flexibility. Among selective liberal arts colleges a varied pattern prevails. Tufts, for example, seems to have made relatively minor changes in formal curriculum requirements over the years. Middlebury College, which followed a fairly general trend toward free choice in the late 1960's, attracted attention 2 years ago as marking a countertrend when it added a spread of "foundation courses" to its requirements for graduation. It is

Henry Rosovsky

worth noting that attitudes of liberal arts college science faculty toward science courses of the core-curriculum sort seem to differ significantly from those of their counterparts in research universities. At Middlebury, for example, the original initiative for curriculum change came from the faculty rather than the administration and science faculty appear to concur on the worth of foundation courses in science, some regarding them as providing an opportunity to make converts. A "teaching tradition" persists at liberal arts colleges, but some observers speculate that constriction of the academic job market may result in able but research-oriented young faculty taking jobs in liberal arts colleges and a consequent infusion of the research-university spirit there.

Among some private and public colleges and universities, there is caution about "tightening up" because of its possible discouraging effect on applicants at a time of adverse demographics. At Harvard, market considerations are not primary, so that the core curriculum has been discussed, so to speak, on its merits.

A scientist who has been pro-core curriculum from the outset is E. O. Wilson, professor of zoology, author of *Sociobiology* and best known exponent of the subject. Wilson thinks that "Bok and Rosovsky saw higher education in disarray. They saw that the logical thing for the administration to do was to pull the faculty together, challenge them with the proposition that a core curriculum is possible, that Western civilization has not just exploded into pieces and will never come together again." Wilson says he feels that the Harvard faculty should exercise some responsibility in trying to achieve their aim.

The task is difficult, he says, because of the information explosion. In the natural sciences and social sciences, for example, the number of journals doubles every 10 years. "In 1945, it was possible for scholars to sit around and suppose that certain bodies of knowledge could be summarized in survey courses. No one makes that presumption now."

The challenge is not to identify all important parts of knowledge, says Wilson, but rather to convey what are the essential ideas, the most interesting and challenging information. Why this is so hard for scientists now is because they are not able to cope with broad sectors of knowledge. "The image of the scientist has changed. Scientists are no longer thought of as savants in charge of a large part of knowledge. Increasingly, they are regarded as test-tube jockeys, specialists on a narrow front." It is expecting a lot to ask a scientist to be in the forefront and also a generalist. But admitting that its difficult to develop a core curriculum, says Wilson, is no reason to give up the effort to develop one.

The discussion of the core curriculum during three faculty meetings last spring included some wide ranging reflections on the purposes of the university, but Rosovsky himself sees the case for the core curriculum resting at least in part on a clear obligation to Harvard's undergraduates. In an interview, he observed that Harvard is a "great university which contains an undergraduate college. In a research university the faculty has to meet responsibilities for undergraduate as well as graduate education." That is a hallmark of the American university. Those responsibilities can be met, said Rosovsky, only if research faculty deals with all types of students.

When Rosovsky began to look at the situation 5 years ago he says he found himself compelled to ask "Have undergraduates been getting a fair share of the resources of the university. I concluded that in the 1960's, in general they did not, except perhaps for the top 5 percent of students."

The core curriculum then is in part an attempt to give undergraduates a fairer share. In asking faculty members to participate in redesigning liberal education and implementing the revised version the administration was also asking them to reconsider what their job is. And that could be as important as whether the Harvard graduate of the future can discuss the Second Law of Thermodynamics.—JOHN WALSH

Briefing

One U.S. Group Cancels a Soviet Exchange . . .

The Information Theory (IT) group of the Institute of Electrical and Electronics Engineers has effectively canceled a U.S.-Soviet exchange program because of the Soviets' eleventh-hour refusal to allow some of their most distinguished scientists to visit the United States.

In late October, 4 days before the beginning of a planned week-long U.S.-Soviet symposium on information theory in Mount Kisco, New York, Aaron Wyner of Bell Laboratories, the U.S. organizer, learned that the two leading members of the planned Soviet delegation would not be coming.

Yet for nearly a year, the Soviets had been assuring the Americans that a "very strong" delegation consisting of 14 people the Americans wanted to come would be able to attend. Included in this list were the two leading Soviet contributors to information theory, Mark Pinsker and Roland Dobrushin. Dobrushin is also highly regarded as a mathematician. Although both are Jews, they are part of the establishment. Neither has applied to emigrate to Israel or done anything controversial. The episode is typical of the frustrations that many American scientists have encountered in trying to have meaningful scientific exchanges with their Soviet counterparts.

The IT group signed an exchange agreement with the Working Group on Information Theory of the Soviet Academy of Sciences in 1974. The first joint workshop was held in Moscow in December 1975. In return for the Moscow meeting, the Americans planned to have a 1-week-long symposium prior to a major international meeting of the IT group in Ithaca, New York in October 1977. But when the Soviets proposed a delegation for this workshop that the Americans found "weak," they postponed it for a year.

Wyner says that from 1977 on, the IT group members made clear, both officially and in private talks with their Soviet colleagues, that they would like a strong delegation to come to the October 1978 workshop. "We never delivered an ultimatum, but they knew who we wanted," he says. Their firmness seemed to be rewarded when the Soviets agreed to a 14-member delegation that unexpectedly

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included Dobrushin, who had never been to the United States.

The Americans surmounted several problems in order to keep plans for the symposium on track. After the trial of dissident scientist Anatoli Shcharansky, there was pressure to cancel the plans—but the group decided to proceed because, Wyner says, "they were sending Dobrushin. We thought they were moving positively." The workshop was oversubscribed by Americans who were eager to meet this particular group of Soviets, so some IT group members had to be turned away. And throughout the period, in checking with the Soviets, the Americans were told that the 14 on the list, including Pinsker and Dobrushin, were coming. Two weeks before, in fact, Wyner's counterpart told him that it was "one hundred per cent sure," Wyner says.

However, after the buses had been arranged and special tours of the IBM Corporation and Bell Laboratories set up, Wyner did call again, only to be told by the same man that Pinsker and Dobrushin were not on the list after all. Within hours, the group organizers unanimously agreed to cable back that the workshop was canceled. In December, the IT group board of governors will probably confirm that the exchange has been canceled, although the Soviets hastily asked that it be only "postponed."

"What galls me is that they were just going to get off the plane at Kennedy without Pinsker and Dobrushin. It would have been a disaster. I don't know what I would have done, but a lot of Americans have told me that they would have left, right then and there," says Wyner. Fred Jelinek, a past president of the IT group, says, "It shows that no matter how you try to assure that this won't happen, it does."

. . . And Another Starts One with Vietnam

Hampshire College, in Amherst, Massachusetts, has launched a campaign to raise $13,000 to $22,000 to buy a small computer to send to the Republic of Vietnam. Arthur H. Westing, dean of the School of Natural Sciences at Hampshire, hopes to buy an IBM 5110, spare parts, and technical manuals and pay for the visit of a U.S. physicist to Vietnam to see that it is properly used once it arrives there.

Westing says that the 5110 model is comparable to—but in some cases considerably less capable than—the machines available to U.S. undergraduate students.

If the money can be raised and the computer shipped to the National Center for Scientific Research outside Hanoi, it may be Vietnam's first. The Americans left behind one computer in Saigon when they evacuated, but according to Westing and others who have visited the country, it is no longer operating. Meanwhile, the Vietnamese have built the new center for physics in the North and appointed a bright young physicist, Nguyen Van Hieu, as its director, but the country cannot be very efficient about advancing in physics without a computer. With this model, they would at least be able to perform regression equations and integral and differential calculus. The idea was sparked by Hieu himself, who visited the Hampshire College campus on a recent U.S. tour that included Brookhaven National Laboratory, Harvard, Massachusetts Institute of Technology, Fermilab, and Caltech.

Westing says that he and others at Hampshire view the computer project as the beginning of a series of exchange activities, which could include establishing a fellowship for one Vietnamese scientist to come to the Hampshire campus. Other groups have also been trying to aid Vietnam: the Scientists' Institute for Public Information has helped furnish the library of the National Center near Hanoi, and other instruments have been sent by private donors. The center itself was built a few years ago with Soviet government aid.

One French group headed by an astronomer has organized aid; likewise, medical aid has been organized at the Institut Pasteur. The Dutch have sent the Vietnamese antibiotics and vaccines; the English have also been active. Besides the Soviet Union, Sweden is said to have provided the only other official aid; Sweden is financing construction of an $80 million pulp and paper mill there.

The U.S. government, still tiptoeing toward recognition of Vietnam, is embroiled in a dispute with it over whether to provide official assistance. These days, however, Uncle Sam seems mainly interested in helping the Chinese, with whom the Vietnamese are at war. So official U.S. aid to Vietnam seems a long way off at best.

Victorian Follies

In today's rush to show that all sexes and races are created equal and to support this view with scientific data, it is interesting to look at scientists from the Victorian era who, while serving as exemplars of rationality, soberly "proved" that women were inferior to men. So writes Harvard history of science professor Stephen Jay Gould in a recent article in *Natural History* magazine.

In the 1860's, Paul Broca, a professor of clinical surgery at the Faculty of Medicine in Paris, won a decisive debate by presenting data on the relative weights of 292 male brains and 140 female brains taken from autopsies at four Parisian hospitals. The female brains averaged 181 grams, or 14 percent, less than the male brains.

Broca further found a tiny difference between the cranial capacities of prehistoric men and women. These data were taken from seven male and six female skulls found in L'Homme Mort cave. Since the difference appeared to have been minimal in prehistoric times and appeared large by the time the 19th century rolled around, Broca concluded that women's abilities had been getting worse. It was understandable, a Broca disciple explained, because "A man who fights for two or more in the struggle for existence, who has all the responsibility and cares of tomorrow . . . needs more brain than the woman."

Nineteenth-century feminists, used to rebutting philosophy and emotion, were undone by science. Broca's numbers "fell upon poor women like a sledge hammer," wrote one contemporary chronicler. But Gould, with the clear hindsight of the 20th century, applied multiple regression analysis to Broca's data and found him wrong. Gould dismisses the prehistoric data on the basis of the small sample size of 13 skulls. The discrepancy in brain weights from the Paris autopsies, he finds, can be reduced by one-third if age and height are factored in. The remaining difference could be explained by degenerative disease; more of the women in the sample tended to have had such diseases, which are known to reduce brain size over time. Body weight could also be a factor.

So all Broca proved, in the end, was that we are all human.

—Deborah Shapley