

IF YOU WANT AN OBSERVATORY, GO BUILD YOUR OWN

On a ridge in California's Monterey peninsula seven astronomers are establishing their own observatory

BY DIETRICK E. THOMSEN

"Big science" is one of the journalistic clichés of our time. Everyone has read about it; everyone has heard opinion makers deplore it. The illustrative citations are famous: Three dozen physicists sign a single paper. It takes less space to print the text than it does to print their names. More than a dozen astronomers from opposite sides of the earth cooperate in radio observations of a distant quasi-stellar object.

Cliches become clichés because they're basically true and because, like the weather, everybody talks about them but nobody does anything about them. Astronomy is an almost pathological example of big science in operation. Research is concentrated more and more in a few large observatories. (There are now more than 20 telescopes on top of Kitt Peak, perhaps the world's densest concentration of astronomical equipment.) The young astronomer who wants to do research with minimum hindrance must find a position at one of these observatories or at one of a small number of universities that maintain sizable graduate programs in astronomy. Otherwise, any research at all is likely to be confined to quick trips to distant observatories during vacations, and months of fervent prayer that it isn't cloudy over Kitt Peak or Mt. Hamilton during Christmas week.

Can seven young astronomers find opportunities for research, personal satisfaction and economic survival by opting out of the trend and founding their own small observatory? The seven are Craig Chester, Cynthia E. Irvine, Nelson Irvine, Lee McDonald, Albert Merville, Hazel E. Ross and William Bruce Weaver. Six are former students at Case-Western Reserve University in Cleveland. In 1972 they founded their own astronomical research organization, the Monterey Institute for Research in Astronomy. Today they have a 36-inch telescope installed in Cachagua Valley near the coast of California. They are completing the building to house it and are eagerly looking forward to the day when it is in regular operation.

They started with dissatisfaction at the opportunities open to them and a sug-

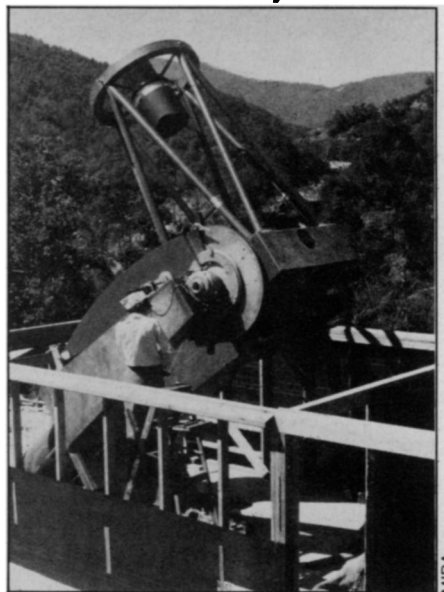
gestion made by an older astronomer. They have generated a good deal of support among the astronomical community, but have also encountered a lot of skepticism. They are counting, ironically enough, on the newest techniques in telescope operation and data recording and processing, the same developments that are driving astronomy into larger and larger concentrations, to enable them and their relatively small telescope to make significant contributions.

To start the Monterey Institute meant reversing certain priorities that other people take for granted.

Most people go where there is a job with a salary attached. If that takes a young astronomer to a school thousands of miles from a major observatory, well, those are the breaks. The Monterey group decided to go where the observing would be best. The coastal mountains of California have probably the best astronomical seeing in the continental United States. Chews Ridge, where they hope to locate permanently is, at 5,000 feet, above the local inversion layer and benefits from laminar flows of air that reduce turbulence considerably.

But there were no jobs, and there was no institution to receive them. Cynthia Irvine remembers that she and her husband came to California with nothing but their clothes—no money, no jobs. Astronomers generally tend to hope that their work in astronomy will support them. These seven are developing other means to support themselves so that they can do research in astronomy. One such project is a book jobbing operation, wholesaling books to schools and other institutions. One reason for choosing it, Chester points out, is that it is a well automated operation and so will not take up an overwhelming amount of their time. Merville stresses that they are not against teaching; he works as a teacher in the local schools. But their first priority was to provide themselves with the opportunity to do the research they wanted to do.

To found their own institute they had to forego or find a substitute for some of the support mechanisms provided by large observatories and universities. One of the most important of these is the opportunity to talk to other astronomers and to use a good library. An important reason for choosing Monterey instead of some other place in the coastal mountains was that it is just across the bay from Santa Cruz. At Santa Cruz is a branch of the University of California with a good library and lots of astronomers. (The headquarters of the Lick Ob-



36-inch telescope has a temporary home.

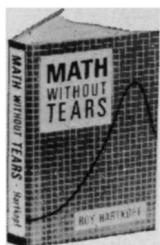
servatory are now at Santa Cruz.) Another necessity is computer time. Large observatories have their own data processing systems, and astronomers spend a lot of time at computer terminal consoles. The Monterey Institute has its own computer system, the components of which were donated by the manufacturers of the various pieces of equipment.

The final necessity for founding your own observatory is capital for buildings and equipment. The seven astronomers could find means of supporting themselves but they did not have the capital for equipment. In this there were some fortunate developments. Through the good offices of Martin Schwarzschild of Princeton University they were able to get the indefinite loan of a 36-inch mirror that had been built as a backup for one of NASA's projects and never used. The Research Corporation made a grant of \$76,000, and there have been other donations of money and equipment. The seven astronomers continue to seek support, and they hope to get much of it from local sources. Merville expresses the belief that astronomy should be supported at least in part the way symphony orchestras are supported. He doesn't want the federal government to stop supporting astronomy, but he believes alternate funding channels should be developed.

It has taken five years to bring the Monterey Institute to its present state of near completion, longer than the members expected, and their connection with the Institute begins to look like a commitment to an organization that will be there when they are gone. Now that they have it, however, it allows them to embark on long-term research projects, on studies that they would like to do rather

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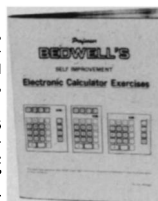
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than on work likely to advance a career. The usual fate of a young astronomer, as is the case with academics in most departments, is to spend a few years at one university, a few years at another and so on until he or she has a sufficient reputation to attract the offer of a tenured position. Research projects tend to be interrupted by moves, and a reputation is usually better built by completing several short projects rather than one long one. Yet in astronomy it is often the projects that take many years that yield the most mature fruit rather than what Cynthia Irvine calls "quick and dirty" ones.

A major project on which MIRA intends to embark is a resurvey of the Henry Draper catalog, one of the standard stellar catalogs that astronomers use. They expect to get spectral information on 125,000 Northern Hemisphere stars, using half the telescope's time for five years. They can get it so fast because the telescope and its building are designed for fast pointing. (MIRA's telescope shelter is not a dome, which has to be rotated, but an oblong structure that will slide completely away from the telescope when it is in use.) Using another telescope, even one with a fairly well-automated pointing mechanism, Chester estimates, it would take about five minutes to find a given star, but only one minute to observe it. Cutting the pointing time materially makes the survey go much faster.

The survey will lead them into other things. It will surely make important contributions to knowledge of the spectral classification of stars and the processes of stellar evolution. They are certain it will turn up unusual objects that it may be profitable to investigate for themselves. Some members of the group are particularly interested in young stars and cool giants. Although, as Merville says, they are primarily stellar astronomers (and that is why a 36-inch telescope fulfills their needs), they do have interests in extragalactic objects such as spiral galaxies. They are also interested in developing new equipment, especially a spectrophotometer based on a Reticon sensor.

Although the group has grown from six to seven with the addition of Lee McDonald, they do not want MIRA to grow too big. From time to time they expect to entertain visiting astronomers and occasionally to have students working with them, but they do not want to become the nucleus of a new educational institution. One thing they do not like in the traditional academic career is that an astronomer who does graduate teaching is expected to replicate himself, producing a baby astronomer every three years. This contributes to overpopulation in an already crowded profession, and they don't want that. They also do not want to become the nucleus of a large observatory. The present smallness of the group gives them flexibility and a freedom from bureaucratic organization. □