Steps to an Ecology of Mind
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Form, Substance, and Difference*

Let me say that it is an extraordinary honor to be here tonight, and a pleasure. I am a little frightened of you all, because I am sure there are people here who know every field of knowledge that I have touched much better than I know it. It is true that I have touched a number of fields, and I probably can face any one of you and say I have touched a field that you have not touched. But I am sure that for every field I have touched, there are people here who are much more expert than I. I am not a well-read philosopher, and philosophy is not my business. I am not a very well-read anthropologist, and anthropology is not exactly my business.

But I have tried to do something which Korzybski was very much concerned with doing, and with which the whole semantic movement has been concerned, namely, I have studied the area of impact between very abstract and formal philosophic thought on the one hand and the natural history of man and other creatures on the other. This overlap between formal premises and actual behavior is, I assert, of quite dreadful importance today. We face a world which is threatened not only with disorganization of many kinds, but also with the destruction of its environment, and we, today,

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are still unable to think clearly about the relations between an organism and its environment. What sort of a thing is this, which we call "organism plus environment"?

Let us go back to the original statement for which Korzybski is most famous—the statement that *the map is not the territory*. This statement came out of a very wide range of philosophic thinking, going back to Greece, and wriggling through the history of European thought over the last 2000 years. In this history, there has been a sort of rough dichotomy and often deep controversy. There has been a violent enmity and bloodshed. It all starts, I suppose, with the Pythagoreans versus their predecessors, and the argument took the shape of "Do you ask what it's made of—earth, fire, water, etc?" Or do you ask, "What is its *pattern*?" Pythagoras stood for inquiry into pattern rather than inquiry into *substance*.[1] That controversy has gone through the ages, and the Pythagorean half of it has, until recently, been on the whole the submerged half. The Gnostics follow the Pythagoreans, and the alchemists follow the Gnostics, and so on. The argument reached a sort of climax at the end of the eighteenth century when a Pythagorean evolutionary theory was built and then discarded—a theory which involved Mind.

The evolutionary theory of the late eighteenth century, the Lamarckian theory, which was the first organized transformist theory of evolution, was built out of a curious historical background which has been described by Lovejoy in *The Great Chain of Being*. Before Lamarck, the organic world, the living world, was believed to be hierarchic in structure, with Mind at the top. The chain, or ladder, went down through the angels, through men, through the apes, down to the infusoria or protozoa, and below that to the plants and stones.

What Lamarck did was to turn that chain upside down. He observed that animals changed under environmental pressure. He was incorrect, of course, in believing that those changes were inherited, but in any case, these changes were for him the evidence of evolution. When he turned the lad-

[1] R. G. Collingwood has given a clear account of the Pythagorean position in *The Idea of Nature*, Oxford, 1945.

der upside down, what had been the explanation, namely, the Mind at the top, now became that which had to be explained. His problem was to explain Mind. He was convinced about evolution, and there his interest in it stopped. So that if you read the *Philosophie Zoologique* (1809), you will find that the first third of it is devoted to solving the problem of evolution and the turning upside down of the taxonomy, and the rest of the book is really devoted to comparative psychology, a science which he founded. *Mind* was what he was really interested in. He had used habit as one of the axiomatic phenomena in his theory of evolution, and this of course also took him into the problem of comparative psychology.

Now mind and pattern as the explanatory principles which, above all, required investigation were pushed out of biological thinking in the later evolutionary theories which were developed in the mid-nineteenth century by Darwin, Huxley, etc. There were still some naughty boys, like Samuel Butler, who said that mind could not be ignored in this way—but they were weak voices, and incidentally, they never looked at organisms. I don't think Butler ever looked at anything except his own cat, but he still knew more about evolution than some of the more conventional thinkers.

Now, at last, with the discovery of cybernetics, systems theory, information theory, and so on, we begin to have a formal base enabling us to think about mind and enabling us to think about all these problems in a way which was totally heterodox from about 1850 through to World War II. What I have to talk about is how the great dichotomy of epistemology has shifted under the impact of cybernetics and information theory.

We can now say—or at any rate, can begin to say—what we think a mind is. In the next twenty years there will be other ways of saying it and, because the discoveries are new, I can only give you my personal version. The old versions are surely wrong, but which of the revised pictures will survive, we do not know.

Let us start from the evolutionary side. It is now empirically clear that Darwinian evolutionary theory contained a very great error in its identification of the unit of survival under natural selection. The unit which was believed to be

crucial and around which the theory was set up was either the breeding individual or the family line or the subspecies or some similar homogeneous set of conspecifics. Now I suggest that the last hundred years have demonstrated empirically that if an organism or aggregate of organisms sets to work with a focus on its own survival and thinks that that is the way to select its adaptive moves, its "progress" ends up with a destroyed environment. If the organism ends up destroying its environment, it has in fact destroyed itself. And we may very easily see this process carried to its ultimate *reductio ad absurdum* in the next twenty years. The unit of survival is not the breeding organism, or the family line, or the society.

The old unit has already been partly corrected by the population geneticists. They have insisted that the evolutionary unit is, in fact, not homogeneous. A wild population of any species consists always of individuals whose genetic constitution varies widely. In other words, potentiality and readiness for change is already built into the survival unit. The heterogeneity of the wild population is already one-half of that trial-and-error system which is necessary for dealing with environment.

The artificially homogenized populations of man's domestic animals and plants are scarcely fit for survival.

And today a further correction of the unit is necessary. The flexible environment must also be included along with the flexible organism because, as I have already said, the organism which destroys its environment destroys itself. The unit of survival is a flexible organism-in-its-environment.

Now, let me leave evolution for a moment to consider what is the unit of mind. Let us go back to the map and the territory and ask: "What is it in the territory that gets onto the map?" We know the territory does not get onto the map. That is the central point about which we here are all agreed. Now, if the territory were uniform, nothing would get onto the map except its boundaries, which are the points at which it ceases to be uniform against some larger matrix. What gets onto the map, in fact, is *difference*, be it a difference in altitude, a difference in vegetation, a difference in population structure, difference in surface, or whatever. Differences are the things that get onto a map.

But what is a difference? A difference is a very peculiar

and obscure concept. It is certainly not a thing or an event. This piece of paper is different from the wood of this lectern. There are many differences between them—of color, texture, shape, etc. But if we start to ask about the localization of those differences, we get into trouble. Obviously the difference between the paper and the wood is not in the paper; it is obviously not in the wood; it is obviously not in the space between them, and it is obviously not in the time between them. (Difference which occurs across time is what we call "change.")

A difference, then, is an abstract matter.

In the hard sciences, effects are, in general, caused by rather concrete conditions or events—impacts, forces, and so forth. But when you enter the world of communication, organization, etc., you leave behind that whole world in which effects are brought about by forces and impacts and energy exchange. You enter a world in which "effects"—and I am not sure one should still use the same word—are brought about by *differences*. That is, they are brought about by the sort of "thing" that gets onto the map from the territory. This is difference.

Difference travels from the wood and paper into my retina. It then gets picked up and worked on by this fancy piece of computing machinery in my head.

The whole energy relation is different. In the world of mind, nothing—that which is *not*—can be a cause. In the hard sciences, we ask for causes and we expect them to exist and be "real." But remember that zero is different from one, and because zero is different from one, zero can be a cause in the psychological world, the world of communication. The letter which you do not write can get an angry reply; and the income tax form which you do not fill in can trigger the Internal Revenue boys into energetic action, because they, too, have their breakfast, lunch, tea, and dinner and can react with energy which they derive from their metabolism. The letter which never existed is no source of energy.

It follows, of course, that we must change our whole way of thinking about mental and communicational process. The ordinary analogies of energy theory which people borrow from the hard sciences to provide a conceptual frame upon

which they try to build theories about psychology and behavior—that entire Procrustean structure—is non-sense. It is in error.

I suggest to you, now, that the word "idea," in its most elementary sense, is synonymous with "difference." Kant, in the *Critique of Judgment*—if I understand him correctly—asserts that the most elementary aesthetic act is the selection of a fact. He argues that in a piece of chalk there are an infinite number of potential facts. The *Ding an sich*, the piece of chalk, can never enter into communication or mental process because of this infinitude. The sensory receptors cannot accept it; they filter it out. What they do is to select certain *facts* out of the piece of chalk, which then become, in modern terminology, information.

I suggest that Kant's statement can be modified to say that there is an infinite number of *differences* around and within the piece of chalk. There are differences between the chalk and the rest of the universe, between the chalk and the sun or the moon. And within the piece of chalk, there is for every molecule an infinite number of differences between its location and the locations in which it *might* have been. Of this infinitude, we select a very limited number, which become information. In fact, what we mean by information—the elementary unit of information—is a *difference which makes a difference*, and it is able to make a difference because the neural pathways along which it travels and is continually transformed are themselves provided with energy. The pathways are ready to be triggered. We may even say that the question is already implicit in them.

There is, however, an important contrast between most of the pathways of information inside the body and most of the pathways outside it. The differences between the paper and the wood are first transformed into differences in the propagation of light or sound, and travel in this form to my sensory end organs. The first part of their journey is energized in the ordinary hard-science way, from "behind." But when the differences enter my body by triggering an end organ, this type of travel is replaced by travel which is energized at every step by the metabolic energy latent in the protoplasm which *receives* the difference, recreates or transforms it, and passes it on.

When I strike the head of a nail with a hammer, an impulse is transmitted to its point. But it is a semantic error, a misleading metaphor, to say that what travels in an axon is an "impulse." It could correctly be called "news of a difference."

Be that as it may, this contrast between internal and external pathways is not absolute. Exceptions occur on both sides of the line. Some external chains of events are energized by relays, and some chains of events internal to the body are energized from "behind." Notably, the mechanical interaction of muscles can be used as a computational model.[2]

In spite of these exceptions, it is still broadly true that the coding and transmission of differences outside the body is very different from the coding and transmission inside, and this difference must be mentioned because it can lead us into error. We commonly think of the external "physical world" as somehow separate from an internal "mental world." I believe that this division is based on the contrast in coding and transmission inside and outside the body.

The mental world—the mind—the world of information processing—is not limited by the skin.

Let us now go back to the notion that the transform of a difference traveling in a circuit is an elementary idea. If this be correct, let us ask what a mind is. We say the map is different from the territory. But what is the territory? Operationally, somebody went out with a retina or a measuring stick and made representations which were then put upon paper. What is on the paper map is a representation of what was in the retinal representation of the man who made the map; and as you push the question back, what you find is an infinite regress, an infinite series of maps. The territory never gets in at all. The territory is *Ding an sich* and you can't do anything with it. Always the process of representation will filter it out so that the mental world is only maps of

[2] It is interesting to note that digital computers depend upon transmission of energy "from behind" to send "news" along wire from one relay to the next. But each relay has its own energy source. Analogic computers, *e.g.*, tide machines and the like, are commonly entirely driven by energy "from behind." Either type of energization can be used for computational purposes.

maps of maps, ad infinitum.[3] All "phenomena" are literally "appearances."

Or we can follow the chain forward. I receive various sorts of mappings which I call data or information. Upon receipt of these I act. But my actions, my muscular contractions, are transforms of differences in the input material. And I receive again data which are transforms of my actions. We get thus a picture of the mental world which has somehow jumped loose from our conventional picture of the physical world.

This is not new, and for historic background we go again to the alchemists and Gnostics. Carl Jung once wrote a very curious little book, which I recommend to all of you. It is called *Septem Sermones ad Mortuos*, Seven Sermons to the Dead.[4] In his *Memoirs, Dreams and Reflections*, Jung tells us that his house was full of ghosts, and they were noisy. They bothered him, they bothered his wife, and they bothered the children. In the vulgar jargon of psychiatry, we might say that everybody in the house was as psychotic as hooty owls, and for quite good reason. If you get your epistemology confused, you go psychotic, and Jung was going through an epistemological crisis. So he sat down at his desk and picked up a pen and started to write. When he started to write the ghosts all disappeared, and he wrote this little book. From this he dates all his later insight. He signed it "Basilides," who was a famous Gnostic in Alexandria in the second century.

He points out that there are two worlds. We might call

[3] Or we may spell the matter out and say that at every step, as a difference is transformed and propagated along its pathway, the embodiment of the difference before the step is a "territory" of which the embodiment after the step is a "map." The map-territory relation obtains at every step.

[4] Written in 1916, translated by H. G. Baynes and privately circulated in 1925. Republished by Stuart & Watkins, London, and by Random House, 1961. In later work, Jung seems to have lost the clarity of the Seven Sermons. In his "Answer to Job," the archetypes are said to be "pleromatic." It is surely true, however, that constellations of ideas may seem subjectively to resemble "forces" when their ideational character is unrecognized.

them two worlds of explanation. He names them the *pleroma* and the *creatura*, these being Gnostic terms. The pleroma is the world in which events are caused by forces and impacts and in which there are no "distinctions." Or, as I would say, no "differences." In the creatura, effects are brought about precisely by difference. In fact, this is the same old dichotomy between mind and substance.

We can study and describe the pleroma, but always the distinctions which we draw are attributed *by us* to the pleroma. The pleroma knows nothing of difference and distinction; it contains no "ideas" in the sense in which I am using the word. When we study and describe the creatura, we must correctly identify those differences which are effective within it.

I suggest that "pleroma" and "creatura" are words which we could usefully adopt, and it is therefore worthwhile to look at the bridges which exist between these two "worlds." It is an oversimplification to say that the "hard sciences" deal only with the pleroma and that the sciences of the mind deal only with the creatura. There is more to it than that.

First, consider the relation between energy and negative entropy. The classical Carnot heat engine consists of a cylinder of gas with a piston. This cylinder is alternately placed in contact with a container of hot gas and with a container of cold gas. The gas in the cylinder alternately expands and contracts as it is heated or cooled by the hot and cold sources. The piston is thus driven up and down.

But with each cycle of the engine, the *difference* between the temperature of the hot source and that of the cold source is reduced. When this difference becomes zero, the engine will stop.

The physicist, describing the pleroma, will write equations to translate the temperature difference into "available energy," which he will call "negative entropy," and will go on from there.

The analyst of the creatura will note that the whole system is a sense organ which is triggered by temperature difference. He will call this difference which makes a difference "information" or "negative entropy." For him, this is only a special case in which the effective difference happens to be a matter of energetics. He is equally interested in all differences which can activate some sense organ. For him, any such difference is "negative entropy."

Or consider the phenomenon which the neurophysiologists call "synaptic summation." What is observed is that in certain cases, when two neurons, A and B, have synaptic connection to a third neuron, C, the firing of neither neuron by itself is sufficient to fire C; but that when both A and B fire simultaneously (or nearly so), their combined "impulses" will cause C to fire.

In pleromatic language, this combining of events to surmount a threshold is called "summation."

But from the point of view of the student of creatura (and the neurophysiologist must surely have one foot in the pleroma and the other in creatura), this is not summation at all. What happens is that the system operates to create differences. There are two differentiated *classes* of firings by A: those firings which are accompanied by B and those which are unaccompanied. Similarly there are two classes of firings by B.

The so-called "summation," when both fire, is not an additive process from this point of view. It is the formation of a logical product—a process of fractionation rather than summation.

The creatura is thus the world seen as mind, wherever such a view is appropriate. And wherever this view is appropriate, there arises a species of complexity which is absent from pleromatic description: creatural description is always hierarchic.

I have said that what gets from territory to map is transforms of difference and that these (somehow selected) differences are elementary ideas.

But there are differences between differences. Every effective difference denotes a demarcation, a line of classification, and all classification is hierarchic. In other words, differences are themselves to be differentiated and classified. In this context I will only touch lightly on the matter of classes of difference, because to carry the matter further would land us in problems of *Principia Mathematica*.

Let me invite you to a psychological experience, if only to demonstrate the frailty of the human computer. First note that differences in texture are *different* (*a*) from differences in color. Now note that differences in size are *different*

(*b*) from differences in shape. Similarly ratios are different (*c*) from subtractive differences.

Now let me invite you, as disciples of Korzybski, to define the differences between "different (*a*)," "different (*b*)," and "different (*c*)" in the above paragraph.

The computer in the human head boggles at the task.

But not all classes of difference are as awkward to handle.

One such class you are all familiar with. Namely, the class of differences which are created by the process of transformation whereby the differences immanent in the territory become differences immanent in the map. In the corner of every serious map you will find these rules of transformation spelled out—usually in words. Within the human mind, it is absolutely essential to recognize the differences of this class, and, indeed, it is these that form the central subject matter of "Science and Sanity."

An hallucination or a dream image is surely a transformation of something. But of what? And by what rules of transformation?

Lastly there is that hierarchy of differences which biologists call "levels." I mean such differences as that between a cell and a tissue, between tissue and organ, organ and organism, and organism and society.

These are the hierarchies of units or *Gestalten*, in which each subunit is a part of the unit of next larger scope. And, always in biology, this difference or relationship which I call "part of" is such that certain differences in the part have informational effect upon the larger unit, and vice versa.

Having stated this relationship between biological part and whole, I can now go on from the notion of creatura as Mind in general to the question of what is *a* mind.

What do I mean by "my" mind?

I suggest that the delimitation of an individual mind must always depend upon what phenomena we wish to understand or explain. Obviously there are lots of message pathways outside the skin, and these and the messages which they carry must be included as part of the mental system whenever they are relevant.

Consider a tree and a man and an axe. We observe that the axe flies through the air and makes certain sorts of gashes in a pre-existing cut in the side of the tree. If now we want to explain this set of phenomena, we shall be concerned with differences in the cut face of the tree, differences in the retina of the man, differences in his central nervous system, differences in his efferent neural messages, differences in the behavior of his muscles, differences in how the axe flies, to the differences which the axe then makes on the face of the tree. Our explanation (for certain purposes) will go round and round that circuit. In principle, if you want to explain or understand anything in human behavior, you are always dealing with total circuits, completed circuits. This is the elementary cybernetic thought.

The elementary cybernetic system with its messages in circuit is, in fact, the simplest unit of mind; and the transform of a difference traveling in a circuit is the elementary idea. More complicated systems are perhaps more worthy to be called mental systems, but essentially this is what we are talking about. The unit which shows the characteristic of trial and error will be legitimately called a mental system.

But what about "me"? Suppose I am a blind man, and I use a stick. I go tap, tap, tap. Where do *I* start? Is my mental system bounded at the handle of the stick? Is it bounded by my skin? Does it start halfway up the stick? Does it start at the tip of the stick? But these are nonsense questions. The stick is a pathway along which transforms of difference are being transmitted. The way to delineate the system is to draw the limiting line in such a way that you do not cut any of these pathways in ways which leave things inexplicable. If what you are trying to explain is a given piece of behavior, such as the locomotion of the blind man, then, for this purpose, you will need the street, the stick, the man; the street, the stick, and so on, round and round.

But when the blind man sits down to eat his lunch, his stick and its messages will no longer be relevant—if it is his eating that you want to understand.

And in addition to what I have said to define the individual mind, I think it necessary to include the relevant parts of memory and data "banks." After all, the simplest cybernetic circuit can be said to have memory of a dynamic kind—not based upon static storage but upon the travel of information around the circuit. The behavior of the governor of a steam engine at Time 2 is partly determined by what it did at Time 1—where the interval between Time 1 and

Time 2 is that time necessary for the information to complete the circuit.

We get a picture, then, of mind as synonymous with cybernetic system—the relevant total information-processing, trial-and-error completing unit. And we know that within Mind in the widest sense there will be a hierarchy of subsystems, any one of which we can call an individual mind.

But this picture is precisely the same as the picture which I arrived at in discussing *the unit of evolution.* I believe that this identity is the most important generalization which I have to offer you tonight.

In considering units of evolution, I argued that you have at each step to include the completed pathways outside the protoplasmic aggregate, be it DNA-in-the-cell, or cell-in-the-body, or body-in-the-environment. The hierarchic structure is not new. Formerly we talked about the breeding individual or the family line or the taxon, and so on. Now each step of the hierarchy is to be thought of as a *system,* instead of a chunk cut off and visualized as *against* the surrounding matrix.

This identity between the unit of mind and the unit of evolutionary survival is of very great importance, not only theoretical, but also ethical.

It means, you see, that I now localize something which I am calling "Mind" immanent in the large biological system—the ecosystem. Or, if I draw the system boundaries at a different level, then mind is immanent in the total evolutionary structure. If this identity between mental and evolutionary units is broadly right, then we face a number of shifts in our thinking.

First, let us consider ecology. Ecology has currently two faces to it: the face which is called bioenergetics—the economics of energy and materials within a coral reef, a redwood forest, or a city—and, second, an economics of information, of entropy, negentropy, etc. These two do not fit together very well precisely because the units are differently bounded in the two sorts of ecology. In bioenergetics it is natural and appropriate to think of units bounded at the cell membrane, or at the skin; or of units composed of sets of conspecific individuals. These boundaries are then the frontiers at which measurements can be made to determine the additive-subtractive budget of energy for the given unit. In

contrast, informational or entropic ecology deals with the budgeting of pathways and of probability. The resulting budgets are fractionating (not subtractive). The boundaries must enclose, not cut, the relevant pathways.

Moreover, the very meaning of "survival" becomes different when we stop talking about the survival of something bounded by the skin and start to think of the survival of the system of ideas in circuit. The contents of the skin are randomized at death and the pathways within the skin are randomized. But the ideas, under further transformation, may go on out in the world in books or works of art. Socrates as a bioenergetic individual is dead. But much of him still lives as a component in the contemporary ecology of ideas.[5]

It is also clear that theology becomes changed and perhaps renewed. The Mediterranean religions for 5000 years have swung to and fro between immanence and transcendence. In Babylon the gods were transcendent on the tops of hills; in Egypt, there was god immanent in Pharoah; and Christianity is a complex combination of these two beliefs.

The cybernetic epistemology which I have offered you would suggest a new approach. The individual mind is immanent but not only in the body. It is immanent also in pathways and messages outside the body; and there is a larger Mind of which the individual mind is only a subsystem. This larger Mind is comparable to God and is perhaps what some people mean by "God," but it is still immanent in the total interconnected social system and planetary ecology.

Freudian psychology expanded the concept of mind inwards to include the whole communication system within the body—the autonomic, the habitual, and the vast range of unconscious process. What I am saying expands mind outwards. And both of these changes reduce the scope of the conscious self. A certain humility becomes appropriate, tem-

[5] For the phrase "ecology of ideas," I am indebted to Sir Geoffrey Vickers' essay "The Ecology of Ideas" in *Value Systems and Social Process,* Basic Books, 1968. For a more formal discussion of the survival of ideas, see Gordon Pasks' remarks in Wenner-Gren Conference on "Effects of Conscious Purpose on Human Adaptation," 1968.

pered by the dignity or joy of being part of something much bigger. A part—if you will—of God.

If you put God outside and set him vis-à-vis his creation and if you have the idea that you are created in his image, you will logically and naturally see yourself as outside and against the things around you. And as you arrogate all mind to yourself, you will see the world around you as mindless and therefore not entitled to moral or ethical consideration. The environment will seem to be yours to exploit. Your survival unit will be you and your folks or conspecifics against the environment of other social units, other races and the brutes and vegetables.

If this is your estimate of your relation to nature *and you have an advanced technology*, your likelihood of survival will be that of a snowball in hell. You will die either of the toxic by-products of your own hate, or, simply, of overpopulation and overgrazing. The raw materials of the world are finite.

If I am right, the whole of our thinking about what we are and what other people are has got to be restructured. This is not funny, and I do not know how long we have to do it in. If we continue to operate on the premises that were fashionable in the precybernetic era, and which were especially underlined and strengthened during the Industrial Revolution, which seemed to validate the Darwinian unit of survival, we may have twenty or thirty years before the logical *reductio ad absurdum* of our old positions destroys us. Nobody knows how long we have, under the present system, before some disaster strikes us, more serious than the destruction of any group of nations. The most important task today is, perhaps, to learn to think in the new way. Let me say that *I* don't know how to think that way. Intellectually, I can stand here and I can give you a reasoned exposition of this matter; but if I am cutting down a tree, I still think "Gregory Bateson" is cutting down the tree. *I* am cutting down the tree. "Myself" is to me still an excessively concrete object, different from the rest of what I have been calling "mind."

The step to realizing—to making habitual—the other way of thinking—so that one naturally thinks that way when one reaches out for a glass of water or cuts down a tree—that step is not an easy one.

And, quite seriously, I suggest to you that we should trust no policy decisions which emanate from persons who do not yet have that habit.

There are experiences and disciplines which may help me to imagine what it would be like to have this habit of correct thought. Under LSD, I have experienced, as have many others, the disappearance of the division between self and the music to which I was listening. The perceiver and the thing perceived become strangely united into a single entity. This state is surely more correct than the state in which it seems that "I hear the music." The sound, after all, is *Ding an sich*, but my perception of it is a part of mind.

It is told of Johann Sebastian Bach that when somebody asked him how he played so divinely, he answered, "I play the notes, in order, as they are written. It is God who makes the music." But not many of us can claim Bach's correctness of epistemology—or that of William Blake, who knew that the Poetic Imagination was the only reality. The poets have known these things all through the ages, but the rest of us have gone astray into all sorts of false reifications of the "self" and separations between the "self" and "experience."

For me another clue—another moment when the nature of mind was for a moment clear—was provided by the famous experiments of Adelbert Ames, Jr. These are optical illusions in depth perception. As Ames' guinea pig, you discover that those mental processes by which you create the world in three-dimensional perspective are within your mind but totally unconscious and utterly beyond voluntary control. Of course, we all know that this is so—that mind creates the images which "we" then see. But still it is a profound epistemological shock to have direct experience of this which we always knew.

Please do not misunderstand me. When I say that the poets have always known these things or that most of mental process is unconscious, I am not advocating a greater use of emotion or a lesser use of intellect. Of course, if what I am saying tonight is approximately true, then our ideas about the relation between thought and emotion need to be revised. If the boundaries of the "ego" are wrongly drawn or even totally fictitious, then it may be nonsense to regard emotions or dreams or our unconscious computations of perspective as "ego-alien."

We live in a strange epoch when many psychologists try to "humanize" their science by preaching an anti-intellectual gospel. They might, as sensibly, try to physicalize physics by discarding the tools of mathematics.

It is the attempt to *separate* intellect from emotion that is monstrous, and I suggest that it is equally monstrous—and dangerous—to attempt to separate the external mind from the internal. Or to separate mind from body.

Blake noted that "A tear is an intellectual thing," and Pascal asserted that "The heart has its *reasons* of which the reason knows nothing." We need not be put off by the fact that the reasonings of the heart (or of the hypothalamus) are accompanied by sensations of joy or grief. These computations are concerned with matters which are vital to mammals, namely, matters of *relationship*, by which I mean love, hate, respect, dependency, spectatorship, performance, dominance, and so on. These are central to the life of any mammal and I see no objection to calling these computations "thought," though certainly the units of relational computation are different from the units which we use to compute about isolable things.

But there are bridges between the one sort of thought and the other, and it seems to me that the artists and poets are specifically concerned with these bridges. It is not that art is the expression of the unconscious, but rather that it is concerned with the relation *between* the levels of mental process. From a work of art it may be possible to analyze out some unconscious thoughts of the artist, but I believe that, for example, Freud's analysis of Leonardo's *Virgin on the Knees of St. Anne* precisely misses the point of the whole exercise. Artistic skill is the combining of many levels of mind —unconscious, conscious, and external—to make a statement of their combination. It is not a matter of expressing a single level.

Similarly, Isadora Duncan, when she said, "If I could say it, I would not have to dance it," was talking nonsense, because her dance was about combinations of saying and moving.

Indeed, if what I have been saying is at all correct, the whole base of aesthetics will need to be re-examined. It seems that we link feelings not only to the computations of the heart but also to computations in the external pathways

of the mind. It is when we recognize the operations of creatura in the external world that we are aware of "beauty" or "ugliness." The "primrose by the river's brim" is beautiful because we are aware that the combination of differences which constitutes its appearance could only be achieved by information processing, *i.e.*, by *thought*. We recognize another mind within our own external mind.

And last, there is death. It is understandable that, in a civilization which separates mind from body, we should either try to forget death or to make mythologies about the survival of transcendent mind. But if mind is immanent not only in those pathways of information which are located inside the body but also in external pathways, then death takes on a different aspect. The individual nexus of pathways which I call "me" is no longer so precious because that nexus is only part of a larger mind.

The ideas which seemed to be me can also become immanent in you. May they survive—if true.

COMMENT ON PART V

In the final essay of this part, "Form, Substance and Difference," much of what has been said in earlier parts of the book falls into place. In sum, what has been said amounts to this: that in addition to (and always in conformity with) the familiar physical determinism which characterises our universe, there is a mental determinism. This mental determinism is in no sense supernatural. Rather it is of the very nature of the macroscopic* world that it exhibit mental characteristics. The mental determinism is not transcendent but immanent and is especially complex and evident in those sections of the universe which are alive or which include living things.

But so much of occidental thinking is shaped on the premise of transcendent deity that it is difficult for many people to rethink their theories in terms of immanence. Even Darwin from time to time wrote about Natural Selection in phrases which almost ascribed to this process the characteristics of transcendence and purpose.

* I do not agree with Samuel Butler, Whitehead, or Teilhard de Chardin that it follows from this mental character of the macroscopic world that the single atomies must have mental character or potentiality. I see the mental as a function only of complex *relationship*.

It may be worthwhile, therefore, to give an extreme sketch of the difference between the belief in transcendence and that in immanence.

Transcendent mind or deity is imagined to be personal and omniscient, and as receiving information by channels separate from the earthly. He sees a species acting in ways which must disrupt its ecology and, either in sorrow or in anger, He sends the wars, the plagues, the pollution, and the fallout.

Immanent mind would achieve the same final result but without either sorrow or anger. Immanent mind has no separate and unearthly channels by which to know or act and, therefore, can have no separate emotion or evaluative comment. The immanent will differ from the transcendent in greater determinism.

St. Paul (Galatians VI) said that "God is not mocked," and immanent mind similarly is neither vengeful nor forgiving. It is of no use to make excuses; the immanent mind is not "mocked."

But since our minds—and this includes our tools and actions—are only parts of the larger mind, its computations can be confused by our contradictions and confusions. Since it contains our insanity, the immanent mind is inevitably subject to possible insanity. It is in our power, with our technology, to create insanity in the larger system of which we are parts.

In the final section of the book, I shall consider some of these mentally pathogenic processes.

Part VI: Crisis in the Ecology of Mind