Western Electric

WE

Fourth Quarter 1983

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SPONSOR 1984 OLYMPICS

Western Electric's Electronic Messaging System (EMS) made its successful debut this summer during a pre-Olympic swimming and diving competition held at the University of Southern California. It received favorable reviews from a demanding group of critics—the media covering the competition. The highly sophisticated system was designed specifically for use during the 1984 Summer Olympic Games in Los Angeles and will provide a dazzling array of communications services to the media, the Olympic organizing committee, athletes, coaches and other Olympic committees.

Patricia Bawdon (above), a correspondence secretary from Sunnyvale, was one of about 35 WE and Teletype people who acted as EMS attendants during the testing and demonstration of the equipment. The attendants answered questions and demonstrated the easy-to-use system for reporters and other users.

For more on WE and the 1984 Olympics, see page 10.

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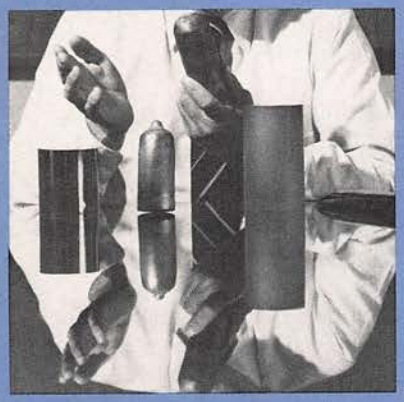

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On the Cover

Tire to tire in the final lap of a 1000 meter sprint, a USA cyclist and his Czechoslovakian pursuer pedal hard for the finish line. Western Electric held equipment tests during the pre-Olympic cycling competition to prepare for its role in the 1984 Olympics.

WE

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Reading Works ...
A Rising Star

By Saul Fingerman

If Reading's burgeoning success is any indication of things to come, the AT&T Technologies sector can look forward to a golden future

If you happened to own a meter that could measure the kind of creative intelligence it takes to produce tomorrow's technology today, and you took it for a drive through the rolling hills of Eastern Pennsylvania, the meter's needle would probably go clear off the scale as you approached a sprawling, low-profiled factory perched high on a bluff overlooking Berks County.

The factory is Western Electric's Reading Works—a beehive of high-tech activity that gives many a visitor the peculiar sensation of having stepped through a time warp into the future. This odd feeling of temporal distortion is probably induced by Reading's penchant for *creating* the future, rather than simply anticipating it. Visitors to Reading get not only a glimpse of the future, but also of the awesome capabilities that are helping to shape it.

That future is firmly rooted in five "technologies," each identified by the particular semiconductor material upon which it is based. They are considered as separate and distinct technologies because they behave differently, begin their crystalline existence differently, and must be processed differently. Not surprisingly, they also finish up as different kinds of products, ranging from things like high-voltage integrated circuits to tiny lasers used for lightwave transmission.

The lasers are produced under the guidance of a cheerful dynamo named Bob Eggers, whose title of Lightwave and Compound Materials Manager, doesn't adequately convey the complexity of his field.

Compound materials are semiconductor materials that are synthesized from two or more elemental chemicals and then grown into single crystals unlike anything found in nature. Compound semiconductors are one of the things that distinguish Reading from Allentown, whose extraordinary integrated circuits are all made from silicon. As a result of over 30 years of research and manufacture, silicon technology is more mature than the technology of compound semiconductors. Many of its mysteries have been solved by now—a happy situation that allows Allentown developers to explore silicon's limits of possibility in terms of how many circuit elements they can crowd onto a single chip. The vast amount of silicon lore they have amassed over the years enables them to keep coming up with industry leaders like the 256K RAM memory and the WE* 32000 microprocessor or minicomputer. Reading, as we'll see, uses a considerable amount of silicon too, but for very different kinds of integrated circuits.

Compound materials haven't been studied for nearly as long as silicon. Even though Eggers' group and Bell Labs have garnered enough data about them to fill a small library, nobody pretends to know all the answers. Also, compound materials have certain additional processing complexities, resulting from the fact that each element of a compound marches to the sound of a different drummer when it is being processed.

For example, when synthesizing gallium arsenide, the arsenide boils off at temperatures needed to melt gallium. Thus, the synthesis has to be done in a closed system under high pressure. For that matter, gallium, itself, is a strange kind of substance, somewhat akin to mercury in its behavior. Its melting point is so low, it will flow in your hand if you close your fingers around it.

This kind of behavior makes compound materials good-news, bad-news substances. The bad news is the problems that go along with synthesizing them and then growing them into perfect crystals. The good news is the special properties imparted to them by that synthesis. Neither gallium nor arsenic is of much use alone for optical applications, but, when you pass a current through a chip of synthetic gallium arsenide, it will emit light. It has, in fact, become a light emitting diode, or LED. And, by changing its chemistry slightly, you can change the wavelength, or color, that it radiates.

Oddly enough, an LED is kind of an embryonic laser. With a few additional processing steps, it can be turned into a laser. If you can confine most of the LED's light within a small region of the chip and create polished mirrors at both ends, you've got yourself a laser.

What happens is that the light is reflected back and forth between the mirrors until it stimulates free electrons in the gallium arsenide into emitting more light—something like a chain reaction. This additional light, in turn, stimulates still more light, until you've got a cascading beam of concentrated light, all radiating at the same wavelength. Since the mirrors aren't 100 percent reflective, a portion of the beam can exit to do its light-

*Trademark of Western Electric

Photos by Joseph Gazdak

wave communications chores.

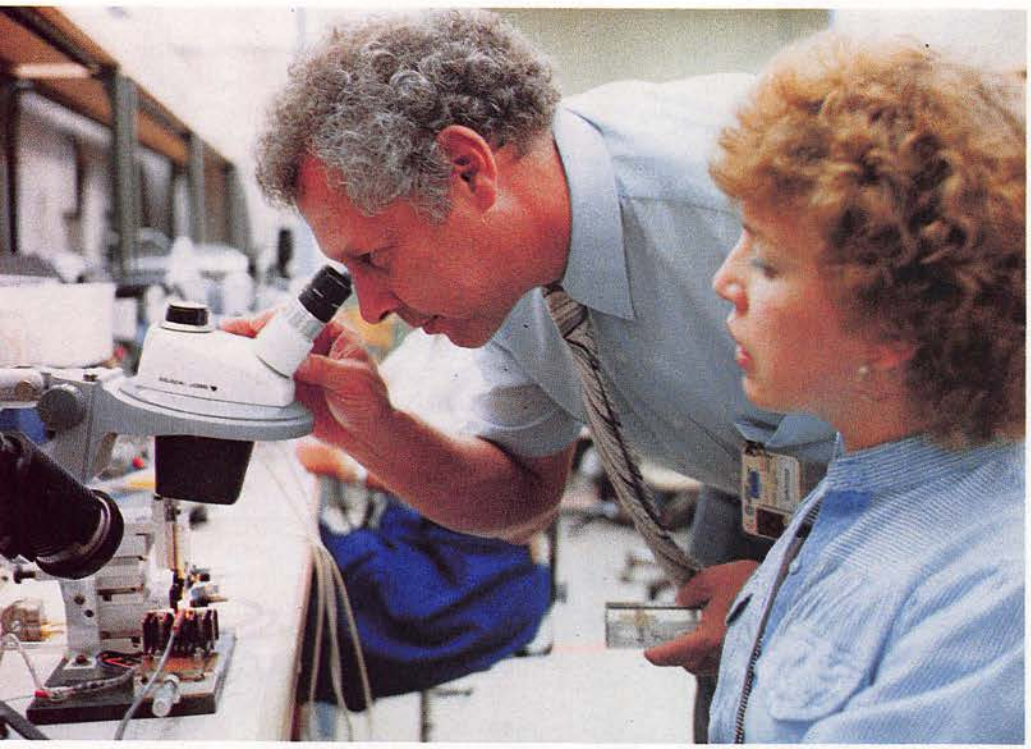
Incidentally, although we call the laser's beam "light," the output of Reading's lasers is substantially in the infrared region and quite invisible to the human eye. "A laser's wavelength is determined by its chemistry and its structure," explains Eggers, adding that, "Lasers come in all sizes, and many different kinds have been developed over the years."

Reading's laser chips are so small they are almost as invisible as the "light" they emit. Seeing them, you might wonder how Reading people can polish mirrors on anything so tiny. Well, they don't. Instead, they take advantage of gallium arsenide's crystalline structure by cleaving the chips at their natural planes, more or less the same way diamond cutters facet jewels. The ends break off so cleanly, they create their own mirror finish.

At this point, from a manufacturing point of view, the job is only half done. As small as the laser chip is, the part that actually lases is infinitesimally smaller. Yet, somehow, you have to align a length of hairthin fiber lightguide to that "hot" spot. What's more, the butt end of the fiber must line up with the spot exactly, or too much of the laser's light will leak off into the air.

Scientists at BTL Reading and at the Engineering Research Center in Princeton outdid themselves on this one and came up with an ingenious computerized process for making the connection. Basically, it involves energizing the laser and measuring the amount of light coming out of the fiber's free end. When that light is at a

Paul Gary displays the five semiconductor crystals that represent Reading's five leading-edge technologies. The crystals' different electrical characteristics are exploited to produce different products.



Bob Eggers peers through Joyce Manwiller's microscope to check connection of lightguide to laser.

maximum, the fiber and spot are in perfect alignment and the fiber is ready for fixing in place. Like so many other processes at Reading, you have to see it to believe it.

Eggers' little lasers kick out enough "light" to transmit signals over fiber for many kilometers between repeaters. His lightwave LEDs, on the other hand, although a lot easier to make, are considerably weaker. They are used primarily for short-haul applications such as subscriber loops and data links. But that, too, is changing. Using a new material, indium phosphide, Reading has recently begun making second-generation, long-wavelength LEDs whose output better matches the transmission characteristics of lightguide. This bit of optical matchmaking has already more than quintupled the distance LEDs can transmit between repeaters.

Similarly, Reading is making a second-generation, long-wavelength laser that will provide a nearly perfect match to the new single-mode fiber now being made at Atlanta Works. The repeaterless distances this combination makes possible are astounding, with talk running to distances as long as 30 kilometers between repeaters for the upcoming FT4E lightwave system. This high-speed system will carry over 6,000 channels per pair of fibers. "That's an exciting prospect," says Eggers, "but the proposed TAT8 is even more exciting."

That's typical engineering understatement. TAT8 will be the world's first transatlantic lightwave cable and a colossal project by anybody's standards. Scheduled for completion by 1988, the cable will be able to handle up to 40,000 simultaneous telephone calls—more than all of its predecessors put together. If AT&T wins its bid against French and English competitors, Western will take on a job that will cost up to a half-billion dollars.

Reading people are highly optimistic about their prospects. Back in June, the plant hosted 60 overseas people representing the international consortium that will pay for and operate the cable. Clearly impressed, the visitors were highly vocal in their admiration for Reading's capabilities. At present, Reading is building a special facility for aging, testing and certifying the lasers, transmitters and receivers it will make for the cable—another investment in the future.

Because everything going into underwater lightwave cable has to be so perfect, everything connected with it has virtually assumed the aura of an independent "culture," in the same way that the compound materials group has more or less evolved into a different kind of culture than has grown up around silicon. When Eggers says, "I've been away from silicon since 1972," he makes it sound as though silicon is another country from which he migrated to compound materials. Even the way he talks about his crystals is different. Silicon people describe their crystals in terms of diameter. They talk of 100-millimeter crystals and five-inch crystals, whereas compound material people usually describe their crystals in terms of square inches. That's because their crystals are so much smaller. "When we started making them in 1968," says Eggers, "they were only three-eighths of an inch in diameter. But we're getting to the point where we can talk about two-inch crystals."

Dan DiLeo holding a rack of light-emitting diodes that are about to undergo a rigorous aging test.

Two inches may be as big as they can get. "We might be banging our heads against nature," says Eggers—meaning that nature's plans for compound materials don't include giant crystals. Nodding his agreement, Charles McCauley, an engineer responsible for growing the crystals adds that, "We don't see a breakthrough coming that will get us beyond that diameter." Fortunately, this relatively small size doesn't really constitute a problem. Reading is already getting over 1,500 laser chip sites on every wafer.

Another Reading man who is deeply involved with LEDs among other things is assistant manager Dan DiLeo. However, in contrast to Eggers' infrared LEDs, DiLeo's are made for the sole purpose of shedding light on things. Made in 100 different sizes, shapes, colors and mounting configurations, they are used for illuminators (of Trimline® telephone dials), for indicators (on multibutton telephones and operator consoles), for alphanumeric displays (in business equipment such as the Dataphone® II data communication terminal), and even for "smart" fuses that light up to tell you they have gone west.

"There is no place in the Bell System," says DiLeo, "that doesn't use our LEDs. In fact, we're the largest supplier of LEDs in the United States, and one of the largest in the world." With a smile as broad as his prospects, he cites projections that indicate Western's LED business may double in the next two or three years.

The smile hangs on as he tells you that production of optoisolators, another of his areas of responsibility, are expected to *triple* in the same time frame. Optoisolators, despite their name, function as circuit couplers. They are used when one circuit has to "communicate" with another, but can't do it over direct metallic connections. Instead, an LED's light beam makes the connection. The job they do used to require electromechanical relays or cumbersome isolation transformers. Because the optoisolators are solid state, there are no contacts or moving parts to wear out.

DiLeo's group also makes the high-speed integrated circuits that control a lot of the electronics in lightwave systems. "Among other functions," says DiLeo, "these speedy chips detect the pulses coming into lightwave receivers so they can be regenerated for further transmission down the line." Together with long-wavelength lasers and single-mode fiber, they make possible the incredible pulse transmission speeds Western is achieving in its lightwave systems—speeds that will eventually run into hundreds of millions of pulses a second, or enough to transmit the contents of an encyclopedia in minutes.

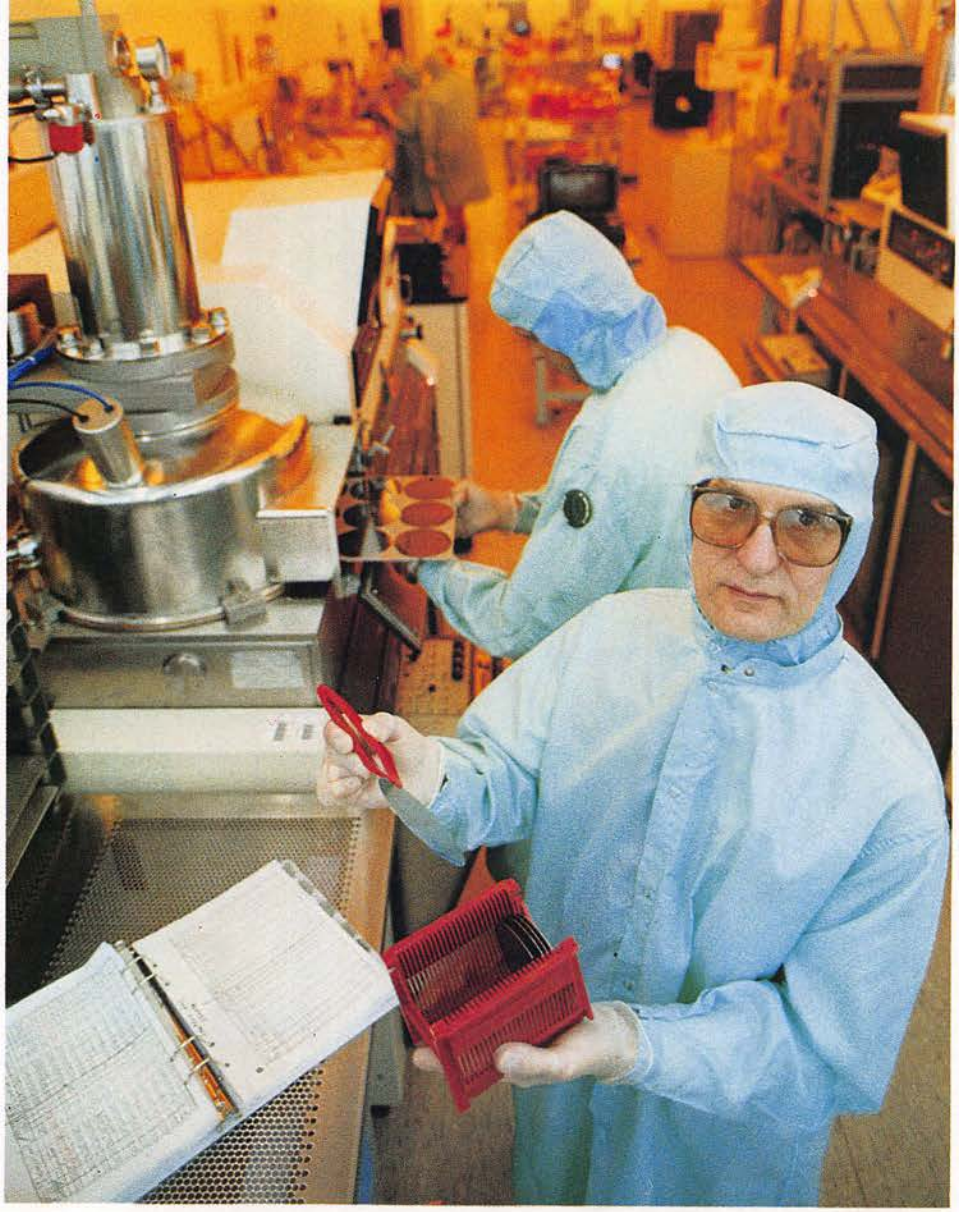
Another of DiLeo's products with a name that's bigger than the device it's describing has significantly cut energy

Anyone assigned to replacing defunct GaAsFETs would find himself with an awful lot of idle time on his hands

and maintenance requirements for long distance transmission. The gallium arsenide field effect transistor, or GaAsFET for short, would just about fit into the space taken up by a couple of letters on this page. However, its tiny dimensions stand in dramatic contrast to the enormous job it does in microwave systems, where it has replaced vacuum tubes hundreds of times as power hungry and thousands of times as large as itself. And the figures on relative life spans are equally impressive. Anyone assigned to replacing defunct GaAsFETs would find himself with an awful lot of idle time on his hands.

The same holds true for the bubble memories that have been made at Reading since 1978. Made from synthetic garnet crystals, bubble memories are what DiLeo calls "niche" devices, filling specialized but limited needs for which there are no viable alternatives. Rugged and nonvolatile, they are ideal for certain military applications. "But," says DiLeo, "they are not synergistic with other Western Electric business needs." Presently, bubbles are used in Bell System recorded message announcement equipment, transmission equipment and by the government. And, when these customers stop ordering them, the line will probably phase down.

One group of Reading products that will probably never be phased out is



Gene Parks holding a pallet of silicon wafers that will become linear bipolar integrated circuits.

its line of linear integrated circuits. The word linear here is roughly synonymous with *analog*—as opposed to digital, which describes all of Allentown's integrated circuits. The Allentown chips perform logic and memory chores, the digital magic of microprocessors, and, increasingly, custom functions such as echo cancelling.

Complementing these digital chips are Reading's analog chips, which perform a lengthy list of vital tasks ranging from amplifying small signals, tone generation, battery feed and conversion of voice (analog) to digital form, and back again from digital to analog. Thus, the two Pennsylvania plants work hand in glove to cover all the integrated-circuit bases.

Gene Parks, the engineering manager responsible for churning out Reading's more than 600 codes of linear ICs notes that they are the plant's biggest single product line, accounting for approximately 50 percent of Reading's business. "We are approaching a $100 million business and anticipate a 60 percent increase in volume during 1984," he says.

Linear ICs are made from silicon, but that's about all they have in common with Allentown's chips. The technology used to make them is called CBIC (pronounced SEE-BIK) for complementary bipolar integrated circuit. *Bipolar* means that both positively (P) and negatively (N) charged elements participate in the operation of the transistor; *complementary* means that vertically structured transistors of opposite operation (PNP and NPN) may be fabricated on the same chip of silicon.

"CBIC is a very powerful technology," says Parks. "It enables Reading's Bell Labs designers to come up with some very sophisticated circuits. But it's also a lot more expensive and harder to make."

One of the problems is that CBIC wafers require as many as twice the number of masking levels as other ICs. Another is that they use many different sizes of transistors—compared to as few as two sizes for digital ICs. Even so, their advantages far outweigh the added difficulties of making them. For one thing, they can perform a host of electronic functions and interface with a wide variety of circuits. For another, they can be designed to use power only when signals are actually passing through them. This parsimonious behavior saves energy and makes them more reliable because they stay cool.

Cool and reliable are words that also serve to describe Tom Mendel, a man who shatters one of the most popular icons of high-tech mythology. That's the one that equates the swift flow of new technology with youth and youth alone. It is an equation whose hasty math is all wet. The truth is that new technology requires a healthy mix of youth and maturity—of youthful exuberance tempered by the accretive, many-layered experience of age. Enter Tom Mendel, High Voltage Integrated Circuits manager.

An old hand who literally grew up with Reading—he came to the brand-new plant in 1952 right out of college—Mendel has helped usher in many new silicon technologies, up to

Tom Mendel checks production of GDXs—the only semiconductors that can handle up to 600 volts.

and including the plant's newest, the gated diode crosspoint, or GDX. Yet, even after three decades, the "game" hasn't lost any of its excitement for him, nor he any of his enthusiasm for it. And bringing in a new technology *is* a kind of game, a high-stakes game loaded with equal shares of risk and reward and definitely not for the timid. The capital investment for any of these technologies runs into the high millions, and no guarantee of success comes with the outlay. This makes it a game only for the totally committed.

The gated diode crosspoint, is a prime example in that it was an idea that conceivably might not have worked. Like CBICs, it is also made from silicon, but it is as different from CBICs as they are from digital chips. In fact, it is completely different from any other kind of integrated circuit. What makes it different is its ability to handle high voltages. The GDX is the only IC in the world that can safely handle voltages as high as 600 volts.

GDXs are "rubber-gloved" as it were by growing a fairly thick layer of insulating oxide on each one before further, conventional processing. The active areas on each chip are then created in individual "tubs" or islands, each isolated from the others by the sea of oxide. It sounds easy until you look at a chart of some of the processes involved, and then it sounds impossible. Fortunately, it isn't impossible as is amply demonstrated by its heavy usage in the 5ESS* switch, for which it was expressly designed. It performs the function that used to be handled by relays, which is no less than making part of the actual connection between your telephone and the one you call. Ultra-reliable, it is one of

*Trademark of Western Electric

the key features that make the 5ESS switch a winner.

The GDX evolved from some of the technology used to harden military ICs against radiation. "We took a relatively old technology," says Mendel, "and revised and revitalized it to create a brand new one." So new, in fact, that all of its possibilities are only now being investigated. Terry Riley, an Englishman and Mendel's Bell Labs colleague, notes that they are already working on many different applications for high-voltage technology. "Wherever you have to interface low-voltage ICs with a hostile environment," he says, "our technology is probably the way to go."

Mendel adds that all of the new applications were conceived in response to requests from other WE plants. "There are also commercial applications," he adds. "Things like motor controllers, automobile electronics, lighting control circuits and interface circuits for the power industry. With typical British reserve, Riley nods agreement but cautions that, "It is still early in the day." He makes it clear that, although GDXs are silicon devices, they won't follow in the path of other silicon devices, such as memories, whose number of components on a chip has doubled almost every year.

However, the one thing Mendel and company are more than doubling is the bottom-line figure for cost reductions. Since GDX was introduced in 1979, 58.2-million dollars have been shaved off production costs.

The comfortable familiarity and obvious teamwork that exists between

Mike Turk explains Reading's many recent changes. Over 40 percent of his plant has been rearranged.

Mendel and Riley is, in microcosm, typical of the close working relationship between WE and BTL at Reading. Engineering Director Paul Gary, himself a former BTL man, says it was one of the reasons he was happy to transfer to WE and come to Reading from Allentown. But he notes that the interface between BTL and Western must continue to evolve in the high-technology competitive environment we are in, and he has used his long BTL experience to make the relationship even tighter.

"We're coming together in a line-of-business environment in order to get our products to the marketplace as quickly as possible. The task here at Reading is very big and very complex."

It was that very complexity, Gary admits, that drew him to Reading in the first place. "Reading is at the technological cutting edge of the Bell System," he says emphatically. "I know of no other factory in the world that has as many solid-state technologies under one roof!"

Because of this diversity, Reading has been hiring people knowledgeable in a broad variety of disciplines, including chemical engineering, material sciences, computer science and, of course, Western's mainstay discipline, electrical engineering. And more and more of these people are coming to Reading with advanced degrees. Similarly, more and more Reading people are participating in programs that will earn them advanced degrees. "The rate of technological change here demands that we stay current," says Gary. "And that applies to equipment as well as education. We're putting into place adequate capacity and engineering talent to provide for the needs of the future."

Probably, nothing makes Gary's point for him as well as the fact that Reading now has 18 clean rooms. Like nearby Allentown Works, the plant is no longer recognizable on the inside. The cavernous open spaces that characterize so many Western Electric plants are gone, filled in by the clean rooms, each capable of creating its own special environment, and each representing a multimillion dollar investment in Western's future.

Why so many clean rooms? Partly because the need for Reading's products keeps growing and partly because the different technologies don't mix too well. Each has its own set of requirements and, often, its unique array of equipment. Frequently, this

equipment is designed and, like GDX test gear, even built by Reading engineers. "We couldn't walk down to our friendly neighborhood dealer and buy a GDX test set," explains Gary.

Reading has even taken to designing its own clean rooms. These are third generation clean rooms, incorporating the benefits of experience gained in the course of two previous generations. One interesting feature of the new rooms is their "tunnel" design. To eliminate the air turbulence that comes with big open areas, each clean room is divided into areas no wider than 14 to 20 feet. Between each area is a narrow tunnel that serves both as structural support for ceilings and as a "dirty" area for plumbing and wiring. The tunnels also serve as an air return for the pressurized laminar air flow coming down from the ceiling.

More than anything, Reading's three generations of clean rooms represent the plant's resilience and adaptability to change.

"In the past four years," says Mike Turk, the plant's dynamic general manager, "we have been in the process of putting about a quarter of a billion dollars worth of new capacity into place. We had to rearrange over 40 percent of the plant—and we had to do it while meeting our customers' product needs." An accomplishment, one feels, somewhat akin to putting up a building in the middle of a football field without interrupting a game in progress.

"What we've demonstrated," says Turk, "is that our people can quickly transfer a technology and bring it up to speed. It's a skill that very few companies have." Underlying this skill, according to Turk, is Reading's WE-BTL team spirit. "If I took you into one of our meetings," he says, "and you spent hours listening to our people talk, you still wouldn't be able to tell who is Western and who is Bell Labs. It's not *us* and *them*; it's just *us*."

Turk feels that strong "us" spirit pervades the entire plant. Both he and his staff manager, George Connolly, attribute much of it to the flexibility and involvement of the local people. Asked to characterize Reading people, Connolly counters with a question of his own. "What kind of superlatives can I use? The work ethic here is superb. Any job that comes to the Reading Works gets done."

"Which is one of the reasons the company has continued to support Reading with increased capacity," adds Turk.

Gazing out the window at a new compound material building still under construction, Turk notes that "The most constant thing about Reading is the constant change—new technology, new processes, new people. And the rate of change keeps speeding up. As one product line matures and stabilizes, another will be getting ready to take off." After a moment's deliberation, he concludes that, "Change is forever going to be our way of life, and our continued success is going to depend on how well and how fast we learn to manage it."

Another necessity, says Turk, is to do away with tunnel vision. "At Reading," he says, "we don't see just a GDX, or a laser chip, or whatever. We see the 5ESS switches or lightwave systems and the needs and problems of the people who are making them. In point of fact, Reading's products don't become significant until our customers actually use them in *their* products."

Continuing in the same vein, Turk adds that, as high as Western's quality standards are, "We'll have to redefine them from the customer's point of view. When you put thousands and thousands of ICs into something like the 5ESS switch, your quality standards have got to be high.

"In any case," he adds, "quality is free," and, in response to a surprised look, explains: "Quality is free in the sense that, whatever it costs, you get back in more good product and customer satisfaction."

When asked what Reading's future looks like, Turk snaps an immediate, "Fantastic!" To make his point, he holds up a graph of the plant's projected production for the next five years. The numbers are proprietary, but the message is clear. The graph's curve takes off and climbs upward like a jet under full power. He's right. Fantastic is the word. Reading Works—once a satellite plant—has become a rising star in its own right.

On Your Mark, Get Set, **Communicate**

Western's technology will provide extraordinary communications at the 1984 Summer Olympics

By Adele Donohue-Evans

The runner bearing the flaming torch climbs the steps and lights the symbolic fire. The first sonorous notes of the familiar theme song boom through the packed stadium, and hundreds of national flags fly in a flash of brilliant reds, greens, yellows, whites, and blues. It is the opening ceremony of the Olympic Games—an ancient athletic tradition that elevates competition to its purest form. It is the ultimate contest of body, mind, and spirit.

Only a handful of young men and women ever reach the level of excellence that qualifies them to compete in the Olympic arena. These young super-athletes, representing some 150 different countries, are united in a common drive to capture the highest possible reward—a gold medal.

In the same way, the two-and-a-half billion people who will watch the Olympics also have something in common. Even the least sentimental armchair spectator can't help but be swept up in the excitement of the Games and the unabashed patriotism they inspire.

Western Electric people who will be watching the 1984 Los Angeles Olympic Games—the first summer Games to be held in this country in 52 years—will have a special reason to be proud.

Western Electric, along with Teletype, Long Lines and Pacific Telesis, are the official telecommunications sponsors for the 1984 Games. Western Electric is one of about 30 major corporations that have entered into partnership agreements with the Los Angeles Olympic Organizing Committee (LAOOC). The 1984 Games are the first to be organized and managed by an independent group—LAOOC—without government subsidy. To meet expenses, the organizing committee is using revenue from corporate sponsors along with the sale of TV rights and tickets.

As official sponsors, the corporations agree to provide money, material goods, or services necessary for the operation of the 1984 Games. In return, the corporations receive the right to use the symbols of the 1984 Games in their advertising or marketing. You may have noticed the "star in motion" logo featured in Western Electric ads or stenciled on Dimension® PBX and 3B*2OS computer cabinets and Teletype® terminals.

Western Electric is donating two major telecommunications systems to the LAOOC for use during the Games: a highly sophisticated electronic messaging system designed specifically for the Games and one of the most advanced voice communication systems in the world.

The unique layout of the Los Angeles Games will make Western Electric's equipment vital to their successful and smooth operation. Next year's Olympiad will be the most geographically widespread of any Olympics in history. The 23 separate sites for the sporting events are scattered over a 4,000 square mile area of Southern California within a radius of up to 110 miles from downtown Los Angeles. The construction of new facilities is being authorized by the committee only if no existing facility can house an event. The majority of the competition will take place at existing facilities at local college campuses and city-owned sites such as the L.A. Memorial Coliseum, which was built in 1932 for the Xth Olympiad.

Several factors at the L.A. Games could contribute to serious communications problems: the sprawling geographic area of the Games; the influx of 2.5 million visitors, in addition to the normal population of 13.3 million; and Los Angeles' notorious traffic problems.

During next summer's Olympics, Western Electric will be responsible for serving the communications needs of the 50,000 people directly involved in the Games—some 14,000 athletes, coaches and staff; 11,000 people from the media; 22,000 staff and volunteers from the Olympic organizing committee; and some 3,000 representatives from the International Sports Federation, the International Olympic Committee and the National Olympic Committees. Previous Olympiads relied heavily on hand delivery of messages, data and other communications. For instance, during the 1976 Olympics in Montreal, small armies of workers delivered messages by hand. Obviously, the Los Angeles Olympics

Photos by Joe Gazdak

*Trademark of Western Electric

will require a far more sophisticated system.

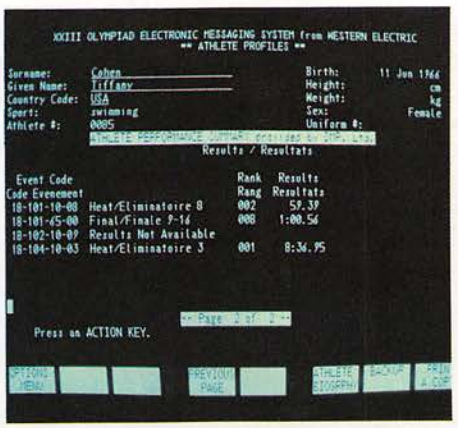
Through our Electronic Messaging System (EMS), Western Electric will bring extensive and unprecedented communications services to the organizing staff, Olympic committees, athletes, and coaches. EMS will also provide capabilities never before available to the press and other media during Olympic competition.

The EMS uses the latest in WE technology, including newly designed software from Bell Labs, a multiplexed data communications network and a complex of WE's 3B20S computers and Teletype's 5410 terminals.

The system, which will operate 24 hours a day during the Olympics, was designed for speed, efficiency, security and reliability. The Bell Labs designers made EMS both simple and fun to use—it requires no technical knowledge and a mere 10 minutes of prior instruction to operate. Its features include a menu of options and items to choose from in either English or French, the official Olympic languages. And most operations can be accomplished by pressing a single key.

At the touch of a button, the EMS will provide users with two basic services and a wide variety of applications. The EMS acts like an electronic mailbox, relaying telephone, Telex and

The Electronic Messaging System will help the Olympic organizing committee's staff and volunteers manage a host of administrative details such as making transportation arrangements, ordering supplies, and handling ticket sales.



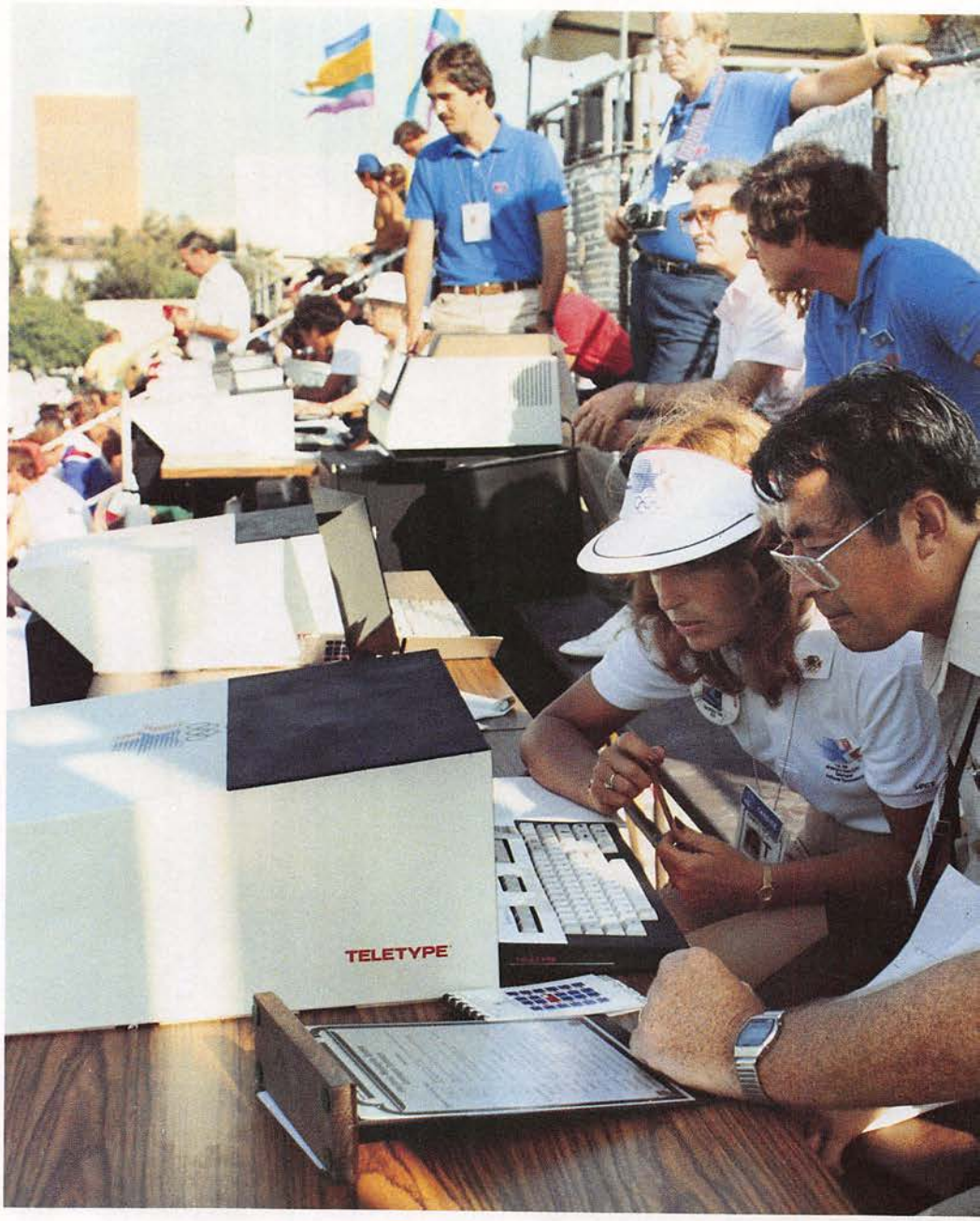
At the touch of a button, reporters can instantly call up an athlete's profile, such as the above on USA swimmer Tiffany Cohen.

personal messages to users. In addition, users can send and receive overseas messages because the system is linked to an international Telex network.

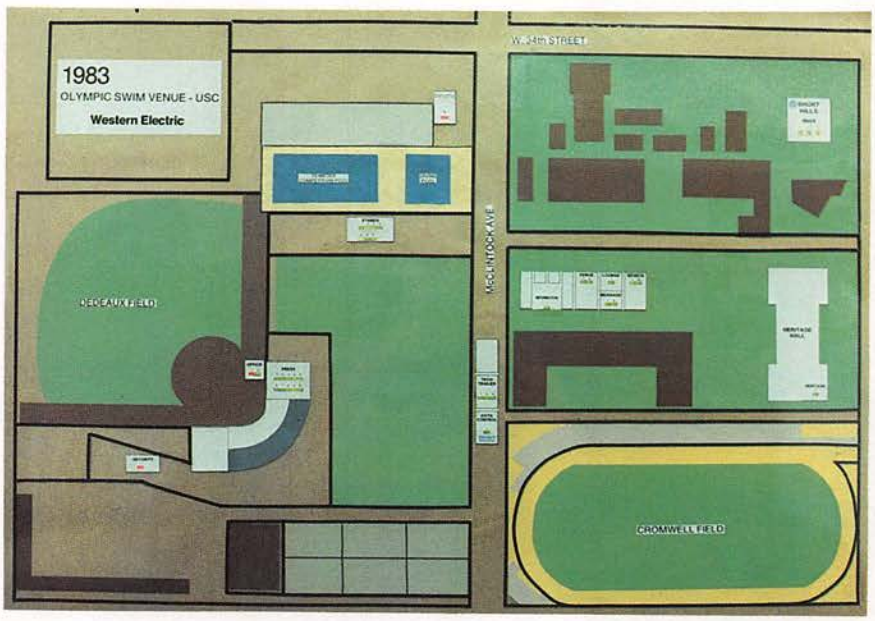
The second feature of EMS, the query system, allows the user to obtain up-to-the-minute results of particular events; comprehensive results of the Games overall; data on individual athletes; and historical data on world champions and record-holders. When the terminals are not in use, they will act as continuous "electronic billboards," displaying up-to-the-minute results from the most recently completed events, along with other items of interest.

EMS will simplify the job of the 11,000 media people faced with the difficult task of covering a 23-sport festival compressed into 16 days. Special Electronic Message Centers will be set up at the international broadcast center in Hollywood (for electronic media) and at the press headquarters in the L.A. Convention Center (for print media). In addition, each event location will have EMS terminals available for use in the press viewing stands.

The EMS will be a handy tool for Olympic reporters, providing almost instant access to all the facts, figures and background information a journalist needs to write a story. For example, a reporter watching a diving competition from the press stands can use the EMS's query system to call up a profile of the winning athlete; data on world-record holders for the event; and up-to-the-minute changes in results. If desired, he can even get a printout of this material for further study. And



Official mascot Sam the Olympic Eagle.



Gathered around an Electronic Messaging System terminal, WE attendants show a reporter covering the swimming competition how easy the system is to use.

that's not all the EMS can do: While still seated in the stands, the journalist can compose his story on the terminal, punch in his Western Union International credit card number, and send the story on its way to his home editor in Tokyo or Moscow or London or Sydney, Australia.

In addition to reporters, athletes and their coaches will find the system extremely convenient in reserving practice fields, notifying team members of changes in schedules, and relaying personal messages. The LAOOC will find the system invaluable in handling a myriad of organizational and administrative tasks such as ordering supplies, scheduling, transportation, maintenance and keeping track of tickets. When the Olympics open next summer, the EMS operations network will be one of the largest area communications networks ever deployed—including 12 3B20S computers, about 1,800 Teletype terminals and some 200 printers.

The second part of Western Electric's contribution to the Olympic organizing committee is an advanced voice communications system. We will provide about 25 Dimension PBXs, some 6,000 special Olympic phones and about 700 electronic telephone sets. As with the EMS, the voice equipment will be spread among 23 athletic sites, three Olympic villages, the press center, international broadcast center, and at various facilities used by the organizing committee.

A Dimension PBX 2000 with a 1500-line capacity and the latest features was installed at the LAOOC headquarters in Marina Del Rey to support the committee's administrative and operational activities. Another PBX will be located at the international broadcast center where ABC will coordinate coverage of the Games for all the electronic media at the Olympics.

Each sports location will have its own PBX with a console operator and message center. The console operators also will work in cooperation with the EMS system so that if a person cannot be reached by telephone, the message will be entered into the EMS and can be "picked up" at the nearest terminal.

Once the games begin, there will be no time to correct any major problems

The special telephone being used at the Olympics is a black, 900-type model with a special face plate showing the 1984 Olympic's star-in-motion logo with the words: "Western Electric: Official Sponsor of Telecommunications for the 1984 Olympic Games." Nearly 6,000 of these phones will provide vital communications links for a variety of official activities, including medical, security, ceremonies and protocol, results room and ticketing. An

Equipment destined for the Olympics, such as the 3B20S computers pictured above at Oklahoma City, are being shipped in specially marked crates.

additional 700 electronic telephone sets with star-in-motion face plates will be used by key office personnel at LAOOC headquarters and by some members of the Olympic committees located in the Olympic villages.

Western Electric's engineers, installers and others are performing functions for the Olympics that operating company people would have done for us in the past. Those functions include requirements planning, systems and site engineering, installation, user training and documentation, ordering, operations and maintenance.

For example, using a Remote Maintenance Test Center, Western Electric installation people and technicians will be able to test, make changes and monitor the various PBXs in the system. The PBXs will be polled from a test center located in the Southern California Installation office in Los Angeles near California State University at Dominquez Hills.

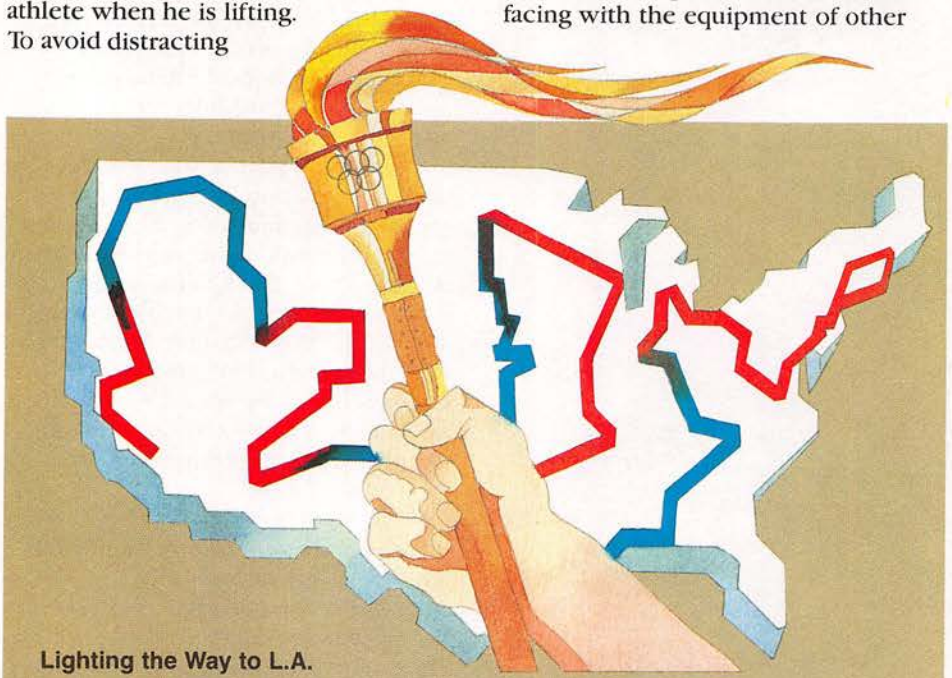
The engineering and installation of the voice equipment for the Olympics presents a challenge of almost Olympian proportions to our engineers and installers. The unique aspects of the L.A. Olympics—widespread sites, a huge population, and traffic congestion—make installation a logistical nightmare. Because almost all the events are being held outdoors, much of the installation is being done outside—through tunnels, over trees and fences, and even under water. In addition to the existing lightguide system, an enormous amount of cable—about 500 miles— will be laid in configurations ranging from the routine to the bizarre.

One of the most challenging jobs for WE installers will be rigging equipment for the canoeing and rowing competition, which will take place 84 miles from Los Angeles on Lake Casitas. The judges' stand and the start and finish lines all require phone service, which isn't unusual, but they will all be located on floating rafts, which isn't exactly a standard installation job. To provide telephone service on the floating platforms, five miles of cable will first have to be run around part of the lake's irregular shoreline and then under water to the platforms.

While judges and officials for all 23 events require telephones, the nature of each particular competition often necessitates some special service or adaptation. For example, the judges for the weightlifting competition will be seated within a few feet of the athlete when he is lifting. To avoid distracting the athlete or breaking his all-important concentration, the judges' telephone cannot have a bell that rings but rather will require a visual signal, such as a blinking light.

One of the unusual things about installing a communications system for the Olympics is that it will be used for a very limited period of time. The competition begins on July 28, and just two weeks later, the XXIIIrd Olympiad will be history. During that two-week period, however, the communications system will be in almost constant use. Therefore, it must be completely reliable and trouble-free. Once the Games begin, there will be no time to correct any major problems in the system.

For this reason and because WE's system will require considerable interfacing with the equipment of other



Lighting the Way to L.A.

A tradition dating back to ancient times and a hallmark of today's Olympics, the Olympic flame symbolizes the peace and unity of the original Games. En route to the 1984 Games, it will be carried on the longest relay run in Olympics history to raise $30 million to be donated to youth organizations throughout the country.

The 1984 Olympic Torch Relay, sponsored by AT&T Communications, will span 19,000 kilometers and will pass through all fifty states on its way to Los Angeles. More than 10,000 Americans—some of them Western Electric employees—will participate in the unprecedented relay that will launch the "Legacy for Youth" fund.

Any individual or organization can make a $3,000-per kilometer pledge to the fund and carry the flaming torch along a designated portion of the route. The legacy kilometer runners will be escorted by members of the AT&T Olympic Torch Relay Team which will include some 200 high-speed runners. In addition to acting as escorts for 10,000 kilometers, the team members will also carry the flame for 9,000 kilometers.

Western Electric Pioneers will help with the elaborate planning and administrative work necessary to organize the relay and keep it on schedule.

participating sponsors, WE held summer trials for EMS and voice equipment in July. The trials were held in conjunction with actual athletic events held at future Olympic sites so that the equipment could be tested in situations similar to those at next year's Olympics. The voice equipment was tested during an international cycling invitational at the newly constructed Velodrome at California State University at Dominquez Hills. A week later, the EMS was given a trial run during an international swimming and diving competition held at the University of Southern California's McDonald's Swimming Stadium. During the swimming and diving competition, the sports media covering the meet got hands-on demonstrations of the equipment. The EMS system provided instant access to results of the events and profiles of competing athletes.

By all accounts, the trials for both the voice system and EMS met expectations and were successful. Following the equipment testing, all the Western Electric people involved met to discuss what they had learned from the trials. Based on those discussions, some minor modifications will be made to the equipment and operations plan before next summer.

In addition to testing the equipment, the trials also provided an opportunity for Western to test its operations plan for next summer. Be-

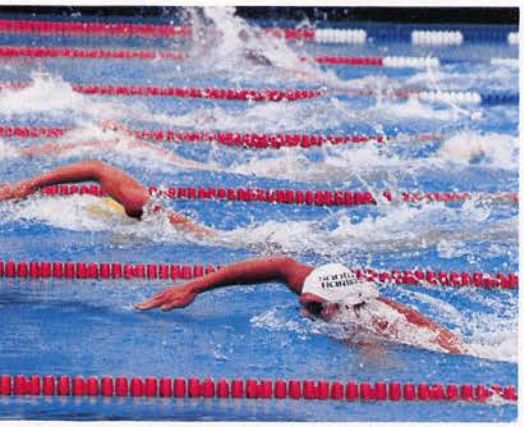
Using a phone provided by Western Electric, official verifies results of a pre-Olympic cycling competition held at California State University this summer.

Teletype printers will provide copies of up-to-the-minute results and other Olympic information.

tween 300 and 400 people will be needed to staff the EMS data center, act as managers of operations at each sports site and work as attendants at all sites, answering questions and giving instructions to users. An additional 500 to 700 people will be needed to work as console operators, station user advisors to assist people not familiar with a modern telephone system or as message center attendants. Some of the positions will require special expertise such as the data center staff, Dimension PBX troubleshooters, and sports site managers. But the bulk of the staff will be made up of attendants, most of whom will be working as volunteers. According to current plans, the volunteer attendants will include WE and Teletype employees who will take vacation time, Telephone Pioneers, and spouses or children of WE and Teletype employees.

By the end of the year, we will begin operations at the Olympic data center located in a central office building in downtown Los Angeles. Three 3B20S computers are now on line along with a small core staff. They will be providing the electronic mail and data base building functions of EMS necessary to support the pre-Olympic activities of LAOOC. Eventually, the data center will house a network of 12 3B20S

WE volunteer Gail Fox (front) and Zayda Vazquez of the PT&T Olympic Project Team worked as Dimension console operators during a trial run of Olympic voice equipment held this summer in conjunction with an international cycling event at Cal State.



computers. These will be added gradually over the next several months. A few weeks before the Olympics, the rest of the operations staff will be brought to Los Angeles for the training, documentation and orientation necessary to prepare them for their jobs during the Olympics.

Trying to find a part of Western Electric not involved in the Olympics project is like trying to find a parking space in downtown L.A.—nearly impossible. Planning, implementation and project management is being handled by Network System Sales in the Pacific Region, PBX Manufacturing—Business Residence Division at the Denver Works, and the Processor and Software Systems Division at the Network Software Center; planning and implementation for operations is the responsibility of Computer Planning, Development and Operations in the Eastern Region; the Oklahoma City Works is providing the 3B20S computers; Teletype's Skokie and Little Rock locations are supplying terminals and printers; the Denver, Indianapolis and Shreveport Works are providing PBX and station equipment; Atlanta, Hawthorne and Phoenix Works are providing cable; Allentown, Reading, Hawthorne and Richmond Works are supplying electronic components and circuit packs; Southern California Installation area is handling installation and distribution of equipment; training materials are being developed at the Dublin, Ohio Training Center; user training is being provided by the Pacific Region; the data design organization in Winston-Salem is responsible for documentation to users; Merrimack Valley Works is providing transmission equipment; Corporate Account Management is responsible for Olympic marketing and sales activities, joint project management, and shares the responsibility for exhibits with Public Relations; Public Relations is also handling advertising and internal and external publicity.

Outside Los Angeles, the rest of the world will also be keyed into the XXIIIrd Olympiad. While over half the world's population will be watching the Olympics next summer, only a small handful of them will be sitting in the stands in L.A. Most of us in the U.S. will be watching some of the 200-plus hours of programming on television from the comfort of our living rooms.

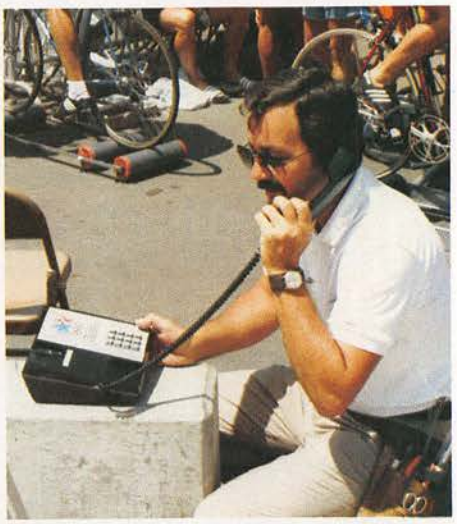
ABC will be broadcasting the video and sound of the Olympics over a remarkable new WE lightwave system installed for Pacific Telephone. The system was originally designed to handle Southern California's growing telecommunications needs more quickly, cheaply and efficiently than ever before. In addition, the system next year will be handling the telecommunications needs of about 2.5 million visitors, and transmitting television, voice and data signals from 23 Olympic sites to the entire world.

Western Electric's Olympic project is a huge, corporate-wide undertaking, representing a considerable investment of equipment, people and resources. The Olympics will provide a perfect showcase for portraying Western Electric as a high-technology leader and a specialist in manufacturing telecommunications equipment. In addition, it gives us an opportunity to work closely with and lend our support to Pacific Telesis, our single largest customer.

In sponsoring the 1984 Olympics, Western Electric will become part of an ancient and honored tradition that is 3,000 years old. At the same time, as one of the tradition-breaking sponsors of the first Olympics in history that is not subsidized by the government, Western Electric is helping to demonstrate the American free enterprise system at its best to a worldwide audience.

In less than nine months, the Olympic blaze in the L.A. Memorial Coliseum will be lit and the XXIIIrd Olympiad will be officially opened. Just as the athletes will be ready to compete after years of training, Western Electric, after months of preparation, will be ready to help bring the rich tradition of the 1984 Olympics to the rest of the world.

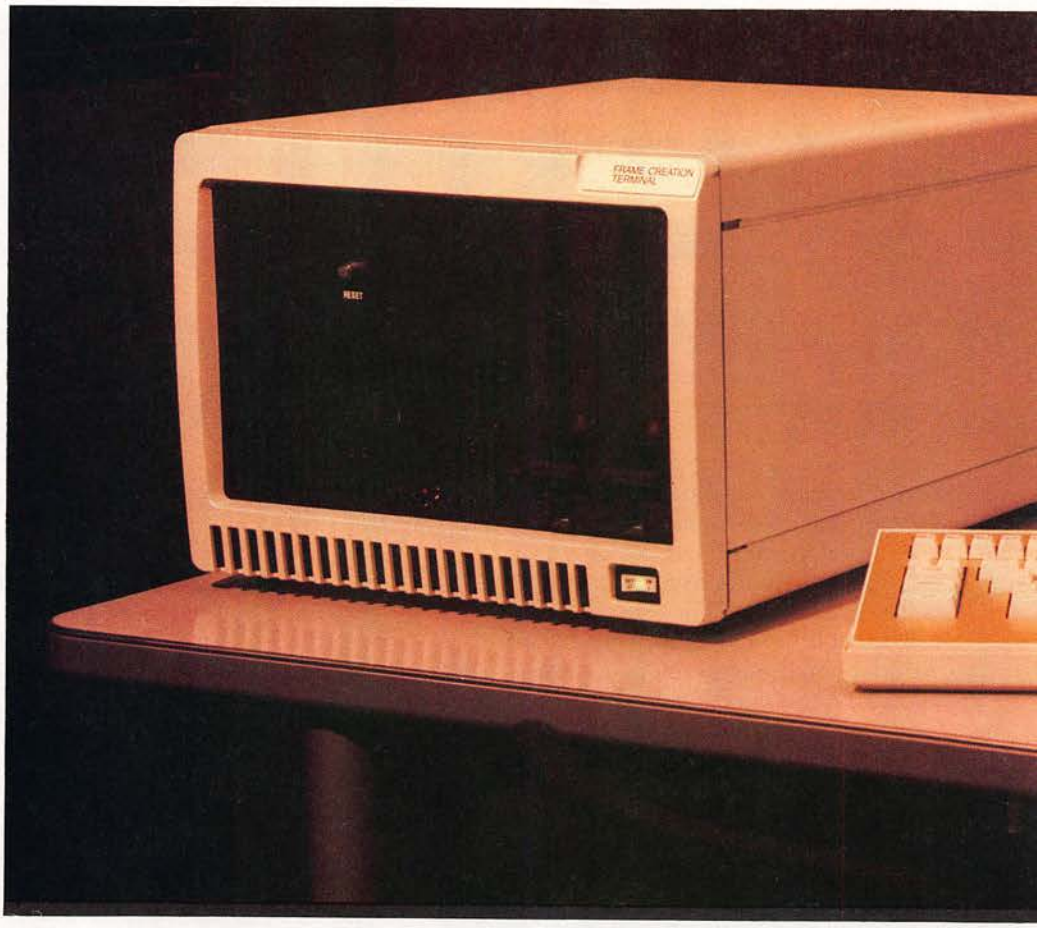
On the infield of Cal State's Velodrome, Pacific Region installer Don Arend tests a WE-donated phone.



First shipment of 3B20S computers arrives in Los Angeles for installation at LAOOC headquarters.

The Irresistible Force

A couple of new Western Electric products can make joining the Information Age fun



First came the telephone and, with it, the instant communications that shrank our world to a more comfortable size. Then came television, the brash, magic box that broadened our horizons and, seemingly, overnight, turned our living rooms into theatres, schools and, on occasion, political forums. Along about the same time came the computer, whose electronic wizardry opened up both outer space and the inner spaces of our minds and, in the process, nudged our world still further into an altered future.

Now, all three of these driving forces of our Information Age have been integrated into a single, exciting concept called *videotex*—an irresistible force that will forever change for the better the way we shop, bank, keep up with the news, and entertain ourselves.

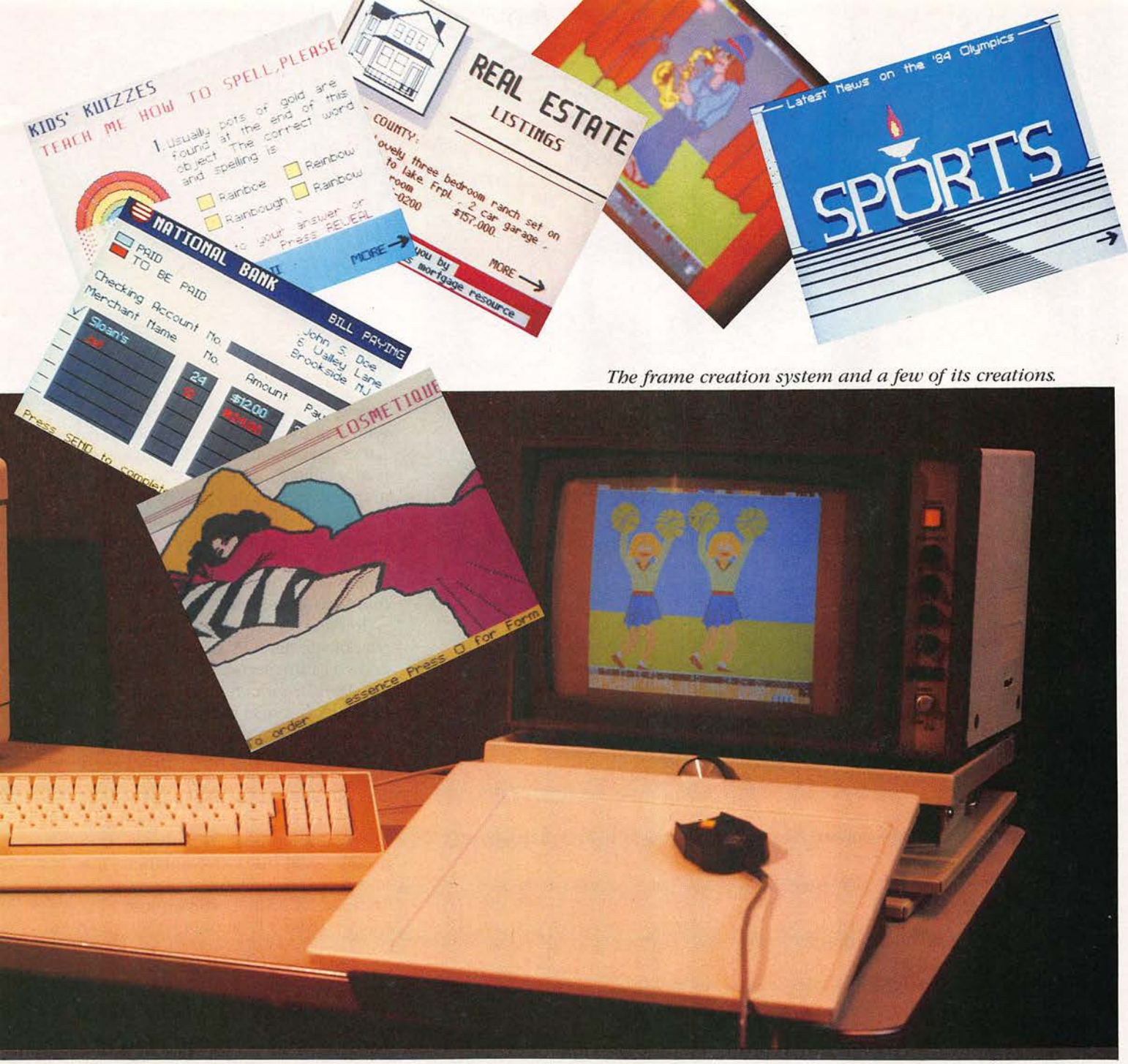
Videotex is the generic name for an electronically based service that makes it possible for you as a subscriber to call up instantly virtually any kind of information you want over your phone line, have it displayed on your television set, and, then, if you wish, communicate directly with the source of that information. In short, it offers two-way, transactional communications.

You can, for example, ask for airline schedules, pick the flight you want, and reserve a ticket—all in a couple of minutes. Or you can call up a department store's illustrated catalog and, with the push of a couple of buttons, "leaf" through its pages, or ask to see the store's sales of the day. If anything strikes your fancy, you can order it by pressing a few more buttons. Videotex even makes it possible for you to pay by charge card or electronic transfer of funds from your bank.

You'll also be able to access computerized newspapers and magazines, order theatre tickets, get the latest news, play video games, and send electronic "letters"—all without leaving your home, or even getting out of your chair.

All those buttons being pushed belong to a remarkable new consumer product being manufactured at Western Electric's Montgomery Works in Illinois. Named the Sceptre™ terminal—probably because of the astonishing array of powers it puts into your hands—this attractive device makes you a full-fledged, participating member of the Information Age.

The Sceptre videotex terminal consists of two units—a keypad very much like the keyboard of a miniature typewriter and a control unit about the size of a table top radio. The control unit can be connected to your TV set and modular telephone in seconds. Once connected, it serves as a high-speed communications link between your TV and the data base that transmits all the information and colorful pictures you punch up on your screen with the unit's keypad.



The frame creation system and a few of its creations.

The keypad is wireless, so there are no cords to trip over. It also incorporates several features that should make it attractive to the public. These include single-button dialing of any five telephone numbers and the ability to display a call-waiting alert on your TV if someone is trying to reach you. Most important, perhaps, is the Sceptre terminal's incorporation of the National Bureau of Standard's data encryption standard. This feature provides complete privacy for banking and other financial transactions and makes it almost impossible for anyone to access your accounts.

Montgomery is also making the unit that makes it easy for graphic artists to create pictures for display on your television set. Called the frame creation system, it lets providers such as retail stores, create attractive, high-quality images like the ones above.

Designed by Bell Labs with the graphic artist in mind, the frame creation system is a splendid example of the kind of human factors engineering it takes to tame complex machines and make them user friendly. An artist needs no computer programming knowledge to use it. At his fingertips are 65,000 colors, plus dozens of shapes, type faces and other graphics aids that leave him free to concentrate on the aesthetics of each frame. Most of the artist's work is done simply by moving a hand held "mouse" over the surface of an electronic "pad" that digitizes his creations and stores them in the system's memory.

William Baldwin, the AT&T Producer Systems division manager responsible for marketing the frame creation system says, "Banks are looking for more efficient ways of decreasing their "brick and mortar" costs; retailers are looking for more effective ways of reaching customers; and consumers—that's all of us—are looking for faster and more convenient ways of shopping, banking and getting information. Videotex can satisfy all these needs."

Baldwin has targeted two major sales areas. The first is commercial providers such as the above mentioned banks and retailers. The second

Montgomery Works—the "Can-Do Plant"

The unique one-year warranty on the Sceptre terminal doesn't faze Montgomery Works' busy general manager, Harry Heilig. "Of course it's reliable," he says. "So is the frame creation system. So is everything we make here.

"We've been making data sets for a long time, and data sets *must* have super-high quality and reliability. We've been told by some of the airlines who use our data sets that they can lose as much as $30,000 a minute if one of our sets goes down and people start calling other airlines. Well, I can tell you we make sure our sets *don't* go down!"

From a manufacturing viewpoint, Heilig doesn't see much difference between the Sceptre terminal or the frame creation system and data sets. "They work with video signals," he says, "but, in the really important things, they are the same as our data sets. That's why our engineers' skills in designing, manufacturing, testing and quality control are ideally suited for these products. Like data sets, our videotex terminals go onto customer's premises and are highly visible. We don't want to have to go out there and service them if we can avoid the need for it during manufacture."

The ways Heilig's engineers make sure their products don't go down are interesting in their own right. In addition to thousands of computerized tests that make their data sets do everything but whistle Dixie, the sets are subjected to a series of "torture chambers." Among other things, they are "aged" in walk-in ovens. If a device is going to go bad, it will do it here. Says Heilig, "The nature of solid-state devices is such that, if they're going to go bad, they'll do it early on—often the first time they are subjected to prolonged heat. On the other hand, if they don't "die" in the ovens, they tend to last, and last, and last. . . ."

Like Montgomery's data sets, the Sceptre videotex terminal and the frame creation system are also subjected to "burn-ins." This grueling sequence involves turning a set on and off thousands of times under realistic working conditions. "If a set is going to die," says Heilig, "it will do it here and not on the customer's premises."

Heilig is enthusiastic about Montgomery's new venture into the often hectic consumer product field that the Sceptre videotex terminal and the frame creation system represent. "Montgomery's relatively small size is important for our future," he says. "A small plant with a short chain of command can quickly respond to changing needs—and that's vital for our competitive future."

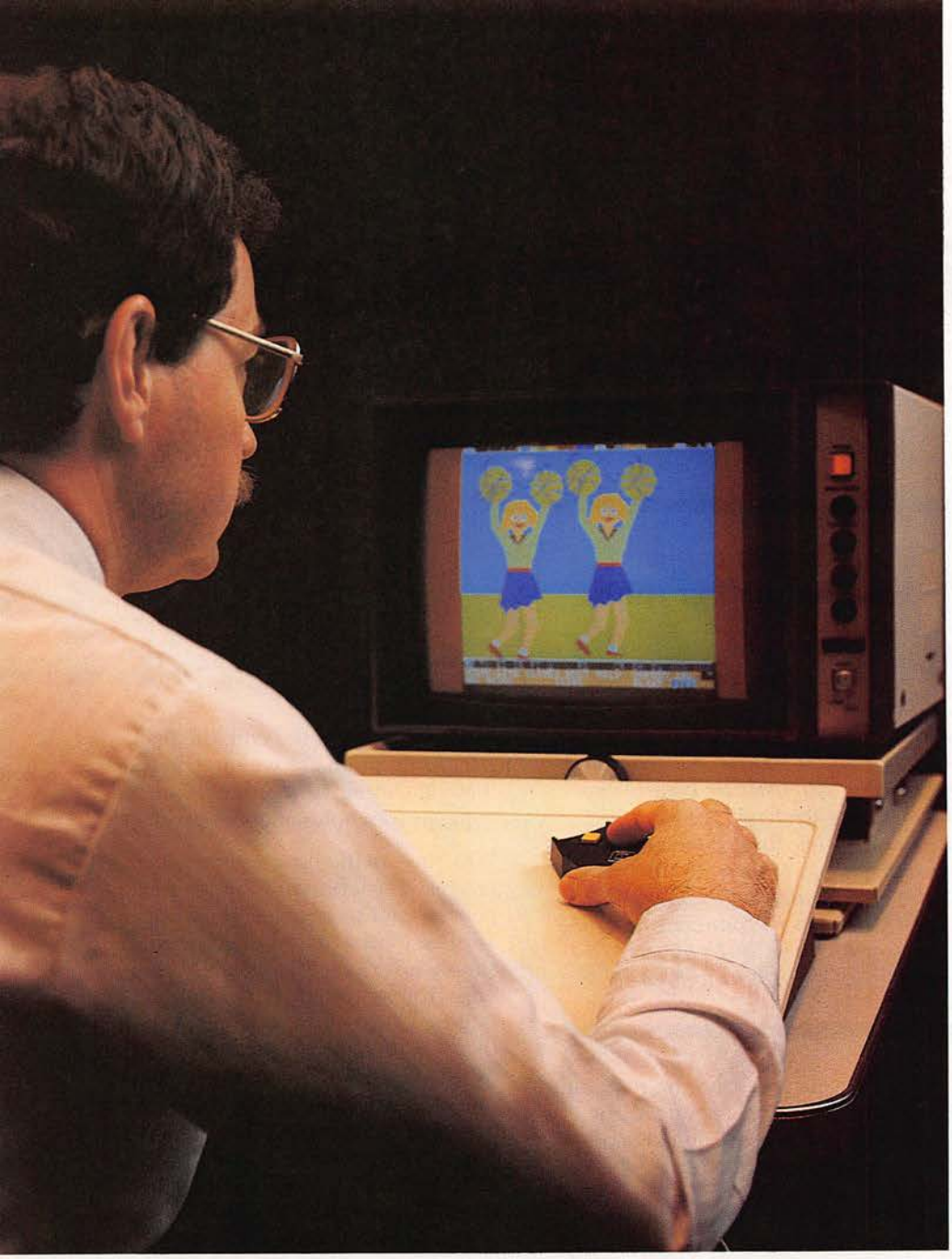
is original equipment manufacturers who will use the frame creation terminal as part of a total package for resale. "For example," says Baldwin, "Videographic Systems of America will provide television stations with all the computers and associated software they will need to broadcast teletext—which is another kind of consumer information service."

Teletext signals ride piggyback on a part of standard TV broadcast signals known as the vertical blanking interval. They are much more limited than videotex because they are strictly a one-way system. Subscribers can receive, but not send information. Thus, they can't conduct transactions the way videotex subscribers can. A retailer's sales offering would probably say something like, "To purchase this product, call the above number." Teletext is also more limited in scope because subscribers can choose "pages" from a total of only 500 or so

Videotex didn't just happen overnight. It's a natural evolution of our business

at a time, which is pretty much all that can be packed onto the host TV signal. With videotex service, there are no technical limits to the number of frames that can be accessed.

Consumer acceptance of the frame creation system is favorable and for two very good reasons: it's good and it seems certain to become the industry standard. After seeing the system at a recent trade show, the *Viewdata Videotex Report* wrote, ". . . it was universally agreed that AT&T's FCS is the best NAPLPS frame creation terminal currently available."



Attractive pictures are easy to make with the frame creation system.

Your eyes probably crossed when they got to NAPLPS, but that mouthful of alphabet soup is another reason for the FCT's success. It stands for North American Presentation Level Protocol Syntax, which is the AT&T-created standard that will probably become universal for all videotex equipment.

Baldwin makes it clear that the frame creation system's success has a long history behind it. "It didn't just happen overnight," he says. "We have been leaders in videotex since the concept was introduced in the 70s. It is a natural evolution of our business."

Carolyn Chin, Baldwin's divisional counterpart for marketing the Sceptre videotex terminal agrees. "We have been testing the videotex concept since 1978 in a number of cities," she says. "And our results tell us it has enormous potential.

"At the same time that industries such as banking, broadcasting, publishing, retailing, travel and transportation are "pushing" the development of commercial videotex, consumers are pulling for it."

Consumer "pull" has been generated by a number of factors, most of them adding up to familiarity with the basic elements of videotex. For years, people have been using interactive devices such as remote TV controls, video games, automatic teller machines and personal computers. Videotex incorporates a little bit of all of these.

That ready acceptance seems certain to make videotex a very big business. As one writer observed, "The videotex explosion now poised to hit the nation's homes will make Pac-Man fever seem like the sniffles."

Chin thinks so too. "The potential of videotex is enormous," she says. "Some projections go as high as $10-billion a year by 1990, when we expect more than a third of all American homes will be using videotex."

Some of that vast potential is already being realized. This autumn, AT&T, in a joint agreement with Viewdata Corporation of America, began marketing the Sceptre terminal and a videotex service called Viewtron to residents of three counties in South Florida. Sceptre terminals will be sold by AT&T PhoneCenters and other retailers for a special introductory price of $600, compared to the suggested retail price of $900. "We're making it easy for customers to buy," says Chin, noting that the unit's price includes a month's free subscription to the Viewtron service.

She is convinced that most subscribers will try it, like it, and sign up for more. "We learned from our tests that, if videotex is going to be valuable to customers, it needs to offer more than a single service. It needs to offer what we call a critical mass of information and services. And that's just what we're doing in Florida."

Few people would dispute that. In addition to banking, shopping, and access to newspaper and magazine articles, Viewtron offers quick access to the contents of a full encyclopedia.

"What's more," adds Chin, "we're offering a unique one-year warranty. If anything goes wrong with Sceptre, you can bring it back to a PhoneCenter store and exchange it for another.

"The Sceptre videotex terminal and the frame creation system are just the beginning," concludes Chin. "We've got several great acts to follow this one. So keep your eyes on us."

A lot of people are doing just that.

A Marketing/Technology Synergy

An Interview with Randall L. Tobias

by Bob Farrell

Randall Tobias heads an organization of 38,000 people that was formed on August 1 by combining elements of Western Electric and American Bell. Tobias, formerly AT&T vice president, Residence Marketing, Sales and Service, is president of AT&T Consumer Products, one of the "lines of business" into which AT&T companies are aligning themselves.

WE: AT&T set up American Bell to sell to the end user. Under the CI II decision Western Electric can't do that. Now the Consumer Products part of American Bell has been combined with parts of Western. Why the reversal?

Tobias: Let me back up to a little before that and talk about what we're trying to do with structure. It's not just a reaction to CI II. Often there is a tendency for people to think of the post divestiture AT&T as a company that has shed the operating telephone companies, and that it's business as usual for what's left. Actually, the changes are more dramatic than that. Our entire mission has changed.

We have been functionally organized for a long time and this has worked well. By "functionally" I mean that there was someone in charge of a function called manufacturing, someone in charge of functions called distribution and repair, and so on, and it all came together at the top, and that's the way the business was run. It was a very efficient way to accomplish our old mission.

Now, however, we have got to drive our business from the marketplace. The customer has got to be in charge. And the only way the customer can be in charge is if you structure the organization so that its elements are focused on the particular needs of the end-use customer. We've concluded that an organization vertically integrated by market segment, and focused not on individual functions but on everything that is required to serve that particular segment, is absolutely essential.

Now, to your question, we're going to have leading-edge products, but we've also got to react quickly and get them out to the marketplace where customers are changing from renting telephones to buying them. And we've got to recognize that customers will buy their phones in the most convenient places—that is, where they're doing other shopping. That's why we are increasingly establishing AT&T Phone Centers within department stores, catalogue houses and other outlets—using the retail distribution systems already set up and staffed by experienced personnel. They, in turn, sell to the end user. We also hope operating telephone companies will sell our products. And, of course, our company-owned AT&T Phone Centers remain an important part of our end-user sales efforts. They must remain in the fully separated subsidiary, which is now called AT&T Information Systems. Finally, through our new structure, we're closer to all steps of the line of business—marketing, research, development and manufacturing.

Now the only interruption in supplying customer premises equipment is that little bit at the end, the final sale. At no point are we interrupted in that vital, integrated process from concept to wholesaling the product.

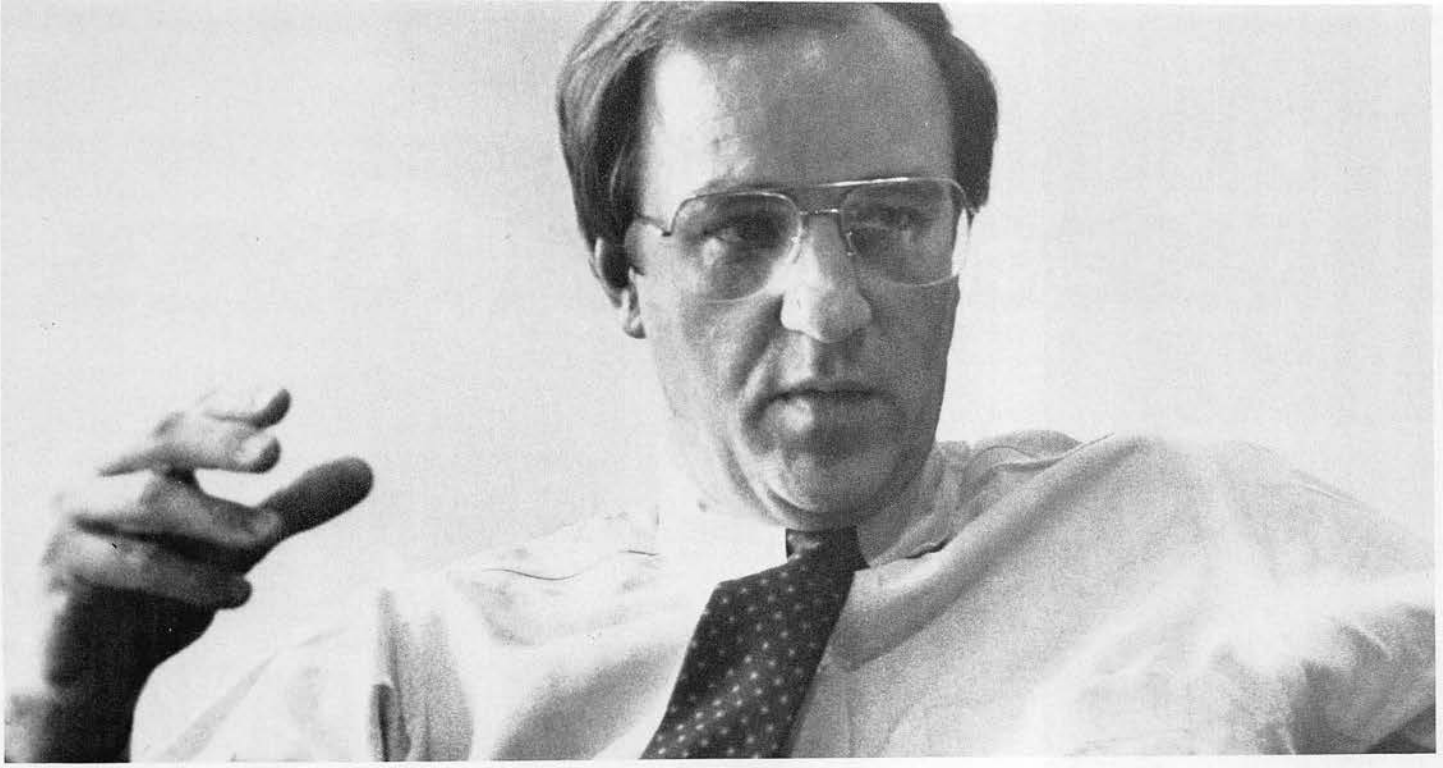
WE: You say the new organization "is not just a reaction to CI II." Yet many people tend to think of it that way.

Tobias: I know they do. But that is simply not right. Many people recall only that we implemented American Bell on January 1 of this year. Although that was the effective date, I came here over two years ago with the express purpose of setting up the consumer products organization without any notion at all that we were going to have CI II or divestiture. So we weren't set up to handle either of those. We were set up to handle changes in the consumer market and have put in those years of planning to do so.

WE: In merging manufacturing with marketing, was the intent also to avoid a double markup?

Tobias: There never was a double markup in the implied sense of excess profits; there was simply a choice on the part of AT&T as to where it wanted to take its profit. If you are taking a profit in more than one place, and have to control those markups individually, you lose pricing flexibility at the end of the line. In my judgment the best way to price is to take the profit in one place and to do it as close to the customer as you can so you can be price competitive. This is one more reason why the line of business is such an important concept.

WE: Will restructuring various organizations into your line of business cause



a significant number of people to relocate?
Tobias: No. As for the Western Electric people, we're not going to relocate factories or other principal installations. Even in other areas—design and development of specific products, for instance—there are some 850 people doing that in my line of business now, and most of them will remain where they are presently located. I don't see AT&T Consumer Products calling for any massive migration of personnel.

WE: Hasn't Teletype been a pretty good example of the closely knit, vertically integrated line of business you're talking about?
Tobias: It certainly has, and is. Teletype is a very good example of the structural direction in which we're going. I fully intend to take my entire line of business, which covers a lot of areas, and develop—call them what you will—sub-lines of business that are focused on particular market opportunities. Teletype is one that already exists and is very successful. It's a group of people who understand their mission and roles and are managing a particular part of the business. And they're good at it.

WE: Obviously new products are going to play a big role in your LOB's future. Which ones are you most excited about?
Tobias: I suspect that what I'm most excited about is different from what most people here find exciting. I'm most excited about the new, lower cost, basic telephones. That's really the heart of this business. I know it's fun to talk about the spectacular products. We have some that begin to illustrate that we are not just in the residence telephone business but, rather, are meeting the communication and information needs of consumers on a broad scale. Our Emergency Call Systems—both the smoke/fire alert and the medical alert—are illustrative. And the Sceptre™ videotex terminal—that's a good example of where this business is going. But we're still very much in the telephone business and the most important task we have—short term—is to be sure that we have products that represent leading-edge technology and are cost competitive in the marketplace. We're getting to the point where we have that, and that's why I'm excited about that part of our business.

WE: Sticking with the "spectacular" products for a moment—will the Frame Creation System be a big item?
Tobias: It will be big in the market in which it competes. But that market is a more limited one than those for many of our other products, limited by the number of transmitting companies that exist. The Frame Creation System is more of an enabling product designed to help the videotex industry grow and get established. We'll be big within the market, but the market isn't big enough for us to build our future on just the Frame Creation System.

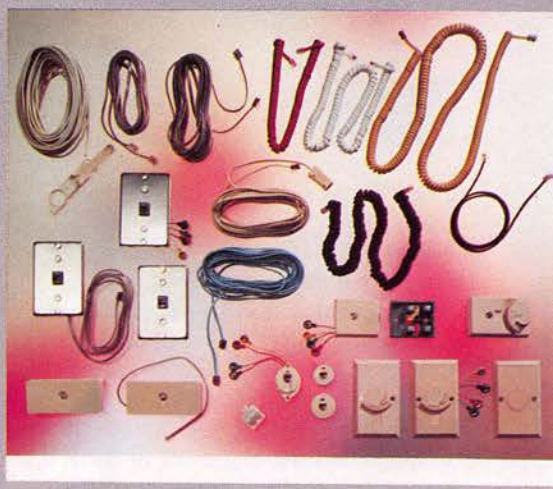
The Sceptre customer terminal will have a much wider application and there will be a family of that kind of terminal. As we go downstream you may not be able to tell the difference between a videotex terminal and a home computer.

WE: How's business going?
Tobias: We're a little ahead of schedule on where we hoped we'd be in sales to retailers; we're behind where we hoped we'd be in sales through our own company distribution channels.

WE: What effect will restructuring have on employees?
Tobias: What we're doing here is putting together a business that is going to be in tune with the needs of the future, so it's going to be an exciting place to work, a growing place to work, and a place filled with the kinds of opportunities that can come from being a major force in a competitive marketplace. I suspect that, in the short term, most of our people are not going to experience much that's different. But, over time, I think perceptions will change. Employees' focus on the fuctional aspects of their work will diminish as they become more and more aware of their work as contributing to moving the products of our line of business out to the customer. For example, I hope that ultimately there will be no dividing line between our design and development laboratories and our marketing and product management people.

I'd like to see all this happen overnight, of course, but I know it won't. I'm eager to see the synergy start flowing, the synergy you get when a group of people with various specialities bend their efforts toward one goal—to perceive a customer's need for a product, develop that product, make it and get it to the marketplace at the best price.

NOBODY MAKES TELEPHONES LIKE WESTERN ELECTRIC



In just about every current magazine and newspaper, you see ads for telephone sets. Everyone is trying to get into the act now that customers can own their own phones.

The new offerings shown here continue the tradition of quality and high reliability that Western Electric has built up over the years, but they also provide exciting new customer-oriented features.

Some of these new sets provide a measure of convenience and security in one-touch dialing for emergency numbers such as police, fire or doctor.

Others contain versatile digital displays that can show the time and date when the phone is not in use. With the touch of a button, the display can also show the number being dialed or the duration of a call.

And they're all made by Western Electric factories that are now part of AT&T Consumer Products.

The **Glow Phone**™ telephone is similar to last year's Big Button™ telephone, although the face plate looks blank when the handset is on the hook. When you lift the handset, however, the oversize numbers light up. It's ideal for bedside, where you can see to dial without fumbling for a light switch.

These are **customer convenience products** that Western Electric has always made for the phone companies, but that are also being offered for sale to the public. They facilitate installation of new telephones: line cords, handset cords, and various types of mounting hardware.

and nobody makes as many kinds

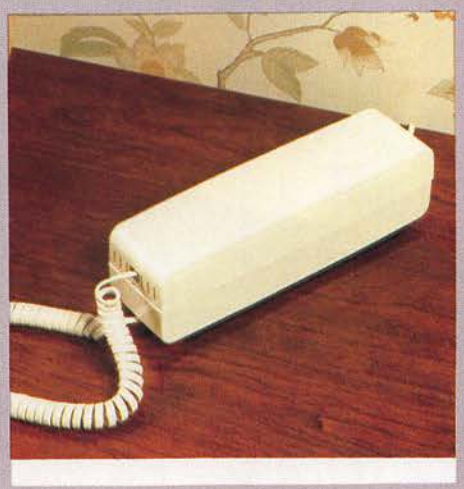
The **Emergency Call System Smoke/Fire Alert** is designed to close a gap in your home's defenses. Triggered by smoke detectors, it can summon help when fire breaks out—even if no one's at home.

The **Showcase™ Olympic Commemorative** telephone is equipped with a digital clock that also shows the date and that may be used as a timer. The plaque can be removed and an athletic sculpture or other decorative item can be attached.

The **Touch-a-matic® 1600** telephone is an automatic dialing phone that allows you to ring frequently-called numbers with a single touch. It also has a digital display window that provides time, date, call duration or number called by touching one or another of the touch-sensitive key pads.

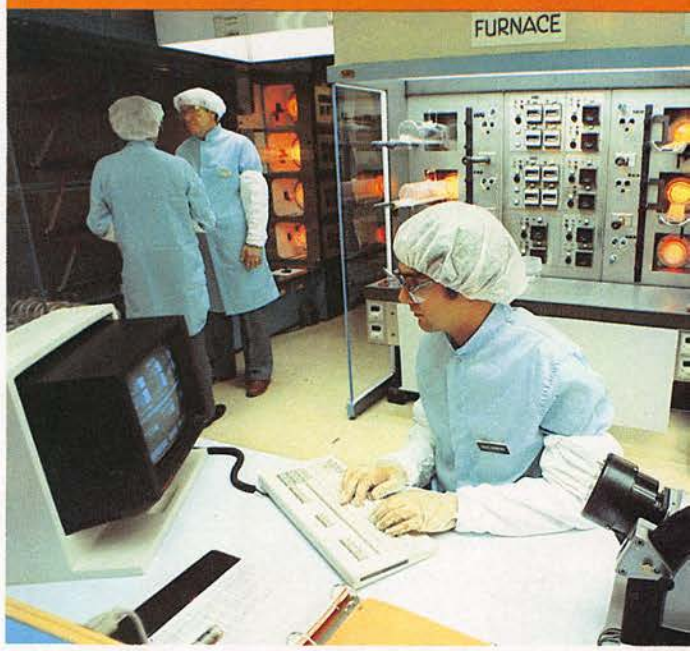
The **Genesis*** telesystem console is the first building block for an exciting new personal communications system. By adding cartridges and a module to your console, as shown here, you can tailor a system to your needs—speakerphone, personal electronic directory, and/or dialing of special numbers from memory.

*Trademark of AT&T.



The **Touch-a-matic 300** telephone shown here and its wall counterpart the **Touch-a-matic 305** telephone are other new electronic phones. They feature one-touch dialing for two saved numbers, plus last number dialed. Ringer volume can be adjusted or shut off, and a mute feature permits a local conversation without the party hearing it at the other end of the line.

4 from TELETYPE



Teletype Corporation introduced four major new products at the 1983 National Computer Conference in Anaheim, Calif. last spring. The annual show is the premier showcase for computer-peripheral-equipment vendors, and Teletype's display caught the eye of many of the more than 100,000 visitors.

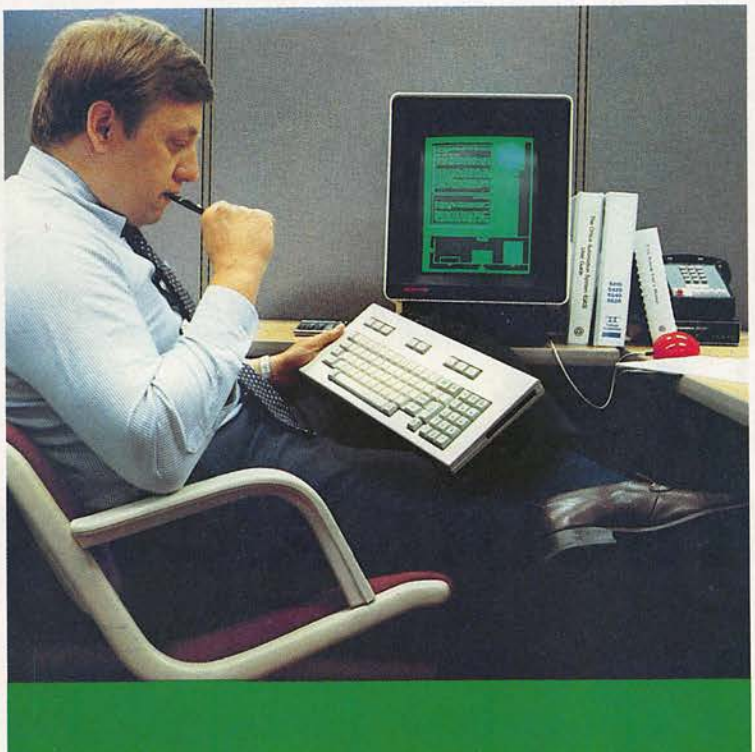
Teletype's new 5000 series of video-screen terminals and keyboards are all finished in an off-white instead of the traditional black. Two of the products (the 5540 and the 5420) address markets where Teletype has not previously been particularly active and the other two (the 5410 and the 5620) are for sale in markets never before entered by Teletype.

The products are shown here in use by Teletype employees at company headquarters in Skokie, Ill.

The **5420** is aimed at the buffered or editing market. It succeeds the Teletype® terminals 40/2 and 44/20 models. It features four ways to access and manipulate display and memory, which is greater versatility than generally available elsewhere. It is shown being used here for process control by Steve Crawford in the VLSI furnace area, at the Teletype laboratory.

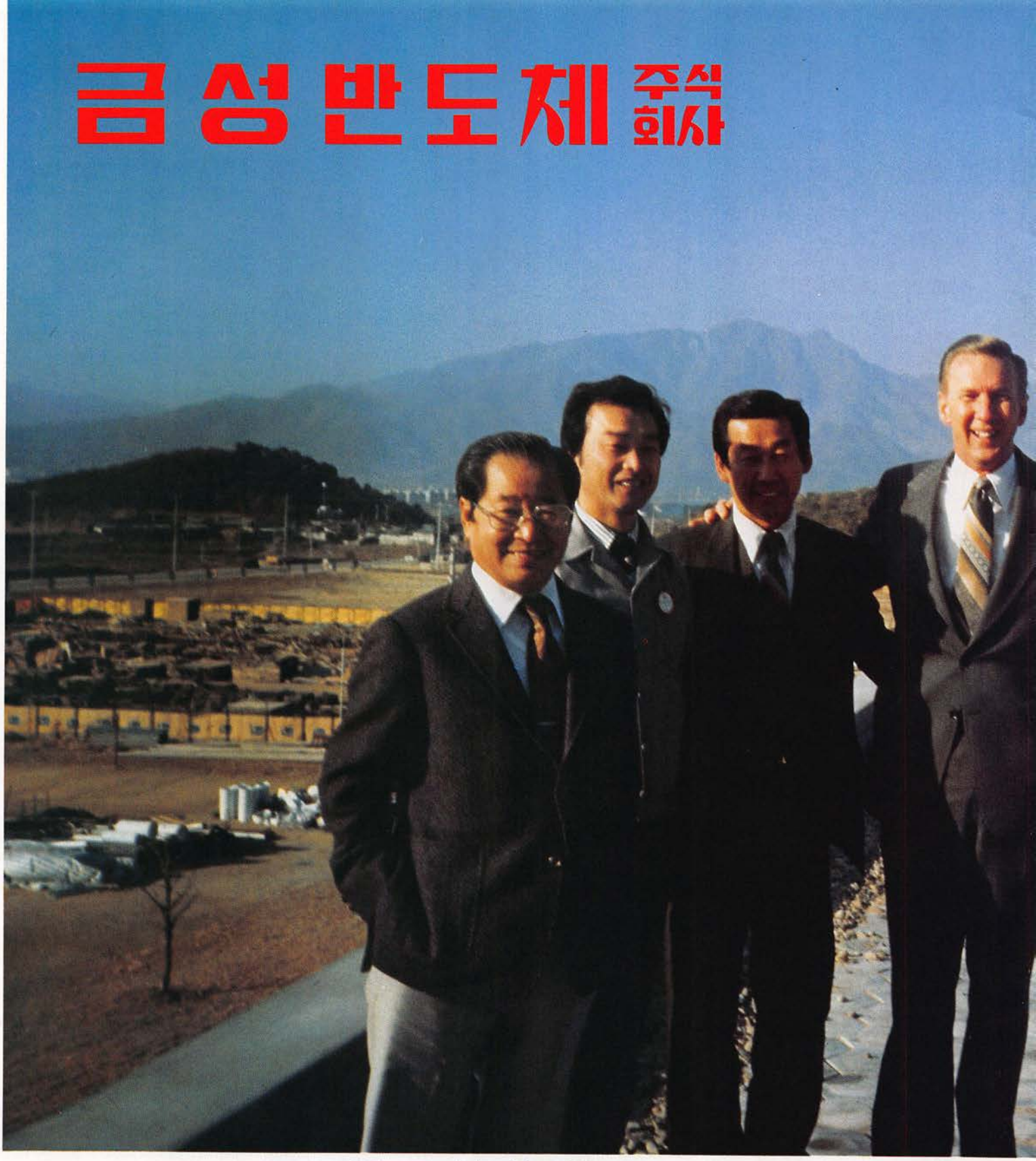
The **5540** is aimed at the largest single terminal segment of the market. It is a third generation Teletype product; its predecessors were the 40/4 and the 45/40. It is being demonstrated here as an executive terminal by Dave Hodges. It enables the boss to call up facts and figures from the computer and get the word directly on what's what.

The **5410** is the least expensive of the four new terminals. Its list price is under $1,000 and it is the equipment that was used extensively for the Olympic trials in Los Angeles (See page 10). It's aimed primarily at the office automation market. Here it is being used by Michele Smedley who reports that she seldom uses her typewriter anymore. Anything that is repetitive or that is subject to revision is much easier to do on her 5410.



The **5620** is the one with the green screen. It's called a dot-mapped display terminal and allows users—primarily programmers—to work on several different programs simultaneously. The most expensive of the four, it provides 256K bytes of RAM and 48K bytes of ROM and offers keyboard selectable settings of 300, 1200, 9600 and 19200 bits per second. It is shown here being used by Product Planner Don Wolski. Holding the low-profile keyboard in the lap, while you concentrate, is fast becoming the way to work, rather than sitting upright in front of the typewriter.

금성반도체 주식회사



Gold Star Semiconductor, Ltd.

Atop factory roof in Gumi, South Korea, Al Basey (fourth from left), former GSS executive vice president, now general manager at Oklahoma City, poses with other GSS executives.

By Adele Donohue-Evans

After a 50-year hiatus, Western is proving it can successfully operate in an international environment

On the inside, Gold Star Semiconductor's ESS* switch factory could be mistaken for Western Electric's Oklahoma City Works. But located in the small, industrial town of Gumi, South Korea, it's nearly 9,000 miles from its American look alike.

The Korean factory is owned and operated by Gold Star Semiconductor, Limited (GSS), a company formed in February 1981 through a joint venture between Western Electric and The Lucky Gold-Star Group, a major South Korean conglomerate.

The joint venture is more than a simple export of technology. Western Electric owns 44 percent of GSS and looks upon the venture as a long-term partnership. The terms of the agreement call for Western Electric to participate in the management of GSS and to provide first-hand help and training in the manufacture, engineering, installation and operation of the 1A ESS* switching equipment.

South Korea is also importing Western Electric's switching system for use in its telecommunications network. Western Electric's export sales are made to the South Korean government through AT&T International (AT&TI), the AT&T subsidiary which represents Western Electric and AT&T in the international marketplace. The GSS venture is part of AT&TI's long-term commitment to develop a nationwide electronic telecommunications system for the Republic of Korea.

*Trademark of Western Electric

GSS has two factories in Gumi: one that assembles, wires and tests the 1A ESS switching equipment, and another that manufactures semiconductors. The 1A ESS switches GSS manufactures are sold to the Korean Telecommunications Authority. Some semiconductors are produced for use in the 1A ESS and others are manufactured for commercial sale, both within Korea and for export.

The process of transferring out 1A ESS switch technology to GSS was designed to take place in stages. When GSS began operations, its ESS factory assembled, wired and tested selected frames and units made by Western Electric and exported to Korea. Gradually, GSS—which has about 1,000 employees at its two factories in Gumi—has assumed most of the manufacturing of the 1A ESS switch and its components. By the end of 1983, the company will be mostly self-sufficient and will handle most of the engineering, assembly, wiring, testing and installation of the 1A ESS switch.

To reach this stage, Western Electric engineers have had to provide hands-on training to GSS engineers and technicians both at WE plants, Bell

(Top) Inside the ESS factory, Art Davie, Al Basey, Mike Judy, and I. B. Kim, deputy plant manager, observe operation of a 1A trunk test set. (Bottom) The group looks on as automatic wiring machines are loaded.

Sales regional locations, the Dublin Training Center and at GSS's factories in Korea. Bell Sales people also have trained GSS personnel in equipment engineering, installation, customer service and sales functions.

As a further effort to provide local support for GSS, the terms of the agreement call for two of the seven WE directors on GSS's board to reside in Korea. Al Basey and Mike Judy were the first Western Electric people sent to Korea to represent the company's interest in GSS as representative directors. They played an active role in the company's management and day-to-day operation of the factories.

Basey, now general manager of the Oklahoma City Works, had been an executive vice president of GSS and a member of its board of directors. The new EVP is Art Davie, a director from the Columbus Works who works at GSS headquarters in Seoul. Mike Judy, the executive managing director and second-ranking WE executive in GSS, acted as a technical advisor to both its factories and was responsible for running the electronic switching systems factory. He was succeeded in August by John Leary, previously Manager, Switching PLPM, at the Network Software Center. Leary lives about 30 miles from Gumi in the larger, more residential city of Taegu.

Al Basey and petite-sized kitchen sink in the house he and his family rented in a suburb of Seoul.

In addition to Davie and Leary, there are four other Western Electric people working in Korea for GSS on approximately two-year assignments. George Slazyk is manager of systems equipment engineering and installation; Dave Staeheli, manager of ESS control and coordination; Claude Pfromme, manager of engineering (Gumi) and Joe Terrett, manager for material management (Gumi). Jim Smith returned to Kansas City after spending one year in Gumi to help start Western products in the semiconductor factory.

The WE employees living in South Korea have found it a very different country than the one portrayed on the popular television show M*A*S*H.

"South Korea is a very progressive country," says Al Basey. "Seoul is a nice metropolitan city with modern office buildings, big hotels and wide boulevards."

During his tenure with GSS, Basey lived with his wife and two sons in a rented company house in a suburb of Seoul. Carolyn Basey helped select and furnish the typically Korean house: a compact, solid concrete dwelling with a small yard protected from the busy, narrow streets by a high wall.

Having never visited a Far Eastern country before, the Baseys found it a fascinating experience. Since most of the shopkeepers, merchants and taxi cab drivers do not speak English, the family soon developed what Basey calls "survival-kit Korean"—enough to know how to get home, read certain food labels and bargain with a vendor.

Basey's two teen-aged sons—Lee, then a high school senior and David, a freshman—attended Seoul Foreign School. The English-speaking school's student body is composed of about one-half Americans while the rest of the students come from all over the world.

"The boys' soccer team looked like it represented the United Nations," Basey recalled.

Basey says that his sons had the best time of their lives while living in Korea. The younger son, David, still receives about one letter a week from various friends he met while living in Korea.

Just as living in Korea was a new experience for the Baseys, GSS was WE's first international joint venture agreement in more than 50 years. It was important that the GSS venture succeeded, because our competitors and future customers were watching to see how well our products and services performed in an overseas environment.

Thus far, both partners agree that the project has been a success. The transfer of Western Electric technology to the Koreans has gone smoothly and more rapidly than originally planned. The switch has performed well in the field, and customer response has been very positive.

By the end of the year, GSS and AT&TI expect to have provided an additional one million lines to the Korean telecommunications system. They plan to continue to add some 400,000 lines per year. Much of the credit for the modernization of the Korean telecommunications system and growth in the number of telephone subscribers is due to the efforts of hundreds of Western Electric people, AT&TI and GSS.

Western Electric, AT&TI and GSS are currently negotiating with the Korean government on Phase II of the technology transfer agreement. The second phase calls for Western to exchange with GSS the technology for the 5ESS switch, 3B* computer and SLC 96* carrier system. As originally planned, the transfer was to begin by the end of this year and continue gradually over the next five years, concluding in 1989 when the transfer is scheduled to be complete.

Through its agreement with GSS, Western Electric has learned a great deal about the advantages and problems of dealing in an international marketplace.

"It's not just business as usual," says Al Basey of his experience with GSS. "But we did exactly what we set out to do and proved that Western Electric can successfully operate in a different environment."

And that experience will prove to be a tremendous benefit to Western Electric in preparing for future international ventures.

*Trademark of Western Electric

Hurricane Alicia

by Lydia Whitefield

It was early morning, August 18, when Hurricane Alicia slammed into the Gulf Coast of Texas. Its powerful winds splintered houses. Power lines, and the poles they clung to, were hurled through the air. Trees fell, windows shattered and cars and boats floated side by side down flooded streets. When the first major hurricane to hit the U.S. in three years was over, 20 people were dead and property damage was so extensive that Alicia would earn the distinction of being one of the costliest storms in U.S. history. And, if Mother Nature cooperates, it will be remembered as the last time the Bell System would work together as a whole to restore telephone service to a storm devasted area.

However, few probably realized that in August much of the Bell System was operating as if divestiture had already occurred.

For example, Southwestern Bell, as required in the Plan of Reorganization, had established and was operating its own warehouse. This meant that Western Electric's Houston Service Center, which during previous storms was Southwestern Bell's single point of distribution of emergency repair material, was now shipping material to the new warehouse.

"Alicia gave us the chance to see how well the post divestiture companies would react in an emergency," explained Bill Dreyer, Western Electric's Southwestern Region vice president. "The disaster also gave Western Electric an opportunity to prove to Southwestern Bell once again that we are a responsive, reliable supplier."

Dreyer, who transferred from Southwestern Bell in 1982, is familiar with the planning that must take place before a storm strikes. "The Gulf Coast is hit frequently by hurricanes. With help from meteorologists, Southwestern Bell tracks every storm to determine if, when and where it might hit. When it determines that a major storm is moving toward land, steps are taken to insure public safety and minimize property damage. When I learned that it was fairly certain that Alicia was heading toward Texas, I called Southwestern Bell to assure them that Western Electric would assist them in any way we could."

"The outside plant usually sustains most of the damage during a hurricane," said Harold Ludwick, assistant manager at the Houston Service Center. "When it was apparent that the storm was moving our way, we contacted the Cable and Wire division's Material Planning and Procurement Center (MPPC) in Atlanta to determine the availability of cable and drop wire at our cable plants. Within minutes, the MPPC began setting aside cable for us. Then, only hours after the storm, cable was being shipped."

Installation personnel also went into action. The Monday before the storm, Leonard Kuenstler, an orbit supervisor with responsibility for one of Western's first lightguide restoral contracts, began lining up the technical help he might need should there be a problem with the area's lightguide facilities.

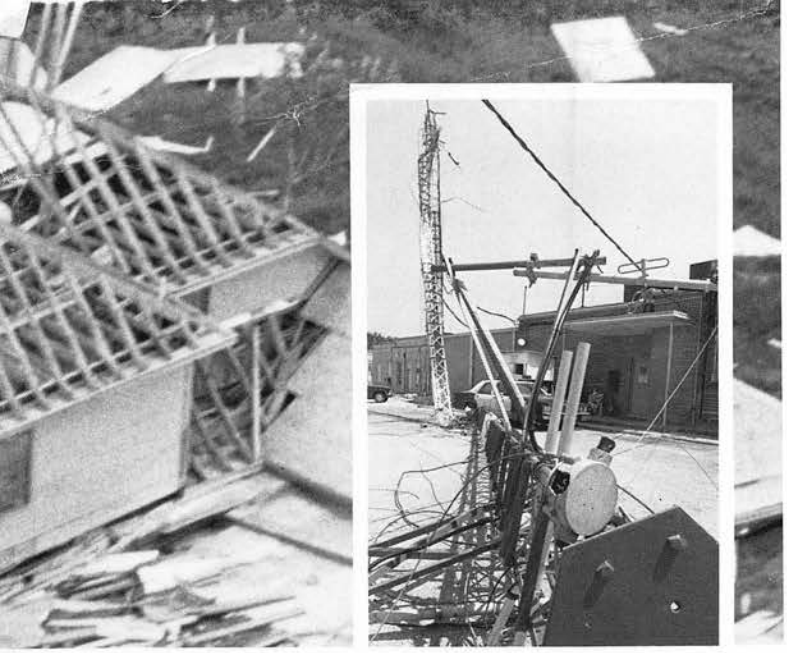
"I called everyone who played a major role in the installation of this facility including our outside suppliers." Kuenstler said. "I got their home phone numbers and told them to be prepared to help at anytime. Everyone cooperated willingly."

As the hurricane moved closer, installation supervisors joined Southwestern Bell technicians in area central offices to keep the offices going. When the storm finally hit, commercial power was lost. The teams worked with backup generators and in temperatures that reached the 110 degree mark. Their efforts kept all of the 71 offices operating throughout the storm.

When the winds died down and the rains slowed, Southwestern Bell teams—one of which included Bill Dreyer—began surveying the damage. Approximately 250,000 lines were out of service. Some 45,000 business and residence telephone sets, one million feet of aerial wire and six million feet of drop wire would be needed.

Six hours after the storm's peak, the Houston Service Center, working on emergency power, began shipping materials. Cable previously set aside was shipped from the Baltimore, Phoenix, Omaha and Atlanta Works. Installation supervisors with outside plant experience helped Southwestern Bell installers hang drop wire. Others wound up in manholes splicing damaged underground cable.

"There were quite a few Western people who gave up weekends and a lot of sleep for this effort," Dreyer said. "But their work didn't go unrecognized. After things began to settle down, I got a call from John Anderson, Southwestern Bell's vice president, customer services. He wanted me to know that he had never seen Western Electric react so quickly and offer so much service. Yes, we've delivered excellent service in past emergencies, but this was a case where the best got better."



Left. Begun before the storm, construction on this Galveston home might as well start all over again.

Insert. Downed power lines and lights caused traffic problems in Houston for days.

The day after the hurricane, Al Steinke (left) and George Polk, Western Electric installation supervisors, pitched in to help Southwestern Bell repair outside telephone cable.

Left. A Southwestern Bell lineman takes down a storm-damaged cable.

Right. Southwestern Bell linemen check out a restored line.

The Information Age in your home. See page 18.

To change address below, please notify your supervisor, retirees, your benefit branch office.