Human Technological Progress, Like Photosynthesis, is a Principle of the Universe

by Krafft Ehricke

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Technology is not the solution to our own shortcomings. To do that, we have to grow, we have to mature. But technology often can make it easier. If you have a no-growth philosophy and if you regress into the Middle Ages, then you create an environment in which that, what you are asking the human being to do—namely to live with less, to exist very modestly, and be this and that and the other thing, and not to grow—is impossible, because a dog-eat-dog fight is bound to break out under those conditions. We've come too far. We have to go on. Life shows us that technological advances are the road to go. But based on those technology advances, have to come the advances of the species and the advances of our civilization.

In the first formation, in the light of the young Sun, there was no control, by anybody, over the generation of inorganic matter. Earth was like a gigantic flower, which soaked up solar energy and also utilized other energy to establish basic organic compounds, and amino acids. When life began to stir here, there lived, made of those fossil assets, Haldane's famous "soup that ate itself up," or something similar to that. Eventually those resources ran out. The first great crisis of life on this planet occurred, because those compounds were living off previously generated organic substances—

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Krafft Ehricke speaking on "Lunar Industrialization and Settlement—Birth of Polyglobal Civilization" at a 1984 conference.

and eventually off each other. Heterotrophic cells living off the autotrophic cells. The forerunners of the plant-eating animals were the heterotrophs and the autotrophs were the forerunners of the plants.

It was then, that we saw for the first time, two things: That what seemed to be an absolute limit to growth, was no limit to growth. It was a hindrance that had to be overcome and was overcome by technological advance—incredible technological advance, namely photosynthesis. And secondly, that life, and metabolism—if it is to have endurance, has to endure over long periods of time, and cannot rely on the results of the preceding sphere, of the preceding generation of materials.

Industrial Revolutions by Life and Mankind

And so, we cannot rely on fossil fuels forever, obviously. That's a very analogous situation. We have to start going to the primordial energy resources, which are so abundantly all around us, and in the atom. Technological advance occurred by the generation of an enzyme in the photoautotroph, which ultimately led to the chlorophyll molecule, and the chlorophyll molecule and photosynthesis inaugurated the first industrial revolution on this planet.

This industrial revolution did what we are doing now: It realized that it cannot be totally planetogenic. It had to go to space resources. It went to the solar resource. Since it couldn't go out into space—biological technology does not lend itself to going out into space—it took that resource from space that came to Earth, solar radiation. Solar radiation became the fourth element, so to speak, of the new environment of life: water, land, and air, and radiation.

With photosynthesis, life developed control over the basic staples of life. Life created out of primordial materials—CO_2, and water. With the aid of solar radiation, life changed solar radiation to chemical energy. And with that, the basis on which everything else relied was created, including the parasitic oxygen metabolism, which replenishes the only primordial resource in short supply, namely, CO_2.

So, in the womb of what was created here—the highly negentropic biosphere, an immensely complex system of ecological niches that developed, over time, to encompass an entire planet, and industrialize it, and process its energy and its materials—in the womb of this biosphere arose then the human being as the seed of the next higher metabolism.

Each sphere, each large environmental sphere (some of which took on planetary proportions, and others had subplanetary proportions), has to have one umbilical metabolism: I call it an umbilical metabolism, because it is that kind of metabolism that interacts between the negentropic sphere, and the entropic wilderness on the outside. It was photosynthesis that did this. Oxygen metabolism is not an umbilical metabolism. It's parasitic. It eats other animals, and it consumes plants. Animals and humans, being in this respect the same, rely on the umbilical metabolism of photosynthesis, and some other fermentation metabolism such as nitrogen fixation, but the primary one is photosynthesis.

In that respect, the human being is not so much a descendant of the ape or proto-ape; the human being is actually the descendant of photosynthesis, because information metabolism is the first metabolism that actually can interact with inorganic matter and therefore is an umbilical metabolism; and is broader, even, than photosynthesis, because we can interact with nuclear matter, we can build a chemical industry of vast proportions, although chemosynthesis has done that, too; we will in the next century, I'm sure, build up an atomic industry of enormous proportions—and a subatomic industry; and a quark industry.

This goes far beyond that. And for this, and some other reasons, information metabolism transcends planetary limitations, and is *the* metabolism on which life moves now over into space itself.