

CHAPTER 1

IMAGES *and* APPEARANCES

“Image” may indicate a likeness between two distinct objects. A son is the image of his father insofar as their appearances are similar, even if they are not identical in any single respect. The example of father and son relates to a secondary, reproductive sense in which designating something as an image marks its derivative status. A Roman reproduction of a Greek sculpture, though perhaps indiscernible from the original, is an image in this sense of copy. A third function of the word concerns the role of images as semblances, or feignings of reality. Used in this sense, the image’s likeness to the thing it represents is incomplete. Such a self-dissimulating image is not a purely causal reflection of a natural form but must be created intentionally.¹ “Image” can connote one or more of these senses, but its extension is indeterminate. A son is not the image of his father in the way a photograph is. What counts as an image depends on what sort of conversation one is having.

In the earliest Greek sources, an image (εἶδωλον) is associated with the dead. In the *Iliad*, when Achilles has fallen into a deep sleep, his recently deceased companion Patroklos appears to him in a vivid dream. Patroklos warns that Achilles will also die at the hands of the Trojans

and implores that their bones be interned together in a single urn. But when Achilles rises to embrace him, Patroklos's psyche disappears in a vapor. Achilles, jumping to his feet and striking his hands, laments that "in the house of Hades, there is a psyche and *eidelon* that have no life in them," and that such an image has hovered over him all night, looking wondrously like (*eikto*) Patroklos.² The image here indicates the dead man's similarity, as well as his status as a derivative and mere semblance of Patroklos's living body. As Garland writes of the dead in archaic Greek literature, "Linguistically their insubstantiality is suggested by such words as *eidōlon* (image) and *skia* (shadow), which unambiguously indicate that the dead as perceived by the living were in a very literal sense mere shadows of their former selves."³ Images are insubstantial but nevertheless objective, insofar as the dream is something *seen* by the dreamer.⁴

The rise of figural representation in art leads to the development of a different concept of the image. Vernant argues that the language of plastic forms is unknown in the Dark Ages, with the verb "to draw" (*γράφειν*) continuing to indicate as disparate activities as writing letters and painting figures for several centuries. Archaic religious carved idols, the xoana, do not represent deities in their canonical forms but function as religious artifacts, the contemplation of which serves to initiate the viewer into the invisible world of the divinities. The representational form of the idol thus has not yet reached "full autonomy" and "the boundary is still rather fluid between the xoanon and certain symbolic objects that also bestow a particular religious quality on their possessors."⁵ Early Greek sculptural productions are not images that depict an external reality but objects of cultic contemplation, which draw the individual viewer into a religiously modified state of consciousness.

The public statue, which arises with the institution of the temple as the house of a god in a city, represents a decisive break from the older tradition of symbolic objects. Divinities are now represented conventionally, for display before a viewing public. Thomas Hobbes connects this to the rise of the state, since "before introduction of Civill Government, the Gods of the Heathen could not be Personated."⁶ Vernant agrees with Hobbes, writing: "The statue is representation in a really new sense. Liberated from ritual and placed under the impersonal gaze of the city, the divine symbol is transformed into an image of the god."⁷ The publicity of the statues of the gods allows them to function as physical embodiments of state power.

Statues function in a context in which the human body is gaining importance. The representation of human forms in archaic religious art, sometimes misunderstood as "anthropomorphizing" the gods, valorizes

the human form as a reflection of the divine, a status that develops apace with the civic and religious significance of athletic competition. The spectacle of struggle among naked, masculine bodies stands in for the relations among cities, serving a civic and religious function, in which victory consecrates the victor.⁸ Nicholson argues that athletic victory serves as a sign both of virtue and of divine favor.⁹ From the mid-sixth century to the mid-fifth century, victory monuments justify aristocratic political power to a broader public. Indeed, statues of athletic victors erected in temples and other civic spaces were sometimes thought to have special powers, such as the ability to cure fevers.¹⁰ The valorization of human form thus corresponds to a political culture in which aristocracy is represented as a divinely sanctioned form of rule.

The mimetic function of the image develops initially in funerary sculptures, which in the late sixth century were erected to reproduce the lost beauty of the dead. In the late archaic period, this practice loses its religious meaning but gains a new significance, in which statues serve as imitations or copies of a living body. Vernant writes, “For the image to acquire the psychological significance of a copy that imitates a model and gives the spectator an illusion of reality, the human figure must have ceased to incarnate religious values; in its appearance, it must have become in and for itself the model to be reproduced.”¹¹ This loss of ritual significance by symbolic objects and of religious meaning by the human body gives rise to the mimetic function of statuary, in which the image is a mere semblance of a freestanding reality.

The mimetic function of artistic images gives rise to an anxiety, portrayed dramatically by Euripides in Admetus’s speech to his dying wife, Alcestis. “Represented (εἰκασθῆν) by the hand of skilled craftsmen, a figure shall be laid out in my bed. I shall fall into its arms, and as I embrace it and call your name, I shall fancy (δόξω), though I have her not, that I hold my dear wife in my arms, a cold pleasure, to be sure, but thus I shall lighten my soul’s heaviness. And perhaps you will cheer me by visiting me in dreams. For even in sleep it is pleasant to see loved ones for however long we are permitted.”¹² Here the funerary image is a replica of Alcestis, built to replace her in the bed of her bereaved husband. The state of fancy that image stirs in Admetus is not unrelated to dreaming of his deceased wife: both are fleeting and unreal but somehow relieve his soul of the burden of her death. Gombrich characterizes this image as inculcating a “dream for those who are awake.” For Gombrich, this discovery of a “twilight realm” of waking dreams marks the beginning of an emancipation of consciously constructed fiction from myth.¹³ This eventually leads to the Platonic anxiety about the untruthfulness of images.

These considerations about the development of the concept of the image may be supplemented by considering some social functions possessed by images in the sixth and fifth centuries in Greece. In what Steiner calls a logic of replacement, an image depicting an object could come to stand in for the object itself. For instance, the manufacture of a statue of a dead person might appease his disquiet spirit by allowing for its symbolic reinternment in a body. In this case, the statue stands in for the absent body. Thus Steiner reads Herodotus's story concerning the deceased Aristeas, whose body disappears but who returns as an apparition (φάσμα) to demand that a monument be erected in Apollo's grove, to assume a power of statues "to actualize the individuals' power at the site and to make it continuously accessible to those who have erected the monument."¹⁴ The continuance of this power is made possible through the replacement of the living body of Aristeas with his memorial statue. A related, political function of images is suggested by an inscription recording an explicit social contract of seventh-century Greek colonists in Libya. According to this inscription, the colonists burned wax images (κολοσσῶν) while stating, "May he who does not abide by this agreement, but transgresses it, melt away and dissolve like the images, himself, his seed, and his property." As Steiner points out, "the efficacy of the ritual depends on the statuettes' capacity to re-present the oath takers, and not merely to symbolize but rather to prefigure the perjurer's eventual fate."¹⁵ Finally, there is a fixative function of imagery, in which an image (εἰκῶν) traps a restless ghost or repels it from the site it haunts, such as the place in which the person had died. Crucially, such an image is made not of the original living body but of the ghost itself, exorcising the invisible apparition by giving it substance.¹⁶

These athletic, religious, and spiritualistic functions of produced images did not escape criticism by philosophers. Empedocles describes artists' paints as narcotics (φάρμακα) by which they supply a whole world of likenesses.¹⁷ One finds a more iconoclastic sentiment, directed against both bodily valor and the religious significance of the human figure, in the late archaic fragments of Xenophanes of Colophon. The sixth-century wandering poet complains that having good boxers, pentathletes, wrestlers, fast runners, "not for that reason would the city be any better governed."¹⁸ By pointing out that athletic accomplishment does not lead to better governance, Xenophanes criticizes the games and suggests that athletic *agon* is not a suitable model of civic virtue. Xenophanes also writes against the anthropomorphized conception of the gods: "There is one god, greatest among gods and human beings, not at all like mortals in form, nor yet in mind."¹⁹ The greatness of god, far from stemming from his likeness to humankind, is understood in his

dissimilarity to us. Xenophanes worries that “mortals believe that gods are begotten and have clothing, voice, and body like their own.”²⁰ Such characterizations are ridiculous since “Ethiopians say that their gods are snub-nosed and black; Thracians say that theirs have blue eyes and red hair.”²¹ Xenophanes’s primary reason for rejecting this anthropomorphic religious imagery is its arbitrariness, which degrades the divine. In portraying the gods as snub-nosed and dark-skinned, or with red hair and blue eyes, artistic representation misses the crucial point that divinity consists in what is superior to and not shared by mortal men.

Xenophanes’s polemic against the anthropocentrism of representational art, at its most extreme, becomes farcical. Supposing that the artistic representations of divinity are based on the bodies of those who make them, he considers a situation in which nonhuman animals could make their own representations of the gods.

If oxen and horses and lions had hands,
And could draw (γράφαι) and bring about works (ἔργα τελεῖν) like men,
Horses like horses, and oxen like oxen,
Drawing forms of the gods (θεῶν ἰδέας) and giving them bodies (σώματ’
ἐποίουν),
These would be just like the one that each of them has.²²

If horse- and ox-shaped gods are ridiculous, then portraying gods in human form is equally absurd. This critique of religious imagery is directed at the image’s function as a reproduction of the familiar, in this case the bodies of the imagined animal artists. Just as the animals, when given hands, bring to completion drawings that reflect their own bodies, the work of human hands represents not the invisible, true god but the visible human form. Allegedly sacred images are revealed as cheap copies of human bodies, mere semblances of the divine.

Dressed in attractive poetic language, Xenophanes’s anti-anthropomorphizing arguments are severe and comprehensive. Not only does he attack the civic function of the body and the religious meaning of statuary, but poetry becomes an object of critique. Xenophanes testifies that “both Homer and Hesiod ascribed to the gods all things that evoke reproach and blame among human beings: theft, adultery, and mutual deception.”²³ The greatest poets put the gods in human attitudes, attributing to them not just human shapes but also human flaws. Xenophanes reveals the absurdity of this error. Thus the relation between truth and graphical representation, whether in artistic drawing or poetic writing, is a point of contention a century and a half before Plato, who refers in his own work to the “ancient quarrel between philosophy and poetry.”

Plato follows Xenophanes in criticizing Homer, the first of the “initia-
 tive poets” (*Pol.* 607b, 600e), and in focusing his polemic on the un-
 truthfulness of imitative poetry and its consequent ability to replace be-
 ings with mere semblances. Yet Plato’s polemic in the *Republic* radically
 transforms Xenophanes’s iconoclasm. Plato’s opposition to oral culture
 required him to distance himself from the language of the Homeric tra-
 dition.²⁴ Thus, Havelock argues, the movement of the psyche in Plato’s
 work from the many to the one or from “becomingness” to “beingness”
 corresponds to “a conversion from the image world of Epic to the ab-
 stract world of scientific description, and from the vocabulary and syn-
 tax of narrativised events in time towards the syntax and vocabulary of
 equations and laws and formulas and topics which are outside time.”²⁵
 If for Xenophanes the religious image was problematic in that it corre-
 sponded to the prejudices and false conceptions of its producers, for Pla-
 to the image has a peculiar metaphysical standing as an imitation, a sta-
 tus defined in relation to the unchanging reality it purports to represent.
 Tying this disparagement of the image to Plato’s elevation of the idea,
 Havelock concludes that “it is fair to say that Platonism at bottom is an
 appeal to substitute a conceptual discourse for an imagistic one.”²⁶ If this
 is correct, then Plato’s understanding of figural representation consti-
 tutes a complete reversal from that of the early archaic period: whereas
 the image once served the ritual function of drawing its perceiver into
 the higher world of the gods, for Plato the image becomes a mere sem-
 blance of a semblance, at “a third remove” from nature (*Pol.* 597e cf.
 602c). Plato’s rejection of the image as faithful representation of reality
 leads him to suggest that beings must lie outside of the perceptible realm
 altogether. Plato’s rejection of images is therefore bound up intimately
 to a conception of appearances as misleading products of perceptual in-
 tercourse with the world.

How is Plato’s critique of imitative art related to his conception of
 appearances? In *Republic* X, Socrates explains to Glaucon how images
 derive from appearances.

“Consider (σκόπει) this: about what is painting (ἡ γραφικὴ) made
 (πεποίηται) in each case? Does it imitate (μιμήσασθαι) being as it is (τὸ
 ὄν ὡς ἔχει, μιμήσασθαι) or the apparent as it appears (τὸ φαινόμενον
 ὡς φαίνεται)? Is it an imitation of appearance or of what truly is
 (φραντάσματος ἢ ἀληθείας οὐσα μίμησις)?”

“Of appearance,” he said.

“Then imitative art (ἡ μιμητικὴ) is far from truth, it seems, and be-
 cause of this can enact everything, so that it hangs onto an aspect of each
 thing, and this is the image (εἶδωλον). For example, we say that the fig-

ure painter will paint (ζωγραφῆσει) from life a cobbler, a carpenter, and other craftsmen.” (*Pol.* 598b)

There are two distinct concepts at work here, which are sometimes misleadingly conflated or treated as interchangeable in translations. The image is a human “production” or “imitation” of a natural form. The appearance is the product of a perceptual episode. Plato explains that images derive from appearances. Appearances, however, arise not through art but by our nature as embodied creatures that inhabit certain perspectives and perceive particular features of objects such as magnitudes, shapes, and colors.

The argument of the passage begins with the premise that what is imitated in figurative art is not an idea but a sensible particular, a “thing.” Plato elsewhere considers as examples the sun, things in the sky, things on the ground, people, animals, manufactured items, and plants (*Pol.* 596d–e). The question is whether the painter imitates the thing as it truly is, or an appearance of the thing. The interlocutors agree that imitative art copies only a thing’s appearance, providing the basis for the view that images are “further” from a thing’s nature than the perceptual episode in which the thing appears. Intermediate between the artist’s image and the reality it purports to represent is the appearance, which is imitated by the artist. The comparative freedom of imitative art, its ability to produce everything, hanging on to only an aspect of what is real, therefore corresponds to its distance from being. Like the mirror that merely reproduces a thing’s appearance, the figure painter produces an appearance of an appearance (*Pol.* 596d–e). Plato concludes that “the maker of the image knows nothing of the being, but only of the appearance” (*Pol.* 601b). Rather than seeing nature as it is, the painter inhabits a single and partial perspective, which is merely reproduced in the painting.

Plato’s argument is sometimes criticized for assuming that art must take all its suggestions and materials from nature.²⁷ But whatever one thinks of that premise, it is clear this passage takes images to derive from appearances. The language of appearance used here has different parts: *phainomenon* indicates an object’s appearance in a perceptual or quasi-perceptual episode; *phantasma* indicates the particular episode in which this object is given. Plato thus speaks of something’s being given “as an appearance” (ὡς φαίνεται) to indicate the unreality or unreliability of the way in which it is presented. Plato argues that there must be a nonrational power of the psyche set over appearances (*Pol.* 603a). For Plato, this power must be perceptual, since false appearances arise paradigmatically from episodes of visual error. A magnitude’s appearing unequal from nearby and from afar, something convex appearing concave

due to the colors and shading of paints, a straight stick appearing bent in water, irregularities in size, shape, and color—are all cases of such misperception. Plato uses only visual examples but insists that appearances exist “not only in the case of visual objects, but in objects of hearing too” (*Pol.* 601b). Thus, Plato takes appearance to be the product of a perceptual episode that causes a confusion (*ταραχή*) in the psyche (*Pol.* 602c–d).

Turning to the arts, Plato is concerned to show how images exploit this natural confusion, and hence affect our nature “as if by witchcraft” (*Pol.* 602d). The central feature of Plato’s critique is directed to the “images of virtue” (*Pol.* 600e) in tragic poetry, which held so much political and religious importance in his time. Like appearances, images for Plato are not internal states of the psyche but are external, having the *effect* of throwing the psyche into confusion. For Plato, while images of virtue have psychological relevance, they are not generated in the psyche. Rather, irregularities of size, shape, and color themselves are taken to be objects of perception. Consequently, for Plato, visible things include both “the kinds of things that are about us,” such as animals, plants, and manufactured goods, and “semblances” (*εἰκόνες*), which include shadows, appearances (*φαντάσματα*) in water, reflections (*φανὰ*) on hard, smooth surfaces, and “all the things like that” (*Pol.* 509e–510a). Whatever the metaphysical status of visible objects in the *Republic* may be, Plato takes it that appearances—*phantasmata*—are perceptual errors or irregularities that mislead and confuse the psyche, which are not themselves states of the psyche. In conceiving appearances and the images derived from them in this way, Plato suggests that when one misrepresents how things are, the deception is to be attributed not to one’s psyche but to the world that presents itself to one.

I have been arguing that *phantasmata* in the *Republic* are not psychological states but products of observing the changing world. Other texts in the Platonic corpus corroborate this nonpsychological interpretation. Consider the section of Plato’s *Sophist* (235d–236c) in which the Athenian Stranger divides imitative art into *eikastikē technē*, which reproduces the true proportions of an original paradigm, and *phantastikē technē*, which distorts those proportions to present things to the viewer in a certain way. These terms evidently have a different sense here than their cognates have in the *Republic*: *εἰκαστική* means “copying” while *φανταστική* means “perspectival.” The former techniques are demanded in constructing a scale model of a building, where accuracy is crucial, whereas the latter is used to great effect in Michelangelo’s *David*, in which the unnaturally large head *looks* proportional and thus beautiful to those who view it from a couple of meters below. Here, too, however,

Plato employs *phantastikē* as a descriptor, not of the psyche of the viewer but of the artist's technique and resultant work. Michelangelo's *David* is *phantastikē* in that it is apt to deceive one in a pleasing way. This deception originates in Michelangelo's technique, not in the viewer's psyche.

There is one passage in Plato's *Philebus* (38c–39c) that seems to propose a psychological theory of mental imagery. When one sees something dimly in the distance, one might wish to discern (βούλεσθαι κρίνειν) what it is (38c). For example, one might observe a figure (φανταζόμενον) under a tree. One then performs the identification of the figure by asking a question of oneself (“What is it?”) and by answering that question (“It is a man.”). When the question is answered correctly, one forms a correct opinion about what one perceives. This process of identification through the asking and answering of questions suggests that the psyche is like a book, in which verbal descriptions are recorded. Plato understands these verbal descriptions to be affections that appear in the perceiver (παθήματα φαίνονται) due to the work of perception and memory. The conclusion of this line of thought is the striking metaphor that whenever one forms a true or false belief, there is a scribe who writes words in the psyche (παρ’ ἡμῖν γραμματεὺς γράψῃ) (39b). The description of mental imagery follows as an addendum to this account of perceptual judgment: when the words are written, another craftsman (ἕτερον δημιουργὸν) in the psyche produces an illustration of the scribe's description. This other craftsman is a scene painter (ζωγράφον), who draws (γράφει) images (εἰκόνας) in the psyche after the scribe records the words. Both the verbal descriptions and the images that accompany them represent past and present objects, as well as future possibilities and expectations, such as hopes for future pleasures (39d–e).

This passage is sometimes considered to employ a concept of imagination. But the psychological images invoked in this passage are taken to emerge *after* the perceiver has apprehended an appearance and given a verbal description of that appearance to himself. So, the images of Plato's account cannot play a causal role in cognition but merely reflect the truth or falsity of the antecedent phantasmata. Moreover, the phantasmata are understood as presentations from the world, which impress themselves on the perceiver, rather than products of a psychological power. Even if one lacked a painter in one's psyche, the world might still present a thing to one falsely, leading to a false verbal description. Moreover, Plato treats appearances and images as distinctive phenomena, which cannot be equated. Thus, it seems that Plato does not here postulate a power of the psyche that produces of appearances but consistently ascribes appearances to the world. Nevertheless, Aristotle's psychological theory is evidently informed by Plato's writings and by ideas he encountered

during his twenty years in the Academy. In this sense, one can say that Aristotle's theory of imagination as a psychological power stems from taking Plato's craftsman to have mastered the *phantastikē technē*.

This point can perhaps be strengthened by comparing it to another pre-Aristotelian psychological doctrine that might be taken to offer an incipient account of the imagination. According to later reports, the atomists have a materialist theory of sense perception, in which images play a central role. On this theory, both thinking and visual perception consist in the apprehension of images (εἶδολα). Democritus employs the technical term *emphasis* to demarcate this sort of image, as opposed to, for example, the images produced by painters. According to this theory, images are able to represent objects to a subject because they share a form with visible objects. However, upon close inspection, it turns out that these images are not psychological items. Rather, they are impressions in the air, which arise between the object seen and the sense organ.²⁸ These images continually stream off of visible objects, and are hence from "outside" the perceiver.²⁹ Thus, while there is a tradition preceding Aristotle that understands perceptions to be representational or depictive, the agency responsible for producing and presenting them is invariably something outside the psyche.

Why do ignorant or inexperienced people tend to be deceived more often and more easily than those who are experienced and knowledgeable? The answer, according to this nonpsychological interpretation of Plato's account of images and appearances, is that everyone is subject to false appearances. The straight stick in water looks bent and Michelangelo's *David* seems proportional even to experienced and knowledgeable people. The difference is that the experienced or knowledgeable person, unlike his foil, has learned not to trust all appearances, and thus doubts that the world is always as it appears to be. Plato's discussions of images and appearances aim to dispel the misconception that things are always as they seem. In these dialogues, Plato offers a vision of philosophy as the path of liberation from the tyranny of seeming, an escape into reality.

If representational art and tragic poetry elicited a reactionary response from Plato, the Sophists provided a more direct challenge to the possibility of knowledge of an independent reality. Consider Protagoras's claim in his book *On Truth* that "of all things, the measure is man, of the things that are, that they are, and of things that are not, that they are not."³⁰ This maxim is humanistic in the sense that it makes each human being the criterion of what is and is not. It is relativistic in that it sets down appearance alone as what makes the truth for each person.³¹ Protagoras thus proposes to replace the concept of truth with a concept of

utility, according to which knowledge and expertise are to be judged by their usefulness to mankind.³² Thus, Protagoras could describe his doctrine as “the art of politics” since by his criterion of utility he could teach political expertise.³³ Sophistical humanism and relativism consequently dispenses with any absolute or superhuman criterion, not only for truth but also for beauty and virtue, and attempts to reconstruct them on non-theological, purely human grounds.³⁴ Plato’s critique of Protagoras is a response to a crisis in Greek thought brought on by the rise of sophistical rhetoric.³⁵

Plato resists this humanistic and relativistic doctrine by arguing that something’s appearing to be the case is insufficient for it actually being the case. In the *Theaetetus* (152a–c), he interprets Protagoras’s humanist maxim to be equivalent to the view that any given thing “is to me such as it appears to me and is to you such as it appears to you.” This entails that the perception that something is hot or cold is always veridical, so that knowledge is appearance (φαντασία) and perception. Protagoras must consider the question of what something is like, apart from what it is like for one person or another, to be senseless.³⁶ However, according to Plato, Protagoras undermines his own argument. If each person has the sole authority to decide what he ought to think, there is no reason to give credence to any argument, even to arguments of experts such as Protagoras himself.³⁷

Regardless of whether this refutation is valid, it rests on a rejection of the view that appearance and perception are sufficient for knowledge. Knowledge, it seems, requires something more than perceptions and true opinion. Indeed, Plato’s epistemology can be understood as attempting to establish, against the Sophists, a disjunction between reality and appearance. Reality is grasped by the sciences. But how something appears to one, how it seems, how it looks, is insufficient for knowledge. An unbridgeable chasm appears between the Sophistical enterprise of producing conviction in an audience and the philosophical and scientific project of gaining true, scientific knowledge of reality. Consequently, while the move toward formalization in mathematics antedates Plato’s philosophical reflections, scientific geometry emerges in Plato’s time as a privileged field for a philosophical battle between sophistry and science.³⁸

The Sophists themselves lead the attack against the geometers. Protagoras claims that when a straight line intersects a circle, they touch not at a single point but across a segment (*Met.* 997b35–998a4). Thus, a geometrical proof that takes intersection at a point as a premise must be false. Indeed, in any drawn figure, a straight line always appears to intersect a ring along an extended segment. If all appearances are true, then it follows that the line in fact intersects along a segment, refuting

the geometer. Another sophistical refutation of the geometers is reported by Aristotle (AnPr. 49b35–37, AnPo. 76b39–77a3, *Met.* 1078a17–24, 1089a21–25). Suppose a geometer draws a line, asserts “this is a foot,” and demonstrates a geometrical proposition. The objection is that since the unit line is not a foot long, the proposition rests on a false premise. The proof is refuted on the nongeometrical grounds of what is perceived by the objector. Yet another example, due to Aristippus, criticizes mathematicians for not explaining the cause of their results (*Met.* 996a29–31). Because geometers cannot say what agent makes a proposition true, they do not possess real knowledge.

These objections amount to a challenge to philosophy to establish grounds, outside of perceptual appearance, for the capacity of geometry to give knowledge to its practitioners. Yet a return to the early view of geometry as a practical art of earth measurement is out of the question. Consider Herodotus’s report that geometry was invented in Egypt as a way to calculate taxes. When the Nile encroached into previously surveyed parcels of land, a method was needed to account for the extent of the loss, and thus to calculate the new, proportionally reduced tax on the holding.³⁹ This is of no avail against the Sophists, whose objections are directed against the epistemic status of geometry. For the calculation of the taxable area would come down to how it appeared to the surveyor who made the estimate, rather than to any fundamental scientific principle. What is needed was not the return to an understanding of geometry as a craft of calculation but an independent grounding for a truth of geometry, a scientific ontology that deflects objections made on the basis of a perceptual appearance.

Plato’s response to this problem is to postulate an independent foundation for geometrical knowledge, which divorces geometrical results from any grounding in appearance. Although he may draw a figure, for example, of a line intersecting a circle, the geometer directs his attention not to the perceptible line and circle but to the “line itself” and the “circle itself.” The latter, indivisible figures, cannot be seen “except by means of discursive thought” (*Pol.* 511a1). Consequently, Plato argues in the *Republic*, insofar as geometry is knowledge about what always is, and not of what comes to be and passes away, education in geometry is beneficial, turning the student’s soul toward truth and being (*Pol.* 526e, 527b).

Plato gives a powerful example of the difference between reasoning about perceptible figures and reasoning about intelligible figures in the *Meno* (75b–76a), in a passage in which Meno asks Socrates to define shape. The first, “naive” definition proffered by Socrates is that shape is the only thing that always accompanies color. The second, “technical” definition, prompted by Meno’s objection that the first assumes one

must already know what color is, is that shape is the limit of a solid. The latter makes use of a general concept of limit and explicitly draws on the geometrical concepts of surface and solid, of which Meno has sufficient knowledge to understand the definition. The difference between the naive and technical definitions is that the former assumes acquaintance with the particular objects of perception while the latter proceeds entirely from general concepts of geometry, and requires no particular content.⁴⁰

The difference between these two definitions is mirrored in Plato's denial of the possibility of knowledge of sensible things (*Pol.* 529b). The philosopher is concerned with objects of the race of the intelligible and who is able to grasp what is "always the same in all respects," while the nonphilosopher "wanders among what is many and varies in all ways" (*Pol.* 484b4–7). This corresponds to a division between "theoretical" arithmetic that counts pure units and "practical" arithmetic that counts heterogeneous units.⁴¹ For example, commercial transactions require practical calculation (*Pol.* 525c-d), which is concerned with heterogeneous objects such as cattle or soldiers. Its theoretical counterpart, pure arithmetic, concerns only things that are homogenous or perfectly like one another (*Philebus* 56d–e, cf. *Met.* 1080a20–23).

According to Aristotle, Plato was made aware of the flux of perceptibles from his acquaintance in his youth with the Heraclitan teachings, which, when combined with the dialectical method of Socrates, led him to conclude that it is impossible to give common definitions of perceptible things, since they are always changing (*Met.* 987b6–7). Since it makes no reference to perceptible things, the geometrical definition of shape can serve as the hypothesis of reasoning that gives knowledge of what always is, while the naive definition does not give knowledge but concerns heterogeneous things, whose colors are Empedoclean effluences "commensurable with sight and perceptible by it" (*Men.* 76d). In other words, the definition of perceptible shape speaks only about the race of the visible while the definition of geometrical shape concerns the race of the intelligible (*Pol.* 509d8).

This distinction between changing sensible particulars and permanent intelligibles gives rise to the ontological question concerning mathematical objects—namely, whether they are to be identified with forms, or whether they are neither forms nor sensible particulars, but are "intermediate" between them.

The doctrine that mathematical objects inhabit a third domain, between perceptible particulars and unchanging forms, is a matter of some debate. Tait argues that there is "no room for intermediates" in Plato's *Republic*, where there is a strict division between the opinable (δοξαστόν)

and the knowable (γνωστόν). Plato takes powers of psyche that accomplish the same thing to be the same power, while if they accomplish different things, they are different powers (*Pol.* 477c–d). It follows that knowledge and opinion are different powers, and thus that the knowable is not the opinable (*Pol.* 478a–b). Since the forms are the objects of knowledge, it is impossible that there be intermediate entities besides them, which are also objects of knowledge.⁴²

Yet insofar as Plato makes a distinction in the upper part of the divided line between discursive thinking and intellect, he opens the possibility of reasoning about knowable objects in two distinct ways, either from hypotheses to conclusions or from hypotheses to a nonhypothetical first principle (*Pol.* 510b). Since we form propositions and make inferences in virtue of discursive thinking rather than intellect, geometry must have a hypothetical method. Thus, Cornford argues that the concept of hypothesis arose originally in a didactic situation, in which a teacher's assumptions were "put to the learner in the process of instruction." By accepting such assumptions, the learner comes to appreciate how the teacher's argument hangs together, and in this sense hypothesis rests on a "kind of agreement between the teacher and pupil."⁴³ Before the Euclidean codification of geometry, which reduces the assumptions necessary for geometry to the fewest possible, this would have been the natural way for geometers to proceed.

Following Aristotle (*An.Po.* 70b23–34) in distinguishing hypotheses relative to the learner from those that serve a technical function as principles of a science, Cornford holds that hypothesis typically has the technical ("absolute") sense in passages in the *Republic* discussing the sciences (510c) but also retains its original sense in certain instances (533c).⁴⁴ Likewise, Lee identifies technical hypotheses with Euclidean postulates, as suggested by Proclus.⁴⁵ In any case, the divided line represents intellect as nonhypothetical, so that what is grasped is known in a more fundamental sense than what is accepted merely hypothetically.

Even if the relation between the species of cognition represented in the divided line remains mysterious, it is clear that the division between the knowable and the opinable in the *Republic* does not foreclose the possibility of different types of reasoning about the objects of each realm. Reeve argues that the intelligible contents of discursive thinking cannot be forms, both because the powers set over each section of the line differ insofar as they are set over different things, and because the powers are said to differ in clarity.⁴⁶ Plato identifies the geometer's state of mind with discursive thinking, which is intermediate between opinion and intellect. Reeve calls these intermediate objects "figures."⁴⁷

How these figures relate to the sensible and the intelligible parts of

the divided line remains unclear. The line could be taken to divide either objects, methods of procedure, deductive or intuitive movements of thought, or states of mind.⁴⁸ For example, Hackforth argues that the purpose of the divided line is not to contrast objects but methods of attaining knowledge about objects.⁴⁹ Thus the division of the intelligibles does not postulate mathematical intermediates but sets in opposition the imperfect method of hypothesis with the perfect method of dialectic. Hackforth's interpretation hinges on taking the "ascent" from hypotheses (*Pol.* 533c–d) as not indicating the shift of the inquirer's interest from one set of objects to another but rather in a perfection of the method in inquiry.⁵⁰ There is no obvious way of dividing the ontological, epistemological, and logical interpretations of the line according to criteria given in the *Republic*. Hence while Plato's procedure is surely "methodological," in that it opposes the activity of the mathematician to that of the dialectician, Burnyeat is right to observe that the *Republic* leaves the question concerning the ontological status of mathematical objects " tantalizingly open."⁵¹

Cross and Woosley find the purported doctrine of intermediates to promise a remedy for an important difficulty.⁵² Suppose that two triangles on the same base between the same parallels are proved to have an equal area. The triangles cannot be the sensible triangles drawn by the geometer, since his thought is not directed toward these images but are mere aids in making his demonstration (*Pol.* 510d–e). But nor, if forms are unitary, can the triangles be the form of the triangle, since the creator made each thing one in nature (*Pol.* 577d). This dilemma would seem to be resolved with the postulation of intermediate objects, since the figures grasped by discursive thinking would be extended and multiple like perceptibles, allowing for reasoning about multiple triangles, but would also be unchanging and perfect, so that their areas could be exactly and hence truly equivalent.⁵³ Yet there is no clear reference to intermediates in the *Republic*, nor in any other dialogue. Considering just the textual evidence of the Platonic corpus, they conclude that the objects of the third section of the divided line must also be forms.⁵⁴

The concern of these twentieth-century scholars to refrain from attributing anything to Plato not explicitly contained in the text of the dialogues was not shared in ancient times. Aristotle's attribution to Plato of the view that mathematical objects are neither sensible things nor forms but are "in between, differing from the sensible ones in being eternal and unmoving, and from the forms in that there are many of them alike; but each form is itself singular" is the source of the doctrine of intermediates (*Met.* 987b14–18, cf. 992b15–18, 1077a9–14). Aristotle makes use of this doctrine in his own division of theoretical philosophy—into

natural, mathematical, and theological branches—which assumes an intermediate status of mathematical beings between the physical and the divine (*Met.* 1026a19). Similarly, Aristotle writes that “Plato posited the forms and the objects of mathematics as substances, and as a third the substance of sensible bodies” (*Met.* 1028b19–21).

Proclus also characterizes mathematical statements as unchanging, stable, and incontrovertible but as concerning entities that are neither simple, incomposite, nor indivisible (*InEucl.* 3). Thus mathematical procedure is discursive and treats mathematical objects as extended, giving different principles for different objects. Such propositionality entails that mathematical judgments are not made by intellect and that mathematical objects are *dianoeta* (“understandables”) (*InEucl.* 10). Proclus holds that the threefold division of being into intelligibles, mathematical things, and physical things is Pythagorean in origin.⁵⁵ For Aristotle and Proclus, at any rate, Plato’s splitting the race of the intelligible into discursive thinking and intellect in the divided line posits two kinds of intelligibles, both of which are independent of perceptible things.

Although the doctrine of intermediate mathematical objects is not explicitly endorsed in any of Plato’s written works, it sheds light on the positive methodological project of *Republic* VII. Plato there makes a distinction between the pure mathematical sciences of arithmetic and geometry, and the sciences of motion whose objects are grasped by perception since, “as the eyes fasten on astronomical motions, so the ears fasten on harmonic ones” (*Pol.* 530d). Both of the latter sciences are flawed as they are currently practiced since they take the observed motions to be real (*Pol.* 528d–e). Yet observed motions “fall short” of the “true” motions of astronomy, the latter of which “trace out” geometrical figures. Thus, Plato advocates a change in the methodology of astronomy and harmonics from a broadly observational one to one based on geometry, in which physical motions are treated as instantiations of ideal, unmoving geometrical structures (*Pol.* 530b–c, 531b–c).⁵⁶ Underlying what comes to be and passes away is what invariably exists. The sciences of things in motion, if they are to render knowledge at all, must render it in geometrical form, since geometry is “knowledge of what always is” (*Pol.* 527b). While astronomy concerns things that are in motion, it should describe these objects with geometrical figures, rooting them in stable and unchanging truths. By rendering statements about the world of becoming in the language of being, the validity of inferences is guaranteed. Plato proposes, in other words, that the natural scientist should approach each phenomenon as an instantiation of intermediates and should direct his attention to the exact properties of those mathematical structures in making further inferences.

While Plato did not explicitly state the doctrine that mathematical objects are intelligible beings intermediate between the forms and perceptible things in his writings, this doctrine was up for discussion in his Academy. According to Dillon, Speusippus derived the universe from two principles. The One, which Speusippus compared to a seed, is the principle that is “before” being. Multiplicity is a fluid diversity that facilitates division into beings and allows the One to be expressed.⁵⁷ The result of this division is a “multi-layered universe” that Aristotle satirized as a “stringing out” of being.⁵⁸ Among the beings were layers of mathematics that were taken to be intermediate between the principles and the animate and inanimate bodies called the “fourths and fifths” (54–55). If Dillon’s reconstruction is correct, Speusippus may be considered to have multiplied the intermediates. Indeed, Aristotle attributes to Speusippus further intermediate ontological categories (*Met.* 1028b21–24).

Aside from constituting a topic of debate within the Academy, the doctrine of intermediacy puts into perspective how Plato thought that sciences of motion could be made intelligible through geometrization. An observed phenomenon could be reduced to a proposition of geometry, and then used as the hypothesis of further geometrical demonstrations. Because Plato conceives of geometry as a science of intelligibles that are not forms, he characterizes geometry as known by discursive thinking. Socrates says to Glaucon that “you seem to me to call the state of the geometers discursive thought but not intellect, discursive thought being intermediate between opinion and intellect,” to which Glaucon replies, “your exposition is most adequate” (*Pol.* 511d). Although the adequacy of this assertion is evidently not as obvious to modern readers of Plato as it was to Glaucon, it is clear at least in the *Republic* that geometry is supposed to operate by taking hypotheses as principles and making deductions from them. Only dialectic, which ascends from hypotheses to the indubitable knowledge of intellect gives genuine knowledge of first principles. Aristotle similarly characterizes geometry as a science that depends on but does not give hypotheses (*Met.* 1005a10; cf. *Meno.* 86e–87b, *Pol.* 510c–d). Aristotle’s assertions about the intermediacy of geometrical objects thus fits well with Plato’s division between the sciences that study motionless things, arithmetic, and geometry, and those that study things in motion, astronomy, and harmonics.

This ontological distinction between perceptible objects and mathematical grounds Plato’s methodological program. By focusing on the geometrical and arithmetic properties of astronomic and harmonic relations rather than their sensory properties, Plato suggests natural sciences can be raised from the perceptible realm to the intelligible. But if the doctrine of intermediates allows for the banishment of motion from

the sciences, a philosophical quandary arises. Given that neither perception nor the other powers can grasp the intelligible intermediates, how are they grasped? The next chapter argues that this question motivates Aristotle's invention of an altogether new power of the psyche—the imagination.