

choices—that is, in order to decide who should live—we should study the lifeboat ethics of Tom Regan, she writes.

Sounds bizarre, doesn't it? Please remember that this kind of thinking is a concrete political threat today. In a time of crisis and economic collapse, public opinion often turns to the demagogues who present simple solutions that look like the lifeboat example. That is: stealing! We have heard it too often before. "We don't have resources enough, so let's kill some of the people that consume them."

Already today, we treat Africa this way. It is claimed that Africa is overpopulated, and the only allowed solution to this is to reduce the number of people. With the crisis in the health-care system in Europe, we can see that they already are using the same method here!

How do we stop it? By showing the human capacity to overcome, and to solve, problems; and by showing how it is possible to create new resources in the national as well as international economy. That is: with creativity!

There is still hope. Many people protest against Singer here in Germany. Good! But in order to stop him it is necessary to fight his philosophical method, game theory. This is something that only we can show to people. Let's go out and do so!

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Jonathan Tennenbaum

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## Toward a True Science of Life

We have just heard how developments in molecular biology and genetic engineering are being used as an instrument for attacking the Judeo-Christian conception of Man and promoting genocidal policies far worse, even than what the Nazis did. It is well documented, in fact, that the Nazis raised the teaching of biology to the level of an official state doctrine, or even state religion, which provided the "justification" for the practices of mass sterilization and, finally, physical elimination of "undesirable" sections of the population.

But was this just a case of science being misused for evil purposes? Are molecular biology and genetic engineering simply being misused today? Or has something gone fundamentally wrong with biology itself, as a purported science? Well, as I shall indicate, there is something very much wrong, and not only in biology, but in a large part of what today passes for physical science.

Let me put my thesis very plainly and undiplomatically: Most of what is being taught in university classrooms today, in biology, and also in physics and mathematics, is actually not science at all, but essentially a variety of *religious cult*,

whose immediate roots can be traced, among other things, to the Cathars and Bogomils of the medieval "dark ages"! True, this cult, which controls much of our educational system and scientific community, naturally does not advertise itself openly as a fanatic form of irrationalist belief; rather, it calls itself "the scientific establishment"; it typically brands those who refuse to accept its most egregious doctrines, as "unscientific."

We could call it the "Cult of Entropy." It is actually very old, it goes back to Aristotle and to Babylon, as a characteristic creation of oligarchism. Its belief structure is *intrinsically* fascist, and over the last 150 years it has come to pervade biology in particular to such an extent, that the teaching of biology has itself been, and remains, a very major vehicle for the propagation of fascism. I shall illustrate this now with the case of Darwinism and modern molecular biology.

### The Case of Darwin

Now, it is easy to show that Darwinism, one of the pillars of modern biology, is nothing but a kind of cult, a cult religion. I am not exaggerating. It has no scientific validity whatsoever. Darwin's so-called theory of evolution is based on absurdly irrational propositions, which did not come from scientific observations, but were artificially introduced from the outside, for political-ideological reasons.

If you find this hard to believe, just have a close look at Charles Darwin's classic work, first published in 1859, usually known as *Origin of the Species*. Actually, the full title is more ominous: *Origin of the Species by Means of Natural Selection or the Preservation of the Favored Races*. As Darwin himself states very clearly, the essential idea for this theory came from Thomas Malthus.

His whole theory of evolution is based on two interrelated propositions: the Struggle for Existence, and Natural Selection. Darwin does not give any experimental proof for them, but presents them as self-evident:

1. The capacity of the planet to sustain living organisms is limited and essentially fixed in terms of the maximum numbers that could be maintained. (Nowadays ecologists often refer to this limit as the "carrying capacity" of the Earth.)

2. Since each population of living organisms, taken by itself, tends to multiply its numbers exponentially, a point is rapidly reached, when in any given species many more individuals are born, than could possibly survive.

3. This situation, according to Darwin, inevitably leads to what he calls a continual "struggle for existence among all organic beings." He notes: "Although some species may now be increasing, more or less rapidly, in numbers, all cannot do so, for the world would not hold them." As a result, the various living organisms are constantly competing with one another, in what Darwin also calls the "War of Nature" or "Battle of Life."

4. In the process of reproduction of individuals of any species, small genetic variations occasionally occur which can be inherited by successive generations. Given the constant



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struggle for existence, the slightest genetic variation, which could lead to a competitive advantage relative to the environment and other living organisms, will lead to an increased population of the individuals carrying the superior traits, while variations leading to a disadvantage, will be eliminated in the competition.

5. Darwin calls this “natural selection,” in analogy with the way human beings breed plants and animals, by artificially encouraging the reproduction of individuals with desirable traits and suppressing the reproduction of “inferior” individuals. In Nature it is the struggle for existence which determines that the superior will survive and the inferior become extinct.

6. This is how, Darwin says, the higher, superior species differentiate and evolve out of lower ones, by a gradual accumulation of improvements and under the influence of different natural conditions in the struggle for existence.

## Darwin and the Nazis

Now, it is well-known, or should be, that Darwin’s thesis of the “struggle for existence” and “natural selection” was key to the ideology of the Nazis. The following characterization by Prof. Percy Ernst Schramm, in the preface to *Hitlers Tischgespräche (Hitler’s Tabletalk)* by Dr. Henry Pickering (Stuttgart: Seewad, 1963), is quite accurate: “Pseudo-Darwinist argumentation has played a more or less important role

in the political polemics of all developed nations since the Nineteenth Century. . . . But no one before Hitler actually based policy on principles derived from Darwin; no one before Hitler drew the final consequences from those biological premises in such a systematic and merciless way, and realized them in action.”

The problem is, probably most people today, absolutely believe Darwin’s biological premises and even regard them as self-evident. Isn’t it obvious that the carrying capacity of the Earth is limited? And isn’t it obvious that living organisms are competing with each other in the “struggle for existence”? After all, these ideas fit exactly with the Club of Rome’s “limits to growth” and in the neo-liberal “free market economy” which is now collapsing all around us. That is no accident, as we shall see.

But look at Nature for a moment. Where is this great war going on, that Darwin refers to? Go to a park: Are the trees really struggling against each other for existence? Are the birds killing each other out of competition? Do cats eat mice because the mice would otherwise compete with the cats for food? Or wouldn’t cats be in favor of having a rich supply of well-fed mice? Do we find the wild animals and fish all on the edge of starvation, as we would expect, if they were in a life-and-death competition for limited food? Furthermore, even if it were true, that more individual living organisms are born, than could possibly be sustained at a given stage of development of the biosphere, does that automatically, self-evidently, mean that living organisms will go to war against each other?

Now we begin to realize, that Darwin’s insistence on the idea of “competitive struggle for survival” — actually a fascist idea — does not come from real observation of Nature, but he simply dragged it into science from the bestial political and economic doctrines of Thomas Malthus, Thomas Hobbes, and Adam Smith. Darwin himself calls attention to Malthus as the original inspiration for his breakthrough on evolution.

## Vernadsky: Nature as ‘Work Process’

How does “Nature” actually work? As was well-known long before Darwin and emphasized by Darwin’s contemporary Alexander von Humboldt, the aggregate of living organisms — what Vernadsky calls “living matter” — exists and has evolved not as a mere collection of individual species, but as an organized *work process*, which is transforming the Earth further and further away from equilibrium. Moreover, as Vernadsky demonstrated on the basis of overwhelming empirical evidence, the overall *free energy* of living matter in the biosphere — the potential for living matter to transform its environment, the biosphere as a whole — is constantly *increasing* in the course of evolution.

What predominates, in the process, is not a competitive struggle between species, but rather the way the activity of each population of living organisms, and the *interaction* between those populations within the total “ecosystem,” contributes to the growing “anti-entropy” of the biosphere as a

whole. Take for example the creation and maintenance of the present oxygen-rich atmosphere of the Earth, through the photosynthesis of plants—an atmosphere that makes it possible for the biosphere to sustain animal species with much higher intensities of metabolic activity. That atmosphere, whose “charged up” chemical potential is also manifested by disasters such as large forest fires, typifies the way the biosphere has developed further and further away from “equilibrium.”

This is not simply something we know from the paleontological and geological record. We know it directly, from Man’s active role in further increasing the *power* and dominion of living matter over non-living matter on the Earth.

It is nonsense, when ecologists claim, that the human population has grown at the expense of plant and animal life on this planet. How do you think that the human population is fed? Only by vastly increasing the overall production of animal and plant life per square kilometer on this planet! For example, there are presently about 40 million cows and pigs in Germany—orders of magnitude more than could possibly have existed in the “natural habitat” of Germany, before Man. (That may be why Jeremy Rifkin has a pathological hatred of cows!) In terms of amount of biomass per unit area, the reduction of wild plant and animal populations, as a result of human activity, has been compensated many times over by the vast increase in domesticated animal and plant populations.

Every farmer knows, how the increase in the yield and fertility of the land, is a function of improving and intensifying a whole cooperative system of microorganisms, insects, plants, animals. The potential to carry on this improvement, overall, depends on Man’s supplying things such as irrigation, drainage and other water systems, new sources of energy in various forms, transport, and so forth, that the biosphere cannot provide by itself, and which are products of Man’s physical economy. Plus, increasingly, applying improved knowledge of the living process itself, in order, in a sense, to improve the organization of the biosphere. All of this is a function of mankind’s unique power to generate, assimilate, and apply original discoveries of new physical principles. Thereby Man supplies intellectual power to the biosphere.

So, Darwin’s theory of evolution rests on absurd and unproven assumptions, which were arbitrarily introduced in defiance of what was well established long before Darwin.

Now, some people might respond to my attack on Darwin, by saying: “Okay, if you say Darwin is no good, then let’s hear your *alternative!* What’s your explanation for evolution?” I answer to that, first of all, that I don’t need to put forward an alternative theory, to justify rejecting something that is demonstrably nonsense. Second, people often delude themselves, in demanding an “explanation” for some phenomenon, by implicitly assuming that reality can be reduced to what their own prejudices would accept as “self-evident”—for example, some simple sorts of interactions among discrete entities considered as “elementary.” But what if reality does not work that way?

## Darwinism and Creationism

The history of futile attempts in geometry to “square the circle” illustrates the problem. It is futile to attempt to express an arc of a circle in terms of linear magnitudes: The curvature inherent in any, arbitrarily small circular arc, defines the circle as a higher form of existence, not reducible to any combination of straight line segments (polygons). Yet, the phenomenon of non-zero curvature in the small actually *exists*, and is characteristic of action in the real Universe.

The same reality has reflected itself down into the domain of elementary mathematics, by the need to introduce higher forms of numbers—irrational, transcendental, complex, etc.—which are not expressible in terms of the simple whole numbers of arithmetic. Even on the level of apparently simple linear magnitudes, the attempt (for example) to express the ratio of the diagonal length to the side of a square, in terms of whole numbers, leads to an unending, infinite series—a phenomenon which the mathematician Georg Cantor once called a “bad infinity.” As we shall see, an even more devastating “bad infinity” is actually exploding in the face of molecular biologists, as a product of the futile attempt to reduce living processes to a complex system of “molecular interactions.”

These remarks are crucial to seeing through the “religious war” which been orchestrated, especially in the United States, between the “Darwinists” and “neo-Darwinists” on the one side, and the so-called “Creationists” on the other. “Creationism,” which finds adherents especially among the fundamentalist right in the United States, denies a progressive emergence of higher species of living organisms in the course of the Earth’s history, proposing instead that the species all came into being at the same time—a kind of biological “Big Bang”—in a manner consistent with a literal reading of the Old Testament’s Genesis.

Although Darwinists and Creationists stand in sharp opposition to one another, the two standpoints share a common epistemological flaw. They reject the notion of a creative principle, embedded in the Universe, which is manifested in a general tendency for progression or development in the biosphere, and is most clearly expressed in the creative powers of the human mind for scientific and related forms of fundamental discovery. The *mechanistic* thinking of the Darwinians—and modern molecular biology, as a continuation of the same thing—finds its echo in the fundamentalists’ slavishly *literal* interpretation of Biblical texts, their apparent inability to grasp the notion of Creation as a continuously unfolding process.

The difficulty is, that a universal physical principle cannot be directly perceived by the senses, nor derived as a “literal interpretation” of sense perception. Grasping a universal principle requires a creative act of the mind, an act of cognition, of the same sort upon which depends the metaphorical communication of ideas in Classical art.

The form of mental block exemplified by both Darwinist and Creationist “theories” of the origin of the biological species, as well as in molecular biology and other varieties of

reductionism in modern natural science generally, coincides in essential features with the *dualistic world-view* associated with the Bogomil and Cathar sects of the Middle Ages. According to historical accounts, these sects divided reality into a *material Universe*, on the one side, and a *realm of the spirit*, on the other. The former, physical domain, was “created by the Devil,” i.e., is assumed to be intrinsically entropic. Only the immaterial, spiritual domain, created by God, was considered to embody a principle of the Good.

What is significant here, is not the details of belief structure, but the fact, that such a dualistic world-view inevitably arises, where there is denial, suppression, or lack of development of the creative powers of the human mind. When this happens to a person, the notion of an intrinsically anti-entropic Universe becomes incomprehensible, and the subjective processes, associated with the creative potential of the mind, become mystified and relegated to “another world.”

This dualistic world-view correlates with an emotional state of *impotent, destructive rage*, which explains both in the peculiar association of neo-Darwinism with the recent revival of left-wing anarcho-terrorism, and parallel developments among “Creationist”-leaning Christian fundamentalists. (Similarly, the oligarchically manipulated Cathar and Bogomil sects of the Middle Ages were apparently organized mainly as irrationalist protest movements among the most socially oppressed layers of the population.)

The Darwinist or modern molecular biologist today, typically suffers from the same problem of dualism. The notion, that living processes might manifest a universal, anti-entropic principle—one not reducible to the principles of physics and chemistry that appear to govern non-living process—seems “unscientific” and “other-worldly” to them. The material world is for them governed by the law of entropy. But once we tear away the apparently “objective” facade from the thinking of modern neo-Darwinists and the defenders of modern reductionist biology, we encounter a wildly irrational quality of basic assumptions, whose origin has nothing to do with the scientific study of living processes per se.

## **Molecular Biology**

*From a merely technical standpoint, molecular biology is simply a further development of biochemistry*—an eminently useful, if conceptually limited area of experimental investigation. But up into the early decades of the Twentieth Century, no serious biologist would have dreamt of equating biochemistry with biology *as a whole*.

Biology proper, deals with those aspects of living processes, which absolutely distinguish living matter from non-living matter in the biosphere. However useful, biochemistry can hardly discriminate between an organism which is alive, and the state of the same organism just after death, when its chemical composition remains virtually the same. The elevation of biochemistry, under the new name of “molecular biology,” into a pretended *general doctrine* of biology, came about through a powerful manipulation of science from the

outside. Indeed, it is easy to document, that the predominance of molecular biology, in its *present* form, was from the very beginning a conscious project of the *eugenics movement* and its oligarchical backers.

It is no accident, for example, that the same Cold Spring Harbor facility that functioned under the auspices of the Harriman family’s infamous Eugenics Record Office as a coordinating center for the eugenics movement internationally, became a leading center for molecular biology and genetic engineering after World War II. The same holds for Pasadena, California, the birthplace of the mass sterilization programs for “genetically inferior” persons that were set into motion in a number of U.S. states many years before the Nazis came into power.

After the crimes of the Nazis had given eugenics a bad name, the very same Anglo-American families that had enthusiastically supported Hitler and his “race hygiene” policies up to 1938, sought to establish a less openly racist, more “objective,” “scientific basis” for eventually imposing even more radical policies on a worldwide scale. It was against this background that vast resources were channelled into molecular biological research, making it the increasingly dominant direction of postwar development of biology, by the Rockefeller and related Anglo-American financier interests who exerted a controlling influence on medical-related research in the United States. It is no accident, that the same Francis Crick, who together with James Watson is credited with the groundbreaking discovery of the double-helix structure of DNA, declared at a conference shortly after receiving the Nobel Prize, that the “reproductive autonomy” of human beings could not be tolerated in the future. Among other things, Crick suggested the idea of adding a chemical to public water supplies, that would make men and women sterile; only those who qualified for a “license” to produce children, would be given an antidote drug!

Besides this, however, I want to emphasize the role played by the doctrines of “cybernetics” and “artificial intelligence” by John von Neumann, Bertrand Russell, Alan Turing, and Norbert Wiener, which in a certain sense are even more insidious and destructive than even eugenics per se, because they attack the human mind *directly*.

It is the work of Alan Turing, and especially John von Neumann’s work on so-called “self-reproducing machines” or “cellular automata” during the 1940s and into the 1950s, which provided the model for the subsequent elaboration of molecular biology and genetic engineering in their present “mature” form. The reason that biology textbooks today are filled with concepts and terms like “information,” “codes,” “instructions,” “signals,” “receptors,” “information processing,” etc., is *not* because the implied analogy of living processes with digital computers and other “information technologies” has any significant scientific merit—quite the contrary! The extreme mechanistic bias of modern molecular biology was dirigistically imposed on biology from the outside, long before the discovery of the DNA structure and the

so-called “genetic code.” As a matter of fact, it took a great deal of effort, to find a living organism that could be made to display sufficiently “mechanistic” behavior, under certain strictly controlled conditions, as to serve as a “model system” for the elaboration of the desired approach to molecular biology. This work was directed by Max Delbrück and others, with generous support by Rockefeller grants, in the 1930s and 1940s. As a result, the bacteria *E. coli*, consigned by Nature to dirty, but useful work in the intestines of humans and other animals, achieved a stunning career as the number-one laboratory organism for many years.

### **False Notion of ‘Genetic Code’**

I cannot go further into this story here, but I want now to turn to the so-called “genetic code,” whose elaboration consolidated the growing hegemony of molecular biology.

I need not repeat here the bare notion of the “genetic code,” more or less familiar to everyone nowadays. Ironically, this is one of the few scientific topics which is still taught, with some degree of reliability, in the schools. Suffice it to say, that the chemical structure of the DNA molecules, believed to be the material carrier of inheritable traits, is determined by the sequence of so-called “base pairs” that bridge the two strands of the DNA’s twin helix. The base pairs are constituted from four so-called nucleotides: adenine (A), thymine (T), cytosine (C), and guanine (G). The latter always appear in certain paired combinations, in such a way, that the chemical composition of a DNA molecule is completely determined by a sequence formed by the four letters A, T, C, G. As an example, here is a section of the letter-sequence for the segment of DNA which is the basis for the synthesis of collagen protein (9 of the total 24 sequences):

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aaaatgaaag acttctcggc ggggcacggt  
agccaaggcg gcatgccatg aggtcaggag  
cgtctctact actaaaaata caaagattag
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All in all, the chemical composition of the chromosomal DNA, believed to constitute the “genetic material” in each cell of the human organism, corresponds to a sequence of approximately 3 billion base pairs.

Now, how could such a sequence determine the whole development and machinery of our bodies? The supposedly key breakthrough in answering that question, came in the 1960s, when a detailed correspondence was established between the chemical structure of proteins, produced in the body, and the base sequence of the DNA. The primary structure of a protein molecule is a chain of so-called amino acids, of which there are 20 to choose from. It was established, that each protein in a living cell is synthesized on the basis of a certain segment of the DNA, by a stepwise process in which the sequence of base pairs in the DNA segment, determines the sequence of amino acids that make up the particular protein, according to the famous “genetic code.”

At a superficial first glance, the “cracking of the genetic code” seemed to settle all essential questions: The DNA se-

quence programs for the production of all the proteins in the body’s cells, including above all the *enzymes* that regulate and control all the biochemical activities in the body. So, the DNA controls the enzymes, and the enzymes control everything else!

But wait! The actual processes in a cell consist of a large number of very precise events in space and time. Just producing a pile of enzymes means nothing. To carry out even the simplest chemical activity in a cell, a specific enzyme or combination of enzymes, together with the reactants of the reaction, must be present in specific amounts, at a specific place and a specific moment. The array of proteins, “coded” for by the DNA, might be thought of as the keys of a piano or the instruments of an orchestra (in this case there are over 30,000 keys or instruments). But, who plays on the keys? What determines what notes and intervals are played, at what moment?

### **What Turns On Genetic Cause and Effect?**

Although all the DNA, and all the coding sequences for all proteins, are present in all the cells all the time, in a given cell only a relatively small part of the proteins are being synthesized at any time. So, what “turns on” and “turns off” the synthesis of proteins? The French biologists Jacob and Monod received the Nobel Prize for identifying certain “regulator genes” in the DNA, so-called “effector” and “repressor” genes, associated with the gene for a given protein, and whose products can unblock or block the synthesis of that protein (**Figure 1**).

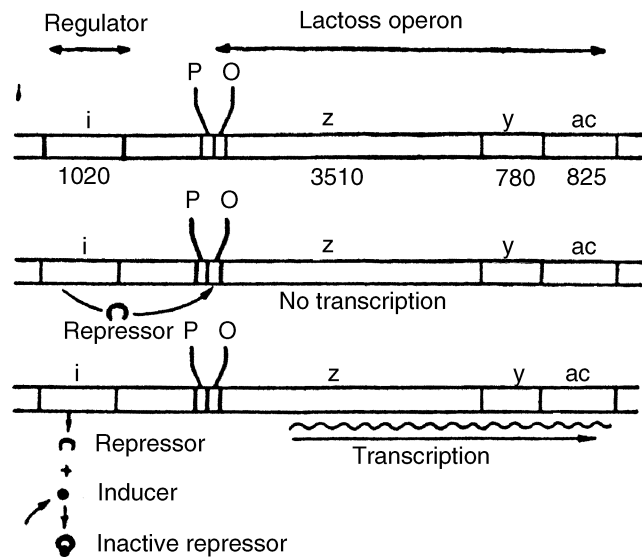
But that just shifts the question: What turns the regulatory genes on and off? The molecular biologists talk about complex interactions of “signal molecules” and feed-back loops, which in turn are connected with the activity of other genes and external factors. We can no longer say, “event X always leads to event Y,” because the relationship of X to Y depends on a seemingly endless array of additional factors. These include the actual geometrical form of the DNA—which is not a simple linear helix, but is further wound up in a complicated higher-order structure that is constantly changing its configuration in a living cell (**Figure 2**). Before it can be “activated,” a portion of DNA must be unwound and exposed in a certain geometric orientation. That depends on still another array of interactions.

Thus if we follow the path of molecular biology, trying to represent living processes in terms of chains of mechanical cause and effect, we end up in an *endless digression*: a labyrinth of interactions, which becomes more and more complex and incomprehensible, the closer we study it. Finally, we lose sight of the original process altogether. There is no way to project anything of significance about the actual behavior of the organism, from our analysis. We have arrived at George Cantor’s “bad infinity.” It is the same dilemma as the “many-body problem” of Newtonian physics.

The famous “human genome project”—actually nothing more than a glorified biochemical analysis of the DNA mole-

FIGURE 1

## Regulator Genes



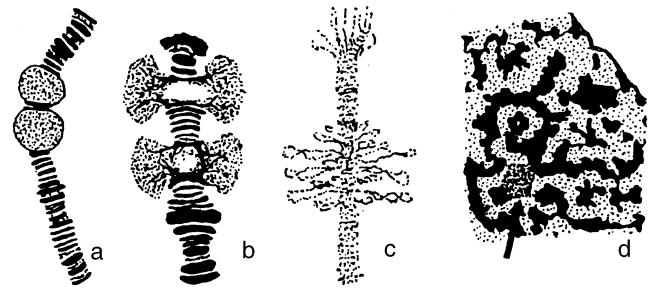
French biologists Jacob and Monod received the Nobel Prize for identifying “regulator genes” whose products can block or unblock the synthesis of a given protein. But who regulates the regulator genes?

cule in human cells—has been hailed as the scientific breakthrough of the millennium. In reality it has not answered a single question of fundamental significance, but rather underlines the absurdities of the entire approach. For example, the base sequences which actually “code” for the synthesis of proteins according to the famous “genetic code,” constitute only about 1.4% of the human DNA! But what about the rest? About 50% of the DNA consists of long sequences that just repeat, and whose biological function is unknown. Some silly biologists call this “junk DNA,” or “selfish DNA” that has just smuggled itself into the genetic material. As for the remaining 48% or so of the DNA, some has been identified as various known sorts of regulatory sequences associated with genes, but most of it is unaccounted for. It is generally suspected of “somehow” being involved in the complex interactions, that are supposed to regulate the activity of the genes.

There are other embarrassing revelations. The number of human genes that have been identified is only about 30,000, whereas a simple fly already has about 13,000 genes and many plants have 26,000 genes. Above all, the human genome seems to be extremely similar to that of apes—so similar, that the late biologist Walther Nagl, in his monograph on chromosomes, wrote: “Is it so self-evident, that a human being always comes from a human egg cell? No, not so self-evident. If you analyze the genes of higher apes and humans, their nucleotide sequence, they are very similar. If you analyze the

FIGURE 2

## Forms of DNA in a Living Cell



gene products, the amino acid sequences, they are also very similar, and the gene products (amino acids) all function nearly alike. Regardless of all efforts it is simply not possible to find a principal difference in the structure and function of the genes and their products, that could explain the difference between Man and ape. And yet, Man is really different in many biological respects.”

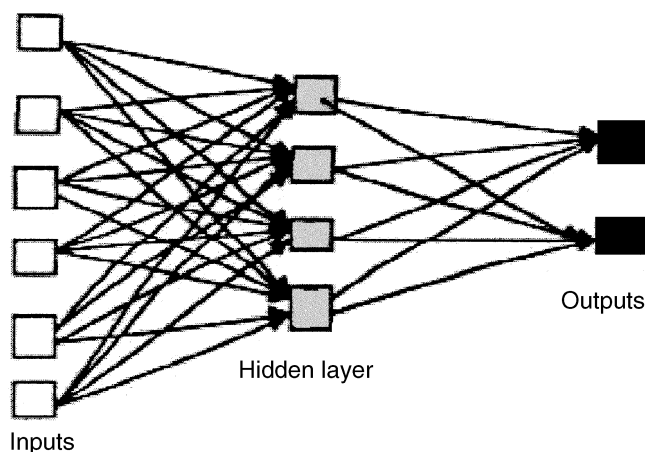
## The Cult of ‘Genes’

The clearest symptom of the cultish nature of molecular biology, is the widespread notion, that *genes* are the source of human *abilities*, such as “intelligence,” for example. On closer examination, this idea reveals itself to be pure superstition. For, according to molecular biology, a gene is equivalent, in content, to a mere sequence of letters A, G, T, C. What *abilities* or *powers* could a mere sequence of letters have? What abilities does a segment of DNA have? Maybe some interesting chemical properties, but these surely have nothing to do with human intelligence!

To make this clear, consider the following analogy: We read a drama by Schiller, and we are profoundly moved. But was it the sequence of printed letters on paper, which caused our profound emotion? Do letters on paper have the power to generate human ideas, emotions, images? What an absurdity! No, the ideas and emotions were generated inside our mind, by our own mental processes. The perception of the letters and words provided merely the trigger or provocation, skillfully constructed by Schiller, to provoke certain creative mental processes in the mind of the reader. No poem or drama, can communicate any idea or emotion, except than what we are able to generate, or actually *reproduce* in our own minds.

Thus, the human genome has, in and of itself, *no content at all*, and certainly no powers or abilities. The genetic material cannot call forth any properties or potentials, except what the living process can generate within itself, in “reacting” to the genetic material as well as its environment, in the course of its development. In a sense, a cumulative process of regeneration or “rediscovery” of potentials of action—a Riemannian manifold!—begins already in the earliest stages of an em-

FIGURE 3

**A Von Neumann ‘Neural Net’**

bryo's development, albeit not the higher, *conscious* form of discovery that is later awakened in a child through its interaction with human culture.

**Von Neumann's Fraudulent Brain Model**

Even more drastically misleading than molecular biology per se, is the identification of the human brain as a species of automaton or computer, which was especially promoted by John von Neumann.

Von Neumann appealed to a simplistic model of neuron function, which had developed out of the work of Hodgkins and Huxley and others on the way nerve cells generate and propagate electrical impulses. The human brain has an estimated 100 billion to 1 trillion neurons (nerve cells). Each neuron is connected to between 100 and 10,000 other neurons through a branched network of filament-like extensions. Von Neumann simply arbitrarily assumed—contrary to all biological evidence—that the brain functions essentially as an electrical network, and that the response of an individual neuron to the electrical pulses coming from other neurons, could be described by a simple mathematical function. He simply decided to ignore the fact, that a neuron is a living process! Well, you can't ignore that, as even the reductionistic neurophysiology shows. But von Neumann just went ahead anyway, the same way he ignored Kurt Gödel's devastating formal-mathematical refutation of his entire approach, in 1931.

The result is attempted computer simulation of brain function, by so-called "neural nets" (Figure 3). There may be some interest in this sort of organization of a computer system, but it has nothing to do with the reality of the human brain! Figure 4 shows the form of actual neurons in the brain.) In reality, neither do the neurons behave like simple electronic components, nor do they interact in the simplistic way the "neural net" suggests. For example, the synapses, where the

FIGURE 4

**Neurons in the Brain**

*Forms of actual neurons do not resemble von Neumann's "neural nets," nor do they interact in the simple way that the neural net model suggests. Here: drawing from a micrograph slide.*

"signals" are supposed to be transmitted from one neuron to the other, are living organs whose structures are always *changing* (Figure 5). Already over 100 specialized chemical substances have been discovered, which are released on one side of the synapse and interact in a very complicated way with the neuron cell membrane on the other. The ongoing synthesis of those so-called neurotransmitter substances, as well as proteins and other substances that modify the properties of the synapse, depends on activity of the DNA in the neuron cell's nucleus. That brings us back again to the endless complexities of "DNA regulation." Furthermore, neurons interact in other ways, than by "hard-wired" electrical impulses or chemical signals across the synapses.

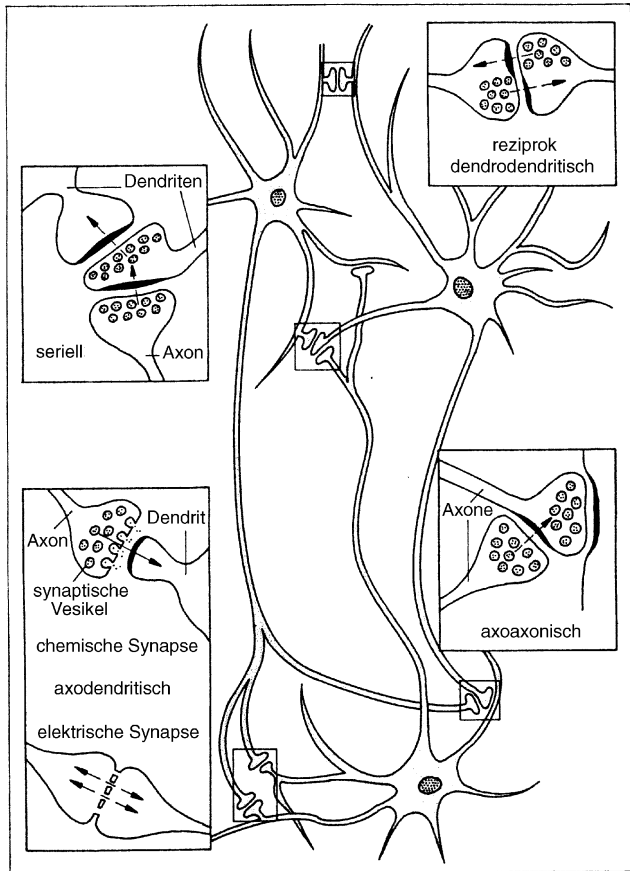
This leads to a notable scandal. Despite intensive efforts, the reductionists have failed to establish any significant correlation whatsoever, in detail, between the internal features of our *mental activity*, in terms of thoughts, ideas, memories on the one hand, and the domain of bioelectrochemical events in the brain, on the other! We do know, that you need a *brain*, as a living organ, to think. But apart from that, the psychological and physiological domains are separated by an apparently unbridgeable gap. Is the world really dualistic? Or does the problem lie in the wrong choice of method?

**Solution to the Paradox: Plato's 'Phaedo'**

The essential fallacy of molecular biology, as well as von Neumann's reductionist theory of the brain, was already pointed out by Plato 2,400 years ago, and is most beautifully

FIGURE 5

## Synapses in Living Organs Are Always Changing



The junctions between neurons, called synapses, are not mere conductors of electrical impulses, as Von Neumann's simplistic model suggests. Rather, they are complex organs whose structures are constantly changing.

set forth in his famous dialogue, *Phaedo*. Socrates, who has been condemned to death in an Athenian court, is visited in jail by his closest friends and students. The discussion turns upon the question of the immortality of the soul. In a famous passage of the dialogue, Socrates pokes fun at the notion of physical or natural science, that rejects the efficient, causal role of *ideas* in the determination of events in the Universe.

Someone, Socrates says, might try to “explain the causes of my several actions in detail, [going on] to show that I sit here because my body is made up of bones and muscles; and the bones, as he would say, are hard and have ligaments which divide them, and the muscles are elastic, and they cover the bones, which have also a covering or environment of flesh and skin which contains them; and as the bones are lifted at their joints by the contraction or relaxation of the muscles, I am able to bend my limbs, and this is why I am sitting here in

a curved posture. . . . And he would assign ten thousand other causes of the same sort, forgetting to mention the true cause, which is that the Athenians have thought fit to condemn me, and accordingly I have thought it better and more right to remain here and undergo my sentence. . . .”

Just so, by banning the efficient role of higher principles, as molecular biology does in an extreme form today, we create a form of purported science which is axiomatically unable to account for the most elementary features of living processes—not to speak of the higher order, creative processes of the human mind.

Socrates goes on to demonstrate, that the *efficient causes* of events in the Universe can only be found at the level of *ideas*, and not in the domain of interactions among object-like existences, of the sort naive sense-perception might mislead us to regard as “physical reality.” To reach knowledge of the Universe, we must rise above slavishly literal interpretations of sense perception, to grasp the universal principles which, though not directly perceptible to the senses, can nevertheless be demonstrated to actually govern the Universe. The paradoxes of reductionist biology, provide a case in point.

Just as the mathematical Cartesians hysterically rejected Leibniz's transcendental function theory, so, today, molecular biologists violently object, when we introduce the concept of “intention” and “mind” into the analysis of a living processes. Yet, living processes are by their very nature *intentional* in character. Complex chains of biochemical events do indeed occur in living organisms, but we cannot infer the characteristics of living processes from the apparent properties of molecules in and of themselves. On the contrary, Vernadsky and Gurwitsch assembled overwhelming empirical proof, that biochemical processes run a characteristically *different* course in living matter than in non-living matter. The interactions of molecules in living matter are modified in a characteristic manner by the action of a higher principle, which imposes a distinct type of continuously developing “curvature” on the entirety of processes occurring within a living organism. As Lyndon LaRouche has demonstrated, that special “curvature,” which distinguishes living processes from non-living ones, is necessarily *Riemannian* in form.

Thus, the interaction of living processes is not basically by “signals” and “information.” There does exist a kind of common language of living processes, waiting to be elaborated by a future biology, but fundamentally different from the so-called “genetic code.” Living processes communicate, in virtue of the fact, that they constitute Riemannian manifolds, participating in a common, anti-entropic development of the biosphere. But only Man can know the principle of life “from the inside”; through the conscious replication of those creative processes of mind, by virtue of which Man has been able, through his active intervention into Nature, to progressively increase the biosphere's potential to sustain human and other forms of life. Thus, the Science of Life begins, with what Malthus and Darwin denied to exist.