

Jacob Bronowski: A Retrospective

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Jacob Bronowski: A Retrospective

Charles S. Shapiro

Abstract—It is about 10 years since the death of Jacob Bronowski, an appropriate time to reflect on the man and his work. Bronowski's influence permeates Western civilization and is becoming part of our folk culture. We can best celebrate his life by examining his intellectual pursuits and carrying them forward.

I. INTRODUCTION

The decade following the death of Jacob Bronowski brings us to a time for reflection on the man and his work. Bronowski's influence is manifesting itself today throughout Western civilization. We can best memorialize him by assessing his intellectual contributions and carrying them forward. His interests included science and human values, the convergence of science and the humanities, human specificity, stratified stability, the brain, origins of languages and the public exposition of science. Bronowski can also be assessed as an exemplar of the broadly educated scientist-citizen.

Bronowski partisans are gathering together in a unique and joyful spirit to share their views of his work in a context of optimism and hope, at a time when civilization is preoccupied with the dangers of nuclear war, crime and overpopulation. They recall Bronowski's unifying philosophy and energetic program of action, his love of humanity, excitement of discovery, dedication to beauty and excellence, gift of language both written and spoken, and his challenge to humankind to see to the 'ascent' of our species.

Why is Bronowski important and deserving of a retrospective? Let's examine this question at two levels, his importance to individuals and his importance to Western culture as a whole.

II. BRONOWSKI'S IMPORTANCE TO INDIVIDUALS

Our perspective of the human condition has been greatly altered by the majesty

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Based upon a presentation given at the Symposium "Jacob Bronowski: A Retrospective" held by NEXA, the Science-Humanities Convergence Program at San Francisco State University, June 1984, in conjunction with the Pacific Regional Meeting of the American Association for the Advancement of Science, funded by the Walter and Elise Haas Fund, San Francisco, CA.

and grand sweep of Bronowski's view of our species from its beginnings millions of years ago to the present. His grasp of human specificity transcended time, geography and culture. Bronowski's work, as highlighted in *The Ascent of Man* [1], portrays human cultures as a nonlinear complex of interconnected and interdependent parts in which the whole is far greater than the sum of the parts.

Bronowski believed that human evolution, both biological and cultural, is powered by a nurturing interaction of human specificities and the properties of nature; that man's gift of foresight, imagination and sense of ego have driven his ascent. He wrote:

Human beings create their values, they form an ethic, because they direct their aspirations towards the command of nature, not by the means that other animals use but by the road of knowledge.

... the evolution of man is most remarkable and spectacular. His gifts of discrimination and judgement, the ability to speak, to remember, to foresee, to imagine and to think symbolically, his carriage and the freedom that it gives to hands and face, his face-to-face relations and his way of making love, his family life and the intimacy of his social values, are an incomparable biological equipment.

... What makes the biological machinery of man so powerful is that it modifies his actions through his imagination: it makes him able to symbolize, to project himself into the consequences of his acts, to conceptualize his plans, and to weigh them one against another as a system of values [2].

Bronowski introduced me to William Blake, in particular to this excerpt from *Auguries of Innocence*:

To see a world in a grain of sand
and heaven in a wildflower
To hold infinity in the palm of your hand
and eternity in an hour [3].

The idea that the whole universe can be seen in a grain of sand is beautiful and

exciting and is in part why science is a great adventure. One can see the laws of nature everywhere, in every detail of everyday things. A few examples that come to mind: Mendel grew garden peas, Newton passed light through a prism, Darwin observed beetles and finches, Einstein in his first relativity paper examined what happened when light hits a moving mirror. Yes, one can see a world in a grain of sand.

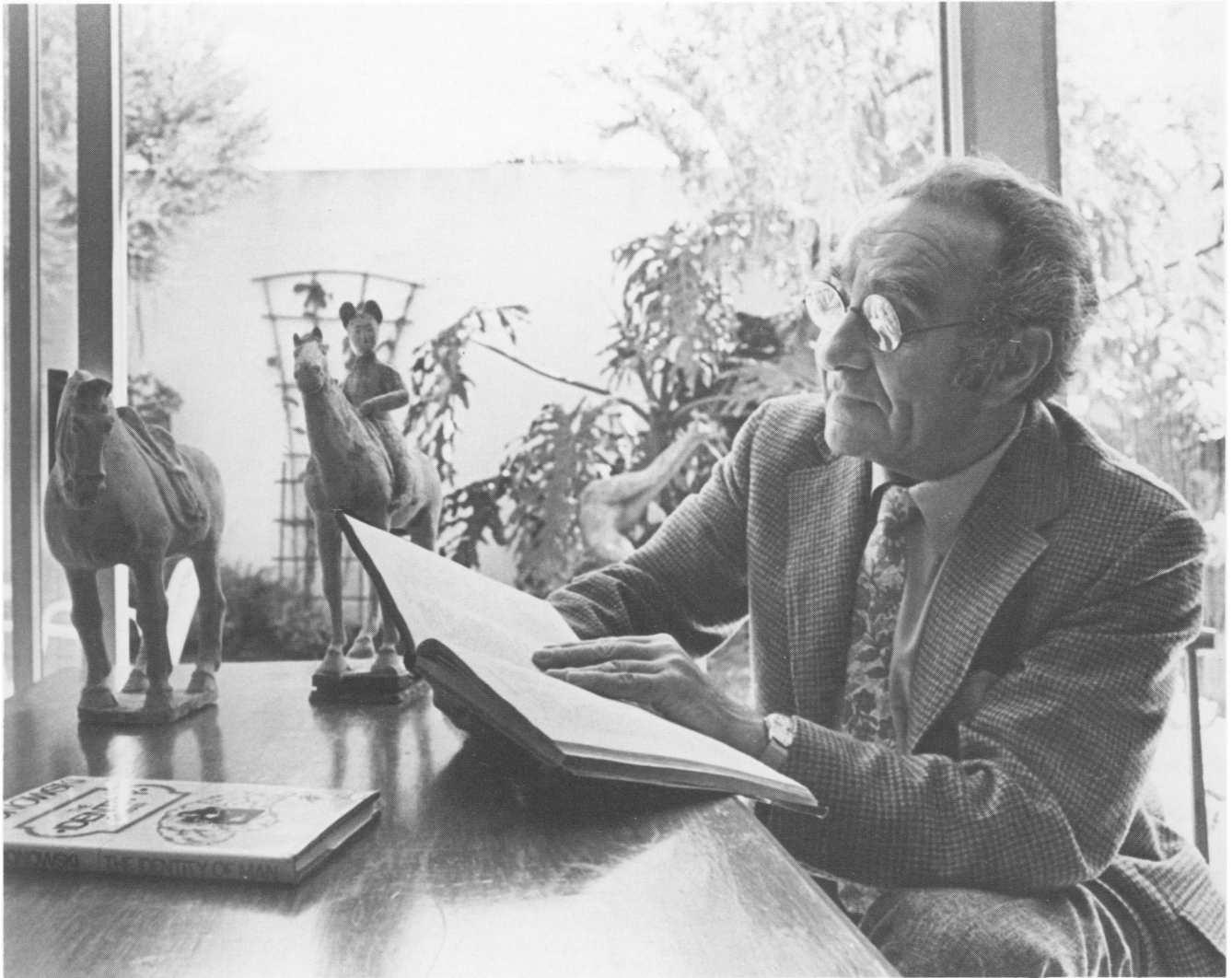
Bronowski's gift of language, both spoken and written, was evident to all who read or heard him. His talents in prose and speech are related to his talent as a poet. It is the poet's challenge to find just the right word, to execute the perfect, concise phrase, pregnant with meaning and lyric. What better talent for executing prose or speech?

A list of Bronowski 'gems' would be long indeed! A favorite, useful in restraining the impulses of children, is "One property that distinguishes humans from other animals is the ability to postpone immediate gratification for a larger reward sometime in the future." This important ability also distinguishes children from adults (at least most adults).

In discussing the driving force and speed of human evolution, Bronowski wrote of courtship and love:

We, the hominids, must have supplied a form of selection of our own; and the obvious choice is sexual selection . . . The preoccupation with the choice of a mate both by male and female I regard as a continuing echo of the major selective force by which we have evolved . . . Ours is a cultural species, and I believe that our unique attention to sexual choice has helped to mould it.

Most of the world's literature, most of the world's art, is preoccupied with the theme of boy meets girl . . . This expresses the deeper fact that we are uncommonly careful in the choice, not of who we take to bed, but by whom we are to beget children. Sex was invented as a biological instrument by (say) the green algae. But as an instrument in the ascent of man which is basic to his



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cultural evolution, it was invented by man himself [4].

Who could not be moved by the powerful lines he spoke spontaneously (never working from a script) at Auschwitz when filming *The Ascent of Man*? While standing fully dressed in the mud and mire of a pond, he said:

This is where people were turned into numbers. Into this pond were flushed the ashes of some four million people. And that was not done by gas. It was done by arrogance. It was done by dogma. It was done by ignorance. When people believe that they have absolute knowledge with no test in reality, this is how they behave. This is what men do when they aspire to the knowledge of gods . . . We have to cure ourselves of the itch for absolute knowledge and power. We have to close the distance between the push-button order and the human act. We have to touch people [5].

This humanistic evocation concisely summarized a major part of Bronowski's philosophy, placing the litany of millennia of human tragedy at the foot of the pedestal of dogma. He prescribes for our salvation 'the habit of truth' as found in the test of reality (experiment) that has been the foundation of science since Galileo.

An opportunity to assess Bronowski's importance to other individuals was provided at a memorial service held at the Salk Institute in La Jolla, California shortly after his death. Professor Salvador Luria said:

The main contribution of science to ethics came from the integrity of its day-by-day practice, an integrity due to the single fact that only reproducible

results are useful in science. In science truthfulness becomes, in Bruno's words, 'the habit of truth'. In *The Identity of Man* Bronowski wrote, 'Man constantly invents ideas to express what seems to him to lie behind the appearance of nature and to hold them together. The invention of these ideas is imagination' [6]. He defines science: 'All science is the search for unity in hidden likenesses. Art is the search for meaning in the inner experience. Together Science and Art are different paths to the highest goal—knowledge of self'.

Luria added:

In conversation as well as in writing, Bruno made his greatest impact on a sensitive audience. His conversation had the heady quality of those great wines whose sparkle increases the joy of the bouquet. It was always a productive conversation, aiming at creating new knowledge both ways—in speaker and listener. Bruno's conversation was something more, however. It had an almost sensual quality of mutual enjoyment between human beings. It was the essence of friendship [7].

Jonas Salk said of Bronowski, "He wrote like an angel, and his words charmed, even when acting the role of Devil's Advocate". An example can be found in a letter in Bronowski's archives that he wrote to his daughter, Lisa Jardin. She had sent him a manuscript of a book that she was writing and asked her father for his opinion. He responded with a six-page typewritten letter. Here I am paraphrasing: "Dear Lisa, This is just fantastic. I think you're great. You are smart, talented, and sensitive. I just love what you did, and I'm so proud of you. You deserve a big strong pat on the back." And that's what he said very emphatically. Yet when one came to the

end of the letter, it was clear that in between those very nurturing and supportive words, he had made some rather drastic suggestions. "Get rid of this chapter—reorient that—redo this, redo that." It was, however, presented with that loving touch that sometimes eludes us, especially in the delicate situation of a parent advising a child. That characteristic was very revealing of his character. When recalling this with Lisa, she remembered the letter and told me that was his way with everyone. He left you feeling supported and encouraged, yet with a long list of very constructive suggestions.

Gerald Piel, at the same memorial service, chose a quote from Bronowski's *Science and Human Values*:

Man masters nature not by force but by understanding. This is why science has succeeded where magic failed. Truth is the drive at the center of science. It must have the habit of truth, not as a dogma but as a process [8].

Bronowski is eminently quotable. His works touched the mind and emotions of many; yet he was important to each in a unique way.

III. BRONOWSKI'S IMPORTANCE TO WESTERN CULTURE

Before discoursing on why Bronowski is important to Western culture, a digression is in order to define the words *culture* and *important* in this context. There are hundreds of definitions of culture. Lawrence Durrell said that culture is "the sum at any given time of all the efforts man is making to interpret the universe about him" [9].

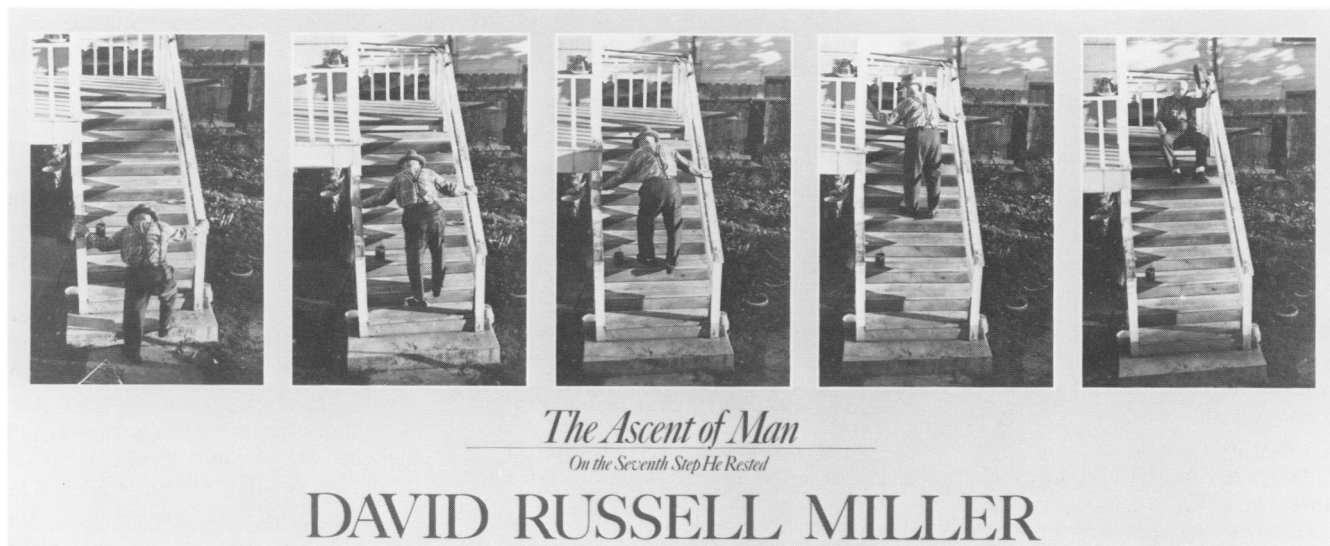


Fig. 1. David R. Miller, *The Ascent of Man*, photography sequence, ©1981 by David Russell Miller, 2511 Fulton St, Berkeley, CA 94704, U.S.A. This series of five photographs appeared in a color poster that the author discovered by chance in a coffee shop in San Francisco.

Laura Silver and I published a paper entitled "Disciplinary Interdependencies" [10], which focused upon the relationships between disciplines and on the source of the creative ideas that change culture. It was inspired by Bronowski's *Ascent of Man*. We defined culture using the concept of paradigms as put forth by Thomas Kuhn [11]. Paradigms define a way of actually 'seeing' reality. The way of seeing, which is the paradigm, actually becomes the perception of reality itself. Indeed, we introduced the concept that one *defines* a culture by describing its paradigms, i.e. its perceptions of reality.

Our thesis was that creative ideas emerge from the paradigms that pervade the culture of a time and place. These ideas produce what we normally define as 'progress' and 'change'. What changes from culture to culture, or milieu to milieu, is the paradigms.

New ideas do not spring from a vacuum. An examination of history shows that surges of creativity are localized in time and place. Moreover, these creative surges do not occur in just one discipline, but in many disciplines during the same period of time, and all deal with the same concepts. It is not an accident that such bursts of creative ideas occur at discrete times and places. For example, as Bronowski wrote in "The Creative Process":

Is it coincidence that Galileo shared the patronage of the Venetian republic with sculptors and painters? Is it a coincidence that, when Galileo was at the height of his intellectual power, there were published in England in the span of 12 years these three works: the Authorized Version of the Bible, the First Folio of Shakespeare, and the first table of logarithms? [12].

We often think of certain periods of time and of certain places as more important than others: classical Greece, the Renaissance, the turn of the nineteenth century to the twentieth century in Western Europe. These periods are characterized by creative activity, not just in one but in all disciplines. When one examines this creative activity closely one finds that all the disciplines are grappling with the same concepts, the basic paradigms, that define the culture. These concepts include our understanding of who and where we are, the nature of the universe and our role in it. These paradigms that define cultures are so fundamental and basic that we sometimes lose sight of them. Yet they constitute the basic structure upon which everything is built. They determine what we do, how we live and to what we aspire. They tell us what is the best way to live our lives; what

most deserves our energies. They shape our values and ethics, and define our happiness.

We can now define the word *important* in this cultural context. An idea or theory is important when it changes in a fundamental way the paradigms that lie at the foundation of a culture. Jacob Bronowski is important to Western civilization because of his influence in changing the paradigms of the second half of the twentieth century in the West.

What are the paradigms that Bronowski's work is changing? Most importantly, his majestic grand sweep view of humanity in time and space has helped us to see the evolution of the human condition over the course of its history and *over all the cultures* on the earth. He also worked to unify the divergent elements of our culture—the two cultures, the three and a half cultures, or the two hundred cultures. He helped us understand our complete interdependencies. Gerald Holton called Bronowski a 'lumper' as opposed to a 'splitter', because of his coherent world view [13].

He captured many paradigms in a phrase: the habit of truth; the democracy of the intellect; man's commitment to excellence, to self-excellence; the democratization of power; the social-solitaire. We will remember him for these ideas, and hopefully carry them forward.

The Ascent of Man has sold over a million copies. That is a tremendous statement about the reach of Bronowski's contribution to the public exposition of science. When the "Ascent of Man" films were first shown at least two million people watched them. They are constantly being exhibited to millions more and have become a standard by which to judge similar film series.

Bronowski's general optimism, his view of science as essentially good and his assertions that the methods of science could form the basis for a humane culture have helped erode the general hostility toward science that seemed prevalent in the 1970s.

All of the contributions mentioned so far are related to Bronowski's attempt to find a philosophy for the twentieth century by which to guide us into the future:

My ambition has been . . . to create a philosophy for the twentieth century which shall be all of one piece . . . a philosophy of nature rather than of science . . . There cannot be a philosophy, there cannot even be a decent science, without humanity. For me, the understanding of nature has as its goal the understanding of human nature, and of the human condition within nature [14].

IV. BRONOWSKI IS 'IN THE AIR'

Indeed, we seem to be entering a nascent period—nascent in terms of events revolving around the work and influence of Jacob Bronowski. Many of his works are appearing synchronistically and independently in a multitude of media. Evidently Bronowski is 'in the air'. He is becoming a part of our folk culture.

A June 1984 retrospective symposium at San Francisco State University was only the first of a number being planned. Film producer Peter Kaye in San Diego, who made the film *Jacob Bronowski: Twentieth Century Man*, has completed a new film called *Jacob Bronowski—Life and Legacy* which he refers to as a "chapter 14" following the 13 chapters of *The Ascent of Man*. Inspired by Jacob Bronowski, the Ruth Langbridge Dance Company from Tiburon, California has created a dance called *Partially Debugged*. It was choreographed by Ruth Langbridge and has original music by Herbert Bielawa. Gerald Kirsch in San Diego, California created a new planetarium show inspired by Bronowski. Francis Gretton, an English professor at San Francisco State University, wrote and made a video film, *On Newton, Blake, and Bronowski*. David Russell Miller created a poster entitled *The Ascent of Man* (Fig. 1). The first of a planned series of conferences in honor of Jacob Bronowski was held in March 1985 at the University of California, San Diego, on the topic "Drama, Theater and Society in Renaissance England".

There are probably many more works in honor of Bronowski of which this writer is not aware. Bronowski disciples appear to be everywhere! I will conclude this partial list by mentioning a major new symphony written by composer Michael Tippett for orchestra, chorus and soloists. His *The Mask of Time* had its world premier with the Boston Symphony in April 1984. A reviewer for the *New Yorker* magazine called it a masterpiece [15]. At the start of the libretto, the composer acknowledged a large debt to *The Ascent of Man*, both the television series and the book. When Tippett wrote and set to music "O rose-red cinnabar, you sombre metal, hell heated hotter, hotter! Radiant look look! A silver and liquid pearl of mercury, For fire is alchemy", he paraphrased Bronowski's account of the medieval alchemists in *The Ascent of Man*. The symphony program explained, "*The Ascent of Man* is not a popular history of science but rather an essay in natural philosophy. *The Mask of Time* is the composer's response to the scientist—

philosopher's account of man's origins, his evolution, and his discoveries about the world and the universe he inhabits."

V. A SEMINAL FIGURE

The life and work of Jacob Bronowski is changing the evolution of our culture in fundamental ways. His ideas, and his espousal of them, are changing the paradigms that pervade Western civilization. He has, indeed, become part of our folk culture.

Someday in the future, when someone writes a new *Ascent of Man*, Bronowski's name will be associated with a peak of human achievement like those he selected for *The Ascent of Man*. He will be recognized as a seminal figure who influenced our conception of the nature of the world. He is a perfect example of the kind of person he himself described at the conclusion of *The Ascent of Man*:

Every man, every civilization, has gone forward because of its engagement with what it has set itself to do. The personal commitment of a man to his skill, the intellectual commitment and the emotional commitment working together as one, has made the *Ascent of Man* [16].

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