To Know the Future

B. F. Skinner
Harvard University

Bertrand Russell once said that one of the two great aims of his life was to discover what could be known. I could say that one of mine has been to discover what it means to be a knower. For Russell, the world lay waiting to be known; whether or not he would know it depended on him. It is possible, however, that action is initiated in the other direction, that the world makes itself known. Genetics calls for such a reversal of direction. We say that a mother has a baby; it is her baby and there has never been anything quite like it before. Nevertheless, she is not responsible for any of its features. She gave it half its genes but she got them from her own father and mothers. (If there were variations, they were accidents.) If we knew as much about the origin of behavior as we know about the origin of species, we might say the same of those who discover what can be known.

Knowledge is imposed upon the knower by three kinds of variation and selection. The first, natural selection, accounts for the behavior of species, for what animals, nonhuman or human, must know in order to survive. The second accounts for what individuals come to know during their lifetimes. It is not as well understood as natural selection, but it is much easier to study experimentally and we have learned a great deal about it. The third, a quite different kind, accounts for the evolution of the social environments we call cultures, which enable the individual to profit from what others have come to know during their lifetimes. Russell called what is known through contact with the world "knowledge by acquaintance" and what is learned from others "knowledge by description."

Most of what scholars and scientists

know is knowledge by description. Only a relatively small part of what Russell knew about philosophy and mathematics was knowledge by acquaintance. Samuel Butler once said that a hen is simply an egg's way of making another egg. In modern terms, the organism is the servant of the gene. We could say that Russell was one of the ways in which traditions of philosophy and mathematics made more of those traditions. It is easier to say it for the hen than for Russell because we know more about the origin of species than about the origin of behavior (and more about chromosomes and genes, complex as they are, than about brains). Butler was simply reversing the view that an egg is the way a hen makes another hen, but there is a possibly endless succession of hen, egg, hen, egg, hen, as there is a succession of person, tradition, person, tradition, person. The individual is essential; without a hen, there would be no more eggs and without philosophers no more philosophy, but the enduring things are the genes and the tradition.

It is also easier to accept the point for the hen than for Russell because it reduces the individual to a mere place in which something is happening—in the hen the survival, and possibly an accidental contribution to the evolution, of a species, and in Russell the survival, and possibly an accidental contribution to the evolution, of philosophy and mathematics. We should like to think that Russell's contribution was more than a variation arising from some accidental acquaintance with the world. We think of ourselves as we think of Russell, and we want to believe that what he did started in him, as we want to believe that what we do starts in us, and that he created something for which he should be given credit. We may agree that evolution replaces creation in explaining the origin of species, but we cling to the belief that we were born in the image of a creative god.

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It is not hard to imagine how a god might create a world step by step according to Genesis, starting with the two great sources of light, the sun and the moon, moving on to the seas and the land, and then to plants and fruits, and finally to "creatures," among them women and men. That is how we might go about it if we had the power. It is much harder to imagine creating, for example, a Big Bang from which everything followed according to inexorable law—the galaxies, suns, and planets, and among them our galaxy, sun, and planet, the last with just the right conditions for the origin of life and the evolution of more and more complex living things. That is not the way we tend to create things, yet it is what cosmology, biology, and biochemistry are telling us about the origin of our world.

It has been thought that people were creative because they had minds. Mind is "beyond physics" (metaphysical) and therefore beyond physical limitations. Philosophers and psychologists have looked at their minds through introspection for more than two thousand years but have never quite agreed on what they have seen. Many psychologists have abandoned introspection and have turned instead to theories about the mind. It would not be hard to construct a theory that would explain creative action, of course, but theories need confirmation and psychologists have turned for that to brain science. The mind, it appears, is simply "what the brain does," and that can be observed objectively. But the brain is only one part of the body, and if the mind is what the brain does, it is only what a part of the body does. What the whole body does is explained by those three types of variation and selection. As a structure that obeys the laws of physics and chemistry, the brain is not a promising candidate for creator. (We may hope to find a creative feature in it so long as we do not fully understand it, but it is in the nature of science that every new discovery reduces the chances that something we hope to find is still there.)

It is possible that we believe so strongly that we initiate our behavior (and are therefore responsible for it) because we

are aware of what we are doing but forget, if we ever knew, the history of variation and selection responsible for our doing it. It is more likely, however, that we believe it because we have so often been told. We are told in order to justify the use of rewards and punishments. We are held responsible and punished when we hurt people or break the laws of governments; our responsibility is acknowledged when we are rewarded for what we do—when, for example, we are paid by those to whom we hand over things or for whom we work; and we are threatened with punishment when we violate the laws of religions and promised rewards when we obey them. We are punished and rewarded because the genetic, personal, and cultural histories responsible for what we do are out of reach. (The simple rewards and punishments of daily life do not raise any question of responsibility. If something we eat is delicious, we eat it again; if it is tasteless, we do not. The food is responsible for our subsequent behavior. Only when governments, industries, and religions impose consequences on our behavior are we, rather than the consequences, held responsible. Those who impose them then escape responsibility.)

To say that a person is simply a place in which something happens seems even more threatening when it raises questions about what we are likely to do rather than what we have done. A planned world was one of the casualties of evolutionary theory, and the belief that a life or a culture has evolved according to a plan is suffering the same fate. Too much of what will happen depends upon unforeseen variations and adventitious contingencies of selection. The future is largely a matter of chance, and that is particularly ominous when we are speaking of the future of the world. The overcrowded, impoverished, and polluted future that now threatens us could scarcely have been planned. It appears to be due instead to an unavoidable fault in the process of variation and selection, which can prepare a species, person, or culture only for a future that resembles the selecting past. In a changed environment, a species may

perish; behavior acquired in one setting may not be useful in another; governmental, industrial, and religious practices that flourish in one state of the world may not function well in a different one. At one time in the history of the species, for example, a strong inclination to behave sexually had survival value, not only for the species but for any culture that encouraged the inclination; it is now overpopulating the world. A strong tendency to accumulate more than one needed had survival value if it helped to bridge serious shortages; it now means waste and pollution. Religious beliefs that once supplied answers to difficult questions about life and death now stand in the way of answers that would be of more help in thinking about the future.

We know the future almost wholly from what science tells us. We may suffer overcrowding, shortages, and pollution, but they are the present; they are bits of the future that we have already reached. Only through science do we know how serious they will eventually become, and only through science are we aware of current dangers such as those of solar and nuclear radiation. But science is almost wholly known by description—indeed, the less reliable kind called prediction. A basic difference is therefore crucial.

We acquire knowledge by acquaintance when we act upon the world, and we possess it as a tendency to act. We acquire knowledge by description when we are told about the world and we possess it only as a tendency to repeat what we are told, either to ourselves or others. Another step must be taken before we act. We see such a difference when we compare what we have read or heard about a city (knowledge by description) with what we see, hear, smell, feel, and taste when we are in it (knowledge by acquaintance). The difference in how well we get about in the city is even greater. What, then, can we do about the future if we know it only by description?

It would be inconsistent to ask what we *should* do. All we can say is what we are likely to do, and that will depend on our further genetic and cultural evolution. There will not be time for further

natural selection; we cannot keep pace with current changes by evolving as a species that withstands strong radiation or tolerates heavily polluted air and water. The evolution of new cultural practices is a better possibility and, in fact, there are some promising signs. Though we cannot initiate action, we can at least watch.

We see the continuing evolution of the culture we call science. Scientists are discovering more and more about the future consequences of what we are doing. We see teachers, writers, and the media making what science discovers more and more widely known. We see governments punishing those who waste resources, pollute the environment, and, in one instance at least, have too many children. In doing so, they may seem to be constructing surrogates of the future; the punitive consequences they impose should act as the future would act if it were here now. Until recently, however, a government could not restrict the use of resources that were not already in short supply without risking its own future. An industry could not manufacture a product that would reduce a merely predicted pollution of the environment but at the cost of some inconvenience without losing its market. So long as there seemed to be room in the world for everyone, religions could not change what they had to say about birth and death without risking their credibility.

There has been a change, however, and nothing like it may ever have occurred before. It is a change in "culture" as distinct from government, industry, and religion. It consists of the dissemination of what is known about the future (necessarily by description) to large numbers of people and the organization of protests against governments, industries, and religions that do not adjust their practices to what is known. Giving those institutions current reasons to change their practices could be said to convert knowledge of the future by description into knowledge by acquaintance. If what can be known about the future thus becomes part of the history of enough people, the earth may last a longer time.

It may be said that this is a discouraging view of human behavior and that we shall be more likely to do something about the future if we continue to believe that our destiny is in our hands. That belief has survived for many centuries and has led to remarkable achievements,

but the achievements were only the immediate consequences of what was done. We now know that other consequences have followed and that they are threatening our future. What we have done with our destiny may not be a testament we wish to leave to the world.