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Philosophy of Sound, Ch. 2 (English translation)

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2. Distinguishing the senses

2.1 Hearing as a sensory faculty

Our access to sounds is quite specific: we *hear* them. But what does “hearing” mean? The access to sounds is specifically sensory: hearing cannot be reduced to thinking of sounds, or to having beliefs about sounds. Furthermore, hearing sounds is not reducible to the recording of sound information by the means of the auditory system. Nor to just having the simple impression of hearing sounds, nor even to actually having auditory sensations.

There is a wealth of attempts to provide a classification of the senses in the philosophical tradition, while the nature of sounds and the foundations of their classification do not seem to attract the philosopher’s interest quite as much. Hearing is traditionally listed as one of the five senses. But why five senses? And what is a sense? Senses are faculties, but then can perception not be described as a faculty too? Are senses sub-faculties of perception, or are they independent faculties? Add to this that there is no universal agreement concerning what kind of faculty perception is.

In the taxonomies proposed by traditional philosophy, the senses are commonly and univocally associated with specific sensory objects, the *proper sensibles*. The idea is that, in spite of the existence of common sensibles that can constitute the object of different senses (i.e. shape and movement, accessible to sight as well as to touch), a certain number of sensory objects are sense-specific, and thus help to individualize the senses. Thus sounds are the objects of audition, colors those of vision, and so on. In reality, some authors, like Berkeley, claim that visual shapes

are not the same as tactile ones, thus implying that shape is not a common sensory object (see chapter 7). Moreover, in order for them to be considered as suitable criteria for distinguishing between senses, it is necessary for proper sensibles to be individuated without making reference to any particular sense. A preliminary characterization of color as an essentially visual object would make the characterization of vision as the faculty of perceiving circular. But even under these conditions, the criterion is not fully satisfactory: an organism which can successfully make use of its eyes (organs akin to our eyes, from the physiological and the structural point of view) for accessing sounds, could alternatively be described as seeing sounds and as hearing by the means of its eyes. In the absence of further specifications, the fact of perceiving sounds still does not suffice to establish if the organism is endowed with the faculty of hearing.

In the present chapter we make reference to recent discussions (Grice, 1962; Roxbee Cox, 1970; Leon, 1988; Nelkin, 1990) in order to show that there is one and only one reliable criterion for distinguishing between the senses, and that this criterion consists in considering sensory modalities as defined by two elements: a sensory organ and a class of *beliefs* that are specifically justified in relation to that organ. This dual-component theory carries a seemingly surprising consequence: that *sensations* play no role in the definition of the senses. Hearing, for instance, does not require one to possess sound sensations. Even if one had never been under the *impression* of hearing sounds, one could not, for that reason only, be considered deaf. We shall discuss the implications of this theory and its compatibility with the physicalist theory of sounds that we have presented in chapter 3. Since our criterion of choice refers to a specific class of beliefs, we will demonstrate what it means for a belief to be specifically auditory in nature.

2.2. *Distinguishing between the senses*

We will not broach the general, methodological question: what are the requirements for a criterion of distinction between the senses to be appropriate? We all have pre-theoretical intuitions concerning how many senses there are, or the idea that vision and touch are distinct. By this we do not intend to rule out the possibility of a most interesting empirical discovery, i.e. that, in fact, no matter how they appear to us, vision and touch are not distinct senses. We are merely presupposing that an appropriate criterion must, at the very least, provide an answer to specific questions, such as: what distinguishes sight and hearing, supposing that they are distinct? It is clear, moreover, that a criterion that answers this metaphysical question does not necessarily answer the epistemological question of how we know whether sight and hearing, or two distinct senses in general, really *are* distinct. Let us start by addressing the epistemological question, and we will continue with the metaphysical one in section 2.3.

According to Grice (1962, 1989: 250), the senses can be distinguished according to four possible dimensions: (i) the kind of things that constitute their object (colors and shapes in the case of sight, scents in the case of smell) – we call this the property criterion); (ii) the characteristics of the the experiences that are involved in perception; (iii) the differences between stimuli (contact in the case of touch, light in the case of sight); and, finally, (iv) the type of perceptual organ (and its connections to the brain). Grice does not rule out the possibility that each criterion, on its own, could be insufficient, and that multiple criteria might have to be combined in order to obtain an appropriate taxonomy.

The proposition advanced by Roxbee Cox (1970) constitutes an improvement of the property criterion (i) described by Grice. In fact, a key property is associated with each perceptual modality. A certain perceptual event will then be classified as presenting a certain perceptual modality in virtue of the fact that perception presents its object as something possessing the key property of that perceptual modality.

According to the property criterion, sight could never be distinguished from touch, because there are properties that can be perceived by sight as well as by touch - as in the case of shape. If perception is analyzed in terms of beliefs, then the property criterion rests on the existence of beliefs concerning, for example, states of affairs that are specifically auditory, rather than on the existence of beliefs that have an auditory justification. The latter condition wouldn't be suitable for distinguishing between sight and touch either, because states of affairs such as the one described by the sentence: "there's a hole in my jacket" can be perceived both through sight and by touch. But this difficulty vanishes if we associate each sense to a key property, which can't be perceived but by the intervention of one precise sense: heat in the case of touch, color in the case of sight, and, if we accept Berkeley's remark, visual shape as opposed to tactile shape (Leon 1988: 248).

There are two dimensions in our experiential reports: the first one represents the contents of the experience, while the second one represents the modality of the experience (i.e. auditory as opposed than visual). According to Leon (1988) the intuitions according to which there is a phenomenological difference between seeing and hearing that is accessible to introspection should be taken into account (p. 265-266). Thus, in the case of sight and of touch, seeing an object as a square object seems different from feeling it as a square (p. 244). However, this intuition does not enable one to immediately and appropriately distinguish between the senses: it is still necessary to explain the possibility that two distinct experiences, that are phenomenologically identified as such, can still belong to one and the same perceptual modality. For instance, one could find that the experience of seeing a triangle and the experience of seeing a square are far more different from each other than are the experiences of seeing and of touching a square.

Up till now we have presented a series of positions without insisting on the relevant motivations for or against them. In any case, it seems that none of the criteria that we have listed above has the capacity of drawing a clear and appropriate distinction between the senses. This is the thesis of Nelkin (1990), and we agree with him. First, as we have already underlined, the property criterion (i) presents the following drawback: certain properties are common sensibles, and can be perceived according to different perceptual modalities. The enhanced version of the property criterion, the one proposed by Roxbee Cox, is not exempt from difficulties. On the one hand, individuating a key property does not explain the distinction that we draw between seeing and feeling a shape; on the other hand, we would have to accept an uncontrolled multiplication of senses, i.e., multiple forms of touch: a sense of touch for thermal properties, a sense of touch for texture, all differing from each other at least to the same extent that taste differs from smell. A rather counterintuitive assertion, as Hamilton has observed (see Reid, 1983: 119).

Criterion (iv), which refers to the difference between sensory organs, is vulnerable to a similar objection: the difficulty of avoiding the multiplication of many differing senses of touch (one for each part of the body which is provided with tactile receptors) and audition (one for each ear). Making reference to a type of organ rather than to a token helps to solve the problem in the case of hearing, but not in that of touch.

The same is true for criterion (ii), since from the fact that thermal sensations feel rather different from the sensations produced by pressure, one is not compelled to hold that the two constitute different forms of touch (Nelkin, 1990: 148-152). It can be added that the stimulus criterion (iii) does not enable one to predict a distinction between visual and thermal perception, since in both cases the relevant medium can be constituted by electromagnetic radiation. It would seem that H. von Helmholtz (1852, 1992:

29) derived the correct consequences of the acceptance of criterion (iii) when, in discussing a case similar to our counter-example, he asserted that in his view, the human skin should be construed as a kind of extended, primitive eye.

Nelkin therefore introduces a belief criterion (v): perception is, among other things, a mechanism for generating beliefs. These beliefs may surely differ according to the perceptual modality which has taken part in their generation. Thus, beliefs that concern the distance and position of some object in relation to the observer can take on a different form according to whether they are acquired by sight or by hearing. In fact, the distance of objects that are not accessible to sight can be determined by the means of hearing, as in the case of the telephone that rings in another room (see below, section 2.4).

But the proposed criterion is still too strong: from the fact that we have specifically different beliefs, we are not in a position to conclude that we have two different senses. For instance, from the existence of two visual beliefs that are specifically different, the first of which concerns shape while the second concerns the distance of an object, one cannot deduce the existence of two distinct “shape-sight” and “distance-sight senses”.

Nonetheless, Nelkin suggests that a combination of two criteria should constitute a sufficient condition for establishing an appropriate classification. For example, the sensation criterion can be paired with the perceptual organ criterion, or the perceptual organ criterion with the belief criterion; alternatively, the organ/sensation couple can be enhanced by associating it with the organ/belief couple (Nelkin 190: 152-6).

2.3 *The nature of the senses*

As rightly argued by Nelkin, the taxonomic classification of the senses is only partly an epistemological problem, a problem to which we have dedicated section 2.2 by discussing the different criteria for distinguishing between the senses. Yet, the problem of the *nature* of the senses remains unsolved. Knowing how to distinguish between the senses is one thing, another is understanding what the senses are (for those who think that epistemological criteria should harmonize with a theory of the nature of the senses, we can anticipate that Nelkin's theory also possesses this advantage, among others). Nelkin has imagined a thought experiment aimed at showing that each perceptual modality has at least two components: on the one hand, the possibility of acquiring beliefs of a certain kind, and on the other the presence of a perceptual organ which is capable of acquiring that kind of information. The specification of the perceptual organ can certainly represent a problem: let us imagine someone who claims to see by means of his ears; should we continue to call these organs "ears"? The sensory organ is the lower limit of perception – our interface with the surrounding world. There are two possible mental candidates for the upper limit: belief and sensation. According to the following thought experiment, sensations could be ruled out. Let us imagine a race of Martians with perfectly working ears; in fact these Martians can correctly locate events happening behind their back, as shown by the fact that they take shelter when they hear an explosion. Also, they form, by the means of their ears, the very same beliefs that we consider to be specific of hearing. But let us also suppose that in all these cases they develop non-auditory sensations: a loud noise is perceived as a flash of light, they are under the impression of seeing red when they hear a D sharp. Let us now turn to Venusians, which differ from us in a complementary way: D sharp provokes the same effect on them that D sharp has upon us; but they cannot form the same, appropriate, judgments in presence of surrounding sounds (they do not seek shelter in presence of an explosion, they cannot locate a sound which is

produced behind their backs). In other words, they have the right sensations, but not the relative beliefs (we will see that, at the end of the day, the possibility of dissociating intrinsically visual beliefs from intrinsically visual impressions is questionable).

We would probably be more inclined to ascribe the capacity of hearing to the Martians, rather than to the Venusians, and to conclude that sensations are not essential to audition, while appropriately generated beliefs are.

The thought experiment we have presented involving Martians and Venusians is, in a sense, symmetrical to the one described by Kripke:

Perhaps we can imagine that, by some miracle, sound waves somehow enabled some creature to see. I mean, they gave him visual impressions identical to ours, including, maybe, the perception of color. We can also imagine the same creature as being completely insensitive to light (photons). Who knows what subtle, undreamt of, possibilities there might be? Would we say that in such a possible world, sound was light, that these wave motions in the air were light? (1972: 70)

Kripke answers that we would be inclined to describe the situation as a form of deviant sensibility to sound waves. The word “light” is not synonymous with “that which produces visual impressions in us, that which puts us in the condition of seeing”. In fact, the latter description simply enables us to establish the reference to light. In the same way, if we begin by focusing on the perceptual faculty rather than on the object of perception, we can say that sound sensations enable us to ascertain the reference to hearing, without, however, contributing to its definition. The fact that they enable

us to ascertain this reference gives us the illusion that sensations are essential. Besides, if having sound sensations is what matters in the appreciation of music - rather than forming certain beliefs concerning the location of the sound sources in the environment - and if we accept the thesis concerning the nature of audition, then we should accept what at first might seem a rather bizarre, yet reasonable, conclusion: that the appreciation of music does not require hearing. It is indeed possible to conceive a solipsistic musical subject who has no beliefs concerning sound events but who hears symphonies as a consequence of hallucinations.

The possession of beliefs seems to be a necessary but insufficient condition for defining the senses, as shown by the fact, in certain intermediate cases, in the absence of a precise reference to the organ involved, examining the beliefs does not help to determine the sense involved. Let us go back to the previous case, the one involving the being that successfully uses its ears in order to access the shape of distant objects. What would we say of it: that it hears shapes, or that it sees shapes by the means of its ears? The beliefs that are involved in this example are of a purely visual nature (“There is a square over there”), but we are not authorized, by this fact, to affirm that the organism sees. At the same time this is a borderline case, because we could not say that the organism does not see, or that it hears shapes. An apparently similar case is represented by blind people “seeing with their hands”. But as a matter of fact, if beliefs concerning the objects’ shape constitute a part of the beliefs that are specific to touch, the same is true of sight. The case would become much more intriguing if blind people could identify distant objects by stretching out their hands in their direction.

2.4. Specifically auditory beliefs

The metaphysical issue of the distinction between the senses cannot be solved without recognizing the central role of our beliefs. But in what manner are these beliefs distinct from each other, and in what measure does distinguishing between beliefs help to establish a distinction between the senses? Setting apart the typically qualitative contents of experience (those qualia which determine what it is like to hear, say, D sharp rather than B) - because they are related to sensations, and we have previously established that sensations are not essential - we are left with two possibilities when faced with the prospect of distinguishing between beliefs: the way beliefs are justified in relation to their spatial content, and the way beliefs are justified in relation to the properties of the represented objects. The mention of the epistemic filiation of beliefs, that is to say the way they in which are justified, is consistent with choosing the perceptual organ as the other component that contributes to the distinction of the senses. Indeed, the sensory organ plays an important causal role in justification.

2.4.1. Spatial content

Our examples of beliefs about sounds (such as the one involving Martians and Venusians) were concerned with spatial contents. In this respect, we may draw inspiration from the observations made by Jean Nogué concerning the organization of the sensory spaces that are associated to each sense. Nogué purports to show that sense data follow specific forms of organization, that is to say that they are variously distributed in space according to their type. We can use Nogué's indications without committing to his metaphysics of the sensible, and by translating his approach in terms of specific beliefs. In the case of smell, for instance, the key concept is that of the "source which occupies a certain position in the region outside the individual", which "indeed, makes it possible for one to undertake a [...] complex [...] research activity because, rather than waiting for the object to come within our reach, we can anticipate its location and calculate long distance movements in order to find it"

(Nogué, 1937: 135).

The elements of spatial content are here « varied sense and direction, the notion of an external region, but such that we think that the object possesses an yet to be determined position in it, which calls for a search »; these elements are joined in the notion of a scent: « odor comes to us from without, from a certain source, which we can approach at a regular pace: we just have to follow the direction and sense in which the degrees of the sensation increase » (Nogué, 1937 : 135).

Les éléments du contenu spatial sont ici «sens et direction variés, notion d'une région extérieure, mais avec cette différence qu'au sein de celle-ci nous allons supposer que l'objet possède une certaine position encore indéterminée, qui soulève un problème de quête)); ces éléments se réunissent dans la notion d'effluve, <<l'odeur vient à nous du dehors, à partir d'une certaine source, dont nous pouvons nous rapprocher d'une façon régulière : il suffit de suivre à la fois sa direction et le sens dans lequel les degrés de la sensation vont croissant », (Nogué, 1937 : 135).

The specific characteristic of smell's spatial content consists in the fact that, by moving, we can *infer* the distance between us and its source. The growing intensity is an indicator of the proximity of the source. If taken in isolation, the contents of smell do not provide any information concerning the position or distance of the source; it is only

through the comparison of multiple contents that we can infer these properties. This idea perfectly characterizes the behavior which is described as “following a scent”.

In one actual case, auditory beliefs are similar to olfactory ones, as far as the kind of spatial information they carry is concerned. When deep diving one cannot determine the direction of the source of an isolated sound which is located under the water’s surface (such as the engine of a boat), and one is forced to move in order to compare a succession of sound presentations, the intensity of which varies according to their distance from the source. This case, that we may call that of the “sound-scent”, constitutes a transition from the structure of justification which is specific to smell to the one which is involved in normal auditory perception. Nogué makes the following suggestion:

By adding the notion of *distance* to that of source, and by introducing at the same time the notion of the simultaneous existence of *multiple sources*, we obtain a new spatial combination, richer than the previous ones, and of potentially considerable interest in that it makes possible the orientation of action at great distance (and not only step by step as is the case for scents), whilst at the same time ensuring the appraisal of the area extending beyond the direction which is presently followed. This is the combination which is realized by the sense of hearing. Indeed, when a sound is produced it has a clearly determined direction and a pre-specified distance, but nonetheless natural sounds exist in a polyphonic way that has no equivalent in the world of smells, where the sense is always forced to choose one smell over the others. In virtue of this fact,

sounds enable simultaneous representations of multiple possible actions, even when one of them is in the process of being carried out. (p. 137)

There are several characteristics that we shall outline in this way: firstly, in normal cases, auditory beliefs present a group of objects simultaneously; secondly, they locate the object as being in a certain position in relation to the hearer; finally, the notion of scent no longer comes into play.

The determination of the position of the object is much more exact in the case of sight than it is in the case of hearing, and in virtue of this fact the distinction between the structure of the justification that is suitable for visual beliefs and that which is suitable to auditory beliefs is reinforced. On the other hand, “the ear [...] is a remarkable organ of discovery, even more varied in its applications than the eye, since it may function in all circumstances and even through a number of masks that block the field of vision” (p. 137).

In particular, hearing makes accessible to us objects and events that are out of sight, because they are masked by obstacles, because they are behind the hearer’s back, or because they occur inside objects that are not transparent to sight.

To sum things up, we can distinguish between two major classes of senses: in the first one we find hearing, smell and sight, which, in contrast to touch, are typically related to distance (they enable us to gather information about distant objects). Furthermore, hearing and touch make possible the gathering of information about objects that are not accessible to sight and hearing can access events that are not available to smell.

2.4.2 Categorization

Information carried by the sense of hearing is clearly not reducible to spatial information. An important part of the cognitive value of sounds is due to the fact that sounds inform us as to the internal composition of objects, or as to the material (or materials) a sounding object is made of. An obvious advantage of the theory that we defend in chapter 3 is that this fact is strictly dependent upon the nature of sound, an event in the material the object is made of. Hence it is natural that sounds constitute sources of information that are primarily concerned with this material. This is a salient kind of information, because it enables us to outline a primary categorization of objects. Glass and wood react very differently to percussion; shaking a wool cover will produce a light and dull ruffle, while the same sway imposed to sheet metal of equal shape and size will produce a distinctive clang. The differences that are perceived are due to differences in the material out of which the object is made and in its organization.

These differences enable us to effectuate a first classification of the objects on the basis of the characteristic way their matter sounds (Schapp 1912, 1925, chapter II; Conrad-Martius, 1924: 282; a detailed phenomenology can be found in Gibson, 1966: 89, and sqq.) This is certainly a very rough classification, which may justify a number of quite significant revisions, as is the case for any purely perceptual classification. Nonetheless, it possesses an indicative value. In general terms, we can subscribe to a minimalist principle concerning the quality of our epistemic states, the *differential principle*: to any perceptual difference there must correspond a difference in the world. Perception is an epistemically reliable source if, given the same observational conditions, a perceptual difference reflects a difference between objects. Perception could not be considered reliable if it happened to be completely independent from the observed object, that is if, given the same observational conditions, the object could be presented as different by perception (if, for instance, when looking at a

red surface which does not vary during the whole period of our observation, we saw it sometimes as being red and sometimes as being blue). The complementary epistemic fault of underdetermination does not affect reliability as seriously: our perceptions are underdetermined when we perceive two differently colored objects as having the same color. The converse of the differential principle, according to which a difference in the world must correspond to a difference in perception, obviously cannot be endorsed. The rough, approximate nature of hearing does not prevent it from contributing to knowledge. If hearing retains its role as a rough means getting one's bearing in the world, it is also in virtue of its conformity to the differential principle (a perceptual difference is linked to a difference in the world), a conformity that its possible underdetermination does not undermine. Imagine listening at a concert: a violin and viola are playing on stage, and someone asks you to point out the violin player. You might be unable to do so, maybe because the two musicians are very close to each other – even if you know perfectly well what a viola and a violin respectively sound like. This does not prove that the differential principle is epistemically pointless and useless. Recognizing that there is a difference between, respectively, the sound of a violin and the sound of a viola is a sufficient condition for the general judgment: “There are two different sources of sound here”, but not necessarily a sufficient condition for the judgment that a certain object is the source of a certain sound.

Up to this point, we have discussed the matter of the object as being the content of sound information, but this content presents other aspects. In a more complex, but often very clear fashion, we learn through hearing, that certain objects are hollow, or that they are composed of several assembled parts - that these parts are connected to each other like the gears of a clock, or that they have a greater freedom of movement, like marbles in a cardboard box. This kind of information is still related to the material, but also to other features of the object – i.e. its shape or the relational properties between its components, or even to the presence of relatively independent parts. We can use a general concept

including all these determinations, and refer to the *internal structure* of the object. Thus sounds are sources of information concerning the internal structure of the object. By contrast, colors most often inform us as to objects' surface structure, and odors most often as to the basic material they are made of.

At this point, we can briefly discuss the distinction between musical sounds and noise (a distinction that doesn't play any fundamental role in our arguments about the nature of sounds, because musical sounds and noise are not sharply distinguished from each other on the basis of their relationship to space or to their nature as events). The distinction concerns, roughly, the difference between the effect produced by our hitting a table, and that which occurs when we hit a piano key, thus playing a note. The latter is what we call a musical sound; the first one is a non-musical sound or a noise. Some authors (Piana, 1988: 222-223) have tried to introduce a phenomenological distinction between sounds and noises, on the basis of the fact that noises are still related to the object, they are permeated by the material that constitutes the object; while sounds, in the musical sense have the privilege of a certain independence (even if it is only relative) from the object, and become sound-objects, autonomous entities. We do not by any means believe in this distinction. The way the distinction is formulated (noises being fixed in matter, while musical sounds flutter in the wind, free from matter), that is to say, that musical sounds do not bear the mark of the instruments they are produced by, is not really plausible. On the contrary, it is clear that the differential principle that we have mentioned above applies perfectly to musical sounds, and enables us to classify musical instruments according to their timber. The only aspect of the phenomenological observation concerning the distinction between musical sounds and noises that we can make use of is that the purity of the first bears witness to the *purity of the structure* of the objects which produce them.

In the present chapter we have suggested that the essential criterion for distinguishing between perceptual modalities is constituted by the association of the sensory organ, on the one hand, and a specific class of beliefs on the other; we have also shown in what sense beliefs can be purely auditory, by distinguishing them in terms of the justification of their spatial and qualitative content.