time as too speculative and risky because the system is so conventionalized." But whether there has actually been a decline in the quality of those entering science is a question that sharply divides observers of science. Some scientists do agree with Stephan. A Gallup poll commissioned by the Pharmaceutical Manufacturers Association Foundation early this year showed that, of the respondents, 41% of academic researchers and 44% of NIH grant-holders think that the quality of American graduate students entering biomedical research is going down. Only 21% and 15%, respectively, think the quality is on its way up. In a typical comment, Margaret Geller of the Harvard/Smithsonian Astrophysical Observatory told *Science*: "The brightest people aren't being attracted to science...even the best are not what they used to be."

But several big guns emphatically reject Stephan's views. Atkinson says, "The young assistant professors I've seen are more capable and more brilliant than ever in the past." Says Lederman: "My impression is that scientists if anything are publishing more per person than ever before." And Robert Rosenzweig, president of the Association of American Universities, says, "I have never seen evidence that I thought was reliable" indicating that young scientists are not producing at the level of previous generations.

And some in Stephan's own field question her view of the students who go into science. Cornell University economist Ronald Ehrenberg notes that Howard R. Bowen and Jack H. Schuster, in a 1986 book on American unversity faculty, reported from a poll of department chairmen in the humanities, arts, and sciences that graduate students seemed "better" in the mid-'80s than in the late '60s. Another study indicated that top scorers in undergraduate Scholastic Aptitude Tests were *not* increasingly migrating to professional schools rather than doctoral programs. Concludes Ehrenberg: The evidence is "inconclusive."

And even if an economic argument can be made that a shorter supply of Ph.D.s will raise salaries, lure some defectors back from industry, and make academia a more attractive place for potential scientists, would a shortfall in supply really be beneficial? Atkinson, for one, has no doubt that it would not. We need those Ph.D.s, he argues, and if the supply diminishes, the nation will suffer. "We've got to produce a necessary number to maintain the business of society. If we change that mode, then we're just going to change the whole society we're living in....If the economy becomes a totally Third World economy, then we don't need Ph.D.s." ■ CONSTANCE HOLDEN

Europeans Push Computer Plan

Brussels—European physicists, looking enviously across the Atlantic at the $638-million high-speed computing initiative proposed by the Bush Administration, are pushing for an even more ambitious European effort. Last week, a working group of the European Commission, chaired by CERN director Carlo Rubbia, laid out a proposal for a high-speed computer network spanning the continent, and a massive investment in the development of a European supercomputer industry. Total cost: about $1.4 billion a year over the next decade, half from government and half from industry.

"Unacceptable." *Europe needs a supercomputer industry, says Rubbia.*

Europe has a long way to go to rival the United States and Japan in supercomputing, however. Although Europe represents 30% of the $2.6-billion world market for supercomputers, not a single European company manufactures the machines. And that, says Rubbia, is "an unacceptable situation."

It might seem a bit late to play catch-up, but Rubbia argues that Europe has a window of opportunity because high-performance computing is at a watershed. Current machines are capable of several gigaflops. (A flop is essentially one calculation per second.) The next generation will be teraflops machines, capable of 10^{12} flops. That will require completely new approaches to hardware and software, which could be developed in Europe.

The report, drawn up by 18 high-level users of supercomputers, outlines a five-stage program. First would be an effort to encourage the use of existing supercomputers. That's where the new pan-European high-speed network comes in. Existing links are relatively slow and fragmented within individual countries. Rubbia would like to see a multi-megabaud backbone to create what he calls "a European high-performance computing community" and position Europe to build the next generation of gigabaud links. While that is going on, manufacturers should "vigorously" pursue advanced machines, while programmers concentrate on "the inventive development of novel software." Basic research will be needed "to raise the competitive level of European industry." And education and training—even at the high school level—should be stepped up to ensure that Europe's scientists become aware of the potential of high-performance computing.

As for funding, the Rubbia report says spending—currently about $150 million for "advanced architectures and their application"—should increase gradually to about 1 billion European Currency Units a year by 1995. (One ecu is currently worth about $1.4.) But it does not say exactly where that funding should come from. Rubbia took the easy route: "We are scientists and engineers, calling attention to the needs rather than suggesting a clear financial strategy of how to solve these problems."

The working group unveiled its proposal to the European Commission last week, and it got a favorable reception. Fillipo Maria Pandolfi, vice president of the commission, hinted that Rubbia's proposals fit well with future plans of Directorate-General XIII, which is responsible for telecommunications, information industries, and innovation, and which commissioned the report. In 1992 the directorate will reassess priorities under its third Framework program. That will involve concentrating resources in specific areas, Pandolfi said, and supercomputing is likely to be one of them.

Does Europe really need its own supercomputer industry? Rubbia and other members of the working group stressed the benefits that supercomputers bring to science, engineering, and everyday life. But they were less specific on the benefits of building, rather than buying, the capability. "It is just inconceivable to buy everything from abroad," said Rubbia. Pierre Perrier of Dassault Aviation stated baldly that "without a supercomputer industry, Europe would return to the second world. It would not be part of the first world." ■ JEREMY CHERFAS