depending on how you look at it. And academics feel that universities are "unpopular" with the public and, therefore, with the politicians. Antiscience feeling in Britain does not seem to be virulent, although a strong "ban the bomb" movement in the past has resulted in something of a disposition to blame the bomb on scientists.

Unquestionably, the status as well as the image of scientists has slipped. This is reflected in the discontent of members of the scientific civil service, who are protesting what they argue is discriminatory treatment. The matter is complicated because their union, the Institution of Professional Civil Servants, includes a variety of professionals as well as what Americans would call semiprofessionals—technicians and draftsmen, for example—with a variety of grievances. But it seems to be true that scientists in the civil service have lost ground in recent years, with many of them being paid significantly less than members of the administrative corps of the civil service with comparable responsibilities.

If Labour continues in office with a working majority, what will be its general policy on science and technology? Certainly, Labour's new style is different. In contrast to its tactics when it took office in 1964, pledging a "white hot technological revolution" and creating a Ministry of Technology with a jazzy nickname, Mintech, to foment it, Labour has had little to say on the subject this time. The Conservatives late last year created an energy department out of elements of the Department of Trade and Industry (DTI) which had absorbed Mintech. Labour has embraced the energy department but has gone on to reorganize DTI into three sections dealing with trade, industry, and prices and consumer problems, headed by coequals in the Cabinet. Anthony Wedgwood Benn, erstwhile minister of technology, holds the industry portfolio. The science advisory apparatus in the Cabinet Office is also being reorganized and the think tank is expected to continue (Rothschild is a Labour peer), but as one senior departmental civil servant put it, "Frankly, we don't know yet what the setup is."

The issue of energy is obviously a key one for science policy. The Labour government is pledged to get better terms for the country from the international oil companies which are prospecting for and producing North Sea oil and gas, but a new formula is not proving an easy one to arrive at. As in the United States, research and conservation are expected to figure large in a new energy policy, but no such policy seems to be emerging, and the British face the added task of taking the Europeans into account—and for that matter the Americans—in their planning for energy for the rest of the century.

Energy research, however, is not expected to be a particular boon to basic research. Nor do there seem to be other promising sources of major relief. No cushion of unexpended funds remains in the budget, and prospects for transferring funds within the research council budgets to benefit basic research in the universities appear limited. In addition, the British must find ways to finance the increasingly expensive community projects to which they are committed with their European partners.

Given Britain's economic and political circumstances, a reversal of policy on science and higher education is thought highly unlikely irrespective of which party wins the anticipated election. So basic science in Britain would seem to be, at best, in a holding pattern.—JOHN WALSH

Science and Crime: Engineers Claim a Rosy Outlook, but Police Aren't Sure

One of the least publicly known incursions of science and technology into national life is the burgeoning field of domestic security and police technology. Yet this field constitutes a major high technology business which will pump more than $4 billion through the U.S. economy this year, if the estimated $3 billion private security market is combined with the $1 billion which the federal Law Enforcement Assistance Administration (LEAA) gives to local police departments.

Many developments in this field, such as laser fences and radar cadaver detectors, are as fantastic as Buck Rogers' disintegrator ray gun. Even the more mundane advances, such as fingerprint identification systems for company employees, are often elaborate and expensive. The technology comes in all sizes and shapes, and ranges from long overdue and useful modernizations to elegant gizmos that don't even work.

Crime fighting R & D even has its own scientific meeting. Every year since 1968, the University of Kentucky has sponsored the Carnahan and International Crime Countermeasures Conference.* This year, strolling over the grounds of Carnahan House, on a former Lexington race horse farm now owned by the university, a suitably diverse group gathered to expound the merits and demerits of preventing and fighting crime with machines. There were private detectives, industrial security agents, policemen, military engineers, officials from federal and local law enforcement groups, in addition to scientists from universities, think tanks, federal laboratories, and electronics and aerospace firms. Even the international set showed up—security experts from Canada, Great Britain, West Germany, and Israel.

What this year's conference illustrated was that police technology has become big business—to the delight of the private industries who are exploring the market, to the dismay of some civil libertarians, and to the occasional bafflement of the police themselves. One Department of Justice official explained on the first day: "The industries want to find a market for the stuff they've developed for the military. They're the sellers and we're the buyers. That's what's going on here." But, like other "buyers," this official was critical of the proffered technology. "The trouble is that a lot of this technology doesn't transfer very well from the military uses it was designed for." Another

* Past conference proceedings may be ordered from the Office of Research and Engineering Services, College of Engineering, University of Kentucky, Lexington 40506.

"buyer" put it more colloquially: "much of this stuff is garbage." And another said of those who market crime fighting systems, "Vendors lie!"

The principal organizer of the conference, John S. Jackson of the Department of Electrical Engineering of the university, tries to organize the meeting in such a way as to separate the wheat from the chaff. An outside review panel helps him select papers to be presented (one out of every two gets to the podium). The "vendors'" presentations are interspersed with those of academic and government experts. In addition, the informal discussions and question periods after lectures are intended to create a forum where everyone can get beyond the salesman's pitch.

Another way Jackson says he helps to maintain the quality and independence of the meeting is to have it privately financed. Registration fees and university funds cover the costs; in general, money is not sought from the plentiful coffers of the Justice Department's LEAA, which Jackson calls a "white collar WPA [Work Projects Administration]."

The Pentagon Connection

The Carnahan conference offered a capsule view of the field of police technology and domestic security. The papers on property, building, and room security systems, for example, illustrated the point that the impetus for much R & D comes from the military. Of 11 papers discussing aspects of physical premises security, 8 reported on work done for the military research program BISS (Base and Installation Security Systems), which dominates the field. BISS is a triservice program that aims to install automated security systems on all U.S. bases and installations around the world by 1981. Eventual components could include mobile laser fences and pressure sensors in the form of underground cables which detect human footsteps.

BISS has a daughter program called J-SIIDS, or Joint-Service Interior Intrusion Detection Systems. This program combines approximately a dozen different types of sensors that will detect air currents, floor or wall vibrations, low noise levels, and other indicators of possible intrusion into a room—for example, a room where weapons are stored.

As for foolproof identification of only those who are authorized to enter such secure areas, Captain Gregory Cieciwa of the Air Force's Electronic Systems Division presented a separate, "hybrid multisensor system" which would analyze a person's voice, fingerprints, and handwriting before admitting him.

Systems like these are also attractive to the nonmilitary sector. Some firms which hold BISS and J-SIIDS contracts, among them Mitre Corporation, Sandia Corporation, GTE Sylvania, Incorporated, and Westinghouse Research Laboratories, have commercial arms too. Fred G. Geil of Westinghouse presented a wire-in-tube sensor now being tested by the military. He said he hopes that the company's home security systems division, which is the nation's largest manufacturer and installer of such systems, could market his sensor for suburban homeowners. Geil suggested that the system could be built to give warning signals if someone set foot on the property, or, when set another way, it would turn on the porch light as guests approached. Another J-SIIDS contract holder, Calspan Corporation, presented a fingerprint identification system for company use. With it the employees' fingerprints could be checked automatically before they could be admitted to a particular building or room.

The extension of military security into civilian crime fighting was one theme of the conference, which could perhaps be termed the Pentagon connection. What might be called technology without a mission was another theme that ran through the sessions. It seems that some of the systems and devices that companies are pushing for domestic security and police use do not have a clear purpose or utility. An example of this is AVM, or Automated Vehicle Monitoring.

AVM aims to tell a police dispatcher where each and every patrol car is at every moment. Thus, when the dispatcher assigns a car to a particular call, the response should be as fast as possible. But despite the ingenious array of proposed AVM systems, there remain a number of problems. For one thing, patrolmen themselves are said not always to want the dispatcher to know where they are. For another, the proposed systems can be expensive.

Novatech, Inc., of Burlington, Massachusetts, presented a proposed AVM which would operate on a network of coded magnets buried beneath the pavement at street intersections around the city. Specially equipped police cars would pick up the codes as they traveled around the city and relay them to headquarters. Novatech's representative at the meeting estimated that for a city the size of Detroit the magnetic array would cost $3 million. Another, more elaborate AVM was presented by Hoffman Electronics Corp. of El Monte, California. Hoffman and its related companies plan to build pulse ranging tracking systems for military aircraft; the proposed police AVM is a domesticated version. Yet even some of the experts making presentations admitted that small cities probably don't need AVM, and, as for the large cities, one New York City official noted afterward that New York's 2000 patrol cars are now adequately tracked by the policemen notifying the dispatcher where they are by radio.

Keystone Kops Revisited

Another theme of the conference was the mismatch between the design of available systems and the capabilities of the systems' users. An example is the data processing systems which police departments around the country are installing. The advantages of computerized information services, sometimes including direct-dial terminals in the patrol cars, are unquestionable. Yet Estelle Zannes of the University of New Mexico, who is making a study of the effects of technology on the police, described why the marriage of the policeman and computer has to be carefully arranged.

One Cleveland district, she found, had installed a computer system that only 3 of its officers knew how to operate; the supervisor there told her: "When they're off [duty] we don't bother with it." In interviews with approximately 500 policemen, Zannes said, "more than 90 percent claimed they did not understand the concepts of computers."

Zannes also contrasted the claims of the system designers and vendors with reality in the station house. The system adopted in Albuquerque, she said, was advertised thus: "The Hub. On a quiet day or an explosive night, the big decisions all come through here." But in truth, she indicated, some of those "big decisions" don't go through the computer system:

> . . . Initially the citizen calls 911, a direct toll line, or a nonemergency number. All lines come in to the 911 operator. The operator sits with her back to the dispatcher, enters the information into a computer.
>
> Unfortunately in Albuquerque, the program is in the process of being rewritten; there are incongruities in the system and

the evaluation of the hardware is still going on. Therefore, in addition to entering the information in the computer, the operator uses a LEMRAS card and duplicates the information.

If the call is an emergency, she hand-carries the card to the dispatcher.

Otherwise, she enters the call . . . : name of calling party, street and apartment number, patrol district, the dispatcher position and additional information not to exceed 142 characters. Anything beyond 142 characters cannot be retrieved.

. . . Once a call is completed it cannot be retrieved. An officer in the field cannot call in for information about a completed call. Feedback between operator and dispatcher is difficult. The seating arrangement limits any visual communication, and the technology does not allow for two-way communication between operator and dispatcher. "If a robbery is in progress," said the supervisor, "we throw away the machines and go to verbal."

The Keystone Kops and the computer scenes that Zannes described and the proliferation of police technology around the country generally both raise the question of how a local police chief distinguishes fish from fowl in the marketplace. "I feel sorry for the rural or small town police departments," said one police officer from a large city. "They're very vulnerable to the vendors, and they get most of the money from LEAA. . . . Once you give the slightest hint that you're looking for something, they'll knock your door down to sell you something."

Accordingly, the conference devoted a session to government standards setting in the field of law enforcement. Representatives of the Law Enforcement Standards Laboratory (LESL) of the National Bureau of Standards (NBS) reported on the work they are doing to develop voluntary equipment standards which will be promulgated by LEAA. The LESL is now developing 105 official statements regarding performance and safety features of

Briefing

Drug Abuse Man to Head ADAMHA

Announcement is expected shortly of the appointment of Robert L. DuPont, the Administration's top drug abuse official, as the first permanent director of the Alcohol, Drug Abuse and Mental Health Administration, or ADAMHA. DuPont will take over from Roger O. Egeberg, who has been holding the fort while the Administration made up its mind.

President Nixon is expected to make the announcement when he signs the authorization bill for the National Institute for Alcoholism and Alcohol Abuse (NIAAA). The bill also formally establishes ADAMHA.

The Administration originally was seeking a psychiatrist with broad administrative experience to head the new agency, but finally, in keeping with its preoccupation with drug abuse, selected DuPont, whose experience is more limited. The 38-year-old psychiatrist is currently head of the National Institute for Drug Abuse (NIDA) and the Special Action Office for Drug Abuse Prevention. He previously headed the Narcotics Treatment Administration in Washington, D.C., and is known as a strong advocate of methadone treatment for heroin addicts.

ADAMHA is a tripartite organization made up of NIAAA, NIDA, and the National Institute for Mental Health. It was formed partially in response to a desire on the part of the alcohol people to get on an equal footing with and separate from NIMH.

DuPont intends to continue as head of the special action office until its scheduled dissolution in June 1975. A lot of mental health professionals are concerned that this dual role will result in unbalanced attention to drug problems at the expense of mental health problems, and DuPont probably will encounter some hard questioning on this matter before his nomination is confirmed by the Senate.

NIMH director Bertram Brown very much wanted the ADAMHA job, but he is being a good sport about it all. He gets along well with DuPont and plans to stay on, at least for a while, to see how mental health fares in the new setup.—C.H.

American Tentative Society Has Money, Needs Ideas

"There is a hazard when we learn anything," a letter we received recently began. ". . . We may become prisoners of our own dogma, stuck with our yesterdays. We may become arrogant in defense of some outmoded 'truth.' Scientists, among others, can be guilty of sins against reason."

The letter was from the American Tentative Society (ATS),* an organization committed to the idea that knowledge is, indeed, tentative. The society, which has been accused of being frivolous, now has some $300,000 to back its contention that it is in earnest. "Our name, American Tentative Society, is not a jest," the letter says. "We think the principle of regarding most knowledge as tentative, subject to growth, is essential to all science and most aspects of living as well. ATS can help nourish mankind's unique possession—his flexible but fallible mind." With that philosophy as a guide, the ATS wants to promote knowledge about science "for the benefit of writers, educators, students, and the general public." "We don't want money. We have that," says ATS President Alton Blakeslee, who is science editor of the Associated Press (AP). The society is simply soliciting ideas.

During the 8 years since its formation the tentative society has been little more than what Blakeslee calls a "lively concept." But now it is ready to become more than that, because one of its founders, AP reporter Rennie Taylor, made it possible. "He lived modestly, invested prudently, and, when he died last August, willed most of his estate to the Society," Blakeslee says. It has not yet decided whether to invest Taylor's legacy in a few big projects or to support many modest proposals.

The ATS is willing to back projects in writing, film, or tape recording. It is interested in science and medicine, social science, government, and economics. It is willing to be interested in almost anything anyone cares to propose. In getting started, what we need, says Blakeslee, is "counsel from imaginative minds." Anyone have a bright idea?

—B.J.C.

*American Tentative Society, Inc., 13 Vista-Way, Port Washington, New York 11050.

law enforcement equipment, of which some 51 will be in the form of standards (the other being informational reports). To date, however, only 4 standards have been publicly issued.

One of these is a standard for metal weapons detectors used in airports and other public places; another is for the breath analyzer devices which police use to measure illegal drunkenness in drivers. Both these standards will put some current models off the market or force their redesign. But only the breath analyzer one, which will be promulgated by the Department of Transportation and not by LEAA, will be mandatory and have the force of law. For the rest, the local police purchasing agent must obtain the relevant LESL documents† and copies of the standards, and compare the specifications they state with those offered by the vendor. It is a clumsy process, some NBS officials say, and the police and other users of this equipment would be better protected against poorly designed and unsafe equipment if the standards LEAA issues were mandatory.

The Carnahan meeting also offered other presentations which indicated the extent of R&D going on in crime technology and the range of clients and institutions involved. Lawrence Livermore Laboratory is performing a $1.8 million study for the Pentagon's Advanced Research Projects Agency (ARPA) which examines the seven major computer manufacturers' system designs to find where their operating systems or "brains" are vulnerable to illegal access. Jet Propulsion Laboratory reported on a study prepared for the National Science Foundation on standards, of all things, for AVM systems. An entire morning was given over to the international side of crime technology field, when the British, Canadian, and other foreign experts spoke.

And, for those who feel that the police have gotten the lion's share of new technology, the "Courtroom of the Future" was displayed one evening in a film. The Courtroom of the Future is located at the McGeorge School of Law at the University of the Pacific, in California. In the film, television's courtroom virtuoso, Raymond Burr, who starred as Perry Mason on TV, described how the room's circular shape and special acoustic ceiling, eight-track sound recorders, and, ironically, its 14 television monitors, could help the ends of justice be served.

Vendors, military engineers—even the experts from universities and federal laboratories—at the meeting all spoke as though technology really would bring a better future to the police and result in substantial improvements in their operations. But the police themselves, who as Zannes pointed out are the "ultimate users" of the technology, aren't so sure. In a talk given at the 1973 meeting and distributed again this year, the Chief of Police of Miami, Bernard L. Garmire, wondered aloud how Miami was going to spend a $20 million bond issue it raised to modernize its police force.

Like most police institutions, Garmire said, the Miami department lives "in an experiential vacuum" with respect to technology.

> I have often been given to wonder if the police have not been exploited, particularly by the manufacturers and vendors of technical services and hardware. Is the hardware really designed for police use, or is it simply adapted . . . ? Is the hardware constructed with the durability to withstand 24 hours a day, seven days a week usage, or is the standard obsolescence built in? . . .
>
> That the police are so grossly inexperienced in technology that they are easily victimized is, I suspect, well known in some circles.

Douglass Lee, a lawyer with the American Civil Liberties Union's Privacy Project, pointed to another problem. Summarizing what he had seen and heard at the Kentucky meeting, Lee explained the "chilling" effect all this technology could have on citizens' habits once it comes, slowly and invisibly, into general use. Lee noted that when the day comes when average people have to pull switches to enter or leave their houses without setting off an alarm, when vehicles can be tagged electronically, unknown to a driver as he travels down the highway, and when employees are fingerprinted in order to get into their place of work (not to mention telephone tapping and computerized banking) people will feel watched. Whether we really are on the road to George Orwell's *1984*, of course, cannot be foreseen. At least the Carnahan conferences offer some signposts along the way.

—DEBORAH SHAPLEY

† Documentation and copies of the LESL-developed standards may be obtained from the National Criminal Justice Reference Service, Law Enforcement Assistance Administration, U.S. Department of Justice, Washington, D.C. 20530. Questions about standards for law enforcement equipment may be addressed to Lester D. Shubin, Manager, Standards Program, LEAA.

Airlines: Half-Empty Planes Keep Profits Low, Waste Fuel

Since the mid-1960's the U.S. airline industry has, on the whole, been in the anomalous situation of suffering from overcapacity and low profits at the very time that passenger traffic has generally been rising. Moreover, even while many commercial aircraft have been flying half empty, state and local authorities across the nation have been planning or undertaking costly and sometimes environmentally questionable projects to relieve airport congestion. If only from the standpoint of energy conservation alone, the inefficient use of aircraft and airport facilities is serious because of the waste of fuel.

For the outsider looking in, the management and regulation of the airlines and the airports have been puzzling indeed. Joseph L. Sax, a University of Michigan Law School professor who has been interested in the problems of commercial aviation for some time, has described the situation as "bizarre." Commenting on its conservation aspects, Sax observes:

> To put it as bluntly as possible, redundant planes with lots of empty seats are one significant piece of the energy crisis. And, to make matters worse, the more planes there are—full or empty—the more congested the airports are. And airports that suffer congestion . . . undertake development and enlargement programs that, of course, use more energy and cost vast sums of money. In short, a whirlwind of energy wastefulness.