a level of about $60 million—which might still be an underestimate of the need and potential.

The task force set out to show, not that technology is the solution to crime, but that it could be addressed to specific problems in prevention and control, including making targets of crime less vulnerable. An example of the latter, mentioned in the report, is a method used in one country in South America, where police are instructed to deflate the tires of an automobile with keys left in the ignition, thereby preventing a thief from driving away with it. This may be a primitive method of crime prevention, yet it is probably quite effective.

The task force took a much more sophisticated approach to the problems of crime, but in many cases came up with recommendations as simple or obvious as deflating tires. As James Vorenberg, executive director of the Crime Commission, said, much was accomplished just by having men with scientific backgrounds apply traditional scientific analytical methods to the problems of crime. He said he felt the greatest fruit of the task-force study was the discovery of how much can be gained from collaboration of physical scientists and law enforcement personnel.

The approach of the task force was, first, to study systematically aspects of the criminal justice system to determine areas of weakness, and then to find how current knowledge and technology could improve matters in the problem areas. For example, a study conducted by the task force in Los Angeles showed that the sooner a patrol car can get to the scene of a crime, the better is the chance that the criminal will be apprehended. This seems an obvious answer. However, the analysis of the problem went further. Where are the time delays? These could be broken down into the lapse between commission and reporting of the crime; the time needed to process the complaint; the time needed to locate the closest available patrol car and relay the instructions; and the time required for getting to the scene.

Applying only current technology and a lot of common sense, the task force came up with many recommendations for cutting down on the police response time. To facilitate the reporting of the crime, the study suggested opening police call boxes to the public; having one nationwide police emergency number; providing pay telephones from which a caller can reach the operator without a dime; and providing employees in gas stations and liquor stores —establishments which are highly susceptible to robbery—with pocket radio transmitters to enable them to trigger a remote alarm.

To facilitate the location of patrol cars, the report suggests that the cars be equipped with some kind of visual, acoustic, or electromagnetic emitting device whose signal can be picked up by sensors located in police call boxes. Further, the report recommends that all policemen be furnished with portable radios so they can be in contact with headquarters, whether they are in or out of cars.

In some large cities, radio congestion delays the dispatching of instructions. This could be alleviated, the report suggests, by establishment of area-wide networks so that lesser-used frequencies could be called upon, or by use of vacant television frequencies. A conceivable but more costly method would be the installation of teletype machines in patrol cars to receive non-urgent messages.

Not all of the report's recommendations were so elementary. The task force outlined the establishment of a local, state or regional, and a national computer-based information system. Using it, a police department could receive, in a matter of seconds, a response from the national center to inquiries about stolen autos, wanted persons, or stolen property.

The task force produced many feasible ideas, but it did not set out to solve in its year of existence the technical problems of the criminal justice system. Its goal was to point the way

Russian Hail-Suppression Experiments

An experimental hail-suppression program in the Soviet Union appears to have provided significant protection to crops against hail damage. Approximately 1.25 million acres in the Northern Caucasus, the Alazan Valley of Georgia, and the Armenian SSR—areas comprising large, state-controlled farms—were protected by cloud seeding during 1964 and 1965. Silver or lead iodide was fired from shells by antiaircraft gun batteries into clouds that appeared to be potential hail-producers.

The method is described in a detailed report* by G. K. Sulakvelidze of the High Altitude Geophysical Institute, Nalchik, Caucasus. When observations indicated the presence of clouds that were likely to produce hail, the guns fired projectiles that exploded within a so-called "hail-growth zone"; radar echoes identified these zones and showed that hailstones were forming, and that supercooled water droplets were present in large concentrations at approximately −6°C. The resulting nucleation of the supercooled water droplets prevented further growth of the hailstones. Most of the stones already formed were small enough to melt during their fall to the ground, or were too small to do great damage. Overall results of the experiments indicate that crop damage by hail was reduced by 80 percent or more, when compared with previous records and with hail damage in nearby control areas.

The Sulakvelidze report, recently translated into English at the National Center for Atmospheric Research,† is stirring great interest and increased optimism among American atmospheric scientists, many of whom have been cautious about staging hail-suppression experiments on a scale similar to those of the Russians. For the past year, a group of U.S. and Canadian scientists, led by Dr. Verner E. Suomi of the University of Wisconsin, has been formulating recommendations for a national program on hail-suppression. The results of the Suomi study, sponsored by NSF at the request of the Interdepartmental Committee on Atmospheric Sciences of the Federal Council on Science and Technology, is expected within the next 2 months.—WALTER ORR ROBERTS, *Director, National Center for Atmospheric Research*

* "Rezul 'taty rabot kavkazskoi protivogradovoi ekspeditsii 1965," *Vysokogornyi Geofizicheskii Institut Trudy* **7**, 1–61 (1966). † Available from NCAR, Boulder, Colorado 80302, or from the Atmospheric Sciences Section, National Science Foundation, Washington, D.C. 20550.