THEN AND NOW: THE VIEW FROM A SMALL ASTRONOMY DEPARTMENT

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ABSTRACT. In the last thirty years, astronomy at Wesleyan has seen many triumphs and some failures. Some of each are noted. Of concern is a decline in professional achievement noted among astronomy students in recent years. Factors that may influence student quality and instructional effectiveness are discussed; among them are the rise of the double major, now very fashionable, at least at Wesleyan. The poor employment situation is of such long duration, that its influence is uncertain.

"Men do not so much hate an evildoer, or evil itself, as they hate the man who calls evil by its real name."

- Giacomo Leopardi (1798 - 1837)

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A rite of passage takes place when one becomes the honoree of a meeting. Certain allowances are made, one of which permits him the luxury of a narrative in place of a more orthodox scientific paper. That’s my rationale for this opus, and among its harmonics one can detect the traces of a memoir.

I didn’t think when I came, that I would all but close out the century here at Wesleyan. Permanence through the tenure process here was very unlikely for anyone when I came, and the job market was only starting to fall
from the halcyon days of the fifties and early sixties, into its present despond. The Van Vleck refractor with its jewel-like lenses, was an enticing research instrument of class, and even now, with the appearance of CCD's and Hipparcos its potential remains high.

The department was stronger then, with Professor Thornton Page at the helm, and Carl Stearns a still-active emeritus professor. Emery Fletcher, Herbert Rood, and I formed the younger faculty succeeding Heinrich Eichhorn and Frank Zabriskie, and more than a half-dozen graduate students were here at any one time.

I have, of course, seen many changes within and without the department in the past thirty years. For all but eight of those years, I was the department chair and observatory director, and was appropriately engaged in its continuance and sustenance. It may be instructive to divide my tenure into three equal time periods, with cusps at the midpoints of the respective decades. Scrutiny of the students of each ternary period is revealing. An outstanding student might come along at any time, but the median has changed perceptibly. Underlying any analysis of this department, as it would any other, is the changing nature of its status and makeup.

The first decade was marked by the instability of its appointments. From the departure of Thornton Page in 1968 until my tenure in 1977, no astronomer had an appointment lasting over four years, and we became a department of transients. Following the lead of the administration, long-term commitments to astronomy at Wesleyan were few, as students and faculty alike were preparing for a future position somewhere else, not for this one here. Yet despite the enduring malaise, the department flourished and the internal relations between astronomers remained very cordial, if not exuberant. Herb Rood and I inaugurated the undergraduate major in 1969, and separated the introductory course into two, as is commonplace today. Two years later, I arranged for the Perkin Telescope to be moved from the Perkin estate in New Canaan and remounted at the Van Vleck Observatory, and in 1974, in response to the rising awareness of global warming, ozone depletion, and acid rain, I introduced meteorology into the Wesleyan curriculum.

The second decade was one of relative stability and prosperity as the department grew from three to seven full-time and part-time professional astronomers, of which only 1.6 in full-time-equivalence were to be found on the university payroll. Wesleyan got something for nothing in those years; our students gained much from the expanded research opportunities provided by the larger staff, and also gained in many ways from experiencing many more
than two of them in the classroom. In 1982, Mathematics Professor Wistar Comfort and I were appointed to two new Van Vleck professorships in our respective disciplines. These endowed chairs were created when the Van Vleck estate passed to the university.

The high point of this period was surely IAU Colloquium No. 76, on The Nearby Stars and the Stellar Luminosity Function, (Philip and Upgren 1983), a meeting held here in June, 1983, with more than one hundred participants, including some of our students. The proceedings formed the first in a new and distinguished series of Contributions of the Van Vleck Observatory, edited with distinction by Adjunct Professor Davis Philip. Their dissemination at no cost to about 300 astronomical institutions gained worldwide recognition and respect for the observatory. It was a rare occurrence then, if not also today, for a very small department to host and carry out all of the tasks imposed by a meeting of this extent.

In the last decade, astronomy at Wesleyan has fared less well. To no one's advantage, the department has jettisoned off half of its staff, and many of the research opportunities then available to its students have disappeared.

Do these sweeping alterations affect our students, and if so how? The master's degree program in astronomy was introduced, as far as anyone is able to determine, about 1960 through the efforts of Thornton Page, Carl Stearns, and Heinz Eichhorn. They shepherded through some of the most able and distinguished students of all. It would be remiss of me were I to fail to take note of the outstanding start for the program, simply because I was not yet a part of it. My first ten years here saw an almost equally worthy group, the best and the brightest having long since made their mark on the field.

The numbers of matriculants decreased overall in the late seventies and early eighties, mirroring national trends, although the quality remained high. Only the relative youth of those finishing in that decade confines them to a lower level of prominence than that achieved by their elders, but I am certain that in time, some of them too shall achieve wide recognition in their discipline.

It is when we come to the most recent students that we see a notable drop in further collective success. Not one of the 17 graduate students of the last ten years has completed a Ph.D. degree, and only two are currently enrolled in programs leading to it. The data are shown in Table 1 and plotted in Fig. 1.
TABLE 1. Numbers of astronomy graduate students at Wesleyan

<table>
<thead>
<tr>
<th>Period</th>
<th>students enrolled M.A. Degree</th>
<th>students completing M.A. Degree</th>
<th>students starting Ph.D. degree</th>
<th>students completing Ph.D. degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960-66</td>
<td>14</td>
<td>9</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>1967-76</td>
<td>28</td>
<td>19</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>1977-86</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>1987-95</td>
<td>17</td>
<td>10</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>46</td>
<td>35</td>
<td>21</td>
</tr>
</tbody>
</table>

Fig. 1. The data in Table 1 plotted by year intervals.

To what might we attribute the relative success of the earlier students? In my experience the chief difference between students of today and their predecessors is one of attitude. Few today are, to put it simply, interested and motivated by the entire field. By this I mean that the innate curiosity in things astronomical, aside and well apart from the course work and closely associated topics, is minimal. The discussions and speculations that might erupt over some question, substantive or trivial, don’t occur with the frequency and fervor of years past. Last year, when the first news of the existence of 51 Pegasi B broke, I found as others did that the distance to this star given in the media was considerably in error (see e.g., van Altena et al. 1995). Speculation in that, and in the theories of planetary origin threatened by a Jovian planet so close to its
primary star, elicited interest among astronomers here and elsewhere, but I
detected none among our students. Similarly, student curiosity remained absent
over the spectacular successes of Hipparcos, such as the new color-magnitude
diagram of nearly 9000 stars with parallaxes determined to less than ten percent
error (Perryman et al. 1995). These are among many similar examples.

I suspect that several factors are responsible for this decline in innate
curiosity; some are characteristic of the field at large, while others may be
peculiar to this institution alone. I feel that the greatly expanded popularity of
the double major is one of the primary reasons for the change. Although
directly affecting only the under-graduates, the commonality of our upper-level
undergraduate courses with those for graduate students, has loosened the
astronomical incentive for both groups. Any major concentration in astronomy
must include a strong dose of physics, mathematics, and computer science, but
here only four upper-level courses in astronomy by the campus regulations, and
only three in actual practice, satisfy the full astronomy major. All of our recent
undergraduates have also majored in physics. A major in that science has long
been an approved preparation for a career in astronomy. But it is questionable
that so few astronomy courses make for a second separate major in addition to
it. The courses may be worthy in themselves, but together they may not form
a critical mass that can instill a bond of common interest in astronomy as a
whole with an attendant esprit de corps, as they did in years past.

The second cause is the reduction by choice, of the astronomers not
nominally, but truly accessible to students here to only two, a feckless endeavor
that can only be deleterious. The infusion of fresh ideas and viewpoints,
inevitably a touchstone of good education, has here been severely constrained
in an unnecessary way, and students are the losers for it.

Third is the ever-widening gyre of awareness of such recent departmental
practices as the attendance of oral thesis defenses by invitation, defying the
open tradition reaching back to the rise of universities in thirteenth-century
Europe (Green 1977). I know of some bright student prospects who have
declined to apply to Wesleyan as a direct consequence of behavior such as this.
I do believe that the present plight here will improve with the passage of time,
whether by catharsis or by a more gradual evolution. I like to think that it will
evolve into a setting more conducive to natural curiosity. One thing is clear;
this too shall pass.

One potential constituent in this mix is not yet a factor here. This is the
semester or year of study abroad, now fashionable among the non-science
curricula. It may prove antithetical to the vertical course structures of the
physical sciences, but as yet it has affected only one astronomy student at Wesleyan.

I am not sure of the role played by the continuing dismal employment situation. It has been widespread and of long duration, but new factors may have emerged that sway the decisions of young astronomers. Certainly the bleak prospects for a full career in astronomy, coupled with the above, call for a critical review of the nature and aims of Master's programs in astronomy here and perhaps elsewhere, in view of diminishing funds everywhere in education. At the least, a broadening of the Master's degree experience as advocated by the National Academy of Science, to include more options of instruction and research, seems particularly applicable to the small department (National Academy Press 1996).

What should the governing paradigm be for a master's degree program in this department? The science enterprise has seen a period of unparalleled growth over much of my time here, but that period appears over, at least for the near term. The "end of science" has become a fashionable catchphrase in this decade. In a book by that name, Horgan (1996) feels that the big questions in the physical sciences have been answered as much as they can be answered; he contrasts an emerging decay in science, not altogether convincingly, against the well-known world view of fin de siecle physics, prior to the full impact of relativity and quantum theory. Holton (1993) disputes this dour outlook with a lively and balanced approach, and, like Horgan, traces it back to the ideas of Oswald Spengler some seventy years ago. I feel more comfortable with the more prosaic outlook offered by Price (1961) who demonstrates that the finite resources of society restrict the growth of science. It can no longer continue at an exponential rate, but must approach saturation, as must the world population in time. Both Spengler and Price offer the end of this century as the approximate turnover time, from different premises.

The consequences of this decline upon the course curricula of small college astronomy departments are taken up by Bruce Partridge (1996) of Haverford College. Partridge quotes Saint Augustine in The Confessions, who preached against "the disease of curiosity", comparing it to the lust of the flesh, and notes that "curiosity and the skepticism it engenders are not popular attributes at either end of the political spectrum or among religious groups whose truth is received rather than searched for."

Augustine cautions that "one who can measure the heavens number the stars, and balance the elements is no more pleasing to God than one who can not. Scientific knowledge is more likely to encourage pride than to lead people
to God.” Salvation was his goal, not material progress; science was not only superfluous to that aim, but might even be dangerous. The increasing scientific illiteracy of today could move our society toward a world of this pious desolation, and broader-based science majors should be better able to deal with it.

Partridge feels that Haverford’s current approach will allow a small department to accommodate to the changed circumstances of science with relative ease by continuing “not to indoctrinate students with a particular block of scientific knowledge but to train them to think like, or as, scientists so they can keep up with disciplines that change faster than we live. Able students broadly trained may well have an edge in the long run.” I believe that Wesleyan would do well to adopt this practice.

A direct comparison between undergraduates and graduates may not be realistic, at least at Wesleyan. As noted above, the astronomy major program was started about 1969, and the first Bachelor’s degrees were awarded five years later. The same trends are visible among them, but with the much shorter time frame since the inception of the B.A. degree, the distinctions are somewhat less clear. Furthermore, almost all recent undergraduates have fulfilled the higher standards of the major in physics. Only four of these 17 double majors have even gone on in graduate astronomy, another indication that most are physics students in all but name. It is not this, but rather the existence of two separate major programs that I question.

Other problems of personnel and of personality have arisen within the department, that did not exist just a few years ago. I do not intend to dwell upon them; they are well known to many. The defining moment of these troubled last years was the occasion of my last meeting with the President of Wesleyan University two years ago. It was at his invitation and took place in his office. There he apologized profusely to me and through me to others, for Wesleyan’s egregious behavior. He agreed that the intellectually lazy and indefensible attempt by Wesleyan and its administration to isolate these problems within the department as if it were a lethal strain of ebola virus, and to enforce in effect, a military-style chain of command, is as unsuccessful as it is unacademic.

Although it continues, I have come to perceive it in some ways, as a blessing in disguise. I am reminded of a remark by Aaron Copland in The New Music, his commentary on the music of his and our times (Copland 1968). Conducting became a passion for him only in his middle years, having not inspired him earlier in his musical life. He cites the following remark in support of his taking up the baton in earnest at that time. He states, “an elderly and
wise woman once gave me some excellent advice. 'Aaron,' she said, 'it is very important, as you get older, to engage in an activity that you didn't engage in when you were young, so that you are not continually in competition with yourself as a young man.'"

Like Maestro Copland, I have become engaged in new activities as the rewards of astronomy at Wesleyan wither away. The rapidly growing public awareness of the excesses of outdoor lighting engages me as much as I am willing to be engaged. Last year I became a fellow at Wesleyan's Center for the Humanities, to teach the first course offered for credit at the collegiate level in light pollution and its ramifications on technology and society. An appointment at Yale provides a natural and very welcome home for my grants, as well as many new opportunities for research and access to good students. The future, whether with Van Vleck or not, is as alluring to me as ever.

REFERENCES

National Academy of Science 1996, Reshaping the Graduate Education of Scientists and Engineers, National Academy, Washington
Price D. J. 1961, Science Since Babylon, Yale, New Haven