sharply calls into question whether Stanford Medical School has ever turned out a preponderance of scientists and academicians, even in the biomedical boom days of the sixties. Lawrence Horowitz, a staffer for Senator Edward M. Kennedy's Senate Health Subcommittee, did a survey of Stanford alumni while he was a Robert Wood Johnson Clinical Scholar at Stanford from 1974 to 1977. Horowitz found that the "new," post-1959 Stanford Medical School did indeed graduate significantly more M.D.'s who ended up in medical research and teaching than the old San Francisco-based school had. Even so, he found, only one out of five Palo Alto-period alumni became full-time medical school faculty members. Moreover, a majority of those who graduated between 1960 and 1972 do no medical research, and a majority of those who do spend less than a quarter of their time at it.

"If it is clear that the majority of Stanford students do not want to become scientists or do research in a meaningful way," Horowitz asked in an article published last summer, "then does it not follow that Stanford's education is unbalanced because of a research and subspecialty bias?"

The "Horowitz Report" is not much talked about at Stanford Medical School; out of two dozen interviews with *Science* recently, no one brought it up spontaneously and most brushed it aside when it was mentioned. Last month, however, as if in rebuttal to Horowitz's question, a curriculum reform committee chaired by Robert A. Chase, a surgeon, said the school should take firm steps to ensure more research-oriented and scientifically competent graduates. Specifically, the committee frowned on the growing tendency of Stanford students to get through medical school as rapidly as possible and get on to clinical training; to reverse this state of affairs, it recommended that all students be required to write and defend a thesis, and to stay at least 13 quarters to do it.

The recommendation has not yet been acted upon by the school's faculty senate. So far its critics have been found mostly among the students, who question whether the thesis requirement will produce better doctors, diminish diversity among the student body or even, given its coercive aspect, lead to scientific competency and useful work. Proponents tend to take the attitude that it matters not one whit what the current students think: in the future, if the thesis requirement is adopted, Stanford will attract only those students who *want* to engage in "a scholarly investigative experience." The students' self-appointed ombudsman and faculty spokesman, William Creger, sees it a different way. Creger, who was dean of student affairs at the medical school until he had a falling out with Rich over admissions procedures and other matters 2 years ago, calls the proposed thesis requirement "more depressing than a required religion" and adds caustically: "I think we've got some scientists around here who feel threatened because students don't think they're the only gods any more."

Apart from the particulars of the "thesis" debate, however, the interesting thing about the Chase committee's report is the set of underlying "assumptions" which the authors took the trouble to lay out. Two of the 13 assumptions stand out:

- "Stanford should specifically address the public's need for medical scientists"; and
- "It should not be Stanford's function to meet specific societal needs through production of the number and proportion of various kinds of M.D.'s needed in today's maldistributed pool."

If this language sounds a tad defiant at a time when HEW Secretary Joseph A. Califano is telling the Association of American Medical Colleges to curb "the runaway growth of specialists and subspecialists," the implication is entirely deliberate. In discussions of the Chase committee's report among the faculty leaders recently, someone reportedly pointed out that the school should consider how such statements would read "on the front page of the *New York Times*." But after due consideration, the faculty decided to let it stand.

The document is merely symptomatic, in an unusually stark way, of the tensions within academic medicine in the late 1970's. Stanford traditionalists see their plight as tragic and their resistance as noble. But even one of Stanford's own, health economist Victor Fuchs, sees it in quite a different light. Speaking before the New Orleans convention of the Association of American Medical Colleges in late October, Fuchs said:

"Even a sympathetic, friendly observer can't help but get the impression that academic medicine's interest in health policy begins and ends with two commandments:

"First, 'give us money,'

"Second, 'leave us alone.' "

—RICHARD A. KNOX

Knox, medical editor of the Boston Globe, *is currently a Professional Journalism Fellow at Stanford University.*

Briefing

Toxicologists Struggling for Federal Identity

Environmental legislation of the past decade has been a boon to the still-emerging discipline of toxicology. Toxicologists are in great demand—but short supply—in both the regulatory establishment and the private sector. In the government alone, more than 2000 toxicologists are expected to be employed by 1985, up from a relative handful now working in each of the large agencies, such as the Food and Drug Administration, Environmental Protection Agency, Occupational Safety and Health Administration, and Consumer Product Safety Commission.

In the heady hiring competition between government and the private sector, however, the federal government has more often than not been the loser—in part, the bureaucrats say, because of civil service regulations. The civil service has not yet recognized that the independent discipline of toxicology even exists. On the registers of scientists available for federal employment—from which all applicants must be drawn—toxicologists are classified under any of a number of related disciplines, such as pharmacology, biochemistry, entomology, or veterinary medicine. The result has apparently been a lot of confusion and extra work for applicants and employers alike. Without a separate toxicology register, "we are effectively prevented from recruiting toxicologists on the basis of their particular knowledge and abilities in toxicology," wrote the heads of the four agencies recently to the chairman of the civil service commission, Alan C. Campbell. Difficulty in recruiting, they said, soon becomes difficulty in regulating.

The agencies have proposed that a separate register be established, and that toxicologists be given a federal job description that would make them something akin to Christopher Reeve amid the test tubes. Intensive preparation would be expected in toxicology; substantial preparation would be demanded in physiology, chemistry, and biochemistry; and additional preparation would be required or desired in pharmacology, anatomy, pathology, biostatistics, genetics, neurotoxicity, cytology, immunology, morphology, ecosystems, and epidemiology. These qualifications are similar to those

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being prepared by the Society of Toxicology as prerequisites for the title of diplomate of the American Board of Toxicology.

Although the agencies requested that the separate civil service register be established at the "earliest possible time," Campbell responded that the commission would not be able to make a judgment on the request until 1980 or 1981.

What Went Up in 1973 Is Coming Down This Summer

Before the leaves begin falling this autumn, Skylab will. The efforts of the National Aeronautics and Space Administration (NASA) to prolong its life in orbit until it could be rescued by the space shuttle have now been abandoned.

Between July and September, NASA officials say, the 85-ton satellite will begin to strike the outer edges of the earth's dense atmosphere 60 nautical miles above the surface. The spacecraft will skip along, its smaller parts whirling off to create sparks in the sky from New York to San Francisco and 800 miles out into the ocean off each coast, if fortune plays it that way—over an area 4000 miles long (east-west) and 100 miles wide (north-south) that NASA has injudiciously termed a footprint. In all, two-thirds of the spacecraft will be consumed by fire.

With little predictability, some of the larger parts of Skylab will plunge through the atmosphere, striking the earth in the area of the footprint at up to 300 feet per second. Between 400 and 500 pieces, or 25 tons of large debris, will drop. The largest, a film vault and an air-lock shroud, weigh 4000 and 5000 pounds apiece. They might come in together.

Unfortunately, NASA will not be able to predict the sites of impact with any precision. As late as an hour and a half before everything actually starts raining down, NASA will only be able to restrict the target area to 12 percent of the earth's surface. The chance of a piece dropping on a city of 100,000 people or more is 1 in 7, the agency says; the likelihood of a piece weighing 250 pounds or more falling on such a population center is 1 in 40. Soothingly, only one large piece is likely to fall in a single city because of the wide dispersal of the wreckage. As John Yardley an associate administrator of NASA, said at a recent press conference, "The nice thing about Skylab is that it is nondiscriminatory."

Only with great reluctance did NASA end its efforts to rescue Skylab, on which it has recently spent $26 million. "We in NASA are sorry to have to take this action," said Yardley. "Skylab has been a good friend." The agency has been talking electronically with its friend since April, getting it to stop spinning and to put its nose forward, thereby reducing drag. Were the agency to keep it in that mode, its orbital lifespan would be extended by 1 year to March 1980. The capabilities of the craft have been taxed near the limit, however, and it was doubtful that the rescuing shuttle could be launched in time.

Had everything worked perfectly, the shuttle crew would have attached a space booster, the teleoperator retrieval system (TRS), designed to push Skylab to an orbit that would keep it aloft until it could be reused (*Science*, 7 April). But the teleoperator has a limited lift capacity, and by the time of the shuttle launch Skylab would have sunk so far that reboosting it would be infeasible. The alternative was to "deboost" it into an ocean, detaching the TRS at the last moment for later reuse. Even this proved too chancy, a judgment with which President Carter personally concurred on 15 December. NASA estimates that it can recover half of the $20 million invested in the TRS thus far, presumably by designing a new TRS for projects other than Skylab. "We really learned our lesson on the TRS," said a staff aide to the Senate subcommittee on science and space. "It was too hastily conceived and begun."

Few scenarios for preventing Skylab's fall have gone unconsidered by the NASA staff. Blowing it up in space, if possible, would cause even more debris to reach earth. The Soviets could not rescue it, because they do not have the proper docking hardware, and their docking technique demands a cooperative target, which Skylab is definitely not. The last remaining fuel on board Skylab cannot be used to target its fall, because NASA's ability to control the satellite ends too far above the earth.

So there is little the agency, or anyone else, can do. NASA officials assured *Science* that the public has nothing to fear, and that should Skylab start coming in over Washington, they will be seen outside their building, gazes turned skyward to see the light show. And perhaps to see when to run.

CBS News Plans Prime-Time Science Show

Signs of an increasing popular interest in science and science-related issues have proliferated in the past year, with the introduction of *Omni*, the well-funded new science magazine by the publishers of *Penthouse*, and plans for a children's science program under the direction of the Children's Television Workshop (*Science*, 17 November 1977). The *New York Times* has begun printing a science section each Tuesday, and Time, Inc., is toying with the publication of a new science magazine. The AAAS is also considering publication of a new popular magazine of science.

As yet another sign of science's new popularity, the highly regarded news division of the CBS television network in New York is preparing a pilot for a 30-minute weekly science program to be shown in prime time beginning in March or April. The style of the program will borrow from both "60 Minutes," the highly successful CBS news program, and "Nova," the science program produced for PBS by Station WGBH in Boston. Viewers will be offered four segments on topical issues of science in each program.

"We would like to cover everything from black holes to personal health," says Ron Bonn, who also produced the network's evening news coverage of the Apollo and Gemini space programs. "We'll probably have segments on plate tectonics, the big bang, and how DNA works, each with spectacular graphics."

Whether the show will transcend the inherent limitations of television productions of complex material—scarce originality and oversimplification—is another matter, however. "I think we can get the essence of each topic across in a few minutes," insists Bonn. Like *Omni*, which bills itself as a magazine of science and science fiction and also runs a monthly column on UFO's, the CBS program also may stray far afield topically. "We may, for example, run a segment about the arrival of killer bees," says Bonn. "We would explain, of course, that they're not killers and they're not coming."

Bonn cautions that without a firm air date for the pilot, the weekly science series has not yet become a network commitment.

R. Jeffrey Smith