frequency, a feature known as the start transient. The start transients will be present on the original tape but not on any rerecording, because the bias frequency is too high to be reproduced by conventional playback heads.

The White House tape recorder—a Sony 800B—may have left other distinguishing marks on the tape besides the bias frequency. One is the angle of the recording head to the tape; any shift from the vertical can be measured by a reduction in the efficiency of the recording. Another measurable feature is the degree of wear on the recording head (or, more precisely, the difference in wear between the top and bottom halves of the head). The wow and flutter, caused by imperfections in the capstan, are also a characteristic of each machine. Though none of these features by itself is definitive, together they should serve to fingerprint the White House machine beyond any reasonable doubt.

Unfortunately the particular speed at which the White House recorder was played may put the bias frequency studies suggested by Blesser at or even beyond the limits of present technology. To pick up the bias requires a playback head with a gap between its magnetic poles which is no wider than the frequency wavelength. The Sony 800B has a bias frequency of 55,000 cycles per second and was played at a speed of 15/16ths of an inch per second, giving a wavelength of 17 microinches. The smallest gap available in commercially produced heads is 60 microinches. Even with a custom-built head, the minute separation caused simply by the surface finishes on the recording head and the tape might have prevented the bias frequency from being recorded in a recoverable way.

If the bias frequency cannot be recovered, it may be possible to use other periodicities on the tape instead, such as the 60-cycle-per-second hum of alternating current.

Another approach outlined by Blesser is to look at the acoustics in which the recording was made. According to the White House, some of the microphones were concealed in desk drawers. A desk drawer will act like a sound box, with a particular dominant resonance that can be identified from the tape recording. If any rerecording had been made with the mike outside the drawer or even in a different position in the drawer, there would probably be a noticeable discontinuity in the energy pattern of sounds recorded on the tape. The expert placed on the panel to study this possibility is Thomas Stockham of the University of Utah. Stockham has developed a computer program for improving old Caruso recordings by subtracting the undesirable acoustic qualities of the horn Caruso sang into. The same method should be capable of pinpointing Nixon's drawer.

A third kind of test for editing, according to Blesser, is analysis of various speech factors. One such factor is the intonation pattern that rises and falls continuously throughout a sentence. Excision or insertion of a phrase will produce an evident discontinuity in the pattern. Another anomaly caused by trying to edit the continuous stream of human speech can be detected by making sound spectrograms, or voiceprints. Most speech sounds are com-

SIPI Appeals for Aid to Vietnam

The Scientists' Institute for Public Information (SIPI) has started a drive to mobilize the resources of the American scientific community to aid in the recovery of war-damaged Indochina. Scientific Aid to Indochina (SAI), a task force established by SIPI, plans to determine what scientific and technological help is needed by the peoples of Indochina to restore their agricultural lands and to help supply it through voluntary contributions of time, equipment, and money by scientists.

Arthur W. Galston, professor of biology at Yale University and SAI's chairman, said that the first project of the task force will be to establish a small Research Institute of Agricultural Botany in North Vietnam in response to a direct request from the North Vietnamese government. The institute is expected to be staffed by 25 to 30 scientists and a number of technicians. The government of South Vietnam has made no such request, but in the event that they do, Barry Commoner, chairman of the board of directors of SIPI, says that SAI would make every effort to provide similar help there.

The Research Institute of Agricultural Botany is of first priority because of the dependence of the Vietnamese people on agriculture. The destruction of agricultural lands by U.S. earthmovers, bombs, herbicides, and other weapons calls for advanced techniques in repairing the land and making it productive again. Existing agricultural research laboratories were destroyed during the war, according to the SAI.

Senator Gaylord Nelson (D–Wis.), who has introduced an Ecological Damage Assessment bill to determine the long-term ecological effects of the war, is fully in support of the task force and its first project.

The SAI was established last spring to inform American citizens of the extent of human and ecological damage in Indochina and what can be done to repair it. Its first project was developed after two of its members, E. W. Pfeiffer, professor of zoology at the University of Montana, and Arthur H. Westing, professor of botany at Windham College, returned from a tour of North Vietnam last summer. They told of massive bomb craters and large areas of devastated farm land. After Pfeiffer and Westing had discussed the situation with the State Committee for Science and Technique of North Vietnam and the Society for the Dissemination of Science and Technique, SIPI's counterpart in North Vietnam, SAI adopted the research institute as its first project.

The letter of appeal from SIPI, signed by Commoner and Galston, has been sent to more than 10,000 scientists. According to Galston, the project will have no connection with any government-related effort. Galston likens the voluntary participation of U.S. scientists in this venture to "an act of personal restitution for war damage." The immediate goal is to raise $100,000 by early 1974 so that Galston can travel to North Vietnam in the spring to establish the institute. Books, journals, and equipment are also needed, as well as scientists to train the institute personnel. Prospective contributors may contact SAI at 38 East 68 Street, New York 10021.—S.B.M.