

The Senses Considered as Perceptual Systems

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Conclusion

Thomas Reid's assertion in 1785 is just as true as it ever was, that "the external senses have a double province; to make us feel and to make us perceive." They "furnish us with a variety of sensations" and they "give us a conception of external objects." Philosophers and psychologists have been fascinated by these feelings that accompany perceiving, and physiologists have discovered some of their causes. But animals and children and ordinary persons are not in the least concerned with how it feels to perceive. When the senses are considered as channels of sensations they are curious and interesting, but they are not the instruments of our contact with the world. The impressions of sense are incidental accompaniments of perceiving, not the data for perceiving. They are not entailed in perceiving. Sensations are not, as we have always taken for granted, the basis of perception.

When the senses are considered as perceptual systems, all theories of perception become at one stroke unnecessary. It is no longer a question of how the mind operates on the deliverances of sense, or how past experience can organize the data, or even how the brain can process the inputs of the nerves, but simply how information is picked up. This stimulus information is available in the everyday environment, as I have shown. The individual does not have to construct an awareness of the world from bare intensities and frequencies of energy; he has to detect the world from invariant properties in the flux of energy. Such invariants, the direction of gravity for instance, are registered even by primitive animals who do not have elaborate perceptual organs.

Mathematical complexities of stimulus energy seem to be the simplicities of stimulus information. Active perceptual systems, as contrasted with passive receptors, have so developed during evolution that they can resonate to this information. The mathematically simple and easily measurable variables of energy are bare of meaning, to be sure, but they

are only relevant to the action of mechanoreceptors, photoreceptors, and chemoreceptors.

When it is recognized that receptors, nerve bundles, and the corresponding modalities of sensory experience do not provide a fixed number of senses or permit a fixed inventory of sense impressions, we are free to study the redundant overlapping activity of perceptual systems unhindered by the old doctrines. Proprioception or self-sensitivity is seen to be an overall function, common to all systems, not a special sense. The activity of orienting and that of exploring and selecting — the commonsense faculty of attending — is seen to be one that extracts the external information from the stimulus flux while registering the change as subjective feeling. This feedback system also, of course, controls the performatory activity of the body, the executive systems of behavior proper as distinguished from perception, but that aspect of proprioception lies outside the scope of this book.

The puzzle of constant perception despite varying sensations disappears and a new question arises, how the invariant information is extracted. Perceptual development and perceptual learning are seen as a process of distinguishing the features of a rich input, not of enriching the data of a bare and meaningless input. A perceptual system hunts for a state of what we call "clarity." Whatever this state is physiologically, it has probably governed the evolution of perception in the species, the maturation of perception in the young, and the learning of perception in the adult.

The puzzle of depth perception disappears and the question becomes one of how animals detect the layout of their surroundings. The puzzle of form perception is no longer important (consisting only of the question of how men learned to see the perspectives of things from this or that point of view when they began to draw pictures) and the important question emerges of how animals and children detect those distinctive features of things that are invariant under changes of perspective.

The puzzle evaporates of the seemingly innate capacity of newborn animals and human infants to interpret certain sensations without prior experience. Instead, the question arises of how it is that vision, hearing, and smell are attuned to (or are rapidly imprinted by) certain sights, sounds, and odors.

Above all, the puzzle of meaning and value in perception takes an entirely new form. If what things afford is specified in the light, sound, and odor around them, and does not consist of the subjective memories of what they have afforded in the past, then the learning of new meanings is an education of attention rather than an accrual of associations.

The problem of the communication of information from one person to another also takes a new form. Pictures and words are now seen to be

truly mediators of perception, of perception at second hand. Spoken and written words presuppose a code, and associative learning of the classical sort does come into the child's mastery of this code. But association is not the basis of learning as we have been taught. Discrimination has to precede association for language to be of any use. The ability to name and to predicate fixes the gains of perceiving but it does not explain perceiving. It fosters the education of attention to the facts of the world but cannot substitute for it.

The useful senses have been contrasted in this book with what might be called the useless senses. The fact is that, although different men do not all use their senses in the same way, they *can* all use their senses in the same way. The basis for agreement among men exists in the available stimulus information. Men often disagree but they are not fated to do so by their language or their culture. Disagreement is not caused by inherent differences in their habits of interpreting sensory experience — habits permanently fixed by the words they use. A man can always re-educate his attention. For that matter, a man can invent new words for something he has seen for himself. He can even get others to see what he has newly seen by describing it carefully, and this is a fortunate man.

Let us recognize the strength of the dead hand of habit on perception. Let us acknowledge that people — other people, of course — often perceive the world like silly sheep. But it is wrong to make a philosophy of this rather snobbish observation. The orthodox theories of perception have encouraged this fallacy and one purpose of this book has been to undermine them. This book is dedicated to all persons who want to look for themselves.