

The Order of Procedure in the Study of Nature

We now turn to Aristotle's text, which we shall quote and then attempt to explain with the help of St. Thomas's exposition.

[184a10] In all sciences of which there are principles, or causes, or elements, it is acquaintance with these that constitutes understanding and scientific knowledge. For we do not think that we know a thing until we are acquainted with its first causes and first principles, and have got down to its elements. Plainly therefore in the science of nature our first task must be to determine what relates to its principles.

The first statement seems to ~~imply a repetition~~ contain either a repetition or a haphazard use of terms: for every 'element' falls under 'cause', and every cause is a 'principle'. ~~Yet St. Thomas points out that these diverse terms may well be used deliberately.~~ It seems that in using no more than the word ~~principles~~ 'cause', Aristotle would have expressed all there is to be said at this point, for the principles of a science are causes. Yet St. Thomas shows that these diverse terms may well be used here, deliberately, to signify various kinds of causes.

By 'principle' we mean 'that from which something proceeds in any fashion'; by 'cause', 'that ~~from which~~ upon which ~~something~~ some things depend as to their existence or coming into being; the word 'element' means 'that from which a thing is primarily composed, and is in it', as letters are the elements of words, but not the syllables. Hence, not all principles are causes, ~~for the point, as the beginning of a line, is a principle, but not a cause.~~ Nor are all causes elements; the shoemaker is a cause of the shoe, but not an element of it.

It should be noted, however, that among the various kinds of causes, some have more the nature of principle than others do, inasmuch as

the word principle, according to its first meaning, refers to the idea of 'process'. Hence, in the present context, 'principles' ~~may be used to mean agent and moving causes.~~

Of causes, on the other hand, some of them share more in the nature of that upon which something 'depends' as to its existence or its becoming than do other causes, however much the latter too must be requisite. Such is the case of ~~xx~~ final cause, namely, 'that for the sake of which' something is done or made, like a house, which is for the sake of habitation; formal cause too has a pre-eminence as cause, like the structure of a house, while the same material could be used for something else.

But whatever Aristotle's intention may be, it is plain that we would not truly know what a house is unless we knew it in the light of all its causes. Now, if the things of nature have a determinate structure, if their constituent parts are not ~~of~~ indifferent ~~character~~ as to what the things are, ~~if they~~ and if these come to be by some given process, and if in all this there is ~~something for the sake~~ a purpose, plainly, we must try to become acquainted with all ~~the~~ their causes.

If the terms used by Aristotle have that meaning, he implies, at the same time, something which, among the speculative sciences, is characteristic of the study of nature. For not all sciences demonstrate by every kind of cause. In mathematics, the 'why' is taken from 'what the thing is' that the demonstration is about, and never from final or agent causes; and the same holds for mathematical physics as such. Metaphysics, on the other hand, never demonstrates from material cause, since matter is never ~~the~~ a cause of ~~being~~ as such, though cause of a certain kind of being.

When the Philosopher says "down to its elements", he ^{appears} ~~seems~~ to imply that 'what a thing is made of' is known last of all. This seems

contrary to the obvious fact that one may ~~know~~ recognize the material that a thing is made of without knowing just what the thing is; e.g., Socrates might be reduced to a certain number of elements/ⁱⁿ ~~of~~ the table of ⁱⁿ Mendeljeff, ~~and~~ ~~these elements are the elements of hydrogen~~. But to know that such and such elements go into the make-up of Socrates is to know them no more than materially. To know them in some ultimate way would be to see why and how they serve as components of a man. Seeing a brick and recognizing its ~~shape and size~~ shape is not the same as knowing its use.

Perhaps we should note, in passing, that if element is defined as "the primary component immanent in a thing, and indivisible in kind into other kinds", no instance of element is known outside the arts; a letter is an element, and ^{so is a} brick ~~is~~, ~~the~~ inasmuch ~~as~~ ^{some} as it is not to be divided into ^{another} kind of building material. But so far as natural science is concerned, the elements are not known; for what we call ~~the chemical~~ elements in chemistry are not such in the sense just defined. ~~Besides, it is difficult~~ Newton's atoms ('indivibles') would be such elements. However, in the present stage of physics, nothing is clearly known to be ~~indivisible~~ indivisible in the sense which the definition of element requires. The elements which Aristotle here has in mind are not ~~the elements~~ of the matter and the form which he considers later in ~~this book~~ Book I of the Physics, but the earth, air, fire, and water that he turns to in later treatises, of which ^{type of elements} he says that we can hardly identify their purpose, even though we realize that they have one.

Now acquaintance with the principles, causes and ~~elements~~ elements of this science constitutes "understanding and scientific knowing." The term 'understanding' refers to ~~the~~ definitions, St. Thomas points out, and 'scientific knowing', to demonstrations. For not only demonstrations

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are taken from causes, but so are the definitions themselves. In fact, when a thing has many causes, the understanding of ~~a~~ these causes, ~~constitution~~ provides a complete definition of the thing, differing from demonstration only by the position of the terms. For, once we know what is the purpose of a house, what it is made of and what its structure is, and that nature does not provide that kind of shelter, we grasp the connection between these various causes, and see that the purpose is the cause of all the other causes. Such a complete definition ~~embraces~~ embraces all that a demonstration provides, viz. a middle term ('to shelter against exposure, etc.') and a conclusion ('~~it must~~^{to} be made of such or such material'). Thus, ~~a~~^{the} definition of man, ~~that it would be~~^{to} complete and natural, would ~~require~~^{much} require more than the knowledge which all the natural sciences combined could provide in their present state. Seeing the ~~nature~~^{kind} of the methods we must follow in the investigation of nature, such ~~knowledge~~^{a definition} is likely ~~impossible~~^{to remain unaccomplished}. We would have to see exactly what kind of organism is ~~required~~^{needed} in the subject of rationality, right down to the ultimate physical entities required; to the kind of molecules, cells, and tissues, etc. that are essential to that type of organism. Such knowledge is a limit toward which the ensemble of natural sciences converge. The fact that we are far from having attained ^{such a} ~~that~~ limit, or that we shall never do more than approach it, is no reason why we should ~~fail to~~^{fail to} define it as an ideal, if only to remind us of the limitations of what we actually know.

But what are the principles from which the study of nature



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ought to begin? When Aristotle said that "in the science of nature our first task must be to determine ~~the~~ what relates to its principles", he ^{was} ~~not~~ using this term in the restricted sense that it has in the context of "causes, ~~and~~ or elements". For it would mean that we must consider first of all agent and moving principles. The first part of the passage we have quoted refers to definitions and demonstrations. The latter raises the question of procedure in the science, to which the answer is contained in the text that follows:

[184a/6]

Now the natural way of doing this is to ~~proceed~~ start from things which are more knowable and certain to us, and ~~thence~~ proceed towards those which are more certain and more knowable by nature; for it is not the same thing to be knowable relatively to us, and to be knowable absolutely. Such, then, is the method to be followed here: advancing from what is less certain by nature, though more certain to us, towards the things that are more certain and more knowable by nature. Now the things that are at first more obvious to us and certain are the more confused; ~~from~~ proceeding from these, their elements and principles become known later by way of analysis. We must therefore advance from universals to indivisibles.

Thus to sense-perception it is the whole that is more known, and the universal is a kind of whole. For the universal comprehends many things as parts.

The comparison of names to the definition is somewhat similar to this, for they signify a whole indistinctly, like circle; whereas the definition divides it into its single parts.

Children likewise first call every man 'father', and every woman 'mother'; but later on they distinguish each of them.

To grasp the bearing of this text we must realize that Aristotle is concerned here, not with the order of demonstration in the study of nature, but with the order to be observed in ~~our~~ applying ourselves to the various things or aspects of them, that the science is concerned with. For instance, is animal the first thing to be considered in this science, or is there something about it more known to us and more certain than the fact ~~that it is~~ of ~~a~~ being 'a body endowed with ~~sensation~~ sensation'? Once we have defined animal we realize that there is something about it that we knew first and more plainly, viz. that it is a body. And of trees ~~as of~~ horses and men, the most striking thing about them is that they are moveable, and subject to becoming and decay. Trees come to be, grow, and decay, and so do horses and men. Their coming to be is preceded by some change in nature, and so is their destruction. And all the bodies we observe appear to be moveable at least according to place. ~~That~~ That mobility pervades all ~~of~~ the things of experience is more obvious than the fact that whatever is mobile is a body. Whether a thing, to be moveable, must be a body is not self-evident. We must note, too, that 'body' is not to be confused with the body that is considered in geometry. We now have to do with what is a body ^{in the order of sense.} ~~to sense~~. We cannot assume that all moveable reality is of a bodily nature. 'To be moveable' therefore seems to be the most general aspect of sensible reality, and the least we can know of anything in nature.

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points of

than he does ~~here~~ in his commentary. We shall first quote the

body of this article, and then add a further explanation of the terms employed which he gives in the ~~xxxxxxx~~ reply to some objections.

In our knowledge there are two things to be considered. F i r s t, that intellectual knowledge ~~xxxxxxxxxx~~ knowledge in some way ~~takes~~ ~~xxxxxxxxx~~ originates from sensible knowledge: and, because sense has things that are singular for its object, whereas the intellect has universals for its object, it follows that our knowledge of the former is prior to our knowledge of the latter.

Secondly, we must consider that our intellect proceeds from a state of potentiality to a state of actuality; now whatever thus proceeds from potentiality to actuality comes first to an incomplete act, which is midway between potentiality and actuality, before accomplishing the fulness of act. The perfect act of the intellect is complete science, by means of which things are distinctly and determinately known; whereas the incomplete act is imperfect science, when ~~things are~~ things are known indistinctly, and as it were in a kind of confusion. What is thus imperfectly known, is known partly in act and partly ~~in potentiality~~ in potentiality, and hence the Philosopher says [Physics I, i], that ~~is~~ the things that are at first more obvious to us and certain are the more confused; afterwards we know them by distinguishing principles and elements.

Now it is plain that to know something ~~that comprises many~~
~~things~~ in which many things are contained, without proper knowledge
of each thing contained in it, is to know that thing ~~confusedly in~~
~~asking of confusion~~ confusedly. In this way we can have knowledge
of not only of the universe as a whole being animal, which contains parts
for example man and horse potentially, but also of the integral whole

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not only of the universal whole[e.g. 'animal'], which contains parts potentially[e.g. 'man' and 'horse'], but also of the integral whole ~~[which is like a house]~~, which [like a house, which contains its parts actually, viz. foundation, ~~walls, and~~ walls, and roof]; for each whole can be known confusedly, without its parts being known distinctly.

But to know distinctly what is contained in the universal whole is to have knowledge of something less common, as to know animal indistinctly is to know it as animal; whereas to know animal distinctly is to know animal as rational animal or irrational, that is, to know a man or a lion. Thus our intellect knows animal before it knows man. And the same reason holds in comparing whatever is more universal with what is less universal.

Moreover, as sense, like the intellect, proceeds from potentiality to act, the same order of knowledge appears in the senses. For by sense ~~we judge~~ we discern the more common before the less common, in reference both to place and time; in reference to place, when a thing is seen afar off we perceive that it is a body before we recognize it as an animal; and that it is an animal we see before we recognize it as

(A)

man p. 8

Aristotle's comparison of name and definition ~~xxxxxxxxxxxx~~
~~xxxxxxxxxxxx~~ as a sign in support of his position,
has confused commentators to the present day. (1) The difficulty

(1) Cf. W.D. Ross, Aristotle's Physics, Commentary,
184a24-b12.

arises when one fails to distinguish between the potential whole or
universal and the integral whole. Both are first known confusedly,
in which respect they are comparable, as St. Thomas explains in his
commentary:

...An integral whole and the universal agree in this, that both
are confused and indistinct. For just as he who apprehends the
genus, does not apprehend the species distinctly but in potency
only, so he who apprehends house, does not yet distinguish its
parts. Whence, since by reason of confusion the whole is prior
known ~~xxxx~~ as to us, the same reason holds good for both wholes.
But to be composed is not common to both wholes, whence it is
plain that he [Aristotle] designedly said confused, and not
composite.

← [St. Thomas then turns to the case of name and definition:

~~When [Aristotle] says~~

...[Aristotle ~~then~~ ^{provides}] gives another ^{argument} ~~sign~~ ^{regarding the} of an intelligible
integral whole. For that which is ~~defined~~ defined is to those
things which define it after the manner of an integral whole,
in so far as the defining elements are in act in the defined.
But nevertheless he who apprehends the name, as, e.g. man or circle,
does not immediately distinguish the defining principles. Whence
the name is a certain whole and indistinct, but the definition
divides into singulars, i.e., distinctly lays down the principles
of the defined.

But this seems to be contrary to what he said above. For
the defining elements are seen to be more universal, which he
said were more known to us. Furthermore, if the defined be better
known to us than the defining elements, the defined would not
be made known to us through the definition, for nothing is made
known to us except through that which is more known to us.
But it should be stated that the defining elements are more
known to us than the defined; whereas the defined is prior known
to us than the knowledge that such are its defining elements,
just as animal and rational are prior known to us than man;
but man is prior known to us in a confused way than that animal
and rational are its defining elements.

a man, and that it is a man we see before we are aware that it
Socrates or Plato. And the same is true as regards time, for a
child can distinguish man from not man before he distinguishes this
man from that, and therefore children at first call all men fathers,
and later on distinguish each one from the others [Physics I, i].

The reason of this is clear: because he who knows a thing indistinctly is in a state of potentiality as regards the distinguishing principle; as he who knows the genus is in a state of potentiality as regards the difference. Thus it is plain that indistinct knowledge is midway between potentiality and act.

~~XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX~~

That is why we say that knowledge of singular things is prior, as regards us, to ~~knowledge of the universal~~ the knowledge of universals, in the way in which sensible knowledge is prior to intellectual knowledge. But in both sense and intellect the knowledge of the more common precedes the knowledge of the less common. (1)

(1) Ia Pars, 85, 3, c.

more express

It may be worth ~~recalling~~^{more express}/attention to the ~~fact that~~^{can}

~~xxxxxxxx~~ two ways in which a universal may be known ~~xxxxxxxx~~

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known. First, confusedly, like when we know animal without distinguishing

its kinds. Thus we know something generic, but we do not know it

qua generic. Secondly, ^{it can} experience shows that there are different

kinds of animals, ~~and~~ our mind compares one with the other, thus

forming a relation of universality, of a 'one to ~~4~~ many'. This is

distinct knowledge of a universal qua universal. The universal

thus abstracted by a comparison made by the mind ~~xxxxxxxxxxxx~~

on the basis of further experience is known last.

We must note, too, that the confused knowledge of animal does not mean confusion with regard to animal as such, but with regard to the parts that divide it, like man, elephant, etc.

Now, when we compare what we know of man as an animal, with what we know of him as a distinct kind of animal, we see that

man~~x~~ has more actuality inasmuch as he is a man that inasmuch

(And to know man as man implies that he is known as animal.
as he is an animal.) This points to the distinction which Aristotle

makes between the knowability of things as regards us, and the

knowability which they have in themselves. The comparison is

explained by St. Thomas in his commentary:

~~St. Thomas's comment any way help us here~~

It is to be noted that ~~the philosopher states the same thing~~ to say that a thing is known by nature is the same as to say that it is known absolutely. Those things are absolutely better known, ~~th~~ which are of themselves better known. But those things are of themselves better known which have more of being, since each thing is knowable in so far as it is being. But those things are more being, which are more in act: whence such are most knowable by nature. But the converse occurs with us, in that we proceed in understanding from potency to act; and the beginning of our knowledge is from sensible things, which are material, and intelligible in potency. Whence those things are sooner known to us than are the separated substances, which are more known according to nature, as is plain in Metaphysics II. (1) He [Aristotle] therefore does not say 'more known by nature' as though nature knew them; but because they are more known of themselves and according to their own nature. He ~~also~~ says more knowable and certain, because in science there is sought not just any knowledge, but certitude of knowledge. (2)

(1) Lect. 1, n. 7.

Thus, the least we can know of a thing is that it ~~has being~~ is a being, ~~the commonest and indistinctly~~ which is most common to all things indistinctly. And this is also ~~what we know first~~ the respect in which the intellect knows a thing first. (2) ^{But} the perfection of

(20 This 'first known' should not be confused with the subject of metaphysics, as we shall have occasion to show in ~~the~~ a ~~later~~ chapter.

knowledge lies in the opposite direction ~~knowledge of this kind of universality.~~

Nor will any amount of mental operation on the confused universals bring about ~~any~~ knowledge of the ~~potential~~ parts which they contain potentially. ~~What we know is not the universal but the particular.~~

For, 'to be contained potentially' does not refer to the potentiality of our knowledge alone, as if man and horse were actually contained in the original universal 'animal' but that we do not as yet know this. If such were the case, that which is more known to us in nature would also be more knowable in itself. We ~~might~~ ^{could} then be led to believe either that ~~there might be some~~ some method might be found, allowing us to elaborate more distinct knowledge without further recourse to experience; or, if experience is required, it would be

no more than a
 interpreted as/~~xxxx~~ means of making us aware of what we already
 knew in some hidden way. Thus Plato suggested a method of division,
 and Hegel one of negation. Both admit that the method is in fact
 a posteriori as regards us, ~~but that it~~ reflects ^{my} the true process
 of reality or of "absolute thought" in reverse.

Plato's assumption was that the being which things have
 in our mind is the same as the one which they have in themselves.
 Such an assumption could be arrived at in the following way.
 If, on the one hand, it is true to say that a horse is an animal,
 and that the horse is not every kind of animal; and if, on the
 other hand, truth consists in the conformity of the mind with what
 is, then, to found this truth, there ought to ^{be} exist in reality
 more than animal, yet of which all the kinds of animal are ~~no~~ more
 than ^{the genus} contractions, or ~~limited~~ participations. Thus, ~~animal/xxxx~~ animal
^{reflect} would/~~be~~ a higher kind of reality than any one of its kind; knowledge
 of the various kinds of animals would lead us to a knowledge of
 'the' animal that ~~xxxxxxx~~ is more actual and real than each and all
 of its kinds.

We hold, on the contrary, that the relation of universality
 is something produced by the mind ~~andxxxxxxxinthezzmindonly~~
 in comparing one thing to the other, and though based on things, exists
 only in the mind. Besides, as was already pointed out, we distinguish
 being, existence, or 'to be', in the sense of truth, like when we say
 that the circle exists, whereas the round square does not; and in the
 sense of what is like Socrates, or this horse, a being which is had
 only by singular existents. Hence, when we say that a horse is an animal
 we do not intend that the horse of ~~the~~ animal we then speak of is
 there like this horse, or this horse which is this animal; no more
 than when we say that a second intention is a relation of reason.
 The only difference is that a horse can be in reality, and so can ~~be~~
~~be in~~

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an animal, provided it is either a horse, or a cow, or some other thing that is not just animal.

~~However, we shall see, in Book II, that apart from these reasons brought forth in support of Plato's position, there is some ground to his view, as we shall see when investigating the nature of universal cause.~~ ~~xxxxxx xxx xxx xxx xxx xxx xxx xxx xxx xxx xxx~~

The main thing to be kept in mind at this juncture is that the original ~~confused knowledge~~ confusion of our knowledge can be dispelled only by constant recourse to experience, leading us towards knowledge of things in their ~~distinction~~ specific distinction, and to theorizing about how they come to be that way. We shall see that in that direction there lies still a different kind of universality, viz. that of universal cause, ~~which the~~ knowledge of which is the terminus ad quem of science. It is a universal which is the opposite of the one that is first and more known to us.

Substance
Russell

194-10

MAJUEL

Chap. I, Sect. 2.

10 pp. enclosure (transmission)

12. The division of sense objects.

By 'sensible' we mean, primarily,
 that which produces some kind of alteration
 in ~~our~~ ^{our} senses in our senses: like when
 I plunge my hand into this water I hear
 a sound, I have ~~the~~ the feeling that it ~~is~~ is soft, yielding
 to my touch,

of wet and of cold, and I see my hand become red. I also both see with my eyes and feel with my hands that this basin is at rest, here on this stand, and that the water is in movement, like I see that there is only one basin here, that its edge is round, that it is a rather large basin, and that my hand has been in the water for some time.

The feeling of hard and soft, wet and dry, warm and cold, we attribute to the sense of touch; colours to sight, sounds to hearing. ~~Note here that~~ do not see sounds (meaning by sounds what the deaf do not hear), and I do not hear colours (meaning by colours what the blind do not see). Objects thus perceived by one sense only are called 'proper sensibles.'

I call by the name of 'proper sensible' of this or that sense that which cannot be perceived by any other sense than that one and in respect of which no error is possible; in this sense colour is the proper object of sight, sound of hearing, flavour of taste. Touch, indeed, discriminates more than one set of different qualities. Each sense has one kind of object which it discerns, and never errs in reporting that what is before it is colour or sound (though it may err as to what it is that is coloured or where that is, or what it is that is sounding or where that is)." (1)

^{like} We refer to such qualities in reply to the question 'How?', ~~as~~ in 'How is this water? Cold and clear.' That is why we call them 'sensible qualities.'

Observe that when we are asked what is meant by 'warm' we can only convey the meaning by inviting the questioner to share the experience of

1) - Aristotle, De Anima, II, 6, 418a10.

Sichaita def. 394

two sensations guddichadi Benichdi.

Subject not in the manner in which the flower is subject to the beetle, or the elan to the hawk.

A perceptual projection into reality

We do not judge that it is sensible, but that it is hard. The animal I have the sensation of is not the sensation of warmth.

Proper sensibles. Incommensurable

having such a feeling : we cannot ^{properly} ~~properly~~ ^{mean by this} ~~mean by this~~ ^{by} ~~that proper~~ ^{we mean by the proper} ~~refer to~~ ^{sensible} ~~refer~~ ^{is} to a particular kind of experience which the other must be able to share if he is to know what we mean by that word.
We cannot convey to a man born blind what ^{we mean by the proper} ~~sensible~~ ^{is} 'redness'.

Now some of the objects referred to in the example given above are not proper to one sense, but perceptible to both sight and touch; e.g., rest and movement, number, ^{place, time:} figure, magnitude, hence they are called 'common sensibles.' Not that they are perceived by each and every sense, ~~but~~ ^{actually} ~~though~~ ^{they appeal mainly to sight,} they are not the exclusive object of one sense. All of them are either quantity, like number and magnitude, or quantitative modes, like the amount of movement, ~~or~~ the shape of the thing, ~~or~~ ^{where it is}.

The common sensibles do not have the ineffable immediacy of the proper sensibles, ^{whereas on the other hand} ~~while~~ they ~~are~~ ^{are} more readily communicable : we can express them in terms of measurement, without reference to one single kind of sensation.

Even the person born blind can know what is meant by 'three marbles,' viz., their shape, size, and number. Though blind and deaf, he can be made to understand 'the clatter of three cold green marbles,' provided that by ^{by} 'clatter' we mean the measurable intensity of the sound; ^{temperature} the amount of heat defined by means of a thermometer; by green the colour defined by the angle of refraction when it passes through a prism All this has to do with quantity of modes of quantity, ^{which can be determined by comparison and} ~~revealed by~~ measure. It is from such a basis that mathematical physics will proceed throughout. ~~the~~

copy

actually they appeal mainly to sight,

whereas on the other hand

Rural

(2) A History of Western Philosophy, chapt. XXII, ~~pp. 201-202~~ pp. 201-202.

Mr.Smith to his colour pattern,to the series
of sounds he produces,~~and other~~ and so
on ~~price~~ provided they are not like substance.
The man is reduced to a bundle of per se sensible
objects. And this is intended as a manifestation
of what it really is to be a Mr.Smith. But ~~the~~
~~man is thus reduced to a bundle of objects which are not like substance.~~
~~And this is intended as a manifestation of what it really is to be a Mr.Smith.~~

The difficulty here is that in bundling sheer colour patterns and series of sounds he has given them the status of what he ~~intended~~ set out to avoid--substance~~xxx~~. The result is even greater obscurity. & The assumption ~~is that~~ was that if the incidentally sensible cannot be sensed per se, it is not really anything at ~~all, which~~ all, and the same could then be said of the mind in ~~as much~~ as it knows such an object.— A further criterion of the reality of substance, to him, is that if it is something in itself and not in another, we ought to be able to isolate it; but when we set aside the colour pattern and the series of sounds, etc., we are left with nothing. Now why/primary substance is to be real, it ~~ought to~~ ^{if} be available without anything inhering in it, and be known by us while not sensing, is a further assumption unwarranted by the definition. ~~What is it with the word "substance" when we say "A mere imaginary hook..."~~ Where was it suggested that we know Mr. Smith apart from our sensation ~~of him?~~ of him? To call Mr. Smith "A mere imaginary hook..." does not prove very help-ful, ~~and is not~~ except that it implies that what is not sensed per se is no more than the stuff that dreams are made on. Nor does it answer the question why we should find an imaginary hook so convenient.— Lord Russell had also ~~assumed~~ *imagined* that if substance is to be what Aristotle said it was ~~in the above definition~~ *in the definition* quoted above.

Russell

Here is an attempt to visualize what is meant by the name 'substance' as used by Aristotle, ~~first~~ first in terms of what is per se sensible, second in terms of ~~what~~ something else that is equally obscure. ~~He~~ The meaning he has in mind cannot be verified, while at the same time he cannot ~~never~~ fail to ~~refer~~ designate expressly what the name really means. What can we know about Mr. Smith? In his reply Lord Russell carries Mr. Smith with him. "When we look at him, we see a pattern of colours; when we listen to him talking, we hear a series of sounds." Lord Russell reduces Mr. Smith his colour pattern, to the series of sounds he brings the individual man to

Mr. Smith to his colour pattern, to the series of sounds he produces, ~~and so on~~ and so on ~~provided~~ provided they are not like substance. The man is reduced to a bundle of per se sensible objects. And this is intended as a manifestation of what it really is to be a Mr. Smith. ~~But~~ ~~the~~ ~~difficulty~~ ~~is~~ ~~that~~ ~~the~~ ~~man~~ ~~is~~ ~~reduced~~ ~~to~~ ~~a~~ ~~bundle~~ ~~of~~ ~~per~~ ~~se~~ ~~sensible~~ ~~objects~~ ~~and~~ ~~this~~ ~~is~~ ~~intended~~ ~~as~~ ~~a~~ ~~manifestation~~ ~~of~~ ~~what~~ ~~it~~ ~~really~~ ~~is~~ ~~to~~ ~~be~~ ~~a~~ ~~Mr.~~ ~~Smith~~ ~~But~~ ~~the~~ ~~difficulty~~ ~~is~~ ~~that~~ ~~the~~ ~~man~~ ~~is~~ ~~reduced~~ ~~to~~ ~~a~~ ~~bundle~~ ~~of~~ ~~per~~ ~~se~~ ~~sensible~~ ~~objects~~ ~~and~~ ~~this~~ ~~is~~ ~~intended~~ ~~as~~ ~~a~~ ~~manifestation~~ ~~of~~ ~~what~~ ~~it~~ ~~really~~ ~~is~~ ~~to~~ ~~be~~ ~~a~~ ~~Mr.~~ ~~Smith~~

The difficulty here is that in bundling sheer colour patterns and series of sounds he has given them the status of what he ~~intended~~ set out to avoid--substance. The result is even greater obscurity. ~~The~~ The assumption ~~is~~ was that if the incidentally sensible cannot be sensed per se, it is not really anything at ~~all~~ all, and the same could then be said of the mind in ~~as~~ much as it knows such an object. — A further criterion of the reality of substance, to him, is that if it is something in itself and not in another, we ought to be able to isolate it; but when we set aside the colour pattern and the series of sounds, etc., we are left with nothing. Now why/primary substance is to be real, it ~~ought~~ ought to be available without anything inhering in it, and be known by us while not sensing, is a further assumption unwarranted by the definition. ~~What~~ ~~is~~ ~~the~~ ~~difficulty~~ ~~is~~ ~~that~~ ~~the~~ ~~man~~ ~~is~~ ~~reduced~~ ~~to~~ ~~a~~ ~~bundle~~ ~~of~~ ~~per~~ ~~se~~ ~~sensible~~ ~~objects~~ ~~and~~ ~~this~~ ~~is~~ ~~intended~~ ~~as~~ ~~a~~ ~~manifestation~~ ~~of~~ ~~what~~ ~~it~~ ~~really~~ ~~is~~ ~~to~~ ~~be~~ ~~a~~ ~~Mr.~~ ~~Smith~~ Where was it suggested that we know Mr. Smith apart from our sensation ~~of~~ of him? To call Mr. Smith "A mere imaginary hook..." does not prove very help-full, ~~and~~ except that it implies that what is not sensed per se is no more than the stuff that dreams are made on. Nor does it answer the question why we should find an imaginary hook so convenient. — Lord Russell had also ~~assumed~~ *imagined* that if substance is to be what Aristotle said it was ~~in~~ in the ~~above~~ definition quoted above. ~~†~~

This is unwittingly made plain by Lord Russell where he rejects 'substance' as ~~an unnecessary existence~~ as being no more than a linguistic convenience.

[" 'Substance, in fact, of pounds.' "

p. 201.

What we see per se is a pattern of colour, and we hear per se a series of sounds, but not him; he is sensed incidentally. ~~Lord Russell~~

~~Yet Lord Russell cannot help perceiving him and saying as much~~ Yet Lord can no more help speaking of him than he can help perceiving ~~the~~ Mr. Smith when he sees and hears him. And if we cease to have a perception of we also cease to ...

Δ → yet, proceeding in that way, ~~But~~ in actually doing so, we ~~do not~~ burden the notion of substance with ~~all~~ properties that eventually ~~do not~~ make it untenable. ~~For instance~~ Lord Russell will try to visualize substance as something lies underneath some other thing like the floor beneath the table, when he says that Mr. Smith has no need of a substance "any more than the earth needs ~~to have~~ an elephant to stand upon." (p. 202.

The difficulty with ^{this} kind of incidentally
sensible object is that we unconsciously try
~~attempt~~ to make it more known to us
by ~~trying to~~ by expressing by reducing
it to something per se sensible, like they
who imply that ~~they would accept~~ substance would be acceptable if we
~~it~~ could be made to see one ~~like~~ in the way
in which we ~~can~~ see a figure. And this is

Natural, for sense is prior to reason. Some, ~~as~~
like Lord Russell, understand the ~~term~~
name substance of something that ~~is underneath~~
some other thing in the way the floor is subject
to ~~the~~ table, and the

substance 'under' the
sensible ~~object~~ objects like the
house under the roof.

'Substance' indeed just
means 'what stands ~~in~~

beneath', but the imposition of the name is changed when
we use ~~that~~ name to mean 'what can be neither said nor
be in another'. E.g. ~~as~~ Lord Russell says that

"Substance", ~~when taken seriously~~, in fact, of sounds."
While rejecting substance, he cannot escape enunciating it:

"When we look at him, when we hear him..." Indeed we
do not see him per se, what we see per se is a pattern of
colours, and what hear per se is a series of sounds. But he
is so incapable that we cannot ~~perceive~~ see colours or hear
sounds without

(1) In A History of Western Philosophy
he says that 'Mr. Smith' ~~he~~ has no
need of a substance ^{anyone} than the earth
needs an elephant to stand upon."
p. 102.

the substance of Socrates ought to be
really more "solid" than the things that ~~and "real"~~
happen to him. If that is what the definition
implied, substance would be less than an
imaginary hook still having reference to
some kind of real hook that one ~~can hang~~ 's hat can hang from.
~~one can hang from~~ Little wonder ~~than~~ that if it
~~substance~~ is to be real, the substance of
Mr. Smith ~~ought to be~~ with regard to the bundle
of occurrences that is he, ought to be
far more ~~sound than~~ than the elephant the
earth would need to rest upon. *Churdy*

Russell

A bundle of occurrences not being much
in the nature of what we say hello
to. But he is quite right:

Mr Smith is a collection of occurrences,
~~just as much~~ as he is bones and flesh
much

because we do not know it apart from per se sensible objects, but ~~the subject~~ ^{we do attain the subject - whatever it may be in itself -} as related to them in a per se way.

only The trouble with substance is that we at once try to visualize that which is incidentally sensible in terms of what is per se sensible: it seems that it would have a ~~less~~ clearer and more certain status if we could be made to perceive it in the way we see colours and shapes, or if we could identify it with ~~with something~~ hardness or solidity, resisting the sense of touch, like the "familiar" table of Sir Arthur Eddington's "two tables". And so we are ~~we~~ lead to believe that the whole notion of substance breaks down when the "substantial" table of familiar experience turns to be "mostly emptiness. Sparsely scattered in that emptiness are numerous electric charges rushing about with great speed; but their combined bulk amounts to less than a billionth of the bulk of the table itself." (1) And the same must hold for Socrates. He is nearly all empty space--"space pervaded, it is true, by fields of force, but these are assigned to the category of 'influences', not of 'things'. Even in the minute part which is not empty we must not transfer the old notion of substance. In dissecting matter into electric charges we have travelled far from that picture of it which gave rise to the conception of substance, and the meaning of that conception--if it ever had any--has been lost by the way." (2)

of if we could represent terms of weight, and

(1) The nature of the physical world, p. xii.

(2) ibid.

What then remains of Socrates, whom we had chosen as an instance of substance? Lord Russell, though unwittingly, makes ~~it~~ plain precisely where he attempts to show that Aristotle's "'Substance', in fact, is merely a convenient way of collecting events into bundles. What can we know ~~about~~ about Mr. Smith? When we look at him, we see a pattern of colours; when we listen to him talking, we hear a series of sounds. We believe that, like us, he has thoughts and feelings. But what is Mr. Smith apart from all these occurrences? A mere imaginary hook, from which the occurrences are supposed to hang. They have in fact no need of a hook, anymore than the earth needs an elephant to rest upon." (3)

this

Mistaken, completely, popularized for the purpose.

(3) A History of Western Philosophy, pp. 201-202.

9 Lord Russell does not probe the question ~~of~~ why we should find an imaginary hook so convenient, not to say ~~inescapable~~ inescapable: he states expressly that we see him, Mr. Smith, when we see that pattern of colours, and ~~we~~ listen to him talking when ~~we~~ we hear that series of sounds, and so on. And of

course if by 'knowable' we mean knowable absolutely by the ~~senses~~ senses, it is not only Mr. Smith as a subject in itself and not in another who "denotes something completely unknowable", as Lord Russell adds, but the talking too becomes quite unknowable if to understand the talk is not the same as hearing the series of sounds that convey what Mr. Smith is talking about.

Moreover, Lord Russell's understanding of substance as 'that which in itself and not in another' is such that he could easily unmask the term by simply pointing out that after all ~~xxxxxx~~ a man can be in a house, in the Universe, and even in the belly of whale, like an oyster in the stomach, where man and oyster, presumed to be substances, are ~~clearly~~ not only in ~~themselves~~ themselves but also clearly in something else. ~~And~~ ~~that~~ ~~is~~ ~~the~~ ~~case~~ ~~with~~ ~~the~~ ~~name~~ ~~Mr.~~ ~~Smith~~ ~~is~~ ~~a~~ ~~collective~~ ~~name~~ ~~for~~ ~~a~~ ~~number~~ ~~of~~ ~~occurrences~~ ~~and~~ ~~we~~ ~~continue~~ ~~to~~ ~~believe~~ ~~that~~ ~~his~~ ~~head~~ ~~his~~ ~~arms~~ ~~etc.~~ ~~are~~ ~~nevertheless~~ ~~intrinsic~~ ~~parts~~ ~~of~~ ~~him~~ ~~in~~ ~~a~~ ~~way~~ ~~we~~ ~~would~~ ~~not~~ ~~confuse~~ ~~with~~ ~~that~~ ~~in~~ ~~which~~ ~~the~~ ~~many~~ ~~sticks~~ ~~belong~~ ~~to~~ ~~their~~ ~~bundle~~ ~~On~~ ~~Lord~~ ~~Russell's~~ ~~view~~ ~~it~~ ~~is~~ ~~difficult~~ ~~to~~ ~~see~~ ~~how~~ ~~a~~ ~~name~~ ~~can~~ ~~be~~ ~~anything~~ ~~but~~ ~~collective~~ ~~when~~ ~~everything~~ ~~we~~ ~~know~~ ~~is~~ ~~always~~ ~~somehow~~ ~~collective~~ ~~many~~ ~~at~~ ~~least~~ ~~in~~ ~~attributes~~ ~~Besides~~ ~~he~~ ~~nowhere~~ ~~explains~~ ~~why~~ ~~we~~ ~~may~~ ~~ignore~~ ~~the~~ ~~very~~ ~~many~~ ~~ways~~ ~~in~~ ~~which~~ ~~the~~ ~~terms~~ ~~'one'~~ ~~and~~ ~~'many'~~ ~~are~~ ~~used~~ ~~To~~ ~~his~~ ~~mind~~ ~~even~~ ~~the~~ ~~name~~ ~~'point'~~ ~~would~~ ~~be~~ ~~collective~~ ~~since~~ ~~it~~ ~~to~~ ~~him~~ ~~it~~ ~~would~~ ~~mean~~ ~~'the~~ ~~class~~ ~~of~~ ~~points'~~ ~~while~~ ~~he~~ ~~might~~ ~~agree~~ ~~that~~ ~~'this~~ ~~particular~~ ~~point'~~ ~~has~~ ~~no~~ ~~name~~ ~~if~~ ~~he~~ ~~concurs~~ ~~that~~ ~~there~~ ~~is~~ ~~no~~ ~~particular~~ ~~name~~ ~~for~~ ~~the~~ ~~individuals~~ ~~of~~ ~~mathematics~~

On Lord Russell's view it is difficult to see how ~~any~~ any name could be anything but collective, when everything we know is always many in some sense

It was always known that a man, ~~is~~ though in a sense one, is also a composite, like of head, arms, legs, liver, etc, but this hardly lead to the discovery that 'Mr. Smith' is a collective name for a number of occurrences, while we continue to believe that his head, his arms, etc. are nevertheless intrinsic parts of him in a way we would not confuse with that in which the many sticks belong to their bundle. On Lord Russell's view it is difficult to see how a name can be anything but collective, when everything we know is always somehow ~~collective~~ many, at least in attributes. Besides, he nowhere explains why we may ignore the very many ways in which the terms 'one' and 'many' are ~~used~~ used. To his mind, even the ~~name~~ the name 'point' would be collective, since ~~it~~ to him it would mean 'the class of points', while he might agree that 'this particular point' has no name, if he concurs that there is no particular name for the individuals of mathematics.

Having described Mr. Smith in terms of what belongs to him as things of himself, like arms, head, electrical charges, all his emptiness, we still have not got rid of him, at least not verbally. Yet we can surely say that we have undone Mr. Smith, as well as ourselves including what we need to grasp the series of sounds as talking, on the assumption that nothing is, or is knowable in any way, except what can be expressed in terms of what is sensible absolutely. All the rest can be declared no more than like the stuff that dreams are made on—omitting the things such stuff might still refer to. In short, if ~~we~~ with Lord Russell ~~that~~ we agree that ~~the~~ the many ways in which the terms 'one' and 'many' are used ~~is~~ is of no account, Mr. Smith is actually a collection

course if by 'knowable' we mean per se knowable to the senses, Mr. Smith as a subject in itself and not in another as such - it "denotes something completely unknowable" (1) And ~~Lord Russell with~~ ~~feeling has solved his problem by~~ ~~declaring 'Mr. Smith's collective name~~ ~~for a bundle of events, one hardly~~ ~~knows it~~ It was always known that a man Mr. Smith is somehow a composite package of head, arms, legs, liver, etc., but ~~this hardly lead to~~ the discovery that ~~'Mr. Smith' is a~~ collective name for a number of occurrences, "when we continue to believe that this head, these arms, etc., are nevertheless his own." And if any name denoting an ensemble is a collective name, ~~it would follow that all names are collective.~~

(1) Michel, you note a joint can be collective - joint ☒

To Lord Russell's mind, even

as intrinsic part of him. (2)

in any other, verifiable way

M. Michel, note adjoints ☒

(2) If any name used in relation to an ensemble were therefore a collective one, it is difficult to see ~~how~~ what name could signify anything other. Even the name 'point' would signify the collection of points, while no 'this particular point' has a ~~name~~ proper name. ~~For to such a point would apply what he himself states elsewhere, "the only difference must lie in just that essence of individuality, which always eludes words and baffles description, but which, for that very reason, is irrelevant to science." Introduction to Mathematical Philosophy, p. 61.~~

Having described Mr. Smith in terms of what belongs to him as ~~the~~ ~~things of himself~~ like arms, head, electrical charges, all his emptiness, we still have not got rid of him. ~~And if this name is a collective name, it is a collective name for a bundle of events, one hardly knows it~~ Yet it is true ~~that verbally we can get rid of him, as well as of ourselves, including when we assume that nothing is, or is knowable in any way, except what can be expressed in terms of what is per se sensible. It is precisely what our imagination adds to substance as being substance that allows one to make such sport of the term.~~

what is required to understand this above all intellect,

on the assumption

library

the things

(at least not verbally)

what it is

That we can say that we disagreed with

Let the stuff that dreams are made on - without the things that stuff refers to

to prove the sense of words as talking

and Russell apparently uses the word substance ~~according to~~ in the sense of its original imposition—'what stands beneath' like the ~~the~~ foundation ~~is~~ beneath the house, or the man under the tree—, which provides him with something sturdy like an elephant supporting the earth. That is ~~precisely~~ precisely the "old notion of substance" ~~that we must dissociate from~~ which we must dissociate from what substance ~~is~~

And we should not be surprised at the consequences.

Is as is as ~~defined~~ defined here above. We see no reference in ~~it~~ that definition ~~to the peculiar kind of solid~~ to the peculiar kind of ~~solidity~~ solidity that Lord Russell assumes ~~it~~ ought to have, nor ~~that it is~~ to something beneath some other thing, like the floor ~~lying~~ under the table; neither does it exclude from ~~Mr. Smith~~ Mr. Smith almost innumerable parts of ~~partly different~~ ~~partly different~~ widely different orders; it does not specify that he should be made up of electrical charges, nor how far they should be apart, nor ~~what~~ at what speed they ought ~~to travel~~ to travel. Not that these things are irrelevant to the kind of ~~substance~~ substance Mr. Smith is: it only shows that we can know substance without knowing it to that point, just as we can know a horse well enough to designate one without knowing exactly what ~~it is to be a horse—we may even be confident that~~ we shall never get that far. It is remarkable how well we can know so little, ~~or~~ how little it takes to ~~disturb~~ disturb us in what we know best.

But also It is remarkable how difficult it is to ~~realize~~ realize just what it is that we know best so soon as we want to be exact about it; how little it takes to disturb about what ~~is~~ we actually know better

it is to be a horse. To know that it is a four-legged animal I do not even have to distinguish it as a horse, *be able to*

and this process could be carried back until I would confidently say that it is at least not nothing, while even ~~this~~ would not be answering all the doubts we might contrive about ~~it~~ that. It is remarkable how difficult it is to realize just what it is that we know best so soon as we want to be exact about it and how little it takes to be disturbed, *and deservedly so,* concerning what we actually know better. ~~Substance~~ ~~is a good example of what we know better immediately~~ What is better known we immediately burden with irrelevancies, and when evidence forces us to remove them, we believe that the better known has been carried off in their wake. That is literally what happens to all animals and plants: when it is learned that cats and mice are made up of electrical charges just like ~~inanimate~~ lifeless gases and stones, some wonder just how alive cats and mice are; and it is all the more perplexing when it is actually true that ~~these~~ they are a certain arrangement of particles or waves or both together or whatever they may be an arrangement of. *And how*

But ~~What would be really disappointing. But it would be most~~ *Some people feel relieved* disappointing of all ~~is~~ if this prevented them from ~~acting like~~ *to think that* behaving like ~~living~~ beings we call alive. *Man being no more than a bundle of events, he is not so human after all*

There would be real cause for *would be*

This implies that sensible substance, which the mind perceives per se, is sensible only incidentally, viz. as the subject of what is per se sensible. ~~the mind perceives per se~~ Now we have the meaning of the expression 'sensible matter': the subject of what is per se sensible. Sensible matter, then, is not per se sensible, but sensible incidentally. ~~only incidentally sensible~~ Assuming, for the moment, that intellect is that by which we know sensible matter, like the external sense is that by which we perceive what is sensible per se, why not call the incidentally sensible ~~sensible~~ matter intelligible matter? This would ~~be mistaken~~ show a mistaken ~~because~~ understanding of what incidental ~~refers~~ refers to here. We do not intend that the connection between substance and ~~per se~~ sensible qualities is incidental. It is not per accidens that a man ~~has~~ the shape of a man. ~~Incidental~~ Incidental qualifies how substance is known to the sense-faculty, viz. per accidens.

should have

Not ~~because~~ as if what is incid. sens. were only incidentally ~~sensible~~ connected with what is sens. per se.

abstracted from these bones and this flesh, and common
to all animals ~~except man~~ of which ~~man only~~
~~medicoter~~ can be said 'this is a man'. ~~So far as~~
~~'sensible' because 'what' we know of it is gathered from~~
~~sense experience.~~

In this abstraction, the terminus a quo is the individual,
sensible thing called Socrates, or Plato, matter - like the
bones and flesh of Socrates, which are intelligible only in potency,
and they ~~are~~ never become intelligible in act, although the
intellect ~~does~~ know them, but only with ~~actual~~ reference to an actual
sensation of ~~resistance~~ shape, ~~resistance~~ temperature,
colour, shape.

Show what is meant by 'intelligible in act' by means
of a construction. Then, that this is the terminus ad quem.
That we can never leave behind the qualitative sensation.

No identity ~~of~~ between having sensible matter and
being sensed, because then, if there were no sense to
sense them, all sensible things would cease to be at all.

Now we have the actuality that is required for
demonstration. This is a status which sensible things
can have in the mind only. It is not our business ~~to~~
to show here how this is thought about. For the moment
we can do not more than point out that it must be so.

Our senses do not reveal, by themselves, what the sensible
thing is. We should not be startled by the consideration
that some non-human animals may know that they have
sensation....

^{remain}
~~one~~, one with those we can actually ~~reach~~ reach
by our senses.

And we sometimes forget that the measure-numbers
of physics have to do with ~~metric~~ scales, clocks and
thermometers; they are not gathered freely like the
numbers and magnitudes of mathematics. They have
a background (metric system) a basic
of physics are those furnished by standards of length, by
scales, clocks, thermometers, and so on. ~~Webster defines~~
the meter ~~as~~ They are not gathered freely like the
numbers and magnitudes of mathematics. ~~Webster~~
~~Webster defines meter~~ "The meter as now defined

Two ideas
here:

- (a) ref. to
different kinds
of meas.
- (b) ref. to
smth.
designable.

Hence, 'sensible
matters' more so
here than
elsewhere.

is the distance between two lines on a certain platinum-iridium
bar kept at the International Bureau of Weights and Measures ~~was~~
in Paris, when this bar is at 0°C . or 32°F . Copies of
this bar are kept elsewhere." (Webster). Different kinds
of measure numbers, such as of ~~length~~ ^{weight and of} temperature,
~~and of time~~ are inseparable from the different kinds
of contrivances we use and operations we perform to obtain
the numbers them. A.V., There remains a background
that is ~~not the particular~~ more than ~~merely~~ incidentally
referred to by these ~~different~~ numbers.

Show the special way in which remain dependent
upon the sensible singular. The definitions are never
quite separable from designation of a singular.

Distinguish two kinds of dependence upon individuals.

The science ~~is~~ ~~of~~ that is the occasion of most of
the objections against the sensible realities is precisely
one which ~~cannot even get away from~~ could not even
get away from the individual sensible thing and
shall claim to be knowledge about reality.

Actually of another kind, free from the
limitation of sensible matter.

Cannot consider common sensibles
in abstraction, since they are per
se sensible. When we abstract from
sensible, we have objects and
propositions that ^{do} not hold of nature.

To be true they do not have to be in nature
like anything that is per se or incidentally
sensible. Truth is what is true of them in
abstraction.

Abstracted from the incidentally sensible subject.

Physical quantity has the nature of form with
regard to the incidentally sensible subject

Whereas with regard to this ^{incid. s.} subject the sensible
qualities ~~have~~ are in the nature of form, this
form cannot be abstracted from it when it
is part of their definition. But s.m. is not
part of the defin. of a quantity.

The truth of $1+2=2$ does not depend upon whether
one horse plus one horse are two horses.

$1+1=1+1$ } equiv. The art of calcul. does not
 $1+1=2$ } take this diff. into account.

Diff. between math. in the trad. sense and
math. as art of calculation. The latter is
logistics in the trad. sense of logic & metaph.

Do not have to know what the forms are to
perform a correct operation.

Separately to mind
that is typical of
quantity

When we cannot
use extension of
the intellect
concern. such
a subject.