

WHAT IS THE PURPOSE OF MAN'S LIFE?

R. Buckminster Fuller

Can we learn from our total experience to date whether man has a function in the universe? If we could find that he had this would lend a great sense of purpose and inspiration to the young world, since the old world seems to leave a complete blank about the purpose of man. Now that man has gained some high advantage in relation to his physical environment this open-endedness is a source of great unease and disturbance to the young world.

To make my point clear I am going to have to introduce several words. In the first place the word SYNERGY. This word is a counterpart of the word energy. We are all familiar with energy, and energy and synergy are companion pieces. Synergy is to energy what integration is to differentiation. Our energy studies have been differentiating outputs of our physical universe and studying subjects like optics or gravity but synergy means behavior of whole systems unpredicted by the behavior of any of their parts.

Recently a Nobel prize was given for the demonstration that the conservation of parity is no longer valid: that complementarity is not a mirror image. For example the proton and the neutron are physically not mirror images of one another but you cannot have proton without neutron or neutron without proton. They are interchangeable but in a complex way by virtue of their side kicks of the electron and so on. So synergy is in evidence in our universe a now celebrated by science in that Nobel prize. The fact that the word synergy is so little known means that society is not assuming or thinking that there are behavior of wholes unpredicted by their parts. This means we have depended entirely on statistics or parts. In our education we concentrate upon parts.

We concentrate upon specialization and finding out about the weakest link and we think we have it cold: all we need is some statistics and probability. Synergy makes all that invalid. There are some synergetic strategies that were discovered by scientists in the past. The discovery by the Greeks for instance that the sum of the angles of a triangle would always be 180°. Thus the known behavior of the whole could be deduced from the known behavior of some of the parts, though not on a new probability basis.

Euler's topology did exactly the same thing. It found a fundamental patterning in all the universe: that all the universe could be broken down into convergencies, which were called points and into the trajectories, or vectors, which were the lines; and where a number of the lines crossed you had an area. The areas, points and lines could

never be confused one with the other. And he found that if the pattern occurred on a plane he found the numbers of the points plus the number of the areas equalled the number of the lines plus the number one. If the pattern was in the round the number of the points plus the number of the areas would equal the number of the lines plus the number two. This represents the synergetic behavior of all patterns, so that from the known behavior of some you can find out about the others.

Quantum mechanics is another example: when physics suddenly discovered that energy was conserved. When I was at Harvard College, Society was still thinking of the universe as running down. It was thought of as an instant universe, a system which must follow the law of entropy and be losing energy. When it was realized that the speed of light showed that it took 8 minutes for the light to get to us from the sun and $2\frac{1}{2}$ years to get to us from the next nearest star it was obvious we were not dealing with an instant universe. In the next nearest star we are seeing a live show taking place 300 years ago. So people said that our universe is an aggregate of non-simultaneous only partially over-lapping events. One picture cannot give a picture of the whole.

Then the scientists said it could be that energy is not going out of the universe, and there was no experimental proof of energy being either created or lost. Thus it was concluded that energy was conserved. This has not yet been entered in the books of economics.

I would now like to introduce the word GENERALIZATION. As used by most people this means talking about too much too thinly. In science generalization is the discovery of a principle which is operative in every case, with no exceptions. So a generalized principle is something very powerful. This also is not generally understood by society. An example of a generalized principle was the discovery leverage. This meant that man, having discovered a principle, could get a series of levers one behind the other round a hob and put it under a waterfall where gravity is pulling the water toward the center of the earth. At this point man began to be the maker of the energies flowing in the universe, and able to shunt them out the end of the levers to do enormous jobs of work.

Thus we have synergy, the behavior of the whole unpredicted by their parts and energy conserved (not running down) as principles discovered by man with his intellect by virtue of which he finds he can always do more. Every time we make an experiment, wealth is manufactured: You

always learn more, you can't learn less. The intellectual faculty increases and energy is conserved therefore wealth can only increase. This says exactly the opposite of all economics up to this century. In all of our education we go on from specialization.

Young life as born has a comprehensive interest, continuously asking the most extraordinary questions, and being the most extraordinary research laboratory that we have. We see a small child continuously pushing a fork off the table and our first reaction is that it is a crazy little child. But in 99.0% of the universe there is no such force as gravity and it must seem very strange to the child that the fork is going in one direction instead of staying where it is. The child is much more brilliant than the parents. It is continuously engaged in research.

The words "up" and "down" were invented by man to accommodate his concept that the earth was flat and all perpendiculars to a plane are parallel to one another. In one direction they go out and in the other they go down. However, we now know we are on a sphere and that all perpendiculars to a sphere cannot be parallel to one another. The pilot flying round the world is upside down by home rules but he doesn't feel upside down. So he has to have some better words. He comes *in* for landing and he goes *out*. The words up and down are utterly ignorant. We go in-stairs and out-stairs. If we all said that for a week we would really discover that we were all on the space-ship earth. Man keeps talking about going out into space: he has been in space all the time.

We pay no attention to what we are really learning. I have spent half a century unlearning all the nonsense that had been given to me. Man is designed to be a comprehensivist. Our capability is not with our muscle but with our brain: to apprehend principles and put them to work to organize our universe.

We find in our physical experiments that every local system is entropic: it loses energy that is conserved and picked up by another system in this total non-simultaneous system. We find that our physical universe is locally entropic, continuously giving off energy, continuously in transformation and there is continual motion going on so the energies are given off diffusely. Because of this they occupy more and more space. So our physical universe is inherently expanding and increasingly disorderly. But every negative particle has a positive particle so there must be some phase of the universe where phenomena is collecting and becoming increasingly orderly. Looking around at the stars we can find them giving off energy in a disorderly way and no example of energy being collected and increasingly orderly, until we come to our planet. This is picking up enormous amounts of energy from the rest of the stars—primarily the

sun 100,000 tons of stardust daily according to the geophysical year observation. Also energy doesn't just bounce off the earth but as three quarters of the earth is water, the water is refracting the radiation and is continuously impounding that energy locally in the motions of the atmosphere and deep in the water and as well as the algae in the sea we have all the vegetation on the dry land impounding this radiation. This impounding is done by photo synthesis and this is order—beautiful order.

We find that all the biological life on board our spaceship earth is continually taking in random receipts and converting them into an orderly structure. They are inherently anti-entropic. And of all biological life nothing is quite so important and anti-entropic as man.

I have made a tentative hypothesis of what it is that we are discovering. The neurologists and the physiologists have been probing the brain of the last two decades—they have found out a great deal of what goes on in the brain and the energy output. They say it is easy to explain all that data they have concerning this information handling and receiving system if they assume two prime variables—brain and mind—rather than one—brain—because there are conversations going on over the communications system that cannot be explained by the feedback of the system.

What I am going to give you is a differentiation between brain and mind for which I received an ovation when I presented it to the American Association of Neuro-surgeons in Chicago this year. So I feel it can be accepted as a good working hypothesis. I take a piece of rope and tense it as vigorously as I know how. The more vigorously I tense it the tauter it becomes. This means that while I am purposely tensing it, it contracts in its girth, it inadvertently goes into compression at 90° to my tensing. If I take a number of rods and pack them close together and put some tension around them to bind them, I can then load this as a column. As I apply the load we find the only way the rods can yield is outwardly. Thus as I load in compression they go into tension at 90° at their girth—they try to get fatter. So it is easy to demonstrate in physics that tension and compression always and only coexist.

This constitutes a system and any system—whether it is your body or an island on the earth—must return upon itself. All systems are internally inherently concave and externally inherently convex. Concave and convex always and only coexist. They are not the same. The convex diffuses energy and the concave concentrates it.

Now we have tension and compression, concave and convex and proton and neutron and always and only co-existing. There is also something called the theory of functions which includes relativity. We can have x standing for convex,

tension and proton, and γ standing for concave, compression and neutron. But we cannot have relativity without two variables, so I say the word complementarity; and yet complementarity and relativity are not the same. So I have to have a word that includes both, so I use the word universe.

Now, no one has said to me: "You don't have a piece of rope" when I said: "I take a piece of rope and pull it." This is because there was nothing I said about this piece of rope that in anyway contradicts any experience anyone has ever had with a piece of rope. Thus when I follow through on the generalized behavior of a member this is a first degree generalization. It is a second degree generalization to develop an always and only co-existing tension and compression. It is a third degree generalization to develop a theory of functions. This is generalization of generalizations. Then I came to relativity and complementarity and embraced them with one word-universe. The word universe is thus a fifth degree generalization concept.

What is unique to the mind is just this ability to generalize. The brain deals always with special cases that build up the special parts of the brain. Generalization is something only mind can do: becoming transcendent. That is why the great scientists are always looking for order in the total experience. They start from the raw material of experience and they look for the generalizations. However, our educational system trains more and more people to look into special cases rather than looking for generalizations. And the more you specialize the more you work against the possibility of learning how to do it: so it is rarer and rarer that we get what we call a natural philosopher who can discover these comprehensive patterns.

Having discovered that human beings want to be comprehensivists and that the comprehensive capability is by far the most powerful, how did it come about that society assumes that specialization is logical, desirable and inevitable? We have simply to go back in history and find that the powerful man with a sword developed schools to control the other bright people by making them specialists. He said "You mind your own business, and I will make you my treasurer as I am the only one who is going to mind everybody's business." This is the grand strategy of divide and conquer. Nothing seems more desirable to the have-nots than education and the new schools must look exactly like the most prestigious schools of yesterday: and specialization appeared to be the right thing.

We have learned in all the biological and anthropological sciences that all the species that became extinct do so by virtue of over-specialization and losing general adaptability. Man is about to become extinct. The old masters of the sword

lost their control of the world at the time of World War I—at the time the scientists suddenly took them off into the great realm of reality that we call the electro-magnetic spectrum. Today 99.99% of everything that is going on you cannot see, touch, smell or hear. Society doesn't know what is going on since people concentrate upon looking at the surface of things. They are used to judging everything by touching it with their own hands. Our whole economic system is based on a monetary system where you don't trust anybody. Thus, we have society floundering around, over highly specialized and not knowing where it is going.

I was looking for the function of man in the universe. We find that all biological life is anti-entropic-becoming orderly. But what does man do? He has this metaphysical capability to develop generalizations. Taking all the experiences we have and generalizing them we arrived at the word-universe. This is as far as one can go in defining orderliness. Thus the main function of man is metaphysical in order to cope with the physical. We have the extraordinary demonstration of Einstein as intellect taking the measure of writing the equation of the physical. Nothing in our experience suggests that energy will ever write the equation of intellect. This is irreversible one of the great generalizations of the universe is the irreversibility of entropy. Thus it is clear that man's function is to comprehend, apprehend and to put in order.

Finally, the difference between the craft of yesterday and what we call industry today is the use of the total resources of the total earth for total man. The cost of this must be divided out between all men and only that which really reserves everybody can be properly afforded.

In this space-ship earth which man is locally polluting, feeling absolutely no responsibility, the older generation is being in total ignorance of the generalized principles by which we could make the whole earth work. It is very clear fundamentally and scientifically today that we could make the whole earth work but we can't do it in the terms of local remedies. Just one telephone call requires the resources of five continents. We can't have mastery of our information handling and processing unless we can move around the whole earth with absolute freedom.

We have to think about our space-ship earth as a machine to regenerate life, but the pollution point of no return is probably within only ten years and we are not going to be able to move fast enough unless we start to talk comprehensively now and unless there is a great revolution in our educational system to teach our young people generalizations really look for the great patterns to cultivate the ability and adaptability we are given to comprehend the universe and put every part of it that we come to in order.