

The Task of Perception

WHEN I SPOKE in Chapter 3 of the infant learning how to see—that is, learning how to associate certain sense data with objects—I intended to introduce the subject of this chapter. Perception is indeed a task to be accomplished and a problem to be solved. Perception is active inquiry, not passive reception. The scientist as well as the baby must learn how to see, that is, how to grapple with the flux of sensation and make it amenable to our purposes. The observer is not the spectator of a self-revealing ordered universe. The painter Constable shrewdly remarked, “the art of seeing nature is almost as much to be acquired as the art of reading Egyptian hieroglyphs.”

Seeing-as

I mentioned the difficulty of separating sense data from the accompanying inference or interpretation. Did I really first see a blue patch and then infer that it was my pen? Aside from protocols (“blue here now”), all acts of perception would seem to be acts of perceiving *as* something. Think back to the first time you

saw an X ray, or an aerial photograph, or the man in the moon, or the face of a clock, or a musical score. Have you ever watched a cricket match, or a ballet, and wondered what the audience was applauding? Why did astronomers not know for years whether or not they were seeing canals on Mars? Because in every case, there is more to seeing than meets the eye! All seeing is *seeing-as*, and we must learn how to do this.

What enters the eye is not really seen until it is organized by the brain. To see *what is the case* requires context, inference, concepts, experience, interpretation. This is the basis of the Rohrschach test, which elicits a variety of "seeings-as" in response to a neutral inkblot. Hamlet got Polonius to agree that a cloud looked like a camel, a weasel, and a whale. Two people will stumble over a bit of hard clay, but only one of them will see it as a fragment of a Greek vase. A painter will see his model as a Venus, or as a Madonna, or as his mother. We see a Vermeer kitchen as cheerful and inviting, a Chirico landscape as menacing and ominous. The physicist "sees" the electron as a wave, and electricity as a current. The astronomer "sees" light from the sun as coming in individual rays. William James "saw" consciousness as a stream. Freud "saw" the libido as a reservoir. In the early seventeenth century, the orbit of Mars was seen as a circle (what other path could a heavenly body possibly take?); any deviations therefrom were seen as "librations" (the oscillations of the pans in a scale balance before they come to rest); but Kepler saw the orbit as an ellipse.

There is no "innocent eye." Nietzsche called this "the fallacy of the immaculate perception." In order for you to perceive something, you must add to your sense datum; you must furnish an element of projection. No single act of seeing-as is therefore necessarily the only one or the correct one. Moreover, any one interpretation excludes all others. The psychologist Joseph Jastrow used a well-known drawing to illustrate this point—it is a figure that can be seen as either a duck or a rabbit, and it shifts from one to the other as you look at it; it can never be seen as both, and neither interpretation is "correct." Likewise, if in looking at a painting you concentrate on the brush strokes, you will not see what the painting depicts, and vice versa. In addition, the figure and the ground in a picture may be reversible (M. C. Esch-

er and Salvador Dali are among the painters who make use of this feature of perception). Perception is "multistable." The ambiguity, or available choices, are not always evident in an image, and cannot always be isolated. There is therefore no sharp line dividing perception from illusion.

Perception as the Solution of a Problem

The *selective* nature of perception is also a consequence of the fact that the number of sensory stimuli, or possible messages from outside, is greater than we can receive and process. The channels of communication to us are crowded and noisy; we must filter stimuli. What we receive is usually what we expect, or want, or believe, or are used to. Our eyes and brains coordinate how objects look at different distances, from different directions, and under different light, and show us an object to which we attribute a constant size, shape, and color. To perceive is to *solve a problem*. Our capacity "to find strands of permanence in the tumult of changing appearances" (Polanyi) has survival value. Gestalt psychologists stress how we tend to perceive well-defined patterns and wholes which are not really there, by integrating heterogeneous cues and filling in contours. Michael Polanyi explains, in *Personal Knowledge*:

Perception is manifestly an activity which seeks to satisfy standards which it sets to itself. The muscles of the eye adjust the thickness of its lens, so as to produce the sharpest possible retinal image. . . . But sharpness of contour does not always predominate in the shaping of what we see . . . when a ball set against a featureless background is inflated, it is seen as if it retained its size and was coming nearer. . . . The rule that we follow . . . is one that we taught ourselves as babies, when we first experimented with approaching a rattle to our eyes and moving it away again.

Influence of Convention

In addition to these physical, physiological, and psychological considerations, social conditioning is important in determining how things "naturally look." The term "realism" in art is used

to describe the conventions that are familiar to us; but "flat" Japanese painting, and the Bayeux tapestries, and ancient Egyptian painting are equally "realistic." Each society relies on its own visual schemata; it takes for granted its own "distortions" and "abstractions." Picasso's *Demaiselles d'Avignon* shows the nose in profile, and the eye in front view; twentieth-century Europe found this a revolutionary distortion, but that is how the ancient Egyptians "naturally" painted. *Trompe l'oeil* seldom deceives an infant, or another culture, or a later generation. That is why the history of art is not just a history of artists, but also of styles and conventions.

A striking example of the *persistence of convention* is reported by Meyer Schapiro. In Géricault's *Horse Race* (c. 1820), the galloping horses are shown with all four feet off the ground and pointed in opposite directions (*le galop volante*). No horse can do this naturally; the Lippizaner horses of Vienna perform it after years of intensive training. But Géricault was unconsciously copying certain English hunting prints, which had copied the engravings of Charles Cochin (c. 1750), who had been influenced by the introduction from China into France of porcelain, prints, and *chinoiserie*. In China, the *galop volante* is found as far back as the Han dynasty (206 B.C.—A.D. 220); the Chinese borrowed it from the nomadic Iranian tribes, who borrowed it from the Mycenaeans, who got it from Paleolithic man. And in all these centuries no horse ever did it!

The story of Dürer's rhinoceros also illustrates the overwhelming weight of tradition in determining representation, even when an actual model is before the artist's eyes. Dürer (who died in 1528) had never seen that famous exotic beast, the "dragon with an armored body." Nevertheless he made a woodcut of one, relying on second-hand evidence and his imagination. For centuries thereafter, natural history books used his half-invented creature as a model. When James Bruce visited Africa in 1790 and saw a rhinoceros, he called attention to how "wonderfully ill-executed" Dürer's woodcut was. Yet Bruce's own illustration, drawn from life, was so strongly influenced by his idea of what a rhinoceros ought to look like (i.e., like Dürer's woodcut) that no zoologist can identify what Bruce actually saw! (E. H. Gombrich tells this story in his *Art and Illusion* to show the persistent influence of convention.)

The influence of convention—or lack thereof—may be seen in how primitive people look at a photograph. Melville Herskovits writes,

More than one ethnographer has reported the experience of showing a clear photograph of a house, a person, a familiar landscape, to people living in a culture innocent of any knowledge of photography, and to have the picture held at all possible angles, or turned over for an inspection of its blank back, as the native tried to interpret this meaningless arrangement of varying shades of grey on a piece of paper.

African audiences are at first baffled by our movies; it is not at all clear to them what is going on.

Perspective drawing is also conventional. The frescoes painted in Florence by Paolo Uccello (1397–1475) were apparently the first successful solution to the problem of showing three-dimensional space on the two dimensions of a wall or a canvas. (There were some earlier, tentative efforts; in this, as in everything else, it seems that nothing was ever done for the first time!) The laws of optics and geometry do not entail our conventional manner of showing distance, nor did it occur to earlier generations, nor to other cultures. We draw railroad tracks as if meeting in the distance; but we do not draw vertical telephone poles or the sides of a skyscraper as if converging at the top (although this may be because the psychological preference for seeing things in their most stable aspect overrules the convention of perspective). The painter Jehudo Epstein came to Germany in 1929 from a tiny orthodox Jewish community in Poland which prohibited “graven images”; he found that he could not draw a castle on a hill until someone lent him a book on perspective. Chinese painting employs a radically different convention: more distant objects are typically shown less distinctly or with less intense colors, rather than drawn smaller; and the painter may rely on a moving focus rather than on a fixed point of view; thus, a mountain might be shown from above and from below, or at different times. (But the fact that depth can be represented by various conventions does not help to answer a question with which it is sometimes confused, whether a newborn baby perceives spatial depth, nor whether a man who is born blind and

acquires sight in maturity can distinguish a cube from a sphere by looking at them from a distance, since all his experience up to that point has been from the sense of touch. So far as I can find out, there is no hard evidence on either of these issues.)

Influence of Belief

The influence of belief, or hypothesis, on perception is so striking that one might almost say, not that seeing is believing, but that believing is seeing. There is abundant experimental evidence that what people report about their own afterimage depends on what they are told to expect. "Stooges" can get subjects in experiments to agree that they see unequal lines as equal, or that a fixed candlelight in a dark room is moving (the "autokinetic phenomenon"); these erroneous perceptions persist even after those who have been misleading the subjects have left the room! Experiments have also shown that the unconscious bias of researchers in the social sciences affects their finding.

The witches of Salem and Loudun swore that they had seen, heard, and touched the devil; some even gave details of sexual intercourse. Nietzsche described the powerful influence of myths on the excitable ancient Greeks, who "saw" the goddess Athena in the marketplace and "heard" the tree-nymphs speaking. Hundreds of sober citizens today swear that they have seen flying saucers.

The history of science, too, is full of accounts that illustrate the influence of belief on perception. Scientists, like everyone else, tend to rely upon entrenched paradigms which may predetermine their choice of data. In 1846 James Challis, an astronomer at Cambridge, set out reluctantly to verify the hypothesis proposed by Leverrier and Adams that there existed a planet then unknown (Neptune); he had no confidence in their hypothesis and did not realize until afterward that he had actually unwittingly sighted the planet on four different occasions. Later in the nineteenth century, on the other hand, many astronomical observers reported that they had seen the supposed (but actually nonexistent) planet Vulcan, presumed to lie between the sun

and Mercury. The actuality of hypnotic phenomena was denied for a century; Mesmer (1733–1815) was denounced as an impostor; a Dr. Esdaile (1808–1859) performed some three hundred major operations in India by hypnosis, but no medical journal would print his account (editors said the Indians had simply wanted to please Esdaile and liked to be operated on!). Kelvin declared X rays to be a hoax.

A most revealing account of the influence of belief on perception has been given by a curator of the Metropolitan Museum of Art about a famous ancient Greek statue of a horse:

For some years, every day or two I would walk through the Greek bronze gallery. I'd look at the horse, from a different angle every time. One day, in July 1961, I did a double-take. For the first time I paid attention to a line—it can be seen in all the photos in all the books—that runs from the top of the mane down to the tip of his nose. I examined it through the glass showcase. . . . I knew as sure as I was standing there that the piece was a fraud. I had seen the piece a thousand times before and the line had not registered. This time the line did. . . .

Hearing-as

My examples in this chapter have been concerned mostly with seeing, but similar considerations apply to other senses. It comes as no surprise that we hear a wide variety of different sounds as the one we expect. If you are told, "Bert was sleepy, so he went to bed," almost any consonant can be substituted for the *b* in *bed*, with no change in what the brain reports. A phoneme can sometimes be excised from a tape and replaced by, say, a cough, and its absence will not be noticed. (Let court reporters and psychoanalysts be warned!) The psychologist A. M. Liberman declares, "the sounds of speech are a special . . . code on the phonemic structure of language, not a cipher or alphabet." And, according to William James:

How little we actually hear, when we listen to speech, we realize when we go to a foreign theatre; for there what troubles us is not so much that we cannot understand what the actors say as

that we cannot hear their words . . . we hear quite as little under similar conditions at home, only our mind, being fuller of English verbal associations, supplies the requisite material for comprehension upon a much slighter auditory hint.

In fact, how a given vowel is pronounced varies considerably from speaker to speaker. We possess a kind of mental map of a language, into which each of us fits the sounds we hear. This is one reason for the persistence of a regional or foreign accent: the speaker thinks he is reproducing just what he hears. It is also the reason why typewriters and telephone dials constructed so as to be activated by the sound of the human voice can be set for a single speaker only.

Music offers additional evidence of hearing-as. If you are told that a passage of Beethoven's Fifth Symphony is the "elephant roll" or that a certain composition is called the *Moonlight Sonata* or *Rain-drop Prelude*, your hearing of those sounds becomes irrevocably hearing-as. I cannot myself ever hear the beginning of Mendelssohn's A Major Symphony without forming the words, "Italian, Italian, Sympho-o-ny."

Onomatopoeia, too, is conventional. Speakers of different languages "hear" certain common sounds quite distinctly. American cats say *meow*; French cats say *ron-ron*; German, *schnurr-schnurr*; Japanese, *niago*. Our dogs say *bow-wow* or *arf-arf*; in France dogs say *gnaf-gnaf*; in Spain, *guau-guau*; in Japan, *wung-wung*; in Africa, *kpei-kpei*. In France the rain drops as *plouf-plouf*; in Japan, *zaa-zaa*. A baby's cry in Japan is *ogya-ogya*.

Thus, sensory perception is not passive reception, but active inquiry. It is a task to be accomplished. What is seen, says Sartre, is possessed; to see is to deflower. In my own metaphor, we must cook the raw sensation before we can digest it. We must place sensations in a context, draw inferences, use concepts, project, select, learn, impose structure; in doing this, we rely on convention, on tradition, on accepted paradigms, hypotheses, beliefs, and social pressures. If we succeed in our task, our perception will disclose a world somewhat more amenable to human goals.