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A Biochemist in Honors

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What a long, strange trip it's been.
– Jerry Garcia

In 1984—quite unlike the depressed protagonist of George Orwell's novel—I found myself happily ensconced as a senior research associate in the department of biochemistry and molecular genetics at the University of Alabama at Birmingham (UAB). I had received my Ph.D. in biochemistry from the same institution nine years earlier; had left for two years to do a post-doctoral fellowship in the field of cancer biology at Georgetown University and the National Institutes of Health; but had returned to UAB at the invitation of my doctoral mentor, Jim Lacey, to work on a project grant he had been awarded from the National Aeronautics and Space Administration in the area of origin of life science.

Jim had received his own doctorate in biochemistry from UAB not too many years before I began work with him as a graduate student in 1971. His own postdoctoral studies had been done with Sidney Fox, one of the pioneers of origin of life research and the discoverer of thermal proteinoid microspheres—tiny cell-like structures produced under prebiotic conditions, though devoid of any of the customary biochemical "trappings" of life. Jim's interests then—and later my own—had to do with trying to understand how a genetic apparatus could have become incorporated into such structures, thus transforming them from mere proteinaceous "bubbles" into metabolizing, reproducing, and evolving entities—in other words, life.

It is perhaps difficult to convey to most people not professionally involved in science—especially one of what Victor Weisskopf termed the "cosmic," or origin, sciences—what an extraordinary thing it is to be able to wake up every morning and spend much of the day thinking about one of the "greatest mysteries": what is the nature of life, how did it begin on earth, and what might be its ultimate fate?

Poets and philosophers, mathematicians, literary theorists and psychologists have their mysteries, to be sure—but I am convinced that only those who strive to take a measure of the larger cosmos and its origins deal routinely with truly palpable mysteries, or what the philosopher David Hume termed "matters of unspeakable importance." That belief is, I hope, the only arrogance I shall have to bring to the story that follows.

While in my research position at what is termed the "medical end" of the UAB campus, I did have fortunate occasion to lecture three or four times a year to first-year medical and dental students, and I had accepted a position as a part-time instructor in biochemistry in the university's graduate nurse anesthesia program. While I enjoyed these teaching "diversions" very much, my principal duties and greatest professional satisfactions were confined to the laboratory setting: planning, carrying out, and analyzing a variety of "bench top" chemical reactions designed to uncover and elucidate any hidden physico-chemical patterns in the nature and functioning of the contemporary genetic code. In short, I had been hired—like many in science—not as a teacher but as a researcher and generator of external funding.

It was, though, my enjoyment of occasional instructional interludes which caused me to take a second look at a campus-wide memorandum that crossed my desk in the winter of 1984 from Ada Long, a faculty member in the department of English and the director of UAB's newly established Honors Program for undergraduates. In her memo, Ada described the nature and philosophy of the nascent program, gave a brief synopsis of its first interdisciplinary course offering the previous fall term, and solicited both suggestions for the upcoming course theme and volunteers to help teach it. Although I was familiar with the concept of team-taught "interdisciplinary" courses through my participation in the first-year medical students' biochemistry curriculum—which employed both physicians and research scientists from such fields as biochemistry, internal medicine, physiology, pathology, molecular biology, endocrinology, and neuroscience—the overall and day-to-day conduct of the course never varied from a single-minded focus on the biochemical intricacies of health and disease, and certainly the course lecturers

departed not at all from the realm of science itself. In her memorandum, however, Ada seemed to be describing what appeared to me to be a true multi-disciplinary (and so quite novel) course offering—one with instructors from such diverse areas as English literature, mathematics, history, and economics, all invited to bring their varied expertise to bear on a single theme.

Intrigued, I gave the matter some thought and then responded with a memo of my own, outlining in the roughest of fashion an interdisciplinary course which focused on the contemporary scientific understanding of origins—the universe, the Earth and solar system, life, and the human species. Since all human cultures without exception—including scientific cultures—have origin stories, the topic seemed to me to lend itself handily to the kind of true interdisciplinary enterprise I thought Ada might have in mind. I offered to help plan and—if I could find the time—help teach such a course. In retrospect, I have to admit that my motives were partly selfish in that I was seeking a forum to share with undergraduate students my love and excitement for what mattered most to me in my intellectual life. It did not dawn on me until much later that such a motivation was exactly what Ada was looking for!

I next met with Ada in her office at the "liberal arts" end of the UAB campus to discuss my proposal. She was quite enthusiastic about its basic theme; accepted it—with some tinkering—as the Honors Program's course offering the following fall term; invited me to participate in its planning and instruction; and then set about the task of assembling a cadre of additional faculty to help with its instruction. I, in turn, sought and obtained permission from my co-workers in the lab—and NASA—to take a kind of "leave of absence" for a term, and then began the task of trying to prepare for whatever it was that I had gotten myself into! What I had gotten myself into turned out to be—without question or hyperbole—one of the most interesting and rewarding experiences of my life.

The course which resulted from all this activity was titled ***The Cosmic Quest: Perspectives on Determinism and Free Will***. My original proposal of an "origins" theme seemed sabotaged by that philosophically "beleaguered" title, but it was not, and I managed to fit in lectures and discussions on virtually every relevant topic of

personal interest to me, and then some. Full-time faculty included representatives from the departments of English, biochemistry, psychology, and history, but the course relied as well on several guest lecturers from astrophysics, anthropology, linguistics, computer science, and geology. What I found most novel and interesting about the course, though—besides being able to teach science from my head and heart rather than a textbook—was that the faculty were expected to be in attendance as students themselves for all the lectures and class discussions, not just their own. In the medical center setting it was rare for basic science classes to be attended by faculty other than the instructor, even in team-taught courses, and so my experience in the Honors Program was a pleasantly exciting and unique one. Not only did I get to help teach a course—I got to take one as well!

I guess Ada liked the job I had done—perhaps she mistook the glorious fun I had for pedagogical expertise!—for in the months that followed she offered me the position of associate director of the Honors Program and also arranged an appointment—through her contacts with the higher administration—as an associate professor in UAB's School of Education. It was, as I described it to my friends and colleagues in the laboratory, the proverbial "offer I could not refuse."

Money was a factor, to be sure. As the recently divorced father of a young child, I was beginning to grow tired and apprehensive about living grant-to-grant as a research associate, and the administrative and teaching positions Ada offered seemed to me a kind of refuge from that uncertainty. But I had also had the grandest time teaching in the Honors Program—perhaps teachers really are frustrated actors (or in my case, rock stars!)—and the thought of repeating that experience again and again was immensely attractive. I had also learned recently that surveys from the U. S. Department of Labor indicated most Americans over the course of their lives change jobs ten times—and careers three times—and so these data seemed to provide a kind of statistical security blanket for me, at least suggesting that such a major life change was not without precedent.

I did not teach in the Honors Program the following year, 1985, spending that time instead in transition between my former position in biochemistry and my two new homes at the Honors House and the

School of Education. In effect, I really had three quite different jobs that year. Some days would be spent in the laboratory, going over my research logs with Jim Lacey, explaining some of the nuances and peculiarities of the reactions I had been running, composing final manuscripts, and going over the application files for my replacement. Other days would be spent with Ada and her administrative assistant, Debra Strother, trying to get a handle on the "ins-and-outs" of the Honors Program—one disaster was Ada's attempt to get me to oversee and manage the Program's budget, something I resisted mightily and finally managed to convince her was a terrible mistake by revealing that I never balanced my own checkbook, relying instead on the bank to let me know if things went awry. And then, of course, there was the School of Education. Why the vice-president for Academic Affairs had chosen to place me there as part of a joint appointment remains somewhat of a mystery even today, though I have to assume it had something to do with the then recently released *Nation at Risk* report and its damning indictment of (especially) mathematics and science education in the United States. Just exactly what I was expected to do about this is part of the mystery, although I have to say that my tenure in the School of Education has been—well, an education—and it is something I plan to reflect upon and write about in my "sunset" years.

And so it was that I came to leave the world of scientific research and join the curious realm of academia, teaching, and Honors education. Some of my friends in biochemistry were aghast; some were puzzled; some just curious; but all were supportive—and I guess I felt the comfort of knowing that, if worse came to worse, I always had the option, at least for a time, of returning to that world. In science today, though, one cannot stay away from the "thick of things" too long, as the "thick of things" becomes thicker by the month!

From the beginning of my involvement with the Honors Program at UAB and, in turn, the NCHC, my interests have focused mainly on science education, and for obvious reasons. I was struck early-on by the fact that science and mathematics are the only curricular areas which enjoy a separate committee status within the hierarchy of NCHC. And while I don't know the full history of this committee—

despite having served as its chair for a number of years—I was given to suspect that Honors Programs generally are more likely than not to be administered by faculty from the arts and humanities, or perhaps the social and behavioral sciences, rather than the natural sciences or mathematics. Science and mathematics thus seemed to be viewed as curricular areas deserving of special attention, advice, and counsel from the larger membership. This suspicion was more-or-less confirmed by the results of a survey conducted by Ada Long in preparation for her 1995 monograph, *A Handbook for Honors Administrators*. These data indicated that, of 136 Honors administrators who responded, only about seventeen percent listed their primary academic affiliation with the natural sciences or mathematics. Thirty-two percent of the respondents were members of either English or history departments, and another twelve percent reported themselves to be associated with such fields as the arts, foreign languages, women's studies, drama and theater, and communication studies.

Another problematic issue, though one usually and correctly seen as a strength of NCHC, has to do with the tremendous curricular diversity among Honors Programs throughout the country and so just how the Science and Mathematics Committee—and NCHC generally—can best lend assistance to such a varied assemblage of programs and requirements. Some colleges and universities, for example, have Honors Programs which satisfy core curriculum, or general studies, requirements, including science; others have courses which meet only departmental, or major, requirements. Some institutions offer interdisciplinary coursework for honors students; others only strict disciplinary studies. Still others require a final thesis or some other written document for graduation; many require only successful completion of a set of prescribed courses. It is thus difficult to imagine a blanket set of helpful guidelines for honors faculty with respect to science and mathematics instruction—or any other discipline, for that matter.

If there is one common theme which does seem to pervade the intersection of science, mathematics and honors education, however, it is the difficulty many programs seem to have in recruiting science faculty for their courses, interdisciplinary or otherwise. As I have

tried to indicate above, I am neither unfamiliar with nor unsympathetic to this problem. By the same token, I have no ready answers for the dilemma and have said as much to correspondents who have sought my advice and counsel on such matters. With some exceptions (e.g., theoretical physics or mathematics), most science faculty in academia do have physical and temporal constraints imposed upon them which are not typically shared by other scholars. This is no doubt especially true in the life sciences, by far the most popular field of science electives for non-science majors. As I have tried to explain to my colleagues in the arts and humanities, "doing" science often means being in a particular place at a particular time (e.g., the laboratory or the field), unlike the situation for those whose non-teaching professional responsibilities can often be carried out in an office, library, or even at home, and on an altogether more flexible schedule. Too, one cannot ignore the hard realities of our academic environment today which, after all, simply reflects the orientation of our society and culture toward the scientific and technological. Research into the genetic basis of disease, solid state physics, or our simmering environmental problems simply attracts more funds from extramural sources—and so their concomitant indirect cost monies—than does the work of literary scholars, musicians, or historical scientists, and so often requires more "budgetary attention" from its recipients. It is, alas, a problem not likely to be solved by the likes of the NCHC, except perhaps to the extent that we can offer honors administrators the tools and techniques for identifying those science faculty who do recognize the importance of excellence in undergraduate education and who might be willing and able to forego a semester or two of their own work in the furtherance of that recognition.

Several years ago I submitted an essay to the quarterly newsletter of the International Society for the Study of the Origin of Life (ISSOL) in which I "chastised" its members for not taking a more vigorous and active role in the science education of undergraduates on their campuses, and especially the science education of future pre-college teachers. My article had been prompted by two issues quite unrelated to honors education: (1) the continued decline in the performance of American elementary, middle school, and high school students on

nationally and internationally administered science and mathematics tests, and (2) the on-going and seemingly endless controversy in my own state, and others, over the teaching of evolution in public school science classrooms. Taking a cue from a similar controversy surrounding sex education in our public schools, I argued that the members of ISSOL—by virtue of their work in fields of science which most students intuitively find both fascinating and disturbing (recall David Hume's "matters of unspeakable importance")—had a special responsibility toward undergraduate students on their campuses to involve themselves in courses which "talk" to our students about what they both "want and need to hear." I also argued that the origin sciences can perhaps be used as a kind of "leverage" to introduce and entice students to the extraordinary world of science itself and help them realize that science can be more than a subject to be dreaded as part of their core curriculum requirements—that it can be interesting, relevant and, if taught well, fun.

Mostly, I am afraid, these pleas fell on deaf ears although I received many letters, emails, and phone calls from colleagues in ISSOL who agreed with my comments and who vowed to "do better" in their responsibilities as teachers of young minds—and future research scientists. It is an interesting fact that I have encountered few if any academic scientists who chose to go into their respective fields in order to teach science; most recognized that this would be a necessary part of their duties, but rarely did they see it as the primary motive for their choice of careers. Certainly, this would describe my own experience. Contrary to this view, however, Ada Long has told me that, in her opinion, it is usual to encounter doctoral candidates in English literature who are anxious to teach and share with students the writings they love; though they recognize that research and publishing will be a necessary part of their academic lives, it is the classroom that pulls them most strongly toward a scholarly life.

If there is a lesson in all of this for those of us concerned about science and mathematics teaching in Honors, it is that there are faculty members in these disciplines at most colleges and universities who do have respect and concern for the classroom; who can conduct both classes and laboratory training sessions which leave students eager to learn more; and who can perhaps help prepare a next

generation of teaching scientists even more willing to share their knowledge and expertise with young minds. The challenge for Honors directors and administrators then is to find ways at their own institutions to identify and recruit such faculty for their programs. Perhaps it is in that arena that the Science and Mathematics Committee should be focusing its own activities and attention.

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