fense Department can adopt commercial standards for much of the equipment, such as electronic components, that it buys. The Pentagon could then buy off-the-shelf commercial products that are dramatically cheaper because they are produced in large quantities under the pressure of marketplace competition.

Some progress has been made in buying commercial off-the-shelf equipment, said Costello. The Defense Science Board is now studying how well the Defense Department has put into practice the recommendations of a 1986 report that called on the Pentagon to use more commercial components.

Changing the maze of regulations governing defense procurement will, however, be a more daunting task—especially in the wake of allegations of corruption within the Pentagon's procurement system. During recent appearances before Congress, Costello had to defend the current regulations—which he would like to trim back—against suggestions that they need to be tightened.

Currently, the Defense Department tries to guarantee fair prices for its equipment through a complex system of cost accounting regulations. But its efforts to eliminate fraud, said one electronics industry executive, have made doing business with it "a real mess." According to a variety of industry executives, those regulations virtually guarantee that Pentagon contractors will be inefficient.

To dramatize the burden of regulation that the Defense Department has placed on industry, Costello recently carried a 4-foot-high stack of regulations into a congressional hearing room. "Reform should simplify, not complicate, defense procurement," he told the House Government Operations Committee on 13 July.

One consequence of the complex procurement regulations is that companies typically set up separate divisions to work on government contracts in order to keep their commercial business from getting entangled in the Pentagon's cost-accounting rules. The facilities of these divisions sometimes duplicate the company's commercial production lines, and typically have extremely high overhead costs. They produce small quantities of equipment custom-designed for the military.

As a result, said William Perry, chief executive of HLQ Technology Partners, a venture capital firm in Silicon Valley, computer chips for the Defense Department cost more than three times what identical commercial chips do. Perry served as under secretary of defense during the Carter Administration.

The wall that separates Pentagon contractors from the commercial market also limits the commercial usefulness of the Pentagon's R&D investments. In many corporations, contact between divisions that work on commercial and military products is limited and there is "not a whale of a lot" of technology transfer from the corporation's defense work into its commercial work, said William Howard, Jr., formerly a vice president of Motorola and currently a senior fellow at the National Academy of Engineering.

Only a handful of companies—generally those with roughly half of their business in each area—make a serious effort to use Pentagon-sponsored technology in commercial products, said Branscomb. A company that relies on the Defense Department for most of its business is rarely able to function well in the commercial marketplace, said Perry. "It's a different world, a different culture," he said.

One consequence of separation from the commercial market can be technological timidity. Unlike private firms, defense contractors cannot make big profits on speculative R&D investments in new products. As a consequence firms that develop new technology for the Pentagon wait for a contract to be announced before starting to work on it.

Bobby Inman, chairman and CEO of the Westmark Corporation, agreed. During the time he headed a consortium called the Microelectronics and Computer Technology Corporation, he said, "I was amazed. The companies that were prowling the halls looking for new tools were the ones in the commercial arena. Those in the defense business were waiting to be told what to use."

For Inman, Costello's initiatives in the Pentagon have been "a breath of fresh air." But to turn the Defense Department from a haven for inefficient industries into a champion of commercial competitiveness, he said, will take "a fundamental change of approach." ■ **DANIEL CHARLES**

Daniel Charles is a free-lance writer based in Washington, D.C.

Soviet Biotechnology Meets Glasnost

Moscow

In remarks that may sound familar to the American biotechnology community, a Soviet minister recently expressed frustration over the shutdown of a biotechnology facility that was prompted by protests from local citizens and an "unobjective" press.

In a rare glimpse of Soviet society under glasnost, Minister of the Medical and Microbiological Industry Valery Bykov talked about the problems related to the plant closing in an interview published is the 24 July issue of *Moscow News*, an English language newspaper published in the Soviet Union.

According to Bykov, the ministry, in an effort to beef up the nation's cattle production, set up a plant in Kirishi, a city 60 miles southeast of Leningrad, to produce fodder protein "using biotechnology." (Bykov did not specify whether production involved recombinant DNA techniques.)

The protein dust, however, proved to be an allergen. Some of it escaped the plant. "True, the cleaning system at the plant worked badly," Bykov said. "We fired some managers for that. But our plant in Kirishi was made the scapegoat for an increase in illness."

He argued that the city already suffers from heavy industrial pollution and that the contribution of the biotechnology plant was "trifling." Nevertheless, "some people claimed that the plant was producing 'biological bombs' and that it was responsible for the deaths of a number of local people. This absurdity landed in the papers. All our arguments were ignored," Bykov complained.

Criticism in the press mounted. A newspaper published a letter by plant workers, who questioned the necessity of the facility. A television show, "Spotlight of Perestroika" faulted the ministry. Bykov said, "We telephoned [the show], saying that we were ready to respond, but were informed that our reply wasn't necessary. Such are the ups and downs of glasnost," complained Bykov.

Bykov said that opposition to the Kirishi plant eventually "snowballed into a campaign against the entire industry—against biotechnology." The plant was recently closed.

"The most important part of our work, the development of biotechnology, is hindered by items in the press and the reaction to them." Bykov said, "I think we are guilty of not popularizing biotechnology, of not explaining what it would do for the people." Major scientists, he said, have written articles on biotechnology and sent them to the press for distribution, "but not a single one has been published," Bykov noted.

"Of course I'm for glasnost," he said, "but glasnost must be democratic. It's no good at all if it's based on unobjective facts."

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