October 5, 1964

Professor Richard Rorty
Department of Philosophy
Princeton University
Princeton, New Jersey

Dear Dr. Rorty:

When I spoke to you on the telephone last spring, I hope I conveyed our interest in having you address our departmental colloquium early this semester. I am writing now to inquire whether it would be feasible for you to spend a day or two on our campus for this purpose in the near future. My hope is that you might have a paper already on hand (perhaps on some topic in classical philosophy) which it might not be too troublesome for you to "put into shape" for us. If so, sometime in the third or fourth week of October or early in November would be a propitious (though by no means only) time available in our colloquium schedule.

We would, of course, pay the travel and living expenses which would be a concomittant of your trip. We are able, in addition, to provide a very modest honorarium, (fifty dollars) for some of our guest speakers--and this would be available to you.

I shall be looking forward to hearing from you and to supplying any further information you may require.

Sincerely yours,

Richard S. Rudner
Chairman

RSR.m

cc: Palmer
Beamrin ✓

November 27, 1964

Professor Richard Rorty
Department of Philosophy
Princeton University
Princeton, New Jersey

Dear Professor Rorty:

Let me thank you, on behalf of the department and myself, for the two copies of your excellent paper on the "Irreducibility of Substance." As you know, we enjoyed very much your recent visit with us and I look forward to seeing you again soon.

Sincerely,

Stefan Baumrin, PhD.

sb/ar

WASHINGTON UNIVERSITY

DEPARTMENT OF PHILOSOPHY

INVITES YOU TO ATTEND A COLLOQUIUM

DR. RICHARD RORTY

DEPARTMENT OF PHILOSOPHY
PRINCETON UNIVERSITY

"ARISTOTLE ON THE IRREDUCIBILITY OF SUBSTANCE"

Monday, November 2, 1964

8:00 P.M.

Liggett Apartment

THE IRREDUCIBILITY OF SUBSTANCE

1. This paper is an attempt to interpret Books Z and H of the Metaphysics in the light of the following outline of Aristotle's assumptions and intentions:

(a) Aristotle thinks that the common-sense view of the world answers the question "What is there?" by saying "There are substances," and that philosophy need not and should not depart from this common-sense view.

(b) 'Substance' is exemplified by men, animals, plants, rocks, stars and pots, and is not exemplified by colors, sounds, nor spatial relationships.

(c) Some of the items mentioned in (b) as being 'substances' are more clearly substances than others. Men, for instance, are paradigm cases of substance. Rocks, however, although obviously substances in comparison with their colors, are far enough away from the paradigm case to be bad examples of substance.

(d) Besides rocks, there are other borderline cases. The referents of terms like "surface" and "circle," for instance, would seem to have some of the marks of substance. (Their names frequently function as the subjects of sentences, there is a science devoted to their study, and -- unlike colors -- they might plausibly be said to be "parts" of, e.g., rocks or animals, and thus

to partake of the substantiality of the wholes of which they are parts.) On the other hand, the referents of these terms are not "things" in the obvious way in which men and rocks are: they are not, to use one of Aristotle's more perplexing terms, "seperable."

(e) Most philosophical error is the result of treating a borderline case of 'substance' as if it were paradigmatic. Specifically, Democritean materialism is the result of attending to such things as rocks, and Platonic formalism is a result of attending to such things as circles.

(f) Once one takes a borderline case of substance to be paradigmatic, as Plato and Democritus do, one will be led to emphasize certain criteria of substance at the expense of others, and to assimilate all cases of what common-sense calls "substance" to one's chosen case. The difficulties encountered in such an assimilation will ultimately lead to an invocation of the distinction between appearance and reality, and to attempts to consign all the features of things which do not conform to one's chosen paradigm to the realm of "mere appearance."

(g) This distinction between appearance and reality tends to make the distinction between substance and non-substance superfluous. Philosophies which invoke the former distinction therefore inevitably drift farther and farther away from the standpoint of common sense.

Instead of including, as common sense does, both fundamental characteristics and derivative characteristics of things, they include within the compass of philosophical explanation only the "real," discarding the "illusory." Because of their initial preference for borderline cases, they relegate cases which, for common sense, are paradigms of substance, to the realm of illusion. Once philosophers realize how far they have departed from common sense, they proceed to drop their original claim to have "analyzed" or "developed" common sense, and instead claim to have detected its "errors." The key error in common sense then turns out to be the substance vs. non-substance distincton itself. In this way, the notion of 'substance' itself gradually disappears from philosophical reflection.

(h) A prerequisite for sound philosophizing is, therefore, the rehabilitation of the notion of 'substance!' If this notion is rehabilitated, then perhaps we can proceed to do justice to those borderline cases of "substance" which reductionist philosophers take as paradigmatic, while nevertheless retaining the standpoint of common sense.

(i) The notion of "substance" can be rehabilitated by showing that it is only in terms of this notion that the notions (e.g., "Form," "atom") taken as central by reductionist philosophers make sense, and that any attempt

to reduce it away can be reconciled with the facts only by tacitly and disengenuously making use of it.

2. The program of rehabilitating "substance" by showing that it is irreducible is carried out explicitly in the Metaphysics (and implicitly in most of the other Aristotelian treatises.) In what follows, I shall be treating the Metaphysics as an argument for the irreducibility of substance, and I shall try to show that this view of the treatise sheds some light on the discussion of substantial forms in ZH. I shall not be trying to defend Aristotle's arguments for the unique status of substantial form (although I think many of them, suitably rephrased, are sound). Rather, I shall be trying to show how the farrago of analyses of apparently unrelated topics, polemics against shadowy opponents, and apparent contradictions which make up ZH fall into a fairly reasonable, and perhaps even plausible, pattern of argument once one views them against the background of the assumptions which I have just outlined. Before turning to what happens in these books, however, I shall try to remedy some of the vagueness in these statements of Aristotle's assumptions by describing in more detail the way in which conflicts can arise about what constitutes a "substance" and what doesn't, and by describing how "reductionist" philosophies emerge out of these conflicts. I shall discuss Aristotle's

two principal criteria for the application of the term ousia (the word which is translated "substance"), and how these criteria come into conflict with one another. I shall call these two criteria the "logical" and the "physical" meanings of "substance."

3. The locus classicus for Aristotle's "logical" definition of "substance" is in Categories, 5:

> Substance, in the truest and primary and most definite sense of the word, is that which is neither predicable of a subject nor present in a subject; for instance, the individual man or horse. But in a secondary sense those things are called substances within which, as species, the primary substances are included; also those which, as genera, include the species. (2a 11ff.)

This definition throws us back on the meanings of the terms "predicable of a subject" and "present in a subject." A proper discussion of these terms would entail a full-dress analysis of the Categories; here, however, we may simply note that the definition of "present in a subject"[1] is "incapable of existence apart from the said subject" (1a 22-3), and that Aristotle's examples of such presence, and hence of such inseperability, are the presence of grammatical knowledge in a man and of color in a body. No metaphysical analysis of this notion of "seperation" is here offered, but we are certainly meant to take it common-sensically. A man can get along by himself, and doesn't need something else to be "in," whereas a color does. Of an "inseperable" X one can always ask questions like "What is it an X of?"

or "Whose is it?"--whereas of a "seperately existing" X such questions are inappropriate.

4. The only departure from common sense, at this stage of the game, is the doctrine of "secondary substances." One might ask in what sense genera such as "animal" and species such as "man" are capable of "getting on by themselves."[2] However, they do share with "Socrates" the characteristic of being inappropriate values for "X" in questions like "What is it an X of?" Even though "man" does not, as Aristotle is well aware, exist in the same way in which Socrates does, it is nonetheless not a mere attribute of Socrates and Callias in the way in which their respective complexions are. (Cf. 3b, 10ff.) Thus secondary substances, like primary ones, are never "present in" a subject.

Nevertheless, it still seems odd to include both individuals (things which are a "this" (tode ti) and "atomic and numerically one" (3b 13) and universals under the same heading. Aristotle knows that language may mislead us (as it misled Plato) into thinking that "man" is also a "this" and numerically one (3b 14f.). Despite this awareness, he persists in emphasizing the resemblances between Socrates and "man," and their common differences from, e.g., "white," "colored," "virtue," or "three." Why does he find these resemblances more important than

the difference between the individual and the universal?

The best answer to this question to be found in the Categories is Aristotle's dictum that substance "Although it remains, notwithstanding, numerically one and the same, is capable of being the recipient of contrary modifications." (4a 10f.)[3] The sense in which this is true is obvious for the case of primary substances, and (although Aristotle does not offer any illustrations) is fairly clear for the case of genera--which can admit of contrary differentiae while remaining the same (e.g., "animal" is one genus, even though one species of animal is rational and others are non-rational).[4] It is a bit harder to see how it applies to species, but presumably the analogue is that a species stands to its individual members as they stand to their accidents and as genera stand to their differentiae.[5] In all three cases of substances, then, we find the characteristic of being a determinable--of sustaining external relationships, and thus remaining self-identical despite changes in these relationships. In contrast, a quantity ("three"), or a quality ("white") or a relation ("servitude") is not determinable--it is just what it is "and no other thing." To say that "a red," or "a triplet" or "servitude" has now this property and now the contrary is always, from the standpoint of common sense, to say something about the things which are red or grouped in threes,

or about the persons who are enslaved. (To put it in modern jargon, all synthetic statements are about the presence of accidents in substances; all statements about accidents, qua entities in their own right, are either analytic ("red is a color") or elliptical ("red is very popular").)

5. The three relationships which relate the three sorts of substance to their respective sorts of determinations (attribution in the case of individuals, specification in the case of genera, and individuation in the case of species) are quite distinct, yet they have a certain formal similarity. In a work on words rather than things (which the Categories is) Aristotle is content with such a purely formal treatment. However, if we are content (as Aristotle is not) to remain within the context of talk about words (like the Sophists) or if we are intrigued by the possibilities of increased elegance which present themselves within this context (like the Platonists), we shall be tempted, after reading the Categories, to construct a reductionist theory of "the nature of substance" on the spot. For example, we may brush aside Aristotle's (cryptic, but vital) remark that species and genus "do not merely indicate quality" but "determine quality with reference to substance" (3b 18-20), and view all determination of determinables as an instance of attribution. This will get rid

of secondary substances altogether, since there will no longer be a distinction between placing an individual within a species and attributing a set of qualities to him. There will no longer be a distinction between "essential predication" (in which "both the name and the definition of the predicate must be predicable of the subject"--2a 19-20) and "accidental predication" (in which only the name is predicable--cf. 2a 27ff.), for all predication will be "accidental." No batch of qualities will be the "essence" of a given primary substance and none will be more "determined to substance" than any other. Substances~~as~~substrata will be replaced by substances-as-congeries-of-universals. This approach, however, effectively obliterates the distinction between primary substances and the other categories, as the Locke-Berkeley-Russell tradition makes clear. For if any "nominal essence" of the substance is as good as another, then the substance itself dissolves into a broth of qualia and relations, and philosophy looks about, in Lockean bewilderment, for a bare substrate to which these qualia and relations may be pinned.

The same reductionist result will be reached if one takes the idealist tack, which construes all relations between determinables and determinations on the model of specification. In this approach, we construe the accidental features of Socrates (for instance, his snub-nosedness) as

specifications of the generic characteristic "Socratic," "Socratic" as a species of "human," "human" as a species of "animal," and so on upwards until we reach "Being"--at which point, usually, we decide (like Spinoza) that "all determination is negation" and thus dismiss every differentiation of Being as illusion. In this tradition, the problem is not that of being left with a lot free-floating qualities and relations on one's hands, but of being left with nothing but pure, undifferentiated substance.

6. For Aristotle, any such rapid transition from a classification of our use of words to a dissolution of our common-sense conceptual framework would be an error. The crucial metaphysical thesis of the Categories--that species and genera are not merely collections of qualities, and that the distinction between the essence and the accidents of a primary substance is irreducible--is, indeed, left undefended there. But Aristotle is well aware of the reductionist temptations to which its defenselessness gives rise, and the Metaphysics is devoted to defending it. What the Categories contribute to the Metaphysics is simply an exposition and clarification of the meaning of "substance" which is relevant to an analysis of language: namely, determinability. Having pointed to the formal similarities between individual things and species and genera of individual things, he drops the term "secondary substances" (it occurs

nowhere in the corpus, outside the Categories) and devotes himself, in the Metaphysics, to exploring the differences between the way in which individual things are determinable and the way in which species and genera are, and to discovering how these differences may be explained without falling into reductionism.

The Metaphysics, however, also concerns itself with another set of differences: the differences between the various sorts of things which count as primary substances. If one takes the mark of substantiality to be determinability, then one will say, as Aristotle does in the Categories, that no substance can be more of a substance than any other, and in particular, that no primary substance can be more "substantial" than any other. (Cf. 2b 22ff.) Now in one way this accords with common sense, but in another way it departs from it. Viewed formally, a rock seems just as good an example of self-identity-despite-change and receptivity-to-contrary-determinations as Socrates is. But what about a mote of dust? And what about a drop of water? They too remain numerically one despite shifts between contrary attributes, yet there is something unsettling about putting Socrates on a par with a dust-mote. (And was the drop of water a substance even when it was in the river, mingling with all the other drops?) Aristotle himself, in his assertion of the equality of all substances (2b 27) is care-

ful to chose examples (an ox and a man) as close together on the scale of being as possible; his argument would not have been so plausible had he chosen examples more widely seperated. The uneasiness one feels at this sort of ontological egalitarianism, like the uneasiness felt at putting universals and individuals under the same category, is not relevant to the theory of predication, but it is to metaphysics. For the distinction between high-grade and low-grade primary substances, like that between primary and secondary substances, provides an opportunity for reductionist assimilations of substance to the other categories. If a dust-mote is a substance, what about a patch of color which remains the same despite being moved about? Further, what about a tone, the pitch of which remains constant despite changes in loudness? How can we prevent these from counting as primary substances? Our instinctive reply is probably that it is not the color which persists, but the body on which the color forms a patch, and that it is not the pitch which persists, but the air in which the sound-waves travel, or perhaps the brain cells which store up auditory impressions. This protest is an expression of the common-sense view that brains, bodies, and perhaps even masses of air can exist "seperately," but pitches and colors can't. If Aristotle is to preserve this common-sense claim, he is going to have to produce another criterion for being

a substance, and thus for "seperate existence," than determinability.

7. Now this second criterion gives us what I have previously referred to as the "physical" meaning of "substance." The locus classicus for this meaning is Metaphysics VII, 16:

> It is obvious that even of the things that are thought to be substances, most are only potencies--both the parts of animals (for none of them exists seperately; and when they are seperated, then too they exist merely as matter) and earth and fire and air; for none of them is a unity, but as it were a mere aggregate till they are worked up and some unity is made out of them. (1040b, 5-10)

Here again, we would need a full-dress analysis of the context in order to explicate the terms used to distinguish substances from potencies (viz. "matter," "potency," and "unity.") For the moment, however, it will be enough to cite a few passages where Aristotle makes clear the sort of unity he thinks a proper substance should have:

> That which is a whole and has a certain shape and form is one in a still higher degree (than that which is merely "continuous"), and especially if a thing is of this sort by nature, and not by force like the things which are unified by glue or nails or by being tied together, i.e., if it has in itself the cause of its continuity. A thing is of this sort because its movement is one and indivisible in place and time; so that evidently if a thing has by nature a principle of movement that is of the first kind (i.e., movement in place) and the first in that kind (i.e., circular movement) this is in the primary sense one extended thing. (Metaphysics X, 1052a 21-8)

> All things which have no matter are without qualification essential unities. (Metaphysics VIII 1045b, 21-8)

Unity in this sense may be called self-reliance, and self-reliance is the criterion of substantiality which Aristotle uses whenever he is interested in the physical meaning of "substance." A thing which "exists by nature" is a paradigm case of self-reliance, because "having within itself a principle of motion and of stationariness" (cf. Physics II, 1), it has the ability to maintain itself more or less independently of what other things are up to. Among natural things, animate organisms such as Socrates and ox are better unified than a rock, and vastly more so than a mote, for they are clearly better able to fend for themselves and insure their own continuity. (Although technically a rock, and even a mote, is a "natural" object, since it is earth and has a "natural" principle of motion within it (viz., seeking its natural place by falling downwards whenever possible), Aristotle at Metaphysics VII, 16 is prepared to think of it as a mere aggregate (soros--literally, "heap") which requires to be "worked up" before it can be promoted from "matter" or "potential substance" to "actual substance." An example of such working up would be its transformation into the tissues of a plant through dissolution and ingestion.) At the extreme of ability to fend for oneself are the stars (which are what Aristotle is referring to in the passage from Metaphysics X above: since the stars are composed of none of the four sublunary elements, they have matter only

for circular motion in place--cf. De Caelo, I, 2). The Unmoved Movers are even more perfect examples of self-reliance, since they have no matter at all. (Cf. Metaphysics XII, 6). When we use self-reliance as a criterion, it becomes obvious that some primary substances are much more primary substances than others, the Categories to the contrary.

8. We now have two meanings of substance, both of which explicate the core notion of "capacity to exist seperately." The first--the logical meaning--is determinability, the ability to sustain external relations. The second--the physical meaning--is self-reliance, causal independence from other substances. Before turning to the way in which Aristotle tries to disentangle, and then to reconnect, these two meanings in the Metaphysics, it will be useful to see what happens when these criteria of substantiality are invoked by reductionist philosophers.

An opportunity for such philosophers is, obviously, provided by the logical meaning of "substance," for the distinction between internal and external relations seems, prima facie, a pragmatic one. An external relation sustained by X is one whose presence or absence does not affect X's self-identity, and "X's self-identity" would seem (for the familiar reasons spelled out by Hume) an abbreviation for "our willingness to continue applying the term 'x'." To put the matter another way, if we take Aristotle's ten categories

to parallel ten sorts of questions which can be asked of anything, and take "substance" to be anything that answers the question "What is it?", then we can say that a given substance retains its self-identity just so long as we are prepared to use the same terms in replying to the question "What is it?" which is asked about it. Conversely, we say that X sustains an internal relationship to those of its characteristics whose absence would make us cease to reply "X," in answer to the question.

Now if we are content to remain pragmatists in our theory of knowledge, we can say that anything may count as a "substance" if we are willing to predicate contraries of it--if, that is, we are willing to retain the same characterization of it as before, while admitting that it no longer possesses a feature which it once possessed. Specifically, we could "hypostatize" items which for Aristotle clearly fall under categories other than substance and remark on their persistence through change. (An example is the pitch which persists through varying loudnesses; other examples are the same features appearing in parent and child, or the same "red" appearing in Titian and in Goya.) As pragmatists, we can think of permanence and change as a function of our interests; by restructuring our experience in new ways we can grant determinability to new aspects of experience. From this pragmatical point of view, we can say that the only reason

why we most frequently adopt the "things" of common sense as the determinable elements in experience is that our interests are such as to require these particular "logical constructions" rather than others. If naming is relative to our interests, and the only criterion of substantiality is "having the same name despite changes," then substantiality too will be relative to our interests.[6]

For Aristotle, on the other hand, the reason why we pattern our discourse in such a way that "things" are the most frequent examples of determinability is that we want our discourse to portray correctly the relations of priority and posteriority which exist in natura rerum. These patterns are causal patterns, and for this reason determinability and causal independence are not, for Aristotle, independent characteristics. He is quite aware that we can treat colors as determinable and "things" as their determinants, but he is sure that if we do we shall be wrong. We can give proper names to colors and pitches and treat them as sustaining external relations,[7] and doing so may be very useful, but we will not thereby have reached an understanding of the real. (Cf. Metaphysics I, 996b 15-19). To do this, we must make what is "better known in the order of being" also "better known to us," and this means grasping the "principles and causes of things." (Cf. Physics I, 1, esp. 184a 22ff.; Metaphysics I, 1). The behavior of the "things" of common

sense is, after all, the ultimate cause of, e.g., various pitches and loudnesses being correlated as they are. Further, the characteristics to which a thing is internally related--the characteristics which it must have in order for us to continue to call it by the same name--are not, for Aristotle, determined by our processes of naming; it is just the other way around. The essence of a thing is its form and, viewed from the standpoint of an analysis of the thing's coming-to-be, its formal cause. Knowing a thing properly depends upon bringing the "nominal essence" of its species into line with the "real essence", for only so will we grasp the formal cause of the thing. Some items in experience--viz., substances --have forms and some don't;[8] the ones that do also have, to a greater or lesser degree, the sort of unity and causal independence which, Aristotle says, distinguishes substances from mere potencies. Their causal independence of other substances is a function of the ability of their formal causes to master the matter out of which the substance is formed. (On this notion of "mastery," cf. De Gen. Anim. IV, 769b 11ff.)

9. This notion of "mastering matter" provides a way of expressing the connection between causal independence and determinability more vividly. The ability to sustain external relations--to retain self-identity despite passage between contraries--is an achievement. (The literal sense of

one of Aristotle's two words for "actuality"--entelecheia--is "having reached the goal".) Mere "matter," as exemplified by "aggregates", is a bare substratum which, viewed logically, lets itself be called by the name of whatever accidental feature is present in it at the moment. Viewed metaphysically, its lack of achievement is reflected in the fact that it lets itself be "shaped" by whatever causal influences are in the neighborhood. A bare substratum has no self-identity, and cannot be "numerically one." Material substance, on the other hand, is a substratum of accidental change, but, because it possesses an essence, it is not a bare substratum. It has mastered matter, in the sense that it has forced matter to hold still long enough to have a permanent, essential characterization in addition to its accidental ones. This same "forcefulness" (the term is a fair equivalent of Aristotle's other word for "actuality"--energeia) is what makes it causally efficient in respect to its neighbors and capable of fighting off their attacks on its integrity. It is the reason why these attacks do not result in the destruction of one substance and the generation of another, but in mere accidental change. Put paradoxically, we may say that only what is strong enough to possess a form can be passive enough to undergo change.

This paradox may be more forcefully put by noting that causal independence entails determinacy. It is

precisely because a thing is not further determinable in some (essential) respects that it is further determinable in other (accidental) respects. Thus we may say that only the determinate is determinable. The completely indeterminate ("mere" potency or "mere" matter) is not determinable because it has no (relatively) permanent features against the background of which determination can take place. As long as we use the essence-accident distinction to distinguish the senses in which things are determinable and in which they aren't, there is, of course, no paradox. But when we begin to think along reductionist lines, and to attack the distinction between essence and accident as arbitrary, then this paradox becomes troublesome, and desperate reductionist efforts must be made to avoid it.

10. Getting back now to the reductionists, we may ask why they do attack the common-sense distinction between substance and the other categories, and between the essence and the accidents of substances. The answer is that they adopt a "pragmatic" attitude toward these distinctions because certain border-line cases of "thinghood" present exceptionally attractive opportunities for gaining certainty. These are the cases of mathematical "objects"--such as The Circle--and of the "simple bodies" (ta hapla somata--Aristotle's term for the four elements.)

A mathematical object such as The Circle presents a puzzle to common sense. On the one hand, we might like to

dismiss it as an hypostatization of a certain accidental feature of bodies. On the other hand, the existence of a body of geometrical knowledge which does not seem to be "about" bodies but to be "about" circles, makes it seem reasonable to talk about The Circle as if it were a substance. Previous to the rise of a body of knowledge (and exceptionally high-grade knowledge, at that) about circles qua circles, it would have sounded odd to reply to the question "What are you enquiring about?" by saying "circles." (one might have answered "the stars" or "pots," or something else which exemplified circular movement or shape.) But once this body of knowledge does exist, then it seems natural to think of The Circle as a determinable--as remaining circular despite being now large and now small, now light and now dark, in just the same way in which Socrates remains Socrates throughout his life, and despite changing his clothes.

Having thus found that The Circle resembles Socrates in fulfilling the "logical" criterion of substaniality, one will be tempted, as Plato was, to make it fulfill the physical criterion also. That is, one will be tempted to attribute both causal independence and causal power to The Circle. But since The Circle seems perfectly helpless at causing things to happen, nothing short of a radical revision of the common-sense world-view will permit such an attribution. One can perform such a revision by replacing the distinction between

essence and accident, and between substance and non-substance, with the distinction between the real and the apparent, and by reducing all the four sorts of causality to one--formal causality.[9] (In other words, one construes "power" and "independence" in the senses in which these terms are used to describe axioms in formal systems.) This is, of course, precisely what Plato (and later Spinoza) did. He justifies the revision on the ground that the retention of the common-sense viewpoint was a stumbling-block to the possibilities of successful inquiry which the discovery of mathematics had revealed.

Alternatively, one may proceed to a revision of the common-sense viewpoint, in the interest of attaining greater certainty than is possible from that viewpoint, by starting with such dubious cases of substance as motes of dust and drops of water. The advantage of working with these border-line cases of "thinghood" is, once again, that doing so seems to provide an exceptionally efficient way of getting knowledge. In medicine, for instance, the more one can analyze the patient's overall condition into the condition of his parts--the color of his internal secretions, the temperature of his blood, the texture of his skin--the more certainty one can have about how to treat him. Proceeding along these analytical lines, one soon begins to think that if one could get down to the things which stand to blood,

skin, and bile as these stand to the man himself, one would have still more certainty. These things, for most Greek scientists, were the four elements. (Democritus went one step further and postulated atoms--standing to the four elements as these stand to blood, skin, etc.) Once one has reached this level, one begins to claim that one has established the claim of these simple bodies to count as full-fledged substances. Soon, indeed, one goes further and claims to have shown (by invoking the appearance-vs.-reality distinction, along the lines of Eddington's "two-table" doctrine) that these simple bodies are the only true substances. For are they not the underlying determinables of which Socrates and the ox are merely so many transitory determinations? Having thus made the simple bodies into the ultimate determinable, thereby fulfilling the logical criterion of substantiality, materialists would like to have them fulfill the physical criterion also. However, the only sort of causality which is attributable to the four elements is material causality. (Cf. Metaphysics I, 3-4) Therefore, just as Platonists reduce all four kinds of causality to formal causality, the materialists must disrupt the common-sense world-view by reducing them all to material causality.

11. For Aristotle, the general violence done to common-sense and to ordinary ways of speaking, as well as the

specific and conspicuous failure of both reductionisms to render an account of motion and efficient causality,[10] make it clear that the pursuit of simplicity and certainty has led to metaphysical confusion.[11] If we are to get back to common sense, we need an explicit analysis of the criteria of determinability and independence which common sense uses to dedect what is primarily real, and which reductionism has abused in order to simplify the real. Aristotle's general strategy is to show that the very meanings of the correlative terms "determinable-determinant" and "dependent-independent" are lost if one begins to reduce the entities to which these distinctions are applied either to forms-without-matter or to matter-without-form. In other words, he wants to show that the common-sense criteria of determinability and self-reliance no longer make sense once one has abandoned (to use Wittgenstein's phrase) "the language-game which is their original home." This is the negative side of his treatment of substance in the Metaphysics. The positive side is his elaboration of the crucial heuristic distinction--that between potentiality and actuality--which must be used if we are to explain what common sense means by what it normally says about substance. Aristotle is quite aware of the tensions within common sense of which reductionists take advantage--they are real tensions, and reflect real tensions in the nature of things. But, Aristotle assumes (and this

assumption is at the heart of his philosophical method), the nature of things also includes the means of resolving these tensions without, as the reductionists do, condemning one side or the other of the tension-creating distinctions to the realm of "mere appearance."

12. The various tensions within our common-sense notions of what counts as an ousia are summed up by Aristotle in his formal listing of the various meanings of the term in Book V of the Metaphysics--the so-called "Philosophical Lexicon." Chapter 8 of this Book reads, in full, as follows:

> We call 'substance' (1) the simple bodies, i.e., earth and fire and water and everything of the sort, and in general bodies and the things composed of them, both animals and divine beings, and the parts of these. All these are called substances because they are not predicated of a subject but everything else is predicated of them.--(2) That which, being present in such things as are not predicated of a subject, is the cause of their being, as the soul is of the being of an animal.--(3) The parts which are present in such things, limiting them and marking them as individuals, and by whose destruction the whole is destroyed, as the body is by the destruction of the plane, as some say, and the plane by the destruction of the line; and in general number is thought to be of this nature; for if it is destroyed, they say, nothing exists, and it limits all things.--(4) The essence, the formula of which is a definition, is also called the substance of each thing.
>
> It follows, then, that 'substance' has two senses, (A) the ultimate substratum, which is no longer predicated of anything else, and (B) that which, being a 'this' is also seperable--and of this nature is the shape or form of each thing. (1017b 10-26)

This four-fold distinction should be taken together with another, quite different, four-fold distinction given at the

beginning of Chapter 3 of Book Z:

> The word 'substance' is applied if not in more senses, still at least to four main objects; for both the essence and the universal and the genus are thought to be the substance of each thing, and fourthly the substratum. (1028b 34ff.)

Both these lists should be compared with the three-fold distinction which is presented immediately after the second of these lists (1029a 3f.) and at innumerable other points throughout the corpus--sometimes as a distinction between three senses of "substratum," sometimes as between senses of "substance," and sometimes (cf. Physics II, 1-2) as between senses of "nature": the distinction between form, matter, and the composite of form and matter which is the particular substance.

For purposes of the analysis conducted in ZHΘI, this last, three-fold distinction is the crucial one. We can gear it in with the others if we note why Aristotle at 1017b 24-6 reduces the four senses which he has distinguished to two--form and matter--and if we note the distinction between the sense in which a particular thing (the combination or composite--synholon) is a substance and the sense in which something (the form or the matter) "in" that particular thing is the substance of it.

The first sense of substance given in Metaphysics V, 8, is the preanalytic common-sense one, in which bodies (somata) are the paradigm case of substance because they

are the referents of the terms which most frequently function as logical subjects. In this pre-analytic sense, there is no distinction in degree of substantiality between the simple bodies (the elements), animals, and "divine beings" (daimonia--the heavenly bodies), nor between any of these and their parts. Here the criterion of determinability is used exclusively, as it is in the Categories. In the three following senses in the four-fold list of Book V, the senses are the various post-analytic ones which have been proposed in answer to the question: "Why do these bodies all share the ability to be determined?" These three-soul, simplest parts, and essence--like the four senses listed at 1028b 34ff.--the essence, the universal (i.e., the species), the genus, and the substratum--are all attempts to explain what feature of these bodies it is which answers this question, by explaining why such bodies have the unity and self-reliance which are the prerequisites for determinability. All of these terms can be grouped under either "form" or "matter" (as suggested at 1017b 24-6) as follows:

Form

Essence
The Universal (i.e., the formal characteristics of the species under which the particular falls)
The Genus (construed as a higher universal under which the particular falls)
Soul (which, for Aristotle, is the "form of the ensouled body"--cf. De Anima II, 414a 25ff.)
Simplest Parts (when these are construed as numbers or as universals, as they are by Pythagoreans and Platonists)

Matter

Substratum (not the composite substance as substrate of accidental change, but the substrate of the process which is the coming-to-be of the composite)
The Genus (when this is construed as naming the material out of which the species is formed by adding the differentia--cf. sec. 24 below.)
The Simplest Parts (construed as materialists and atomists construe them).

Aristotle runs back and forth across the gamut of these various meanings of "form" and "matter" in complex and bewildering ways throughout the Metaphysics. The common elements in the items under each heading are neatly expressed, however, in the phrases used at 1017b 24-6: substance-as-matter is "the ultimate substratum, which cannot be further predicated of anything else" and substance-as-form is "that which, being a 'this,' is also seperable." Here again we have the familiar contrast between the criterion of determinability and that of self-reliance. "Matter" is the aspect of substance which fulfills the first criterion, and "form" is that aspect which fulfills the second; their compresence in particulars is the reason why particulars fulfill both.

13. The difficulties about these criteria--difficulties which lead to the reductionist efforts summarized in secs. 8 and 10 above--may expressed by noting that everything seems to satisfy the criterion of determinability, and that nothing seems to satisfy the criterion of self-reliance, except perhaps abstractions. If we construe "capacity to exist by itself" as meaning "capable of entering into external relations,"

then Hume's claim that this criterion of substance applies to "everything that can possibly be conceived" seems inevitable.[13] If, on the other hand, we construe it as meaning "completely independent of anything else,"--then it would seem that none of the common-sense paradigms of 'substance'--a particular man or ox, for example--could possibly qualify. For each of these requires innumerable sorts of support from innumerable sources to keep it from being destroyed (as, e.g., oxen and men need the right food, temperature, etc.), even apart from its dependence upon antecedent causes for its existence in the first place.

Thus everything can qualify as "matter," if one cares to treat it as matter by using its name as the subject-term of a sentence. And nothing can qualify as "form" except what is artificially sheltered from the hazards of real existence by being abstracted out (as, e.g., "man" is abstracted out from Socrates and Callias.) Once one realizes this, one is led to reduce all the various senses of substance which are listed under "Matter" in the table above to substance-as-the-simplest-parts (of common-sense substances). For the question "what is determinable?" now seems best answered by saying: "everything, but, pragmatically, those things whose determinations are describable in the simplest possible terms." Similarly, one is led to reduce all the sense of substance which fall under "Form"

in the above table to the highest genera, for the question "what is causally independent?" is answered by saying "only abstractions, and of these, only the most abstract." Thus one way in which Aristotle states the problem which the Metaphysics must resolve is: "Whether it is the genera that should be taken as elements or principles, or rather the primary constitutents of a thing?" (998a 22-4).

Materialists want to answer this question by declaring the highest genera to be mere appearance, and Platonists by interpreting the "primary constituents" as highest genera. (That is, Platonists claim that the materialists' "elements" reduce to such qualitative universals as "hot," "cold," "moist," and "dry," and that these in turn reduce to numbers, as in the Timaeus.) Both answers generate puzzles, and Aristotle, in his scientific treatises, wants to eliminate these puzzles by directing our attention back to the composite particular substances of which the genera are genera and the parts are parts. But he cannot do this unless the composite substance will, as it were, hold together long enough to be discussed, rather than immediately splitting itself up into self-subsistent form on the one hand and self-subsistent matter on the other. It will so split itself if the relation between form and matter--between the ground of a substance's self-reliance and the ground of its determinability--is interpreted on the model of the relation

between the composite substance and its accidents. So interpreted, the form becomes an accident of matter (thus creating puzzles about how a mere appanage can supply the determination necessary for determinability) or the matter will become an accident of form (thus creating puzzles about how that which form is form of can be merely an accident of form). To avoid such puzzles, some sort of special relationship between form and matter must be found which will not be reducible to this substance-accident pattern.

The defense of the category of substance against reductionist attack thus ultimately depends upon being able to provide a different sort of connection between the formal and the material aspects of a substance than the connection between that substance and its attributes, or between that substance and its parts. The relationship between a substance and "the formula of its essence" must be distinguished from its relationship to its other attributes. This distinction will be the logical counterpart of the ontological bond which ties form and matter together in the unity of substance. The central books of the Metaphysics thus represent a search for (a) a sense of "matter" which will not be synonomous with "a part, capable of seperate existence, of substance," and (b) a sense of "form" which will not be synonomous with "self-subsistent collection of qualities." If either of these two identifications are admitted, then

the unity of substance will be analyzable in terms of spatio-temporal location and/or qualitative similarity (as it is by Democritus--cf. 1042b 12ff.--Hume, and Russel). If we can find no other way of conceiving of "form" and "matter" as components of substance than on the model of substance itself --that is, conceiving of both of them as quasi-substances possessing both determinability and causal independence, as being both substrates and "thises"--then we shall be unable to retain the common-sense view except as a convenient pragmatic ellipsis. For each of the ordinary "substances" of common-sense will then be analyzable away into a multitude of seperate quasi-substances--Platonic Forms, Humean impressions, Russellian qualia, or Democritean atoms, as the case may be, but in any case into items which, when taken as prior in definition, require a wholesale abandonment of the common-sense point of view.

14. The analysis in Z, 12 through H, 6 of "the unity of definition" is Aristotle's attempt to explain what is special about the form-matter distinction, and why it should not be reduced to the substance-accident distinction or the whole-part distinction. This analysis culminates in the "discovery" of the potency-act distinction in H, 4-6, and in the adoption of "actualization" as the name of the ontological bond which we have been seeking. The groundwork for this analysis is laid, however, in Z, 4-11. I shall go through

the topics of these chapters one by one, trying to show how they fit into Aristotle's overall anti-reductionist argument.

15. Chapters 4-5: In Z, 4-5, Aristotle insists that we must not be misled into attributing an essence to qualities, nor into thinking that qualities are definable. His point here is that "We have definition not where we have a word and a formula identical in meaning (for in that case all formulae or sets of words would be definitions; for there will be some name for any set of words whatever, so that even the Iliad will be a definition)." (1030a 7-9) In other words, if whenever we have extensional equivalence between the denotations of two linguistic entities, we say that one gives the "meaning" of the other, we shall have stripped "meaning" of all meaning. The paradigm case of a definition is an answer to the question "What kind of thing is it?" This is why, in the strictest senses of "definition" and "essence," "only substance is definable" (1031a 1) and why "nothing which is not a species of a genus has an essence" (1030a 10f.). If we are to speak of qualities as having essences or as definable, we must, Aristotle says, be using an extended and parasitic sense of the terms "definition" and "essence" which require reference to the original sense to be understood. (Cf. 1031a 1-14; 1030a 17-27; 1030b 6f.) This paradigm-parasite relationship is, of course, the logical and epistemological counterpart of the fact that all items falling under categories other than substance "are" only by virtue

of being "present in" substances. The fact that not all "definitions" are equally "definitions" is a reflection of the fact that not all "beings" are equally "beings." The fundamental equivocity of "to be" (1030a 20-1; cf. Meta. IV, 2) is such that every entity (this brown sense-datum, Pegasus, the key of B-flat, etc.) may properly be said to "be" in some sense, but every such sense must exhibit the relation of the entity to some substance or species of substances. (This equivocity is why it is almost impossible for Aristotle to sound plausible to philosophers who take the fundamental sense of "to be" as given by "(∃x)." The existential quantifier is, of course, indifferent as to the sort of thing it quantifies over--which, for Aristotle, just shows you what's wrong with the existential quantifier.[15]) Attempts to ignore this equivocity, or to invert the true relations of priority and posteriority involved in it by making the "being" of qualities or relations prior to that of substances, are encouraged by the fact that we can (and often do) leave the reference to "presence in substance" implicit when we are discussing such entities. But although "we must no doubt inquire how we should express ourselves on each point," we should not permit the availability of elliptical ways of speaking to obscure "how the facts actually stand" (1030a 27-8). If we do so, we see that "it does not follow that there is a definition of every word which means the same

as any formula; it must mean the same as a particular kind of formula; and this condition is satisfied if it is a formula of something which is one not by continuity like the Iliad or the things that are one by being bound together but in one of the main senses of 'one,' which answer to the senses of 'is.'" (1030b 7-11) If we think in terms of unity through continuity or through "being bound together" (e.g., the sort of unity which a "state of affairs" such as Socrates' snub nose will have if it is construed as a bundle of qualities roped together with spatio-temporal relationships or relations of similarity), we shall find that the unity of our definitions utterly dissolves. It dissolves, as Aristotle notes, into an infinite regress (cf. 1030b 28-37), for we are unable to give meaning to the terms which denote qualities unless we refer to the substances which embody those qualities; if those substances are themselves defined in terms of qualities, then the substance never will get defined.

The fact that these "accidental unities" generate such regresses, however, may suggest that any unity is going to do the same. To stop such a regress, we should need something which is definable not by reference to something else, but "in its own terms." This is, we need to find something whose definition will not be in relational terms. But this seems absurd. For surely to give a definition is to cite the genus and the species of the definiendum: that is, in

defining something we indicate what it has in common with other things, by showing what universals it falls under. It would seem, indeed, that the whole point of defining something is to get outside it and put it in a larger framework. Aristotle, however, sees clearly that if we follow this line of thought we will end by breaking down the distinction between real and nominal essences: for the only way to escape an infinite regress of defining universals in terms of other universals will be by the sort of pragmatic arbitrariness which picks out a few privileged sets of universals (e.g., color-words) as not needing definition and calls them "primitive." To avoid these consequences, Aristotle is going to have to say that in some sense the real essence of a substance (what is formulated in its genus-species definition) is not something "in" the substance which it shares with other substances, nor something "about" it, but that it just plain is it. This is just what we do find him saying in the next chapter of Z (although we shall find him modifying this conclusion later on.)

16. Chapter 6: He begins Chapter 6 by noting that a particular substance is not thought to be different from "its" substance, and that "essence" (to ti en einai--literally "that which it was to be (the substance)") is an obvious candidate for the position of the feature of a substance which is "its" substance. This illustrates the general

dilemma in which Aristotle finds himself in ZH: in asking what it is about a substance which makes it a substance, he is constantly having to draw back from taking either a "part" or an "attribute" of the substance as the answer. The question "what makes a whole more than the sum of its parts, or the sum of its attributes?" can obviously not be answered by citing one more part, or one more attribute. The substantiality of a substance is "not an element but a principle" (1041b 30). What answers the question must be somehow identical with "what the particular is," but must amount to more than an uninformative pointing at the particular. The particular substance must somehow be both identical with, and different from its essence--that is, its substance. In Chapter 6, Aristotle emphasizes the sense in which it must be identical; in later chapters he emphasizes the sense in which it is different.

It must be identical, he says, because if it were not we should have to postulate some third thing to glue the particular and its essence together, and then a fourth thing to glue them together, and so on. (Cf. 1031b 27 - 32a 4) This point is simply an application of the point of chapters 4-5: if there are none but accidental unities whose elements are connected by attribution (1031b 22-6), then there will be nothing self-subsistent. But since there clearly are such things, "each primary and self-subsisting thing is one and the same as its essence." (1032a 5)[16]

17. Chapters 7-9: The discussion formed by chapters 7-9 begins by identifying "essence" with "form" (eidos): "by 'form' I mean the essence of each thing and its primary substance" (1032b 3). Eidos is the word for "species" as well as for "form" and, as we have learned at 1030a 10, "nothing which is not a species of a genus has an essence." Taken together with the result of chapter 6--that what has an essence is identical with its essence--we conclude that "form," "essence," and "substance" may (for the time being) be treated as synonomous. But if we say this, we run into a new paradox: particular substances (or at least sublunary ones) come into being and pass away. They are generated out of matter, and they "contain" matter, in the sense that they are "capable of being and not being" (1032a 15-23). But specific forms under which the particular substances fall don't, it would seem, get generated out of matter or "contain" matter. So how can the particular substance be identical with its form? Or, to put it another way, how can we avoid thinking of the form as "just a part of" the individual substance? Now Aristotle has to agree that although the particular, composite, substance is generated and destroyed, form isn't. (Cf. 1033b 5-10, 17). Whenever an exemplar of a given species comes into being, it is because the form of the species has been antecedently exemplified in another individual, which latter individual supplies the formal cause of the former. (Cf. 1032a 22ff., 1034a 1ff., 1034b 16ff.) Thus individual

embodiments of the same specific form come and go, but the form itself goes on forever. If Aristotle did not admit this, he would fall into nominalism, since the "species" would then be merely a name for a collection of similar entities which happened to share a certain concatenation of qualia, rather than a locus of causal power and a repository of "substantiality."

On the other hand, lest this concession to Platonism set our feet upon the road to declaring the matter of substances mere appearance, and to thinking of their forms as Forms (as 1032b 14 might suggest), Aristotle is careful to note that the form of a species contains within itself reference to matter: "man" is not analogous to "sphere" but to "brazen sphere" (1033b 24-6) for "matter is an element even in the formula" (1033a 1).[17] In other words, the specific form itself is not to be thought of as a simple list of qualities which, if stuck onto "matter," will produce an exemplar of the species. Rather, it must be thought of as those qualities which, if used to transform certain particular sorts of substance (e.g., brass in the case of the sphere, flesh in the case of the man), will produce such an exemplar.[18] It will produce such an exemplar not by sticking some new qualities onto these qualities previously plastered on a bare substratum, but by destroying the substance which is the proximate material cause of the new exemplar and generating

a new substance. This is why this new substance cannot properly be called by the name of the species to which its material cause belonged: "A thing is not said to be that from which it comes...the statue is not said to be wood but... wooden, not brass but brazen." (1033a 16ff.)

18. Chapters 10-11: This attempt to make specific form contain a reference to matter, even when viewed apart from particular exemplars of the species, is somewhat clearer in Chapters 10-11, especially Chapter 11. (But the difficulties of such an attempt are also clearer.) Here we find Aristotle's explicit argument against the Pythagoreans' and the Platonists' attempts to build substances out of universals: "So to reduce all things thus to Forms and to eliminate the matter is useless labor; for some things surely are a particular form in a particular matter..." (1036b 22-4). On the other hand, if "'man' and 'horse' and terms which are thus applied to individuals, but universally, are not substance but something composed of this particular formula and this particular matter treated as universal" (1035b 28-32), then it might seem that "the formula of the part must be present in the formula of the whole" (1034b 23). In order to specify the essence of the species 'man,' perhaps we would have to explicitly define "this particular matter treated as a universal" (1035b 30), and thus go into detail about the material parts of man. In other words, it might seem that

the proper way to define "man" would be genetically, by starting with the atoms or the four elements and running through the whole series of progressively more complicated structures which culminate in a human being. But if Aristotle admitted this, he would have escaped from Platonist reductionism only to fall into materialist reductionism. Teetering desperately, he momentarily keeps his balance by distinguising (in Chapter 10) between the parts of the formula of the species and the parts of the composite substance (1035a 30-2; cf.1037a 25ff.). This distinction lets him deny that the substance is the sum of its material parts, but it makes it all the more perplexing how the formula of the species can simultaneously refer to the matter suitable to exemplars of that species and yet not refer to the parts of that matter. And so we find him, in the last paragraph of Chapter 11, back (momentarily[19]) in the arms of the Platonists. Here he qualifies the conclusion of Chapter 6--"each primary and self-subsisting thing is one and the same as its essence"--by restricting the dignity of "self-subsistent thing" to "substances which have no matter"--e.g., "curvature" as distinct from "Callias" and "nose." (1037a 22 - b 7) We are now told that "of this [the particular composite substance] there is in a sense a formula and in a sense there is not; for there is no formula of it with its matter, for that is indefinite, but there is a formula of it with reference to its primary substance...for the substance is the indwelling form." (1037a 26-9).

19. The problem that emerges from Chapters 1-11 of Z has now been narrowed down to this: the formula which tells us what makes a given substance a substance is going to tell us about the from of the substance, but it has to do so by telling us just enough about the matter to prevent the Platonist reductionism decried at 1036b 21ff., while not enough to lead us back to the materialism decried at Z, 3. At the beginning of Chapter 12, Aristotle proposes to investigate the nature of the "reference to matter" which the formula of the essence makes by investigating the connection between the two parts of a definition per genus et differentiam. The point of this is that the peculiar sort of metaphysical glue which holds matter and form together in the composite substance may have its analogue in the peculiar sort of logical glue represented by the "and" in, e.g., "animal and two-footed." This "and" is, in Aristotle's mind, quite distinct from the "and" in, e.g., "round and red" or that in "human and snub-nosed." The unity symbolized by this "and" will perhaps give us a clue to "the unity of that, the formula of which we call a definition"--that is, of the "essence" (cf. 1037a 23) or of the "substance" (cf. 1037b 27).

This question thus presents itself as either (1) why, when we predicate both "animal" and "two-footed" of Socrates are we thereby answering only one question, rather than two?, or (2) why is it improper to think of "animal" and "two-footed"

as two substances linked by "juxtaposition"? (cf. 1043b 5ff., 1045a 14ff.). Aristotle's answer to both these questions emerges, after a great many dialectical fits and starts, in the following passage from H, 6:

> To return to the difficulty which has been stated with respect both to definitions (cf. Z, 12) and to numbers (cf. Z, 13), what is the cause of their unity?... Clearly, then, if people proceed thus in their usual manner of definition and speech, they cannot explain and solve the difficulty. But if, as we say, one element is matter and another is form, and one is potentially and the other actually, the question will no longer be thought a difficulty. For this difficulty is the same as would arise if 'round bronze' were the definition of 'cloak'; for this word would be a sign of the definatory formula, so that the question is, what is the cause of the unity of 'round' and 'bronze'? The difficulty disappears, because the one is matter, the other form. What, then, causes this--that which was potentially to be actually--except, in the case of things which are generated, the agent (or, the efficient cause)? For there is no other cause of the potential sphere's becoming actually a sphere, but this was the essence of either. Of matter some is intelligible, some perceptible, and in a formula there is always an element of matter as well as one of actuality: e.g., the circle is 'a plane figure.' (1045a 8-35; italics, of course, are not in the text)

I shall not try to discuss Z, 12 - H, 6 in the detail in which I have discussed Z 4-11. Rather, I shall confine myself to passages which aid in understanding the italicized phrases in the above passage.

20. Chapters 12-13: In Z, 12 Aristotle gives the first clue to the solution ultimately reached in H, 6 by suggesting that the genus, if it "exists" at all, exists only as "matter" for further determination. (1038a 5-8)

On this basis, he concludes Chapter 12 by saying that it would seem that the definition of a substance can, if the definition is to be a unity, only mention the ultimate differentia which marks off the species to which a substance belongs from other species within the same genus. This conclusion is clearly factitious, since it suggests that a differentia, all by itself, can define a substance--and thus ignores the fact that "in a formula there is always an element of matter." Aristotle here asks rhetorically "how are we to think the one element [in a substance] posterior and the other prior [if substance is a perfect unity] ?" (1038a 33-4); in H, 6, he will answer this by saying that we can indeed, by distinguishing form from matter as act from potency, envisage an order of priority and posteriority within a single substance. Taken together with 13, this chapter constitutes, in fact, a reductio ad absurdum of the Platonist reduction of substance to pure form into which we have wandered in Chapters 10-11. For in Chapter 13, Aristotle pokes fun at the idea that a universal can be a substance. He here takes the attitude that universals like "animal" are in no sense "this"es but only "such"es, and thus that any attempt to define a concrete substance is bound to engender an infinite regress of "such"es without a "this" ever being reached (1038b 34 - 1039a 1).[20] Further, if we, like the Platonists, fail to distinguish act and potency (cf. 1039a 5), we shall find

that no two universals can ever be made to name one substance. In other words, if we take every universal occuring in the definition of a species to be a name of what the substance actually is, we shall no longer be able to have a unified definition or a unified substance (1039a 15-24).

The upshot of Chapters 12-13, then, is that definition of composites is impossible, if definition is conceived of as adding universals together by "juxtaposition." In one way, this merely restates the previous point that we have to find some new way of joining the elements of a definition, but it should be noticed that we have now accumulated enough hints to suggest the solution: viz., that genus is to matter as differentia is to form, and that both are to their correlatives as potentiality to actuality. If the elements in a definition are not names of distinct actualities, but if one of them (the genus) is instead the name of a potentiality, then the objection to the theoretical possibility of defining composite substance falls flat. For now we have "actualization" as a unique sort of glue, quite distinct from either "attribution" or "juxtaposition," to bind the two aspects of substantiality together.

21. Chapters 14-17: Chapters 14-17, however, postpone this solution; in them, Aristotle gets in some further digs at the Platonists, and then summarizes his results so far. In 14-15 we get Aristotle's negative argument against the

Platonic reduction of substance to form (cf. sec. 11 above.) The point of what he is saying is that the Platonists have conceived their "Forms" on the model of material substances--or, in other words, they do not see that the Forms, whatever they may be, cannot be discussed in the same linguistic framework as material substances.[21] They have looked for the same sort of self-reliance and causal independence which distinguishes, e.g., Socrates from a heap of pebbles, and they have found it in simple qualitative universals. However, since they fail to recognize that substances such as Socrates are composites of matter and form, and thus fail to ask themselves how these two poles are unified, they find themselves baffled when they come to ask themselves how Forms are related to one another. (Cf. 1039a 34; 1039b 7.) In particular, they assume that since substances like Socrates can be defined *per genus et differentiam*, Forms should be definable in that way also, and they are baffled when it turns out that they cannot so define them (1039a 26). If Forms are thought of as pure qualities, then it is simply impossible to define them (1040a 9). Any process of definition (excluding pure ostention) must be a process of relating the definiendum to something else (cf. 1040a 10-12); this means that nothing that is particular will be definable, *qua* particular. This is not disastrous for sensible individual substances like Socrates, since they fall under species and their specific essences *are* (as we shall see, once these present perplexities

are cleared up) as definable as we had always thought. But it is disastrous for those ultimate qualitative universals in terms of which all defining of species is done, if these universals are taken as "individual and capable of existing apart" (instead of as abstractions, which is what they really are). (Cf. 1043b 28-33.) What the Platonists do not see is that the sort of unity which is characteristic of such paradigm cases of substance as Socrates is not the sort of logical unity which we may call "unanalyzability." Socrates is analyzable (into his form and his matter), and his specific essence is analyzable (into genus and differentia), but Socrates is nevertheless a unity. He is a unity in the sense of a unification--a unification which is an achievement, the achievement which is what Socrates essentially is. (Cf. sec. 9 above on the etymology of entelecheia.) Socrates' actuality --his entelecheia--is the unification of from and matter, and his definition (that is, the definition of his specific essence) is a unity in the same sense (the unity of genus and differentia.)[22] The general moral to be drawn from Chapters 14-15 is thus that the unity of a definition is not to be found through a quest for simplicity alone; for if this quest is pressed too far, we find that we have reduced substance to quality (cf. 1038b 23f.), and thereby reduced definition to ostention.

In chapter 16, the locus classicus for the physical meaning of substance (1040b 5-8, quoted in sec. 7 above), Aristotle extends to materialists his polemic against attempts to reduce the unity of definition (or of substance) to the simplicity of the constitutents of a definition (or of the substance). This confusion of unity-as-unification with unity-as-simplicity is common to both materialists and Platonists, and so Aristotle notes that the attempt to reduce substances to their least parts suffers from the same difficulties as the attempt to reduce them to their highest genera: both are only potencies, but reductionism treats them as actualities. The parts of animals and the four elements are not (contrary to common opinion: cf. 1017b, 10; 1028b 8-10; 1042a 6-11) full-fledged substances, but only potential substances. Similarly, such candidates for the position of "highest genera" as universals of quality are not substances (as the Platonists think), but are merely what would be substance if they were "determined to substance" (in the phrase of Categories 3a 20-1) by becoming the constituents of a specific essence. For Aristotle, both material parts and universals are, from an epistemological point of view, abstractions, and from a metaphysical point of view, potencies. A batch of universals, like a batch of simple bodies, form "a mere heap, till they are worked up and some unity is made out of them." (1040b 9) The questions which we have to answer,

and which neither sort of reductionism can answer, are summed up in Chapter 17: "why is the matter some definite thing?" (1041b 4) and "how can we find a principle (arche) that is not an element (stoicheion)?" (1041b 25)--that is, how can we find a principle of unity which will make a substance more than the sum of its parts or attributes, and not be simply one more part or attribute? We have learned, in the course of Z, that the form of the substance must be such a principle (1041b 7), but we do not yet know how it can be.

22. In H we find out. We do so by supplementing the "logical" analysis of the notion of ousia conducted in Z--an analysis which has taken us back and forth from one reductionist extreme to the other, and has had the largely negative result of showing us the absurdity of both extremes--by a physical analysis of the process of generation of particular substances.[23] In H, it is as if Aristotle said to his students: "All right now, outside of metaphysics class, what answer would you give to the question of what ties form and matter together?" The answer is, of course, that the efficient cause does. (What unites the lump of bronze with the human form? The sculptor does.) If we think of form not as "the principle of unity and self-reliance" but as "the formal cause," and of matter not as "the principle of determinability" but as the "material cause," we can accept this answer. By thinking of the substance-as-matter as the material

cause of the substance, we are made to see that (cf. H, 4-5) "matter" is not the name for a special sort of quasi-substance, which is in some inscrutable way a "part" of every substance, but that it is a term which expresses a function. Various different substances are the proximate material causes of other substances, and not every substance can be matter for any other substance (1044a 15-32). To put it another way, a substance is the proximate material cause of another substance only when it is that substance potentially: "the proximate material cause and the form are one and the same thing, the one potentially and the other actually." (1045b 18-19) Seen in this light, the question of Z, 12--in what does the unity of the genus with the differentia in a definition consist?--becomes pointless. "It is like asking what in general is the cause of unity and of a thing's being one; for each thing is a unity, and the potential and the actual are somehow one. Therefore there is no other cause here unless there is something which caused the movement from potentiality to actuality." (1045b 19-25)

This approach to the problems, however, seems to confuse the history of the genesis of a particular exemplar of a specific form with the definition of that form. After all, isn't the definition supposed simply to signify the formal cause, rather than summing up the whole causal situation within which the formal cause works? In answer to this, Aristotle has to

say something which is not made explicit in H, but is hinted at elsewhere in the corpus, and without which H is mysterious: he has to say that the genus, in a definition by genus and differentia, signifies (albeit indirectly) the material cause of the individuals of the species defined. In other words, he has to say that, e.g., "animality" stands to "rationality" or "two-footedness" as the brass of the statue stands to its shape. The proximate material cause of a man (cf. Θ,7) is the sort of organic material which can be called "animal" but cannot be called "human." "The genus is matter of that which is called the genus" (1058a 23-4), because it tells us about the sort of substance which can be made into a substance of a species which falls under that genus.

23. Before seeing how this identification of genus and matter is made plausible, I shall show that, if it <u>can</u> be made out, it bids fair to fill the requirements for a characterization of "substantial unity" and "unity of definition" which are laid down in Z. If the genus is to the definition of the species as the matter of particular instances of the species is to their form, then the "reference to the parts being in a certain state" which we found to be essential to the definition of specific form at Z, 11 (1036b 29) will be performed by the inclusion of the genus within the definition. The mention of the genus will be a mention of "this particular matter treated as a universal" (1035b 30)--a

mention which enables us to bridge the gap between the "parts of the definition" and the "parts of the concrete thing" which opens up in Z, 10. If there is an "element of matter" (1045a 34) in every defining formula of a species of sensible substance, then we can see how all such substances may be analogous to "brazen sphere"--as Aristotle said they were in Z, 8 (1033b 4). We can see further that, since the essence thus has "matter in its formula" (1033a 4), it makes sense to speak of a particular substance as being identical with its essence (rather than its essence being a mere part of it) as we did in Z, 6 (cf. 1032a 5ff.). It will remain true, of course, that the individual qua individual cannot be defined (cf. 1039b 27ff.), but it will not be the case that definability is a prerogative only of species of immaterial substances (as 1039b 29, 1035a 30-1, and 1037b 4-5 might suggest). Rather, a definition of a species of materiate substance will, by mentioning its matter, cover the necessity for individual differences as well as the common features which individuals share. The individuality of Socrates as opposed to Callias --his snub nose, say--will obviously not be mentioned in the definition of "human," but by virtue of the reference to "animality" in the defining formula "rational animal" which is predicated of both Socrates and Callias, the necessity of some such individuating features will be asseted. For to be human is to be flesh-and-bones put together in a certain

way, and the form of rationality will never master the flesh-and-bones so completely that only those arrangements of flesh and bones which are required for "rationality" will appear. This incomplete subsumption of matter under specific form is the ground of our ability to tell the various members of a species apart, for it makes possible the working of accidental causes upon the matter of an individual substance, producing such individuating features as a snub nose.

24. Let us now turn to the key question: is it in fact the case that the reference to the genus in a genus-and-differentia definition of X permits us to identify the sort of substance which can serve as proximate material cause for an X? Aristotle nowhere comes out plainly and says that this is so.[24] But, apart from our need of this doctrine if we are to make H, 6 intelligible, it is not hard to make a case for it. To see this, let us momentarily resort to the picture (quite misleading, but here heuristically useful) of substance being built up by successive layers of qualities plastered on top of a bare substratum. The doctrine in question then amounts to saying simply that if possession of qualities $Q_0 \ldots Q_i$ is a necessary condition for a substance falling under G (the species to which X belongs), then these qualities will be found in any substance Y which serves as proximate matter for an X. Put in these terms, the plausibility of the doctrine is evident. There is a neat parallelism between

the genus and the material cause of X and between the differentia and X's formal cause (the qualities $Q_j...Q_n$).

The puzzling features of the doctrine, on the other hand, emerges from considering some examples. We do not think of "animal" as the proximate material cause of man, nor of iron as the genus of "saw" (cf. 1044a 25ff.). The proximate material cause of a man is (for Aristotle) the menses (cf. 1044a 35) and the genus of "saw" is, say, "cutting tool." However, the linkage is obvious: iron is hard, and nothing can cut which isn't hard; the menses. as organic tissue of a certain sort, already contain the properties which form the least common denominator of the various species of animal (i.e., whatever properties distinguish animal tissue from vegetable tissue and inorganic matter: cf. 1049a 1ff.), even though they are not themselves "an animal." Our puzzlement will dissappear, and these linkages will be more apparent, if we notice two points: (1) no substance, of course, is "a G" tout court--e.g., there is nothing which is simply "an animal" without falling into some species of animal;[25] (2) Y's possession of the qualities $Q_0...Q_i$, which are also shared by all instances of G, and by virtue of which it is a proximate cause of X, does not require that Y itself should fall under G--on the contrary these qualities will usually be "accidental" features of Y. If this latter point is not recognized, we shall find ourselves claiming that the

proximate material cause of an X must always be of the same genus as X; but, apart from the fact that this is empirically false, the same reasoning will also lead us to conclude that the proximate material cause Z of a Y must itself fall within the same genus as X and Y, and so on. This course would lead us to the absurd conclusion that the remotest material cause of X must still be in the same genus as X. (This absurdity is in fact encountered by materialists who attempt to define specific form by giving an historical account of the genesis of individuals of that species.) The fact that, by virtue of accidental features, a substance falling under genus G_1 can be matter for a substance falling under genus G_2, makes it possible for material causality to cross generic lines.[26] But this same fact means that to mention the genus under which a substance falls will also be (implicitly, or better, "potentially") to describe the "matter" of the substance. The hardness of the saw does not enter into its definition, but (a) it would enter into a description of the saw qua matter for something else (e.g., if it were to be melted down and used for forging a sword), and (b) it would enter into a description of the iron which was the proximate material cause of the saw, and (c) it is implicit in the term "cutting tool" which plays the role of genus in the saw's definition. (On this example, cf. Physics II, 9.)

25. This completes our discussion of the way in which H, 6 resolves the problems of Z. Such a solution, which amounts to little more than making explicit what was allowed to remain implicit in the statements of the problem in Z, may well seem anticlimatic. But this, to an Aristotelian, is a mark in its favor. For Aristotle, the dialectical unraveling of philosophical perplexity is largely a matter of making explicit distinctions which are already given in common sense, and applying them where they are most needed. The distinction between actuality and potentiality, which is Aristotle's master distinction (the one which he invariably brings to bear in the face of reductionist confusions and over-simplifications, both in the Metaphysics and throughout the corpus) is familiar enough in discourse about motion (cf. fn. 23 above); all that Aristotle does is to use it to light up an area of discussion which, as a result of an inordinate quest for simplicity, had suffered from too many coalescences and not enough distinctions. As Randall puts it "Aristotle's careful distinctions so painstakingly--and so painfully--worked out in Books Zeta and Eta were necessary to clarify the confusions about talking and its relations to what is talked about into which several generations of Greek garrulity seem to have gotten the Greeks."[27]

FOOTNOTES

1. "Subject" here is hypokeimenon, the word which is usually translated as "substrate." It has the same etymological sense as the Latin substratum--"that which underlies"--and has no etymological connection with ousia. Thus the parallelism of "subject" and "substance" in English is quite absent in Greek.

2. I put "man" and "animal" in quotation marks, rather than talking about "humanity" or "animality," because the latter terms have no true Greek equivalents, and tend to suggest odd hypostatizations which Aristotle would not have dreamt of.

3. The examples which Aristotle gives to illustrate this determinability are all examples of primary substance. Nevertheless, the context makes clear that the criterion is intended to apply both to primary and to secondary substances.

4. Cf. 2b 18ff.: "Now the same relation which subsists between primary substances and everything else (i.e., the items falling under the other nine categories) subsists also between the species and the genus, for the species is to the genus as subject is to predicate."

5. There is a difficulty here, since the individuals which determine the species are primary substances, and primary substances have no contraries (3b 25ff.) Elsewhere, however (e,g., Meta. X, 9), Aristotle speaks of contrary accidents (such as paleness and darkness) as the individuating features of the various members of a species. Socrates, qua primary substance, has no contrary, but Socrates qua the species-man-embodied-in-matter is distinguished by his individual matter from Callias, qua the species-man-embodied-in-matter, by being dark rather than pale.

6. Cf. P.F. Strawson's contribution to a symposium on "Logical Subjects and Physical Objects" in Philosophy and Phenomenological Research, XVII (1957), pp. 441-87. Strawson considers the question: why are "particulars" (defined as the sort of thing whose "position in the single, unified, spatio-temporal system which we ourselves occupy is, in the theoretic extremity, and in a certain sense, essential to its identity"--p. 443) traditionally given a central position among "individuals" (defined as "logical subjects")? His answer, in simplified form, is that the basic ways of introducing reference to entities into discourse are through proper naming and through quantification, that individuals

are, pre-eminently, what gets introduced into discourse in quantified statements, and that we pretty well have to use quanitification in order to refer to most particulars, since there are just too many of them, and they come and go too quickly, for the use of proper names to be a practical alternative. (Cf. p. 451) This pragmatic explanation of the traditional priority of the "things" of commom sense to their attributes is, for an Aristotelian, a clear case of confusing the accidental features of practical utility with the essential ontological truth which accounts for this utility. For a quasi-Aristotelian reply to Strawson, see Wilfrid Sellars', contribution to the same symposium, pp. 458-72, especially the typically Aristotelian distinction between "real functions" and "propositional functions" at pp. 468-9.

7. For an example of a metaphysics built around such "abstract particulars," cf. Donald Williams, "The Elements of Being, I," Review of Metaphysics VII (1953), pp. 1-18.

8. One might want to interject here that accidents too have forms, but this is, in Aristotle's eyes, a misuse of the word "form" --a confusion of "form" with "universal." Eidos, the word which is translated as "form," is also, in appropriate contexts, translated as "species" (and in Plato as "Form.") It is employed only with reference to substance. The universal "redness" is not the form of any given substance or species of substance -- it is simply an abstraction. Aristotle, in order to emphasize the abyss between specific form and accidental attribute says at one point that "the accidental is practically a mere name." (Meta. VI, 2)

9. Cf. Meta. I, 988a 10ff. (Note that the Platonic notion of a material cause is just another Form: "the Great and Small.") See also 988b 1ff.

10. Cf. Meta. I, 990a 8f., 991a 9ff., 985b 19f.

11. One way of putting Aristotle's general diagnosis of such reductionisms is that they represent a confusion of the theoretical order with the practical and productive orders--of right knowing with efficient action or with making efficient tools. For him, the cosmological stories told by Platonists and materialists are mere useful fairy-tales--no less fairy-tales for being useful. Since he would view modern scientific theories as fairy-tales also, Aristotle would agree with modern philosophers of science who say that criteria such as "simplicity" or "fruitfulness"

are what determines which among alternative scientific theories is to be preferred. But he would insist that the development of such theories is not "knowing."

12. Cf. 1039b 28f.--neither particulars qua particulars nor Forms qua Forms can be the subject of demonstration or definition.

13. Cf. Treatise, I, IV, 5: "For thus I reason. Whatever is clearly conceived may exist; and whatever is clearly conceived, after any manner, may exist in the same manner. This is one principle, which has been already acknowledged. Again, every thing, which is different, is distinquishable, and every thing which is distinguishable, is seperable by the imagination. This is another principle. My conclusion from both is, that since all our perceptions are different from each other, and from everything else in the universe, they are also distinct and seperable, and may be considered as seperately existent, and may exist seperately, and have no need of any thing else to support their existence. They are, therefore, substances, as far as this definition explains a substance." (p. 233)

14. In order to get ahead faster, I refrain from glossing chapters 1-3. In them, Aristotle simply formulates the various senses of substance which need to be disentangled and (in chapter 3) makes clear that "matter" (conceived of as bare substratum) won't do as an explication of "substance."

15. Cf. Manley Thompson, "On the Distinction Between Thing and Property," in The Return to Reason, ed. Wild, (Chicago, 1953), pp. 128n., 148.

16. In this chapter Aristotle, confusingly enough, uses Platonic Forms as his example of "substance" (although warning the reader at 1031b 15-18 that they are not the sort of thing he usually means by "substance".) The advantage of doing so is that the Forms have snappy one-word definitions, and hence Aristotle can ignore the problem of the unity of genus and differentia in the definition (a problem which is taken up in Chapter 12). The obvious infinite regress (the "third man" argument) which ensues if one denies self-predication to the Forms serves Aristotle's purpose by illustrating particularly vividly the dangers of seperating a substance from its essense.

17. This may seem to be contradicted, in Ross's translation, at 1036b 5-7. However, there is a mistranslation here. The sentence given as "No, they are matter, but...abstraction" is actually a question: "Or are they not, but only matter,

and is it only because man is not found also in other matters that we are unable to perform the abstraction?"

18. Cf. Wilfrid Sellars, "Substance and Form in Aristotle," Journal of Philosophy LIV (1957), p. 698.

19. Contrast, e.g., 1043b 28-33.

20. See the discussion of Z, 5-6, in sec. 15 above.

21. Cf. 1040b 33f. Compare 997b 13: "nor are the Platonists making the Forms anything other than eternal sensible things"; also 990b 3. This is why Platonism is subject to the "third man" argument--because Platonists do not distinquish between potentiality and actuality, they merely reduplicate the actualities which they intended to explain; thus this reduplication requires a new actuality (the "third man") to explain it, and so on.

22. For another formulation of the contrast between these two notions of unity, see Kant's distinction in the Paralogisms (e.g., at A363) between "logical unity" and "the unity of the subject." Aristotle's critique of the Platonic confusion of unanalyzability with substantial unity is parallel to Kant's critique of Leibniz's confusion of the merely logical notion of unity with the actual unity of the manifold which constitutes experience.

23. Cf. J. H. Randall, Jr., Aristotle (New York, 1960), p. 120. It should be noted that the actuality-potentiality distinction, which is at the heart of this new analysis, is borrowed from the vocabulary used in discussing such processes. Cf. Meta. IX, 1; V, 12; Physics III, I. Kinesis, which is translated as "motion" in the Oxford translation, is better translated in this context by "process." In Aristotle, the original sense of "potentiality" (dynamis) is "potentiality-for-process" (a notion close to our "potential energy"); this is why kinesis is definable (201a 10f.) as "the fulfilment of what exists potentially, in so far as it exists potentially." The sense of potentiality-for-substance, which is the sense of dynamis most prominent in the Metaphysics, is an extension of this original sense. Aristotle is deliberately importing a quasi-technical term from physics into metaphysics.

24. But he does frequently speak of the genus as "matter": besides 1058a 23-4 and 1038a 5, previously cited, see 1058a 32ff., 1057b 38f., 1043b 11, and especially 1024b 8-9. These passages could, at a pinch, be taken as expressing nothing

more than a loose analogy between the genus-differentia relation and the form-matter relation, without commiting Aristotle to the doctrine which we have formulated here. But unless this analogy is based upon such a doctrine, it can hardly serve the purpose for which Aristotle invokes it at H, 6.

25. We speak of a substance as "a G" (or, more commonly, as "a piece of G," or as "G-ish"), in fact, only when we have its use as a material cause in mind. Thus, for example, let us assume that the definition of "book" is "printed paper": we should only speak of a copy of Aristotle as "some paper" if we had in mind using it for some extraneous purpose--for fuel, or for palimpestic writing.

26. However, it must be admitted that the fact that a material cause can belong to another genus than that of which it is the cause raises problems for Aristotle's account of scientific explanation. At Post. Anal. I, 7, he insists that in scientific demonstrations "the extreme and the middle terms must belong to the same genus" (75b 11-12), and at II, 11 that the material cause can be the middle term of such demonstrations. This is one out of many examples of the way in which the formalism of the Posterior Analytics is out of key with Aristotle's scientific practise and with his common-sensical metaphysics.

27. Randall, op. cit., p. 123.