from a special interest group. Only about half the members of the committee were professional mathematicians, David noted. The other half were representatives of institutions and disciplines that rely heavily on mathematics, including physics.

The committee's report was based on a 3-year study coordinated by Kenneth Hoffman, professor of mathematics at MIT. The report traces the deterioration in mathematics funding to the Mansfield amendment of 1970, which barred the Pentagon from supporting research unless it directly related to defense needs. Pentagon cuts in the early 1970s affected pure mathematics especially adversely. There were supposed to be compensating increases in NSF support, but NSF funding for mathematics research declined in the 1970s and early 1980s, while funding for physics and chemistry increased substantially. The number of mathematics students who received NSF fellowships or traineeships fell 90% from 1179 to 116 between fiscal 1969 and fiscal 1974, the committee found.

According to the committee's report, the mathematics community did not make more of a fuss about the Federal spending cuts in the early 1970s because "(a) mathematicians were extremely worried about an oversupply of PhDs in their field, and (b) at that time, the universities needed more teaching assistants and young faculty, and had the resources to hire them." Demand for undergraduate teaching continued to increase through the late 1970s and into the 1980s (see box at right). During the last 8 years alone, demand for college mathematics instruction rose 60%, the report says.

In addition, the severity of cuts in Federal support for graduate study and research in mathematics was obscured by a tendency until the late 1970s to lump funding for the expanding computer sciences together with support for basic research in mathematics. From 1976 to 1984, Federal funding for basic mathematical research grew at an average annual rate of 9%, while funding for computer science increased an average of 17% a year.

Even now, Hoffman says, there is no satisfactory way to disaggregate all the data for pure mathematics and computer science for the 1970s. But the committee was able to make a rough comparison between funding in the early 1980s and 1968 spending largely because of a special analysis memo done for that year at NSF. Hoffman doubts that the probable error in his 1968 baseline estimate of support for mathematics is more than 10%.—ws

College students take much more math

Despite the shortage of Federal funds for higher mathematics, basic math literacy appears to be rising rapidly among undergraduates, judging from data issued by the American Mathematical Society and the Conference Board of Mathematical Sciences. The data reveal startling enrollment increases in college mathematics classes during the 1970s and 1980s and, consequently, a growing teaching burden on mathematics instructors. The data also indicate unmet demand for mathematics faculty with PhDs and suggest that demand will continue to grow in the years ahead.

In 1981, the Board reported that the number of undergraduates in mathematics per full-time-equivalent faculty member had increased from 77 in 1970 to 83 in 1975 and 98 in 1980. In other words, the teaching burden for the average college math teacher became 27% heavier in one decade. Between 1975 and 1980 alone, course enrollments increased 33%, the Board found. According to a report published by the AMS in February 1984, enrollments have continued to rise rapidly in recent years. The Society estimated that nearly 2.5 million students were enrolled in college math courses in fall 1983, while the Board estimated total enrollments at around 2 million in 1980.

Why the surprising interest in mathematics among the millions? Required remedial math courses, demand for math and statistics in engineering, business, management and environmental studies, along with the booming popularity of computer science, are the principal reasons for increased enrollments, according to authorities on the trends. Harry Lustig, provost at the City College of the City University of New York, explains that remedial courses mushroomed during the 1970s because a growing proportion of high-school graduates were going to college at a time when high-school math requirements had been sharply reduced in many places. Demand for remedial instruction may now be leveling off, says Donald Rung, a Penn State mathematics professor who prepares the reports issued by the American Mathematical Society. Rung expects demand from computer, engineering, business and management programs to remain strong.

Rung thinks that "the signals are improving" for pure mathematics. From 1982 to 1983, he reported in February 1984, there was an 8% increase in the number of full-time graduate students in mathematics, and the numbers of juniors and seniors majoring in math at institutions with doctoral programs climbed by a hefty 20%. Moreover, Rung believes, the prospects of luring math majors into graduate programs seem favorable, provided adequate resources become available, because considerable unmet demand for math PhDs already is apparent. The Mathematical Society's 1984 survey data indicated that US colleges and universities filled 724 full-time mathematics positions with people lacking PhDs in fall 1983 and that they would have preferred PhDs for 401 of the positions—more than half.

The Board, anticipating a large increase in retirements among tenured mathematics professors in the 1990s, reported in 1981 that "there should be many tenured positions in colleges and universities for students now at the point of starting graduate studies." The Board was not sanguine about prospects for the interim, however. It warned that "the continued availability of enough teaching assistants is in doubt, with many departments seeking TAs from other sources in addition to their own graduate students." The Board found that "in 1980, over 25% of all TAs employed by mathematical science departments were not mathematical science graduate students."

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Education

Foundations award new grants for video science productions

Donors of grant money continue to express confidence in the educational value of television programming about science, a well-established if somewhat under-nourished staple on public (but not commercial) networks. Recent awards will support training of television science writers, production of new shows for an exceptionally successful series, and repackaging of another series for use in high school instruction.

This summer, 12 high school physics teachers and administrators were invited to spend two months at Caltech adapting "The Mechanical Universe" for use in secondary schools. "The Mechanical Universe" is a college-level introductory physics course being prepared at Caltech for showing on public television stations around the country, starting in fall 1985. The course was conceived by Caltech physics professor David L. Goodstein, who is managing its production and will serve as host of the show.

Goodstein's objective is to create a course that can be viewed with profit both by the general public and by people with some grounding in science—secondary school teachers, for example, who are being required to teach physics for the first time. Viewers will be able to earn credit for