Ovshinsky: Promoter or Persecuted Genius?

Last November an inventor-scientist-entrepreneur from Michigan gained national headlines with the announcement of a "scientific discovery" that he predicted would revolutionize solid-state physics and electronics. The inventor was Stanford R. Ovshinsky, a self-educated high school graduate who heads Energy Conversion Devices Inc., a tiny profitless electronics company in suburban Troy, Michigan, about 15 miles from downtown Detroit. His "discovery" involved the detection of unusual electrical switching effects in amorphous, or glassy, materials and the production of new electronic switching devices from these materials.

In a press release dated 11 November 1968, Ovshinsky's firm triumphantly announced that this "new and completely unexpected phenomenon" was expected to "transform the electronics industry much as the transistor did 20 years ago." Among the marvels promised were large, flat television displays that could be hung on the wall like pictures; pocket-sized computers; and missile guidance systems which would be impervious to radiation.

Praised and Denounced

The immediate reaction to Ovshinsky's announcement ranged from extravagant enthusiasm to bitter denunciation. On the one hand, some of the world's leading solid-state physicists were quoted as hailing the dawn of a new age. Sir Neville Mott, director of the Cavendish Laboratory at Cambridge University in England, who is an unpaid consultant to Energy Conversion Devices (ECD), called Ovshinsky's work "the newest, the biggest, the most exciting discovery in solid-state physics at the moment," according to a report in the New York *Times*. Similarly, Morrel H. Cohen, director of the James Franck Institute at the University of Chicago, predicted that "discovery of the Ovshinsky effect is going to have the same kind of impact on fundamental physics the transistor had." Cohen is a paid consultant and a stockholder in the company.

On the other hand, many of the nation's leading electronics companies pooh-poohed the importance of Ovshinsky's announcement, claiming that the switching effect supposedly discovered by Ovshinsky had been known for years and showed little promise of leading to the production of practical semiconductor devices. Among the giants of American industry that were quoted as throwing cold water on Ovshinsky's supposed breakthrough were Bell Telephone Laboratories, International Telephone and Telegraph, Raytheon, and Texas Instruments.

Energy Conversion predicted that its devices—although not directly comparable to transistors in all respects—would make possible "smaller, faster, simpler, more reliable, and much cheaper electronic circuitry than is possible with transistors." The devices can also handle alternating current—a feat which is clumsy with transistors—and they are more resistant to nuclear radiation than conventional semiconductor devices, an asset which may prove useful in space and military applications. However, critics complained that the devices are unreliable, unstable, and hard to reproduce.

Ovshinsky said he had developed two basic switches to control current flow in solid-state circuits. Neither device is available commercially, but both are being produced in small quantities at Energy Conversion.

One device, which Ovshinsky calls the Ovonic Threshold Switch, acts as an insulator and blocks current until a voltage of just the right threshold is applied, at which point it suddenly becomes a conductor and passes current. The device continues to pass current as long as the required voltage is applied, but when the voltage drops below a critical value, the device again goes into the blocking state. The other device, which Ovshinsky calls the Ovonic Memory Switch, also switches from blocking to conducting when a threshold voltage is applied, but it then remains in the conducting state even when the current is turned off; a pulse of current must be applied to convert it back to the blocking state. The device thus has a "memory" of the last state it was in. The threshold switching phenomenon that occurs in both devices has been dubbed the "Ovshinsky effect" by Ovshinsky and his scientific colleagues (but not, it must be emphasized, by his legion of critics).

Ovshinsky's claims caused quite a stir largely because his devices seemed to pose a challenge—some would say "threat"—to existing solid-state theory and technology. Solid-state electronics has thus far concerned itself primarily with crystals—that is, materials which have a regular, periodic atomic structure—and with minor imperfections in these crystals. Conventional semiconductor devices, such as the transistor, for example, are made from carefully grown crystals that are "doped" with very precise amounts of impurities to enhance their electrical qualities. Ovshinksy's devices, on the other hand, are made from glassy materials that have a disordered atomic structure, and the amount of impurity in these materials does not seem to matter very much. A challenge was thus posed on two levels. Could solid-state theorists explain how the switching effect worked in these "messy" disordered materials? And could these materials actually be made into practical semiconductor devices that might compete with existing technologies?

Interim Assessment

Nine months have now passed since Ovshinsky's dramatic announcement, and while it is still too early to assess fully the importance of his contribution, it has become clear that (i) Ovshinsky, though he never went to college, is an unusually bright individual who is apparently able to break out of traditional ways of thinking; (ii) he is also a zealous promoter who has a knack for collecting eminent scientific advisers and then using them to gain recognition from the public and the scientific community; (iii) Ovshinsky's scientific contributions, and his promotional methods, remain matters of great controversy in the physics fraternity; nevertheless, (iv) Ovshinsky has sparked intense interest in the field of amorphous semiconductors at a time when solid-state physics, according to some of its most eminent practitioners, was becoming dull and predictable.

Whether another technological revolution is indeed around the corner remains to be seen. But it is interesting to note that over the past 9 months

some eminent scientists have retreated from the extreme positions they were previously identified with. Mott, whose dramatic quote in the New York *Times* was picked up and repeated by many other publications, denies ever making the statement attributed to him. "That's not the kind of language I used, or would use," he told *Science* in a trans-Atlantic telephone interview. "I think I may have said it was a very interesting development. I guess the reporter just decided to put it in good old Americanese." Mott said he thinks Ovshinsky's switching devices are "of very considerable interest" and "worthy of further experimental investigation," but he added that "only the future can tell if the devices will be technologically important—I would not stick my neck out on that." (However, William K. Stevens, the *Times* reporter who interviewed Mott, says there is "no question that Mott made the statement. I had a good telephone connection and I took it down on my typewriter.")

There has been a similar retreat by some scientists who were initially harsh in their judgment of Ovshinsky. Benjamin Lax, head of the National Magnet Laboratory at M.I.T., told *Science* he was originally skeptical of Ovshinsky's claims, and remains skeptical, feeling Ovshinsky's devices have been "oversold in the press" and have "not yet proved themselves." But Lax notes that Julius Feinleib, one of the brightest young physicists at M.I.T.'s Lincoln Lab, will soon join Ovshinsky's company for a year, and he comments: "If Feinleib's willing to devote his time to this, there may be something in it. Let's wait and see. We've all been wrong before."

Industry Interest

Most of the negative comments about Ovshinsky's devices have come from companies that might be considered competitors of Ovshinsky's. In contrast, some big companies that are potential "users" of the new technology have recently expressed sympathetic interest. A Xerox vice-president has called the materials "very promising." Zenith Radio's vice-president for research, Robert Adler, told *Science* he is watching Ovshinsky's work "with great interest." And the top scientist at a computer manufacturer confided: "It may not be the greatest thing since sliced bread, but there's enough in it to warrant careful examination by people like ourselves. There may be applications that haven't even appeared yet."

One of the most notable developments of the past 9 months has been a sharp upsurge of interest in amorphous materials among solid-state physicists. In March, a symposium sponsored by IBM and the American Physical Society included two papers relating to amorphous semiconductor switches, one emanating from Bell Telephone Laboratories and one from Energy Conversion. According to Marshall I. Nathan, of IBM, these two papers "provoked the most spirited discussion of the conference." A few days later, at the American Physical Society's annual meeting in Philadelphia, Energy Conversion scientists spoke to a crowd of perhaps 1000. Then, in May, some 300 participants attended a 4-day symposium in New York City—sponsored by the Picatinny Arsenal and the Army Research Office-Durham—that was devoted entirely to semiconductor effects in amorphous solids. The symposium was remarkable, according to some participants, both for its large attendance and for its highly polarized, emotionally charged atmosphere.

"It was very hard to remain neutral," says David Adler, associate professor of electrical engineering at M.I.T., who has recently become a consultant to Ovshinsky's firm. "It was like a basketball game. People were cheering on one side and booing on the other. I never saw anything like it at a scientific meeting before."

The meeting produced several sharp personal exchanges. In one instance, a General Electric scientist showed slides of Ovshinsky's newspaper publicity and made it clear he didn't intend to discuss science in such a flamboyant fashion. That won appreciative laughter from part of the audience, but brought a lofty retort from one of Ovshinsky's scientific backers deploring the introduction of personal innuendo into a professional meeting. In another instance, a Texas Instruments scientist gave a paper raising questions about Ovshinsky's work, and Ovshinsky later ran up, grabbed the microphone, and described his detractor's work as "crap." That gave the anti-Ovshinsky forces an opportunity to regain the high road, and a Bell Laboratories scientist piously observed that the word "crap" had no place in a technical discussion. Several participants have told *Science* these exchanges were "unbelievable" and "in poor taste," but there is no doubt that they provide an accurate reflection of the intense feelings that Ovshinsky arouses among physicists.

Last month Ovshinsky delivered a paper at the prestigious Gordon conferences in New Hampshire, and next month Mott is hosting an international symposium on noncrystalline materials in England, so there is no question that amorphous semiconductors have become a matter of great interest in the international physics community. This interest has been building up for years and is not, of course, due solely to Ovshinsky. But even Ovshinsky's detractors are inclined to credit him with a major role in dramatizing the importance of amorphous materials.

The Man and His Background

Opinion is sharply divided as to what sort of a man Ovshinsky is. His critics generally picture him as a glib con-man and promoter. His supporters picture him as an oppressed genius who is being persecuted by the forces of status quo in industry and science. As is usual in such cases of controversy, there seems to be an element of truth in both pictures.

Ovshinsky has already experienced something of an Horatio Alger climb to prominence. He was born into a poor family 46 years ago in Akron, Ohio. His father, an immigrant Lithuanian Jew, scratched out a living chiefly by collecting junk and then selling it. Ovshinsky himself dropped his formal education in 1941 after simultaneously graduating from high school and from night trade school. "School bored me," he says. "I didn't find it pertinent to the world."

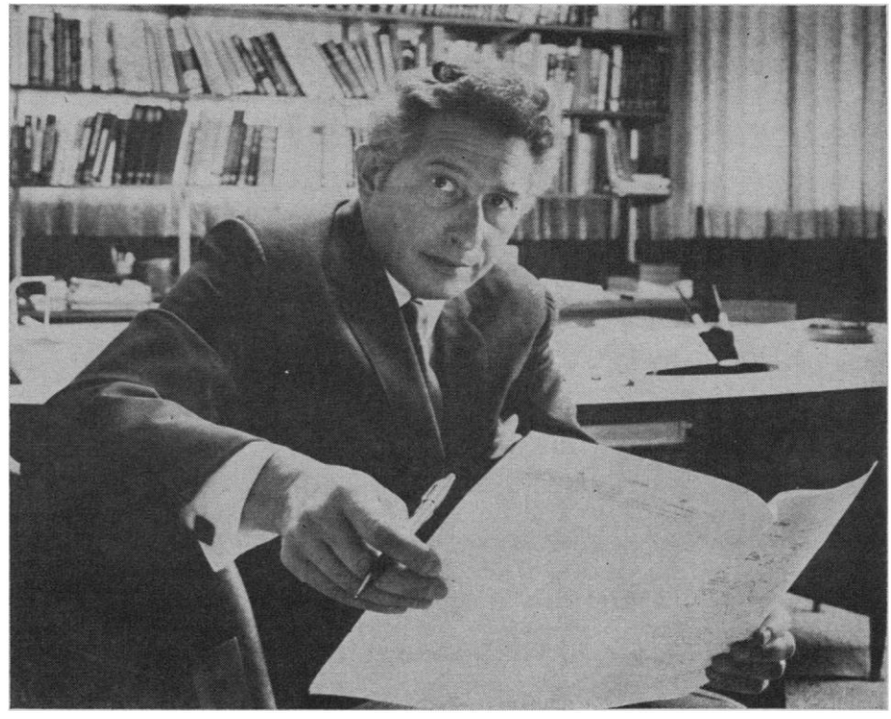
Leaving school seems not to have slowed Ovshinsky's intellectual development in the least. Indeed, Hellmut Fritzsche, a University of Chicago physicist who is a vice-president of Energy Conversion, theorizes that Ovshinsky may have been lucky to avoid the conventional crystal-oriented instruction dished out to solid-state physicists in the universities, for he was thus presumably better able to appreciate the possibilities of amorphous materials. At any rate, Ovshinsky has continued to educate himself broadly and deeply by reading and experimenting on his own, and he has not confined himself to physics. Sir Neville Mott finds Ovshinsky "both charming and extremely cultured—a man of very, very wide interests. I noticed on his bookshelf a German playright (Ernst Toller) that I had read with enthusiasm years ago. I've never met anyone else who has read him."

Ovshinsky has more than once sur-

prised the experts by educating himself in a highly technical field and then offering new insights.

In 1955 Ernest Gardner, then chairman of the anatomy department at Wayne State University's medical school, received a letter in the mail containing an unsolicited manuscript from Ovshinsky. The paper suggested mathematical models that might explain how the nervous system functions and indicated that Ovshinsky had read extensively in the biomedical literature. "We were intrigued," recalls Gardner, who is now dean of the medical school. "A number of things in the paper revealed inexperience but reflected intelligence and imagination." Ovshinsky was invited to test out some of his ideas experimentally at the medical school, and his name appears as a junior author on several papers published by the medical school's researchers in the late 1950's. Gardner recalls that Ovshinsky "brought an attitude toward the work that was a little bit different. He would raise questions that made you stop and think about things you usually take for granted." Ovshinsky was also the sole author of three papers on schizophrenia (published in the *Journal of Nervous and Mental Disease* and the *Journal of Neuropsychiatry*) and he gave a talk on the physical basis of intelligence to the Detroit Physiological Society in 1959. Ovshinsky says his interest in how nerve cells store and switch information led directly to his search for switching effects in amorphous materials, and he intends ultimately to return to his neurophysiological studies, believing in "the unity of science."

Ovshinsky's business career has been highlighted by numerous inventions and the founding of small companies to exploit these inventions. After graduating from high school in 1941, Ovshinsky worked as a machinist for a few years, then ran his own shop for a while. In 1946, he founded a small manufacturing company to exploit a new metal-cutting machine he had invented. Four years later, lacking financial backing, he liquidated the company and sold patent rights on the machine to a Connecticut firm. After working for others for 5½ years—first for the Connecticut firm, then as director of research for the Hupp Corporation—he again ventured out on his own, in 1955, and founded a tiny company to serve as a vehicle for his work on new types of electrical controls for automatic equipment. Three years later he sold his invention of an electrochemical switching device based upon amorphous oxides to another small company, and became president of, though not the chief power in, that company. In 1960 he left to found Energy Conversion. Through it all, Ovshinsky has kept the Patent Office busy. He has been issued at least 38 patents on various machine tool and electrical inventions.



Stanford R. Ovshinsky

Energy Conversion started in a storefront, with Ovshinsky, his wife, and children serving as work force. Today it occupies two modest one-story buildings and has a staff of about 100. As might be expected for a firm trying to develop a new technology, Energy Conversion has lost money every year but one. In fiscal 1968, it showed a net loss of $714,210 and in fiscal 1969 reported losses are running about the same. Most of the expenditures are going for product development, research, and patents. Capital has come from private investors, a public stock offering, licensing agreements, and a few government contracts. Energy Conversion currently has four military contracts, and Ovshinsky is said to be pressing for more. Well-placed sources report that one of Ovshinsky's financial backers, exerting pressure through an influential U.S. Senator, recently arranged a meeting between Ovshinsky and John S. Foster Jr., the Pentagon's research chief. Ovshinsky's pitch: he's being penned in by entrenched industry and needs government funding to break through the blockade.

Ovshinsky seems well off in terms of personal finances. He and his second wife, Iris, who holds a doctorate in biochemistry and serves as vice-president and treasurer of Energy Conversion, received a combined compensation of about $50,000 from the company last year. They also own stock which had a paper value of about $18 million at the end of last week. If the company should fail, the stock would not be worth much, but if it succeeds, Ovshinsky will clearly be a multimillionaire.

Perhaps the most striking feature of the company is its formidable array of scientific talent. When Ovshinsky decided he needed help in explaining the switching effect in the early 1960's, he first called John Bardeen, winner of a Nobel Prize for his work on transistors. (Bardeen, incidentally, feels Ovshinsky's work is "very interesting scientifically, but the practical applications are still uncertain.") Bardeen was too busy and suggested Fritzsche instead. Fritzsche became excited over the potential and signed on as a consultant in 1963, becoming a vice-president in 1965. Ovshinsky next latched onto Nobelist I. I. Rabi who came out to look over the company on behalf of a group of investors and was persuaded to serve, first as a director, and now

as a consultant. Over the past few years Ovshinsky seems to have filled his consulting stable with a good portion of the leading researchers in relevant fields. He now has 11 consultants, including such renowned figures as Morrel Cohen, of Chicago, and David Turnbull, of Harvard.* Most receive consulting fees, but Cohen and Fritzsche own stock as well. In recent months, Ovshinsky has been recruiting full-time researchers. By this fall he will have five full-timers on the scene.†

Controversy Over Style

Much of the criticism directed at Ovshinsky stems from a distaste for his style of operating. Questions have been raised about the way he got his paper published in *Physical Review Letters*, about the press conference he staged last November, about the way in which he has gained recognition with the help of his eminent scientific backers, and about gyrations in the company's stock. There is sharp disagreement over whether Ovshinsky should be praised or blamed for his behavior—but whatever one thinks of the matter, it is interesting to note that Ovshinsky's stable of eminent scientists has played a major—perhaps crucial—role in bringing him to prominence.

Prior to last fall, Ovshinsky had gained greater recognition abroad than he had in this country. His first major scientific talks were given in the Soviet Union and in Rumania in 1967. And last year he was awarded the Diesel Gold Medal of the German Inventors Association "in recognition of his discovery of the semiconductor switching effect in disordered and amorphous materials." Ovshinsky says he was nominated for the award by the research director of a leading German electronics firm who had visited his plant. Only three other Americans have won the award: Nobel laureate John Enders, Wernher von Braun, and Edwin Land.

The event which made possible Ovshinsky's jump into national prominence was his publication of a paper in the 11 November 1968 issue of *Physical Review Letters*, a prestigious journal of the American Physical Society. The paper was rejected at one point on the ground that it was more suitable for an applied physics journal, but it was ultimately published after two of Ovshinsky's most prominent scientific associates—namely Fritzsche and Turnbull—wrote letters arguing that Ovshinsky's work was of great interest to the international physics community. Ovshinsky's critics complain that he "pulled strings" to get his paper published in a leading journal. They contend that *Physical Review Letters* is supposed to carry "hot" items of a "basic" scientific nature whereas Ovshinsky's work, which had been described to some extent in magazine advertisements over the years, was "old stuff" of an "applied" nature. Kasturi L. Chopra, author of a book on thin film phenomena, charged publicly that Ovshinsky's article constituted "a sad example of the misuse of a scientific journal for commercial publicity." He said Ovshinsky's discussion of the switching pheonomen "is not new and is in fact borrowed piece by piece from various references." Ovshinsky's backers tend to dismiss such criticisms by noting that Ovshinsky's work has, in fact, generated considerable interest among physicists. They regard the intervention of Fritzsche and Turnbull as less a case of "pulling strings" than of "righting a wrong." In an effort to counter persistent complaints, the editors of *Physical Review Letters* explained their decision to publish Ovshinsky's paper in the March issue of *Physics Today*, then explained their explanation in the July issue of the same magazine.

Probably no aspect of Ovshinksy's work has so angered critics as the tremendous newspaper publicity he received at the time his paper was published last fall. Without question the publicity would have been more restrained were it not for the enthusiastic endorsements Ovshinsky received from his scientific backers and the publication of his paper in a leading journal.

Shortly before the paper was scheduled to appear, Energy Conversion held an advance briefing for leading science reporters at its Michigan plant. Ovshinsky, Cohen, and Fritzsche all gave talks, and the reporters were given a press release prepared by John Osmundsen, a former New York *Times* science writer who had been employed by Ovshinsky to handle press relations.

The press conference resulted in a barrage of favorable articles. Ovshinsky's work was highlighted in page-one stories in the New York *Times*, Washington *Post*, and other leading papers, as well as in a major article in the financially influential *Wall Street Journal*. A Detroit *News* headline even nominated Ovshinsky for a Nobel Prize. Some of Ovshinsky's scientific supporters blame the newspapers for running wild with the story, but the newspapers in turn seem to have played the story big largely because of the scientists' endorsements. Stevens, the New York *Times* reporter, says that, had Ovshinsky's work not received enthusiastic comments from such eminent scientists as Cohen, Fritzsche, and Mott, the *Times* "wouldn't have hit the story hard at all—we would have run 500 or 600 words on the business page about another interesting device that may or may not work."

Ovshinsky and his colleagues seem genuinely surprised at the extent of the publicity. They also can't see why their press conference should be considered less respectable than similar press conferences held by other companies and even by university researchers who are announcing a new finding. "It wouldn't have mattered what I did," says Ovshinsky. "They just jumped me, they really jumped me. I became a lightning rod for discontent, jealousy, and commercial rivalries." Still, Energy Conversion was obviously pushing hard for publicity. Writers at the American Institute of Physics report that Osmundsen persistently urged them to put out a press release on Ovshinsky (they didn't). And scientists at Bell Labs report that one of Ovshinsky's scientific consultants called them up and gently chided them for helping to quash the AIP press release (the Bell people say they did no such thing).

Stock Gyrations

The wave of newspaper publicity triggered a dramatic, though temporary, rise in the bid price of Energy Conversion stock—from $57 a share just before the stories appeared to as high as $150 a share immediately afterward. This led to speculation that Ovshinsky may have generated the publicity so as to make an enormous profit selling off shares, but Ovshinsky told *Science* that "no insiders" were involved in the trading. The price later returned to its previous levels. Energy Conversion did sell $2.5 million worth of stock to a private investment group about 2 weeks after the publicity broke. The price does not seem to have been affected by the publicity (the in-

* Other consultants, in addition to Cohen, Fritzsche, Mott, Rabi, and Turnbull, include David Adler, M.I.T.; Arthur I. Bienonstock and Richard Bube, Stanford; Karl W. Boer, Delaware; Heinz K. Henisch, Penn State; and William Paul, Harvard.

† Edward Fagen, originally at the University of Pittsburgh; Julius Feinleib, M.I.T.; John de Neufville, a new Harvard doctorate; Robert F. Shaw, Cavendish Laboratory, Cambridge; and James Thompson, University of Texas.

vestors paid $40 a share), but whether the decision to buy was influenced by the publicity is presumably known only to the investors, whose identities have not been divulged.

Much of the criticism of Ovshinsky's "style" comes from well-fed industrial and academic scientists who aren't struggling—as Ovshinsky is—to get a fledgling company established in a field dominated by giant corporations. "The scientific community ought to be taught a little charity," says Robert Adler, vice-president for research at Zenith Radio. "I've met Ovshinsky," he adds. "He's an absolutely first-class promoter and he must hold the world's record for name-dropping. He's used practices that someone working for a big company can afford to frown on. But how the hell are you going to finance something like this unless you're a bit of a promoter?" Many critics also talk as if Ovshinsky had somehow seduced his eminent scientific advisers into serving as unwitting promoters of both him and his company—but the scientists seem genuinely excited and many are far from naive.

The worth of Ovshinsy's scientific contributions is a subject of bitter dispute. Critics allege that Ovshinsky was not the first to discover the switching effect and that he therefore has no right to name it after himself. Actually, the priority question is extremely muddled, and it is not clear just who deserves credit for what. Mott, who has a thick file on amorphous semiconductors, says, "Anyone who claims priority is bound to be disputed." Bell Labs and Energy Conversion both hold patents for switching devices but there is disagreement as to which can claim the earliest filing date and as to what the patents cover. If the devices become commercially important, the courts may have to resolve the issue.

Regardless of who was first, Ovshinsky has clearly done more work on the devices than anyone else. Bell Labs, after some initial work in the early 1960's, concluded the devices had little potential and reduced its efforts—as did a number of other companies. But Ovshinsky continued to test thousands of amorphous materials in an effort to find the best combinations, and he seems to be the only one producing devices in a packaged form. "He has an exceedingly good idea of the chemistry involved—he's come up with materials that you can work with," says Feinleib, the young M.I.T. researcher who is joining Ovshinsky's staff. Morrel Cohen adds: "There are lots of questions about priority, but the real question is totality of contribution, and there Ovshinsky's contribution has been the greatest. He's generated the most excitement and he's got a large and vital organization devoting its energies to the work. If he hadn't done it, the others wouldn't be claiming priority."

Where will it all end? The people at Energy Conversion believe they are on the verge of success. They claim many of the reports of unreliability and instability were caused by mechanical packaging problems, which they have overcome, while others were caused by the fact that rival investigators didn't know how to make chemically stable devices. Energy Conversion has been turning out devices in a discrete package and in thin film form and is now incorporating the devices into actual products, including electrically alterable "read only" memories for computers, solid-state electroluminescent displays, and solid-state printers. "We're not just a device company," Ovshinsky says. "We're going flat out to make actual products." Cohen, who says he's "familiar with the problems that stand in the way of a practical technology," adds: "I don't see the need for any breakthrough ideas. I see a need for manpower, time, and money."

Still, there are major hurdles ahead. Even if the company's devices and products work, they may not be outstanding enough to supplant existing products; or they, in turn, may be outmoded by other new technologies before they get off the ground.

Whatever the technological outcome may be, the scientific fallout promises to be substantial. Already scores of physicists are struggling to understand how the switching effect works. There is considerable debate as to whether the phenomenon is primarily electrical or thermal in nature, and there are a number of competing models, none of them generally accepted. Solid-state physics has been gearing up for an assault on disordered systems for several years now, and Ovshinsky seems to have come along at just the right time to dramatize the field. And if his devices ever do catch on, the priority question and the other controversies may no longer seem important. As one eminent scientist observed: "Edison wasn't the first to invent the incandescent bulb but who remembers the guys who preceded him?"

—PHILIP M. BOFFEY

NEWS IN BRIEF

• **CALIFORNIA LIMITS DDT USE**: The Agriculture Department of California, a state which uses more pesticides than any other, has adopted regulations to restrict the use of insecticides DDT and DDD. The two pesticides have been banned for use in home gardening and households; their dust forms have been prohibited from agricultural use, and their liquid forms allowed in agricultural use only when no reasonable substitute can be found. The new ruling, which will take effect on 1 January 1970, is expected to reduce by one-third the use of DDT in the state of California.

• **HOUSE ANTIRIOT PROVISION**: The House on July 31 approved a mild 2-part campus antiriot amendment attached to an HEW appropriations bill. A provision similar to last year's rider would provide that federal aid be cut off to students engaged in serious college disruptions. A new provision would bar federal aid to institutions that fail to punish rioters. As was the case last year, no provision is made in the bill to enforce either measure; the House Appropriations Committee earlier failed to pass a provision that would have designated the Secretary of HEW to set institutional guidelines for enforcement.

• **UNIVERSITY OF TEXAS AT DALLAS**: The Texas State Legislature has transformed the Southwest Center for Advanced Studies (SCAS), a private research institute in Dallas, into a state-supported degree-granting campus of the University of Texas. The action will give Dallas a state-level institution and ease SCAS's financial worries (see *Science*, 13 December 1968). The legislature rejected an alternative proposal that would have made SCAS a part of the University of Texas, but would have allowed it to develop joint doctoral programs with other public and private institutions in the state as well. The state legislature has restricted the enrollment of SCAS to graduate students until 1975 as a concession to other institutions in the area, particularly to the University of Texas at Arlington, which feared competition from SCAS for students, funds, and influence. After 1975, SCAS will be allowed to admit students on the junior and senior level.