

Boulding, K.E. (1956). The Image

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AS I SIT AT MY DESK, I know where I am. I see before me a window; beyond that some trees; beyond that the red roofs of the campus of Stanford University; beyond them the trees and the roof tops which mark the town of Palo Alto; beyond them the bare golden hills of the Hamilton Range. I know, however, more than I see. Behind me, although I am not looking in that direction, I know there is a window, and beyond that the little campus of the Center for the Advanced Study in the Behavioral Sciences; beyond that the Coast Range; beyond that the Pacific Ocean. Looking ahead of me again, I know that beyond the mountains that close my present horizon, there is a broad valley; beyond that a still higher range of mountains; beyond that other mountains, range upon range, until we come to the Rockies; beyond that the Great Plains and the Mississippi; beyond that the Alleghenies; beyond that the eastern seaboard; beyond that the Atlantic Ocean; beyond that is Europe; beyond that is Asia. I know, furthermore, that if I go far enough I will come back to where I am now. In other words, I have a picture of the earth as round. I visualize it as a globe. I am a little hazy on some of the details. I am not quite sure, for in-

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stance, whether Tanganyika is north or south of Nyasaland. I probably could not draw a very good map of Indonesia, but I have a fair idea where everything is located on the face of this globe. Looking further, I visualize the globe as a small speck circling around a bright star which is the sun, in the company of many other similar specks, the planets. Looking still further, I see our star the sun as a member of millions upon millions of others in the Galaxy. Looking still further, I visualize the Galaxy as one of millions upon millions of others in the universe.

I am not only located in space, I am located in time. I know that I came to California about a year ago, and I am leaving it in about three weeks. I know that I have lived in a number of different places at different times. I know that about ten years ago a great war came to an end, that about forty years ago another great war came to an end. Certain dates are meaningful: 1776, 1620, 1066. I have a picture in my mind of the formation of the earth, of the long history of geological time, of the brief history of man. The great civilizations pass before my mental screen. Many of the images are vague, but Greece follows Crete, Rome follows Assyria.

I am not only located in space and time, I am located in a field of personal relations. I not only know where and when I am, I know to some extent who I am. I am a professor at a great state university. This means that in September I shall go into a classroom and expect to find some students in it and begin to talk to them, and nobody will be surprised. I expect, what is perhaps even more agreeable, that regular salary checks will arrive from the university. I expect that when I open my mouth on certain occasions people will listen. I know, furthermore, that I am a husband and a father, that there are people

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who will respond to me affectionately and to whom I will respond in like manner. I know, also, that I have friends, that there are houses here, there, and everywhere into which I may go and I will be welcomed and recognized and received as a guest. I belong to many societies. There are places into which I go, and it will be recognized that I am expected to behave in a certain manner. I may sit down to worship, I may make a speech, I may listen to a concert, I may do all sorts of things.

I am not only located in space and in time and in personal relationships, I am also located in the world of nature, in a world of how things operate. I know that when I get into my car there are some things I must do to start it; some things I must do to back out of the parking lot; some things I must do to drive home. I know that if I jump off a high place I will probably hurt myself. I know that there are some things that would probably not be good for me to eat or to drink. I know certain precautions that are advisable to take to maintain good health. I know that if I lean too far backward in my chair as I sit here at my desk, I will probably fall over. I live, in other words, in a world of reasonably stable relationships, a world of "ifs" and "thens," of "if I do this, then that will happen."

Finally, I am located in the midst of a world of subtle intimations and emotions. I am sometimes elated, sometimes a little depressed, sometimes happy, sometimes sad, sometimes inspired, sometimes pedantic. I am open to subtle intimations of a presence beyond the world of space and time and sense.

What I have been talking about is knowledge. Knowledge, perhaps, is not a good word for this. Perhaps one would rather say my *Image* of the world. Knowledge has an implication of validity, of truth. What I am talking

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about is what I believe to be true; my subjective knowledge. It is this Image that largely governs my behavior. In about an hour I shall rise, leave my office, go to a car, drive down to my home, play with the children, have supper, perhaps read a book, go to bed. I can predict this behavior with a fair degree of accuracy because of the knowledge which I have: the knowledge that I have a home not far away, to which I am accustomed to go. The prediction, of course, may not be fulfilled. There may be an earthquake, I may have an accident with the car on the way home, I may get home to find that my family has been suddenly called away. A hundred and one things may happen. As each event occurs, however, it alters my knowledge structure or my image. And as it alters my image, I behave accordingly. *The first proposition of this work, therefore, is that behavior depends on the image.*

What, however, determines the image? This is the central question of this work. It is not a question which can be answered by it. Nevertheless, such answers as I shall give will be quite fundamental to the understanding of how both life and society really operate. One thing is clear. The image is built up as a result of all past experience of the possessor of the image. Part of the image is the history of the image itself. At one stage the image, I suppose, consists of little else than an undifferentiated blur and movement. From the moment of birth if not before, there is a constant stream of messages entering the organism from the senses. At first, these may merely be undifferentiated lights and noises. As the child grows, however, they gradually become distinguished into people and objects. He begins to perceive himself as an object in the midst of a world of objects. The conscious image has begun. In infancy the world is a house and, perhaps, a few streets or a park. As the child grows his

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image of the world expands. He sees himself in a town, a country, on a planet. He finds himself in an increasingly complex web of personal relationships. Every time a message reaches him his image is likely to be changed in some degree by it, and as his image is changed his behavior patterns will be changed likewise.

We must distinguish carefully between the image and the messages that reach it. The messages consist of *information* in the sense that they are structured experiences. *The meaning of a message is the change which it produces in the image.*

When a message hits an image one of three things can happen. In the first place, the image may remain unaffected. If we think of the image as a rather loose structure, something like a molecule, we may imagine that the message is going straight through without hitting it. The great majority of messages is of this kind. I am receiving messages all the time, for instance, from my eyes and my ears as I sit at my desk, but these messages are ignored by me. There is, for instance, a noise of carpenters working. I know, however, that a building is being built nearby and the fact that I now hear this noise does not add to this image. Indeed, I do not hear the noise at all if I am not listening for it, as I have become so accustomed to it. If the noise stops, however, I notice it. This information changes my image of the universe. I realize that it is now five o'clock, and it is time for me to go home. The message has called my attention, as it were, to my position in time, and I have re-evaluated this position. This is the second possible effect or impact of a message on an image. It may change the image in some rather regular and well-defined way that might be described as simple addition. Suppose, for instance, to revert to an earlier illustration, I look at an atlas and find out

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exactly the relation of Nyasaland to Tanganyika. I will have added to my knowledge, or my image; I will not, however, have very fundamentally revised it. I still picture the world much as I had pictured it before. Something that was a little vague before is now clearer.

There is, however, a third type of change of the image which might be described as a revolutionary change. Sometimes a message hits some sort of nucleus or supporting structure in the image, and the whole thing changes in a quite radical way. A spectacular instance of such a change is conversion. A man, for instance, may think himself a pretty good fellow and then may hear a preacher who convinces him that, in fact, his life is worthless and shallow, as he is at present living it. The words of the preacher cause a radical reformulation of the man's image of himself in the world, and his behavior changes accordingly. The psychologist may say, of course, that these changes are smaller than they appear, that there is a great mass of the unconscious which does not change, and that the relatively small change in behavior which so often follows intellectual conversion is a testimony to this fact. Nevertheless, the phenomenon of reorganization of the image is an important one, and it occurs to all of us and in ways that are much less spectacular than conversion.

The sudden and dramatic nature of these reorganizations is perhaps a result of the fact that our image is in itself resistant to change. When it receives messages which conflict with it, its first impulse is to reject them as in some sense untrue. Suppose, for instance, that somebody tells us something which is inconsistent with our picture of a certain person. Our first impulse is to reject the proffered information as false. As we continue to receive

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messages which contradict our image, however, we begin to have doubts, and then one day we receive a message which overthrows our previous image and we revise it completely. The person, for instance, whom we saw as a trusted friend is now seen to be a hypocrite and a deceiver.

Occasionally, things that we see, or read, or hear, revise our conceptions of space and time, or of relationships. I have recently read, for instance, Vasiliev's *History of the Byzantine Empire*. As a result of reading this book I have considerably revised my image of at least a thousand years of history. I had not given the matter a great deal of thought before, but I suppose if I had been questioned on my view of the period, I would have said that Rome fell in the fifth century and that it was succeeded by a little-known empire centering in Constantinople and a confused medley of tribes, invasions, and successor states. I now see that Rome did not fall, that in a sense it merely faded away, that the history of the Roman Empire and of Byzantium is continuous, and that from the time of its greatest extent the Roman Empire lost one piece after another until only Constantinople was left; and then in 1453 that went. There are books, some of them rather bad books, after which the world is never quite the same again. Veblen, for instance, was not, I think, a great social scientist, and yet he invented an undying phrase: "conspicuous consumption." After reading Veblen, one can never quite see a university campus or an elaborate house in just the same light as before. In a similar vein, David Riesman's division of humanity into inner-directed and other-directed people is no doubt open to serious criticism by the methodologists. Nevertheless, after reading Riesman one has a rather

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new view of the universe and one looks in one's friends and acquaintances for signs of inner-direction or other-direction.

One should perhaps add a fourth possible impact of the messages on the image. The image has a certain dimension, or quality, of certainty or uncertainty, probability or improbability, clarity or vagueness. Our image of the world is not uniformly certain, uniformly probable, or uniformly clear. Messages, therefore, may have the effect not only of adding to or of reorganizing the image. They may also have the effect of clarifying it, that is, of making something which previously was regarded as less certain more certain, or something which was previously seen in a vague way, clearer.

Messages may also have the contrary effect. They may introduce doubt or uncertainty into the image. For instance, the noise of carpenters has just stopped, but my watch tells me it is about four-thirty. This has thrown a certain amount of confusion into my mental image. I was under the impression that the carpenters stopped work at five o'clock. Here is a message which contradicts that impression. What am I to believe? Unfortunately, there are two possible ways of integrating the message into my image. I can believe that I was mistaken in thinking that the carpenters left work at five o'clock and that in fact their day ends at four-thirty. Or, I can believe that my watch is wrong. Either of these two modifications of my image gives meaning to the message. I shall not know for certain which is the right one, however, until I have an opportunity of comparing my watch with a timepiece or with some other source of time which I regard as being more reliable.

The impact of messages on the certainty of the image is of great importance in the interpretation of human be-

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havior. Images of the future must be held with a degree of uncertainty, and as time passes and as the images become closer to the present, the messages that we receive inevitably modify them, both as to content and as to certainty.

The subjective knowledge structure or image of any individual or organization consists not only of images of "fact" but also images of "value." We shall subject the concept of a "fact" to severe scrutiny in the course of the discussion. In the meantime, however, it is clear that there is a certain difference between the image which I have of physical objects in space and time and the valuations which I put on these objects or on the events which concern them. It is clear that there is a certain difference between, shall we say, my image of Stanford University existing at a certain point in space and time, and my image of the value of Stanford University. If I say "Stanford University is in California," this is rather different from the statement "Stanford University is a good university, or is a better university than X, or a worse university than Y." The latter statements concern my image of values, and although I shall argue that the process by which we obtain an image of values is not very different from the process whereby we obtain an image of fact, there is clearly a certain difference between them.

The image of value is concerned with the *rating* of the various parts of our image of the world, according to some scale of betterness or worseness. We, all of us, possess one or more of these scales. It is what the economists call a welfare function. It does not extend over the whole universe. We do not now, for instance, generally regard Jupiter as a better planet than Saturn. Over that part of the universe which is closest to ourselves, however, we all erect these scales of valuation. Moreover, we change these

scales of valuation in response to messages received much as we change our image of the world around us. It is almost certain that most people possess not merely one scale of valuation but many scales for different purposes. For instance, we may say A is better than B for me but worse for the country, or it is better for the country but worse for the world at large. The notion of a hierarchy of scales is very important in determining the effect of messages on the scales themselves.

One of the most important propositions of this theory is that the value scales of any individual or organization are perhaps the most important single element determining the effect of the messages it receives on its image of the world. If a message is perceived that is neither good nor bad it may have little or no effect on the image. If it is perceived as bad or hostile to the image which is held, there will be resistance to accepting it. This resistance is not usually infinite. An often repeated message or a message which comes with unusual force or authority is able to penetrate the resistance and will be able to alter the image. A devout Moslem, for instance, whose whole life has been built around the observance of the precepts of the Koran will resist vigorously any message which tends to throw doubt on the authority of his sacred work. The resistance may take the form of simply ignoring the message, or it may take the form of emotive response: anger, hostility, indignation. In the same way, a "devout" psychologist will resist strongly any evidence presented in favor of extrasensory perception, because to accept it would overthrow his whole image of the universe. If the resistances are very strong, it may take very strong, or often repeated messages to penetrate them, and when they are penetrated, the effect is a realignment or reorganization of the whole knowledge structure.

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On the other hand, messages which are favorable to the existing image of the world are received easily and even though they may make minor modifications of the knowledge structure, there will not be any fundamental reorganization. Such messages either will make no impact on the knowledge structure or their impact will be one of rather simple addition or accretion. Such messages may also have the effect of increasing the stability, that is to say, the resistance to unfavorable messages, which the knowledge structure or image possesses.

The stability or resistance to change of a knowledge structure also depends on its internal consistency and arrangement. There seems to be some kind of principle of minimization of internal strain at work which makes some images stable and others unstable for purely internal reasons. In the same way, some crystals or molecules are more stable than others because of the minimization of internal strain. It must be emphasized that it is not merely logical consistency which gives rise to internal cohesiveness of a knowledge structure, although this is an important element. There are important qualities of a non-logical nature which also give rise to stability. The structure may, for instance, have certain aesthetic relationships among the parts. It may represent or justify a way of life or have certain consequences which are highly regarded in the value system, and so on. Even in mathematics, which is of all knowledge structures the one whose internal consistency is most due to logic, is not devoid of these nonlogical elements. In the acceptance of mathematical arguments by mathematicians there are important criteria of elegance, beauty, and simplicity which contribute toward the stability of these structures.

Even at the level of simple or supposedly simple sense perception we are increasingly discovering that the mes-

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sage which comes through the senses is itself mediated through a value system. We do not perceive our sense data raw; they are mediated through a highly learned process of interpretation and acceptance. When an object apparently increases in size on the retina of the eye, we interpret this not as an increase in size but as movement. Indeed, we only get along in the world because we consistently and persistently disbelieve the plain evidence of our senses. The stick in water is not bent; the movie is not a succession of still pictures; and so on.

What this means is that for any individual organism or organization, there are no such things as "facts." There are only messages filtered through a changeable value system. This statement may sound rather startling. It is inherent, however, in the view which I have been propounding. This does not mean, however, that the image of the world possessed by an individual is a purely private matter or that all knowledge is simply subjective knowledge, in the sense in which I have used the word. Part of our image of the world is the belief that this image is shared by other people like ourselves who also are part of our image of the world. In common daily intercourse we all behave as if we possess roughly the same image of the world. If a group of people are in a room together, their behavior clearly shows that they all think they are in the same room. It is this shared image which is "public" knowledge as opposed to "private" knowledge. It follows, however, from the argument above that if a group of people are to share the same image of the world, or to put it more exactly, if the various images of the world which they have are to be roughly identical, and if this group of people are exposed to much the same set of messages in building up images of the world, the value

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systems of all individuals must be approximately the same.

The problem is made still more complicated by the fact that a group of individuals does not merely share messages which come to them from "nature." They also initiate and receive messages themselves. This is the characteristic which distinguishes man from the lower organisms—the art of conversation or discourse. The human organism is capable not only of having an image of the world, but of talking about it. This is the extraordinary gift of language. A group of dogs in a pack pursuing a stray cat clearly share an image of the world in the sense that each is aware to some degree of the situation which they are all in, and is likewise aware of his neighbors. When the chase is over, however, they do not, as far as we know, sit around and talk about it and say, "Wasn't that a fine chase?" or, "Isn't it too bad the cat got away?" or even, "Next time you ought to go that way and I'll go this way and we can corner it." It is discourse or conversation which makes the human image public in a way that the image of no lower animal can possibly be. The term, "*universe of discourse*" has been used to describe the growth and development of common images in conversation and linguistic intercourse. There are, of course, many such universes of discourse, and although it is a little awkward to speak of many universes, the term is well enough accepted so that we may let it stay.

Where there is no universe of discourse, where the image possessed by the organism is purely private and cannot be communicated to anyone else, we say that the person is mad (to use a somewhat old-fashioned term). It must not be forgotten, however, that the discourse must be received as well as given, and that whether it is received

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or not depends upon the value system of the recipient. This means that insanity is defined differently from one culture to another because of these differences in value systems and that the schizophrenic of one culture may well be the shaman or the prophet of another.

Up to now I have sidestepped and I will continue to sidestep the great philosophical arguments of epistemology. I have talked about the image. I have maintained that images can be public as well as private, but I have not discussed the question as to whether images are *true* and how we know whether they are true. Most epistemological systems seek some philosopher's stone by which statements may be tested in order to determine their "truth," that is, their correspondence to outside reality. I do not claim to have any such philosopher's stone, not even the touchstone of science. I have, of course, a great respect for science and scientific method—for careful observation, for planned experience, for the testing of hypotheses and for as much objectivity as semirational beings like ourselves can hope to achieve. In my theoretical system, however, the scientific method merely stands as one among many of the methods whereby images change and develop. The development of images is part of the culture or the subculture in which they are developed, and it depends upon *all the elements of that culture or subculture*. Science is a subculture among subcultures. It can claim to be useful. It may claim rather more dubiously to be good. It cannot claim to give validity.

In summation, then, my theory might well be called an organic theory of knowledge. Its most fundamental proposition is that knowledge is what somebody or something knows, and that without a knower, knowledge is an absurdity. Moreover, I argue that the growth of knowledge is the growth of an "organic" structure. I

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am not suggesting here that knowledge is simply an arrangement of neuronal circuits or brain cells, or something of that kind. On the question of the relation between the physical and chemical structure of an organism and its knowledge structure, I am quite prepared to be agnostic. It is, of course, an article of faith among physical scientists that there must be somewhere a *one-to-one correspondence between the structures of the physical body and the structures of knowledge*. Up to now, there is nothing like empirical proof or even very good evidence for this hypothesis. Indeed, what we know about the brain suggests that it is an extraordinarily unspecialized and, in a sense, unstructured object; and that if there is a physical and chemical structure corresponding to the knowledge structure, it must be of a kind which at present we do not understand. It may be, indeed, that *the correspondence between physical structure and mental structure* is something that we will never be able to determine because of a sort of "Heisenberg principle" in the investigation of these matters. If the act of observation destroys the thing observed, it is clear that there is a fundamental obstacle to the growth of knowledge in that direction.

All these considerations, however, are not fundamental to my position. We do not have to conceive of the knowledge structure as a *physico-chemical structure* in order to use it in our theoretical construct. It can be inferred from the behavior of the organism just as we constantly infer the images of the world which are possessed by those around us from the messages which they transmit to us. When I say that knowledge is an organic structure, I mean that it follows principles of growth and development similar to those with which we are familiar in complex organizations and organisms. In every organ-

ism or organization there are both internal and external factors affecting growth. Growth takes place through a kind of metabolism. Even in the case of knowledge structures, we have a certain intake and output of messages. In the knowledge structure, however, there are important violations of the laws of conservation. The accumulation of knowledge is not merely the difference between messages taken in and messages given out. It is not like a reservoir; it is rather an organization which grows through an active internal organizing principle much as the gene is a principle or entity organizing the growth of bodily structures. The gene, even in the physico-chemical sense may be thought of as an inward teacher imposing its own form and "will" on the less formed matter around it. In the growth of images, also, we may suppose similar models. Knowledge grows also because of inward teachers as well as outward messages. As every good teacher knows, the business of teaching is not that of penetrating the student's defenses with the violence or loudness of the teacher's messages. It is, rather, that of co-operating with the student's own inward teacher whereby the student's image may grow in conformity with that of his outward teacher. The existence of public knowledge depends, therefore, on certain basic similarities among men. It is literally because we are of one "blood," that is, genetic constitution, that we are able to communicate with each other. We cannot talk to the ants or bees; we cannot hold conversations with them, although in a very real sense they communicate to us. It is the purpose of this work, therefore, to discuss the growth of images, both private and public, in individuals, in organizations, in society at large, and even with some trepidation, among the lower forms of life. Only thus can we develop a really adequate theory of behavior.