interpretation of Aristotle, on which the eye undergoes a physical change but where this change is not a reception of colour.¹⁵⁸

Like Sorabji, however, Caston is clear that the solution to the problem of simultaneous perception put forward in the above passage amounts to a denial that the eye receives colours in a physical sense and so a denial that the eyes become perceptibly coloured. This claim conflicts with Alexander's view as I have presented it, on which the received colours are visible as mirror images in the eye. In the following section, I will argue that Alexander's proposed solution ought not to be taken in the way Sorabji and Caston suggest. It may – and indeed ought to – be read as a solution which still involves the physical reception of colour.

5.2 'The sense of sight does not become white or black': A Physical Solution

The first point to note against Sorabji and Caston's interpretation is that it involves attributing inconsistency to Alexander. As I argued in chapter three, Alexander does state

¹⁵⁸ Victor Caston develops this interpretation in 'The Spirit and the Letter: Aristotle on Perception', in Ricardo Salles (ed.) *Metaphysics, Soul, and Ethics in Ancient Thought* (Oxford: OUP, 2005), 245-320. On Caston's interpretation the eye, whilst it undergoes a physical change, does not become coloured. Instead it takes on the 'underlying proportions of the qualities perceived.' He describes this interpretation as 'analogical'. If we take 'F' to denote the relevant colour property of the object, on Caston's view, the perceiver, in the act of perception, takes on another property G, through which the eye becomes like F but does not come to be F. The property G in some way signifies F. He gives the example of the way in which the scrawl of a signature signifies the approval of a document of the person who made the scrawl without being identical to it. In developing his account, Caston draws on Aristotle's view of what colours are. Caston notes that 'perceptible qualities are defined as proportions of a specific pair of contrary qualities along the same range' (p.314). A particular colour such as crimson is a certain proportion of white and black. On Caston's view the perceiver takes on this proportion but the proportion is not exemplified in the same contrary properties as the perceptible quality. In the case of crimson then, it is not exemplified in the amounts of white and black. If it were, then the perceiver would literally become crimson. Rather, it is exemplified in some other set of contrary qualities, meaning that whilst the sense organ does not literally become F (e.g. crimson), it comes to instantiate G which is a certain proportion held by the perceptible object. G, as held by the perceiver, signifies F and in this way is able to cause or constitute perception of F. Caston writes, 'it might be the case that in vision, for example, the proportion of white to black will be embodied in the proportions of proper perceptibles like hot and cold, or qualities that are not proper perceptibles, like runny or viscous' (p. 314).

that the eyes become perceptibly coloured. He also clearly states that, in certain circumstances, the medium too becomes perceptibly coloured (*On the Soul*, 42,19 - 43,4). This is incompatible with the claim either that the eye does not receive colours in a physical way, or that the eye undergoes a physical change but does not receive colours. Sorabji acknowledges this tension and in response restricts his claim that Alexander holds a spiritualist view of the changing of the eye to Alexander's *On the Soul*. Whilst Sorabji understands Alexander's solution to the problem of simultaneous perception of contrary properties to involve a denial that the eye undergoes a physical colouration, he claims that, 'in other works Alexander does not apply the contraries problem to the organ, and is consequently free to take a more ambivalent, or even favourable, attitude towards the view that colours show in the eye [i.e. that the eye takes on colours in a literal, physiological way]. So the dematerialisation evident in this one text [i.e. *On the Soul*] is not quite steadily maintained.'¹⁵⁹ Even this restriction, however, I consider insufficient since I have argued that there is evidence that the eye and medium take on colours in a physical sense in *On the Soul* as well as in other texts. To be charitable to Alexander, we ought not to attribute such inconsistency unless there is sufficient evidence that we must.

Caston too notes a tension. If we take the claim that the eye does not become coloured, as the claim that the eye is not coloured in a physical way, we must take the parallel claim concerning the medium in the same way. The claim that the medium does not become perceptibly coloured, however, conflicts with claims Alexander makes elsewhere. In a note to the passage from *On the Soul* in which Alexander discusses the phenomenon of the perceptible tingeing of the medium by brightly coloured objects such as gold and murex dye (42,11-19), Caston writes 'the example is potentially significant, because tingeing might seem to involve the medium's literally taking on a colour, at least in the sense that it visibly comes to be of that colour, even if this is not a change in its own proper (oikeion) colour. But Alexander will later deny that in ordinary cases the medium undergoes literal alteration when it relays colour or that the eye does either (63,3-7)'.¹⁶⁰ Caston is left in the difficult

¹⁵⁹ Richard Sorabji, 'From Aristotle to Brentano: the development of the concept of intentionality', in *Aristotle and the Later Tradition, Oxford Studies in Ancient Philosophy* supp vol. 1991, p. 230.

¹⁶⁰ Victor Caston, *Alexander of Aphrodisias On the Soul. Part 1*, (London: 2012), p.153-154 (n.374).

position of having to suggest that Alexander is not claiming in the earlier passage from *On the Soul* that the medium literally takes on colour in certain cases, despite the fact that this seems to be the clear meaning of the passage. Bergeron and Dufour note the same tension in their commentary. But their attempt to resolve the tension seems compatible with my reading. They suggest that in the earlier passage Alexander is just concerned with the change brought about in the transparent medium, whereas in the later passage Alexander wishes to emphasise the special nature of the change undergone by the transparent medium when it receives colours.¹⁶¹ To interpret the above passage in the way Sorabji and Caston have, taking it to deny that the eye and the medium take on colour, or to deny that they take on colour in a physical way, involves attributing inconsistency to Alexander.

The second point to note against Sorabji and Caston's interpretation, arises from the passage immediately following Alexander's discussion of the eye and the medium. After claiming that the eye does not become black or white, and that the medium too does not become black or white, he introduces the example of mirrors:

It is also not the case that the colours appearing as reflected images (ἐμφαινόμενα) in mirrors or in water, makes such things [i.e. appearance-making things] themselves, of the kind they [i.e. colours] themselves are. Indeed, in each of these cases, the change which comes to be in the water and the mirror, the change produced by the sensible object, ceases as soon as the sensible object is no longer present' (*On the Soul*, 62,13-62,16).¹⁶²

After claiming that eyes and the medium do not become black and white when colours are perceived, Alexander adds this third example. He claims that mirrors, water and

¹⁶¹ 'Ce passage (62, 5-7) peut sembler en contradiction avec la doctrine exposée en 42, 11-19, où Alexandre soutient que le milieu adopte la couleur de l'objet. On peut cependant alléguer qu'Alexandre voulait alors souligner que le milieu est, d'une certaine manière, mû, alors qu'ici il souhaite probablement montrer que le milieu n'est pas mû au sens strict, c'est-à-dire comme une matière pâtit d'une forme' (Bergeron and Dufour, *de l'âme*, 308-309).

¹⁶² οὐδὲ τὰ ἐν τοῖς κατόπτροις δὲ η̄ ἐν τοῖς ὕδασιν ἐμφαινόμενα χρώματα τοιαῦτα αὐτὰ ποιεῖ ὅποιά ἔστιν αὐτά. συμπαύεται γοῦν ἐκάστου τούτων η̄ ἀπὸ τοῦ αἰσθητοῦ κίνησις ἐν αὐτοῖς γινομένη, ὅταν μηκέτι η̄ παρὸν τὸ αἰσθητόν.

other appearance-making bodies do not become coloured when an image appears in them. When applied to mirrors, we see that the claim that '*x* does not become coloured', in this context cannot mean what Sorabji and Caston take it to mean. The colour of course is visible in the mirror. For something not to become coloured in this sense, then, must mean something other than that thing does not become visibly coloured and therefore does not become coloured in a physical way.

The final point to note against Sorabji's interpretation is that it disregards the way in which the phrase to receive *not as matter* has been used by Alexander in the context of the eye and the medium elsewhere. Sorabji takes it that to receive colour not as matter is to receive colour in a non-physical way. However, when the phrase is applied to the eye and the medium elsewhere, for example at *On the Soul*, 42,20-43,4, to receive colour *as matter*, i.e. to undergo ordinary alteration, is opposed, not to receiving colour in a non-physical way, but rather to receiving colour by virtue of relation. Alexander denies that the eye and the medium undergo alteration when they receive light and colour, but the positive claim is not that, instead, they undergo some kind of non-physical or spiritual change, but rather that they undergo change by virtue of relation. Change by virtue of relation is not a spiritual change but rather, as Alexander states in his commentary on *de Sensu* (132,5-12, 134, 11-19), it is the same kind of change which a subject undergoes when it comes to be to the right of another object.

It would be strange if elsewhere Alexander claimed that the eye and the medium received colour *not as matter* but rather *by virtue of relation*, but here he claimed that the eye and medium received colour *not as matter* but rather they undergo spiritual change. Again, this would be to attribute a serious inconsistency to Alexander. What is more, there is evidence that even here it is change by virtue of relation Alexander has in mind for the positive side of the claim that the eye and medium receive colour not as matter. In the passage above, when Alexander discusses his final example of something which does not become coloured when it receives colours - the example of mirrors, water and other appearance-making bodies - he states that, in each of these cases, the changed subject reverts back to its pre-

change state as soon as the sensible object which produced this change is no longer present. As we have seen, this is the key feature of change by virtue of relation

I suggest that we ought to read Alexander's claim regarding the eye, medium and mirrors, the claim that they receive colours not as matter, in same way as we read this elsewhere. The eye, medium and mirrors do not undergo ordinary alteration when they receive colours but rather they undergo change by virtue of relation. This is a special kind of physical change. This reading involves taking the claim that 'the eye does not become black and white', not as the claim that the eye does not become perceptibly coloured. The eye does become perceptibly coloured. As we saw in chapter three, it receives mirror images of the objects perceived. Instead, the claim that the eye receives colour *not as matter* and does not become black and white may be understood as the claim that no part of the eye comes to stand to the colour form received as the material constituent of a hylomorphic compound.

Alexander's claim, however, is that '*we see* that the eye does not become black and white'. On my interpretation the eye *does* visibly become black and white, so what is it that we see or do not see? One suggestion is that we see that the image in the eye does not remain after the black and white object is removed, and thereby see that the eye does not become black and white in the sense of receiving the colours *as matter*. Another suggestion is that Alexander could be using ὄρωμεν in a metaphorical sense, meaning by it we know or discern, from Alexander's previous discussion, that the eye does not become black and white in this sense.

It would have been desirable for the contemporary reader of Alexander if, when Alexander claimed that the eye does not receive form *as matter* and so does not become black or white, he had at this point reiterated what it is for something to receive form *not as matter* and had thereby clarified the particular sense in which the eye does not become black or white. As it is, the passage, taken in isolation, is open to misinterpretation. I suggest, however, that Alexander could have assumed familiarity with the concept of receiving form *not as matter* and the fact that, in the case of the eye and the medium, the positive correlate of this claim is that the eye and the medium receive form *by virtue of relation*.

We may also provide some explanation for the fact that he does not set out his claim fully at this point. This version of the claim is made in the context of discussing the problem of simultaneous perception. Firstly, as I will argue in the next two sections of this chapter, Alexander does not ultimately find the solution to the problem of simultaneous perception in the claim that the sense organs receive form *not as matter*. It is his second suggested solution, which does not rely on this claim, that he ultimately accepts. For this reason he may have chosen not to discuss this first suggestion solution in as much detail as he discusses the second. Secondly, the problem of the simultaneous perception of contraries arises when we consider the impossibility of a single thing *being altered* through taking on contrary properties at the same time. This first solution relies on the negative claim that, at least where the peripheral organ and medium for sight is concerned, these do not undergo an alteration. Alexander has already made this negative point with the claim that colour is received by the eye and medium *not as matter*. There is no need for him to spell out, in positive terms, the way in which the eye and medium do receive colour, especially as ultimately he will not use this solution. Even if we take Alexander to have expressed himself unclearly at this point, it is more charitable to attribute a lack of clarity to Alexander, than to attribute to him the inconsistencies entailed by the alternative interpretation.

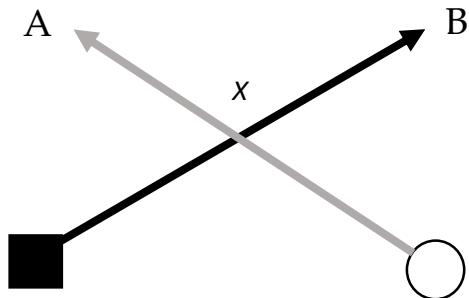
I do not think there are sufficient grounds to understand Alexander as claiming that the eye and medium receive colours in a non-physical way in *On the Soul*. However, in order to firmly establish this and to establish the validity of my own interpretation, there remains a crucial point to be discussed. So far I have provided evidence that the text is best read, not as claiming that the eye and medium do not receive colour in a physical sense, but rather simply as claiming that they do not receive colour *as matter*, the implication being that they instead receive colour by virtue of relation, which is a special sort of physical change. However, this only works as an interpretation if the fact that the eyes and medium do not receive colour *as matter*, but rather by virtue of relation, could provide a solution to the problem of simultaneous perception. If it cannot, then this provides a strong motivation to take the passage in the same way as Sorabji, since it seems that a solution to the problem

could be grounded in the fact that the forms of perceptible objects are received by the perceiver in a non-physical way.

In addition, for my interpretation to work, it needs to be the case that the notion of receiving colour *not as matter* but by virtue of relation is able to provide a solution to a further problem raised by Alexander, a problem already indicated in the passage quoted at length above. I will quote the relevant part of the passage again. After Alexander claims that the medium does not become black or white, he writes:

So for example nothing prevents, across the same air, one person perceiving black and the other white. This happens when a black object and a white object have been placed in front of the perceivers of the objects and each of the two people looks not at the colour in front of them, but the colour in front of the other. Even if the viewers are themselves black and white respectively and are looking at each other, there is nothing to prevent the air between them from acting as a messenger for both of them at the same time since it is not changed by being affected, nor by standing to them as matter
(*On the Soul*, 62, 8-13)

In this passage (*On the Soul*, 62, 8-13) Alexander outlines the following scenario, the possibility of which he claims is explained by the fact that the medium does not become black or white, i.e. the medium does not receive black and white *as matter*. There are two perceivers and two objects, one black, one white. Person B is looking at the black object in front of person A. Person A is looking at the white object in front of person B. The part of the illuminated air labelled 'x' in the diagram below, must receive both black and white simultaneously if person B is to see the black object and person A is to see the white object, since the medium which transmits colour from the black object to person B crosses the medium which transmits colour from the white object to person A. The scenario looks like this:



Alexander then gives a simpler scenario, now describing the viewers as black and white respectively. The air in between still acts as a medium for both viewers, taking on both black and white at the same time:



In the above scenarios it must be the case that the contrary sensible properties – black and white – are received simultaneously in the same part of the medium. It is impossible for something to gain contrary properties simultaneously in the same part through alteration. Therefore, it must be the case that the properties are received by the illuminated air in a different way. Alexander uses these scenarios in order to refute certain other theories of vision.¹⁶³ Therefore, he must be able to show how these scenarios are possible on his theory.

¹⁶³One of the arguments Alexander puts forward against the view that we see by means of visual rays utilises this scenario. He argues that a visual ray theory entails that the rays emitted by the eyes of different perceivers (rays which take the shape of cones, with the apex in the eye and the base at the object) would intersect with each other. After presenting a few different scenarios, Alexander writes: 'In this way the cones would be divided by each other. If this comes about, the continuity of the bodies which are sent out to the <body> being seen is necessarily broken up, and if this <continuity> were divided it would no longer be possible to see. This same thing would necessarily come about also if the people seeing were two people standing opposite each other, and there were something visible placed in a straight line with each of the people seeing and they were not seeing the things in a

In order to do this, he uses the notion of receiving *not as matter*. If my interpretation is correct, it must be the case that it is possible for a single subject to receive contrary properties *not as matter*, specifically to receive contrary properties by virtue of relation and therefore to undergo a physical change, simultaneously and in the same part.

Before demonstrating this possibility, it is worth noting that I do not think it counts against my interpretation that Alexander does not himself provide an explanation in *On the Soul* of how it is possible for a single subject to receive contrary properties *not as matter* but *by virtue of relation* (at least beyond the fact that, since the subject does not undergo alteration, there is no obvious impossibility). As a solution to the problem of simultaneous perception, this first suggestion – that the problem may be solved through the notion of receiving form *not as matter* – is underdeveloped. It is underdeveloped understandably since, as I will argue in the next section, Alexander ultimately does not take it that the fact that the perceiver receives form *not as matter* provides the solution to the problem of simultaneous perception. Whilst it *could* provide a solution, insofar as it is possible for a subject to receive contraries simultaneously in this way (and whilst it *does* provide a solution to the question of how two perceivers may see different colours across the same medium), it ultimately proves insufficient as a solution to the problem of simultaneous perception. This could explain why the suggestion is underdeveloped compared with his lengthy discussion of his second suggested solution, which I discuss in the final section of this chapter. However, I will now show that Alexander had the resources to provide a fuller explanation of how a solution based around the receiving of form *not as matter* could work.

There is a passage in the *Mantissa* which presents the same scenario as above. The question posed is, 'how it is possible for those who see different or even opposite things, positioned diagonally to one another, to see [them]' (*Mantissa*, 147,18-19, trans. Sharples). A difference between this and the passage from *On the Soul*, a difference which provides a degree of support for my interpretation, is that the author of this passage explicitly states that the

straight line with themselves but each of them <were seeing> the thing that had been placed in a straight line with the other person. For in this case necessarily the cones would collide with each other in the middle and be divided by each other or one would pass through the other. In this case two bodies would again come to be in the same <place>' (*de Sensu Comm.* 30, 9-18, trans. Towey).

possibility of the scenario is due to the fact that the medium is changed not through alteration but rather by virtue of relation. This is the way in which I have argued the passage from *On the Soul* ought to be read. What is especially significant about this passage is that it also goes some way towards explaining how it is possible for a single subject to receive contraries by virtue of relation. Here is the passage:

Since seeing comes about in this way, not by an affection and alteration of what [is] in between, but by a relation, the difficulty is also resolved which some people raise, how it is possible for those who see different or even opposite things, positioned diagonally to one another, to see [them]. For it will seem that the air in between...receives opposite colours at the same time. This is solved by the fact that the air is not coloured (μὴ χρώννυσθαι), but through the relation to it of what is seen the colour appears (ἐμφαίνεσθαι) in it in a straight line with what is seen. For nothing prevents the same thing from not preserving the same relation to different things, just as nothing prevents the same thing from being half of one thing and twice another (*Mantissa*, 147,16-25, trans. Sharples).¹⁶⁴

The author of this passage explains why it is that the fact that the colour is in the transparent by virtue of relation to the object of perception, means that the medium can take on contrary colours at once. The explanation is that it is possible for a single thing to bear different or even contrary relations to different things. For example, it is possible for a single thing to be both double in relation to a smaller object, and half in relation to a larger object. To give another example, a person may simultaneously come to be both to the right, in relation to person A, and to the left, in relation to person B, by walking in between persons A and B.

¹⁶⁴ οὗτως δὲ τοῦ ὁρᾶν γινομένου, οὐ κατὰ πάθος καὶ ἀλλοίωσιν τοῦ μεταξύ, ἀλλὰ κατὰ σχέσιν, λύεται καὶ ἡ ἀπορία, ἦν ἀποροῦσίν τινες, πῶς οἷόν τε τοὺς τὰ διαφέροντα ἥ καὶ ἐναντία ὁρῶντας ἀλλήλοις διαγώνια κείμενα ὁρᾶν. ὁ γὰρ μεταξὺ ἀηρ...άμα δόξει τὰ ἐναντία χρώματα ἀναδέχεσθαι. τοῦτο δὴ λύεται τῷ μὴ χρώννυσθαι τὸν ἀέρα, ἀλλὰ κατὰ σχέσιν τὴν τοῦ ὁρῶμένου πρὸς αὐτὸν ἐμφαίνεσθαι ἐπ' εὐθείας τοῦ ὁρῶμένου τὸ χρῶμα. οὐδὲν γάρ κωλύει τὸ αὐτὸ πρὸς ἄλλο καὶ ἄλλο μὴ τὴν αὐτὴν σχέσιν φυλάττειν, ὥσπερ οὖν καὶ τὸ αὐτὸ οὐδὲν κωλύει τοῦ μὲν ἔμισυ εῖναι, τοῦ δὲ διπλάσιον.

Whilst this goes some way to providing the explanation needed for how it is possible for a single subject to receive contrary properties simultaneously by virtue of relation, more needs to be said. Once again, the example used by the author of this passage involves relational properties. The properties consist in the subject's relation to that of which it is half or double. Plato, in his formulation of the principle that a single subject cannot bear contrary properties, made an exception for those properties borne in relation to different things. I have argued, however, that the colours taken on by the transparent medium ought not to be understood as relational properties. It is not the case that the black in the medium consists in the relation between the medium and the black object of perception. Instead the black object of perception is the cause of the black in the medium.

This may seem to be a problem. In cases of ordinary alteration, it is impossible for a single subject to undergo contrary changes, even if the causes of these changes are distinct. For example, something cannot be heated and cooled at the same time. It would either be heated if the power of the heating thing were stronger, or it would be cooled if the power of the cooling thing were stronger. If the power of the thing heating and the power of the thing cooling were equally matched, no change would occur at all. The scenario would certainly not lead to the impossible result that the subject is both hot and cold simultaneously. It is so far unclear why the fact that the medium is black and white by virtue of relation to different things, means that it is possible that it is black and white simultaneously.

I suggest the answer lies again in a consideration of the material cause. Taking again the example of heating and cooling. It is not the case that it is impossible for a single subject to be acted on by both a heating thing and a cooling thing simultaneously. Imagine a room with both the radiator and the air conditioning on at the same time. What is impossible is that, by this dual action, the subject is getting hotter and colder simultaneously. The temperature of the room cannot be going both up and down. I suggest we can explain this impossibility in terms of the material cause. If just the radiator is acting on the air in the room, the air is heated. The efficient cause of this heating is the radiator, and the material cause is the air itself. The air comes to stand to the form 'hot' as the material constituent of a hylomorphic compound. If just the air conditioner is acting on the air in the room, the air is

cooled. The efficient cause of this cooling is the air conditioning unit, and the material cause is the air itself. The air comes to stand to the form ‘cold’ as the material constituent of a hylomorphic compound. What is impossible is not for the radiator and the air conditioning unit to act simultaneously, what is impossible is for the air to stand as a material constituent to contrary forms simultaneously. Matter cannot simultaneously constitute two contrary properties at once. This is not to say that matter cannot, in some other non-constitutive way, receive contrary properties.

We may now see how it could be possible for something to possess contrary properties by virtue of relation. The air is acted on simultaneously by both the black object and the white object. The black and white objects are the efficient causes of the air’s taking on black and white. However, once the colours are received by the air, no part of the air stands to the forms black and white as the material constituent of a hylomorphic compound. This would be impossible. Instead that which is responsible for the contrary states – being black and being white - are the continuing relations between the medium and the black object and the medium and the white object. These relations are distinct so there is no impossibility in their holding at the same time. As the author of the *Mantissa* writes in the passage above, ‘nothing prevents the same thing from not preserving the same relation to different things.’

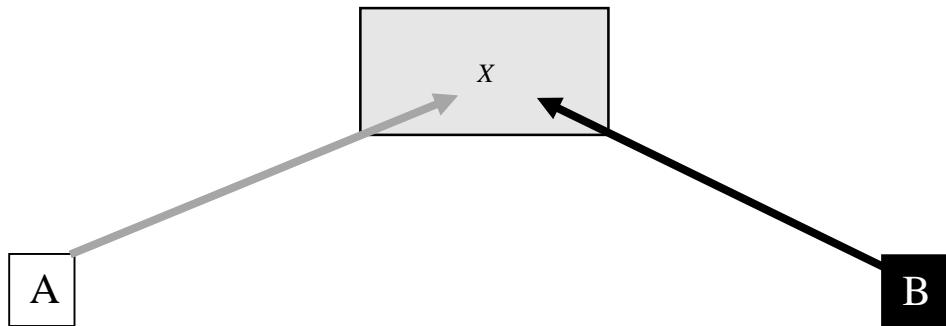
This then, I take it, is how it is possible for a single subject to simultaneously receive contrary properties by virtue of relation. In demonstrating this possibility, I have defended my interpretation of Alexander’s first suggested solution to the problem of simultaneous perception. This solution to the problem of simultaneous perception, I have argued, is compatible with the claim that the eye and medium take on colours in a physical way, by virtue of relation. I have argued that the solution is not, as Sorabji takes it, that the eye and medium, in receiving colour, undergo a non-physical change.

I will just mention, however, one possible objection which could be raised against my claim that it is possible, within Alexander’s framework, for a single subject to simultaneously receive contrary properties by virtue of relation. Someone may observe that whilst the explanation provided above could make it seem theoretically possible that one thing could

be black and white simultaneously within Alexander's framework, it is impossible for us to conceive of what this would be like. What would it be like to experience something that is simultaneously black and white in the same part? The fact that we cannot conceive of this, the objection goes, suggests there is something wrong with the argument for its possibility. Either Alexander is wrong to assume that it is possible for a single subject to receive contrary properties by virtue of relation, or my interpretation of Alexander is wrong.

There is a way to respond to this objection, but since it involves developing Alexander's view beyond what is stated in the text, and taking us away from his discussion of the problem of simultaneous perception as it is presented in *On the Soul*, I include this response in an appendix. The response involves the claim that whilst it could be possible, on an Alexandrian view, for a subject to receive black and white simultaneously by virtue of relation, it would not be possible for these two colours to be perceived simultaneously by a single perceiver. The starting point for the response is a consideration of the following scenario:

Two people, one dressed in white (person A), the other dressed in black (person B), are standing in front of a mirror. Person A is standing in front and to the left of the mirror. Person B is standing in front and to the right of the mirror.



Given the angle at which person A is standing in relation to the mirror, she can see the mirror and objects reflected in it, including person B, but she cannot see herself. Person B can also see the mirror and objects reflected in it, including person A, but cannot see

himself. In fact person A sees person B in the same part of the mirror that person B sees person A. Person A, when she looks in the part of the mirror labelled x sees the black image of person B. Person B, when he looks in the exact same part of the mirror sees the white image of person A. In this scenario, one part of the mirror is simultaneously both black and white and yet no one perceiver perceives it simultaneously as white and black. This is all I will say here regarding possible responses to the above objection. This response is developed in more detail in the appendix.

In the following section, I present my argument for the claim that Alexander does not take the fact that a subject may receive contrary forms simultaneously *not as matter*, to provide a sufficient solution to the problem of simultaneous perception. Whilst it is possible, on Alexander's view, for a subject to receive contrary forms simultaneously in this way, for this to provide a solution to the problem, it must be the case that the sense organs do not *also* undergo alteration when they receive the perceptible forms. In the next section I will argue that, on Alexander's view, the sense organs do undergo some alteration when they are changed by the object of perception and so the fact that they also undergo a change *not as matter* does not provide a sufficient solution to the problem. I present Alexander's second suggested solution, the one which I will argue he does take to provide a satisfactory solution to the problem, in the final section of this chapter.

5.3 Traces in the Eye and Alexander's Rejection of the First Solution

In *On the Soul*, Alexander presents two solutions to the problem of simultaneous perception. The first – which rests on the fact that sense organs receive form *not as matter* – I presented above, and the second I will present in the final section. The second solution provides a complete solution to the problem and does not rely on the claim that the sense organs receive form not as matter. It is unclear then what the status of the first solution is, since, given the second solution, it is not required in order to solve the problem.

Bergeron and Dufour interpret the presence of the two solutions as Alexander offering a range of arguments, leaving it to the reader to decide which they find convincing.¹⁶⁵ I find this unsatisfactory and will argue that Alexander in fact rejects the proposal that the notion of receiving affections *not as matter* can provide a solution to the problem of simultaneous perception and takes only his second proposal as a solution to the problem. This reading, I will argue, makes better sense of the discussion as a whole. I will argue that on Alexander's view, whilst it is possible for a subject to receive two contrary properties simultaneously *not as matter*, it is in fact not the case that the perceiver does receive the perceptible forms *only* in this way. In fact, the perceiver also undergoes some change *as matter*, which means another solution must be found.

There is a passage in between Alexander's first suggested solution and the second, the purpose of which interpreters have struggled to understand. I will argue that this passage in fact gives the reason why Alexander's first suggestion will not work as a solution to the problem of simultaneous perception, and so necessitates the move to the second. Here is the passage:

What is more (εἴτι), if a body with a psychic power is changed in this way [i.e. *not as matter*], it seems to preserve a trace of the change produced by the sensible object, by means of the imagination, even though the sensible object is departed and no longer present. In any case, those who look at an extremely bright object have in their eye (ἐν τῇ ὄψει) a residue of the change produced by these objects, even if these are no longer present. For the change produced by sensible objects is not the same in inanimate bodies and animate bodies (*On the Soul*, 62,22-63,5).¹⁶⁶

¹⁶⁵'On voit qu'Alexandre énumère ici des solutions variées et qui n'ont pas pour but de s'harmoniser les unes aux autres. Il s'agit plutôt d'offrir un florilège d'arguments, dont l'un ou l'autre arrivera à persuader le lecteur' (M. Bergeron and R. Dufour, *Alexandre d'Aphrodise: De l'âme* (Paris : Librairie Philosophique J. Vrin, 2008, p. 42.)

¹⁶⁶ ἔτι δοκεῖ τὸ μετὰ ψυχικῆς δυνάμεως οὕτως κινούμενον σώζειν τι καὶ ἀπελθόντος τοῦ αἰσθητοῦ ἔχνος τῆς ἀπ' αὐτοῦ κινήσεως διὰ τῆς φαντασίας καίτοι μηκέτι τοῦ αἰσθητοῦ παρόντος. οἱ γοῦν τῶν σφόδρα λευκῶν αἰσθανόμενοι ἔχουσί τινα ἐγκαταλείμματα ἐν τῇ ὄψει τῆς ἀπ' αὐτῶν κινήσεως καίτοι μηκέτ' ἐκείνων παρόντων. οὐ γὰρ ἡ αὐτὴ κίνησις ἀπὸ τῶν αἰσθητῶν τοῖς τε ἀψύχοις καὶ τοῖς ἐμψύχοις σώμασιν.

There is a contrast being drawn here between animate bodies, which preserve a trace of the change produced by the sensible object even when that object is no longer present, and inanimate bodies, such as water and mirrors. In the case of these latter bodies, as we are reminded a few lines above, ‘the change which comes to be in the water and the mirror, the change produced by the sensible object, ceases as soon as the sensible object is no longer present’ (*On the Soul*, 62,15-16). As we have seen, Alexander treats this as the key behavioural feature of those bodies which receive affections *not as matter* and by virtue of relation.

As established over the previous chapters, the medium and eyes are changed not as matter and *by virtue of relation* by the objects of perception on account of their being transparent. When a body is changed not as matter but rather by virtue of relation, the change only lasts as long as the object which produces the change is present. In the passage above, however, Alexander claims that ensouled bodies preserve a trace of the change produced by the sensible object even when the object is no longer present. If the sense organs were changed by virtue of relation alone, no trace would remain, since once the object of perception is removed there would be nothing causally responsible for the continued presence of the property in the sense organ. There would be nothing about the matter of the sense organ which would explain the continued presence of the trace. I suggest that the fact that a trace remains, shows that the sense organ does, in addition to being changed by virtue of relation, undergo a change *as matter*.

I suggest we take Alexander’s claims here as follows: In ensouled bodies which possess the faculty of imagination, it is the case that when the perceptible object changes the sense organ, causing it to receive the form of the perceptible object *not as matter*, this change causes a trace to be produced in the sense organ. The presence of the perceptible form, present by virtue of relation, somehow, on account of the fact that the body possesses the faculty of imagination, causes the sense organ to receive a trace of that form *as matter*. When the object

of perception departs, the form in the sense organ, present by virtue of relation, departs with it. The trace, however, remains. This trace is then available to the faculty of imagination.¹⁶⁷

Regarding these traces and their relationship to changing of the sense organs in actual perception, Alexander writes:

We shall better be able to discover what imagination actually is if we understand that the vital movements which are set in motion by sensible objects produce a kind of impression or delineation in the primary sense organ: that is, in the body to which the sensory power of the soul belongs. This impression is a residue of the movement generated by the sensible object; it is like an image of that object which is preserved, and which remains even when the object itself is no longer present; and, being thus retained, it is the cause of memory in us (*On the Soul*, 68, 4-10, trans. Fotinis).¹⁶⁸

As a direct result of the changes produced in the sense organ by sensible objects, a kind of impression is produced in the ultimate sense organ. This impression remains as a trace of the form of the object of perception after the object of perception has departed and is no longer seen. Since it remains after the object of perception has departed, we may infer that the sense organ, to the extent that it retains the trace, undergoes a change *as matter*. The change in the sense organ, the receiving of perceptible form by means of which perception occurs, is a change *not as matter*. As a result of this change, however, the sense organ is also changed *as matter*.

If, when acted on by the sensible object via the medium, the sense organ undergoes a change *not as matter* but also undergoes a change *as matter*, Alexander's first solution to the problem of simultaneous perception will not work. Whilst it may be possible for a sense organ to

¹⁶⁷ See *On the Soul* 68,4-70,14, for a discussion of these traces and their use by the faculty of the imagination.

¹⁶⁸ τί τοίνυν ἔστιν ἡ φαντασία, ὅδε ἀν γνωρίσαιμεν· δεῖ νοεῖν γίνεσθαι ἐν ἡμῖν ἀπὸ τῶν ἐνεργειῶν τῶν περὶ τὰ αἰσθητὰ οἷον τύπον τινὰ καὶ ἀναζωγράφημα ἐν τῷ πρώτῳ αἰσθητῷ (τοῦτο δ' ἔστι τὸ σῶμα, ἐν ᾧ ἡ αἰσθητικὴ τῆς ψυχῆς δύναμις ἔστι), ἐγκατάλειμμά τι ὃν τῆς ὑπὸ τοῦ αἰσθητοῦ γινομένης κινήσεως, ὃ καὶ μηκέτι τοῦ αἰσθητοῦ παρόντος ὑπομένει τε καὶ σώζεται, ὃν ὥσπερ εἰκὼν τις αὐτοῦ, ὃ καὶ τῆς μνήμης ἡμῖν σωζόμενον αἴτιον γίνεται.

receive black and white simultaneously and in the same part *not as matter*, it remains an impossibility to receive them as matter. It would also, it seems, be impossible for a sense organ to receive *a trace* of white and a trace of black simultaneously in the same part, if these traces are received as matter. I take this passage then, positioned in between Alexander's first suggested solution and his second, to point to the reason why the first suggested solution is in fact insufficient. Whilst it could provide the solution to the problem of simultaneous perception if the only change in the sense organs brought about by the objects of sense were changes *not as matter*, since this is not the case, we need to look for a new solution.

This interpretation also makes sense of the fact that this passage concerning traces and the imagination is included in Alexander's discussion of the problem of simultaneous perception at all. Since others do not take this passage as constituting an objection to the idea that the problem of simultaneous perception could be solved through the notion of receiving affections *not as matter*, it presents a problem. Bergeron and Dufour state that the connection between the passage and the previous passages is unclear.¹⁶⁹ Fotinis in his translation places the entire passage in brackets, treating it as a digression. Ivo Bruns, in a note in the critical apparatus, questions whether this passage should be here at all (62, 22). Bergeron and Dufour claim Bruns' doubt stems from the fact that the passage begins with 'ἢτι', which suggests a new argument is about to begin, but then what follows does not seem to connect with what has gone before. For this reason, Bergeron and Dufour take the 'ἢτι' with the 'σώζειν τι' in the line below. They deny that the ἢτι introduces an argument, and so, rather than translating the passage as: '*what is more*, if a body with a psychic power is changed in this way, it seems to preserve a trace of the change produced by the sensible object...', instead their translation in English would read, 'if a body with a psychic power is changed in this way, it seems to preserve *still* a trace of the change produced by the sensible object...'

¹⁶⁹'La transition avec le passage précédent n'est pas évidente. I. Bruns trouve suspect le début de ce texte (62.22), car on comprend mal comment le nouvel argument, introduit par le ἢτι, se rattache à ce qui précède.' (M. Bergeron and R. Dufour, *Alexandre d'Aphrodise: De l'âme* (Paris : Librairie Philosophique J. Vrin, 2008, p. 309).

On my interpretation, the $\varepsilon\tau\iota$ ought to be taken as introducing an argument, specifically an argument designed to show that the suggested solution to the problem of simultaneous perception does not work. However, the use of $\varepsilon\tau\iota$ on this reading is odd. In the previous passages we find the claim that if the affections were received *not as matter*, then the problem of simultaneous perception would be solved. We also find the claim that the affections in fact are received *not as matter*, at least by the eye and the medium. If the passage under discussion plays the role I argue it does, it makes the point that *despite* the fact that the sense objects cause the sense organs to receive form *not as matter*, ensouled bodies also preserve a trace of the change, i.e. they also undergo some ordinary alteration. So we must, therefore, look for another way in which simultaneous perception can be explained. We would expect such a passage to be introduced by a word meaning ‘however’ or ‘nevertheless’, not $\varepsilon\tau\iota$ which suggests that the passage provides an additional argument for a claim previously discussed, as opposed to providing a counterargument.

It is possible that the word $\varepsilon\tau\iota$ was added by an early editor who missed the significance of lines 62,22-63,5. Perhaps, like Bergeron and Dufour, the editor was unsure of the connection of this passage with what had gone before, and rather than leave the text with what appeared to him an abrupt change of subject, added $\varepsilon\tau\iota$ to link it with what had gone before, unknowingly distorting the meaning of the text. Bruns doubts whether any of lines 62,22-63,5 should be found at this point in the text. I suggest these lines belong here, and just the $\varepsilon\tau\iota$ does not.

5.4 Alexander’s Solution to the Problem of Simultaneous Perception

The second solution supplied by Alexander is found not only in *On the Soul*, but also in his commentary on *de Sensu* and in the *Quaestiones*. The solution relies on a feature of Alexander’s theory of perception outlined in the first chapter. This is the fact that whilst the sense organs, both the peripheral sense organs and the ultimate sense organ, receive the

perceptible forms as a result of being acted on by the objects of perception via the medium, this reception of form by the sense organs is not that in which perception consists. Perception is rather the exercise of the perceptual capacity for judgement, an activity of soul. Consider this passage from Alexander's commentary on *de Sensu*, found in the context of a discussion of the problem of simultaneous perception:

Alternatively perception, even if it seems to come about by means of an affection, is nevertheless itself a judgement. (That which is opposite in an affection is different from that which is opposite in a judgement. For in an affection white is opposite to black but in a judgement the judgement concerning the white body that it is white and the judgement of the black body that it is black are not opposites. For these are true together and it is impossible for opposite judgements to be true together. But what is opposite to the judgement concerning the white body that it is white, is the judgement concerning the white body that it is black. For this reason the latter judgements are never present together in the judgement in accordance with perception, but the former ones are. For they are not opposites). However when that body is affected in which is housed the perceptive capacity of soul, and which it is habitual to call the ultimate sense-organ, <it is affected> not in respect of the same part by both <opposites> but rather it is generated in different parts by different opposites just as we see that the opposites are at the same time clear both in the eyes and in mirrors (*de Sensu Comm.*, 167,21-168,5 *trans.* Towey).¹⁷⁰

This passage presents a solution to the problem of simultaneous perception. The problem and the solution are split into two parts. On the one hand there is a solution regarding the reception of form by the sense organs. On the other hand there is a solution regarding the

¹⁷⁰ ἡ ή αἰσθησις, εὶ καὶ δοκεῖ διὰ πάθους τινὸς γίνεσθαι, ἀλλ' αὐτή γε κρίσις ἐστίν (ἄλλο δὲ τὸ ἐν πάθει ἐναντίον καὶ ἄλλο τὸ ἐν κρίσει. ἐν πάθει μὲν γὰρ τὸ λευκὸν τῷ μέλανι, ἐν κρίσει δὲ οὐχ ἡ κρίσις ἡ περὶ τοῦ λευκοῦ ὅτι λευκὸν οὐδὲ ἡ τοῦ μέλανος ὅτι μέλαν ἐναντίαι· αὗται μὲν γὰρ ἄμα ἀληθεῖς· ἀδύνατον δὲ τὰς ἐναντίας κρίσεις ἄμα ἀληθεῖς εἶναι. ἀλλ' ἐστι τῇ περὶ τοῦ λευκοῦ κρίσις ὅτι λευκὸν ἐναντίον ἡ περὶ τοῦ λευκοῦ ὅτι μέλαν. διὸ αὗται μὲν οὐδέποτε συνυπάρχουσιν ἐν τῇ κατὰ τὴν αἰσθησιν κρίσει, ἐκεῖναι δέ· οὐ γάρ εἰσιν ἐναντίαι), πάσχοντος μέντοι τοῦ σώματος ἐν ᾧ ἥδε ψυχή, ὁ ἔθος ἐστὶ λέγειν ἔσχατον αἰσθητήριον, οὐ κατὰ τὸ αὐτὸ μόριον ὑπ' ἀμφοῖν, ἀλλὰ κατὰ ἄλλο ὑπ' ἄλλου γίνεται, ὡς γὰρ ὅρωμεν καὶ ἐπὶ τῶν ὀφθαλμῶν καὶ ἐπὶ τῶν κατόπτρων ἄμα ἐμφαινόμενα τὰ ἐναντία.

judging or grasping of form by the perceptual capacity. With regards to the problem as applied to the judging of form by the perceptual capacity, Alexander notes that there is no contradiction in judging that one thing is black and another is white.¹⁷¹ Regarding the problem as applied to the sense organs, the solution is found in the fact that it is not the case that the sense organ receives different forms in the same part, rather it receives them in different parts. Just as different colours appear in different parts of the image in the eye, when we perceive something visually, or different colours appear in different parts of a mirror when it takes on an image, so the sense organ receives different sensible qualities in different parts. In this passage Alexander is concerned with the ultimate sense organ, but as we shall see, he treats the peripheral sense organs in the same way.

In his commentary on *de Sensu* Alexander suggests this as a solution but does not say whether he accepts it or not. In the commentary he frequently lays out ideas and possible developments of Aristotle's theory, without explicitly stating his position. In his treatise *On the Soul*, however, it is clear that this is the solution he accepts. In *On the Soul* we again find the claim that 'it is not true that if, in the case of affection, it is impossible for contraries to coexist in the same thing, the case must be the same for judgement of these. A judgement of contraries, when it judges the contraries, is not contradictory. What would be impossible is the contraries coming to be simultaneously in the same thing' (*On the Soul*, 64,11-14). The solution follows, as it did in the commentary on *de Sensu*, that the perceptive capacity judges that contrary sensible qualities are different, and is able to do so as it is not contradictory to judge that one thing has one property and another thing has the contrary property. The judgement occurs by means of the ultimate sense organ, in which the perceptive capacity resides. Alexander writes that, since it is 'not possible that contrary affections come to be in the same place at the same time' (*On the Soul*, 64,6), it is 'in different parts that the sense organ simultaneously receives the affections of contrary sensibles' (*On the Soul* 64,4-5').

The discussion in *On the Soul* also makes it clear that the same solution can be applied to the peripheral sense organs. After the claim that the sense organ simultaneously receives the affections of contrary sensibles in different parts, Alexander writes, 'this sense organ is

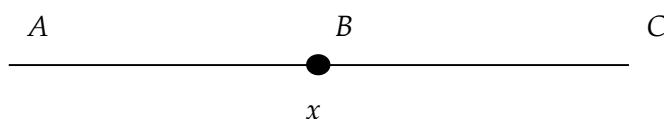
¹⁷¹ See also, *Quaestiones*, 98,6-7.

affected in different parts by contrary sensible objects, and as it is affected, so it transmits to the ultimate sense organ, and this latter undergoes the affections in its parts in about the same way' (*On the Soul*, 64,6-9). Alexander claims that the sense organ is affected in different parts, and then that the affection is transmitted to the ultimate sense organ. The first use of the term 'sense organ' must then refer to a peripheral sense organ, which, like the ultimate sense organ, is affected in different parts.

This, however, does not constitute a complete solution to the problem of simultaneous perception. Alexander has made the point that the content of the perceptual judgements of contrary qualities does not conflict: for example, whilst it is not possible for a unified entity to become both white and black, it is possible to judge both that something is white and that something else is black without contradiction. However, more explanation is needed as to how a single entity may make multiple distinct judgements at the same time whilst retaining its unity. To address this aspect of the problem, Alexander draws on and develops one of the solutions to the problem of simultaneous perception suggested by Aristotle in *de Anima*. Aristotle's statement of this solution is as follows:

That which judges, therefore, is one and judges at one time in so far as it is indivisible, but insofar as it is divisible it simultaneously uses the same point twice. In so far then as it uses the boundary point twice it judges two separate things in a way separately; in so far as it uses it as one it judges one thing and at one time (*de Anima*, 427a9-14)

This solution involves a comparison between sense and a point. A point is numerically indivisible and yet it can be divided insofar as a point may form the limit of two lines. Point x in the diagram below is an indivisible unit, but it is also more than one thing insofar as it forms the limit of both line AB and line BC. It is one and yet it is also two insofar as it is the end point of AB, and the end point of BC.



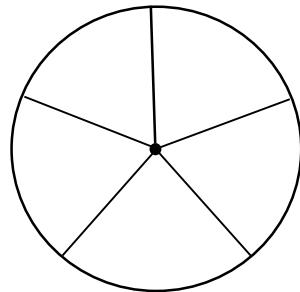
Discussing the point solution Alexander writes,

For by means of this he shows how, being one, [that which perceives] will perceive several different things together. For in so far as it is itself taken and thought of in itself as being an indivisible limit of all the sense-organs, it will be in actuality and by its own nature an indivisible one, and this <will be> able to apprehend, and perceptive of, all perceptibles. ‘*But when it comes to be divisible in actuality*’ (449a12), i.e. when it is divided by the activities in respect of the sense-organ, it will be more than one. In this way, in so far as it is one thing in respect of that which underlies, that which perceives all the perceptibles and judges them will be the same thing, but in so far as it is divided by the activities in respect of the sense-organs, coming to be many in a way, it will perceive several different things together. [Aristotle] has discussed this view in *On the Soul*. It is taken as divisible because it is taken <as> a limit of several things. For being a limit of all the sense-organs in the same way, when the activity in respect of several sense organs comes about, it is taken as divided and as more than one. To the extent that it comes to be a boundary of several things together, the same <limit> in the activities in respect of several sense-organs, to this extent one thing would perceive several things of different genera together. For the same thing is both one and many, just like the centre in the circle. This, being one in respect of what underlies, comes to be many in a way, when it is taken as a limit of the <lines> drawn from the circumference to the centre (*de Sensu Comm.* 165,2-165,20, *trans.* Towey).¹⁷²

¹⁷² διὰ γὰρ τούτου δείκνυσι πῶς ἐν ὁν πλειόνων τε καὶ διαφερόντων ἄμα αἰσθήσεται. καθόσον μὲν γὰρ αὐτὸ καθ' αὐτὸ λαμβανόμενόν τε καὶ νοούμενον ἀδιαιρέτον πέρας τι ὁν πάντων τῶν αἰσθητηρίων, ἐνεργείᾳ τε καὶ τῇ αὐτοῦ φύσει ἀδιαιρέτον ἐν τι ἔσται, καὶ τοῦτο πάντων αἰσθητῶν ἀντιληπτικόν τε καὶ αἰσθητικόν· ὅταν δὲ διαιρετὸν γένηται κατ' ἐνέργειαν, τουτέστιν ὅταν δὲ ὑπὸ τῶν κατὰ τὸ αἰσθητήριον ἐνεργειῶν διαιρεθῆ, πλείω ἔσται. οὕτω δὲ καθὸ μὲν ἐν τί ἔστι κατὰ τὸ ὑποκείμενον, ταύτον ἔσται τὸ πάντων τῶν αἰσθητῶν αἰσθανόμενον καὶ κρῖνον αὐτά, καθὸ δὲ ὑπὸ τῶν κατὰ τὰ αἰσθητήρια ἐνεργειῶν διαιρεῖται, πολλά πως γινόμενον πλειόνων καὶ διαφερόντων ἄμα αἰσθήσεται. εἴρηκε δὲ περὶ τῆς δόξης ταύτης ἐν τοῖς Περὶ ψυχῆς. λαμβάνεται δὲ ὡς διαιρετὸν τῷ πέρας πλειόνων λαμβάνεσθαι. πάντων γὰρ τῶν αἰσθητηρίων ὅμοιώς ὁν πέρας, ὅταν κατὰ πλείω γίνηται ἡ ἐνέργεια αἰσθητήρια, ὡς διηρημένον καὶ ὡς πλείω λαμβάνεται· καθόσον δὲ ἄμα πλειόνων γίνεται πέρας τὸ αὐτὸ ἐν ταῖς κατὰ πλείω αἰσθητήρια ἐνεργείαις, κατὰ τοσοῦτον ἀν καὶ ἐν τῶν πλειόνων τε καὶ ἀνομογενῶν ἄμα αἰσθάνοιτο. τὸ αὐτὸ γάρ ἔστιν ἐν τε καὶ πολλά, ὡς τὸ ἐν τῷ κύκλῳ κέντρον· καὶ τοῦτο δὲ ἐν ὁν κατὰ τὸ ὑποκείμενον πολλά πως γίνεται, ὅταν ὡς πέρας λαμβάνηται τῶν ἀπὸ τῆς περιφερείας ἐπὶ τὸ κέντρον ἀγομένων.

In this passage, the way in which that which perceives is both one and many, is expressed in terms of Aristotle's language of potentiality and actuality. The perceptive capacity - i.e. the potential to perceive, described in the passage above as 'that which is able to apprehend and is perceptive of all perceptibles' and 'that which underlies' – is one, but when this capacity is activated or in actuality, when the perceiver is actually perceiving multiple sensible qualities, it is in a way many.

In the above passage Alexander focuses on the problem of perceiving sensible qualities of different kinds, i.e. belonging to different individual senses. He writes not of contraries and perceptibles belonging to the same sense, but rather simultaneous perception of 'things of different genera', perceived through the activities of distinct sense organs. When the perceptive capacity is activated it sees, hears, smells, touches and tastes all at the same time. It becomes many insofar as its activities are many. Alexander's explanation of how, even in activity, that which perceives remains unified, is that it is a limit of all the individual sense organs. He describes it as analogous to the point in the centre of a circle which forms the limit of several lines which run from the circumference to the centre.



It is not clear either on Aristotle's version of this solution, which draws an analogy between sense and a point which divides a line, or on Alexander's version as presented here, which draws an analogy between sense and the point in the centre of a circle at which lines from the circumference meet, how exactly it is supposed to solve our problem. A point is a good example of how something can be one and many, but it remains unclear how the analogy works and so how sense can be one and many in the same way. On this issue, a helpful discussion is found in the *Quaestiones*. The author, after an initial statement of the analogy between sense and a point at the centre of a circle, writes:

But what it is possible to grasp that is like this in the case of sensation, so as to be one and many simultaneously, in a similar way to the centre of the circle that is taken as the terminus of the many straight lines, it is not easy to discover (*Quaestiones* 96, 28-31, *trans.* Sharples)

The author then goes on to answer this question of what, precisely, is supposed to be analogous to a point in sensation, and how. First the author argues that the sense-organ, the body, cannot be analogous to a point. This negative claim is argued for using the principle that it is not possible for different, let alone contrary, sensible properties to affect the same part of the body (*Quaestiones* 96,31-97,2, *trans.* Sharples). As they cannot come to be in the same place, they must come to be in different parts of the organ, and so the organ is not analogous to a point. The author of the *Quaestio* concludes that it is the perceptive capacity which is analogous to the point:

[The point is analogous to] the capacity of that body which we call the ultimate sense organ, [the body] of which the capacity of sensation is the form; this capacity senses and judges the things that come about in the body, of which it is the form and capacity, according to the transmission from the sense-organs. For this capacity is single and, as it were, the terminus of this body of which it is the capacity, since it is to this that the changes are conveyed as their ultimate [destination]. [The capacity] being incorporeal and indivisible and similar in every way, as being single, in a way becomes many [capacities], since it senses similarly the changes in each part of the body of which it is the capacity, whether the change comes about in it in some one part or in several. For in the judgement of several [parts] the single [capacity] in a way becomes several capacities, since it is taken as the proper terminus of each part. (*Quaestiones* 97,9-19, *trans.* Sharples).¹⁷³

¹⁷³ τῇ δυνάμει τῇ τοῦ σώματος ἐκείνου, ὁ λέγομεν ἔσχατον αἰσθητήριον, οὗ ἡ αἰσθητικὴ δύναμις εἶδος, ἥτις δύναμις αἰσθάνεται καὶ κρίνει τὰ ἐν τῷ σώματι, οὗ δύναμις καὶ εἶδός ἐστιν γενόμενα κατὰ τὴν ἀπὸ τῶν αἰσθητηρίων διάδοσιν. ἡ γὰρ δύναμις αὕτη μία οὖσα καὶ ὡσπερ πέρας τοῦ σώματος τούτου οὗ δύναμις ἐστιν, ἐπειδὴ ἐπὶ τοῦτο τὸ ἔσχατον αἱ κινήσεις φέρονται, ἀσώματός τε οὖσα καὶ ἀδιαιρέτος καὶ ὄμοια πάντῃ, μία οὖσα, πολλαῖ πως γίνονται τῷ τῶν καθ' ἕκαστον μόριον τοῦ σώματος, οὗ δύναμις ἐστι, κινήσεων αἰσθάνεσθαι ὄμοιώς, ἢν τε κατὰ ἐν τι μόριον ἡ

A discussion of this complex solution to the problem of how a thing may be both one and many is beyond the scope of this thesis, the focus of which is not the perceptive capacity but rather the eye and medium. I will, however, pick out a few key points. The author describes the perceptive capacity as the ‘terminus’ of this body of which it is the capacity. The idea seems to be that the peripheral sense organs are affected by the sense objects and these affections are then transmitted to the ultimate sense organ which houses the perceptive capacity and which takes on the affections in different parts. At the end of this process the affections are judged or sensed by the perceptive capacity. The perceptive capacity is both singular and present throughout the ultimate sense organ. In conceiving of the capacity as the limit of the body, one can begin to make sense of the analogy to the point at the centre of a circle. In his statement of the second solution in *On the Soul*, Alexander uses similar language, claiming that the perceptive capacity is able to perceive many things on account of the fact that ‘when the sense organ is affected in each of its parts, it perceives the affection through being the capacity and limit of each part’ (*On the Soul*, 63, 21-23).

This, then, is Alexander’s complete solution to the problem of simultaneous perception. When a perceiver simultaneously perceives distinct perceptual qualities, whether they are contrary properties falling under one individual sense such as black and white, or properties belonging to distinct senses such as white and sweet, the sense organs, both the peripheral organs and the ultimate sense organ, are affected in different parts. It is impossible for a single unified entity to acquire, simultaneously, contrary properties. No unified entity, for example, can be simultaneously both white and black. It is clearly not impossible, however, for a body to be affected in different ways in different parts. The perceiver is able, in exercising their perceptive capacity which resides in the ultimate sense organ, to simultaneously judge these distinct or even contrary properties since there is no contradiction in judging that one thing is white and another is black. The capacity remains unified whilst it makes these distinct judgements, since there is a single unified capacity inhering in all the parts of the ultimate sense organ and which serves as the limit of each

κίνησις ἐν αὐτῷ γένηται, ἃν τε κατὰ πλείω. ἐν γὰρ τῇ τῶν πλειόνων κρίσει πολλαί πως δυνάμεις ἡ μία γίνεται ως ἔκαστου μορίου πέρας οἰκεῖον λαμβανομένη.

part. It remains unified in an analogous way to that in which a point at the centre of a circle remains one, despite forming the limit of multiple lines which extend from the circumference of the circle to the centre point.

I have not attempted here to offer a full presentation and analysis of Alexander's second solution, but the following point is clear. This solution to the problem of simultaneous perception, found not only in *On the Soul* where it is developed to a much greater extent than his first solution, but also in other of Alexander's texts, provides what Alexander takes to be a satisfactory solution to the problem of simultaneous perception. Crucially, it does not require that the sense organs take on colour in a non-physical way. Taking this into consideration, alongside my claim that the first solution rests on the claim, not that colour is received by the eye and the medium non-physically, but rather that it is received by virtue of relation, I am able to conclude that the problem of simultaneous perception poses no problem for a reading of Alexander on which the eye and medium take on colour in a genuine, physical way.

CONCLUSION

The purpose of this thesis was to present Alexander's theory of visual perception, with an emphasis on the way in which the transparent medium and the eye are changed by the objects of perception. Over the course of the preceding chapters, it was argued that Alexander takes the objects of perception and the source of illumination to change the medium and eyes in a genuine, physical way. The changes which the eye and medium undergo are not 'spiritual' changes, nor are they instances of mere Cambridge change.

Two novel and interesting features of Alexander's account were also explored: Firstly, his claim that the images in the eye play a role in perception, a claim which represents a disagreement with Aristotle, and secondly his claim that the way in which the medium and the eye receive colour is *by virtue of relation*. I hope to have developed a way of understanding Alexander's notion of change by virtue of relation which is both consistent with the text and enables the concept to play the role Alexander requires of it. I will end with a summary of Alexander's view as I have presented it over the preceding chapters.

The coloured object of perception changes the transparent medium, causing it to receive colour. The medium in turn changes the eye, causing it too to receive colour. Perception, for Alexander, does not consist in this reception of colour, it is rather by means of this reception of colour that perception occurs. The colour is transmitted by the eye through passages filled with transparent material to the ultimate sense organ: the heart. The heart receives the colour, but this reception also is not what constitutes perception. The heart is where the perceptive capacity resides. It is the exercise of this capacity of the soul, which consists in the grasping and perceptual judgement of the perceptual forms, which constitutes perception.

The receiving of colour by the eye and the medium is a physical change. Once received, colour is occasionally visible in the medium and always visible in the eye. It is visible in the eye on account of the fact that the eye is composed of water. Water differs from air in that it

has the capacity, not only to take on colour, but to 'keep in and preserve it'. To 'keep in and preserve' in this sense is to receive colour in such a way that it may not only be passed on, but it is also displayed. Alexander understands the images we may perceive in the eyes of others, as colour, transmitted through the medium, and kept in and preserved in this way. He takes these images to play a necessary role in visual perception. In order for colour to be transmitted from the eye to heart, it must first be captured by the eye. It is not sufficient for the eye to receive the colour in the same way as the medium does in those cases where the colour is not apparent in the medium but is merely passed on.

Alexander understands the capacity of the eye to receive and preserve colour in this way, as the same capacity as that which enables a mirror to take on an image. Alexander does not explain mirror images through recourse to the idea of light or an effluence rebounding from the object's surface. For Alexander, when colour is seen in a mirror, there really is colour in the mirror. The mirror is changed, via the medium, by the object of perception and takes on colour. The kind of change undergone by the mirror, eye or medium, however, is not alteration. In all these cases colour is acquired *not as matter* and *by virtue of relation*. This is the same kind of change undergone by the transparent body – for example air or water – when it is illuminated by a source of light.

The key behavioural feature of change by virtue of relation is the fact that the property gained through the change is immediately lost when the object to which the changed subject is related is removed. Examples of changes by virtue of relation include, not only illumination and the taking on of colour by a transparent body, but also cases in which a relational property is gained, for example a subject coming to be to the right of something. We ought not to infer from this, however, that light or colour are to be understood as relational properties. Instead, in order to understand Alexander's concept of change by virtue of relation, we must examine his claim that when a subject undergoes this kind of change, the form or property received is received *not as matter*. I analysed this notion in terms of Aristotle's concept of material cause. To undergo ordinary alteration is to receive form *as matter*. The subject becomes the matter or proximate subject for the form, in the sense that it comes to be the material cause of the fact that it possesses that form. The subject or

part of the subject comes to stand to the form acquired as the material constituent of a hylomorphic compound. For a subject to receive a form *not as matter* is for the subject to receive the form without being the material cause of the fact that it has that form. No part of the subject stands to the form acquired as the material constituent of a hylomorphic compound.

The illumination and taking on of colour by the transparent medium are cases in which a property – light and colour respectively – is received *not as matter*. The transparent medium is in fact not able to receive colour *as matter*, since, as Aristotle claims in the *Metaphysics*, the proximate matter for, or material cause of, colour is the surface of the body in which it inheres. Air and water are ‘unlimited’, they do not have their own fixed boundary or surface, and as a result, unlike opaque solid objects, they cannot possess colours *as matter*. Solid bodies, if they are smooth and dense, are also able to take on colours *not as matter*, despite the fact that they are able to possess their own colour, but they may only do so via a transparent medium. There are several ways in which a subject may receive form *not as matter*. One example is the way in which the perceptive or intellectual capacities of the soul grasp form. Changes in which a form or property is received *not as matter* form a broad class. Change by virtue of relation, the way in which the medium, eye and mirrors receive colour, is one kind of change in which the property is received *not as matter*.

As a concluding thought, I would like to note that I view Alexander’s theory, with its concept of change by virtue of relation, as an impressive and innovative attempt to supply a coherent and worked out Aristotelian theory of visual perception. I have suggested that the concept of change by virtue of relation ought to be understood as derived from Aristotelian metaphysics, specifically Aristotle’s hylomorphism and his notion of a material cause, and developed in order to make sense of certain of Aristotle’s claims: the claim that colour changes the medium and eye; the claim that light is the presence of fire in a transparent body; the claim that when colour changes the transparent medium, or when the medium is illuminated by a source of light, this change happens all at once. The concept is also seemingly designed to make sense of certain observable phenomena, for example, the fact that darkness falls and colour disappears the instant a source of light or colour is removed.

The concept of change by virtue of relation also has a notable explanatory advantage within an account of perception which requires that the perceiver take on the form of the object of perception. It gives the Alexandrian a way to account for the fact that the perceiver, through becoming coloured, is able to perceive the colour of *the object*, as opposed to its own colour for which the object of perception is causally responsible. The perceiver does not possess the colour by virtue of itself, in the sense that no part of the perceiver is the material cause of the fact it has the colour. Despite the fact the colour is in the perceiver, it is not the perceiver's own colour. Instead the perceiver has the colour by virtue of its relation to the object of perception and in this way the connection to the object of perception is retained. In these ways, Alexander's use of the concept of change by virtue of relation in his account of visual perception represents a subtle and hugely clever development of Aristotle's theory.

APPENDIX

In chapter five, I raised a possible objection to my claim that, for Alexander, it is possible for a subject to simultaneously take on contrary colours by virtue of relation. The objection was founded on the fact that it is not possible for us to conceive of what it would be like to experience something which is simultaneously both black and white. This impossibility seems to threaten the claim that it is possible for a subject to simultaneously take on contrary colours by virtue of relation, since when a colour is taken on by virtue of relation, for example in a mirror or the eye, this colour is perceptible. My response to this objection, contained in this appendix, involves a development of Alexander's view beyond what is stated in the text. I suggest, however, that it nevertheless remains consistent with the Alexandrian framework.

I will begin my response to this objection by again outlining the scenario mentioned in chapter five. Two people, one dressed in white (person A), the other dressed in black (person B), are standing in front of a mirror. Person A is standing in front and to the left of the mirror. Person B is standing in front and to the right of the mirror.

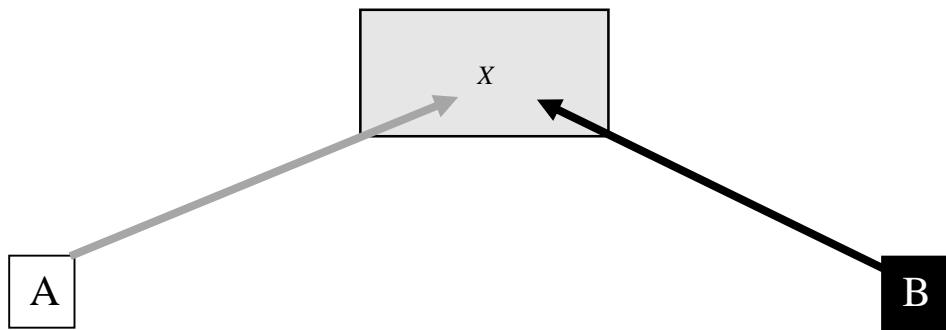


Fig. 1.

Given the angle at which person A is standing in relation to the mirror, she can see the mirror and objects reflected in it, including person B, but she cannot see herself. Person B can also see the mirror and objects reflected in it, including person A, but cannot see himself. Person A sees person B in the same part of the mirror that person B sees person A. Person A, when she looks in the part of the mirror labelled x sees the black image of person B. Person B, when he looks in the exact same part of the mirror sees the white image of person A. One part of the mirror is simultaneously both black and white.

On Alexander's understanding of mirror images, person A sees black on account of the fact that the colour of B changes the transparent between person B and the mirror, and the mirror takes on and displays the colour black. The black in the mirror then changes the transparent between the mirror and person A, and the colour is perceived in the mirror by person A. Person B sees white on account of the fact that the colour of A changes the transparent between person A and the mirror and the mirror takes on and displays the colour white. The white in the mirror then changes the transparent between the mirror and person B and the colour is perceived in the mirror by person B.

Person A and person B see different colours in the same part of the mirror, but according to Alexander's view of mirroring this cannot be because the colour in the mirror is relativised to the perceiver. It is not the case that the mirror simultaneously has the properties 'black relative to person A' and 'white relative to person B' and does not have the properties black and white *simpliciter*. Given Alexander's account of mirror images, the mirror is black by virtue of relation to the black object (person B) and white by virtue of relation to the white object (person A). This would be the case even if the black and white objects were inanimate and there was no one currently in a position to perceive either image.

The mirror example, understood within an Alexandrian framework, illustrates that whilst it is possible for a body, such as a mirror, to receive contrary colours simultaneously by virtue of relation, it is not possible for one perceiver to simultaneously perceive both these colours. The mirror is both black and white, but one perceiver perceives it only as black and the other perceives it only as white. If this is the case then this explains why, whilst it could be

possible on Alexander's view for a single subject to possess contrary colours at once, we cannot imagine what it would be like to perceive an object which is both black and white simultaneously in the same part. A subject could possess contrary colours but one person would not be able to see them both. However, for this to be a satisfactory explanation and response to the above objection, some further explanation would need to be given for *why* it is the case that a single subject may possess contrary colours but that a single perceiver will never be able to perceive both. Such an explanation would go beyond anything in Alexander's texts, but I see nothing to prevent an explanation being available to Alexander if he had wished to formulate one. I shall attempt such an Alexandrian explanation here.

In order to explain the fact that, despite the mirror having taken on both black and white, only person A sees it as black and only person B sees it as white, Alexander would need to make a claim regarding the activity of colours when they are taken on by virtue of relation. The colour which is proper to an object, a colour which is taken on by that object *as matter*, changes the transparent in straight lines in every direction. If the mirror had a red coloured decoration in the centre of it, so that red was the proper colour of this part of the mirror, then so long as I were in a position to see this part of the mirror, I would see that the part of the mirror is red. This is because wherever I stand, so long as I am in the correct relation to the mirror, the red of the mirror changes the transparent between itself and me. By contrast, when a colour is taken on by a mirror by virtue of relation, it is not the case that a perceiver can see that colour so long as they can see the mirror. In the example above, person A, situated to the left of the mirror, sees black in the mirror. Were she to move directly in front of the mirror, however, she would no longer see black, rather she would see the white of her own clothes in the same place in the mirror. This is not to say that the colour black is no longer in the mirror. Since person B is still standing in the same place, and the transparent medium and mirror continue to be changed by the black colour of person B in the same way, black is still in the mirror. It is just that when person A moves, she can no longer perceive the black in the mirror.

To explain this phenomenon, it must be the case that when an object such as a mirror has a colour by virtue of relation, it, *qua* possessing this particular colour, can only change the

transparent in a single direction. If the principle is to explain the observable phenomenon, this direction must be determined by the spatial relation between the mirror and the perceptible object which caused it to take on the colour. Since it can only change the transparent in one direction, it may only be seen by a perceiver from a specific position.

Consider the diagram below. If the mirror has a coloured image by virtue of relation to the coloured books, the mirror, *qua* possessing this particular image, only changes the transparent along the line between it and perceiver B in the diagram below. It therefore can only be seen by perceiver B and not by perceiver A. The arrow on the left represents the line along which the transparent medium is changed between the books and the mirror, the arrow on the right represents the line along which the transparent medium is changed between the image in the mirror and perceiver B. The line along which the transparent medium is changed between the image in the mirror and perceiver B is determined by the line along which the perceptible object changed the transparent in order to produce the image in the mirror. If the mirror had its own proper colour, by contrast, for example if an image were painted onto the surface of the mirror, it would be visible to anyone facing the mirror and standing in any straight line in relation to the mirror.

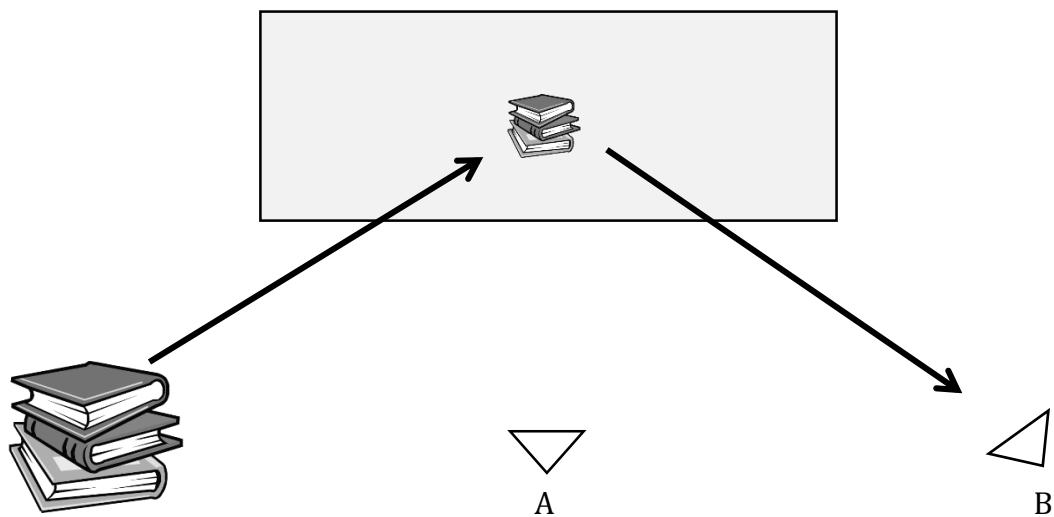


Fig. 2.

If this were the case, that colours taken on by virtue of relation only change the transparent in a single direction (a direction determined by the spatial relation between the body or surface in which the image appears and the perceptible object which caused it to take on the colour), then we could explain why it is possible for two contrary colours to be simultaneously taken on by a single subject by virtue of relation, but why it is impossible for the two contrary colours to be perceived in the subject, for example the mirror, by a single perceiver.

For a mirror to take on contrary colours simultaneously in the same place, it must be changed by virtue of distinct relations to perceptible objects. It cannot become black and white by virtue of relation to the same perceptible object, since it would not be possible for a single perceptible object to have both black and white as its own proper colours in the same place. The black object and the white object, by virtue of relation to which the mirror is both black and white, cannot themselves be in the same place. Given that a) the colours in the mirror only change the transparent in a single direction, and b) this direction is determined by the spatial relation between the body or surface in which the image appears and the perceptible object which caused it to take on the colour, and c) if a mirror takes on black and white simultaneously in the same place, the perceptible objects which caused the colours to be in the mirror must be themselves in different locations, i.e. the black object and the white object must bear distinct spatial relations to the mirror, then it follows that the directions in which the colours in the mirror change the transparent will themselves be distinct, i.e. the black in the mirror will change the transparent along a different line to the white in the mirror. It follows from this that no single perceiver will be able to see both colours at the same time. They would be able to see one from one location, and the other from another, but not both colours from the same position.

Returning to the example of the person in black to the right of a mirror and the person in white to the left: the reason Person A, to the left of the mirror, cannot see herself in the mirror but only sees person B, is that given the spatial relation between person A (white object) and the mirror, the white colour, when it is taken on by the mirror, is only able to change the transparent along the line between the mirror and person B. Person B (black

object) then can see the white colour, but person A cannot. Person A, however, can see person B, since given the spatial relation between person B and the mirror, the black colour in the mirror is only able to change the transparent along the line between the mirror and person A. Person A, therefore, sees the black image of person B, and person B sees the white image of person A but neither can see themselves.

On a contemporary understanding of mirror images, this phenomenon that mirror images may only be viewed from a particular direction is explained through reference to the angle of incidence and the angle of reflection of light rays. The angle of incidence between the ray travelling from object and the surface of the mirror, equals the angle of reflection between the mirror's surface and the ray which then causes the image to be perceived. Alexander, since his theory does not involve travelling light rays, would need to explain this phenomenon in a way compatible with his theory of mirror images. It seems possible that he could explain these phenomena through reference to the difference in behaviour between subjects with colours acquired by virtue of relation and subjects with colours which are proper to the subject – the former changing the transparent in a single direction, the latter changing the transparent in multiple directions - as suggested above.

It is not clear why, given Alexander's account, the ability of colours taken on by virtue of relation to change the transparent would be different to the ability of colours in opaque, solid objects: the former only being able to change the transparent in one direction and the latter being able to change the transparent in multiple directions. It is also unclear why the single direction in which the colour taken on by virtue of relation is able to change the transparent, would be determined by the spatial relation between this colour and the object it exists by virtue of relation to. Alexander would need to assume this principle to hold, however, in order to be able to explain why it is the case that mirror images can only be viewed from a certain direction. I will now say a little more about how such an Alexandrian principle could be formulated.

I begin with a passage from the *Mantissa*, which states that the transparent is changed by coloured objects in cone-shaped segments. The visual field of a perceiver is determined by

whatever is covered by the base of the cone shaped segment, the apex of which is at the eye of the perceiver. Here is the passage:

'[Sight] sees and judges size by the angle of the cone which is formed towards the sight. For it sees the things that it sees by a cone which has the pupil as its vertex, and as its base the line which defines what [part] of the perceived body is seen and what not. But this cone comes about not by the pouring forth of rays [from the eye], but from the thing that is seen' (*Mantissa* 146, 16-21, trans. Sharples)

The suggestion is that the perception of size and distance of the objects seen somehow comes about through the angle of the cone formed between the object and the perceiver. I will not develop this point further, however, since my aim here is to explain the behaviour of mirror images using an Alexandrian framework, it is not to determine how Alexander would explain the perception of size and distance.

In order to simplify the discussion, I will move to two dimensions and speak not of cones extending from surfaces but of triangles extending from a base formed by the line between two points on an object's surface. There is no indication in *On the Soul* or the commentary on *de Sensu* that the eye or reflective surface itself has any causal influence on the way in which the coloured object changes the transparent medium. Such a view would be difficult to make sense of without going well beyond Alexander's text. It is not the case, then, that a line between two points on an object's surface would change only that portion of the transparent medium which forms a triangle between itself and an eye or reflective surface, and leave the rest unchanged. Rather, I take it that for any two points on the surface of a coloured object, the line between these points would change triangular segments of the transparent in every direction in which the surface is exposed to the transparent body. A perceiver positioned at the apex of one of these triangles, will see everything in between these two points and these points will lie at the limit of their visual field. The diagram below illustrates the directions in which the transparent medium would be changed by the colour between points *x* and *y*. The perceiver represented by the eye in the diagram would view *x* and *y* through the triangular

segment of the medium which falls between the two bold lines serving as a messenger for the colour.

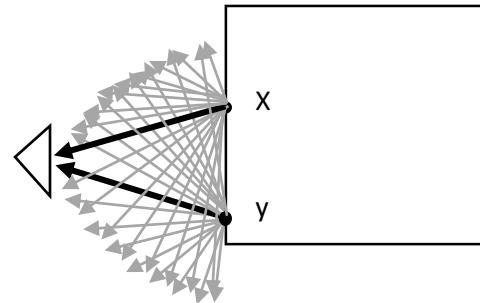


Fig. 3.

Images in mirrors are created when the mirrored surface intersects one of these triangles. The mirrored surface must intersect the two lines which run from the base of the triangle towards the apex. Any one part of the mirror will intersect triangles extending from multiple objects, and different parts of the mirror will intersect different triangles extending from the same objects as shown on the diagram below. In any one part of a mirror, then, there will be multiple images, i.e. it will receive a multitude of colours by virtue of relation. It will receive images of single objects displayed from different angles and images of distinct objects which are situated at different angles in relation to it.

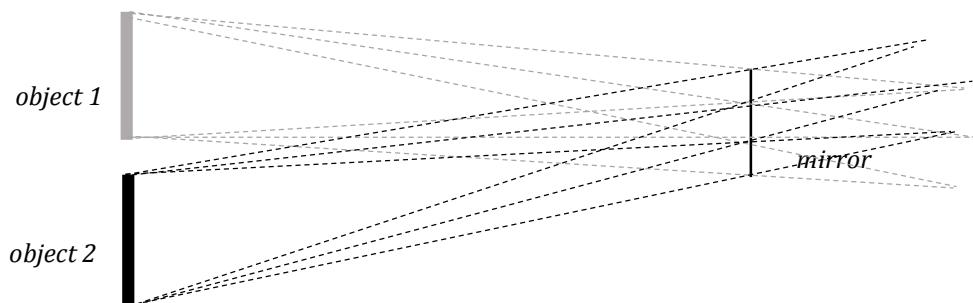


Fig.4.

This diagram shows three triangular segments of the transparent changed by each object. Each segment of the transparent will serve as a messenger between the object and the mirror where the colour transmitted will be displayed. On the surface of the mirror, between each pair of lines extending from the outer limits of the object, is an image of the object. The diagram shows those segments of the transparent which form three distinct images of each object in different parts of the mirror. For every image of object one, there is also an image of object two in exactly the same place. The above diagram, then, represents six distinct images in the mirror. But in reality, the mirror would contain many more.

Let us now take just one of these triangles extending from each object and consider from where the images produced by means of these two triangular segments would be able to be perceived. (For simplicity, we are assuming that the image in the mirror is all the perceiver can see, i.e. it takes up their entire field of vision).

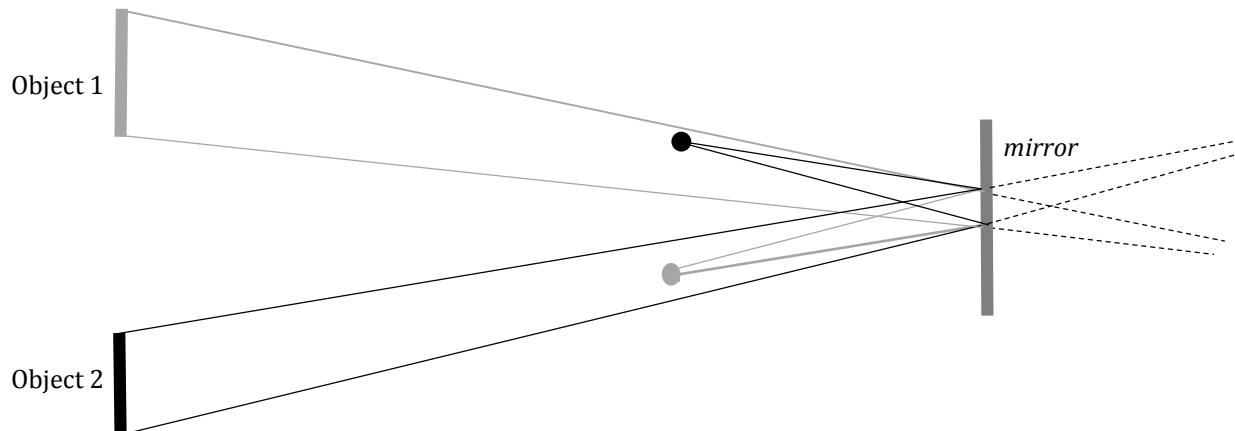


Fig 5.

The black circle is the position from which this particular image of object two can be seen and the grey circle is where this particular image of object one can be seen. A perceiver standing where the black circle is, would perceive an image of the black object in the mirror. A perceiver standing where the grey circle is, would perceive an image of the grey object in the mirror. Of course the perceiver can move around, within certain limits, and still perceive the same object but when they move they will see a different image of the object in a

different part of the mirror, an image produced by means of a distinct segment of the transparent medium.

If the triangle-forming lines extending from the object are conceived of as rays, and we hold a rebound explanation of mirror images, this phenomenon, that particular images may only be seen from particular positions, would be explained as follows. Any particular image is produced by just one set of rays converging into a triangle from the reflected object. These rays are reflected by the mirrored surface at a specific angle determined by laws of reflection, and will enter the eyes of any perceiver who is standing in the appropriate location. If a ray hits the mirror at 90 degrees, it will rebound back from the mirror at 90 degrees. If it hits the mirror at a 45 degree angle, it will rebound back at a 45 degree angle.

Alexander, however, does not conceive of these lines as rays. They rather mark the boundary of a triangular section of the transparent changed by the coloured object, which serves as a messenger for the colour, transmitting it to the appearance-making surface which then takes on and displays the colour. For Alexander to explain the phenomenon that different images can be seen from different angles in the same part of the mirror, he would have to posit the following principle, as stated above:

Colours acquired by virtue of relation may only change the transparent in a single direction, a direction determined by the spatial relation between the body or surface in which the image appears and the perceptible object which caused the body or surface to take on the colour.

The diagrams below represent the difference between the way in which an object with its own proper colour changes the transparent, and the way in which an object with a colour by virtue of relation changes the transparent medium. The former object changes the transparent medium to which its surface is exposed in cone shaped segments extending in every direction. The latter object, *qua* possessing any one particular colour by virtue of relation, only changes a single segment of the transparent.

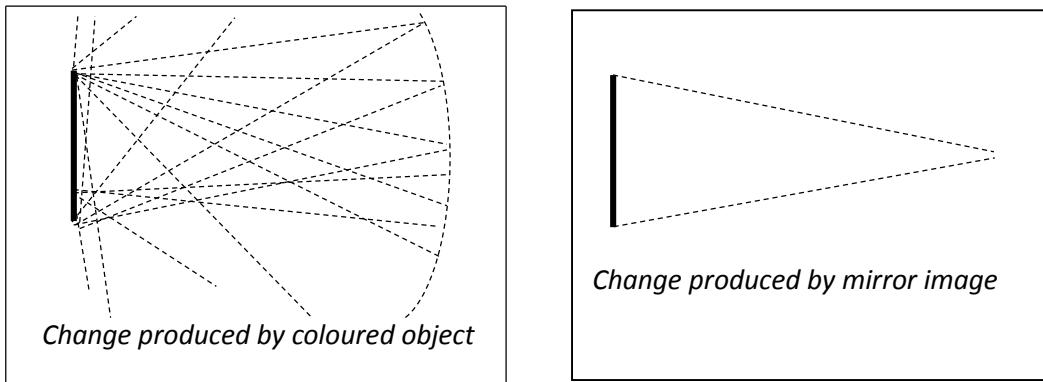


Fig 6.

To account for the fact that the particular segment of the transparent changed by the mirror image is determined by the position of the coloured object which produced that image, something like the following rule would have to apply.

Take a line extending from p to q on the surface of a coloured object, this line (pq), having its own proper colour, can change the transparent in several directions, with the result that it may be seen from different positions or produce images in different locations. Each reflected image of line pq lies between two lines which converge from points p and q . Lines run between point p and the corresponding point on the image, and point q and the corresponding point on the image, as shown in the diagram below. The image of the line pq represented on the diagram (hereafter p^1q^1) is a particular image, produced by the object (pq) changing the transparent between lines a and b (see diagram below – fig 7). Let us name the line which runs between p and the corresponding point on any image ‘limit line 1’ and the line which runs between q and the corresponding point on any image ‘limit line 2’. Let us call the angle at which limit line 1 meets pq ‘ x ’, and the angle at which limit line 2 meets pq ‘ y ’.

These angles between pq and the limit lines specify an area of the transparent changed by pq , and it is change in this specific area which produces the image p^1q^1 . For each distinct image, the size of angles x and y will be different. Here is a rule which would determine which single segment of the transparent is changed by an image. The term ‘image’ in this context

refers exclusively to an image composed of colours received by a mirror by virtue of relation. Again, for simplicity, an image is treated as a line between two points:

For any image (p^1q^1), the image will change that segment of the transparent between those converging lines which extend from the points p^1 and q^1 (i.e. the outermost points of the image), and which depart from the surface in which the image is displayed at angles x and y . Angles x and y are the internal angles of the triangle formed through the meeting of these converging lines. These angles x and y are identical to the same internal angles of the triangle formed by a particular set of converging lines which extend from the points p and q on the surface of the object responsible for the production of the image. The particular set of converging lines, are those which frame the section of the transparent which served as a messenger for the production of the image (p^1q^1).

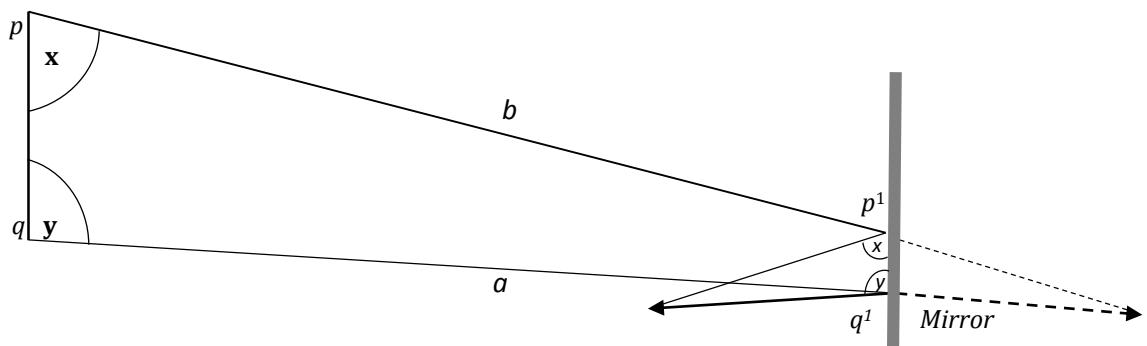


Fig 7.

If we take 'M' to refer to the mirror image, and 'O' to refer to the object which produced the image, the rule may be stated more succinctly, as follows:

M has the power to change the section of the transparent which stands to it, as the changed section of the transparent by means of which M is produced stands to O.

The addition of such a rule to Alexander's theory would enable him to explain the fact that images in mirrors may only be seen from a certain location, and that this location is determined by the position of the object which produces the image.

This suggested development of Alexander's theory completes the response to the objection presented in chapter five. The objection went that, given that it is impossible for us to conceive of experiencing an object as black and white simultaneously, there must be something wrong with the claim that a subject is able to take on contrary colours simultaneously by virtue of relation. The response is that it could both be impossible for a single perceiver to experience an object as black and white simultaneously and yet still be possible for an object to take on black and white simultaneously by virtue of relation. And so the fact that we cannot conceive of experiencing an object as black and white simultaneously need not refute the claim that it is possible for something to possess black and white simultaneously. The mirror, for example, could be both black and white and yet, if we assume that these colours can only change the transparent in a single direction determined by the spatial relation between the mirror and the coloured objects which produce the colours in the mirror, and given that, on this assumption, the directions in which each colour changes the transparent would have to be distinct, it would not possible for a single perceiver to see the mirror as both black and white.

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