to balance the overall federal budget in 1984. Willis Shapley, author of a AAAS study of the science budget,* said, "We have to face the fact that there will be pain around."

During an afternoon session, Richard DeLauer, the under secretary of defense for research and engineering, outlined in broad fashion some of the major research efforts under way at the Pentagon, which include major research on the MX missile and a new strategic bomber; efforts to improve WIMEX, the military's worldwide computer network; and changes at the Advanced Research Projects Agency to make sure that its work is more closely tied to the needs of the individual military services.

There is obviously a good deal of interest in the Administration's plans to move research funds from the civilian sector to defense. Shapley raises a concern in his book that "the defense budget, instead of being simply a means for achieving substantive defense objectives at least cost, has taken on a life of its own and become an end in itself. . . . Fully responsible judgments on the size of the Department of Defense budget for R & D or its major constituent parts demand an understanding of the program that is both comprehensive and detailed. . . . To acquire this is frustratingly difficult, and perhaps impossible, for anyone except those actively engaged in central management or review of the program."

Still, George Riedel, a staff member on the Senate Arms Services Committee, provided a summary of defense procurement plans and problems. He questions whether the Administration's goals for defense can be met within the estimated costs, noting that the Navy's plans to organize a fleet of 600 ships could cost as much as $25 billion a year over the next decade, and that the Air Force's new bombers might cost an additional $25 billion during that period.

George Rathjens of MIT, a longtime adviser to the government on defense, offered a critique of the Reagan plans, but in general the plans ignited far less debate than the $100 million cutback for programs in education, social sciences, and international budgets.

—R. JEFFREY SMITH

*Willis H. Shapley, Albert Teich, Gail Breslow, *Research and Development AAAS Report VI* (AAAS, Washington, D.C., 1981).

Court Upholds Controversial Regulations

But the Administration's regulatory reforms can continue

The Reagan Administration has considerable leeway to continue deregulating the workplace and the mining industry, despite three recent Supreme Court decisions upholding stringent mining and occupational health rules. The decisions—resulting from disputes on cotton dust, lead, and strip-mining—have been widely interpreted as inimical to the Administration's plans, but close examination reveals that they will have little if any adverse effect.

The decisions are similar because in each one the Court upheld stringent health and environmental requirements in the face of evidence that they would be costly to the affected industries. The requirements were imposed during the early days of the Carter Administration, when there was a general reluctance to consider these costs, or certainly to consider them important. The Reagan Administration has reversed this position, and is taking steps to ease many environmental and health rules. So-called cost-benefit analysis has been embraced with patriotic fervor at the Office of Management and Budget, and agencies such as the Occupational Safety and Health Administration (OSHA) have been ordered to conduct such comparisons and scrupulously abide by the results.

The Supreme Court, in the cotton dust decision on 17 June, says explicitly that OSHA must ignore the results of any cost-benefit comparison when setting a standard for worker exposure to a hazardous substance. Justice William Brennan, writing for the court's five-person majority, said that "Congress *itself* decided the basic relationship between costs and benefits by placing the 'benefit' of the worker's health above all other considerations" when it wrote the law in 1970. Yet the agency cannot require exposure controls that are impossible to achieve, nor can it bankrupt an entire industry, Brennan wrote. He concluded that consideration of anything besides these questions would be inconsistent with Congress's direction.

The opinion settles a long-standing grudge between unions and industry. Byssinosis, or brown lung disease, is one of those that the OSHA law was passed to prevent, and the agency had labored for years before fixing the exposure standard in 1978. The opinion also repudiates an attempt by Thorne Auchter, OSHA's current administrator, to withdraw the standard and submit it to the cost-benefit analysis that the previous administrators had scorned. Auchter had specifically asked the Court not to rule on cotton

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Cotton dust decision

Settles grudge between unions and industry

Earl Dotter/American Labor

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dust, but it decided to go ahead anyway. He has tried to make the best of it since, noting that the decision permits the agency to use cost-benefit analysis for safety regulations. "Further, the Court did not decide on the legality of cost-benefit analysis under other statutes," such as those administered by the Environmental Protection Agency or the Department of the Interior, he notes.

Initially, there was some confusion about whether the opinion specifically prohibited cost-benefit analysis or merely said it was not required. But lawyers at the Labor Department and in the environmental groups now agree that any agency standard based on such a comparison can be challenged and overturned. OSHA's regulation writers will no longer have to fulfill President Reagan's Executive Order mandating cost-benefit comparisons throughout the federal government. (It is noteworthy that a recent study by the Congressional Research Service concluded that the order may not be legal, although OMB is unlikely to withdraw it.)

OSHA still has enormous discretion in setting standards. In the past, for example, standards have often been set low enough to require state-of-the-art technology to limit workers exposure. Auchter could just as well determine that standards incorporating such technology are unfeasible, and that less stringent efforts need rely only on proved control technology. Relaxation of the standard with this approach would approximate that achieved if costs were taken into account. Auchter could exercise the opportunity when and if he proposes an exposure standard for a hazardous chemical that is currently unregulated.

In the strip-mining decision of 15 June, the Supreme Court upheld provisions of a law passed in 1977 that similarly allows little consideration for the costs of mining reclamation operations. Mine owners and operators in Indiana and Virginia had attacked it as unconstitutional, claiming that its requirements violated due process and unjustly outlawed certain inexpensive mining procedures. The Court said that "Congress acted rationally" in writing such strict rules, given the mining industry's record of environmental destruction, amply documented in congressional reports that led to the law's enactment. The Court's unanimous opinion, written by Justice Thurgood Marshall, overturned lower court rulings and upheld controversial requirements that prime farmland and other areas be returned to their original contour and productivity.

The narrow ruling skirted claims that mine owners are entitled to some form of compensation if they are unable to continue mining under the act. The "issue remains available to, and may be litigated by, any owner . . . whose property interest is adversely affected by the enforcement of the Act," writes Justice Lewis Powell in a concurring decision.

More important, the opinion fails to specify how enforcement should be conducted. Interior Secretary James Watt has curtailed mining inspections, and recently announced plans to close six regional enforcement offices. Plans are under way to reinterpret many existing regulations to favor mine owners (*Science*, 15 May, p. 759). As in the cotton dust decision, the Court affirmed the soundness only of the law itself, giving Reagan appointees an opportunity to continue deregulation.

—R. JEFFREY SMITH

The U.S. Flight from Pilotless Planes

Glory-bound pilots in the U.S. Air Force veer away from a simple technology that can save dollars and lives

The Israelis have long enjoyed aerial supremacy over Lebanon, searching out Palestinian strongholds with impunity. When in May, Israeli photo reconnaissance drones brought back pictures revealing batteries of Soviet-made SA-6 antiaircraft missiles, their silver warheads gleaming in the sun, the Israelis threatened to strike. The Middle East braced for a violent showdown. What ensued, however, was a battle not of men but of machines. The missiles in Lebanon shot down several Israeli drones. Far from a setback, the loss of these nonphotographic "hero" drones provided the Israelis with valuable electronic intelligence about ways to knock out the missile threat. Right before it dies, a hero drone sends back information about the signals that guide missiles to their targets. Later, jammers can disrupt these signals.

The current missile crisis has not escalated into a full-scale conflict that might require such maneuvers. A few years ago, however, it was a battlefield coup that first sparked Israeli respect for drones. At the start of the 1973 October War, Egyptian missile crews thought they had scored a victory when they knocked out a whole Israeli flying formation. As the Egyptians reloaded, however, a second wave of Israeli fighters slipped through and knocked out vital targets deep within Egypt. Later, when the Egyptians examined the wreckage of the first Israeli wave, they discovered not complex jet aircraft but small, inexpensive decoy drones that the Israelis had electronically enhanced to look larger on Egyptian radars.

As all this suggests, the Israelis have latched onto a simple and elegant military technology.

And the U.S. Air Force? The question is especially relevant since drone and remotely piloted vehicle (RPV) technology was pioneered in the United States and the Israelis buy many of their vehicles from U.S. manufacturers. The U.S. Air Force, however, has turned its back on the technology. The main reason, admitted by some Air Force officials, is that it offers little by way of career opportunity and nothing by way of battlefield promotion and glory. In short, the neglect of drones is a classic example of how military prejudice and the lack of a constituency in the Pentagon has ruled out a simple technology that can save billions of dollars and untold numbers of lives.

Not that this has always been the case. Expediency on occasion can overcome the most profound predilection in the U.S. military. During the Vietnam War, the United States flew more than 3000 RPV sorties over North Vietnam, the aircraft automatically photographing targets and recording damage after manned bombing missions. Fewer than 10 percent were shot down. In peacetime, however,

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