

## Toward laser weapons in space

The prediction last summer that a decision was imminent on whether to push development of high-energy laser weapons and that their first application would likely come in space (SN: 7/3/76, p. 11) now seems to be coming true. In testimony last week before the House Armed Services Committee, George H. Heilmeyer, director of the Defense Department's Advanced Research Projects Agency (ARPA), said: "It is my belief that the high-energy laser in space could represent a Sputnik-like event—a technical achievement which could influence the perceptions of foreign countries as to who is the leader in defense-related technology."

That statement is a far cry from the Defense Department's demure earlier posture that it was experimenting with high-energy lasers merely as a "logical exploration of this technology." The budget figures accompanying Heilmeyer's statement underscore the impression that a weeding-out of less feasible applications has taken place in favor of laser weapons in space. While the overall department request for high-energy lasers has dropped 10 percent to \$150 million, ARPA's request for "space-based lasers and related technology" has risen 16 percent to \$24.9 million.

The basis for this rising enthusiasm, as predicted, results from recent developments in chemical lasers. Said Heilmeyer: "Our recently completed analysis indicates that laser systems incorporating much more efficient future chemical lasers may be feasible." During the past year, he said, the ARPA goal of developing an efficient, small-scale hydrogen-fluoride chemical laser had been achieved. He called the 2.7-micron-wavelength infrared laser "the most promising device candidate," and said the task of the next year

will be to scale it up to higher power levels.

Heilmeyer also reported on progress in developing high-power visible lasers for use in the atmosphere. During the past year, he said, a "breakthrough" was made in increasing energy levels of rare gas-halogen (RGH) eximer lasers from one joule per pulse to more than 350 joules per pulse. These recently developed lasers, which can now convert electrical energy to light at about 10 percent efficiency, are also considered important in the development of fusion energy (SN: 4/3/76, p. 212).

A third goal for high-energy lasers was also reached during the past year—prec-

sion tracking of an object in space using laser radar. Heilmeyer said completion of the installation and integration of optical components into this laser radar can be expected during the next year.

Finally, Heilmeyer reported that an X-ray laser had been demonstrated but that the program would be dropped because the device apparently has little immediate military value. Coherent radiation was produced at 380 angstroms wavelength, and "further progress was probable," Heilmeyer said, but "it became apparent that, even granting technical success, any military impact was at best indirect, long-range, and would require extensive research and exploratory development to exploit." He recommended that the National Science Foundation fund future research in this area. □

## The violent American home

Severe beatings, assaults with deadly weapons, serious injury and even murder are far more commonplace occurrences in the home than previously believed, according to the first survey of domestic violence based on in-depth interviews of a cross section of American families. At a time when officially reported acts of child abuse annually run into the tens of thousands, the new study concludes that each year well over 1.5 million children experience an attack by their parents that could cause severe bodily harm or death.

The study, sponsored by the National Institute of Mental Health, was reported at the AAAS annual meeting in Denver and will be published in more detail as a book, *Violence in the American Family*. The research was conducted by Richard J. Gelles of the University of Rhode Island, Murray A. Straus of the University of New Hampshire and Suzanne K. Steinmetz of the University of Delaware, in collaboration with the Response Analysis Corp.

Physical force is apparently well accepted as a form of punishment in the United States. Some 80 percent of parents of young children (age 3 to 9) and a third of parents with older children (age 15 to 17) acknowledged using some form of corporal punishment in the preceding year. The most distressing aspect of this figure, however, is what Gelles calls the "astoundingly large" number of very serious incidents included. By extrapolating their results to the American population as a whole, the researchers conclude that annually 1.2 to 1.7 million children are "kicked, bit or punched" by their parents; 460,000 to 750,000 are "beaten up," and roughly 46,000 are attacked with guns or knives.

Although the analysis of the data is not yet complete, some interesting patterns of violence have already emerged: Mothers are more prone to strike their children than are fathers. Male children are slightly

more likely to receive corporal punishment than female children. And although younger children are more likely to be struck, older children are more vulnerable to the severest kinds of violence.

Violence between parents is also remarkably frequent. Preliminary analysis indicates that 7.5 million couples probably experience a "violent episode" in a given year, and that over the duration of a marriage, the figure would probably rise to include one quarter of all couples. Attacks of wives against husbands were found to be about as frequent as attacks of husbands against wives. (A "violent episode" was defined as any act intended to cause physical pain or injury. The authors defend their generally broad definitions of violence by saying that a slap and a murder are only opposite extremes of a continuum of violent acts, any one of which—if committed on a stranger—would be considered a chargeable assault.)

Finally, the greatest incidence of violence occurs between brothers and sisters. During the survey year, 38 percent of the children were reported to have punched, bit or kicked a brother or sister, and 14 percent had "beaten up" a sibling. At some time during their lives, roughly 5 percent—or 2.3 million children—had used a knife or gun on a sibling.

The researchers say more study will be needed before the causes of violence in the American family are well understood. If anything, the new study has brought new uncertainty to old theories—well-educated families, for instance, seem just as violence-prone as less educated ones. Also there is some evidence to indicate that even these figures are too conservative. Only "intact" families with an adult male and female in the home were interviewed, although some believe that single-parent families are more prone to violence. And, since information was given voluntarily, under-reporting would be expected. □

## 'Last' Salyut 5 crew returns to earth

Soviet cosmonauts Victor Gorbato and Yuri Glazkov returned to earth in their Soyuz 24 spacecraft, landing safely in the Kazakhstan region of Soviet central Asia about 2,000 kilometers southeast of Moscow on Feb. 25. Their return marked the conclusion of a mission during which they spent more than two weeks aboard the Salyut 5 space station (SN: 2/19/77, p. 117), the second cosmonaut crew to occupy the facility. They boarded the station just two days after their Feb. 7 launching, but their visit lasted far less time than the seven-week residency of the Soyuz 21 crew last fall. Activities aboard the station were only vaguely described by officials, but the Soviet news agency Tass has indicated that the Soyuz 24 team would be the last to go there. □