many faculty committees, which refused to suggest any women candidates. Naturally, women quickly became frustrated, and "we stopped applying," recalls immunologist Margot Zöller of the German Cancer Research Center in Heidelberg.

The existence of this kind of backlash means the climate for women scientists in Germany is not about to improve overnight. "Things are changing, but very, very slowly," says statistician Nanny Wermuth of the University of Mainz. Indeed, many women scientists believe German labs will become a genuinely friendly environment for female researchers only when the current older generation of ultra-conservative professors, who subscribe to the "Kinder, Küche, Kirche" philosophy, are replaced by men who know professional women, and their needs, close-up. Says virologist Karin Mölling, who last year left Germany for the University of Zurich after 25 years in the MPS: "I wish every man a successful daughter."

–Peter Aldhous

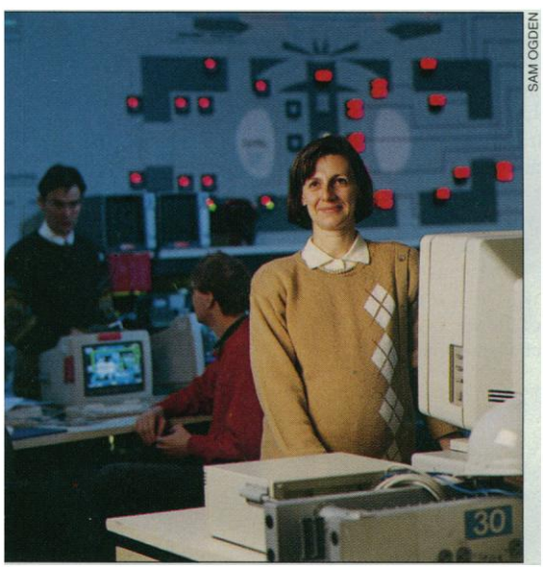
ITALY

Warm Climate for Women on the Mediterranean

Italian women in physics say they find little discrimination in their field

When English particle physicist Cherrill Spencer moved to the Italian National Lab at Frascati, on the outskirts of Rome, in 1972, to work on an electron-positron storage ring experiment, she says she had two unexpected experiences—one negative, one positive. The first was constant, unwanted attention on the streets of Rome. "I have light brown hair but there I was considered a blonde," she says. "I don't consider myself particularly attractive, but I couldn't walk three feet without men pestering me and asking me for my phone number." The second experience was more appealing: For the first time in her career, Spencer found herself working with other women physicists. And, to make it easier for female researchers with children, the lab had a free on-site child-care center. "It's a great anomaly," she says of the position of female scientists in Italy.

That was 22 years ago, but the anomaly still exists. Although Italy may not be known as a bastion of feminist ideals, growing numbers of women are finding a place in the traditionally male-dominated world of physics. Statistics collected by Jim Megaw of Canada's York University and published in a report by the U.S. National Research Council show that of a sample of 572 physics professors in Italy, 23% are women, compared with 3% in the United States. The same study revealed that Italian women hold 29% of physics bachelor's degrees and 21% of doctorates—compared with 15% and 9%, respectively, in the United States.



No way out. Nuclear physicist Francesca Bombarda says Italian girls benefit from being required to take math and science courses.

Interviews with more than a dozen female physical scientists who have worked in Italy reveal women there feel that, in spite of the street harassment, they are treated as equals in the arena of physics. Indeed, many who have worked in both places say the climate for women in physics is better in Italy than it is in the United States. "As a physicist you don't experience discrimination from direct colleagues," says nuclear physicist Francesca Bombarda, who is pursuing a career in fusion research at one of the major Italian national labs run by ENEA (the Agency for New Technologies, Energy, and the Environment). And—ironically, in view of the climate on the streets—she adds that within the scientific community "problems like sexual harassment are almost unheard of."

High-energy physicist Alessandra Ciocio, now at the Lawrence Berkeley Laboratory, says that after working in both countries, she finds that Americans pay more lip service to equality for women than Italians do, yet American women physicists have to fight harder to get the credit they deserve. "It's true that men [in Italy] will never let you pay for a meal and they will always open the door for you," she says. "But this kind of behavior doesn't affect your life [as a scientist] there." "In the United States I have to shout to get anyone to listen to me, and then I get accused of sounding hysterical," she says. "I'm much less offended by men opening the door for me than I am by having to struggle to get noticed."

How is it that Italian society can seem sexist on the surface yet be welcoming to women in the generally male domain of physics? Tradition is one factor cited by several of the women interviewed by *Science*—and this is borne out by a key historical work on the subject, *Woman in Science*, by a Notre Dame chemistry professor (and Catholic priest), H.J. Mozans, published in 1913. Italy, says Mozans, boasts a history of female intellectual achievers dating back to the middle ages. Women were allowed to attend the first Italian universities from their inception during the Renaissance.

From those universities emerged a handful of acclaimed female academics, including a prodigy and mother of 12 children named Laura Bassi, who in the mid-1700s was awarded a chair of physics at the University of Bologna, as well as a place in the prestigious Academy of Science at Bologna. While women in other European countries had to retreat to convents to pursue advanced studies, says Mozans, "the women of Italy were taking an active part in the great intellectual movement inaugurated by the revival of learning...in art, literature, and science."

Many of today's Italian women physicists say they think this tradition has helped to provide a welcoming environment for their careers. "In Italy, there are role models," says Ida Peruzzi, a particle physicist trained in the 1950s in Italy. At the time she was trained, she says, women were a smaller minority, but, "there was a tradition [of women in physics] so I knew that it was something I could try for." Peruzzi went on to work on accelerator projects in the United States and Italy, and she says she was viewed as much less of an oddity by her

Italian colleagues than she was by those from the United States or northern Europe.

University of Torino particle physicist Rosanna Cester, who also started her career in the 1950s, says she was surprised by the reaction she got when she traveled to the States to work at Fermilab. "They [physicists] didn't know how to deal with me. That's not been the case in Italy. Here it was always a more natural and accepted thing."

Tradition is helpful, say other female physicists, but it is not the decisive factor. A more powerful influence, they argue, is the Italian system of schooling. "Girls here are not discouraged from taking math and science," says nuclear physicist Bombarda. In fact, she says, "we never got the choice." In Italy, high school girls don't have the option of dropping out of math and science—and thereby foreclosing a science career—because those courses are required for everyone. Bombarda says that in Italy many girls who might not otherwise have considered a career in science develop an interest during high school—at a time when many girls in the United States have long since stopped taking science courses.

The influence of education and training on women doesn't end after secondary school. Italy's higher education system puts aspiring scientists through a system of training strikingly different from the one that prevails in the United States. In Italian universities, people training to be high school physics teachers take the same courses as those training to be researchers in physics. Since women dominate high school teaching in Italy—even that of physics—women often outnumber men in university physics departments. The result, says particle physicist Cristina Marchetti, is that at the undergraduate level, "women physicists feel neither isolated nor odd." And the inevitable result is that some talented women who began by contemplating a high-school teaching career wind up going into research.

LIBRARY OF CONGRESS

Productive. Laura Bassi was a physicist at the University of Bologna in the 18th century—and the mother of 12 children.

Women have traditionally received another advantage—at least by comparison with the U.S. system—after graduation from university. Until the last couple of years, scientists in Italy didn't go to graduate school. Instead, they left their undergraduate institutions with a degree called the Laurea, roughly equivalent to a master's degree, and went straight into postdoc positions or other low-paying research jobs. At that stage, a young scientist can secure the equivalent of an assistant professorship through highly competitive national competitions called Concoursi, in which hundreds of aspirants compete for the fewer than 50 openings per year. A panel of established professors selects the winners, who all get a position but can't choose their fate; they go to whichever Italian university chooses them.

Italian-born superstring theorist Chiara Nappi, now at Princeton's Institute for Advanced Study, says qualified women benefit from the formal, uniform nature of the Concoursi. In the United States, she says, criteria for selecting assistant professors vary from institution to institution and depend on contacts and recommendations—both of which are susceptible to "old boy networks." The Italian system makes everyone present their work in the same format before the same panel. This, she says, creates a more level playing field for the genders. "If you make it, you make it according to ability," she says. In the United States, she adds, "it's harder to prove you are good."

After that first job appointment, Nappi continues, the Italian system remains woman-friendly by allowing people to climb the academic ladder at their own pace. A young physicist can stay in lower-level positions for as long as 10 years while starting a family, and move up later without the stiff penalty an American physicist would pay by delaying. "There's more room to combine family life and physics." Helping out further, the country provides free day care for all working women.

Other women physicists add that the Italian tradition of strong extended families gives them an advantage, because they always have relatives handy to help with child care when research demands long hours or travel—alleviating, at least in part, the work-family split that rends female scientists in the United States. "Whenever I have a conference my mother can take care of the children," says particle physicist Monica Altereli, now at CERN.

But these favorable influences don't warm the climate for everyone. In reality, they operate mainly for the benefit of well-educated women from the well-to-do upper and middle classes. Women (and their male counterparts) from the lower classes still find it nearly impossible to realize—even to acquire—dreams of scientific success. A career in science requires years of education followed by low-paying postdoc-type jobs, with no guarantee of a professorship or other higher-paying research position at the end. Many of the women interviewed said they survived only by dint of considerable financial help from their families—help that poor families are in no position to provide.

And lest all the happy impressions above suggest that Italy is a paradise for female scientists, it should be noted that a recent survey of the national labs run by ENEA indicates that women are hitting a glass ceiling. ENEA has some 5000 employees in branches throughout Italy, and of those only 160 are the elite: lab chiefs. And of that number, only two are women. Furthermore, many female researchers in the survey said they felt they did not receive enough recognition for their achievements.

Veteran physicist Milla Baldo-Cholin, who is often looked up to in Italy as a sort of "physics matriarch," points out that while 23% is a higher percentage than that of many other countries, it is less than one-quarter of all physics professors. She prescribes self-esteem boosting to increase the number of women physicists, in Italy and in countries where there are fewer female physicists. "If you think things are more difficult for you because you are a woman, you will be less confident," she says. "The difficulty is more in ourselves than outside." In Italy, where the climate for women in physics is fairly warm, that seems to be true.

–Faye Flam

"If you make it, you make it according to ability."

–Chiara Nappi