

# Books: A Double Review

## *The Coming of the Golden Age: A View of the End of Progress*

by Gunther S. Stent

The Natural History Press, Garden City, New York . . . . . \$4.95

Reviewed by Richard E. Dickerson  
Professor of physical chemistry

Reviewed by Max Delbruck  
Professor of biology

Gunther Stent's *The Coming of the Golden Age: A View of the End of Progress* is really two independent books between one set of covers. The first four chapters, entitled "The Rise and Fall of Molecular Genetics," are a personalized view of a field of science in which Stent has been an important participant. He divides its history into a Classic Period, during which a gene was an abstract concept rather than a molecule; a Romantic Period, when even physicists speculated that the laws of chemistry and physics might be insufficient to account for the gene; a Dogmatic Period dating from the Watson-Crick DNA double helix; and the current Academic Period in which molecular genetics has become both respectable and dull, and the romantics have moved on to look for new frontiers. Stent views himself as a frustrated romantic who has lately realized that the number of new frontiers is strictly limited. As with Watson's *Double Helix*, I enjoyed these chapters and learned from them. Whether what I learned was correct in nuance as well as in fact, I leave to more competent judges.

The last three chapters, "The Rise and Fall of Faustian Man," are the real heart of the book. They are an elegy for the decline of progress, and for Faustian man, who is its architect. Adopting the imagery of Oswald Spengler and Friedrich Nietzsche, Stent sees Faustian man as having a driving "will to power," or the desire to manipulate the external world successfully for his own ends. Such a man, in Stent's vision, is the hero of the drama of history.

In complete contrast to Faustian man stand the beat generation of a few years ago and the present hippie movement. Seen in a narrow sense, Stent's book is

*Continued on next page*

"A new age is dawning: everybody seems to have noticed it . . . I consecrate my essay to the Golden Age whose onset I happen to envisage . . . The arts and sciences will have reached the end of their long road."

The first part of this book details the history of molecular genetics, a field in which the author is a professional. Here his account is as knowledgeable and incisive as any that could be written today. It is lively and untechnical. A defect perhaps is its overemphasis of the fascination with the paradox claimed to have obsessed the members of the early phage group. I do not think that any member of that group *believed* that new laws of physics would be discovered in the unraveling of the riddles of genetics. Only a few of them were even motivated by contemplating such an outcome as an intriguing possibility. Otherwise, the characterization of the four periods (the Classic, the Romantic, the Dogmatic, and the Academic) appears to me germane to the subject, and witty, especially a picture of the Nobel ceremony in 1962 with the caption "Solemn Inauguration of the Academic Period."

Stent's comments on the great remaining paradox of biology, the relation of mind to matter, are as intelligent and as unsatisfactory as any that I have read. And no wonder. Where everybody else, including Niels Bohr, fails, why should not he, too, fail to enlighten us? It is important, though, to remain disquieted by this problem.

The second part of the book, entitled "The Rise and Fall of Faustian Man," is much more fascinating to me and probably to most readers. The author asserts that universal progress is a parameter of human society which can be at least crudely measured; that it has been

---

*In 1948 Gunther Stent, who had just finished his graduate work at the University of Illinois, arrived at Caltech as a research fellow in biology. He joined the Institute's Phage Group, organized only a year earlier to work under the direction of Caltech biologist Max Delbruck. Stent left Caltech in 1950 to do research in Copenhagen and Paris, and in 1952 went to the University of California at Berkeley, where he is now a professor of molecular biology and of bacteriology.*

---

accelerating over many millennia; that its occurrence had not been noticed, and that therefore the concept of progress had not been formed till about 200 years ago when the rate of progress became sufficiently fast to become a matter of personal experience during a lifetime; that, considering the psychic and material dynamics involved, there must be some upper limit to progress; and that this upper limit will be approached within a few decades. These points are presented persuasively and I, for one, am not inclined to contest them.

What follows? In the view of the author there follows, and is near at hand, the end of the arts and sciences. In the arts this end is clearly discernible by the constant acceleration of the rate of change of styles and their progressive lack of semantic function, tending to the extreme in which sense experiences are considered the only truths and the

*Continued on next page*

## Books

### Delbruck . . . *continued*

function of the artist consists solely in adding to the store of unique experiences. In science, Stent asserts that the vanishing of all threats to human survival (hunger, cold, and disease) will make further scientific research ever decreasingly useful. He considers that chemistry and biology have now, or will soon have, no deep problems left; that physics, though it is open-ended, is limited in practice because of expense and feasibility and because it is becoming progressively less clear what it actually is that one is ultimately trying to find out; that mathematics is open-ended ever since Gödel's theorem, but that one may doubt whether the human brain was designed by evolution to handle the problems of future mathematics. On the whole he believes that with further abstraction there will occur a loss of psychic meaning of the insights gained and hence a weakening of the intensity of interest in probing further.

What follows? In the view of the author there follows, if we are lucky enough to avoid war, the Golden Age—a brave new world clearly heralded by beat philosophy and hippie movement, somewhat similar to the Polynesian culture, a race without will to power, without Faustian aspirations, free from toil and grief and with a great deal of synthetic happiness, a culture involving erosion of the reality principle and with an autistic feeling of oneness with the universe. "Millennia of doing arts and sciences will finally transform the tragicomedy of life into a happening."

A book of this kind, to bolster its vision, must necessarily be very sweeping in its generalizations and extrapolations. Thus, the Berkeley scene is taken to stand for student unrest the world over, and U.S. affluence is assumed to spread across the globe in rather short order. However, I do not wish to criticize details. I think it is a bold and important book. I think it should and will be read by many people, young and old. I think it should be discussed on the basis of reading it rather than upon reading a review of it. And I think more people with encompassing interests who have thought seriously about human affairs should write their books regarding the coming ages.

### Dickerson . . . *continued*

a diatribe against the hippie culture that has sprung up outside his laboratory. But Stent views the hippies, with great regret, as the wave of the future, which he ironically calls the "Golden Age." The outright rejection of the accumulation of goods as ends in themselves, a withdrawal from the world rather than the successful manipulation of it, and a turning away from the exercise of power—all are signs of the decay of Faustian man, and the onset of what Stent calls in his final chapter "The Road to Polynesia."

Progress, according to Stent, is self-limiting and contains a negative feedback that insures its own demise. The will to power thrives in times of adversity, for "the higher the degree of economic insecurity extant, the greater the power over external events needed by the individual for his survival." But the successes achieved by Faustian man make it less probable that he will transmit his will to power to his descendants.

As Stent says:

In Western society, a decline of Faustian man set in the nineteenth century, mainly brought about by the economic fruits of the Industrial Revolution and the social consequences of the rise of liberal democracies in Europe and America. The ever-mounting degree of security provided to the citizens of bourgeois societies then began a gradual erosion of the intensity with which the environment of child rearing engendered the will to power in the adult.

Progress, which began before the rise of civilization, and which has been accelerating at an exponential rate since the beginning of the Industrial Revolution, will soon level off and stop, principally because it has succeeded so well that it has sapped the will to continue. The few Faustian men left (and Stent rejoices that he will not be one of them) will provide the minimal effort to keep the wheels of the economy turning so that the masses can spend their lives on one long trip.

In an essay criticizing Arnold Toynbee, the Dutch historian Pieter Geyl compares history to a thick bouillabaisse, full of all manner of things, from which each

historian dips what he needs. Toynbee, says Geyl, so astonishes you with what he produces that you never notice what is left behind in the cauldron. Stent's argument is subject to the same criticism, for Stent totally overlooks the one time in human history when a revolution of comparable magnitude to our present Industrial-Technical-Scientific Revolution took place. This was the Neolithic Revolution, which occurred in the Middle East around 9000 B.C. Before that time, *Homo sapiens* lived in small roving bands of hunters and gatherers. After the discovery of agriculture and the domestication of animals, the economic basis of human life became farming, and remained so for over 10,000 years. Both the Neolithic and the Scientific Revolutions produced (or are producing) massive changes in the pattern of life for all of mankind. In contrast, the changes in life style between these two revolutions have been confined to a minority of the population. As late as 1700, the great majority of the human species, even in Europe, was still living a peasant farming existence that would not have seemed strange to an early neolithic farmer. All of the wonders of urban, literate civilization rested on a technical and economic base which had changed little in ten millennia.

Perhaps the idea of "progress," which Stent claims has been used only during our latter-day Scientific Revolution of the past 200 years, is in reality only applicable during the explosive growth of such transition periods. After the first spectrum of domesticated plants and animals, farm technology stabilized. Relatively few *new* species were domesticated between the Neolithic Revolution and the Scientific, and improvements in technology were largely limited to finding better ways of turning the soil over by animal power. If a neolithic Farm Bureau agent were to define progress as an increasing mastery over new species of plants and animals, then he would have to admit that progress quickly came to a halt after the initial rapid successes with various grasses, beans, gourds, dog, cat, sheep, goat, cow, water buffalo, elephant, llama, duck, chicken, pigeon, cormorant, onager, and horse. (The camel represents much later

progress.) Perhaps in a few centuries, when our own revolution can be seen in perspective, our current criteria of progress will appear as provincial as those of our neolithic stockbreeder.

If I were a satirist, I could write the chronicle of a pre-neolithic scholar of hunting, who devoted his life to a study of the habits of the species on whom he depended for his existence (called, perhaps, Nimrodean man after Nimrod the hunter, Noah's great-grandson), and who gloried in the heroism of the chase. But as his quest succeeds, and his understanding of his quarry reaches completion, he becomes dismayed to see other people accept his findings without using them as he had intended. Instead of cultivating the noble virtues of Nimrodean man, and inculcating the will to hunt in their offspring, these degenerates pen their onetime prey in ignominious captivity, slaughtering them without personal danger when the need arises. Instead of exercising the intelligence and initiative needed to track down edible plants, they first destroy the natural ecology, and then strew seed about, to be collected later in relative idleness. Woe to the coming generations, our prophet cries, when the will to hunt is gone. Nimrodean man is no more, and the children of the new affluence waste their newfound leisure in self-gratification and in withdrawal from the world of reality!

Of course, no such thing occurred. The Neolithic Revolution *did* bring economic affluence. Rather than each man having a full-time struggle for bare subsistence, one man or one family could produce enough to keep many people alive. But this economic surplus was not frittered away in sedentary navel-gazing. The surplus that each farmer accumulated enabled him to bargain for things that he could not produce (and therefore formerly had to do without). This in turn made it possible for other people to exist without farming; by making what others wanted and would bargain for. The full-time professional artisan arose, and the roots of technology began. From this economic surplus came urban, literate civilization, and all the advantages that are customarily ascribed to it.

Participants in a movement are poor prophets. The art of writing would have seemed of marginal use to our imagined frustrated scholar of hunting. Metallurgy and better weapons he would have appreciated, but he would never have seen how they could be developed in a hunting culture in which time off from the hunt today meant potential starvation tomorrow. One might as well try to go to the moon.

Stent sees the hippie movement, with a loss of the will to control the environment, as the inevitable response to a release from economic pressures. We are certainly being freed from such pressures, in a way that has not been so dramatic since we first learned to grow crops and keep cattle. But Stent's view of what we will do with our new leisure is open to serious challenge. There were probably a few converted hunters in 9000 B.C. who were content to scratch the soil, harvest the crop, and spend the rest of their time in a hammock. Such marginal cultures exist today, and they might fairly be called the descendants of the hippies of the Neolithic Revolution. But the bulk of mankind did not make this response. Stent's prime difficulty is that he cannot see, or cannot even imagine, what *Homo sapiens* might do with the new freedom following the eventual working-out of the Scientific Revolution.

I cannot believe that Faustian man is merely the product of economic determinism. I prefer to believe that *Homo sapiens* is curious in an intelligent way because intelligence and curiosity have a high survival value for the species, and always have had, and that the process of natural selection has favored those groups and societies that have fostered curiosity, intelligence, and initiative. Someone from our time might say to our disgruntled neolithic scholar: "If the hunt has developed the highest qualities of man, think how those qualities could grow and flourish if man were relieved of the necessity of fighting every day for survival." And today, we can say to Stent: "If Faustian man has achieved so much in a world of strictly limited energy sources and unknown forces, what might he not attain if these limits were removed?" People often

cannot see the challenge of new circumstances. Stent himself makes the very perceptive observations that the idea of progress arises only when changes in life style begin to occur so rapidly that they can be noticed in the span of a single generation, and furthermore that alienation and withdrawal occur when this change becomes too rapid to be adjusted to and accepted in a single lifetime. He meant his comments to apply to the beats and hippies, but like so many of our comments, they tell us as much about the speaker as the subject.

To buttress his case for the decline of progress, Stent devotes one chapter to "The End of the Arts and Sciences." Here he argues that there has been a steady and progressive loosening of the rules of style and composition from ancient times in music, art, drama, and architecture until we have now reached such absolute formlessness and anarchy that no further change is possible. It is tempting to the ego of the reviewer to embark on a detailed analysis of his arguments, but space forbids this. Stent does not like modern art, modern music (which he equates with Schönberg and John Cage; jazz and the return to modal harmonies of current rock music are ignored), modern drama (which he equates with the theater of the absurd), or modern architecture; and he generalizes this personal dislike into a statement of the current meaninglessness of the arts. In science, he manages to have it both ways simultaneously: Chemistry and biology are at a dead end because their subject matter is finite; physics is at a dead end because its subject matter is infinite. And at least in the discussion of the history of music, the bouillabaisse syndrome is much in evidence. This chapter is totally unconvincing, and hence weakens the edifice built up in the previous and subsequent chapters.

This book is highly recommended to those who love a good fight, or who read a book with red pencil in hand. One only wishes for wider margins. It would be an admirable focus for a graduate or undergraduate discussion group, and is to be commended for its clear and enjoyable style. But whatever else you do, do not take it as gospel.