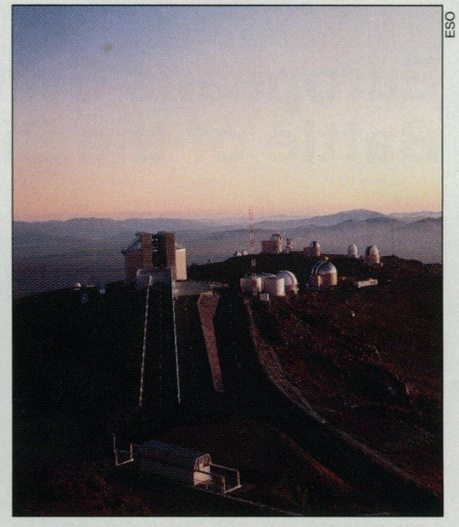
ASTRONOMY

New Telescopes Bring Europe Closer to the United States



ESO

Telescopes. La Silla *(above)* in December 1991, and Cerro Paranal, the future site of the VLT *(left)*.

MUNICH—Last year, astronomers got their deepest look so far into the outer reaches of the universe. It was a view that showed huge numbers of galaxies around the 29th magnitude—so remote that they are about as faint as the glow of a cigar seen from the distance of the moon. Another first for the Hubble Space Telescope, or the big U.S. ground-based instruments that have dominated optical astronomy for three decades? No, this discovery came courtesy of the European Southern Observatory (ESO) and a state-of-the-art telescope perched atop a mountain in Chile. And you can expect more key findings from European astronomers in the years ahead, for the center of gravity in astronomy is shifting toward Europe. "We have the sense that we are moving towards something really great. It's a euphoric feeling." says Richard West, a Danish astronomer at the ESO's headquarters in Garching, Germany. The excitement is even being felt across the Atlantic: "The Europeans are going like gangbusters," says Andrea Dupree of the Harvard Smithsonian Astrophysical Observatory.

West is euphoric because in the past few years, European groups have built or begun some of the world's most advanced ground-based telescopes, covering almost every sector of the electromagnetic spectrum. Most impressive of them all is the ESO's Very Large Telescope (VLT), now under construction in Chile. When it is finished in 1999 this four-telescope array will be the world's largest optical telescope. It will join ESO's New Technology Telescope (NTT), completed in 1990, which uses computer-assisted "active optics" to yield images that are up to three times sharper than those of telescopes using conventional optics. And in radio astronomy, the 30-meter telescope of the Institute for Millimeter Radio Astronomy (IRAM), run jointly by France and Spain in the Sierra Nevada near Grenada, Spain, is one of the two best telescopes in the world in the millimeter waveband. Add to these a dozen other telescopes that began operating in the 1980s or are in various stages of construction and planning, and you'll see why European astronomy is forging ahead.

Behind this astronomical building boom is an array of multinational collaborations for specific projects, cemented together with long-term, stable funding. Consortia like ESO, IRAM, and half a dozen others, with anywhere from two to 13 member states, form a strong but flexible skeleton upon which European astronomers can build. No one organization is dominant, but one or the other is usually in a position to build whatever project the astronomy community proposes—with a few notable exceptions.

Multinational consortia in Europe provide budget agreements that would be unthinkable across the Atlantic. In the United States, big science projects are funded through annual appropriations and need to be sold over and over. As one ESO researcher puts it, "We don't need to produce sensations every week" just to keep the money flowing. "In America," says this researcher, "you need a much harder sell than you do here."

ESO typifies the European approach. In addition to paying annual dues to maintain ESO staff and facilities in Germany and Chile, member states agree separately on each large project and commit themselves irreversibly to funding it. This gives a project like VLT, with an overall budget of more than $200 million, a guarantee of support over several years that allows astronomers to get on with their work. The tradeoff is that ESO has to deliver each telescope on time and within budget. "If it looks like we will go over budget, we have to simplify the design," says ESO director-general Harry van der Laan.

The system does, however, have its flaws. Take the case of a Dutch-led consortium for very long baseline interferometry, which is struggling to get funding to build a new correlator to bring together the signals (and so improve resolution) from 20 scattered radiotelescopes. The correlator, which would achieve capabilities close to those of the U.S. Very-Long-Baseline Array, was selected by the European Science Foundation as the single most important astronomy project in need of European funding in 1990. Yet for the past 5 years, Richard Schilizzi of Dwingeloo Observatory in the Netherlands, the correlator project manager, has been lobbying the European Community (EC) in vain for the relatively small sum of $21 million. The problem says Schilizzi, is that the project is "not backed up by a treaty" between countries—it is simply a proposal from a set of European observatories. And without a treaty to prod member states to contribute, individual nations tend to give their own projects higher priority.

Despite this remaining tendency to put national interests first, astronomers like West of ESO say they see Europe "moving toward a much larger degree of unity" than has ever been the case before. West points to the recent formation of a European Astronomical Society (EAS) as an example. Like its counterpart in the United States, the American Astronomical Society, EAS will sponsor meetings and encourage contact among scientists, says West, and could become a forum to identify common European interests.

But increasing collaboration within Europe does not mean that Europeans are just looking inward. Both Italy and Great Britain are beginning large-scale collaborations with the United States to build large optical telescopes in both hemispheres. And astronomers in all countries stress that scientific merit is what matters in choosing a partner.

European astronomers do, however, anticipate a subtle change in the attitude they expect from their American colleagues: "We were children, and now we have grown up," says Franco Pacini, director of the Arcetri Astrophysical Observatory near Florence. "The Americans will realize that we are their equals and they can't overlook us any more."

–Steven Dickman

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