for every three people, two disappear." She says she knows of one bright postdoc who got burned out in a highly competitive lab and ended up taking a job that was "below his level." She says: "It's like a dysfunctional family. He'll pass on his bitterness."

Molecular biologist Harry Noller, whose lab at the University of California, Santa Cruz, is exploring the structure and function of ribosomal RNA, encourages informal collaboration, reminding colleagues that the more projects they get involved in, the more papers they'll have their names on. In most of these labs, camaraderie is reinforced by regular meetings where researchers discuss their work. Managers also meet with workers individually.

Some managers also stress the importance of doing things together outside the lab. "Sometimes we take an afternoon, go to the lake with picnic lunches, and have our lab meeting there," says Schwartz at Duke.

Independent investigators. Just as important as bringing smart people together is knowing when not to micromanage them. "The very good people you by and large leave alone and reward" with raises and awards, says Nabil Amer, a condensed matter physicist at IBM's T. J. Watson Research Center in Yorktown Heights in New York, where he manages 28 researchers in the nanoscopic physics group.

"If there's one thing that's emotionally deadening, it's not having an arena where you can be creative," says Bishop of AT&T. "[You can't] spend all of your time worried that the guy above you is going to second-guess you."

Don't be an absentee manager. At the same time, good managers seldom stray too far from the premises. "When you stop working in the lab, you stop appreciating what the problems are," warns Noller. "I try to go in the lab several hours each day." He adds: "It also dignifies working in the lab, so to speak—I don't want to raise scientists who think it's cool to be a scientist flying around to meetings." Staying close to the lab can head off problems. "I'm always very close to the experiments and the data," says Noller. "It'd be very hard for someone in the lab to fake an experiment."

Honest feedback. The people skills required to manage a lab also include being able to handle uncomfortable confrontations. Schwartz, for example, had to tell one researcher that she did not think that person was cut out for independent scientific work. That researcher is no longer in the lab.

Managers should be able to take feedback as well as dish it out, says Bishop, who has his researchers fill out an anonymous questionnaire. Early in this practice, he learned that "I am an opinionated, overbearing jerk," he jokes. But Bishop thinks he's gotten better—he tries not to tell people what to do but to ask them questions that help them see for themselves.

Like good scientists, good managers experiment with their groups to find out what works best for that mix of people at that time in that lab. The bottom line, they say, is to learn as you go. As Bishop puts it: "Part of the problem of trying to be a science manager is that no one ever wrote a book."

–Ann Gibbons

PLANNING AHEAD

Retirement: When to Go And What to Do

Both academia and industry are offering sweet buy-out deals.

Today may not be a good time to be entering the scientific job market, but for many, it's a great time to be leaving it. Both industry and academia, anxious to trim payrolls and unclog the pipeline for younger researchers, are offering tempting early retirement deals. The University of California (UC) system, for example, recently lured close to 20% of its tenured faculty into retirement with incentives such as giving a 55-year-old benefits ordinarily not accrued until age 60 (*Science*, 20 May, p. 1074). And retirees are finding that new communications technologies are making it possible to continue to work and stay in touch to a degree never imagined a few years ago.

In recent years "the whole dynamic of retirement has changed," says John Hansman of the department of aeronautics and astronautics at the Massachusetts Institute of Technology (MIT), head of a committee examining his school's retirement policies. One reason is the aging of university faculties: The percentage of faculty members aged 45 or older went up from 45% in 1979 to 59% in 1989, according to the National Research Council (NRC). Another is that many younger people are retiring as institutions try to cut costs.

Universities once had a sure-fire way of getting high-priced professors off the payroll: retirement at age 70. But in 1986 Congress outlawed mandatory retirement ages in most professions. An exemption for academia ran out last January. As a result, academics have gained new leverage. The law has "actually created a good that didn't exist before—the individual professor now has control over the ability to continue working and can sell it," observes Brett Hammond of TIAA-CREF, the primary retirement fund for academics. Although an NRC panel concluded in 1991 that "decapping" retirement wouldn't have a major impact in academia, some research universities fear otherwise. Committees at both MIT and the University of Chicago, for example, have analyzed retirement patterns and concluded that people will be hanging on longer.

The economic pressures and demographic shifts are forcing universities to take a hard look at how their faculty members view retirement. They are finding that people are attached not only to their jobs, but to a way of life, says biologist Alexander Glazer of UC Berkeley. With retirement, "they essentially feel divorced." They may be cut off from club memberships, committee positions, parking places, library privileges, and lab access.

Schools are now responding to these concerns. The University of Chicago, for example, has finally started providing low-cost post-retirement health benefits. It also offers an early retirement incentive: Starting at age 63, you receive a cash bonus if you commit yourself to retiring 2 years before you do it. Yale University has been using another approach: phased retirement. Professors can continue at half time for up to 3 years, starting at age 62. Harvard University also wants to

help people "avoid the sense of falling off the cliff into the unknown, which was happening to our emeritus professors," says dean of faculty Jeremy Knowles. Now, all emeriti are entitled to office space; they can be invited to offer courses or seminars by their departments; they can be on university committees; and they have access to support services and small internal grants.

Reasons for leaving. Now that academics are uncapped, why do they go when they do? After talking with several dozen retirees and university officials, *Science* found that—assuming good health and adequate finances—the main reason academic scientists want to retire is so they can work. Dean James Wright of Dartmouth College says that when faculty members are asked about retirement, "the financial things are not the things they want to talk about. The focus is on how to stay involved." The retirees *Science* talked with were happy ones. But they emphasize repeatedly that, as Temple University biologist Dorothy Berner puts it, "you have to have a plan....If you don't have a focus you have a very difficult time."

Too good to pass up. Some researchers have taken early retirement because the deals they were offered were too good to refuse. Crystallographer Jim Stewart, age 63, says that 5 years ago his department chair at the University of Maryland offered to put him on 12-month (as opposed to 9-month) appointments—which would increase the state contribution into his retirement plan by 25%—if he would retire in 4 years. Stewart took the bait. Now he's moved to Pennsylvania, where he is doing crystallography on his computer, building a solar house, and planning to go into solar energy consulting.

Berkeley biologist Alexander Glazer cut a different kind of deal: At age 59 he is getting extra years of retirement credit in exchange for spending one third of his time running the department of molecular and cell biology. The rest of the time he's his own man. "Now I can do the thing every academic dreams of but never does, namely work," says Glazer.

Dropping the hassles. If there's one thing you're almost guaranteed to hear from the retired academic, it's relief at not having to serve on any more committees. Robert Textor, a "futures anthropologist," took early retirement in 1990 after 25 years at Stanford University and headed up to Portland, Oregon. "Now I go to my computer in the morning with a song in my heart because I am deciding what I will do with my time. Not some committee—no lectures to prepare, no doctoral candidates to advise." Instead, Textor is on a commission helping Portland plan for its long-term future.

A lot of people are also glad to shed their teaching loads. "I had 20 years of large introductory biology classes," says Berner of Temple, who retired in 1991 at age 62. And it wasn't getting any easier—"Students are not as literate and well prepared as they used to be."

Change. Some people grasp retirement as an opportunity to try something different. Psychologist Donald Norman, age 58, was the founding chair of the department of cognitive science at UC San Diego. He says he could have comfortably spent the rest of his life there, but was prodded by his wife to think about taking one of the UC buyout plans. While he was thinking, he got a job offer from a small company, but it didn't seem much different from his university job. That catalyzed Norman's realization that "the whole point of leaving [UCSD] was to change my life. I wanted a career where it was very different."

So he persuaded Apple Computer, for which he was a consultant, to make him an "Apple Fellow." Now he's "the oldest person at Apple," applying cognitive science and anthropology to the design of a new operating system. He's also doing the opposite of what his wife had in mind, which was slowing down. "I'm a hundred times busier than I ever was."

Personal growth. Social psychologist Paul Bohannon, age 74, retired as dean of social science at the University of Southern California (USC) in 1987, even though the provost asked him to stay on 5 more years. "There is no way I want to spend what the world calls my declining years being a dean," he says. At the time, he was planning to take his pension and explore a *terra incognita*: fiction writing.

That idea evaporated when exposed to reality, but the impetus behind it didn't. What he did instead was "sit down and teach myself my subject all over again....In the course of that, I wrote an introductory textbook in cultural anthropology." This exercise, he says, brought him up-to-date on his subject and "gave me a lot of ideas I've been working on since."

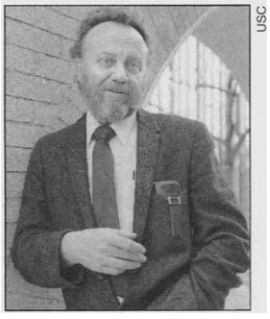
Bohannon stays away from USC. When you retire, you're "assigned a status: honorable but irrelevant," he says. "Most emeritus professors don't have a program of activities....If they don't keep up with change, they grow more and more emeritus until they die of it." Bohannon is feeling very much alive, writing books on culture and ethnic strife, consulting for Exxon on the cultural impact of the *Valdez* oil spill, and getting 45-year-old photos from Africa computerized for access by scholars. Says he: "I feel from the eyebrows up I'm in better shape than I've ever been before."

End of the tunnel. Sociologist Wendell Bell, age 69, of Yale says he decided to take phased retirement because "one often has a lot of things to finish, and you begin to think you may run out of time. I feel fortunate that I recognized I was running out of time while I still had some." Bell, who is working on a book, *Foundations of the Futures Field*, says, "I see some of my friends making the mistake that they'll keep on doing what they're doing...because of their fear of change, fear of disengagement." He could not be happier with how his retirement is unfolding: "In my life I felt I was on a merry-go-round....Now, I feel I should have been on phased retirement all my career."

"There are two kinds of eggheads—those who look ahead, and those who run the late parts of lives from the rear-view mirror," says Bohannon. "I think it's very necessary to start over." Whether scientists choose to stick around the alma mater, set up a business, or head off to that computer in the woods, more and more appear to agree with him.

–Constance Holden

APPLE COMPUTER



USC

Having a ball. Cognitive scientist Don Norman, now at Apple *(top)*, and cultural anthropologist Paul Bohannon—"from the eyebrows up in better shape than ever."

FACTORS IN RETIREMENT PLANNING

Average Rankings From a Survey of 22,000 Faculty Members

1 = Not important 6 = Very important

Overall financial status	4.4
Eligibility for full retirement benefits	4.4
Desirability of more personal time	4.1
Other interests	3.5
Working conditions and policies	2.9
Availability of early retirement incentives	2.6
Personal health	2.5
Annual salary increases	2.2
Availability of emeritus benefits	2.2
Mandatory retirement policies	2.1
Other employment opportunities	2.0
Health of a spouse	1.9

Source: G.G. Lozier and M. J. Dooris, *Faculty Retirement Projections Beyond 1994* (TIAA-CREF and Univ. of Pennsylvania).

Launching the golden years. For scientists, "personal time" often means time to work.