LOCKE'S SCIENCE OF SIGNS: SEMEIOTICA

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INTRODUCTION

At the very end of the Essay Concerning Human Understanding, Locke sets forth a division of the sciences. He sees science as having three branches. The first he calls "natural philosophy" or "physica" (IV, 21, 2, p. 442).[1] Its concern is the "nature of things, as they are in themselves, their relations, and their manner of operation" (IV, 21, 1, p. 442). The second he calls "ethics" or "practica" (IV, 21, 3, p. 442). Its object of study is what "man himself ought to do, as a rational and voluntary agent, for the attainment of any end, especially happiness" (IV, 21, 1, p. 442). The third science he calls "the doctrine of signs" or "semeioticā" (IV, 21, 4, p. 443). Its field of study is "the ways and means whereby the knowledge of both [natural philosophy] and [ethics] are attained and communicated" (IV, 21, 1, p. 442).

This division of the sciences, it seems, is based upon a difference in the objects of study with which each is concerned. Natural philosophy is concerned with things as they are in themselves, and ethics is concerned with human actions aimed at an end, particularly happiness. These areas of study seem to be rather clearly set forth.

However, the domain of the third science, semeioticā, raises a perplexing question. Locke declares that its objects

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1. All pagination for Locke's Essay Concerning Human Understanding is from the edition edited by A. D. Woozley (New York, 1964).

are the signs which "the mind makes use of for the understanding of things, or conveying its knowledge to others" (IV, 21, 4, p. 443). It would seem, then, that the science of semeioticā would be concerned with words, since words are commonly considered to be signs.

To be sure, the science of semeioticā is concerned with words. However, it is also concerned with ideas. It is concerned with ideas and words as the great instruments of knowledge (IV, 21, 4, p. 443). Ideas, though, are not commonly considered to be signs. Thus the question arises why Locke considers ideas to be such.

It seems to me that this question is important. Locke's entire essay falls within the science of semeioticā. The Essay is a consideration of ideas and words as the "great instruments of knowledge". Hence, an examination of how it is that ideas as well as words are considered to be signs should shed light on fundamental views set forth by Locke in the Essay.

In this context, it should be noted that Locke considers the science of semeioticā to be a foundational science. It is the science of science itself. Its concern is to investigate the nature and bounds of human knowledge (i.e., science).

Locke declares at the beginning of the Essay that his purpose is "to inquire into the original, certainty, and extent of human knowledge, together with the grounds and degrees of belief, opinion, and assent" (I, 1, 2, p. 63; emphasis Locke's). He desires to discover wherein knowledge

consists, and distinguish knowledge or science from opinion.

Locke believes that this endeavor will be of practical value to his contemporaries who are working in the physical sciences. At the beginning of the Essay, he cites Boyle, Sydenham, Huygenius, and Newton as master-builders in the advance of science (p. 58). He declares that it is his ambition to be "an under-labourer in clearing ground a little, and removing some of the rubbish that lies in the way to knowledge. . ." (p. 58).

It seems to me that Locke lets modesty temper the expression of his ambition. What he hopes to do in his Essay is lay a foundation for the further development of science. He declares that he hopes to remove rubbish. But he will accomplish that negative task by a positive investigation of the nature of knowledge which will expose the rubbish for what it is.

Locke, in a sense, is as much a master-builder as Boyle, Huygens, or Newton. He is a pioneer in what he considers to be one of the three sciences: the science of semeioticā. He sees the need for a new treatment of knowledge, and attempts in his Essay to meet that need. Furthermore, the science he is working in is foundational to the other two; namely, natural philosophy and ethics. Thus, his work in semeioticā should aid the work of men like Boyle and Newton in natural philosophy.

It seems to me, then, an examination of how it is for Locke that both ideas and words are signs should turn up

results which have a direct bearing on the natural sciences. It should show, on the one hand, that some views of natural philosophy are rubbish hindering natural science, and must be cleared away. And, on the other hand, it should show the correct path for natural science to follow if it would continue its advance.

In examining Locke's view of ideas and words as signs, it would be well to consider ideas first and then, in the second part of the paper, take up the issue of words.

IDEAS AS SIGNS

Before his father died in 1660-1, Locke made an entry concerning philosophy in his father's memorandum book. Here he set forth a division of philosophy into three parts.

PHILOSOPHY

> It is sorted into three parts, namely, Physic, Ethic, and Dialectic.
>
> Physic is to discern and judge of the world and of such things as are therein.
>
> Ethic is to treat of life and manners.
>
> Dialectic, that is, Logic, to make reasons to grow, and improve both Physic and also Ethic, which is Moral Philosophy.[2]

The entry continues with further thoughts on moral philosophy.

It seems, then, that Locke came to view science or philosophy as tripartite at an early date. In the Essay, he maintains the division and ordering of the sciences set forth above, except for a change in the name of the third science;

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2. Quoted by H. R. Fox Bourne, The Life of John Locke (New York, 1876), vol. 1, p. 70.

namely, what is called 'dialectic' above. In the Essay, he calls this science the 'doctrine of signs' or 'semeiotica'.

What led Locke to make this change? It is likely that during the time between the entry in the memorandum book and the writing of the Essay, Locke came upon considerations which induced him to view ideas as signs. It was during this time that he became a friend of Robert Boyle,[3] and a member of the Royal Society.[4] Boyle was one of the foremost advocates of corpuscularianism, which I shall examine as one of the two considerations upon which the view of ideas as signs rests. The other I shall contend is Locke's view that mental processes and entities are ontologically distinct from material things. I shall treat the latter consideration first, and then take up corpuscularianism.

THE ONTOLOGICAL DISTINCTNESS OF THE MIND

It seems to me rather obvious that Locke believed mental processes and ideas to be ontologically distinct from material entities and processes. In setting forth the origin of our ideas, Locke finds two and only two sources. One is external sensible objects; the other is the internal operations of our minds. He declares,

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3. Maurice Cranston, John Locke A Biography (New York, 1957), pp. 74-77.

4. Ibid., pp. 116-117.

> Our observation employed either about external sensible objects, or about the internal operations of our minds perceived and reflected on by ourselves, is that which supplies our understandings with all the materials of thinking. These two are the fountains of knowledge, from whence all the ideas we have, or can naturally have, do spring (II, 1, 2, pp. 89-90).

The ideas of sensation are caused by material bodies affecting the senses, which then convey to the mind whatever it is that produces ideas therein (II, 1, 3, p. 90). The ideas of sensation arise from material bodies and are about material bodies.

The ideas of the mind's mental processes arise from an entirely different source; namely, the mind's own operations perceived through reflection. Locke declares that this "source of ideas every man has wholly in himself. . ." (II, 1, 4, p. 90). Thus, the ideas of the mind's operations, ideas such as perception, thinking, doubting, and willing, constitute a set of ideas distinct from those of material operations. These ideas are not caused by material bodies, and <u>could</u> not be so caused <u>(ibid.)</u>.

The operations of the mind are a source of ideas distinct from the operations of all material bodies. Its operations are of a different kind from the operations of material bodies. Specifically, its operations are immaterial, while those of bodies are material.

According to Locke, the nature of the mind's operations is so distinct from the nature of the operations of physical bodies that we are convinced a spiritual substance underlies

mental operations.

> For whilst I know, by seeing or hearing, &c., that there is some corporeal being without me, the object of that sensation, I do more certainly know that there is some spiritual being within me that sees and hears. This, I must be convinced, cannot be the action of bare insensible matter; nor ever could be, without an immaterial thinking being (II, 23, 15, p. 193).

Ideas of sensation, on the one hand, lead the mind to form a concept of material substances. Ideas of mental operations, on the other hand, lead the mind to form a concept of immaterial substances.

> For putting together the ideas of thinking and willing, or the power of moving or quieting corporeal motion, joined to substance, of which we have no distinct idea, we have the idea of an immaterial spirit; and by putting together the ideas of coherent solid parts, and a power of being moved, joined with substance, of which likewise we have no positive idea, we have the idea of matter. The one is as clear and distinct an idea as the other: the idea of thinking, and moving a body, being as clear and distinct ideas as the ideas of extension, solidity, and being moved (II, 23, 15, p. 192).

I am not arguing here that Locke believed in two kinds of substance: material and immaterial. For in the case of both, the idea of substance itself is not clear or distinct, and, indeed, is the same idea. What is clear and distinct are the ideas of bodies' operations and the ideas of the mind's operations. And these sets of ideas are so different from each other that they lead to the supposition of substances of two different kinds: material and immaterial.

Locke's conviction that the operations of the mind are a reality distinct from the operations of bodies is implicit

at the beginning of the Essay. In the introduction, he states that he will inquire into the nature of human knowledge, but will not examine the mind's physical aspect.

> This, therefore, being my purpose - to inquire into the original, certainty, and extent of human knowledge, together with the grounds and degrees of belief, opinion, and assent - I shall not at present meddle with the physical consideration of the mind; or trouble myself to examine wherein its essence consists; or by what motions of our spirits or alterations of our bodies we come to have any sensation by our organs, or any ideas in our understandings; and whether those ideas do in their formation, any or all of them, depend on matter or no. These are speculations which, however curious and entertaining, I shall decline, as lying out of my way in the design I am now upon (I, 1, 2, pp. 63-64; emphasis Locke's).

The physical aspect of the mind and the mental operations of the mind are distinct enough for the mental operations to be investigated in abstraction from the physical ones.

Not only are the operations of the mind ontologically distinct from the material operations of bodies, but the basic "materials" upon which and with which the mind works are ontologically distinct from physical entities and qualities. I am here speaking of the concrete contents of sensory experience; i.e., ideas of sensation. They are occurrences which are unique to the mind and its immaterial operations.

In distinguishing these ideas from abstract ideas or thoughts, Locke sometimes refers to them as "particular" ideas (I, 2, 15, p. 72; II, 1, 7, p. 92; II, 8, 17, p. 115; II, 11, 11, p. 130). They are the contents of sensory experience just as they are received from the senses (II, 11, 11, p. 130); i.e., the light, colors, sounds, etc. which force

themselves on the mind (II, 1, 6, p. 92). They are occurrences in one's experience, some of which occur more constantly than others, such as the idea of solidity (II, 4, 1, p. 103). Since the mind is largely passive in its reception of these ideas (II, 9, 1, p. 119), Locke sometimes refers to them as "impressions" made upon the mind (II, 1, 24, p. 98), some being deeper and more lasting than others (II, 1, 8, p. 92; II, 1, 22, p. 97). He also speaks of them as being "imprinted" upon the mind (II, 1, 6, p. 92).

Locke takes pains to distinguish the particular ideas of sensation from the modifications of matter in the bodies which cause the ideas. He writes,

> To discover the nature of our ideas the better, and to discourse of them intelligibly, it will be convenient to distinguish them as they are ideas or perceptions in our minds; and as they are modifications of matter in the bodies that cause such perceptions in us. . . (II, 8, 7, p. 111; emphasis Locke's).

The ideas are mental realities which are present to the mind. They are distinct from the material entities, powers, and operations which produce them.

> Whatsoever the mind perceives in itself, or is the immediate object of perception, thought, or understanding, that I call idea; and the power to produce any idea in our mind I call quality of the subject wherein that power is (II, 8, 8, pp. 111-112; emphasis Locke's).

Since an idea is not a physical entity, it is incommensurable with and irreducible to a physical entity or process. A simple idea, for instance, cannot be defined by explaining its physical cause. In illustrating this point, Locke uses

light as an example. He says,

> Those who tell us that light is a great number of little globules, striking briskly on the bottom of the eye, speak more intelligibly than the Schools; but yet these words never so well understood would make the idea the word 'light' stands for no more known to a man that understands it not before, than if one should tell him that light was nothing but a company of little tennis-balls which fairies all day long struck with rackets against some men's foreheads whilst they passed by others (III, 4, 10, pp. 274-275).

In this context, it is worth noting what Locke says about positive ideas which are derived from "privative causes". According to Locke, some simple ideas of sensation may be caused by "privations" in physical objects.

> Concerning the simple ideas of sensation, . . . whatever be the external cause of it, when it comes to be taken notice of by our discerning faculty, it is by the mind looked on and considered there to be a real positive idea in the understanding, as much as any other whatsoever; though, perhaps, the cause of it be but a privation in the subject.
>
> Thus the ideas of heat and cold, light and darkness, white and black, motion and rest, are equally clear and positive ideas in the mind, though, perhaps, some of the causes which produce them are barely privations, in those subjects from whence our senses derive those ideas (II, 8, 1-2, p. 110).

Since the idea is a reality distinct from the physical object, it can be a positive reality while its cause is a privation in a physical object. Locke makes this point in reference to the ideas mentioned in the above quotation.

> These the understanding, in its view of them, considers all as distinct positive ideas, without taking notice of the causes that produce them; which is an inquiry not belonging to the idea, as it is in the understanding, but to the

> nature of the things existing without us. These are two very different things, and carefully to be distinguished, it being one thing to perceive and know the idea of white or black, and quite another to examine what kind of particles they must be, and how ranged in the superficies, to make any object appear white or black (II, 8, 2, p. 110).

Not only can ideas of sensation not be explained in terms of their material cause, they ultimately depend upon the mind for their existence. A material impulse on a sense organ is not sufficient to cause an idea of sensation in the mind. For an idea to come into being, the mind must take notice of the impression. Locke writes as follows.

> A sufficient impulse there may be on the organ, but, it not reaching the observation of the mind, there follows no perception; and though the motion that uses to produce the idea of sound be made in the ear, yet no sound is heard. Want of sensation, in this case, is not through any defect in the organ, or that the man's ears are less affected than at other times when he does hear; but that which uses to produce the idea, though conveyed in by the usual organ, not being taken notice of in the understanding, and so imprinting no idea on the mind, there follows no sensation (II, 9, 4, p. 120).

In other words, the domain of physical causation stops short of the mind and its ideas. The mind and its ideas are a distinct reality. Physical impulses can reach in a self-sufficient causal chain from the external body to the sense organ and up to the mind. But at the mind, the self-sufficient causal chain is broken. No idea is produced unless the mind takes notice of the impression. Thus, a distinction between physical and mental reality is maintained by Locke. An idea is a mental reality and hence depends upon the mind for

its existence.

It should be mentioned in this context that Locke does not believe the mind can create ideas ex nihilo. Simple ideas depend upon the mind's attention for their existence, but that attention must be directed toward a physical object or an operation of the mind itself. Only in this way can the mind obtain ideas. It cannot create ideas out of nothing; nor can it destroy them. In Locke's words,

> These simple ideas, the materials of all our knowledge, are suggested and furnished to the mind only by those two ways above mentioned, viz. sensation and reflection. When the understanding is once stored with these simple ideas, it has the power to repeat, compare, and unite them, even to an almost infinite variety, and so can make at pleasure new complex ideas. But it is not in the power of the most exalted wit, or enlarged understanding, by any quickness or variety of thought, to invent or frame one new simple idea in the mind, not taken in by the ways before mentioned: nor can any force of the understanding destroy those that are there (II, 2, 2, pp. 99-100; emphasis Locke's).

For Locke, then, there are, in a sense, two basic worlds with which man has to deal. One is the physical world of material bodies. The other is the mental world of ideas. In neither world does man create the basic entities found therein. All he can do is manipulate them. In speaking of the manipulation of ideas, Locke says,

> This shows man's power, and its way of operation, to be much what the same in the material and intellectual world. For the materials in both being such as he has no power over, either to make or destroy, all that man can do is either to unite them together, or to set them by one another, or wholly separate them (II, 12, 1, p. 132).

I think, then, that we can conclude with some assurance

that Locke considers the physical world of material bodies and operations and the mental world of immaterial ideas and mental operations to be ontologically distinct. That which is immediately present to the mind are ideas, not physical objects. The problem then arises as to how ideas of sensation are related to the physical objects which are the causes of the ideas and which the ideas are about.

It seems to me that it is this consideration which in part induced Locke to think of ideas as signs. It is to this he refers when he sets forth the conception of ideas as signs.

> For, since the things the mind contemplates are none of them, besides itself, present to the understanding, it is necessary that something else, as a sign or representation of the thing it considers, should be present to it: and these are ideas (IV, 21, 4, p. 443; emphasis Locke's).

Nevertheless, the ontological distinctness of matter and mind does not by itself require that the relationship of ideas to material qualities be that of sign to signified. Rather, it requires merely that a mental correlate of the material quality be present to the mind. Whether that correlate is or need be a sign must yet be established.

However, if the material world would be known, the mental correlate immediately present to the mind must bear a relationship to its material counterpart such that the mental correlate in some way imparts knowledge or conveys information with regard to that counterpart. It must be of use in gaining knowledge of the material entity to which it corresponds. It is probably this Locke had in mind when he

declared it necessary that something else "as a sign or representation" of the material entity be present to the mind.

It should be noted that it is only material things which are not immediately present to the mind. The operations of the mind itself are immediately present to it. Locke says, "For, since the things the mind contemplates are none of them, besides itself, present to the understanding, it is necessary that. . . a sign. . . should be present to it. . ." (IV, 21, 4, p. 443; emphasis mine).

This raises a problem with regard to ideas of reflection. Since the operations of the mind are immediately present to the mind, it would seem that these mental processes do not need mental correlates to be known by the mind. Thus, Locke leaves open the possibility that only ideas of sensation are mental correlates of the object being known; ideas of reflection are not.

CORPUSCULARIANISM

As stated above, it seems to me that the second consideration which induced Locke to view ideas as signs is his belief in corpuscularianism. There has been some debate about the nature of Locke's belief in corpuscularianism. But of the authors which I have read, all hold that Locke did accept a corpuscular view of matter.

R. M. Yost has argued that Locke believed most, if not all, observable events are dependent upon sub-microscopic corpuscular mechanisms. However, Locke did not believe that

such corpuscular mechanisms could ever be observed through the use of scientific apparatus, and that the attempt to do so was a waste of time.[5] Laurens Laudan has suggested that Locke accepted the corpuscular view as a sound hypothesis, but not as scientific truth; i.e., knowledge in a strict sense.[6] David Givner has claimed that for Locke the corpuscular hypothesis was an assumption.[7] Maurice Mandelbaum has argued in no uncertain terms that corpuscularianism was essential to Locke's epistemology and metaphysics.[8] John Yolton has declared that there can be "no question about Locke's acceptance of the corpuscular theory as an account of the nature of matter and as an explanation of the causation of perception".[9]

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5. R. M. Yost, "Locke's Rejection of Hypotheses about Sub-Microscopic Events", Journal of the History of Ideas, XII (January, 1951), pp. 111-130.

6. Laurens Laudan, "The Nature and Sources of Locke's Views on Hypotheses", Journal of the History of Ideas, XXVIII (April-June, 1967), pp. 211-23.

7. David H. Givner, "Scientific Preconceptions in Locke's Philosophy of Language", Journal of the History of Ideas, XXIII (1962), pp. 140-54.

8. Maurice Mandelbaum, "Locke's Realism", Philosophy, Science, and Sense Perception: Historical and Critical Studies (Baltimore, 1964), pp. 1-60.

9. John W. Yolton, Locke and the Compass of Human Understanding (Cambridge, 1970), p. 64.

It seems that there were two main reasons for the acceptance of corpuscularianism by seventeenth century scientists: (1) the work done with the microscope in the seventeenth century, and (2) the ability of the corpuscularian hypothesis to explain physical changes.

Concerning the first, Boyle, in The Sceptical Chymist (1661), made reference to the microscope in that regard. He wrote,

> PROPOSITION I. - It seems not absurd to conceive, that at first production of mixt bodies, the universal matter whereof they among other parts of the universe consisted, was actually divided into little particles, of several sizes and shapes, variously moved. . . .
>
> . . . Besides that which happens in the generation, corruption, nutrition, and wasting of bodies, that which we discover partly by our microscopes of the extreme littleness of even the scarce sensible parts of concretes, and partly by the chymical resolution of mixt bodies, and by divers other operations of spagyrical fires upon them, seems sufficiently to manifest their consisting of parts very minute and of differing figures.[10]

Henry Power, Robert Hooke, and Isaac Newton all believed that through the development of more powerful microscopes eventually the smallest corpuscles could be seen.[11] In the preface to his Micrographia, Hooke wrote the following.

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10. Robert Boyle, The Sceptical Chymist contained in Robert Boyle on Natural Philosophy by Marie Boas Hall (Bloomington, 1965), p. 211.

11. Laurens Laudan, "The Clock Metaphor and Probabilism: The Impact of Descartes on English Methodological Thought, 1650-65", Annals of Science, XXII (June, 1966), pp. 100-103. R. Yost, op. cit., pp. 119-120.

> It seems not improbable, but that by these helps [i.e., improved optical instruments] the subtilty of the composition of Bodies, the structure of their parts, the various texture of their matter, the instruments and manner of their inward motions, and all the other possible appearances of things, may come to be more fully discovered.[12]

In his Opticks, Newton related the discovery of the corpuscles to research on colors. He wrote,

> It is not impossible but that Microscopes may at length be improved to the discovery of the Particles of Bodies on which their Colours depend, if they are not already in some measure arrived to that degree of perfection. For if those Instruments are or can be so far improved as with sufficient distinctness to represent Objects five or six hundred times bigger than at a Foot distance they appear to our Naked Eyes, I should hope that we might be able to discover some of the greatest of those Corpuscles. And by one that would magnify three or four thousand times perhaps they might all be discover'd, but those which produce blackness.[13]

It is in relation to colors that Locke discusses one of the discoveries of the microscope. He says,

> Had we senses acute enough to discern the minute particles of bodies, and the real constitution on which their sensible qualities depend, I doubt not but they would produce quite different ideas in us; and that which is now the yellow colour of gold would then disappear, and instead of it we should see an admirable texture of parts, of a certain size and figure. This microscopes plainly discover to us; for what to our naked eyes produces a certain colour, is, by thus augmenting the acuteness of our senses, discovered to be quite a different thing; and the thus altering, as it were, the proportion of the bulk of the minute parts of a coloured object

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12. Robert Hooke, Micrographia quoted by R. M. Yost, op. cit., p. 119.

13. Isaac Newton, Opticks quoted by R. M. Yost, op. cit., p. 119.

> to our usual sight produces different ideas from what it did before. Thus, sand or pounded glass, which is opaque, and white to the naked eye, is pellucid in a microscope; and a hair seen in this way loses its former colour, and is, in a great measure, pellucid, with a mixture of some bright sparkling colours, such as appear from the refraction of diamonds, and other pellucid bodies. Blood, to the naked eye, appears all red; but by a good microscope, wherein its lesser parts appear, shows only some few globules of red, swimming in a pellucid liquor, and how these red globules would appear, if glasses could be found that yet could magnify them a thousand or ten thousand times more, is uncertain (II, 23, 11, pp. 190-191).

In the last sentence of this passage, Locke poses the question how the blood globules would look under a much greater degree of magnification. That raises the issue whether Locke believed that it was possible in principle to actually observe the most minute corpuscles, given the proper optical equipment. It seems to me that the answer is yes. Locke believed that at least in principle it was possible. In the passage on microscopic eyes, Locke declares that a person having such eyes "would come nearer the discovery of the texture and motion of the minute parts of corporeal things, and in many of them probably get ideas of their internal constitutions. . ." (II, 23, 12, p. 191). With microscopic eyes, then, a person could get closer to actually seeing the minute corpuscles - their texture and motions. When Locke says that "in many of them probably get ideas of their internal constitutions", I take it he is here referring to things whose corpuscles are a bit larger

than most. In the case of these objects, the person would be able to see the corpuscles and, hence, the internal constitution of these things.

There is another passage which indicates Locke's belief that it is possible in principle to see the corpuscles which make up physical things. This passage occurs in the chapter on the extent of human knowledge. He points out that we are ignorant of some things because they are too remote, i.e., too distant, from us, and other things because they are too minute (IV, 3, 24, p. 342). In discussing the bodies which are too minute, he at first makes it sound as if these corpuscles are too small to ever be seen. He refers to our ignorance of their qualities as "incurable".

> These insensible corpuscles being the active parts of matter, and the great instruments of nature, on which depend not only all their secondary qualities, but also most of their natural operations, our want of precise distinct ideas of their primary qualities, keeps us in an incurable ignorance of what we desire to know about them (IV, 3, 25, p. 343).

However, it seems to me that in the following sentences Locke makes it clear that the ignorance is not absolutely incurable. It is incurable only at the present time; i.e., at the time the Essay was being written. At some future time, scientific instruments may enable the corpuscles to be known by the senses. Locke writes,

> I doubt not but if we could discover the figure, size, texture, and motion of the minute constituent parts of any two bodies, we should know without

> trial several of their operations one upon another; as we do now the properties of a square or triangle. But whilst we are destitute of senses acute enough to discover the minute particles of bodies, and to give us ideas of their mechanical affections, we must be content to be ignorant of their properties and ways of operation; nor can we be assured about them any further than some few trials we make are able to reach. But whether they will succeed again another time we cannot be certain (IV, 3, 25, p. 343).

The ignorance of the corpuscles is put within the context of time in this passage. It is not absolute. It is experienced in the present because the senses are not acute enough. But that does not rule out knowledge of the corpuscles at some future date. In principle, it is possible to see the corpuscles. And given the development of scientific instruments, such as higher powered microscopes, that possibility could become a reality.

It should be noted in this regard that for Locke, the real essence of a material body is its corpuscular constitution. ". . . The real essence is the constitution of the insensible parts of that body, on which those qualities and all other properties of [it] depend" (III, 6, 2, p. 284). Since this constitution is knowable in principle, the real essence of a material substance is knowable in principle. It does not lie beyond the transcendental bounds of human cognition, as some might, for instance, consider the Kantian thing-in-itself.

The second main reason for the acceptance of corpuscularianism by seventeenth century scientists was the belief

that the corpuscularian hypothesis was able to explain physical changes. This consideration was very important to Boyle. He felt that the Aristotelian and Spagyrist principles did not have the explanatory power wielded by the corpuscularian theory. First, their principles were not as intelligible as those of corpuscularianism. He wrote,

> The first thing, that I shall mention to this purpose, is the intelligibleness or clearness of mechanical principles and explications. I need not tell you, that among the Peripateticks, the disputes are many and intricate about matter, privation, substantial forms, and their education, &c. And the chymists are sufficiently puzzled, (as I have elsewhere shown,) to give such definitions and accounts of their hypostatical principles, as are reconcileable to one another, and even to some obvious phaenomena. And much more dark and intricate are their doctrines about the Archeus, Astral Beings, Gas, Blas, and other odd notions, which perhaps have in part occasioned the darkness and ambiguity of their expressions, that could not be very clear, when their conceptions were so far from being so.[14]

Second, their principles could not explain the phenomena in the natural world. Boyle continued,

> And if the principles of the Aristotelians and Spagyrists are thus obscure, it is not to be expected, the explications, that are made by the help only of such principles should be clear. And indeed many of them are either so general and slight, or otherwise so unsatisfactory, that granting their principles, it is very hard to understand or admit their applications of them to particular phaenomena.[15]

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14. Robert Boyle from selections of his works edited by Marie Boas Hall, op. cit., pp. 189-190.

15. Ibid., p. 190.

The Aristotelian and Spagyrist principles simply do not explain how physical changes take place.

> They, [the Aristotelians and Spagyrists,] that, to solve the phaenomena of nature, have recourse to agents, which, though they involve no self-repugnancy in their very notions, as many of the judicious think substantial forms and real qualities to do, yet are such, that we conceive not, how they operate to bring effects to pass: these, I say, when they tell us of such indeterminate agents, as the soul of the world, the universal spirit, the plastic power, and the like; though they may in certain cases tell us some things, yet they tell us nothing, that will satisfy the curiosity of an inquisitive person, who seeks not so much to know, what is the general agent, that produces a phaenomenon, as, by what means, and after what manner, the phaenomenon is produced.[16]

Boyle believed that the corpuscular principles were both intelligible and explanatory of the phenomena of nature. In constrasting them with the Aristotelian and Spagyrist principles, he wrote,

> But to come now to the corpuscular philosophy, men do so easily understand one another's meaning, when they talk of local motion, rest, bigness, shape, order, situation, and contexture of material substances. . . .[17]

The corpuscular principles were intelligible, basic, simple, and comprehensive. Boyle called them "fertile catholick principles".[18] By reference to them, i.e., matter (size, texture, figure, etc.) and motion, the corpuscularian can explain how the effects of a physical body are produced.

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16. Ibid., p. 196.

17. Robert Boyle, op. cit., p. 190.

18. Ibid., p. 193.

Since Locke assumes the corpuscular principles in the Essay, he does not specifically argue that the corpuscular principles are intelligible and explanatory of physical phaenomena. But he does declare that the idea of substantial forms does not explain physical phaenomena (III, 3, 17, p. 271). He asserts that what is needed to understand physical substances is an apprehension of the object's corpuscular or mechanical qualities.

> Before we can have any tolerable knowledge of [substances], we must first know what changes the primary qualities of one body do regularly produce in the primary qualities of another, and how. Secondly, we must know what primary qualities of any body produce certain sensations or ideas in us. This is in truth no less than to know all the effects of matter, under its diverse modifications of bulk, figure, cohesion of parts, motion and rest (IV, 6, 14, p. 363).

Locke seems to accept Boyle's idea that it is only through the corpuscular principles that physical bodies can be understood. In his discussion of how primary qualities produce ideas, Locke declares that the only way we can conceive of bodies operating is by impulse. He says,

> The next thing to be considered is, how bodies produce ideas in us; and that is manifestly by impulse, the only way which we can conceive bodies to operate in (II, 8, 11, p. 113).

It seems to me that Locke accepted the corpuscularian hypothesis for basically the same reasons as his seventeenth century corpuscularian contemporaries. However, Locke's acceptance of the corpuscularian hypothesis in general does not mean that Locke believed at present corpuscularian

explanations could be given for the nature of particular substances. Locke did not believe that this could be done in his time. No scientific instruments were acute enough to discover the corpuscles of any substance.

In other words, as Locke sees it, man has clear ideas of the primary qualities upon which the corpuscularian principles are based. He has ideas of solidity, bulk, size, figure, shape, texture, situation, local motion, etc. Hence, the corpuscularian principles are intelligible. However, he does not in Locke's time have ideas of the particular size, figure, shape, texture, or motion of the corpuscles which compose any specific material substance. Those ideas he lacks. In a discussion of this in relation to gold, Locke says,

> For I have an idea of figure, size, and situation of solid parts in general, though I have none of the particular figure, size, or putting together of parts whereby the qualities [of gold] above mentioned are produced; which qualities I find in that particular parcel of matter that is on my finger, and not in another parcel of matter, with which I cut the pen I write with (II, 31, 6, p. 239).[19]

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19. Locke goes on to contrast the corpuscularian principles with the Aristotelian principle of substantial form, saying, "But, when I am told that something besides the figure, size, and posture of the solid parts of that body is its essence, something called substantial form, of that I confess I have no idea at all, but only of the sound 'form'; which is far enough from an idea of its real essence or constitution" (II, 31, 6, p. 139; emphasis Locke's).

For Locke if a person had ideas of the primary qualities of the corpuscles which make up the "internal constitution" of a particular substance, he could deduce from them all of the other properties and powers of the substance. We know that the complex ideas we have of substances at present are not the real essence of the substance, since they do not permit such a deduction.

> The complex ideas we have of substances are, as it has been shown, certain collections of simple ideas that have been observed or supposed constantly to exist together. But such a complex idea cannot be the real essence of any substance; for then the properties we discover in that body would depend on that complex idea, and be deducible from it, and their necessary connexion with it be known; as all properties of a triangle depend on, and, as far as they are discoverable, are deducible from the complex idea of three lines including a space (II, 31, 6, pp. 238-239).

In short, Locke accepts the corpuscularian view of physical bodies in general, but does not believe that knowledge of the corpuscles of any particular substances has been attained.

It seems to me the corpuscularian view commits one to the belief that the way the physical world appears to the unaided senses is not the way it is "in itself". In other words, the physical world would look very different to a man who could see and feel its minute corpuscles than it does to the man who sees it with the naked eye. Locke alludes to this in the passage on a man with microscopic eyes. He says,

> Were our senses altered, and made much quicker and acuter, the appearance and outward scheme of things would have quite another face to us. . . . If that most instructive of our senses, seeing, were in any man a thousand or a hundred thousand times more acute than it is now by the best microscope, things several millions of times less than the smallest object of his sight now would then be visible to his naked eyes, and so he would come nearer the discovery of the texture and motion of the minute parts of corporeal things, and in many of them probably get ideas of their internal constitutions; but then he would be in a quite different world from other people: nothing would appear the same to him and others; the visible ideas of everything would be different. So that I doubt whether he and the rest of men could discourse concerning the objects of sight, or have any communication about colours, their appearance being so wholly different (II, 23, 12, pp. 191-192).

It becomes clear, then, that the world as we experience it in our everyday life is not the material world as it is "in itself". We do not see the physical world as it "really is". Our ideas of bodies do not directly or immediately reveal the real essence of such bodies.

The question then arises as to the nature and role of the ideas we have of physical objects in our everyday life. How are these ideas connected with the corpuscular qualities of physical bodies? Do they in any way give us knowledge of the internal constitution of these bodies?

In order to answer these questions, we must examine in more detail Locke's view of ideas of sensation. According to Locke, all ideas of sensation are caused by minute corpuscles which proceed from the physical body to the human sense organ, imparting a motion to the sense organ. That

motion is conveyed to the brain and produces an idea of sensation in the mind.

Locke holds to a corpuscularian account of the origin of ideas of sensation for both ideas of primary qualities and ideas of secondary qualities. With reference to ideas of primary qualities, he writes,

> If then external objects be not united to our minds when they produce ideas therein, and yet we perceive these original qualities in such of them as singly fall under our senses, it is evident that some motion must be thence continued by our nerves, or animal spirits, by some parts of our bodies, to the brains or the seat of sensation, there to produce in our minds the particular ideas we have of them. And since the extension, figure, number, and motion of bodies of an observable bigness, may be perceived at a distance by the sight, it is evident some singly imperceptible bodies must come from them to the eyes, and thereby convey to the brain some motion; which produces these ideas which we have of them in us (II, 8, 12, p. 113; emphasis Locke's).

With reference to ideas of secondary qualities, he writes,

> After the same manner that the ideas of these original qualities are produced in us, we may conceive that the ideas of secondary qualities are also produced, viz. by the operation of insensible particles on our senses (II, 8, 13, p. 113; emphasis Locke's).

Note that Locke here refers to the product of the causal chain as "particular ideas". As explained earlier (p.8), particular ideas are concrete contents of sensory experience; i.e., "sensations" (II, 8, 13, p. 114; II, 8, 14, p. 114; II, 8, 16, p. 114-115). Thus the ideas of sensation referred to here are occurrences in one's sensory experience, the end product or effect of corpuscular action on the sense organ

(II, 8, 18, p. 115).

Locke does not distinguish between ideas of primary qualities and ideas of secondary qualities on the basis of their causes. Both have the same cause; namely, corpuscles. They are distinguished by their content as it relates to the qualities of corpuscles.

According to Locke corpuscles have certain qualities which are "essential" to their being. He calls these qualities "original" or "primary". He considers these qualities to be inseparable from a corpuscle. They are inseparable in two senses. First, sense experience always finds them present in every material body (which, of course, includes corpuscles).

> Qualities thus considered in bodies are,
> First, such as are utterly inseparable from the body, in what estate soever it be; and such as in all the alterations and changes it suffers, all the force can be used upon it, it constantly keeps; and such as sense constantly finds in every particle of matter which has bulk enough to be preserved. . . (II, 8, 9, p. 112).

Second, the mind in its conception of matter finds these qualities to always be present even in bodies too small to be experienced.

> . . . The mind finds [them] inseparable from every particle of matter, though less than to make itself singly be perceived by our senses: v.g. take a grain of wheat, divide it into parts: each part has still solidity, extension, figure, and mobility; divide it again, and it retains still the same qualities; and so divide it on, till the parts become insensible; they must retain still each of them all those qualities. For division (which is all that a mill, or pestle, or any other body,

> does upon another, in reducing it to insensible parts) can never take away either solidity, extension, figure, or mobility from any body, but only makes two or more distinct separate masses of matter, of that which was but one before; all which distinct masses, reckoned as so many distinct bodies, after division, make a certain number (II, 8, 9, p. 112).

Ideas which have these qualities - extension, solidity, size, figure, texture, number, motion and rest - as their content are ideas of primary qualities. For instance, an idea of the dimensions of a cube has size as its content. Hence, it is an idea of a primary quality. Ideas of primary qualities give information concerning qualities which the corpuscle "really" possesses.

Ideas of secondary qualities, obviously, do not have primary qualities as their contents. For instance, the idea of the blueness of a cube has color as its content. Color is not a primary quality; it is not an inseparable quality of bodies. The cube could be clear, and hence have no color.

The question then arises as to how the ideas of secondary qualities relate to the qualities of a physical body. Locke's answer is that the ideas of secondary qualities are produced by certain primary qualities of the physical body. For instance, the color of a physical body may be produced by the specific texture of the body. In any case, the secondary qualities of a body are powers of its primary qualities to produce ideas whose content is not of primary qualities. Secondary qualities "in truth are nothing in the objects themselves but powers to produce various sensations in us by

their primary qualities, i.e. by the bulk, figure, texture, and motion of their insensible parts, as colours, sounds, tastes, &c." (II, 8, 10, p. 112).

There is a second power which physical bodies possess. It is the power by their primary qualities to change the primary qualities (and hence, secondary qualities) of another physical body. In Locke's words, this is "the power that is in any body, by reason of the particular constitution of its primary qualities, to make such a change in the bulk, figure, texture, and motion of another body, as to make it operate on our senses differently from what it did before" (II, 8, 23, p. 117; emphasis Locke's). Locke cites as examples the power of the sun to make wax white and the power of fire to make lead fluid (II, 8, 23, p. 117).

Locke's account of the nature of physical bodies reflects a corpuscularian view of matter. The only real qualities of a physical body are those of extension, solidity, size, figure, motion, etc. I propose to call these simply 'qualities' instead of 'primary qualities'. The physical body has two kinds of powers. It has powers which change the primary qualities of another body. I propose to call these 'mediately sensible powers', since they are powers which are sensible through changes in another body; i.e., mediated to the senses through another body. The physical body also has powers which produce sensory ideas whose content is not qualities, in the sense proposed above. I propose to call these 'directly sen-

sible powers', since they are powers which are directly sensible; i.e., sensible through the object itself, in contrast to the mediately sensible powers. Thus we have (a) qualities, (b) directly sensible powers, and (c) mediately sensible powers.

In the case of ideas, then, all ideas are caused by qualities. However, only some of these ideas have qualities as their content. Locke expresses this by saying that these ideas "resemble" the qualities. He says that "their patterns do really exist in the bodies themselves" (II, 8, 15, p. 114). I propose to call these ideas 'content correspondent ideas'.

The ideas which are not content correspondent are the ideas which do not have as their content qualities. I would like to quote a passage from Locke with regard to this, and substitute in the passage the terminology set out above. Locke says,

> . . . I think it easy to draw this observation, that the ideas of. . . qualities of bodies are resemblances of them, and their patterns do really exist in the bodies themselves, but the ideas produced in us by [directly sensible powers] have no resemblance of [the qualities] at all. There is nothing like our ideas existing in the bodies themselves. They are, in the bodies we denominate from them, only a power to produce those sensations in us; and what is sweet, blue, or warm in idea is but the certain bulk, figure, and motion of the insensible parts, in the bodies themselves, which we call so (II, 8, 15, p. 114).

The content of these ideas is not a quality of a body. Hence, I propose to call these ideas 'non-content correspondent ideas'.

As far as ideas are concerned, the non-content correspondent ideas are just as much ideas as are the content correspondent. They are just as "real" as the content correspondent ideas. In fact, in naive experience, they are thought to "resemble" real qualities in the object. According to Locke,

> The reason why the [directly sensible powers] are ordinarily taken for real qualities, and the [mediately sensible powers] only for bare powers, seems to be because the ideas we have of distinct colours, sounds, &c., containing nothing at all in them of bulk, figure, or motion, we are not apt to think them the effects of [qualities]; which appear not, to our senses, to operate in their production, and with which they have not any apparent congruity or conceivable connexion. Hence it is that we are so forward to imagine that those ideas are resemblances of something really existing in the objects themselves, since sensation discovers nothing of bulk, figure, or motion of parts in their production; nor can reason show how bodies, by their bulk, figure, and motion, should produce in the mind the ideas of blue or yellow, &c. (II, 8, 25, pp. 118-119).

In other words, since the non-content correspondent ideas are, with regard to their content, distinct from the content correspondent ideas and do not seem to be caused by primary qualities, most people suppose them to be content correspondent also; i.e., they suppose their content is of real qualities in the physical object.

The pressing question which arises here is that of the role of non-content correspondent ideas. Since their content is not qualities of a body, how does their content relate to such qualities? What purpose do non-content correspondent ideas serve?

Locke gives a corpuscularian answer to these questions. The non-content correspondent ideas are produced by the corpuscles of a physical body. Each such distinct idea is correlated with a specific, distinct corpuscular situation in the physical object, such as a distinct size, motion, or texture of the corpuscles. The correlation is invariable. This enables the ideas to be informational with regard to their correspondent corpuscular situations, the former indicating the latter's presence, thus allowing physical objects to be distinguished on the basis of non-content correspondent ideas. If we speak in terms of representation, the ideas do not represent the corpuscular qualities of a physical object by their content "resembling" the corpuscular qualities, but by their content being invariably correlated with such qualities.

Locke makes this point in the chapter "Of Real and Fantastical Ideas". He says,

> . . . Our simple ideas are all real, all agree to the reality of things; not that they are all of them images or representations of what does exist, the contrary whereof, in all but the primary qualities [i.e., qualities] of bodies, hath been already shown. But, though whiteness and coldness are no more in snow than pain is, yet those ideas of whiteness and coldness, pain,

> &c., being in us the effects of powers in things without us, ordained by our Maker to produce in us such sensations, they are real ideas in us, whereby we distinguish the qualities that are really in things themselves. For, these several appearances being designed to be the marks whereby we are to know and distinguish things which we have to do with, our ideas do as well serve us to that purpose, and are as real distinguishing characters, whether they be only constant effects, or else exact resemblances of something in the things themselves, the reality lying in that steady correspondence they have with the distinct constitutions of real beings. But whether they answer to those constitutions, as to causes or patterns, it matters not; it suffices that they are constantly produced by them. And thus our simple ideas are all real and true, because they answer and agree to those powers of things which produce them in our minds, that being all that is requisite to make them real, and not fictions at pleasure (II, 30, 2, p. 233; emphasis Locke's).

The non-content correspondent ideas are not "fantastical". They give information about the corpuscular qualities of a physical object because they are correlated with such qualities. Hence, they provide a basis for distinguishing between the different physical constitutions of material objects. In his chapter "Of the Reality of Knowledge", Locke writes as follows.

> . . .The. . . simple ideas, which since the mind, as has been showed, can by no means make to itself, must necessarily be the product of things operating on the mind, in a natural way, and producing therein those perceptions which by the wisdom and will of our Maker they are ordained and adapted to. From whence it follows that simple ideas are not fictions of our fancies, but the natural and regular productions of things without us, really operating upon us; and so carry with them all the

> conformity which is intended, or which our state requires; for they represent to us things under those appearances which they are fitted to produce in us, whereby we are enabled to distinguish the sorts of particular substances, to discern the states they are in, and so to take them for our necessities, and apply them to our uses. Thus the idea of whiteness, or bitterness, as it is in the mind exactly answering that power which is in any body to produce it there, has all the real conformity it can or ought to have, with things without us. And this conformity between our simple ideas and the existence of things is sufficient for real knowledge (IV, 4, 4, pp. 348-349).

In another passage, Locke permits the constant correlation of non-content correspondent ideas to be relative to the individual. For instance, a certain corpuscular state of an object may constantly produce the color blue in one person's mind, and the color yellow in another's. What is of importance is that the correlation be constant for each individual, for it is the invariableness of the correlation which enables the idea to be informational.

It is in his chapter "Of True and False Ideas" that Locke makes this point. He says,

> . . . Our simple ideas, being barely such perceptions as God has fitted us to receive, and given power to external objects to produce in us by established laws and ways, suitable to his wisdom and goodness, though incomprehensible to us, their truth consists in nothing else but in such appearances as are produced in us, and must be suitable to those powers he has placed in external objects or else they could not be produced in us; and thus answering those powers, they are what they should be, true ideas.
>
> Though one Man's Idea of Blue should be different from another's. Neither would it carry any imputation of falsehood to our simple ideas, if by the different structure of our organs it were so ordered that the same object

> should produce in several men's minds different ideas at the same time; v.g. if the idea that a violet produced in one man's mind by his eyes were the same that a marigold produced in another man's, and vice versa. For, since this could never be known, because one man's mind could not pass into another man's body, to perceive what appearances were produced by those organs, neither the ideas hereby, nor the names, would be at all confounded, or any falsehood be in either. For all things that had the texture of a violet producing constantly the idea which he called blue, and those which had the texture of a marigold producing constantly the idea which he as constantly called yellow, whatever those appearances were in his mind, he would be able as regularly to distinguish things for his use by those appearances, and understand and signify those distinctions marked by the names 'blue' and 'yellow', as if the appearances or ideas in his mind received from those two flowers were exactly the same with the ideas in other men's minds (II, 32, 14-15, pp. 245-246; emphasis Locke's).

It seems to me, then, that the consideration of ideas in terms of a corpuscularian view of matter is one reason that Locke conceives of ideas as signs. The situation is particularly striking with regard to simple, sensory, non-content correspondent ideas. These ideas are correlated with distinct corpuscular states of bodies. They are signs of these distinct corpuscular states, for they warrant an inference from a particular idea to the distinct corpuscular states with which the idea is correlated.

While the case for ideas being signs is rather clear for simple, sensory, non-content correspondent ideas, it is also evident for the content correspondent ideas of everyday life. The naked eye, for instance, does not see the minute corpuscles

which make up the internal constitution of a physical body. If a person looks at a marble statue, he will have an idea of extension, figure, size, and rest. But the idea will only be a sign of the actual extension, figure, size, and motion of the corpuscles which make up the marble statue. It will be a sign correlated with the actual sensible qualities of the marble's corpuscles, which qualities are not seen as they are in themselves due to the lack of acuteness of the eye. In this sense, all content correspondent ideas, including those obtained through the use of telescope and microscope, are signs up until the eye actually sees the minute corpuscles which make up a physical body.

While our sense organs do not discover to us the internal corpuscular constitution of physical bodies, they need not. We can carry forth our practical life tolerably well without such knowledge. We can do so because our sensory ideas are perfectly good signs of the internal corpuscular constitution of bodies. This is all we need for ordinary purposes. Locke writes in his chapter "Of Our Knowledge of Existence of Other Things",

> . . . Our faculties being suited not to the full extent of being, nor to a perfect, clear, comprehensive knowledge of things free from all doubt and scruple, but to the preservation of us, in whom they are, and accommodated to the use of life, they serve to our purpose well enough, if they will but give us certain notice of those things, which are convenient or inconvenient for us (IV, 11, 8, p. 391).

For Locke, the content correspondent ideas do not have a privileged status with regard to imparting knowledge of a physical body. They are just as much signs - up to actual observation of a corpuscle as it is in itself - as are the non-content correspondent ideas. Since we cannot observe the actual corpuscles, the non-content correspondent ideas are just as important as the content correspondent ideas in gaining knowledge of a physical body. Locke writes,

> For, our senses failing us in the discovery of the bulk, texture, and figure of the minute parts of bodies, on which their real constitutions and differences depend, we are fain to make use of their secondary qualities [directly sensible powers] as the characteristical notes and marks whereby to frame ideas of them in our minds, and distinguish them one from another; all which secondary qualities [directly sensible powers], as has been shown, are nothing but bare powers (IV, 23, 8, p. 189).

It is important to note that the status of the sign relationship is different for non-content correspondent ideas and content correspondent ideas. The sign relationship is intrinsic to the non-content correspondent ideas. Since their content is not of real qualities in the physical object, it will always be a sign of such qualities. However, in the case of content correspondent ideas, since their content is of real qualities, when the senses are acute enough to actually perceive the corpuscular constitution as it is, the content correspondent ideas are no longer signs of such physical qualities.

At this point, Locke's view of the mind as ontologically distinct from matter is germane. A simple sensory idea of a corpuscle's extension is not identical with the corpuscle's extension. It is a mental occurrence whose content is correlated with the material quality of extension.

This relationship between content correspondent sensory idea and material quality is intrinsic to the sensory idea. It cannot be eliminated by an acuteness of the senses. Thus, it must be distinguished from the relationship of content correspondent sensory idea and material quality, set forth above, which is dependent on the grossness of the senses. The latter is not intrinsic to the sensory idea.

IDEA-SIGN: SIGN OF OR SIGN FOR

The corpuscular view of matter, then, led Locke to consider both sensory non-content correspondent ideas and sensory content correspondent ideas as signs. Both are correlated with real, distinct corpuscular situations in physical bodies. The sensory, non-content correspondent ideas are signs because, while their contents are not of sensible corpuscular qualities, they are invariably correlated with such qualities. The sensory, content correspondent ideas are signs because, while their contents are of sensible corpuscular qualities, they are not of the corpuscles as they are in themselves. They are merely correlated with such corpuscles.

Professor Woozley has brought to my attention the difference between a sign *for* something and a sign *of* something. A sign *for* a thing is a mark, picture, word, etc. established by man to communicate something with regard to a particular phenomenon. For instance, road signs are signs for various road conditions, e.g. curves, hills, intersections, railroad crossings, soft shoulders. They say something concerning these road conditions. The important thing to note here is that the signs are intended as *communications.* In this respect, signs for are like signals and symbols.

A sign *of* something is a natural indicator of the presence or absence, proximity or remoteness, future appearance or disappearance, etc. of a particular phenomenon. For instance, certain cloud conditions are a sign of an imminent thunder storm; the rustling leaves of a tree are a sign of wind. The important thing to note here is that the signs are not communications concerning these phenomena. Rather, they are *indications* or *manifestations* of the phenomena.

The question which arises here is whether Locke's sensory ideas are signs *of* a hidden corpuscular state, or whether they are signs *for* such states. It should be noted in this connection that the correlation between ideas of sensation and material qualities is established by God. Locke makes this point in a number of passages, of which I quote several.

> . . . All our simple ideas are adequate. Because, being nothing but effects of certain powers in things, fitted and ordained by God to produce such sensations in us, they cannot but be correspondent and adequate to those powers; and we are sure they agree to the reality of things (II, 31, 2, p. 235; emphasis Locke's).
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> . . . Our simple ideas, being barely such perceptions as God has fitted us to receive, and given power to external objects to produce in us by established laws and ways, suitable to his wisdom and goodness, though incomprehensible to us, their truth consists in nothing else but in such appearances as are produced in us, and must be suitable to those powers he has placed in external objects or else they could not be produced in us; and thus answering those powers, they are what they should be, true ideas (II, 32, 14, pp. 245-246).
>
> Blue or yellow, bitter or sweet, can never be false ideas; these perceptions in the mind are just such as they are there, answering the powers appointed by God to produce them, and so are truly what they are, and are intended to be (II, 32, 16, pp. 246-247).
>
> . . . Simple ideas, which since the mind, as has been showed, can by no means make to itself, must necessarily be the product of things operating on the mind, in a natural way, and producing therein those perceptions which by the wisdom and will of our Maker they are ordained and adapted to (IV, 4, 4, p. 348).

The belief that the ideas are established as signs by God is not unimportant. It is this which for Locke guarantees that the ideas are true or adequate signs with respect to the corpuscular states they signify. As is evident in the above quotations, it is in this connection that he brings up God's authorship of the signs. It is to give a basis for considering the signs to be good signs.

Locke also declares that the signs are arbitrary signs. He says that their connection with various corpuscular states

is due to nothing but "the arbitrary determination of that all-wise Agent who has made them to be, and to operate as they do, in a way wholly above our weak understandings to conceive" (IV, 3, 28, p. 345). He states that we ascribe such connections to the "arbitrary will and good pleasure of the Wise Architect" (IV, 3, 29, p. 346).

Locke holds, then, that the signs are arbitrary, but good signs. I think that in the case of non-content correspondent ideas, it is evident why they can be arbitrary and yet good. What is important is that the connection between the various corpuscular states and their associated ideas be constant. That is all that matters since the content of the idea is not of any real corpuscular qualities. In the case of content correspondent ideas, I do not believe that Locke held the connection to be arbitrary. For he claims that the contents of these ideas "resemble" the qualities of which they are signs.

God, then, establishes the connections between the ideas and the states they represent. As to the purpose of the correlation, Locke declares that the ideas are "designed to be the marks whereby we are to know and distinguish things" (III, 30, 2, p. 233). God has established the correlation with the intention that the ideas serve as indicators of distinct corpuscular states. ". . .They represent to us things under those appearances which they are fitted to produce in us, whereby we are enabled to distinguish the sorts of particular substances, to discern

the states they are in, and so to take them for our necessities, and apply them to our uses" (IV, 4, 4, pp. 348-349).

Note that Locke has not claimed that the ideas are used by God to communicate his thoughts to us. God is not talking to us by means of the sensory ideas. The latter do not embody communications from God with regard to corpuscular states; they are not a divine language concerning physical things. Rather, God has set up the ideas so that they are manifestations of the corpuscular states. Thus, they are signs of the corpuscular states, not signs for them.

IMPLICATIONS FOR NATURAL SCIENCE

Locke's view that ideas are signs has important implications for natural science. First, it puts a distance between ideas and the qualities of a physical object. The idea is not the quality. It is a sign of the quality. It is a mental correlate of the quality which gives knowledge of the quality.

This view undercuts the Scholastic epistemology in which the essence of the physical object actually enters the mind and becomes immediately present to the mind. John Sergeant, a Catholic priest, argued for the Scholastic position in opposition to Locke. In the Scholastic epistemology, a distinction had generally been made between the material phantasm and the intellectual notion. The material phantasm stood midway between the external physical object and the mind. It mediated the object to the mind. In the mind, the

object assumed an immaterial form as a notion; i.e., the intellectual notion.

Sergeant centered knowledge on the intellectual notion. To avoid Locke's dualism, he considered the notions to be the material things themselves existing in the mind in an immaterial state. The notion was not, then, a sign of the material thing. It was the thing itself. In possessing the notion, one possessed the thing itself and apprehended its essence.[20]

Locke found Sergeant's attempt to explain how material things get into the immaterial mind completely unconvincing.[21] His position in the Essay stood in direct opposition to such a viewpoint.

Locke's view of mind as a distinct reality and ideas as mental signs of material realities, then, put a distance between ideas and the qualities of a natural object. Distance was also put between ideas and the actual qualities or internal constitution of physical objects by Locke's corpuscularianism.

On the corpuscular view, our ideas of physical bodies do not discover to us their corpuscular constitution as it is in itself. They fail because our senses are not acute enough, and there are no scientific instruments of sufficient power at present to bring to the senses the necessary acuteness (IV, 3, 25, p. 343). Locke, as a corpuscularian,

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20. John W. Yolton, John Locke and the Way of Ideas (Oxford, 1968), pp. 103-106.

21. Ibid., pp. 107-109.

considered the corpuscular constitution to be the real essence of a physical object (III, 6, 2, p. 284). Since it is unknown, the real essence of the physical object is unknown.

Man is not able, then, in his natural science, to classify things according to their real essence. Locke declares that we cannot sort things according to their real essences "because we know them not" (III, 6, 9, p. 287). The ideas we possess are only signs of the real essence of a physical body. Locke compares these signs to the knowledge of the face of a clock apart from knowledge of its inner workings (III, 6, 3, p. 284).

> Our faculties carry us no further towards the knowledge and distinction of substances than a collection of those sensible ideas which we observe in them; which, however made with the greatest diligence and exactness we are capable of, yet is more remote from the internal constitution from which those qualities flow, than, as I said, a countryman's ideas is from the inward contrivance of that famous clock at Strasbourg, whereof he only sees the outward figure and motions (III, 6, 9, p. 287).

Thus, what we possess, with regard to physical objects, are collections of simple, sensory ideas which are experienced to co-exist in the perception of the object (III, 6, 21, pp. 290-291). These collections of ideas can be used by man to form different classes into which the physical objects can be sorted. Such classes are not real essences, but rather nominal or conventional essences, the workmanship of man (III, 6, 37, p. 295).

It is important to see that Locke's view of ideas as signs not only undercuts the Scholastic epistemology, but it undercuts the Cartesian methodology, i.e., an a priori methodology, in natural science. According to Locke, we do not possess the real essence of physical bodies in our mind. We only have signs of their real essence; namely, collections of ideas which we perceive to co-exist in various bodies. Very few of these ideas are found to be logically connected by entailment, or what Locke calls "agreement". Locke writes,

> . . . The simple ideas whereof our complex ideas of substances are made up are, for the most part, such as carry with them, in their own nature, no visible necessary connexion or inconsistency with any other simple ideas, whose co-existence with them we would inform ourselves about (IV, 3, 10, p. 335).

Since very few ideas in a complex idea of a substance can be seen to have a necessary connection with one another, very few propositions dealing with a substance can be known true a priori. In his chapter on "Maxims", Locke says,

> . . . As to co-existence, or such necessary connexion between two ideas that, in the subject where one of them is supposed, there the other must necessarily be also: of such agreement or disagreement as this, the mind has an immediate perception but in very few of them. And therefore in this sort we have but very little intuitive knowledge; nor are there to be found very many propositions that are self-evident, though some there are: v.g. the idea of filling a place equal to the contents of its superficies being annexed to our idea of body, I think it is a self-evident proposition, that two bodies cannot be in the same place (IV, 7, 5, p. 367; emphasis Locke's).

This being the situation with regard to ideas of physical objects, the employment of maxims (self-evident propositions) and a deductive methodology is virtually useless in natural science for making new discoveries. Locke writes,

> They [maxims] are not of use to help men forwards in the advancement of sciences, or new discoveries of yet unknown truths. Mr. Newton, in his never enough to be admired book, has demonstrated several propositions, which are so many new truths, before unknown to the world, and are further advances in mathematical knowledge: but, for the discovery of these, it was not the general maxims "What is, is", or "The whole is bigger than a part", or the like, that helped him. Would those who have this traditional admiration of these propositions. . ., but distinguish between the method of acquiring knowledge, and of communicating, between the method of raising any science, and that of teaching it to others, as far as it is advanced, they would see that those general maxims were not the foundations on which the first discoverers raised their admirable structures, nor the keys that unlocked and opened those secrets of knowledge (IV, 7, 11 (3), p. 370).

Locke's view of ideas as signs not only undercut the Scholastic epistemology and the Cartesian methodology with regard to natural science, but it introduced a dynamism into natural science. A person could not simply look at a physical object and thereby gain a knowledge of its real essence. The real essence of the object was not so easily possessed by the mind. The ideas gained by an examination of the physical object were merely signs of its real essence.

This meant that knowledge of a physical object would be obtained primarily by extensive observation of and experimentation with the physical object. The scientist would need to examine it under various conditions and, in Bacon's words, "vex it" to gain more signs of its hidden corpuscular constitution.

Locke clearly sees this implication of his view of ideas as signs. He declares that since our ideas of a substance lack a discoverable necessary connection with each other, we must rely on "observation and experiment" to further our knowledge of them (IV, 3, 28, p. 344). Since we are unable to directly observe their real, corpuscular constitutions and understand deductively how their effects flow from those constitutions, we can only have an "experimental knowledge" of them (IV, 3, 29, p. 346). We must "glean" from experiments, Locke says. "In the knowledge of bodies we must be content to glean what we can from particular experiments; since we cannot, from a discovery of their real essences, grasp at a time whole sheaves, and in bundles comprehend the nature and properties of whole species together" (IV, 12, 12, p. 400).

In his chapter "Of the Improvement of our Knowledge", Locke makes the fullest statement of this point. He says, and I quote in full,

> In our search for the knowledge of substances, our want of ideas that are suitable to such a way of proceeding obliges us to a quite different method [from deduction]. We advance not

> here, as in the other [namely, ethics] (where our abstract ideas are real as well as nominal essences), by contemplating our ideas, and considering their relations and correspondences; that helps us very little, for the reasons that in another place we have at large set down. By which I think it is evident that substances afford matter of very little general knowledge, and the bare contemplation of their abstract ideas will carry us but a very little way in the search of truth and certainty. What, then, are we to do for the improvement of our knowledge in substantial beings? Here we are to take a quite contrary course: the want of ideas of their real essences sends us from our own thoughts to the things themselves as they exist. Experience here must teach me what reason cannot: and it is by trying alone, that I can certainly know what other qualities co-exist with those of my complex idea. Here, again, for assurance, I must apply myself to experience; as far as that reaches, I may have certain knowledge, but no further (IV, 12, 9, pp. 398-399; emphasis Locke's).

Locke has no illusions about the difficulty with which natural science advances. Observation and experimentation is a laborious and time-consuming endeavor. Locke writes that "it requires much time, pains, and skill, strict inquiry, and long examination to find out what, and how many, those simple ideas are, which are constantly and inseparably united in nature, and are always to be found together in the same subject" (III, 6, 30, p. 293).

Locke's emphasis on observation and experimentation coincides with the program of the Royal Society. One of the main concerns of the Royal Society was, in line with the recommendations of Bacon, to compile "natural and experimental histories" of a wide range of physical phenomena. The Royal Society believed that their historical methodology was

Baconian in contrast to a deductive methodology which was Cartesian.

In discussing the dynamism which Locke felt appropriate for natural science, it is important to note the place of what I have called 'mediately sensible powers' of physical bodies. These are the powers of any body, by reason of its particular corpuscular constitution, to make changes in another body's (or be changed by another body's) corpuscular constitution so that the body being changed appears different to our senses (II, 8, 23, p. 117). These powers play an important part in natural science. Experimentation often involves disclosing these mediately sensible powers of physical bodies, and thereby gaining new signs of the body's corpuscular constitution. For instance, gold is submerged in aqua regia to see what changes occur in gold.

The mediately sensible powers of physical bodies provide a rich source of ideas (signs) of a body's real corpuscular structure. In Locke's words, "The simple qualities which make up the complex ideas, being most of them powers in relation to changes which they are apt to make in, or receive from, other bodies, are almost infinite" (III, 9, 13, p. 304). Here the dynamism is very forceful. The qualities, the directly sensible powers, and particularly the mediately sensible powers all provide signs (ideas), numerous signs, almost an infinity of signs, of the real corpuscular constitution of each physical body. What is needed is skillful exper-

imentation and careful observation to obtain those signs.

Locke's view of ideas as signs also undercuts the genus-species mode of classification. This should be clear from what has been said above. The real essence of physical bodies is unknown to us. We do not know the general "forms" or "moulds" according to which material things are made. Hence, we are ignorant of the genus and species of material things.

What we do possess are signs of the real essence of material things. No one or two signs can adequately signify that real essence, since, of the numerous signs we have of any material thing, each sign appears to be essential (III, 6, 5, p. 286). In other words, no sign is essential (III, 6, 4, pp. 284-285). No sign is privileged; all signs are on an equal footing.

Hence, it is an obstruction of science to settle on two ideas in the classification of a physical thing. A much more adequate basis for classification is obtained when as many signs as possible are considered. With more signs, a more adequate representation of the real corpuscular constitution of the physical object is obtained, and classification made on a more adequate basis.

Because of this, Locke looks askance on the genus-species mode of definition. He considers it a convenient and economical mode of definition (III, 6, 33, p. 294), but rejects it as the best (III, 3, 10, pp. 266-267). He opts for classification according to nominal essences; i.e., complex ideas

containing a number of simple ideas found to coincide in the physical object. In other words, he opts for what came to be called a "natural" system of classification as opposed to an "artificial" system of classification.[22]

In discussing the implications for natural science of Locke's view of sensory ideas as signs, I should at least briefly consider Locke's negative statements with regard to natural science. In Book IV of the Essay, Locke conceives of knowledge as the perception of the agreement or disagreement of ideas (IV, 1, 2, p. 320). Sometimes the agreement or disagreement of ideas can be perceived immediately by the mind; i.e., by "bare intuition" (IV, 2, 1, p. 326). This intuitive knowledge is certain, and the foundation of all certainty in knowledge (ibid.). In knowledge gained by demonstration, it must provide the link in each step, giving to such knowledge whatever degree of certainty it may have (IV, 2, 7, pp. 327-328).

In addition to intuition and demonstration, there is knowledge of the existence of particular external objects gained by the perception of "the actual entrance of ideas from them", called "sensitive" knowledge by Locke (IV, 2, 14, pp. 330-331). With regard to real existence, Locke seems to believe sensitive knowledge carries a high degree of certainty (ibid.), but not the absolute certainty of intuitive knowledge. With regard to co-existence, Locke does not directly speak to

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22. Stephen F. Mason, A History of the Sciences (New York, 1962), p. 331.

the issue, but does put knowledge of co-existence by way of sensation within the bounds of knowledge, as opposed to faith or opinion (IV, 3, 9-16, pp. 334-337).

In natural science, the primary concern is to gain knowledge of material substances; i.e., knowledge of the signs (ideas) of the substance. This, according to Locke, is knowledge of co-existence of ideas (IV, 1, 6, p. 322).

With regard to co-existence, intuition and demonstration provide very little knowledge (IV, 3, 9-14, pp. 334-336). Locke says that "we can by intuition and demonstration discover the co-existence of very few of the qualities to be found united in substances. . ." (IV, 3, 14, p. 336). Thus, one must rely primarily on sensitive knowledge. ". . . We are left only to the assistance of our senses to make known to us what qualities [substances] contain" (ibid., p. 337).

This means that the knowledge one obtains in natural science for the most part lacks the certainty obtainable only through intuition and demonstration. The connections between the ideas are not perceived to be necessary connections. First, the ideas in themselves bear no necessary connections with each other (IV, 3, 10, p. 335; IV, 3, 28, p. 344; IV, 6, 7-10, pp. 360-362). Second, since the internal corpuscular states of physical objects are unknown, the necessary connections between them, their powers, and their representative ideas cannot be perceived (IV, 3, 11-13, pp. 335-336; IV, 3, 25-26, pp. 342-344; IV, 3, 29, pp. 345-346;

IV, 6, 11, pp. 362-363; IV, 6, 14, p. 363).

The harshest conclusions made by Locke with regard to this matter are the following.

> But as to a perfect science of natural bodies, (not to mention spiritual beings,) we are, I think, so far from being capable of any such thing, that I conclude it lost labour to seek after it (IV, 3, 29, p. 346; emphasis Locke's).

After discussing what is requisite (IV, 6, 14, p. 363) for obtaining certain knowledge (IV, 6, 2-5, pp. 358-359) of bodies, he writes,

> Which I think everybody will allow is utterly impossible to be known by us without revelation (IV, 6, 14, p. 363).

In seeking to understand these passages, we have to keep in mind several things. First, Locke does not want to discourage natural science. He specifically says, "I would not. . . be thought to disesteem or dissuade the study of nature" (IV, 12, 12, p. 400; emphasis Locke's). Locke is a member of the Royal Society, a good friend of Robert Boyle and Isaac Newton, and a physician by profession. He wants to encourage natural science.

Second, Locke is denying natural science certain knowledge, not knowledge simpliciter. The knowledge obtainable by natural science has some degree of certainty since it comes by way of sensation (sensitive knowledge), but not that of intuition or demonstration. Third, natural science does not intrinsically lack certain knowledge. It lacks it only because the corpuscular constitutions of physical objects are as yet undiscovered.

Fourth, Locke wrote the Essay when the Cartesian intuitive and deductive methodology was a force to be reckoned with. He wanted to discourage that approach in natural science. He championed an experimental methodology for the natural sciences.

Fifth, he held up the deductive ideal as possible to attain in natural science only if the corpuscular states of physical bodies were discovered. The only way that can be accomplished is through experimentation in which scientific instruments and techniques are developed enabling man to observe the corpuscles. Hence, the emphasis in natural science must be on experimentation, for the latter is the means to bringing about a situation in which a deductive methodology can be applied.

I think that it is in this context that the harsh conclusions of Locke must be understood. Locke is declaring that it is lost labor to seek after a perfect natural science in the Cartesian manner; i.e., apart from laying the necessary foundation in experimental work leading up to the discovery of the corpuscles themselves. He is asserting that it is impossible to gain a knowledge of the corpuscular states, their powers, and representative ideas without revelation if there be no pursuit of such knowledge via experimentation. This way of understanding these passages fits in with Locke's general corpuscularianism, his belief that in principle the corpuscles are observable, and his belief that in the future such observations may be made, all of which was dis-

cussed earlier in the paper.

WORDS AS SIGNS

I have tried to show the sense in which Locke considers ideas to be signs. The science of signs includes for Locke, not only ideas, but also words. In examining the latter, it would be well to first set forth the primary role of words as Locke conceives it.

For Locke, the primary purpose of words is to communicate thoughts. As we have seen, Locke considers the mind tobe ontologically distinct from matter. Material objects are public, available for all to touch and see. But the ideas of material objects are not public. They are mental, the private contents of a distinct mind. The process of obtaining sensory ideas is one which moves causally from public material qualities of corpuscles to private ideas of the mind. Hence, if a person would communicate his thoughts, he must have a process by which he can make his private thoughts public, and thence able to become the cause or occasion of the same thoughts in another man's mind.

That Locke thinks of communication in this fashion is made clear in several passages. In the opening passage in his chapter "Of the Signification of Words", Locke writes,

> Man, though he have great variety of thoughts, and such from which others as well as himself might receive profit and delight; yet they are all within his own breast, invisible and hidden from others, nor can of themselves be made appear. The comfort and advantage of society not being to be had without communication of

> thoughts, it was necessary that man should find out some external sensible signs, whereof those invisible ideas, which his thoughts are made up of, might be made known to others. For this purpose nothing was so fit, either for plenty or quickness, as these articulate sounds, which with so much ease and variety he found himself able to make. Thus we may conceive how words, which were by nature so well adapted to that purpose, come to be made use of by men as the signs of their ideas. . . (III, 2, 1, p. 259; emphasis Locke's).

In his section on the science of signs, he expresses virtually the same thought.

> . . . Because the scene of ideas that makes one man's thoughts cannot be laid open to the immediate view of another, nor laid up anywhere but in the memory, a no very sure repository; therefore to communicate our thoughts to one another, as well as record them for our own use, signs of our ideas are also necessary; those which men have found most convenient, and therefore generally make use of, are articulate sounds (IV, 21, 4, p. 443; emphasis Locke's).

In discussing the "mental operation" of naming, he says,

> When children have, by repeated sensations, got ideas fixed in their memories, they begin by degrees to learn the use of signs. And when they have got the skill to apply the organs of speech to the framing of articulate sounds, they begin to make use of words, to signify their ideas to others (II, 11, 8, pp. 128-129).

He concludes that the use of words is to "stand as outward marks of our internal ideas" (II, 11, 9, p. 129).

It is important to see, then, that words are not ideas.[23]

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23. As I see it, Kretzmann is mistaken when he would have Locke consider words to be ideas. This goes against the heart of Locke's position. Cf. Norman Kretzmann, "The Main Thesis of Locke's Semantic Theory", Philosophical Review, LXXVII (1968), pp. 189-196.

They are external, material, public entities which are used as signs by man. This is why Locke says they are "sensible signs" and "sensible marks" (III, 2, 1, p. 259). Like the sensible qualities of corpuscles, words are material entities which are sensible. Locke writes that words both written and spoken "do really exist without me" (IV, 11, 7, p. 391).

It should be noted here that Locke makes a distinction between words and language. Words are merely articulate sounds (in their oral form) (III, 1, 1, p. 256). A parrot can produce words. But language is words utilized as signs for thoughts (III, 1, 2, p. 256). A parrot cannot produce language; a human can.

According to Locke, the primary purpose of language is to communicate thoughts. For Locke, communication is not incidental to language. He declares,

> God, having designed man for a sociable creature, made him not only with an inclination and under a necessity to have fellowship with those of his own kind, but furnished him also with language, which was to be the great instrument and common tie of society (III, 1, 1, p. 256).

Men make words the signs for their conceptions so that they might make those conceptions "known to others, and the thoughts of men's minds be conveyed from one to another" (III, 1, 2, p. 256; see also III, 2, 2, p. 259). Words can serve other purposes (III, 5, 10, pp. 280-281; III, 9, 2, p. 299), but their primary function is to enable communication. Communication is the "chief end of language" (III, 3, 3, p. 263; III, 5, 7, p. 279).

According to Locke, then, words enable a person to publicly express his thoughts. They are outward, sensible marks for "the ideas in the mind of him that uses them. . ." (III, 2, 2, p. 259; emphasis Locke's). The question that arises here is this: what is the status or character of these ideas?

In the discussion of sensory ideas as signs of physical objects, the sensory ideas were shown to be particular ideas; i.e., concrete contents of a sensory experience. The ideas which words are signs for, however, are not concrete contents of a sensory experience, but rather parts or constituents of thoughts (III, 2, 1, p. 259). Locke refers to these constituents as "conceptions" (III, 1, 2, p. 256; III, 2, 2, p. 260). Thus, it would not be unLockian to say that the ideas which are signs of physical objects are "sensations", while the ideas which words are signs for are "conceptions".

Locke does have a theory of how the mind moves from sensations to concepts. It does so through a process of abstraction; i.e., "by separating from [particular ideas] the circumstances of time and place, and any other ideas that may determine them to this or that particular existence" (III, 3, 6, p. 264). Whether Locke's account of concept formation in terms of abstraction be adequate is not of concern here. What is important is that the idea which a word stands for is in some sense formed by the mind, and thus distinct from the sensory idea imprinted upon the mind, the latter in some way serving as material for the former.

As discussed earlier, sensory ideas are occurrences in the mind. However, concepts are not. When we ask a person for his concept of such-and-such, we are not asking him about an occurrence in his mind. Thus, however the process of abstraction works, the result is not some kind of mental occurrence. We can see, then, that there is an important ontological difference between ideas as "sensations" and ideas as "conceptions". This difference, it seems to me, would disqualify images from being conceptions, and thus, the ideas which words stand for.

The picture Locke sets forth seems to be something like this. The contents of our experience are numerous particular ideas which provide the material for our thoughts. Words are not used as signs for the particular contents of our experience as received by the mind, a particular, distinct word (name) for each particular idea. Locke declares that such a procedure is impossible (III, 3, 2, p. 263); and, even if possible, "useless, because it would not serve to the chief end of language" (III, 3, 3, p. 263). The chief end of language is to communicate thoughts (ibid.). Thus words stand for the constituents of those thoughts; namely, concepts.

Locke declares that words "stand for" ideas (III, 2, 2, p. 259); they are "marks of" ideas (III, 2, 1, p. 259). Locke does not mean that the words denote or refer to the ideas. The ideas are not the denotation of the words, but rather the meaning of the words (III, 3, 10, p. 267). "He that hath names without ideas wants meaning in his words, and speaks

only empty sounds" (III, 10, 31, p. 311).

Words have denotations in virtue of the ideas they stand for; i.e., in virtue of their meanings. Since many particular things may answer ("conform") to a general idea (III, 3, 12, p. 268), the word which stands for that idea can denote those particulars. "Words are general. . .when used for signs of general ideas, and so are applicable indifferently to many particular things. . ." (III, 3, 11, p. 267).

According to Locke's theory of meaning, then, words require supplementation by thought in order to have meaning. Their meaning is not their use, if use can be explained without reference to thoughts.

Words, then, are outward, sensible marks that publicly signify ideas, the ideas being the meanings of those words. Given that the ideas are private to each man's mind, one wonders how the meanings of words can be publicly established.

Since all ideas for Locke are resolvable into simple ideas, the mechanism by which the signification of words is publicly established can best be dealt with by focusing upon them. However, Locke's treatment of this issue is not very thorough. He declares that ultimately signification is made known by ostension. He says that "the only sure way of making known the signification of the name of any simple idea is by presenting to his senses that subject which may produce it in his mind, and make him actually have the idea that word stands for" (III, 11, 14, p. 314; emphasis Locke's).

Apparently Locke did not think the process by which the signification of words for simple ideas was publicly established was problematic. He may have felt his brief treatment of it to be sufficient. He did believe that the signification of words for simple ideas was least in doubt (III, 4, 15, pp. 276-277; III, 9, 18, p. 305). It was the signification of the names of mixed modes and substances that posed the biggest problem, and toward which he directed his greatest attention. And it should be noted that his analysis and proposals with regard to the signification of these names does not rely on the adequacy of his account as to how the signification of names for simple ideas is publicly established. Rather, it relies upon the assumption that the names for simple ideas can be and indeed for the most part are publicly established so as to be unambiguous.

As we saw earlier, that which enables a sensory idea to be a sign of a particular corpuscular state of a physical body is its constant, invariable correlation with the perception of that state. This same principle, namely constant, invariable correlation, plays a significant role in a word's effectiveness as a sign.

According to Locke, a breakdown in communication occurs when the correlation of a word with a distinct idea or collec- of ideas is not kept constant. The word becomes an ambiguous sign or an empty sign. In Locke's own words,

> . . .So far as words are of use and signification, so far is there a constant connexion between the sound and the idea, and a designation that one stand for the other; without which application of them, they are nothing but so much insignificant noise (III, 2, 7, p. 262).

In the chapter "Of the Abuse of Words", two of the abuses concern this issue. One abuse is inconstancy in the use of words; i.e., using the same word for different distinct ideas or collections of ideas (III, 10, 5, p. 307). The other abuse is to either (a) change the usual signification of a word without making that change evident and defining the word in accord with its new use, or (b) to introduce a new word without defining it (III, 10, 6, p. 307). The remedy for these abuses is, of course, to "use the same word constantly in the same sense" (III, 11, 26, p. 319).

Words serve more effectively as signs for ideas than ideas do as signs of various corpuscular states. This is because in the case of ideas and the corpuscular states, the states themselves are not immediately perceived by the mind. The mind is not directly acquainted with the thing being signified. Hence, a particular corpuscular state may have several different signs all representing it; e.g., a peculiar color, sound, and taste each connected with that one state.

In the case of words and ideas, however, the mind is directly acquainted with the things being signified by the words; namely, the ideas. Hence, a single word can serve as an adequate sign for the idea. However, there can be more

than one sign for the idea. There can be different signs which are knowable by different sense organs for the same idea; e.g., a written, visible sign, a spoken, oral sign, and a molded, tangible sign (as in braille). Nevertheless, for Locke there ought to be only one sign of each type, i.e. one word, for every distinct idea or collection of ideas.

WORD-SIGN: SIGN OF OR SIGN FOR

In the case of sensory ideas, it was the constant correlation of the idea with a particular corpuscular state that enabled the idea to be a sign. And, as discussed earlier, the idea was a sign of the corpuscular constitution, not a sign for it.

In the case of conceptual ideas, constant correlation between a conceptual idea and a particular word plays a significant role in a word's effectiveness as a sign. However, constant correlation is not sufficient. The role of the word as a means of communication must be publicly established; i.e., declared, understood, and agreed to.

Locke is aware of this in his discussion of words. He notes that words do not naturally stand for ideas (III, 2, 1, p. 259). They are naturally fitted for that use, but must be appropriated by man and intentionally utilized in that manner to actually become signs that stand for ideas. They become such by a "voluntary imposition" (III, 2, 1, p. 259). Thus, words are signs by human intention.

Furthermore, words are not used by men to be indicators of various thoughts they have. Words are not correlated with concepts so as to be physical manifestations of those ideas. Rather, they are utilized to communicate thoughts. Locke declares that words are correlated with ideas so that the ideas "might be made known to others, and the thoughts of men's minds be conveyed from one to another" (III, 1, 2, p. 256).

Thus, words are not signs of ideas, but rather signs for ideas. They are used for the purpose of communication.

Locke is aware of this. As noted above, he sees communication as the chief end of language. Further, he realizes that constant correlation between word and idea is not sufficient for the word to function as a means of communication. There must also be "a designation that one stand for the other" (III, 2, 7, p. 262).

However, at least in one respect Locke's terminology does not reflect this distinction. For he often speaks of words as signs of ideas, or marks of ideas: ". . . Words. . . come to be made use of by men as the signs of their ideas. . ." (III, 2, 1, p. 259; emphasis Locke's), "The use. . .of words, is to be sensible marks of ideas. . ." (ibid.), "That then which words are the marks of are the ideas of the speaker . . ." (III, 2, 2, p. 259), "That would be to make them [i.e., words] signs of nothing. . ." (ibid., p. 260), ". . . They [i.e., words] can be signs of nothing else" (III, 2, 8, p. 262).

IMPLICATIONS FOR NATURAL SCIENCE

Locke's view of words functioning as language by being signs for ideas has important implications for natural science and discourse in general. Locke's view puts a distance between words and ideas. This means that the possession and use of words carries with it no guarantee that the discourse is meaningful. Unless the speaker has distinct ideas in mind for which the words are signs, his discourse is vacuous.

Locke views vacuous discourse as a major abuse of language. People often become enamored with words and do not take care to examine what ideas, if any, the words are signs for. Locke says,

> . . .Though the proper and immediate signification of words are ideas in the mind of the speaker, yet, because by familiar use from our cradles we come to learn certain articulate sounds very perfectly, and have them readily on our tongues, and always at hand in our memories, but yet are not always careful to examine or settle their significations perfectly; it often happens that men, even when they would apply themselves to an attentive consideration, do set their thoughts more on words than things. Therefore some, not only children but men, speak several words no otherwise than parrots do, only because they have learned them, and have been accustomed to those sounds (III, 2, 7, pp. 261-262).

In his chapter "Of the Abuse of Words", Locke says that "the first and most palpable abuse is the using of words without clear and distinct ideas; or, which is worse, signs without anything signified" (III, 10, 2, p. 306). He declares that this abuse is committed in two ways. First, it is committed when people coin new words for which they have in mind no clear and distinct ideas (III, 10, 2-I, p. 306). Locke

says that this is done primarily by certain sects of philosophy and religion. No doubt he has in mind Aristotelian and Scholastic schools, which he refers to later in the chapter (III, 10, 6-17, pp. 307-309). Second, the abuse mentioned is committed when people use words vacuously (i.e., without settling in their minds the word's meaning) which in common usage do have distinct meanings (III, 20, 3-II, pp. 306-307).

The distance between words and ideas is also to be seen in what Locke sets forth as the sixth abuse. People assume that the words they use cannot help but have precise meaning and hence, others ought to accept their use without question.

> . . .Men having by a long and familiar use annexed to [words] certain ideas, they are apt to imagine so near and necessary a connexion between the names and the signification they use them in, that they forwardly suppose one cannot but understand what their meaning is; and therefore one ought to acquiesce in the words delivered, as if it were past doubt that, in the use of those common received sounds, the speaker and hearer had necessarily the same precise ideas (III, 10, 22, p. 310; emphasis Locke's).

Locke considers this abuse - "taking words upon trust" - to be the cause of the "multiplication and obstinacy of disputes, which have so laid waste the intellectual world. . ." (III, 10, 22, p. 310).

Locke's view of words functioning as language by being signs for ideas puts a distance not only between words and ideas, but also between words and things. Words, for Locke, are not signs for things; they do not mean things; their meanings are not things.

This consideration is particularly important for natural science and philosophy. For it is in natural science and philosophy that a person would view a word as signifying the real essence of a substance (III, 10, 17, p. 309). Since the real essences are not known, the word is used vacuously. Second, it is in natural science and philosophy that words are taken for things (III, 10, 14, p. 308). Words are assumed to be "so suited to the nature of things, that they perfectly correspond with their real existence" (III, 10, 14, p. 308). This abuse creates fictions, such as materia prima, and produces "obscure and unintelligible discourses and disputes which have filled the heads and books of philosophers . . ." (III, 10, 15, p. 309).

The remedy for the abuse of word-signs is different from the remedy for the misuse of idea-signs. In the case of idea-signs, it is God who has established the connection between the idea and the corpuscular state which it signifies. Man cannot change that connection. He can only make use of it, and gain a more complete set of ideas for each physical thing.

In the case of word-signs, however, it is man who establishes the connection between the word and the idea it signifies (III, 2, 8, p. 262). Hence, he can examine that connection and alter it if necessary. Thus, the way to remedy the abuse of words is to examine that connection and correct it where it is defective (which in itself is a remedy for the abuse of taking words on trust).

More specifically, in an examination of words, care must be taken to see that each word does signify a clear and distinct idea. If the word signifies no idea (or, in the case of particles, an operation of the mind), it can be eliminated from the language (III, 11, 8, p. 312). If the idea which the word signifies is indistinct, then the idea can be thought through so as to render it precise (III, 11, 9, pp. 312-313). When the idea is made precise and the connection between the word and the idea publicly established (III, 11, 11-12, pp. 313-314), then care should be taken to maintain the constancy of that connection (III, 11, 26, p. 319). Such a procedure Locke believes would eliminate vacuous and ambiguous words, reduce the corpus of words to a more reasonable number, and bring to an end many of the philosophical disputes which have plagued the academic and scientific world.

It should be noted that Locke does not propose to pull the "curtain of words" and, beginning from a bare contemplation of one's clear and distinct ideas, to erect a new scientific language. Locke has no sympathy with the schemes put forth in his time for a new universal language. Rather, he has a deep respect for the languages in use, and rejects any alteration in them which is not necessary. He writes,

> . . .It is not enough that men have ideas, determined ideas, for which they make these signs stand, but they must also take care to apply their words as near as may be to such ideas as common use has annexed them to. For words, especially of languages already framed, being no man's private possession, but the common measure of commerce and communication, it is not for anyone at pleasure to change the

> stamp they are current in, nor alter the ideas they are affixed to; or at least, when there is a necessity to do so, he is bound to give notice of it (III, 11, 11, p. 313; emphasis mine).

Thus, Locke does not desire to remold all language so as to be fitted for scientific or philosophical use. He recognizes a civil (III, 9, 3, pp. 299-300) or common (III, 9, 8, pp. 301-302) use of language. And in his concern to improve the use of words in communication, he takes into account the different requirements of civil and scientific discourse (III, 9, 15, pp. 304-305).

In sum, Locke treasures language as God's gift to man for the purpose of communication. And he believes it is admirably suited to that purpose. In fact, he finds virtually no imperfection in language (III, 9, 4, p. 300). The abuses of language are not the fault of language, but man's "wilful" misuse of it (III, 10, 1, p. 306). If language fails to serve its purpose, it is because man fails to employ it properly. Furthermore, Locke's own proposals for remedying man's misuse of language include a respect for its natural form.

SUMMARY

The Essay Concerning Human Understanding is an example of the science of semeiotica as conceived by Locke. Its concern is with ideas and words as signs in their relation to the acquisition of knowledge and the communication of knowledge (IV, 21, 4, p. 443).

In dealing with ideas as signs, Locke sets forth the mind's ontological distinctness from matter as being a reason why there must be idea-signs of material entities and processes. However, this consideration only requires that there be mental correlates of physical qualities. It is in developing an epistemology based on a corpuscularian view of matter that the role of ideas as signs becomes evident.

How it is that ideas function as signs is developed in Book II of the Essay. Concrete sensory ideas (content and non-content correspondent) are manifestations of distinct corpuscular states, their role as manifestations being established by God. This view has important consequences for natural science. For instance, it undermines both Scholasticism and Cartesianism, and lends support to a Baconian experimental methodology and system of natural classification. Locke develops these points in Books III and IV of the Essay. Thus, his view of ideas as signs expounded in terms of a corpuscularian view of matter makes its effect throughout the Essay.

In Book III, Locke discusses the nature of words as signs. The word-signs are not signs for the idea-signs (i.e., the concrete contents of sensory experience); but rather, are signs for constituents of thoughts, i.e., concepts. The concepts are the meanings of the words. While the idea-signs are manifestations of their counterparts (corpuscular states) and thus signs of their counterparts, the word-signs are communications of their counterparts (concepts) and thus signs

for their counterparts.

Idea-signs are private occurrences in a person's experience; i.e., private manifestations of public corpuscular objects. Word-signs are public entities; i.e., public communications of private thoughts. In this manner, Locke ties together the public and the private; namely, material objects (public) with human experience (private), and human experience (private) with inter-personal communication (public).

In short, Locke came to see the basic materials or tools utilized in acquiring and communicating knowledge as signs: idea-signs and word-signs. Further, he saw idea-signs and words-signs as intimately related, forming one subject matter. Thus, he called this science, encompassing epistemology and philosophy of language, "semeiotică". This has a very contemporary ring to it, since today many consider epistemology and philosophy of language inseparable.

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