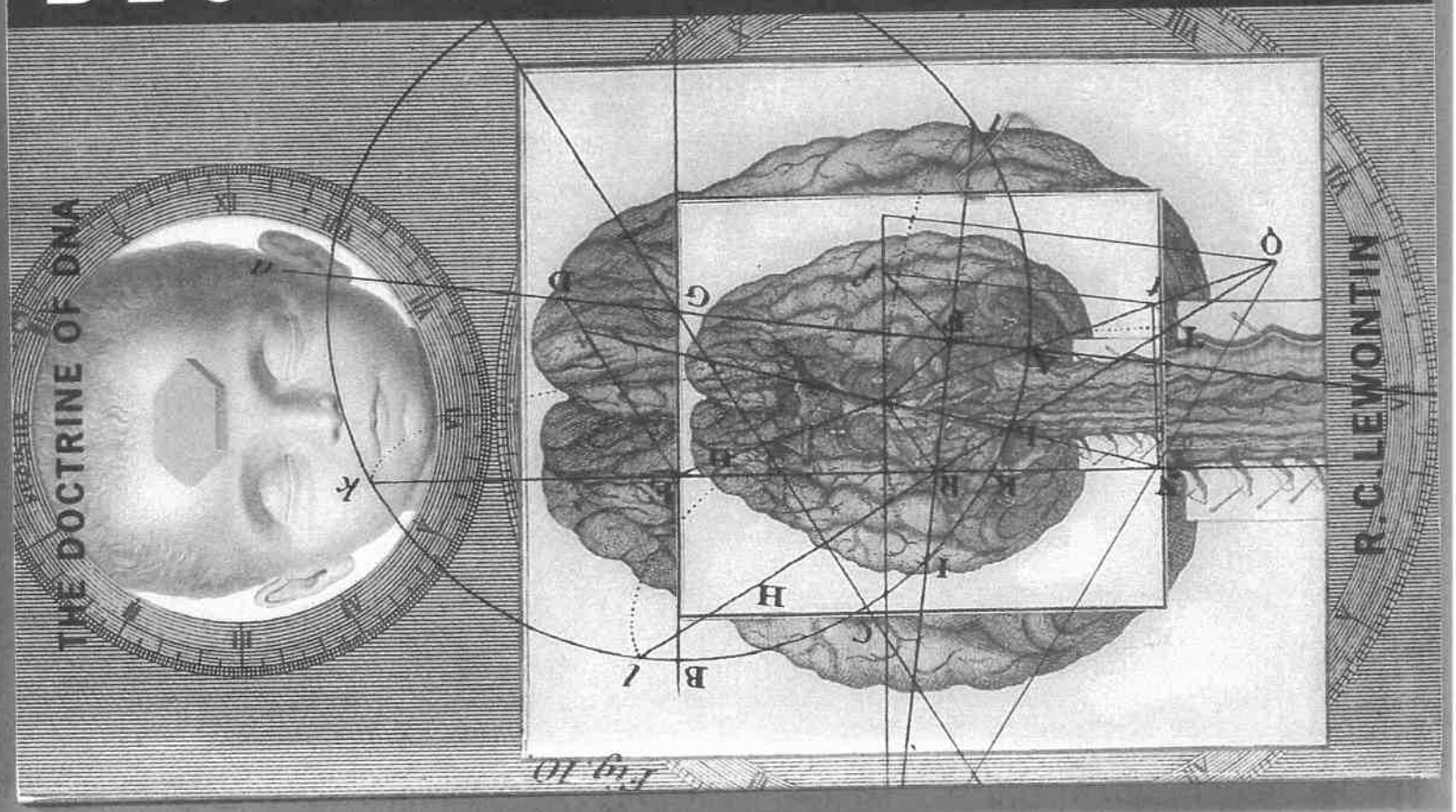
BIOLOGY AS IDEOLOGY



Science is a social institution about which there is a great deal of misunderstanding, even among those who are part of it. We think that science is an institution, a set of methods, a set of people, a great body of knowledge that we call scientific, is somehow apart from the forces that rule our everyday lives and that govern the structure of our society. We think science is objective. Science has brought us all kinds of good things. It has tremendously increased the production of food. It has increased our life expectancy from a mere 45 years at the beginning of the last century to over 70 in rich places like North America. It has put people on the moon and made it possible to sit at home and watch the world go by.

At the same time, science, like other productive activities, like the state, the family, sport, is a social institution completely integrated into and influenced by the structure of all our other social institutions. The problems that science deals with, the ideas that it uses in investigating those problems, even the so-called scientific results that come out of scientific investigation, are all deeply influenced by predispositions that derive from the society in which we live. Scientists do not begin life as scientists, after all, but as social beings immersed in a family, a state, a productive structure, and they view nature through a lens that has been molded by their social experience.

Above that personal level of perception, science is molded by society because it is a human productive activity that takes time and money, and so is guided by and directed by those forces in the world that have control over money and time. Science uses commodities and is part of the process of commodity production. Science uses money. People earn their living by science, and as a consequence the dominant social and economic forces in society determine to a large extent what science does and how it does it. More than that, those forces have the power to appropriate from science ideas that are particularly suited to the maintenance and continued prosperity of the social structures of which they are a part. So other social institutions have an input into

science both in what is done and how it is thought about, and they take from science concepts and ideas that then support their institutions and make them seem legitimate and natural. It is this dual process—on the one hand, of the social influence and control of what scientists do and say, and, on the other hand, the use of what scientists do and say to further support the institutions of society—that is meant when we speak of science as ideology.

Science serves two functions. First, it provides us with new ways of manipulating the material world by producing a set of techniques, practices, and inventions by which new things are produced and by which the quality of our lives is changed. These are the aspects of science to which scientists appeal when they try to get money from governments or when they appear on the front pages of newspapers in their public relations efforts to maintain their prosperity. We read repeatedly about how "science has discovered" something, but more often than not those announcements are hedged with qualifiers. Biologists discover "evidence for" genes that "may one day" lead to "a possible" cure for cancer. While their over-optimistic reports breed a certain cynicism, it is nevertheless true that scientists do actually change the way we confront the material world.

The second function of science, which is sometimes independent and sometimes closely related to the first, is the function of explanation. Even if scientists are not actually changing the material mode of our existence, they are constantly explaining why things are the way they are. It is often said that these theories about the world must be produced in order, ultimately, to change the world through practice. After all, how can we cure cancer unless we understand what causes cancer? How can we increase food production unless we understand the laws of genetics and plant and animal nutrition?

Yet it is remarkable how much important practical science has been quite independent of theory. In Chapter 3, I will consider one of the most famous examples of scientific agricultural change: the introduction of hybrid corn all over the world. Hybrid corn is said to be one of the great triumphs of modern

genetics in action, helping to feed people and increase their well-being. Yet the development of hybrid corn and, indeed, almost all plant and animal breeding as it is actually practiced has been carried out in a way that is completely independent of any scientific theory. Indeed, a great deal of plant and animal breeding has been done in a way indistinguishable from the methods of past centuries before anyone had ever heard of genetics.

The same is true for our attempts to cope with killers like cancer and heart disease. Most cures for cancer involve either removing the growing tumor or destroying it with powerful radiation or chemicals. Virtually none of this progress in cancer therapy has occurred because of a deep understanding of the elementary processes of cell growth and development, although nearly all cancer research, above the purely clinical level, is devoted precisely to understanding the most intimate details of cell biology. Medicine remains, despite all the talk of scientific medicine, essentially an empirical process in which one does what works.

Also in Chapter 3, I will consider the relationship between scientific biology and changes in life expectancy. It is not at all clear that a correct understanding of how the world works is basic to a successful manipulation of the world. But explanations of how the world really works serve another purpose, one in which there has been a remarkable success, irrespective of the practical truth of scientific claims. The purpose is that of *legitimation.*

Regardless of one's political view, everyone must agree that we live in a world in which psychic and material welfare is very unevenly distributed. There are rich people and poor people, sick people and healthy people, people who have control over the conditions of their own lives, work, and time (like professors who are invited to give lectures on the radio and turn them into books) and those who have their tasks assigned to them, who are overseen, who have little or no control over any psychic or material aspect of their lives. There are rich countries and poor

countries. Some races dominate others. Men and women have very unequal social and material power.

Some kind of inequality of status, wealth, health, and power have been characteristic of every known society. That means that in every known society there has been some form of struggle between those who have and those who have not, between those with social power and those deprived of it. The uprising of Blacks in America in the 1960s and 1970s, in which there was vast destruction of property and a radical redistribution of consumer goods, and the armed struggle of Mohawks in Canada to prevent the encroachment of commercial and state power on their lands, are only the most recent events in a long history of violent confrontations between those with status, wealth, and power and those without. Repeated peasant uprisings in Europe in the sixteenth and seventeenth centuries resulted in the wholesale destruction of crops and buildings and the loss of hundreds of thousands of lives. The deeds of peasant rebels like Pugachev and Stenka Razin live in song and story. In the United States just after independence from Britain, the farmers of western Massachusetts, led by Daniel Shays and still in possession of their muskets, occupied the general courts to prevent bankers from obtaining judgments to confiscate farmers' property for debt. The bankers in Boston succeeded in getting Continental troops to put down this rebellion, but all at the cost of considerable social upheaval. It is obviously in the interest of those who have power in society to prevent such violent and destructive conflicts, even if, with the police power of the state, they are sure to win.

As such struggles occur, institutions are created whose function is to forestall violent struggle by convincing people that the society in which they live is just and fair, or if not just and fair then inevitable, and that it is quite useless to resort to violence. These are the institutions of social legitimation. They are just as much a part of social struggle as the rick-burnings and machinery destruction of the Captain Swing riots in Britain in the nineteenth century. But they use very different weapons

— ideological weapons. The battleground is in people's heads, and if the battle is won on that ground then the peace and tranquillity of society are guaranteed.

For almost the entire history of European society since the empire of Charlemagne, the chief institution of social legitimation was the Christian Church. It was by the grace of God that each person had an appointed place in society. Kings ruled *Dei gratia.* Occasionally divine grace could be conferred on a commoner who was ennobled, and grace could be removed. Grace was removed from King Charles I, as Cromwell noted, and the proof was Charles's severed head. Even the most revolutionary of religious leaders pressed the claims of legitimacy for the sake of order. Martin Luther enjoined his flock to obey their lords, and in his famous sermon on marriage he asserted that justice was made for the sake of peace and not peace for the sake of justice. Peace is the ultimate social good, and justice is important only if it subserves peace.

For an institution to explain the world so as to make the world legitimate, it must possess several features. First, the institution as a whole must appear to derive from sources outside of ordinary human social struggle. It must not seem to be the creation of political, economic, or social forces, but to descend into society from a supra-human source. Second, the ideas, pronouncements, rules, and results of the institution's activity must have a validity and a transcendent truth that goes beyond any possibility of human compromise or human error. Its explanations and pronouncements must seem to be true in an absolute sense and to derive somehow from an absolute source. They must be true for all time and all place. And finally, the institution must have a certain mystical and veiled quality so that its innermost operation is not completely transparent to everyone. It must have an esoteric language, which needs to be explained to the ordinary person by those who are especially knowledgeable and who can intervene between everyday life and mysterious sources of understanding and knowledge.

The Christian Church or indeed any revealed religion fits

these requirements perfectly, and so religion has been an ideal institution for legitimating society. If only people with special grace, whether they be priests, pastors, or ordinary citizens, are in direct contact with the divine inspiration through revelations, then we must depend upon them completely for an understanding of what has been divinely decreed.

But this description also fits science and has made it possible for science to replace religion as the chief legitimating force in modern society. Science claims a method that is objective and nonpolitical, true for all time. Scientists truly believe that except for the unwanted intrusions of ignorant politicians, science is above the social fray. Theodosius Dobzhansky, a famous scientist who was a refugee from the Bolshevik Revolution and who detested the Bolsheviks, devoted a great deal of energy to pointing out the serious scientific errors that were being made in the Soviet Union in biology and genetics as a consequence of the unorthodox biological doctrines of T.D. Lysenko. It was pointed out to him that, given his own political convictions, he should not carry on that campaign against Lysenko. After all, he believed that sooner or later a global conflict would occur with the United States and the Soviet Union on opposite sides, and he also believed that Lysenko's false scientific doctrines were severely weakening Soviet agricultural production. Why did he then not simply remain quiet about Lysenko's errors so that the Soviet Union would be weakened and compromised in the conflict that was to come? His answer was that his obligation to speak the truth about science was superior to all other obligations and that a scientist must never allow a political consideration to prevent him from saying what he believes to be true.

Not only the methods and institutions of science are said to be above ordinary human relations but, of course, the product of science is claimed to be a kind of universal truth. The secrets of nature are unlocked. Once the truth about nature is revealed, one must accept the facts of life. When science speaks, let no dog bark. Finally, science speaks in mysterious words. No one except an expert can understand what scientists say and do, and we

require the mediation of special people — science journalists, for example, or professors who speak on the radio — to explain the mysteries of nature because otherwise there is nothing but indecipherable formulas. Nor can one scientist always understand the formulas of another. Once, when Sir Solly Zuckerman, the famous English zoologist, was asked what he did when he read a scientific paper and came across mathematical formulas, he said, "I hum them."

"Despite its claims to be above society," science, like the Church before it, is a supremely social institution, reflecting and reinforcing the dominant values and views of society at each historical epoch. Sometimes the source in social experience of a scientific theory and the way in which that scientific theory is a direct translation of social experience are completely evident, even at a detailed level. The most famous case is Darwin's theory of evolution by natural selection. No scientist doubts that the organisms on earth today have evolved over billions of years from organisms that were very unlike them and that nearly all types of organisms have long since gone extinct. Moreover, we know this to be a natural process resulting from the differential survivorship of different forms. In this sense, we all accept Darwinism as true.

But Darwin's explanation for that evolution is another matter. He claimed that there was a universal struggle for existence because more organisms were born than could survive and reproduce, and that in the course of that struggle for existence, those organisms who were more efficient, better designed, cleverer, and generally better built for the struggle would leave more offspring than the inferior kinds. As a consequence of this victory in the struggle for existence, evolutionary change occurred.

Yet Darwin himself was conscious of the source of his ideas about the struggle for existence. He claimed that the idea for evolution by natural selection occurred to him after reading the famous "Essay on Population" by Thomas Malthus, a late-eighteenth-century parson and economist. The essay was an argument against the old English Poor Law, which Malthus

thought too liberal, and in favor of a much stricter control of the poor so they would not breed and create social unrest. In fact, Darwin's whole theory of evolution by natural selection bears an uncanny resemblance to the political economic theory of early capitalism as developed by the Scottish economists. Darwin had some knowledge of the economic survival of the fittest because he earned his living from investment in shares he followed daily in the newspapers. What Darwin did was take early-nineteenth-century *political* economy and expand it to include all of *natural* economy. Moreover, he developed a theory of sexual selection in evolution (about which more will be said in Chapter 4), in which the chief force is the competition among males to be more appealing to discriminating females. This theory was meant to explain why male animals often display bright colors or complex mating dances. It is not clear that Darwin was conscious of how similar his view of sexual selection was to the standard Victorian view of the relationship between middle-class males and females. In reading Darwin's theory, one can see the proper young lady seated on her sofa while the swain on his knees before her begs for her hand, having already told her father how many hundreds a year he has in income.

Most of the ideological influence from society that permeates science is a great deal more subtle. It comes in the form of basic assumptions of which scientists themselves are usually not aware yet which have profound effect on the forms of explanations and which, in turn, serve to reinforce the social attitudes that gave rise to those assumptions in the first place. One of the assumptions is the relation of individual to collectivity, the famous problem of part and whole. Before the eighteenth century, European society placed little or no emphasis on the importance of the individual. Rather, the activity of people was determined for the most part by the social class into which they were born, and individuals confronted each other as representatives of their social group. In a dispute, for example, between a priest and a merchant over a commercial matter, the priest would make his

case in an ecclesiastical court and the merchant in the court of his own lord rather than both being subject to the same judgment. Individuals were seen not as the causes of social arrangements but as their consequence.

Moreover, people were not free to move in the economic hierarchy. Peasants and lords alike had mutual obligations and were bound to each other by those obligations. There was no freely moving competitive labor force where each person had the power to sell his or her labor power in a labor market. These relations made it quite impossible to develop the kind of productive capitalism that marks our own era, in which freedom for individuals to move from place to place, from task to task, from status to status, to confront each other sometimes as tenants, sometimes as producers and sometimes as consumers, is an absolute necessity. For example, serfdom had to be abolished in Russia in the middle of the nineteenth century because there was a shortage of factory labor and serfs were legally prohibited from being sent to factories. Sometimes, in fact, serf owners illegally shipped their peasants into factories, and serfs petitioned the czar for relief.

The developing science of the Middle Ages and Renaissance was characterized by seeing all of nature as a kind of indissoluble whole. Living and dead could be transformed one into the other, provided one knew the mystical formula. Nature could not be understood by taking it into pieces because by doing so one destroyed what was essential to it. Alexander Pope said it was "like following life through creatures you dissect. /You lose it in the moment you detect." Just as social organization was seen as an indissoluble whole, so was nature.

With the change in social organization that was wrought by developing industrial capitalism, a whole new view of society has arisen, one in which the individual is primary and independent, a kind of autonomous social atom that can move from place to place and role to role. Society is now thought to be the consequence, not the cause, of individual properties. It is individuals who make society. Modern economics is grounded in the

theory of consumer preference. Individual autonomous firms compete with each other and replace each other. Individuals have power over their own bodies and labor power, in what MacPherson called "possessive individualism."[1] This atomized society is matched by a new view of nature, the reductionist view. Now it is believed that the whole is to be understood *only* by taking it into pieces, that the individual bits and pieces, the atoms, molecules, cells, and genes, are the causes of the properties of the whole objects and must be separately studied if we are to understand complex nature. Darwin's theory of evolution was a theory of the differential reproductive rate of individuals, and all of the phenomena of evolution were to be understood at this individual causal level. All of modern biology and, indeed, all of modern science takes as its informing metaphor the clock mechanism described by René Descartes in Part V of his *Discourses*. Descartes, being religious, excluded the human soul from the *bête machine*, but that very soon became included as well to make the *homme machine* of the present view. Modern science sees the world, both living and dead, as a large and complicated system of gears and levers.

A second feature of the transformation of scientific views has been the clear distinction between causes and effects. Things are supposed to be either one or the other. Again, in Darwin's view, organisms were acted upon by the environment; they were the passive objects and the external world was the active subject. This alienation of the organism from its outside world means that the outside world has its own laws that are independent of the organisms and so cannot be changed by those organisms. Organisms find the world as it is, and they must either adapt or die. "Nature — love it or leave it." It is the natural analog of the old saw that you can't fight city hall. As I shall show in Chapter 5, this is an impoverished and incorrect view of the actual relationship between organisms and the world they occupy, a world that living organisms by and large *create* by their own living activities.

So, the ideology of modern science, including modern

biology, makes the atom or individual the causal source of all the properties of larger collections. It prescribes a way of studying the world, which is to cut it up into the individual bits that cause it and to study the properties of these isolated bits. It breaks the world down into independent autonomous domains, the internal and the external. Causes are either internal or external, and there is no mutual dependency between them.

For biology, this world view has resulted in a particular picture of organisms and their total life activity. Living beings are seen as being determined by internal factors, the genes. Our genes and the DNA molecules that make them up are the modern form of grace, and in this view we will understand what we are when we know what our genes are made of. The world outside us poses certain problems, which we do not create but only experience as objects. The problems are to find a mate, to find food, to win out in competition over others, to acquire a large part of the world resources as our own, and if we have the right kinds of genes we will be able to solve the problems and leave more offspring. So in this view, it is really our genes that are propagating themselves through us. We are only their instruments, their temporary vehicles through which the self-replicating molecules that make us up either succeed or fail to spread through the world. In the words of Richard Dawkins, one of the leading proponents of this biological view, we are "lumbering robots" whose genes "created us body and mind."

Just as at one level genes determine individuals, so at another level it is individuals who determine collectivities. If we want to understand why an ant colony has a particular division of tasks or a flock of birds flies in a particular way, we need only look at the individual ants and individual birds, because the behavior of the group is a consequence of the behaviors of the individual organisms; that behavior is in turn determined by genes. For human beings that means that the structure of our society is nothing but a result of the collection of individual behaviors. If our country goes to war, we are told it is because we feel aggressive as individuals. If we live in a competitive entrepreneurial

society, it is because, in this view, each one of us, as an individual, has a drive to be competitive and entrepreneurial.

Genes make individuals and individuals make society, and so genes make society. If one society is different from another, that is because the genes of the individuals in one society are different from those in another. Different races are thought to be genetically different in how aggressive or creative or musical they are. Indeed, culture as a whole is seen as made up of little bits and pieces of cultural bric-a-brac, what some sociobiologists call *culturgens*. In this view, a culture is a sack of bits and pieces such as aesthetic preferences, mating preferences, work and leisure preferences. Dump out the sack and culture will be displayed before you. Thus, the hierarchy is complete. Genes make individuals, individuals have particular preferences and behaviors, the collection of preferences and behaviors makes a culture, and so genes make culture. That is why molecular biologists urge us to spend as much money as necessary to discover the sequence of the DNA of a human being. They say that when we know the sequence of the molecule that makes up all our genes, we will know what it is to be human. When we know what our DNA looks like, we will know why some of us are rich and some poor, some healthy and some sick, some powerful and some weak. We will also know why some societies are powerful and rich and others are weak and poor, why one nation, one sex, one race dominates another. Indeed, we will know why there is such a thing as a science of biology, which itself is one of the bits and pieces of culture lying at the bottom of the sack.

We have become so used to the atomistic machine view of the world that originated with Descartes that we have forgotten that it is a metaphor. We no longer think, as Descartes did, that the world is *like* a clock. We think it *is* a clock. We cannot imagine an alternative view unless it be one that goes back to a prescientific era. For those who are dissatisfied with the modern world and dislike the artifacts of science, the pollution, the noise, the industrial world, the overmechanized medical care that seems

not to make us feel better much of the time — for people who want to go back to nature and the good old ways, the response has been to return to a description of the world as an indissoluble whole that we murder to dissect. For them, there is no use in trying to break anything down into parts because we inevitably lose the essence, and the best we can do is treat the world holistically.

But this holistic world view is untenable. It is simply another form of mysticism and does not make it possible to manipulate the world for our own benefit. An obscurantist holism has been tried and it has failed. The world is not one huge organism that regulates itself to some good end as the believers in the Gaia hypothesis believe. While in some theoretical sense "the trembling of a flower is felt on the farthest star," in practice my gardening has no effect on the orbit of Neptune because the force of gravitation is extremely weak and falls off very rapidly with distance. So there is clearly truth in the belief that the world can be broken up into independent parts. But that is not a universal direction for the study of all nature. A lot of nature, as we shall see, cannot be broken up into independent parts to be studied in isolation, and it is pure ideology to suppose that it can.

The problem is to construct a third view, one that sees the entire world neither as an indissoluble whole nor with the equally incorrect, but currently dominant, view that at every level the world is made up of bits and pieces that can be isolated and that have properties that can be studied in isolation. Both ideologies, one that mirrors the premodern feudal social world, and the other that mirrors the modern competitive individualist entrepreneurial one, prevent us from seeing the full richness of interaction in nature. In the end, they prevent a rich understanding of nature and prevent us from solving the problems to which science is supposed to apply itself.

In the ensuing chapters, we will look in some detail at particular manifestations of the modern scientific ideology and the false paths down which it has led us. We will consider how biological determinism has been used to explain and justify

inequalities within and between societies and to claim that those inequalities can never be changed. We will see how a theory of human nature has been developed using Darwin's theory of evolution by natural selection to claim that social organization is also unchangeable because it is natural. We will see how problems of health and disease have been located within the individual so that the individual becomes a problem for society to cope with rather than society becoming a problem for the individual. And we will see how simple economic relationships masquerading as facts of nature can drive the entire direction of biological research and technology.

While these examples are meant to disillusion the reader about the objectivity and vision of transcendent truth claimed by scientists, they are not intended to be antiscientific or to suggest that we should give up science in favor of, say, astrology or thinking beautiful thoughts. Rather, they are meant to acquaint the reader with "the truth about science as a social activity" and to promote a reasonable skepticism about the sweeping claims that modern science makes to an understanding of human existence. There is a difference between skepticism and cynicism, for the former can lead to action and the latter only to passivity. So these pages have a political end, too, which is to encourage the readers not to leave science to the experts, not to be mystified by it, but to demand a sophisticated scientific understanding in which everyone can share.

ALL IN THE GENES?