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ELLIOT STELLAR

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A Biographical Memoir by

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BY JAY SCHULKIN

ONE OF THE FOUNDERS of what we now call behavioral neuroscience died recently. Eliot Stellar was seventy-three years old at the time of his death and was university professor of physiological psychology at the University of Pennsylvania. He was a former editor of *The Journal of Comparative and Physiological Psychology*, the precursor of behavioral neuroscience. During that time the journal grew in stature as the field rapidly expanded. He led the journal as he did most things, fairly and with catholic sensibilities. He championed individual initiative and expanded the possibilities for others to be included in physiological psychology. As editor and as an individual, he demonstrated the art of inclusion: namely, he brought diverse individuals to participate in the inquiry of the role of the brain and behavior.

In our lifetimes most of us meet few truly great people. Eliot Stellar was for me, and many others, one of them. His particular genius was to nurture both scientific excellence and humane expression. In fact, Eliot Stellar is the paradigmatic example of the statesman-scientist. His example inspired others as they tried to pursue science. The greatness of Eliot Stellar is that he nurtured the science that

one was pursuing, and, perhaps more importantly, he bolstered the life that one ought to be living.

Who was Eliot Stellar? Eliot was born and raised in Boston. He attended the Boston Latin School and Harvard College. At Harvard he heard lectures by Karl Lashley and the philosopher Alfred North Whitehead. At Harvard he began his inquiry into relationships between the brain and behavior. Clifford Morgan was at Harvard at the time, and Eliot began to work with him. This culminated in a paper on symbolic representation in the rat and the role of the neocortex (1942).

Eliot Stellar then attended Brown University and received his advanced degrees in psychology, under the tutelage of Professor Hunt. From Hunt, Eliot's interest in motivation was engendered. This interest in motivation was lifelong for him.

After a stint in the Army during the war, Eliot took a position at Johns Hopkins as an assistant professor of psychology. Clifford Morgan was chairman of the department and was instrumental in hiring Eliot. During this period the two of them worked on the second edition of *Physiological Psychology* (1950). It radically extended and improved on Morgan's first edition and became the main text in physiological psychology for the next twenty-five years.

Of Eliot's many students during his Johns Hopkins years, three stand out. One is Robert MacCleary, the second is Philip Teitelbaum, and the third is Alan Epstein. It was a great period for Eliot and for physiological psychology. MacCleary's thesis was on the role of specific hungers and the differential contribution of taste and postingestive mechanisms in determining ingestion. Stellar and Phil Teitelbaum's work was on the lateral hypothalamic syndrome and recovery of function from this brain damage (1954). Alan Epstein, an undergraduate in Eliot's laboratory, worked on the prob-

lem of sodium appetite. He and Stellar demonstrated (1955) that the appetite for sodium was innate, a finding that Curt Richter also had postulated.

Richter was also at Hopkins, having founded the first laboratory in psychobiology in this country there. Richter's influence on Eliot Stellar was enormous. Richter never really had any students and worked largely alone. But Eliot quickly saw that Richter's concerns were on a continuum with his own—namely, the way in which behavior served in the regulation of the internal milieu. The appetite for sodium was an example of how behavior served to regulate the needs of the body. Both Richter and Stellar wanted to know how the brain served to initiate and integrate behavioral responses that served the body. For Eliot Stellar the biological basis of motivated behavior was pervasive and amenable to study; basic drives for minerals, water, or the sexier one—namely, the motivation for sex—served as model systems in which to study how the brain produced motivated behavior to serve bodily needs.

Eliot Stellar's classic paper was titled "The Physiology of Motivation" (1954). It was a seminal work that dominated the field for over thirty years, integrating what was known about hypothalamic function in regulating basic drives like hunger and sex into a model of brain function. It oriented basic research to a tremendous degree and is now noted as one of the most cited papers in psychology.

But Eliot did not align himself with the tradition of elegant and rigorous experimental design that was emerging from psychology. The tradition of Richter and Stellar is less about design and more about biology. While the experiments were perhaps less elegant, they were tied to real-world events. Statistics were never the determining factor; large phenomena serving biological ends were.

Eliot Stellar was also an inventor, having made an impor-

tant contribution to stereotaxic surgery with the introduction of his stereotaxic apparatus. It was a simple innovation of a technique that made a major difference in the field. His early work with Hill on the lick rates of rats was about how the hardware of systems worked (1952): How many licks could the rat generate? When did it decline? How does motivation for thirst interact with it? These were Eliot's questions.

Eliot moved to the University of Pennsylvania (1954) under unfortunate circumstances. He was told that the Department of Psychology at Hopkins could not house both him and Clifford Morgan, so he began to look around for another job. At that time Penn was in the midst of recruiting faculty for something brand new—the Institute of Neurological Sciences. Lewis Flexner was the chairman of Anatomy at Penn and the director of the institute. After a few minutes of conversation, he hired Eliot as the behavioral person in the group. At that time one could still do that.

Thus began a wonderful period for Eliot and for the University of Pennsylvania. Within a short period, the Institute of Neurological Sciences and the Department of Anatomy came to house very special scientists who worked well with one another in the new field (e.g., Bill Chambers, John Liu, Jim Sprague) that we now call neuroscience. Interesting work on memory and attention appeared within a short time (1961,2; 1963). The inquiry was oriented to what we now call behavioral neuroscience. Each was reductionistic but without reducing behavior from the purview of what was to be explained. Behavior was one level of analysis among others, such as anatomy and physiology. Eliot's role was as the "behaviorist." Of course, he was no behaviorist, either in Hull's or Skinner's sense. What they meant was that his focus was on behavior, on how the brain regulated it, and how behavior influenced the brain.

Eliot had a number of students in behavioral neuroscience at Penn (e.g., Douglas Mook, who went on to the University of Virginia, John Corbitt to Brown University). It is not surprising that an award in behavioral neuroscience named for Eliot Stellar was established at Penn for the best thesis in behavioral neuroscience.

Eliot's role at the University of Pennsylvania was a large one. At one point he was head of the Institute of Neurological Sciences, provost of the university, and then at the end of his life chairman of the Department of Anatomy. He helped cultivate the Department of Psychology into one of the best departments in America and with a strong biopsychology group. He also initiated a number of educational programs at the university. They included the University Scholars Program, Biological Basis of Behavior Major, and scholarship programs that reached out to universities in Europe, Asia, and the Middle East. Students and scholars were both coming to Penn under Eliot's encouragement or going to some place. His sense of scholarship and science was one that knew no borders. The programs of scholarship that he established at Penn reflected this fact. And they always had one important property; they reached out to people

Eliot in his elegant manner ran a number of seminars. One that he helped run for almost forty years at the university was something he called the "feeding seminar." It was founded by Eliot and Mickey Stunkard in the mid-1950s and is still going on. It brings together a broad base of scholars to discuss over lunch the mechanisms of ingestive behavior.

Eliot had great colleagues that championed behavioral neuroscience at Penn. They included Vincent Dethier, who also taught at Penn, Princeton, and the University of Massachusetts at Amherst. He died several weeks before Eliot at age seventy-eight. They wrote a book (1961) together that

represented a comparative approach to behavioral neuroscience. I can remember the debates between Eliot Stellar and Vince Dethier about whether the concept of motivation was necessary in the explanation of behavior. If there was a concept that Eliot thought necessary in the explanation of behavior it was that of motivated behavior. Motivation was a central state for Eliot in the sense in which Karl Lashley, his teacher, had envisioned it.

Eliot Stellar did not publish many papers, but what he did publish made a profound difference. With his son, Jim Stellar, now a dean at Northeastern University, he wrote a book titled *The Neurobiology of Reward and Punishment* (1985).

As I have indicated, beyond his academic and administrative roles, Eliot had a wonderful way with people and a capacity to nurture inquiry and scientific cooperation. Someone working with me on a program project grant from the National Institute of Mental Health asked what Eliot Stellar would contribute. The answer I think is that he civilized us. Eliot was always the impetus for the team spirit in inquiry. That was one of his gifts. He loved to see inquiry thrive.

At the end, he was busy on two major fronts—one as head of the Committee on Human Rights at the National Academy of Sciences. Earlier he had worked for the Committee on the Ethics of Medical Research in Washington, and his interest in human rights was a long-standing one. He prized his work on this committee. They labored to free other scientists abused and in prison around the world. This work and the bonds of the community of scientists were major themes in Eliot's life. Scientists form a community, and this community needs to bond together. After all, both rights and inquiry were formed during the scientific enlightenment period in culture.

The other activity was as president of the American Philosophical Society, the oldest intellectual society in America.

It was founded by Benjamin Franklin and is devoted to what Franklin called "practical philosophy." Eliot loved the work at the society. It was, after all, what his life was devoted to—the expression and cultivation of inquiry, the bringing together of people to pursue that noble end.

Eliot Stellar served the community of inquirers in so many ways. And he was a political man, not just because of the work he did at the University of Pennsylvania but also that of the boards he was on. He cultivated science at the National Institutes of Health, and he was on the board of foundations that he helped orient to behavioral neuroscience—the MacArthur and Whitehall foundations.

Let me end with several personal notes. As a graduate student and still in the philosophy department, I came to see Eliot Stellar on the advice of Paul Rozin, who then was chairman of the psychology department. I was not sure where I fit in the intellectual arena at that time. Eliot had the gift to lift the spirits of those around him. I walked out of his office feeling that, despite the fact that I did not dovetail nicely under the rubric of any department, it was legitimate to pursue inquiry, and he backed me then and right up until he died.

I was Eliot Stellar's last student. I worked with him, published one paper with him (1985), and we were faculty members in the same department over a number of years. I went to Penn because my science teacher (George Wolf) told me as a undergraduate to go there because Eliot Stellar, he thought, would appreciate me. He did. How lucky I was.

Eliot's large imprint is on the people he cultivated and his work for the community. A world without Eliot Stellar is a world with one less smiling face.

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