

CYBERNETICS

META-IMAGE OF THE TWENTIETH CENTURY

This report by WILLIAM R. COZART, a member of the staff of The Ecumenical Institute who has been assigned to the faculty of California Institute of Technology was received in August. Mr. Cozart deals in his report with the relationship of education to the information revolution in our time.

In terms of the secular spirit man as we grasp him today, it seems to me there are six things that are just obvious now, that hardly need repetition except to quickly get before our minds an immediate context from which to move on, six taken-for-grantednesses that everyone realizes are shaping the new man in the secular world.

The first, it seems to me, using insight which is widespread across the world today, is that man must be discovered first as a species. Not as some kind of romantic abstraction, man with a capital M, not in the service of some kind of ideology or manifesto, but he must be discovered simply historically, anthropologically, under developmental principles. It is now cliché that we no longer look at man under the canopy of eternity as we had always done in the West until recently, but under the canopy of evolution. This is all I mean by the first taken-for-grantedness.

Second, the place where man lives is fundamentally not the 20th century, not the contemporary world (however you might describe that sociologically or with impressionistic categories), not the western world, not any of these partial descriptions, but fundamentally man lives today in the invisible envelope of thought that surrounds the globe, or, as Teilhard de Chardin has introduced it, in the noo-

sphere, which in a way capsules this whole insight. As you remember the illustration in *The Phenomenon of Man*, if a Martian should come to the earth the first thing he would notice would be neither the urban revolution in the cities nor the outline of geopolitical areas, but the strange green phosphorescence of thought that flickers around the globe. This is our place today, a luminous kind of intelligence that controls, directs and guides the future of this planet. The world of contemporary man is a noosphere. It has become through electronics a global village which Marshall McLuhan is calling the electronic village.

And thirdly the world has become "cool" in the new sense of the word cool. One point that McLuhan makes over and over again in his essays on mass media is that "the medium is the message." The mass media do not purvey messages, do not transmit messages; they *are* the message. What you see on television is not the message, the message is the screen itself and you are the screen in his language. For example, you have to become, because of television, cool not in the old sense of detached but in the new sense of involved, just as in watching the television screen with its millions of electronic particles that shape the image you have to fill in with your eyesight the gaps in between the dots that are

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racing across the screen. You have to project yourself and literally create whatever it is you see. Therefore McLuhan says that it is beside the point in the first instance to say that television is bad, that the content is written for nine-year-olds. The most significant thing is that television exists and cools you down. It makes you involve yourself in whatever bad "Bonanza" or "Big Valley" is going on. As a matter of fact, he points out, the western on television really has just one story and it should be titled "Let's Make a Town." And as you are making the town of all the disorderly elements that are there you are forcing yourself to construct your model of what that town could be, forcing yourself to cope with the disorder practically, not just abstractly. You are becoming immersed in the concrete flesh and blood of a life situation even as you are supposedly being entertained. Therefore, McLuhan points out that when children who have been brainwashed for years by this kind of process go to school, they are horribly bored because they are presented with the kind of education which is purely verbal, linear, literary in the old Renaissance sense of linear perspective. They sit around drumming their fingers saying, "When's the action going to start being turned on? When are we going to become cool in the classroom? When are we going to project ourselves and become involved?" This is the phenomenon of the noosphere. Electronically the world is being not only brought together in terms of our awareness of events simultaneously, but it is being cooled down together, brought together as a participation kind of experiment, so that everyone is forced to do something with his existentialistic lucidity of ten years ago.

Fourth, another taken-for-grantedness is that the knowledge industry or the "multiversity" is the context in which global education on a mass scale will go on structurally for the rest of our century. As you know from Clark Kerr, who coined this word "multiversity," the knowledge industry has become responsible for forty percent of the gross national product in America alone. It is the greatest industry in our country and the same is rapidly becoming true in Europe. The multiversity itself is a totally new animal in history. There is no longer the ivy tower image, no longer the kind of rural academy that formal higher education used to be; but now the multi-

versity as a kind of network that surrounds the city, or to use another Clark Kerr word, the ideopolis in the center of the city. You think of the Boston-Cambridge area in Massachusetts around which on Route 128 are companies and industries that have grown up as a result of the presence of Harvard and MIT. This is the multiversity physically. It is the technical and liberal arts type of institution which feeds directly the world's work—the government, the industry, the business, the arts and crafts, so that the multiversity is taking over all other images of higher education and is practically, is physically, reshaping our culture.

Fifth, wealth is no longer measured. Economists tell us today, in terms of property or goods. Wealth means simply know-how. You can get rid of every other past kind of wealth. As long as you have the know-how you have wealth. The knowledge industry is just obviously synonymous with the direction of tomorrow's work. If the social revolution which is a world-wide phenomenon and also a taken-for-grantedness — that is, if the world-wide restoration of human privilege repeats itself on the city-wide level, the country-wide level, and in the class war between the nations, the 'have' nations and 'have not' nations; the social scientists tell us we are going to see in the future the strangest kind of connection arising between the mass media and the restoration of human privilege (or the revolution of rising expectation) which at the moment have not been connected in any dramatic way. This is on the horizon.

And lastly is just this taken-for-grantedness of our time. Humanness, whatever else we may mean by that, has to do with the existential edge of coping with the information revolution; not with simply the explosion of knowledge for by information I do not mean a sort of atomistic image of small particles of facts which stream out toward us but rather with the question of meta-images. The edge of the question of humanness as it is concerned with the fundamental identity, the human identity that a man has and from which is created the image beyond all the images (meta really means beyond), is located squarely in the phenomenon of the information revolution. Therefore the key to whatever the meta-image of tomorrow will be has to come from this area.

Let us remind ourselves that historically we have been able at least until the 20th century to chart rather clearly the controlling meta-image of the period, usually within thirty years after it has died or been corrected or been in the process of correction. If you look back just a little space of time to the end of the Baroque meta-image of the 17th century you can see that the 18th century appropriated for itself, as its fundamental picture, what everyone called in one way or another the mechanical meta-image, the mechanistic or clock-work picture which we can draw for ourselves in any number of ways. It arose, as all meta-images do, out of the technological and social practices of the age preceding it, going all the way back to the Middle Ages. But its fundamental assumption as a meta-image or a meta-model was of a whole which was made up of several parts which were separate and independent and which could be replaced. You could rub this circle out and put in a square and there would be no fundamental damage to the whole because the parts were interchangeable. They were also reversible in terms of the temporal running of the mechanism, and the kind of models that grow out of this matrix idea take directions in the most amazing way. The solar system as we imagined it first came from this. The idea of balance of power, checks and balances in government, deism in philosophy, the Newtonian universe of gravitation, action at a distance, and the analytic method which we still make use of today, (the methodology of seeking out the basic fundamental laws which can be abstracted into simple elements which are unchanging) came through this meta-image. And it gave us the images of atoms, corpuscles and waves which persist into the 20th century. From this meta-image came economics in the idea of economic man in Adam Smith's sense. Jeremy Bentham's increments of pain and pleasure is a mechanistic concept. You can not read a word of Benjamin Franklin without meeting this, listen to a symphony of Hayden without hearing it, or tour the gardens of Versailles without seeing it.

This was the age, in terms of humanness, of faculty psychology, seeing yourself as a collection of parts, dimensions or faculties and yourself as part of the enormous whole made up of many other parts which can never be known. The great summa of this meta-image, which for me is Alexander

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Pope's *Essay on Man*, almost painfully inches its way in horribly mechanical heroic couplets, making clear that there is a great chain-of-Being mechanized. You cannot grasp it in the whole, but you know that whatever is, is right; therefore do not commit the sin of pride by going beyond your little square and questioning the greater order.

Let us remind ourselves that this meta-image is grounded in technology. It came out of experimentation with clocks, mills and pumps in the later Middle Ages. It also grew out of social experience and finally, of course, collapsed when somebody, who will always remain nameless, decided that he did not grasp after his humanness that way at all. Or, as a later spokesman puts it, the reaction that became known as romanticism said, "You cannot reduce me to a paragraph. I am not simply a cog in a machine." And in the 19th century, under the great Romantic rebellion which is perhaps introduced historically by the French Revolution, two other meta-images came in as protests against the mechanistic to compete with each other and in some ways overlap. One I like to call the organic meta-image and the other the image of process. Neither died at the end of the 19th century. Both are still with us, but they reached their heyday in the middle of that period.

The organic meta-image could be drawn as a model of a whole which is not equal to the sum of its parts and which could not be tampered with at all without doing severe damage to the total organism. The organism, to be itself, cannot be dissected the way the machine can but rather must be allowed to work out its own inner telos or inner goal, whatever that might be, on a one-way street. It is not reversible. It can only go one way to fulfillment and then will die when maturity is reached. Poetically, we of course meet this most strongly in literature, where the I says to the world, "I am not synonymous with the sum of my parts. I am not even synonymous with my self. There is a gap between myself and my self which means that possibility is always there. The imagination, which is not really a faculty but a capacity to conceive possibility, is controlling a mysterious kind of emergence within me that is so mysterious that I do not know what to call it. Some people call it simply spirit, some people call it survival, some people (reviving Aristotle) call it poten-

tial that you are fulfilling. At any rate, there is some kind of working out of an inner mystery which must be allowed to come to its conclusion.

If you were looking at cultures through this meta-image as Spengler did, there was the same kind of organic urge to maturation and decline that you had in an individual. The important thing was that there was a mysterious question mark at the center that made you who you were. It is interesting that the first major poem after Pope's *Essay on Man* is Wordsworth's *Prelude*, which is subtitled *The Growth of a Poet's Mind*. This is exactly what this image points to—the mystery which you sense being inside you as a seed that you hope will come to flower. As a genius of the 19th century put it, "It was a longing — a yearning."

The process image, which is very similar to this keeps the linear progression of the working out of the spirit but is interested in how this working out meets the external world in the form of conflict. An individual's longing is moving along in history. It encounters resistance from one side and the other which changes the direction in which it is evolving, though not drastically. The antagonist is absorbed into the self and the self moves on until another conflict is met. (The Hegelian dialectic is similar to this but perhaps is more often understood through the organismic image.) In the arts the movement called Realism, which in some ways follows the development of romanticism, can be understood in terms of the process meta-image. All of this we know — except we do not really know it because we are still in it even though there is some kind of detachment going on any time someone calls this to our attention. There is also a vested interest which I have in this particular meta-image since I have always found it amenable to my own mythology and very useful in talking about evolution. And of course it is the image in which evolution was born. The only problem is that none of these meta-images fits the reality of technological experience, of social experience, and I want to insist of personal experience today. Finally, the preceding is history and nothing more. This is not contemporary man however much we may find it useful to use these meta-images. Life is not really in any of these three places any more. It has gone on somewhere else and our question is *where is it now*.

What kind of image of a human being, beyond all other images that we have, could we get at, could we intuit, as being most basic, most beyond, most meta? Just possibly, I would like to suggest, since 1940 something has appeared in history that has absolutely changed man's way of grasping himself. Because of it our inner life will never be the same again. It happened in technology. It happened in the social world. It was called many things. Some people simply called it the communications revolution or communications engineering. It got all kinds of popular titles, such as data processing or the computer technology. But the most significant and the clearest word that has been applied to this is the word cybernetics. This is a word heard every day but I am wondering if it is not a sleeping giant in terms of the next direction of the human self-image, rather than simply being a phenomenon that surrounds us in the technological world. Let me say why I am persuaded this is true.

By the end of the 19th century organism and process had been called into question by three developments which make them forever obsolete. The first is the development of probability theory in physics which of course is very old as a theory (going all the way back to Pascal). It assumes that there are certain classes of events whose outcome is never certain but that there is a predictable regularity to the uncertainty. This has found itself summarized most popularly in the uncertainty principle of Heisenberg but it has nothing to do really with any of these three meta-images and therefore seems to be calling them into question.

The second is the development of non-Euclidian geometry, that is geometry based on postulates other than Euclid's fifth postulate. This says to us through the voices of men like Gauss, Bolyai, Lobachevsky and Riemann that it is not necessary to have geometry follow a certain kind of linear, planal imagination. You can, to put it crudely, image for yourself any kind of world you want to — any kind of world. As long as it is internally consistent it is real. This was an earthquake. We are still reeling from the idea that the human mind can create reality from scratch—from its own postulated givennesses which can follow any direction you please. There can be in theory an infinite number of non-Euclidian geometries. A corollary to this is the development of symbolic

logic as it relates to mathematics. I am thinking particularly of Boole and Boolean algebra, but it is the whole idea of geometry not having to reflect any kind of practical world, or let us say not having to be useful at all but insisting on its own abstraction. This may be simply another way of pointing to the insight of non-Euclidian geometry but the point I want to make is that the deep irony of history that has presented itself to us since the end of the 19th century is that as mathematical systems have become more and more abstract they have become more and more useful. It is their abstraction, their indifference to being part of the naturalistic world, the empirical world, that have made them so powerful. This is what has given us confidence in building models of the future and has given us the realization that unless you guard the "sacredness" of the model that you are building in your mind life is nothing but one empirical hell after another. Finally you realize that you have to have yourself anchored in the model-building enterprise itself.

So where are we? We are in the 20th century, the post-modern world, the post-civilized world, and most particularly, in the world of energy (as again Heisenberg tells us) which becomes matter by way of being the models (these mathematical forms) which are now located in the elementary particles. This energy has one horror to it and that horror is everything. As Gibbs tells us, there is in nature a certain kind of phenomenon which tends to degrade, to destroy, all model building that goes on and all rationality and abstraction. There is in energy a tendency toward randomness. There is on every level a tendency toward disorder to increase. There is in nature a "devil," not a Manichean devil but an Augustinian devil, an absence of order or an inorganic lack, a tendency to randomness which degrades meaning so that even as I talk I am conscious of the fact that every third word, to put it generously to myself, is becoming void, rather than a unit of meaning. I have no choice about this. It is in the nature of sound. And if I were really clever I would talk so improbably that the probability of disorder would be cheated in every word. This is just a fact of life, as much a taken-for-grantedness as anything else we have looked at in our time. But the horror is greater or let us say the tragic dimension of life meets us more heavily in this area now than anywhere else. You cannot escape the

fact that all energy in this universe runs downhill. Or, as in the practical formulation in thermodynamics, the tendency of nature is toward increasing entropy. Increasing entropy is just a measure of this disorder itself. Finally the universe and everything in it runs down no matter what cosmological model you are working on. This is the fate that the Greeks always knew was there. This is necessity. You do not escape this however else you bring your intentionality to bear on your world. This finally wins.

However, at the same time you have to say along with people in this area that though this is true in the general picture there are local enclaves within this great disorder which seem, at least temporarily, to run in the opposite direction. There are local enclaves in which order seems to increase or energy seems to run uphill. Life, biological life, finds itself in front of these enclaves. Evolutionary man is just becoming aware that he lives in what biologists call today open systems, that is, systems that are not closed — in systems which do not tend toward disorder but rather sweep into themselves energy from outside that system, feed on it the way flame feeds on wood, and maintain their being, their openness as a system, by taking away energy from their surroundings and building it up within themselves. Entropy still increases but not reducing enclaves. Entropy increases on the outside. A plant grows because it steals energy from the sun. The sun is burning itself out by giving that energy and of course will ultimately die. The plant temporarily is going the other way. It is going uphill toward some kind of destiny, following some kind of mysterious law.

This, it seems to me, is what is crucial for our look at cybernetics. Keep in mind that this theory of thermodynamics is the way the world is, that negative entropy, which is the kind of information which an open system draws into itself to stay alive is the method by which all of life maintains itself and escapes, at least temporarily fate, and thus creates the universe of the future. Information in this sense is not simply factual data. It is anything that informs, that brings into being form. It is anything that cheats the disorder and brings about order—anything that cheats the probability of randomness and brings about new probable creation, such as any individual who feeds off negative entropy in order to maintain a system in order to create a future. Now, cybernetics is

the field of thought which attempts to cope with this phenomenon in the universe on every level. We think of it erroneously in terms of computers, or in terms of internal self-regulating mechanisms like thermostats or elevators that operate automatically, receiving feedback from the outside world and regulating their course on the basis of an internal kind of programming. Actually, the word cybernetics comes from the Greek word for the steersman who is guiding the ship, the helmsman. The Latin word is gubernator, governor, the one who sails the ship. Therefore all cybernetics means is steersman, that is self-steering, not being steered from the outside. If you draw a model of the meta-image of cybernetics it looks like a net where information is stored. The human brain is such a net, the computer is such a net, social systems are such nets. In them information is stored, recombined and retrieved on the basis of the goal or telos out in the future toward which the system is steering itself. I have to draw pictures for myself of a steersman, a little man, somehow in the midst of this net, who is sketching for himself a shore, a horizon, way out here in the future. He knows that he is sketching it, that it is not objectively there. He is putting it there, his goal. And the information that he is receiving, or the learning that is going on in this system is being combined on the basis of his intentionality and the direction of the shore toward which he is steering. But, and this is again the tragic dimension, the irony, he knows that he is the one who is sketching the horizon out in the distance. He is the one who, upon reaching that shore, discovers footprints and discovers that they are his own footprints. And that, lo and behold, he must create another horizon beyond this toward which to steer his network. Therefore his only appeal to history is, "I am who I am because of my openness toward all of these streams of negative entropy and information that are rushing into myself, because of my capacity, call it imagination if you want, to create horizons toward which I steer myself. And finally I am who I am through learning, in the deepest sense." This whole network is really, as people in cybernetics call it, a learning net. It is made up of all of the education that a person undergoes his whole life long that is self-conscious, not the little things that he picks up, but that which he consciously feeds himself from as wide a series of sources as possible toward as complex

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and improbable a goal in the future as he can sketch for himself. He must be willing to bear the burden, the horror and the glory, of being a self-steering system, knowing that there is no invisible map floating around on the dark waters in which the system floats which will guide him out beyond. He must be willing to take upon himself the courage of being a learner in the deepest sense of literally dreaming the impossible because he has no other choice. The more impossible his horizon is, the more improbable it is, the better chance he has to escape the degradation of all energy, the better chance he has of any kind of future at all.

In teaching scientists this year who, because they are all mathematicians, are enormously lucid about abstraction and enormously lucid about models and how models create the future, I found the one thing that they read all year in the humanities that electrified them was that old friend Don Quixote. Why? I ask myself. The question they wrestled with for weeks was, is this man mad? Which is really the question. Is this our future, being *this* kind of human being? In one sense he must be mad — he has to be mad. On the other, he hasn't any choice but to mount his nag, ride forth in the world and create a future for it, which as you remember, is a hilarious adventure of the spirit energy. What also captivated them was a song which appeared this year in the musical version of Don Quixote, *Man of La Mancha*. There is a song in it called "The Quest for the Impossible Dream." A part of it goes like this:

To dream the impossible dream
To fight the unbeatable foe
To bear with unbearable sorrow
To walk where the brave dare not go
To right the unrightable wrong
To love pure you from afar.
To strive though your arms are so
weary
To reach the unreachable star.
This is my quest, to follow that star
No matter how hopeless, no matter
how far.
To fight for the right without worry
or pause.
To be willing to march into hell
for a heavenly cause
And to know when my ending is
here, when my journey is done
That my heart will rest knowing
that the world is better
That a man scorned and weary of
scars gave his last ounce of courage
To reach the unreachable stars.