

Aristotelian Materialism

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Abstract I argue that a modern gloss on Aristotle's notions of Form and Matter not only allows us to escape a dualism of the psychological and the physical, but also results in a plausible sort of materialism. This is because Aristotle held that the essential nature of any psychological state, including perception and human thought, is to be some physical property. I also show that Hilary Putnam and Martha Nussbaum are mistaken in saying that Aristotle was not a materialist, but a functionalist. His functionalism should instead be given a materialistic interpretation, since he holds that only the appropriate sort of matter can realize the human psyche. Aristotle's functionalism is therefore best viewed as a "causal functionalism," in which functional descriptions enable us to find the right sort of material embodiment. By sidestepping dualistic assumptions, Aristotle also avoids having to deal with any further notion of consciousness.

Keywords Aristotelian materialism · form · matter

I.

It is fashionable to claim that Aristotle tried to steer a middle path between dualism and materialism. This would be true only if we have in mind Plato's dualism of immortal soul and its bodily prison, as opposed to Democritus' materialism of invisible atoms. The claim is anachronistic, however, if we interpret it to refer to Descartes' dualism of consciousness and matter contrasted to the materialism of modern physics. This is because Aristotle had no theory of consciousness, let alone Descartes' view of matter as simply being spatial extension; and present-day materialism is a far cry from Democritus' unverifiable theory of countless numbers of solid bits of reality moving aimlessly in the infinity of empty space. Aristotle's middle path between Plato and Democritus made use of his notion of Form. What I shall argue is that a modern account of Aristotle's notion of Form yields a theory

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that not only allows us to escape from the dualism of the psychological and the physical, but also results in a plausible and powerful sort of materialism.

Aristotle claimed that all particular perceptible things are composites of Form and Matter. A modern rendering of this general claim is that the properties of individuals do not exist apart from what they are properties of, nor do relations exist apart from the individuals so related. To think that they did exist apart was Plato's mistake. Of anything we might predicate of some particular thing, some of these predications indicate "accidental" characteristics – properties and relations that an individual might acquire or lose without becoming a different individual. Socrates' paleness is an instance of a property that Socrates can replace with ruddiness by staying out in the sun, but he remains the same individual, as he does whether he is sitting, standing, walking in the Agora, gaining or losing weight, or entering in other sorts of relations.

In addition to such accidental properties, there are properties essential to an individual's being what it is. If an individual thing loses these properties it becomes a different individual. To be the statue of Athena Nike in the Parthenon requires of the stone composing it to retain its general shape. If the statue is broken into pieces it is no longer the Athena Nike, but is only its remnants. In the case of living things, the basic essential properties are those that permit nutrition, growth, and reproduction. A plant that loses a property required for nourishing itself withers and dies, and is no longer a plant. For human beings, not only is it essential to have properties necessary for self-nourishment, but also it is essential for them to possess properties enabling them to perceive and to think. Socrates living is a different sort of thing from Socrates dead, for the latter is no longer Socrates but is what he has become – a corpse. If we imagine Socrates to be alive but without the ability to perceive, he turns into a different being – a "vegetable" with human shape. Should we imagine Socrates to retain his ability to perceive, but to lose the ability to think and speak, he has become something else – simply a dumb animal.

The foregoing observations reveal Aristotelian principles of identity and individuation for human beings. The principle of identity – that which allows us to say that the same person persists through time – is a particular body's continuing to have the Form of a human soul. The principle of individuation for humans – that which allows us to distinguish two people existing at the same time – is Matter. Translated into modern terminology, it is the spatio-temporal continuity of a body having properties enabling it to nourish itself, perceive, and think that permits our saying that the same person exists at one time and then another. What allows us to individuate two people having such properties is that each person's body occupies a different portion of space.

II.

Given this modern gloss on Aristotle's theory of Form and Matter, the question of whether Aristotle was a materialist turns on whether the properties essential for perception, affect, and thought are simply physical properties; for it is clear that the properties essential for nourishment and growth are nothing but physical properties. Or we might ask, are the properties essential for psychological attributions to humans solely those that are recognized in modern physical and physiological theory? One way to approach this question would be to ask, for example, whether the property of being in pain is identical with some property of the central nervous system. But this approach is unhelpful for the following reasons. First, there is the problem concerning how we could determine property

identity as opposed to the mere constant conjunction of two sorts of properties. Second, even if we could speak of an identity between physical and psychological properties, it might be argued that in speaking of the physical property we were also referring to the psychological property with which it was identical; and so we would still have a dualism of properties and not any sort of reduction of one property to another.

To escape these problems I shall undertake semantic ascent. Let us speak in terms of predicates, not properties, until we have good reason to believe that our linguistic predication reveals some property or other. A materialist might then speak, for example, of the predicate, “is in pain” and assert that this predicate is applicable solely by virtue of some physical property of the body whose pain it is. Using this tactic, I shall now argue that what Aristotle says about psychological predications is not only compatible with materialism but strongly suggests it.

My argument will presuppose that our main concern in making psychological attributions is an ontological one; that is, we wish to know what these attributions commit us to concerning what exists. A materialist is one whose ontology consists entirely of objects, events, properties, and states that are physical. That is to say that the vocabulary of physics and physiology is sufficient for referring to whatever exists. For a materialist, to make true psychological predications of an individual with regard to desire, belief, hope, fear, and other such propositional attitudes, requires only that some physical particular be in some physical state, or have some physical property, or be undergoing some physical change. To ask what desire is, or what belief is, will mean, “What is essential for our truly predicating desire?” or “What is essential for our truly predicating belief?” A materialist will answer that what is essential for speaking truly in attributing desires and beliefs to people is that there be some physical event occurring in their bodies, or else that their bodies have some physical property or other, or be in some physical state.

Here is what Aristotle says about what is essential in making psychological attributions. He uses anger as an example, saying that the dialectician might define it (or say what is essential to it) as “a desire for retaliation or something of the sort.”¹ But he is insistent in saying that the full definition of anger must run as follows: “Being angry is a particular movement of a body of such and such a kind, or a part or potentiality of it, as a result of this thing and for the sake of that.”² How are we then to account for the desire mentioned by the dialectician as being part of the definition of anger? Elsewhere Aristotle tells us what is essential to desire. It is simply a sort of bodily motion.³ Hence, Aristotle’s full definition of anger does include reference to desire. The desire has just become conflated with what is essential to it; namely, a bodily movement. Thus, truly attributing desires to someone does not saddle us with an immaterial property of desire, since the word ‘desire’ simply refers to a physical event in one’s body.

What serves for desires also serves for attributions of perception, thought, and other psychological characteristics. Aristotle strongly suggests that these others are also movements, when he says: “We say that the soul is grieved, rejoices, is confident, and afraid, and again is angry, perceives and thinks. And all of these seem to be movements.”⁴

¹ *De Anima*, 403a30–31.

² *Ibid.*, 403a26–28.

³ *Ibid.*, 433b17–20.

⁴ *Ibid.*, 408a35–408b1–2. Aristotle later says (408b12–15) that it is better to say that a man does all these things with his soul, but he never denies that these things are all movements.

If they are movements, then they are movements taking place in a body, and so they are physical movements. For Aristotle there is no ghost in the machine. Therefore, the essential nature of each of these activities or affects is to be a physical event.

If physical movements are what actual perceivings, desirings, and thinkings essentially are, we have a theory of episodic psychological items; and this is a materialistic theory. But we may also speak of desire, anger, fear, belief, and many other psychological conditions as non-episodic; that is, when we consider them as standing conditions or states of some individual. My being asleep need not deprive me of my belief that I am a philosopher, or my desire to lose weight. If a particular desiring is a physical movement, and a particular believing is another, what should be said about standing states of desire and belief? It is highly plausible that Aristotle considered these to be physical states.

The argument is this. When speaking of psychological predication in general – for example, in saying that a person possesses belief or desire – Aristotle has recourse to the distinction between what is actual and what is potential.⁵ To say that a person possesses belief is just to say that he has the power or capacity to engage in the activity of believing something or other; and this power is dependent upon properties of one's body or its parts, since there are no bare powers. If this is so, then it is plausible to think that a standing belief or a standing desire must also be a power: the power to believe or desire episodically some particular state of affairs, such episodes being physical events. But these powers or potentialities also require a material basis, for Aristotle. So there must be some body or bodily part responsible for these powers, and that body or bodily part must have some physical property or be in some physical state or other, or else the power could not exist. These properties or states are essential for the power to be what it is; and so it is plausible to think that Aristotle must also be a materialist about psychological states.

III.

A strong case can especially be made for saying that Aristotle was a materialist about sense perception, in which an organ of perception undergoes change by being affected from without. He says that in perception the sense organ receives the Form of the sensible object without the Matter, as wax receives the imprint of a metal ring.⁶ This claim has been the subject of controversy. Some materialistic interpreters have claimed that what Aristotle meant was that, for example, in seeing a red rose one's transparent eye-jelly actually turns red; whereas, those who interpret Aristotle as a dualist claim that the form received constitutes an immaterial awareness of red.⁷ I shall not attempt to adjudicate this dispute. Instead, I shall provide a modern materialistic interpretation of what it is to "receive the Form without the Matter," which, though not literally a doctrine of Aristotle's, is definitely Aristotelian in spirit.

⁵ Cf. *Ibid.*, 412a23–28. Aristotle likens sleep to the possession of knowledge and waking to its exercise. The former is classified as a first actuality of a living body, since in the history of the individual the possession of a characteristic comes before its employment.

⁶ *Ibid.*, 424a18–20.

⁷ For a defense of the materialist interpretation see Richard Sorabji, "Intentionality and the Physiological Processes: Aristotle's Theory of Sense Perception," in Martha C. Nussbaum and Amelie Oksenberg Rorty (eds.), *Essays on Aristotle's De Anima* (Oxford: The Clarendon Press, 1992), 295–225. For a recent dualist interpretation see M.F. Burnyeat, "Is an Aristotelian Philosophy of Mind Still Credible? A Draft," *De Anima*, 15–26.

Suppose we understand Forms to be properties possessed by particular perceptible objects, some among which are essential to the identity of that object. Suppose further that we can truly predicate “is red” of the surface of some object. That we can do so entails that there is some property in virtue of which that predication is true. We then look to our best physical theory to tell us what that property is. Perhaps our best physical theory then tells us that the color red is a particular wavelength of light reflected by the surface of the object whose property it is.⁸ Just as there are certain properties essential to an individual’s being the natural kind of thing it is, there are also essential properties that make a natural kind of thing the *kind* it is. To be a kind of thing like gold, for instance, is to have an atomic weight of 79; and to be a kind of thing like color is to be a certain wavelength of light either emitted from a physical object or reflected from its surface.

If we consider a red rose, one of its visual “Forms” is a reflective property of the surface of an object registering a wavelength at the red end of the color spectrum. Another such visual Form is its shape; but it is color that is the “proper” object of sight, since one can see shapes only by seeing colors. In “veridical” visual perception (which, for Aristotle, was a pleonasm) the eye need not “take on” the same shape and color of the object seen, but need only be receptive to them. What this might mean in modern terms is that, in seeing red, the wavelength of light reflected at the surface (the object’s visual Form) must match the wavelength that enters the eye. Otherwise, there is sensory illusion. In the case of shape, what is received will be an image on the retina having that general shape.

What serves for colors and shapes can also accommodate sounds, tastes, smells, and also tactile properties such as heat, cold, rough, and smooth. In hearing, the ear is receptive to sounds; but sounds are essentially waves that travel through the air and are captured by the ear. In hearing a sound, the ear receives the wave produced by the sounding object. In perceiving a taste, the tongue is receptive to what is bitter, salty, or sweet; but these are essentially molecular properties of objects that are received when different parts of the tongue are activated by contact with these properties. In smelling, different smell molecules are received by way of fitting into the properly shaped receptacles in the nose. In perceiving tactile qualities, one’s nerves receive the structural properties of objects that constitute their roughness or smoothness; and the heat sensors in one’s skin are receptive to the degrees of molecular activity that constitute the essential nature of various degrees of heat.

In explaining how sense perception operates by one’s sense organs receiving the “Form without the Matter,” I have concentrated simply on how the sense organs are affected by physical properties of the perceived objects. But is being so affected all there is to perception? Aristotle himself raises this question with regard to smell, for it seems as if air might be affected by smell and yet the air does not perceive.⁹ Aristotle vacillates concerning whether or not sensible properties can affect other than one’s sense organs, but his final answer is apparently that when air becomes affected by a smelly object it immediately becomes another smelly object of perception, so that smelling is always a species of perceiving. But this answer must assume that at least sometimes there is more to smelling, and therefore to perceiving, than merely being affected by sensible properties. So what is it?

⁸ This cannot be a literal interpretation of Aristotle’s theory of visual perception, since he mistakenly thought of light, not as waves or photons, but as something that served to make the medium of sight (the air between perceiver and perceived) transparent. My claim here as elsewhere is that correcting the scientific mistake leaves the philosophical claim intact.

⁹ *De Anima*, 424b15–18.

The answer seems to lie in Aristotle's thinking that, in addition to being affected from without, perceiving could also be propositional in nature.¹⁰ This would explain his hesitancy concerning whether perceiving might be more than simply being affected by a sensible property. It is plausible to interpret him as thinking that sometimes perceiving is merely to be affected in the appropriate way; whereas, sometimes our perception has propositional content. In other words, he might be pointing to the difference between simply perceiving colors, sounds, flavors, odors, and tactile qualities, on the one hand, and "perceiving that" things are thus and so, on the other. The latter sort of perception, unlike the former, has "intentional" features. For instance, if one perceives a white shape, and that white shape is the son of Diaries, then one perceives the son of Diaries; but if one perceives that a white shape is approaching, then, even if that shape really is the son of Diaries, one need not perceive that the son of Diaries is approaching. In the former case, one needs only to have his eyes affected in the appropriate way. In the latter case, however, even if one has identified what is approaching as a white shape, one need not have identified it as the son of Diaries. The latter case requires, in addition to mere perceiving, that one also be perceptive.

If the distinction between "perceiving" and "perceiving that" is what Aristotle is suggesting, then we have an answer to the question he left us with concerning what more there might be to perceiving besides being affected. Suppose we say that perceiving X , where X is some sensible property, is the same as being affected; whereas, perceiving that P , where P goes proxy for some propositional content, is the same as being perceptive. We can then define "perceiving" in its most general sense as follows: perceiving is being affected by a sensible property on the part of an organism that has the capacity to be perceptive. This perceptive capacity, being part of the perceptual faculty in general, is one shared with non-rational animals; so no thought or belief is required. But, like all perceptual capacities, it has its material basis in the reception of sensible properties by the sense organs.

Aristotle also mentions another sort of perceptual capacity, which is that of being able to *perceive* that one is perceiving.¹¹ But even this higher-level capacity is rooted in what is physical. Aristotle apparently thinks that it is a capacity of the affected sense organ itself; but we might more plausibly locate it farther along in the central nervous system. Aristotle's ignorance of the part the brain plays in perception precluded his locating any perceptual capacities there. But this is a physiological mistake, not a philosophical one. If we provide Aristotle with contemporary neurophysiological theory, his psychological account would not be affected by saying that a person's perceiving that he perceives might be the exercise of a capacity of the frontal lobes of his brain. It also seems likely that it was Aristotle's ignorance of the functions of the brain that led him to say that thinking, unlike perception, required no special organ.¹² His philosophical claim is that in thinking the soul receives the Form of the residue of perception – the residue being mental imagery – without the Matter. But this claim is not one that suffers by making the cerebrum the organ of thought; for this part of the brain could, when affected, serve to enable the properties of perceived objects to become themselves objects of intellection.

¹⁰ See, for example, *De Anima*, 430b29–30 and *Nicomachean Ethics*, 1147a25–30.

¹¹ *De Anima*, Ch. 22.

¹² *Ibid.*, 429a25–27.

IV.

One stubborn problem remains for this materialistic interpretation of psychological attributions. It is the problem that specifically concerns higher-order thinking, or intellection. Aristotle notoriously refers to a sort of thinking that is immaterial in Chapter 5, Book III of *De Anima*. If this sort of thought is really an activity of the human soul, then a completely materialistic account of the human soul cannot be attributed to Aristotle. Some commentators apparently think that he is referring to an aspect of human thought, and those of them who accept a materialistic interpretation of Aristotle tend to dismiss his remarks as being inconsistent with his overall psychological theory.¹³ But there is nothing in Aristotle's remarks about an immaterial "productive intellect" that forces us to think that he is speaking of a facet of the *human* soul at all, for elsewhere he clearly states that all human thought requires imagery, which is itself the result of perception.¹⁴ It therefore seems plausible that Aristotle is speaking of, not human thinking, but thought which is ultimately responsible for whatever human thinking there is: thought consisting of Form without Matter and whose whole essence is contemplation. In other words, the reference appears to be to Aristotle's God.

In Chapter 9 of his *Metaphysics*, Aristotle speaks of divine thought as that which is identical with its object. This is also Aristotle's first "Unmoved Mover," which is ultimately responsible for all that takes place in the natural world. If we grant this assumption, then the Unmoved Mover must ultimately be responsible for human thinking, too, since it is the ultimate explanatory principle for everything natural. Because it is superfluous to have more than one ultimate explanatory principle, there is good reason to identify Aristotle's productive intellect of *De Anima* with the intellectual being of the *Metaphysics*. But if it is to serve as the ultimate principle of everything natural, this intellect must operate outside of nature. So we have the following argument. Either it makes sense to speak of such a non-natural explanatory principle, or it does not. If it does not make sense, then Aristotle's psychology can do without it; for then only naturalistic explanations of human thinking are needed. If it does make sense to speak of such a non-natural intellect, then, since it operates outside the natural world, it cannot be a facet of human thought, but simply its explanatory cause. Either way, Aristotle's productive intellect of Chapter 5, Book III of *De Anima* need not be considered to be part of the human soul.

V.

The foregoing account was intended as a positive defense of an Aristotelian materialism. What follows is intended to be polemical, for there are other contemporary interpretations of Aristotle that require refutation if my own interpretation of Aristotle is to succeed. These other interpretations all hinge on arguing that Aristotle is best considered not to be a materialist, but to be a "functionalist" instead. Hilary Putnam and Martha Nussbaum present a clear statement of this functionalist interpretation of Aristotle.¹⁵ They begin by

¹³ For instance, see Chapter 7 of K.V. Wilkes's *Physicalism* (Atlantic Highlands, NJ: Humanities Press, Inc., 1978).

¹⁴ Cf. *De Anima*, 432a8–10, where Aristotle explicitly says that in contemplation one must simultaneously contemplate an image.

¹⁵ Martha C. Nussbaum and Hilary Putnam, "Changing Aristotle's Mind," in Martha C. Nussbaum and Amelie Oksenberg Rorty (eds.), *op. cit.*, 27–56.

correctly pointing out that, since Aristotle really does not have a “philosophy of mind,” any attribution of one to him has to be an extension of his general hylomorphic viewpoint.¹⁶ As we have already seen, this viewpoint involves saying that reference to any natural thing is always a reference to an indissoluble composite of Matter and Form. To speak of Form is not only to refer to a thing’s shape, but also to its organizational properties. To speak of Matter is to refer to what the thing is made of, ultimately to its chemical composition.

Living things are distinguished from non-living things by virtue of their Form, and it is with living things that the identification of Form with function makes the most sense. That is, what distinguish the living from the non-living are certain functional properties, those that allow the former to reproduce and to take in nourishment. Aristotle thus speaks of plants as having a “nutritive soul,” which we can translate simply by saying that plants have the capacity to ingest food. Of things that can reproduce, take sustenance, and grow, some have the power of movement; and thus they are called animals. Since animals all have the power of perception (which is required in order to recognize their food), Aristotle says that they have a “sensitive soul.” Finally, of those living things having the capacity to perceive, some are capable of rational thought and speech. These are human beings who possess “rational soul,” which just means that they are living beings having properties that enable them to think and speak. All these capacities of living things build on one another. The capacity for thought requires the capacity to perceive, which requires the capacity for nourishment. Thus, Aristotle firmly roots the higher mental operations in lower-level psychological operations.¹⁷

How then do Nussbaum and Putnam propose to “change Aristotle’s mind”? They offer their view as a modern gloss on Aristotle’s Form–Matter distinction and apply it to those psychological states involving affect, consciousness, and all other forms of mentality. The view they advocate is that all these mental states are aspects of a being’s “organization to function.” It is on this point that they propose to make common cause with Aristotle. But how are we to understand “organization to function”? Putnam and Nussbaum say that functionalism teaches us that thinking beings are “compositionally plastic.” This allows us to recognize that:

...all sorts of logically possible ‘systems’ or beings could be conscious, exhibit mentality and affect, etc., in exactly the same sense without having the same matter (without even consisting of ‘matter’ in the narrow sense of elementary particles and electro-magnetic fields at all). For beings of many different physical (and even ‘non-physical’) constitutions could have the same functional organization.¹⁸

It is this assumption of “compositional plasticity” that Putnam and Nussbaum apparently wish to attribute to Aristotle. But is that a fair assumption? I shall argue that this cannot be Aristotle’s view about psychological states. It does not even seem to be consistent with what they say earlier in their article:

...on pain of incoherence we cannot describe the natural functions that are the essential natures of animals and plants without making these functions (even if only implicitly) embodied in some matter that is suitable to them: matter that is not simply an inert background, but the very vehicle of functioning itself.¹⁹

¹⁶ *Ibid.*, 28.

¹⁷ Cf. *De Anima* II for Aristotle’s application of the Form–Matter distinction to different sorts of living things.

¹⁸ Nussbaum and Putnam, *op. cit.*, 48.

¹⁹ *Ibid.*, 32.

I understand this passage to mean that living beings must be equipped with proper bodily organs that enable them to exercise their life functions. With respect to human beings, this implies that not only must they have certain physical properties that permit them to think, but they must also possess bodily organs that allow them to perceive and to eat. Thought processes cannot occur in a body that does not also possess sensitive and nutritive soul.²⁰ If this is so then Aristotle cannot agree with Putnam and Nussbaum that “all sorts of logically possible ‘systems’ or beings” could be the subjects of psychological states.

They have been misled, I believe, by some of Aristotle’s overtly functional explanations of artifacts. A house, for example, might be functionally defined as “...a covering to prevent destruction by wind, rain, and heat.”²¹ With artifacts it seems clear that there is a wide range of “compositional plasticity,” since one can build a house of straw, wood, stone, clay, or other suitable materials. In the same way one can fashion a statue of Athena out of bronze, gold, marble, or anything that will support her Form. If one relies too heavily upon thinking of such artifacts, one can be led to assert, as Putnam and Nussbaum do, that the nature of living things is “to be forms embodied in ever-changing matter.”²² But a living thing is not like an artifact because the former, unlike the latter, has a *nature*; that is, it possesses its own source of change – its “soul” or life principle – that makes it the sort of thing it is. Aristotle describes this soul as the “Form of a natural body which has life potentially.”²³ But a natural body can only have life potentially – or the power to live – when it possesses the requisite organs that allow it to exercise that power. This natural body – the Matter for its soul as Form – cannot then be thought of as “ever-changing” in the way that the water composing a river is ever-changing; for any collection of water molecules might constitute the same river, but not any sort of natural body can be the Matter for soul.

Nussbaum and Putnam also seem to be misled by Aristotle’s analogy between the functions of a carpenter’s tools and the functions of bodily organs – the latter being those “tools” the exercise of which allows a living thing to reproduce, perceive, or think. We are to understand the function of anything as that which it primarily does, or is for. Just as the function of an axe is to cut, so too, the function of an eye is to see, and the function of the heart is to pump blood. Aristotle says that, just as an axe without the power to cut is an axe in name only, so too, a blind eye is not really an eye anymore.²⁴ Nussbaum and Putnam conclude from this that Aristotle meant to give purely functional *definitions* of the bodily organs, so that anything performing the function in question would actually *be* that organ. For instance, a functioning Jarvik heart would then *be* the heart of the person who received it.²⁵

This is a mistake. There is no evidence that Aristotle meant to define the bodily organs solely in functional terms.²⁶ In saying that a blind eye is not really an eye, all he is committed to holding is that it is a *necessary* condition for being a particular bodily organ

²⁰ This is the point of Aristotle’s remark that thinking of soul as capable of inhabiting any old body would be like thinking that you could do carpentry with flutes (*i.e.*, instead of with chisels); *De Anima*, 408a19–22.

²¹ *De Anima*, 403b1–3.

²² Nussbaum and Putnam, *op. cit.*, 29.

²³ *De Anima*, 412a19–20.

²⁴ *Ibid.*, 412b20–22.

²⁵ Nussbaum and Putnam, *op. cit.*, 35.

²⁶ There is also evidence that his preferred definitions for psychological states all contain reference to the *appropriate* Matter. Cf. *De Anima*, 403a25–28, where he says: “...it is clear that the affections of the soul are principles involving Matter. Hence their definitions are such as ‘Being angry is a particular movement of a body of such and such a kind, or a part or potentiality of it, as a result of this thing and for the sake of that.’”

that it be able to carry out its function. Nowhere does he say that it is *sufficient* for something's being a particular bodily organ that it is able to function as that organ does; nor does he ever imply that functional descriptions alone reveal the essential nature of these organs. To grasp Aristotle's point we need only recur to his analogy concerning the carpenter's tools. Even though the function of an axe is to cut, there are many things that also can cut – knives, sabers, saws, and scissors – but these things are not thereby axes. To be an axe requires, not only the power to cut, but also to be fashioned in a certain way out of a circumscribed set of materials. Without this material ground we have no axe, just as without an organ made of living tissue we have no heart. A Jarvik heart is an *artificial* heart, but that does not mean that it is a real heart – no more than a decoy duck is a real duck, or a wooden leg is a real leg. It is simply not made of the right stuff.²⁷

There is little left for Putnam and Nussbaum to agree with Aristotle about with if there is no agreement about the compositional plasticity of psychological states. Despite giving functional descriptions for different sorts of living things in terms of their capacities, and also giving functional descriptions of the bodily organs that allow these capacities to be exercised, Aristotle never gives straightforward functional descriptions of any psychological state. He might explain anger formally as “a desire for retaliation,” or materially as “a boiling of blood around the heart,” but he does not attempt to account for anger merely in terms of its functional relationship to one's behavior or other psychological states.²⁸ Thus, the notion of compositional plasticity is doubly deficient when attributed to Aristotle. Not only does he fail to embrace this notion when actually giving functional descriptions of living beings and their organs, but he never offers any functional descriptions of the psychological states that are supposed to exhibit such plasticity.

Compositional plasticity is an ancestor of “computational plasticity,” a term that Putnam now favors. According to this view of computational plasticity, a psychological state cannot be reduced to a specific computational state any more than it can be reduced to a physical one, since there are indefinite numbers of computational “programs” associated with any one such state.²⁹ Nussbaum and Putnam view this as a further agreement with Aristotle. Since Aristotle had no interest in seeking to reduce what was psychological to anything non-psychological, he might be thought to agree that a given psychological state cannot be reduced to any one sort of computational state; so this would mesh nicely with the computational plasticity that they favor.

The appearance of agreement, however, is an illusion. Granted, Aristotle did not seek to reduce psychological *descriptions* to either physical or functional ones. Each sort of description, he could have agreed, has its own logic. But this is not because he favored computational plasticity over computational rigidity, and associated each psychological state with many computational programs instead of with one such program. It is rather that Aristotle was not interested in identifying psychological states with any sort of computational “program” at all. This is not the simple-minded point that his ignorance of computers prevented this identification. It is rather that if he had done so he would have contradicted major portions of his psychological theory.

²⁷ Aristotle is explicit about this in *Metaphysics*, 1036b3033: “For it is not a hand in *any* state that is part of a man, but a hand that can fulfill its work, which must therefore be alive; if it is not alive it is not a part.”

²⁸ Cf. *De Anima*, 403a25–34. It is clear here that Aristotle's preferred definitions for psychological states always mention both Form and Matter.

²⁹ Nussbaum and Putnam, *op. cit.*, 48–49.

According to his psychological theory, all psychological states that involve one's being affected perish with the body that is their subject.³⁰ Had Aristotle identified the sum total of an individual's psychological states with a myriad of computational programs, then, given compositional plasticity and infinite time, these states (or the soul that encompasses them) would be virtually immortal; for in time they might come to "program" a different body. But, according to Aristotle, one's soul perished with the body whose soul it was. If Aristotle had adopted any sort of computational theory of psychological states, he would have been committed to a virtually immortal soul. What is worse, he would have been committed to the possibility of there being many immortal souls "programming" his own body. Since Aristotle believed that there was no beginning or end of time, thinking of the soul as a set of programs would have entailed the soul's virtual immortality; but his goes blatantly against his view that the human soul is "the Form of the body" and cannot exist without it. Any computational view of psychological state elevates Form over Matter; whereas, Aristotle explicitly says that affections of soul are principles involving Matter.³¹

Aristotle's view that psychological states cannot exist unmaterialized also conflicts with the Putnam–Nussbaum position on a more general level. To say that psychological states are "computationally plastic" is to assume that the same psychological state might be identified with one program in one individual and another program in another individual. But both of these programs are still viewed as abstract structures, needing to be realized in some Matter before entering into any causal relations. Yet Aristotle views psychological states as *themselves* being the effects of some cause; therefore, one's psychological state cannot be identified with any abstract psychological program whatsoever. Putnam and Nussbaum seem to forget that, for Aristotle, it is the nature of psychological states to be concrete, not abstract. If he were to view them as Putnam and Nussbaum do, he would be making the same mistake he attributed to Plato: that of hypostatizing Form. Aristotle does allow that the dialectician can give a formal definition of psychological state without mentioning Matter, but nowhere does he suggest that such an abstract definition reveals the essential nature of that state, as Nussbaum and Putnam seem to think.³²

It can further be argued that any sort of computational functionalism, in which a psychological state is identified with a computational state, is also foreign to Aristotle's logic. It matters not whether it is supposed to be a "type–type" identity, as if was in Putnam's earlier version of functionalism, or whether it is only a "token–token" identity, as it apparently is in Putnam's and Nussbaum's appeal to computational plasticity. This is because the items to be identified are really in different categories. Psychological states are always affections of living bodies, whereas any sort of computational program is a mathematical structure. Therefore, identifying a psychological state with a computational program confounds Aristotle's category of affection with the category of quantity – a category mistake if anything is.³³

³⁰ *De Anima*, 403a5–18.

³¹ *De Anima*, 403a25–26. Form seems to get elevated over Matter in his saying what a particular natural substance is, but even here the reference to Matter is essential. Cf. *Physics*, 194a4–6, where Aristotle says, "Odd and even, straight and curved, and likewise number, line, and figure, do not involve motion; not so flesh and bone and man – these are like snub nose, not like curved."

³² In *De Anima*, 403a29–403b1 Aristotle explicitly says that if the state is to exist at all, its Form must be in Matter of "such and such a kind."

³³ Aristotle lists his categories, or types of predication, somewhat differently in *Categories*, Ch. 4 and in *Topics*, Ch. 9.

VI.

I have argued that computational functionalism is neither plausible nor Aristotelian. Is there perhaps some other functionalist account that is more nearly in line with Aristotle's intentions? One variant is the teleological functionalism espoused by William Lycan, Jennifer Whiting, and K.V. Wilkes.³⁴ Despite differences of emphasis, all these views apparently assume that psychological capacities, processes, and states are to be defined in terms of the role they play in furthering the complex activities of the subject to which these psychological characteristics are attributed. Just as the heart might be functionally defined as an organ that pumps blood throughout an animal's body, a psychological state such as desire might be functionally defined as an inner item that tends to move the animal towards some goal. The question, "What is it?" for a teleological functionalist, is the same as the question, "What is it *for*?" In answering the latter question, it is assumed that there is a wider system in which the item under scrutiny plays a distinctive role.³⁵

In stressing the functional role played by the psychological item, the distinction between role and occupant looms large. No less than with computational functionalism, where the essential nature of the psychological state was distinguished from what might realize that nature, a teleological functionalist is committed to serious possibility of there being various physical (and non-physical) realizers of the psychological state. We have already seen, however, that this "compositional plasticity" is not an Aristotelian notion when applied to human psychology, since Aristotle insists that each psychological trait requires that it be a trait of a living body with the requisite natural organs.

The "role-occupant" distinction of the teleological functionalist also has difficulties concerning what the mental state is supposed to be. If it is the role played, then it faces the problem that plagued computational functionalism. Mental states are intuitively thought to have causative powers, but roles are abstract and have no causal efficacy. If it is the occupant, then we can no longer think that mental states are to be *defined* in terms of their functional roles, as teleological functionalism requires.³⁶

There is a more general problem for teleological functionalism, which is that the definition of any psychological state will turn out to be *relational* in nature, since each state is defined in terms of its functional role, either by relating it to incoming stimuli, to other states of the organism, or to possible behavior. But this shows that a functional definition cannot reveal the essential nature of the state in question; it cannot reveal what it is to *be* that sort of state. Aristotle was well aware of this in claiming that, even though the

³⁴ William Lycan's defense of what he also calls "homuncular" functionalism appears in his *Consciousness* (Cambridge, MA: The MIT Press, 1987), especially in Chapter 4. Jennifer Whiting seems to adopt a teleological functionalism in "Living Bodies," Martha C. Nussbaum and Amelie Oksenberg Rorty (eds.), *op. cit.*, 75–91. K.V. Wilkes offers her version in *Physicalism* (Atlantic Highlands, NJ: Humanities Press, 1978), especially at 55–64. Daniel Dennett also claims allegiance to a sort of teleological/homuncular functionalism in *Consciousness Explained* (Boston and New York: Little, Brown and Company, 1991), 262 and 460. What is common to all these views is that they seek to explain how any psychological system works in terms of the functioning of smaller and smaller sub-systems.

³⁵ For Lycan, the psychological state can itself be viewed as a system in which sub-agencies play their roles in the realization of that state, *op. cit.*, 39–41.

³⁶ Lycan seems to want it both ways: to define mental states in terms of their functional roles, and yet to say that what they *are* is to be explained in terms of the sub-agencies that occupy these roles; *Consciousness* (Cambridge, MA: MIT Press, 1987), 41. I think this is confused. If they are defined in terms of their roles, then it is a purely contingent matter that these roles are carried out by homuncular sub-agencies – or by anything else.

dialectician might define a psychological state like anger formally in terms of a desire to retaliate, its essential nature was that of being a motion of a certain kind.

Elsewhere Aristotle speaks of two types of definition. One of these is “nominal definition,” which is an account of what a name signifies. But there is another sort that gives the essential nature of the item under investigation.³⁷ It seems plausible to think that functional definitions of psychological states are nominal only; that is, they allow us to specify that state in a more or less vague way. Once we have identified the item in our experience, we can conduct a scientific investigation that will result in a “real definition” of essential nature, one that will tell us what that state really is. The mistake of teleological functionalism, then, is that it treats nominal definitions as real definitions. Of course, we need not follow Aristotle here in calling a characterization of essential nature a definition at all. A materialist might be content simply to say that any psychological state that was specified in a vague sort of way can be found after further empirical investigation to be a state of the central nervous system.

This last sentence sounds very much like the statement of the causal functionalism of D. M. Armstrong, David Lewis, and J.J.C. Smart, who claim that mental states might be “topic neutrally” characterized in terms of stimuli likely to bring them about, or behavior likely to be produced by them. But their statement of causal functionalism is in need of refinement. This is because they, like the teleological functionalists, seem to interpret functional specification as revealing the essential nature of psychological states.³⁸ This appears to put things back to front. Instead, it seems best to follow Aristotle’s general line in holding that functional characterizations allow us to *refer* to the state in question, either by showing how it serves the purposes of the living being whose state it is, or else by giving its causal antecedents or consequents.³⁹ Once this state has been roughly identified, the goal of further scientific investigation is to say, with as much clarity as possible, what the essential nature of that state is. I believe that this type of causal functionalism best fits Aristotle’s theory of the human psyche. It is also a plausible materialistic theory in its own right, not only because it seeks to combine the assets of both philosophy and science, but also because it places the operations of the human psyche firmly within a physical setting.

One final criticism stands in the way of this materialistic interpretation of Aristotle’s causal functionalism. A property dualist could agree with Aristotle that there is no ghost in the machine – no mental substance – but still maintain that although all objects, events, and

³⁷ See *Posterior Analytics*, Ch. 10. Here Aristotle suggests that we need to know whether something exists before giving a definition of its essential nature. The nominal definition gives a general specification allowing the scientist to identify something for further study. His example is that of thunder, which is nominally defined as a certain noise in the clouds; whereas, a “real definition” of thunder is the noise of fire being extinguished in the clouds.

³⁸ See D.M. Armstrong, *A Materialist Theory of the Mind* (New York: Humanities Press, 1968), 90–91, where he claims that he is offering a logical analysis of the mental concepts, which is to be followed by a scientific identification of the states so analyzed with states of the brain. David Lewis’ defense of a causal functionalism appears in “An Argument for the Identity Theory,” *Journal of Philosophy* 63: 17–25 (1966). J. J.C. Smart gave his groundbreaking defense of a topic-neutral account of sensations in his “Sensations and Brain Processes,” *Philosophical Review* 68: 141–156 (1959).

³⁹ Teleological functionalists limit their characterizations of psychological states to descriptions of how these states serve the purposes of their subject. This notion of purpose is usually reconstructed in evolutionary terms; that is, in terms of the survival value of that state. (See Lycan, *op. cit.*, 45.) But this restriction on functional characterizations seems too narrow, for it is plausible that some psychological states evolved, not because of their survival value, but merely as “epiphenomena”; that is, as causal off-shoots of something that did have survival value.

states have a physical basis, some psychological events or states possess irreducible psychological properties. What basis have we for saying that Aristotle's theory is best interpreted as identifying psychological items with neurological items, instead of just saying that some psychological events – those having the irreducible psychological properties – stand in a causal relation to neurological events? Those likely to press this objection are those sympathetic to materialism, but who think that the problem of consciousness creates a stumbling block for any completely materialistic view of the mind. If there are irreducible psychological properties, however, then one might take those to be the icing of consciousness on an otherwise materialistic cake. There seems to be no other reason for a causal functionalist to assume such irreducible psychological properties than to account for consciousness.

Such criticism assumes that unless one has a theory of consciousness – something Aristotle lacks – one cannot construct a completely materialistic theory of one's mental life. Even if we supply him with contemporary neurophysiological theory, Aristotle's is too coarse – grained a view to address the problem of consciousness. But here the lack of theory provides a benefit; for the simplest way to defend an Aristotelian materialism against this charge is to deny the Cartesian assumption. Aristotle not only lacks a theory of consciousness, but he has no need of one. It was enough for Aristotle to show how each particular psychological event, state, or property could be given a physical explanation. It then becomes unnecessary to have some further notion of consciousness over and above such events, states, and properties. Faced with the objection of the property dualist, it is therefore plausible to think that Aristotle would reply in wonderment that, since he has explained all that needs to be explained, any further notion of irreducible psychological properties could only be a fiction.