

# THE BODY AS THE ACTIVE PRINCIPLE IN THE CONSTITUTION OF PERCEPTUAL SPACE

## Introduction

My thesis is that modern neurological discoveries overthrow the classical dualism which assigns all the constitutive activity of perception to the mind and leaves the body a purely passive role. The paper is in four parts: first I will present the traditional theory, using Berkeley's concept of activity as the key; then I will summarize the relevant aspects of contemporary neurology; third, the incompatibility of these two approaches will be discussed; finally, I will propose that we must reject the materialistic notion of the body and grant it a power of activity which was formerly held to be the monopoly of the mind. Throughout, I will take the spatialization of sensation as the prime example of a constitutive activity.

## I The Traditional Doctrines of Modern Philosophy

Berkeley claims that "all our ideas, sensations, or the things which we perceive ... are visibly inactive: there is nothing of power or agency included in them. So that one idea or object of thought cannot produce or make any alteration in another. ... It remains therefore that the cause of ideas is an incorporeal active substance or Spirit."<sup>1</sup> Berkeley is here expressing a central inspiration of empiricism, indeed of all of modern philosophy, that ideas, sensations and material substance are all totally passive by their very nature and that only in an incorporeal mind can we find power, agency or activity. Kant, for example, understands sensation as a passive receptivity which supplies consciousness with the raw materials which it unifies, formalizes and categorizes, activities proper and unique to consciousness. But this Copernican Revolution is but the logical fulfilment of an inspiration

already present in Descartes and common to rationalism, empiricism, Kantian philosophy and even to some interpretations of Husserl's theory of intentional constitution. The originally given data of sensation are fragmented, isolated atomic entities, "oblivious" of each other, awaiting the intervention of the activity of mind for their unification into related and organized wholes.

From this viewpoint the body, in so far as it is considered at all, takes on the role of Faithful Transmitter; "sensations," or the nervous processes resulting from the movement or stimulation of the corporeal sense organs, are carried, in principle without further distortion, to the central nervous system and hence, somehow, to the mind, which receives them in much the same state as they were when they left the sense organs. It is, of course, the mind which perceives, not the bodily sense-organs; the body is but a passive instrument, a kind of uncorrupting telegraphic service which acts as a go-between, providing the mind with the raw materials, the single atoms which are to be abstracted, combined, associated and organized into the perception of an external spatial world. Once received at the periphery the sensations are passed unchanged, in particular without any positive organizing intervention, through the body to the mind; the passivity of the sensations which reach the mind depends on the passivity of the body. This dualism sets up a sharp dichotomy: the body, like matter and sensation, is passive; only the pure spiritual mind is active.

But what is meant by "activity"? On one level it is the power to unify, to relate, or to structure, that is, the capacity to organize elementary parts into wholes. As Berkeley puts it, "every combination of ideas is considered as one thing by the mind and in token thereof is marked by one name."<sup>2</sup> Similar citations could be culled from Hume, Kant or Husserl. For Berkeley, a set

of ideas cannot itself cause the appearance of another idea; a collection of walls, windows and doors, for instance, cannot cause a house; the new unified idea is dependent on the unifying agency of the mind. But for all these authors there is a more fundamental level below this activity of unification or constitution; there is the already given unity of consciousness, itself an active being-conscious, which supports the constitutive activity. It is only because the mind or transcendental Ego is already being a unity that it can unify and constitute objects. Structuring activity is dependent on the absolute, pure or transcendental unity of consciousness. It is with the constitutive activity, not the pure being of consciousness that I am primarily concerned in this presentation.

Typical of this unifying activity of consciousness is that mode of relation called spatial. In themselves, the raw sensations given to consciousness are traditionally non-spatial; perceptual space presupposes the intervention of the mind. Among empiricists, spatialization involves the association of the idea of space, or some modality of the idea of space, with the raw sensations; a pinprick, for instance, may become associated with a visual image of that part of the body pricked, or a given sensation of colour may be juxtaposed with the idea of a specific location in three-dimensional space. To say a ruler is extended is to say that the idea of extension is juxtaposed in the mind with that complex of sensations which makes up the ruler. For Kant, this explanation by the association of the idea of space is inadequate; space is the name for one mode of articulation of sensations, it is not another element, but the form imposed on the elements. Here the details of the processing are different than for the empiricist, but for our purposes it is the similarity which is important, for both the associative and the articulating processes are attributed to the active power of the mind, of consciousness, albeit transcendental, which acts on passive sensations given by the body as Faithful Transmitter.

This dualistic attitude can be well illustrated by

the work of the 19th century Local Sign theorists, such as Wundt or Lotze. Lotze, for instance, writing in 1877,<sup>3</sup> speaks of the soul receiving two kinds of sensations, the qualitative sensations (colour, heat, pain etc.) and the sensations which make up the local signs of the former and which permit the soul to judge their position of origin on a particular locality of the skin or of the retina. He asks how any mechanical interrelating of the two kinds of sensations within the nervous system could ever give rise to a spatially organized perception. He concludes that it never could, that no set of purely material processes could ever explain that peculiar mode of presentation we experience as space. The structure of this experience is a brute fact which we must simply accept as such, for there is no more rational link here than there is between, say, a particular wavelength of light and the subjective experience of green. He specifically condemns any attempt to render this mind-body barrier intelligible; any effort to understand how specific neurological processes become conscious presentations is in principle perverse.<sup>4</sup> The spatial mode of unification is an activity unique to the mind and is of a radically different nature than any of the body's processes. The mind-body dualism is here a radical one and all spatialization takes place uniquely in the mind; the body, in principle, could never contribute to it.

To summarize, then, the major traditional doctrines of modern philosophy present the body as a passive Faithful Transmitter of raw sensations to the mind which alone has the power to organize them spatially, or, indeed, in any way whatsoever.

## II New Neurological Findings

Neurological findings of the last hundred years, however, no longer permit us to accept the doctrine that the body is a passive, Faithful Transmitter. The work of Weber, Hughlings Jackson, Sherrington, Head, to name but a few, has led to the recognition of a considerably more

active role for the body and its nervous system in the perceptual process. Peripheral sensory nerves have been found not simply to transmit their excitation to awareness or to the cerebral cortex, but to integrate, mutually inhibit, summarize or otherwise process the initial stimuli in various, often complex and poorly understood ways. The processes of combining, dividing and analyzing impulses, and even of initiating responses, continues through the nervous paths from the periphery to the cortex so that the "sensations" one finally becomes aware of are very different indeed from the initial stimuli on the body surface. We will look very briefly at two areas, touch and sight.

Tactile sensations originate in cutaneous nerve endings which specialize in light touch, pressure, heat, cold or pain. Sir Henry Head pointed out, in 1918,<sup>5</sup> that if a hot pointed rod is applied to one of the nerve endings sensitive to cold, it can nonetheless stimulate a sensation, but a sensation which is experienced as an acute point of coldness. If, however, a larger source of heat is applied to a wider skin area which includes, as well as the cold nerve ending, many other nerve endings including those sensitive to heat, the subject feels a uniform sensation of heat over the whole area. That is, although the cold nerve is still reacting, its input is inhibited in favour of the surrounding heat impulses. Such integrative processes occur very early in the central nervous system, probably in the spine. One can conclude, then, that it is the context, that is, the relation to other sensations, which determines which sensations get through to the cortex, and how they are to be interpreted.

Head also presented evidence that the sensations of heat, cold and touch are grouped in the spine by function, not by the originating body part so that a spinal lesion may affect, say, heat sensations on a whole leg, yet leave its capacity for the postural sense of the limb completely intact, or vice versa. As a result, a patient may be sensitive to a heat sensation and be capable of localizing it on a part of his leg, perhaps the ankle, yet because he is unaware of the posture

of the leg, he cannot say where in objective space the sensation occurred, for he doesn't know if his leg is tucked up behind him or stuck out in front. These results indicate not only that sensations are already processed by the spinal cord, but also that full spatialization is a complex process taking place in a number of stages and dependent on more than one type of sensation.

Later research shows that in the case of a more complex sense organ such as the eye, the processes of integration and inhibition are much more developed. To gain sensitivity in the dark, many rods on the retina are integrated so that the stimulation of only a few of them in a given area is enough to fire a whole battery of nerves, whereas under conditions of higher light intensity the number of rods so integrated is vastly reduced, resulting in lower sensitivity but better spatial discrimination. There is also a function which inhibits the sensors just outside the outline of a bright figure in order to enhance the contrast and improve the outline. All these processes occur already before the impulse leaves the eye. Later processing and analyzing, in particular spatial organization, requires information not only about the position of the figure on the retina, but also information about eyeball and head position, input from the vestibular nerves concerning movement and orientation of the head, binocular comparison data and so on. These very varied processes are inaccessible to awareness which is presented only with the final spatialized object.

The exact details of these processes need not concern us here. Suffice it is to say that what arrives at consciousness is very different indeed from the initial peripheral stimulus. The initial impulses have been selected, analyzed, summarized and put into spatial form. That this integrative process takes place in stages and is not a sudden, punctual happening is confirmed by looking at experimental spinal preparations and at pathology, again following spatialization as our representative function.

A spinal preparation involves severing the spinal

cord of an animal just below the head so that although the animal continues to live, there is no communication between the brain and the body below the level of the neck. Many animals, dogs and frogs, for example, remain capable of complex, spatially coordinated limb movements initiated by the decerebrated spine and directed to the elimination of a precisely localized annoying stimulus. This "scratch reflex," as it is called, indicates that such stimuli have some spatial significance for the spine; they have enough spatiality to initiate and direct the limb movement. Yet we would hardly credit the spine with a full objective appreciation of three-dimensional space!

In neurological pathology we find many examples of the partial breakdown of spatialization. Many patients cannot read words, although their vision is intact and they can recognize individual letters; they cannot orientate the letters nor put them into the unique linear order needed to grasp the unity of the word. Lange, in 1930,<sup>6</sup> called this "directional disturbance." Other patients can read maps or charts, but cannot negotiate the hospital corridors; they do not lack the abstract ideas of space, what they lack is the ability to organize their perceptions and actions spatially in an adequate manner.<sup>7</sup> In many cases of right-left disorientation, the patient appears to be conceptually clear on the distinction, but in practice feels all sensations to be on his right side; he may also confuse right and left on the bodies of others and even with respect to inanimate objects in his environment. Other patients may feel tactile sensations on their bodies but be incapable of assigning them to any specific body part; but there is no loss of the "idea" of space, for the patients may be well able to explain what space is verbally, and indeed there may be no loss of spatialization on other parts of the body, or in other faculties, such as sight.

All these results indicate the gradual and complex nature of the process of spatialization, its dependence on the integrity of the various

parts of the nervous system, and its occurrence outside of the sphere of awareness.

### **III The Conflict of Dualism and Neurology**

In one way these neurological advances could be seen as the overcoming of empiricistic associationism by Kantian formalism. The notion that space is an idea, that is, an elementary state of consciousness, which affects other ideas only in so far as it is associated with them, has been abandoned. Rather space is understood as a mode of articulating the sensations, a type of order which is actively imposed on them. The patient who cannot localize a sensation on his skin has not lost some mental power of association, for he is quite capable of association in general. It is a particular formalizing activity of tactile spatialization which is missing. Nor does he lack the idea of space, he lacks only the power to "position" each sensation with respect to other actual and potential sensations, with respect to past events and to possible actions. This is not, of course, to deny that a normal individual may still have, secondarily, an idea of space, but neither the simple possession of the idea nor its association with other ideas adequately explicates the spatialization of sensation. Space is not primarily one more element, it is the order of the elements already there.

But despite this undoubted and important substitution of Kantian structure for the mechanistic association of ideas, 20th century neurology surpasses Kant on another level. The transcendental process of formalization, of which spatialization is but an aspect, is for Kant necessarily the activity of a transcendental consciousness; for neurological theory it is due to the activity of the nervous system. The giving of order, the articulation of sensations into objects for instance, is prior to awareness for both views, but the status and nature of this a priori is radically different in the two approaches. For Kant we can deduce the existence of an absolute unifying power, that of consciousness, whose

actual and pre-existing unity is a precondition for its transcendental unifying activity. For neurology it is the integrity of the various functional levels of the nervous system which is the precondition for the constitution of objects. Neurological theory no longer appeals to levels of consciousness of which we are unaware, or to the hidden judgements so dear to the empiricists, such as Berkeley; the transcendental constitutive activity is being frankly accorded to the body. It is the body which actively generates order, which imposes spatial form on sensation, which constitutes objects.

In effect, the place of the mind, the function of a transcendental consciousness, has been usurped. If we were to place its activity between the end of body processing and the stage at which the mind becomes aware of perception, we would find that there is little work left for it; spatialization and much, if not all, of the operation of objectification would already be completed. One might try to identify the transcendental process of constitution with some nervous functions below the level of awareness; yet to speak of the transcendental ego as operating in the central nervous system, indeed in the spine of a decerebrated organism, seems odd to say the least. It is certainly far from Kant's original conception.

Is this, then, a turn to materialism? Traditionally, materialism involves assigning exclusive rights to "matter," as this term has been understood in modern philosophy since Galileo and Descartes, that is, as passivity. One of the primary intuitions of modern philosophy, however, and one which I think is correct, is that matter, understood in this inert way, is in principle incapable of the type of activity which we are considering here, Berkeley's activity of unification. One can, I think, agree with neurology in assigning such activity to the body only by maintaining that the body is not exclusively composed of passive matter. The body is not "material" in the very precise and strict traditional sense of this term. It is therefore as incorrect to label these neurological theories as "materialist" as it is to

refer to them as Kantian. The appeal is neither to the mentalism of a transcendental consciousness or uniquely active mind, nor to the passivity of matter, but to a body capable of true activity.

#### **IV Indications for the Resolution of the Conflict**

We can conclude, then, that the traditional dualism of active mind and passive body must be rejected. Activity and passivity cannot be isolated and substantialized in this manner. I propose instead that both activity and passivity occur as aspects of one and the same entity, as aspects of the processes of the functioning body. Spatialization, to stick with our example, involves a hierarchical ordering of structuring functions. Each level takes the unifications of the level below it and arranges them into another layer of a higher order. Localized sensations on the skin of the arm together with the kinaesthetic sensations indicating the position of the arm, form the basis for deploying the higher structure of "projective space"; the sensations are given a position in a space which is independent of the arm, a position attainable by other limbs, by other senses, i.e., in "external" space. But this is still *my* external space and awaits higher integration into a space valid, maybe, for any observer. At every step there is an active structuring of the data of the previous level taken as passive. Activity and passivity are to be found at every stage: even the initial receptive nerves of the retina are actively structuring, while the higher levels of the cerebral cortex are still treating their data as passively given. The overall integrated pattern is not, of course, a simple military hierarchy with a unified chain of command; there is not a simple superposition of uniform layers one on top of the other, but rather a highly complex network involving the intermingling of the various levels of the different regions such as sight and touch, leg or arm, involving the influence of higher patterns on the modes of structuration of the lower, and involving input from non-sensory sources, such

as memory and will. Happily, the unravelling of this complexity is a job for the neurologist, not the philosopher!

What concerns the philosopher here, is the conceptual point that activity and passivity cannot be assigned each to its own separate level, nor can they be referred to two distinct sources. Activity cannot be referred to a conceptually isolated, self-contained mind, nor passivity to a mindless body which acts purely as Faithful Transmitter. Our understanding of both activity and of passivity must change. I will discuss each in turn.

In the case of activity, I have already claimed above that, within the context of this discussion, the word activity has two senses; on the one hand the activity we have called constitutive, on the other, the active self-unity of pure consciousness. Traditionally in modern philosophy the former depended on the latter; constitutive activity demanded the prior active being of the cogito. This essential dependence has now been undone, for we find the constitutive activity occurring at levels of the body which have no relationship to self-consciousness, as I pointed out in the example of space. I do not wish in this presentation to say anything about the pure cogito itself, but only to claim that the activity of spatial, and other, constitution, that is, the activity of unification, does not depend on it, but upon bodily structures, though, as I have explained, not bodily in the materialist sense. In other words, constitutive activity does not depend on the activity called "awareness".

What of passivity? Just as activity had its seat in the purity of consciousness, so traditionally passivity was incarnated in the sensation. But an ambiguity in the meaning of sensation now appears. Sensation on the one hand means that which originates in the sense organs, on the other, the simplest data of awareness. As long as the body was but a Faithful Transmitter, these two were essentially the same, but once we grant a power of constitutive activity to the body, that which leaves the sense organs and that which

arrives at awareness are two very different things indeed. The simplest data of consciousness can no longer make any claim to pure passivity, so our search for an initial passivity devoid as yet of activity must lead us to the initial impulses of the sense organs and it is for these that I wish here to reserve the title of "sensation". Our question must now be, is sensation, so defined, a purely passive element?

I think not. A purely passive element would be one that is free of all active organization, innocent of structure; yet if so defined, we can see that a sensation, in the sense of a received impulse on, say, the retina, cannot qualify as purely passive. A quantum of light which falls on a nerve ending on the retina is already a late element in the game; it has been preceded by the setting of a sensitivity level for that part of the eye, by the focusing of the eye, by the orientation of the eye and the head, and even by the context of the individual's anticipatory interpretation and of his potential action. It is these presettings which determine in advance whether this quantum, in the context of other quanta, will fire the action potential of the nerve or not. Here the passive aspect is entirely surrounded by prearranged activity; the quantum is already structured before being received. Its interpretation, its spatial location and even its power to produce a sensation of any kind are all largely decided before the physical reception of the energy. Hence the first firing of the most peripheral nerve ending stimulated is by no means a purely passive datum, a raw unstructured element. True there is some passivity involved, the quantum might have had a different spatial value for instance, but the sensation as such is not this passivity. Within the organism there is no purely passive element. Passivity cannot be isolated into any specific unity, but is an aspect of every level of functioning, though, of course, in different ways. Within the organism all is already structured from the very first moment.

It is only by conceptual abstraction that the omnipresent aspects of activity and passivity are

isolated out and concretized into more or less substantial entities: activity into the mind as transcendental ego, passivity into the purely passive sensation and into the materialist body as Faithful Transmitter. But these are false and misleading abstractions which present activity and passivity as two independent moments, as if passivity ended abruptly at one point and activity took over once and for all. Once we see that passivity and activity continually intermingle on multiple, complex levels, we are saved from the temptation of substantializing them into the duality of mind and material body. Then we can assign the overall process of perception, of reception, structuration, analysis and recognition of what is sensed to the body as an integrated functional unity, which, far from being a passive transmitter, becomes itself the perceiver. Descartes, Berkeley and others were wrong when they assigned perception to the simple grasp of the pure cogito; perception is a complex, multi-level process carried out primarily by the body. It is the body as a unity of structuring functions which perceives.

## Summary

I have argued, then, that the tradition of modern philosophy was to assign to a pure mind or transcendental Ego the monopoly for all constitutive or unifying activity of perception, such as spatialization. As a result, the body was viewed as devoid of activity, serving only the passive role suited to its material nature, that of linking the mind to the data coming from the senses and so supplying the mind with the raw material needed for its activity. Such a traditional concept falls before the findings of 20th century neurology. The transcendental process of constitution must be assigned to the body, but to the body not as a material entity, but the body as a hierarchy of structuring functions, that is, to the body not as Faithful Transmitter, but as characterized by its power to integrate, unify and structure. The result is the abolition of the dualism of active constituting mind—passive material body, in favour of a concept of the body as the unified seat of both activity and passivity.

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- 1 G. Berkeley, *The Principles of Human Knowledge*, in David M. Armstrong, *Berkeley's Philosophical Writings*, New York, Collier Books, 1965. pp 25 & 27.
- 2 G. Berkeley, *An Essay Towards a New Theory of Vision*, in David M. Armstrong, *Berkeley's Philosophical Writings*, New York, Collier Books, 1965. p 109.
- 3 H. Lotze, "Sur la formation de la notion de l'espace" *Revue Philosophique* 46: 345-365, (1877).
- 4 Ibid. P 352.
- 5 Sir Henry Head, "Sensation and the Cerebral Cortex," *Brain*, (1918), 57-253. Reprinted in Henry Head, *Studies in Neurology*, Oxford University Press, (1920), pp 639-800, p 647.
- 6 J. Lange, "Fingeragnosie und Agraphie: Eine Psychopathologische Studie". *Monatschrift fur Psychiatrie und Neurologie*, 76: 129-188, (1930), p 168.
- 7 A.A. Grunbau, "Aphasie und Motorik" *Zeitschrift fur des gesamte Neurologie und Psychiatrie*, 130: 385-412, (1930). p 397.