

THE MAGAZINE OF RCA

Communicate



**RCA Brings The
Telephone To
Alaska's Bush**

September/October, 1973



RCA Brings The
Telephone To
Alaska's Bush

Cover: Three generations of Alaskan natives in remote Kasigluk, near the Bering Sea coast, gather around their newly-installed village telephone. Shortly after this picture, and the others in this story, were taken, the plane carrying RCA Alascom Public Affairs Manager Lou Custrini and free-lance photographer Sam Kimura crashed into a snowbank. Fortunately, Custrini, Kimura, and the bush pilot escaped injury.

Editor

DANIEL S. HIRSHFIELD

Managing Editor

Steve Bliekstein

COMMUNICATE talks about you, your job, and your company. But it also gives you a way to speak to others throughout RCA. You're invited to use COMMUNICATE to share your ideas, suggestions, questions, and contributions by writing to us at the following address:

Editor

COMMUNICATE

RCA Corp., Rm. 4904

30 Rockefeller Plaza

New York, N. Y. 10020



2



6



10



14



20



22

Contents

September/October, 1973

Aegis, Shield of the Fleet

2

RCA combines technology and management to provide the Navy with its most advanced anti-missile system.

RCA Brings the Telephone to Alaska's Bush

6

Remote villages throughout Alaska are getting their first link with the outside world through Alascom's Bush Telephone Program.

Art For Adler's Sake

10

RCA Marketing's Lee Adler has found the business world tolerant, even approving, of his serious pursuit of art. But the art world takes a harder view of his life as a businessman.

The View From Lancaster

13

The RCA Electronic Components plant in the "capital" of the Pennsylvania Dutch country keeps a serious commitment to its community.

No Ceiling On Floor Coverings

14

The Coronet marketing system: size up the market, spot style changes, then sell something people will buy. The result: many more winners than losers.

RCA's Sun-lighting Scientist

17

It has nothing to do with his job at RCA Aerospace Systems, but Ed Wallner is a solar eclipse fanatic. How fanatic? He's traveled 19,000 miles following eclipses for 10 years.

Getting It Together at MCDA

20

There are lots of good jobs out there, and RCA-administered MCDA gets good people ready for them.

A Little Something For Everybody

22

RCA's Solid State Division is in the middle of a miniature revolution—the booming market in integrated circuitry.

Departments

RCA Faces	5
RCA Showcase	20

Photo Credits: cover, pages 6 and 9, Sam Kimura for RCA; pages 10, 11, and 12, Frida Schubert; page 13, Bonnie Snively; page 14, Alan Magee for RCA; page 17 (top) Walter Mudgett; pages 18, 19, and 20, George Rivera; all others RCA. Map on page 8 American Map Co., Inc.

Aegis, Shield of the Fleet

RCA combines technology and management to provide the Navy with the most advanced anti-missile system to date

The most advanced seaborne anti-missile system yet developed is winding up land-based testing at the RCA Government and Commercial Systems in Moorestown, N. J. Some time in November, the system—it's called Aegis—will be trundled into the hold of a C5A cargo jet and flown to the West Coast and the deck house of a U.S. Navy ordnance test ship for months of rigorous sea trials.

A product of RCA and Navy developmental research that goes back ten years, Aegis integrates radars, computers, missiles, and control systems into a system to provide the fleet with quick reaction and concentrated fire power. Aegis is the Greek word for the shield of Zeus. Today's Aegis in effect will provide the Navy with an electronic defense shield that will detect air attack, give tactical options to the commander and direct the selected response. As prime contractor on the program since late 1969, RCA's Aegis system development has covered these principal components:

The An/SPY-1 Array Radar System, which searches, detects, and tracks multiple targets at extreme ranges and transmits guidance commands to interceptor missiles.

The Operational Readiness Test System (ORTS), which provides system operability status and automatic fault detection and isolation.

The Computerized Command and Control System which is provided by three multi-purpose computer groups that enable automatic control of the system's operation.

The Computer Controlled Displays, which give an instant, clear picture of the naval-air situation, facilitating command decisions.

"No RCA program ever had the potential or significance of Aegis," says

Irving K. Kessler, G&CS Executive Vice President who piloted the effort that landed RCA the contract in a competition involving other major weapons system suppliers. "The fleet needs a new defense capability, and Aegis meets that need by using technology that won't go obsolete and can serve such commercial applications as air traffic control besides."

Captain Wayne E. Meyer of the Naval Ordnance Systems Command in Arlington, Va., and Surface Missile Systems Project Manager, describes Aegis as a third-generation anti-aircraft system intended to defend our fleets against airborne threats "in any shape and range you care to name." Adds Captain Meyer, who has been involved in seaborne anti-air warfare system development since 1951, "Missile boats, of the kind the Soviet Union has been building for the past 13 years, can fire what amounts to unmanned Kamikazes. That's why we needed a system with fast reaction to an incoming weapon."

Closer to home—at Moorestown and Camden, as well as Burlington, Mass., and Van Nuys, Calif.—the management of the Aegis program is as sophisticated and critical as the system itself will have to be. Also, since the post-1965 Defense Department emphasis on a weapon's affordability, RCA's Aegis management is particularly cost conscious. William V. Goodwin, G&CS Division Vice President in charge of Aegis and the 255 RCA people on the program, characterizes today's weapons contract as the ultimate test of managerial as well as technological skill.

"We've been at this nearly four years," Goodwin says, "and we keep on learning that we weren't so smart two years ago or even last year. We have to keep one thing uppermost in our minds—we're working for the citizens of the United States and we have to keep them and their elected representatives satisfied. Every day presents us with a challenge to deliver Aegis at the lowest possible cost."

The thought is seconded by Captain Meyer, who maintains close and fre-





quent contact with the RCA project people. "I'm the one who has to deliver the money to RCA," he says. "Success is based on your performance. If RCA doesn't perform, both you and I will have a tough time convincing the rest of the country—let alone some admiral—that Aegis is worthwhile."

It sometimes seems to Kessler, Goodwin, and the others at G&CS that they have spent the better part of their lives convincing people that Aegis is worthwhile. "RCA invested millions in independent research and development on the Advanced Surface Missile System (ASMS) which was to become Aegis," says Max Lehrer, Division Vice President and General Manager of the Missile and Surface Radar Division at Moorestown. "It took vision to see the potential of the program that developed into Aegis. It also took long hours, dedication, endurance, and resistance to stress."

Ironically, when the Navy decided to move on the fleet defense programs, RCA found itself behind General Dynamics and Boeing in the competition for the prime weapon-systems contract. Even Captain Meyer recalls that RCA's chances on Aegis didn't look good at the start of the precontract definition in 1964. "RCA had fewer people trying to get the contract than the other companies," he says, "and RCA had yet to establish relationships with subcontractors. But RCA had two big things in its favor—an expertise in radar and a tradition of high quality products. A system like Aegis requires a high quality, super radar. And you just don't get that in a cigar box."

If, as Captain Meyer points out, RCA had fewer people working to bring in Aegis, the Company put them to good use. For example, Irving Kessler personally brought RCA's case both to lower level government functionaries in cramped cubicles as well as to senior officials.

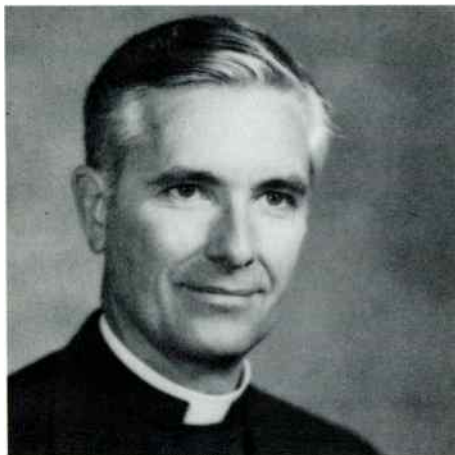
RCA's come-from-behind victory also reflects the Aegis team's keen recognition of what it takes to win a defense contract in these thrift-conscious times. "We never took our eyes off our customer's needs," says Lehrer. "We always looked at the problem through the eyes of the Navy Department and Department of Defense." Says Bill Goodwin: "We followed pro-



Monitoring for missiles, both inside and outside the Aegis missile ship, are (top) a computer-controlled display and the topside radar array.

curement policies set forth for the Defense Department by David Packard, who until recently was Deputy Secretary of Defense. Prime among these was treating cost as a principal design parameter, maximizing simplicity and austerity of design, and leaving enough programming time and funding dollars to accommodate inevitable problems. We never wavered from these 'Packard Principles.' " Adds Lehrer: "What this means is something we called cost credibility. The Navy and Defense Department learned that when we quoted a number, it was the result of our best

On The Side of the Angels



When part of the complex Aegis weapons systems faltered then recovered after only minimal downtime during a recent demonstration, a

Navy officer said to Frank Adams, "Great system recovery." He added in a whisper: "Did you have something to do with this?"

Adams, 47, was asked this question not as Aegis Administrator of Project Management but in his other incarnation, as an ordained Episcopal priest. A veteran of Navy tours in World War II and Korea, Adams was ordained in 1970 as a priest after three years of intensive study under the Church's examining chaplains and is currently in a non-stipendiary capacity as a curate of St. Mary's, Burlington, N. J.

Frank Adams regards the transition from priest to engineer as a natural one. "Whether you're an engineer or a priest, you manage people, not things," he says. "As for more superficial adjustments, you

can always tell mornings when I've celebrated seven o'clock Mass. That's when I wear a dark suit and switch from clerical collar to business shirt when I get to the office."

Responsible for expediting and coordinating the myriad bits and pieces of the Aegis program, Adams has talents and background that go beyond his priesthood or his master's in mechanical engineering. "Earlier this year," an associate reports, "Frank surprised us by giving a group of French naval officers a detailed Aegis lecture tour—in perfect French."

Adams only occasionally encounters some difficulty in maintaining the separation of Church and state. "Every so often," he says, "I get vice presidential requests to arrange good weather for successful tests."

managerial and financial efforts."

The best efforts bore fruit Christmas week of 1969. Irv Kessler, teeing up on the first hole of the golf course at Dorado Beach, Puerto Rico—on his first vacation in two years—was interrupted by a messenger calling him to the phone. "It was the word that Aegis was ours," he says. "I played 18 holes walking on air."

In the three and a half years that Aegis has been at RCA, the program has been passing critical tests set by the Navy. Milestones A (completion of preliminary design review) and B (completion of critical design review, including initial testing of computer programs) have been passed. Milestone C, land-based testing at Moorestown, ends in October with the shipment of the Aegis prototype to Port Hueneme, Calif., for sea trials, or Milestone D. Milestone E will be reached around 1976 with the first production model of Aegis.

"Each milestone is a critical decision point," explains Frank G. Adams, Project Management Staff Administrator for Aegis. "There's a chance that the Navy or Defense Department may tell us to forget it, which is something that's always at the top of our minds. Our biggest job in administering this

contract is to meet these contractual milestones on time and within cost parameters."

Subcontracts with Raytheon (fire control system) and Computer Sciences Corp. (computer software) must be administered to meet RCA's time and cost schedules. Primary and secondary sources of supply must be established for materials—some of them quite exotic—that comprise Aegis components. For example, Al Langford, the man in charge of Aegis production engineering at Moorestown, knew that he would eventually be overtaxing U.S. supplies of garnet, and went to Japan to establish secondary sources of the mineral. And most critical of all is coordinating the sheer mass of components that goes into a totally high-technology system.

Aegis is kept on track and on-time by a dual system of project management and systems engineering. Project Management, under Deputy Program Manager Joseph Volpe, keeps the program moving along its scheduled lines. Systems Engineering, under Deputy Program Manager Dr. Josh Nessmith, determines the path along which the program proceeds. Both Volpe and Dr. Nessmith report to Program Manager Edward W. Petrillo, who is directly re-

sponsible to Bill Goodwin. "It's vital that the project and systems groups keep up a continuing dialogue," says Adams. "In fact, a system has evolved where both groups sit down to an informal luncheon meeting every two weeks to catch each other up on what's going on where. Just to keep things even, the host group alternates from luncheon to luncheon."

The bi-weekly Aegis luncheons could be just one reason why Captain Meyer says the Aegis team has the ability to cope. "We keep resolving disagreements as they happen," says the outspoken officer. "By keeping on top of things, we can handle technical, financial, and programming problems—and we've had them all. We jump on the problem at hand, and get rid of it—today."

Bill Goodwin, who worked 12 hours a day, six and seven days a week for the first year of the Aegis program, sees Aegis as a chance for people to excel, to communicate better, and "not always worry about protecting their own rice bowls." As he prepares for Milestone D, Goodwin, who is as familiar with Aegis as anyone on earth, braces for whatever problems will arise when the weapons system contends with a pitching, squally sea.

RCA FACES



H. Ray Warren and his award-winning SelectaVision MagTape cartridge.

RCA's top honor to its staff for technological innovation is the David Sarnoff Award for Outstanding Technical Achievement. This year 19 RCA scientists and engineers have been named as winners. The awards, each consisting of a gold medal, a bronze replica, a citation and a cash sum, were made at RCA corporate headquarters by Chairman of the Board Robert W. Sarnoff. The winners:

H. Ray Warren, of RCA Consumer Electronics, Indianapolis.

Warren won his award for "outstanding achievement in the development of a highly innovative magnetic tape video player-recorder." He played a key role in creating the tape transport component of RCA's new SelectaVision MagTape system, which permits easy, foolproof loading of the tape cartridge.

The following employees were honored for "outstanding corporate effort leading to an innovative video-by-telephone system." Their work helped to create Videovoice. RCA Globcom's new service which transmits voice, data and pictures over standard telephone lines.

RCA Global Communications

Alfonse Acampora
John T. Frankle
Samuel N. Friedman
Lewis B. Spann

RCA Laboratories, Princeton

Denis P. Dorsey
William D. Houghton

These employees were honored for "outstanding team research leading to a new class of integrated semiconductor arrays." These silicon-on-sapphire devices are a new generation of semiconductors which can perform their functions faster, at lower power and more reliably than earlier products. They are expected to have a wide variety of applications, including use in computers, automobiles, appliances, clocks and watches.

RCA Laboratories, Princeton

Glen W. Cullen
Gerald B. Herzog
Charles W. Mueller
Joseph H. Scott, Jr.

Eight RCA people were honored for "outstanding technical achievements in color picture tube systems," which underlie RCA's development of the precision in-line tube and the 110-degree delta system color tube. Now used in Europe and shown to American set manufacturers this summer, the 110-degree tubes are four to five inches shorter than conventional tubes and permit smaller cabinet designs. The precision in-line tube is shorter and lighter than current tubes, eliminates the need for complex circuit components and many costly adjustments, and provides improved picture sharpness and brightness. The recipients were:

Electronic Components, Lancaster

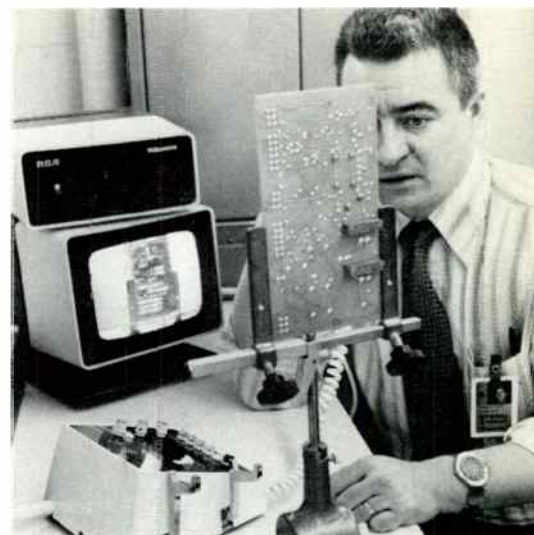
Robert L. Barbin
John Evans, Jr.
Richard H. Hughes
Walter D. Masterson

RCA Laboratories, Princeton

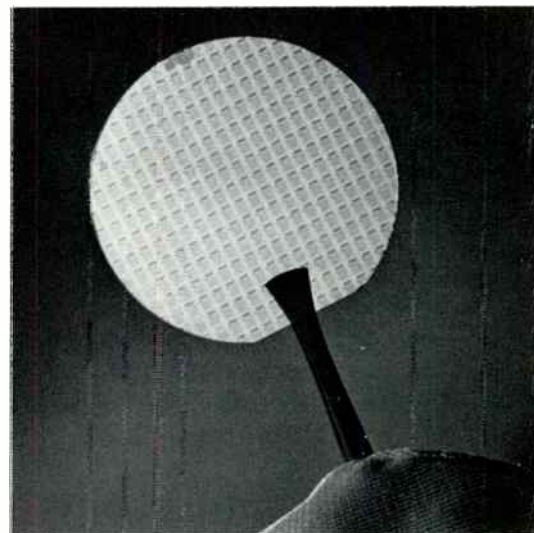
William H. Barkow
Josef Gross

Consumer Electronics, Indianapolis

Horst E. Haslau
Ira F. Thompson



Videovoice lets this engineer show and tell about his product.



A new generation of semiconductor functions faster and at lower power.



The shorter, lighter in-line tube (right) provides sharper color pictures.

RCA Brings the Telephone to Alaska's Bush

Alaska's remote villages
are getting their first link
with the outside world
through Alascom's Bush
Telephone Program

Since July, the 89 inhabitants of Little Diomed, Alaska, have been getting accustomed to an unfamiliar instrument—the telephone.

A rocky Bering Sea island barely 25 miles from Siberia, Little Diomed is the farthest point yet reached by the Bush Telephone Program, an RCA Alascom project designed to bring long distance, direct dial telephone service to 142 remote villages of 25 or more people. While Bush Telephone is the most recent—and unusual—facet of RCA's role in Alaska, the Company for years has been instrumental in providing long-lines communications to the forty-ninth state.

"Before we put in the phone," says Bill Piotter, one of three field technicians who made the installation, "Little Diomed was accessible only by skin boat (25-foot walrus hide vessels), float plane, or helicopter." Other Bush telephone locations—there are now about 50 in operation—are either on the vast, barren plains above the Arctic Circle or in the massive state's virtually impenetrable woods and mountains.

Stephen D. Heller, who frequently visited Alaska as an RCA Service Company executive before joining Alascom as President last year, sees the Bush Telephone Program as a great asset to Alaskans living in remote villages. "Now the people in the villages can really communicate for the first time," he says, "with a world that could only be reached before by such primitive means as dogsled messengers or the most rudimentary radio service."

Calls from Bush Telephone locations are transmitted through a series of microwave or UHF and VHF radio in-



A student at Moravian Mission, near Bethel, makes his first call, which is being processed by Alascom long distance operators at automated Toll Service Desks (right) in Fairbanks and Anchorage.

stallations over a network that will eventually cover 6,600 miles. Yet the operation of the phone in the village itself is necessarily rudimentary. In villages like Kasigluk (see cover), Napaskiak, Egegik, and Eek, one dial phone (actually, a radio telephone) is mounted on a wall in an accessible heated building, such as a general store, health clinic, or schoolhouse. A nearby steel cabinet houses batteries and other electronic gear, while an antenna sits on top of the building. The village headman or council chooses an attendant, who keeps a log of all calls and assists with calls if necessary. The

village pays a monthly base rate of \$35, plus the total charges for toll calls.

"If the attendant is smart," says Bill Piotter, who travels 50,000 miles a year servicing remote phone locations, "he'll keep the caller there while he checks time and charges and then collect right on the spot. Villagers aren't used to receiving bills and don't recognize that they have to be paid."

If some Alaskan villagers are slow to accept the idea of paying for calls that average over 200 miles in distance, they certainly have been quick to put the phones to good—and often profitable—use. According to an informal

survey by Alascom Public Affairs Manager Louis Custrini, a large number of calls are between village children attending regional schools (in Bethel, Sitka, Nome, and Wildwood) and their parents in the remote areas.

Many villages, in fact, log 50 calls a week. John O'Larey, who heads the Nome Toll Center, a repair and control center for 22 Bush phone installations, says there is a high volume of calls between the villages and Nome—the farthest toll-free point—and just between villages. Says O'Larey: "Villagers, especially in coastal areas, now phone each other with informa-





One of the areas where Alascom's Bush Telephone Program operates (inset). The installation at Little Diomed (circle) is 25 miles from Siberia.



tion about where fish are biting and what kind of prices they're fetching. They also use the phone to follow the caribou and reindeer herds."

RCA people in the Bush Telephone Program find it a fascinating reflection of the frontier character of the state itself. A land mass one-fifth the size of the entire "lower forty eight" (as Alaskans call the contiguous United States), Alaska has only 350,000 people, 135,000 of whom live in and around Anchorage. Because driveable roads are at a premium and navigable waterways are frozen or otherwise unmanageable nine months of the year, Alaskans are heavy users of the state's 2,300 private aircraft, which rent for \$55 an hour and up.

Although prices are high, even by today's inflationary standards, and housing is short, Alaskans spend freely. Says a recent transferree to Alascom headquarters in Anchorage, "It's so big and rugged here that small things like high prices don't faze people."

Alascom veterans, especially those who set out from Nome to as far north as the Arctic Circle and as far east as the Yukon River, cannot afford to be easily fazed. Bush Telephone Project Engineer Jim Hayes (see box) casually

mentions that when weather is unfit for flying, field technicians and engineers head for the villages in snow machines—with equipment-laden sleds in tow. Piotter reports frequent delays on roads clogged by herds of reindeer. Frank Bailey, a field installation supervisor who came to Anchorage from Camden just a year ago, says weather is a year-round problem. "At any time of the year you can have dust storms, fog, and snow. If we're at a village accessible only by plane, we have to get out when the weather comes in. A couple of months ago, two other fellows and I stopped at a village for a one-day repair job and stayed a week in dense fog." Snow machine travel, Bailey adds, can also be tricky. "We go no farther than 50 miles and never alone. We travel in pairs at all times. In the short time I've been here, I've found Mother Nature to be a terribly unforgiving lady who doesn't give second chances."

Although RCA is not the only supplier of telephone service in Alaska, it is by far the most visible. Alascom, in

fact, employs 900 people, about 70 per cent of them hired in Alaska, to operate such advanced systems as Direct Distance Dialing. "General Telephone & Electronics does the billing on our long distance service. General Electric provides the multiple access switching system, and more than 20 independent companies supply local telephone service. Yet everybody seems to recognize Alascom as the main telephone company," says field technician Bill Piotter. "For this reason, our jobs consist of more than just grabbing a toolbox and fixing a telephone. We have to get along with the villagers, who don't take easily to strangers, and help them whenever we can."

Bill offers as an example a recent Christmas spent stranded on Point Hope, one of Alaska's northernmost reaches. "I was weathered in and waiting for it to clear when the local storekeeper came to me with a problem," he recalls. "He had just bought a freezer from a company in Seattle but didn't get any instructions or diagrams about how to put it in operation. He explained

"Mr. Bush Engineer"

For his 12 years with RCA, Jim Hayes, a Los Angeles-born electrical engineer, has lived the rugged life in Arctic Alaska. At 40, he is Project Engineer of Alascom's Bush Telephone Program and in that role plies Alaska's rural areas installing, maintaining, and upgrading the state's long-lines telephone system. Currently, Hayes, who has a bush pilot's license and flies his own single-engine Cessna 210, is involved in the installation by helicopter of 35 mountain top microwave units, the first five of which were put in place late in August. The microwave equipment, Hayes explains, will open communications bottlenecks and will bring telephone service to even more remote areas than before.

Like the 12 men with him in the Bush Telephone Program, Hayes has a personal stake in its success. "I've lived in Alaska since 1954 and have come to love it," he says. "The life

is rugged, and the people are hospitable in the way that people who depend on each other for survival are."

Hayes, called "Mr. Bush Engineer" by his associates, joined Alascom from the RCA Service Co. in 1969. Says an admiring co-worker, "I've rarely seen anyone so completely compatible with the native culture." Rosa, his wife of 15 years, is a native Alaskan. Hayes speaks several native dialects. And like most rural Alaskans, he barter goods rather than pay cash when he is in the bush. "I'm not much different from most people who work for Alascom," he says. "They're all rugged people who enjoy and love the wilderness."

Such is Hayes's commitment to the Alaskan Bush that he shares its prospects—and concerns. "Every day, natives become more aware of the progress of industrialization and



Rosa and Jim Hayes

commercialization," he says. "That's why the Bush Telephone Program is particularly timely. To be on a parity with the new world emerging here, rural Alaskans need all the technology they can get. The communications that Alascom provides are a giant step in this direction."



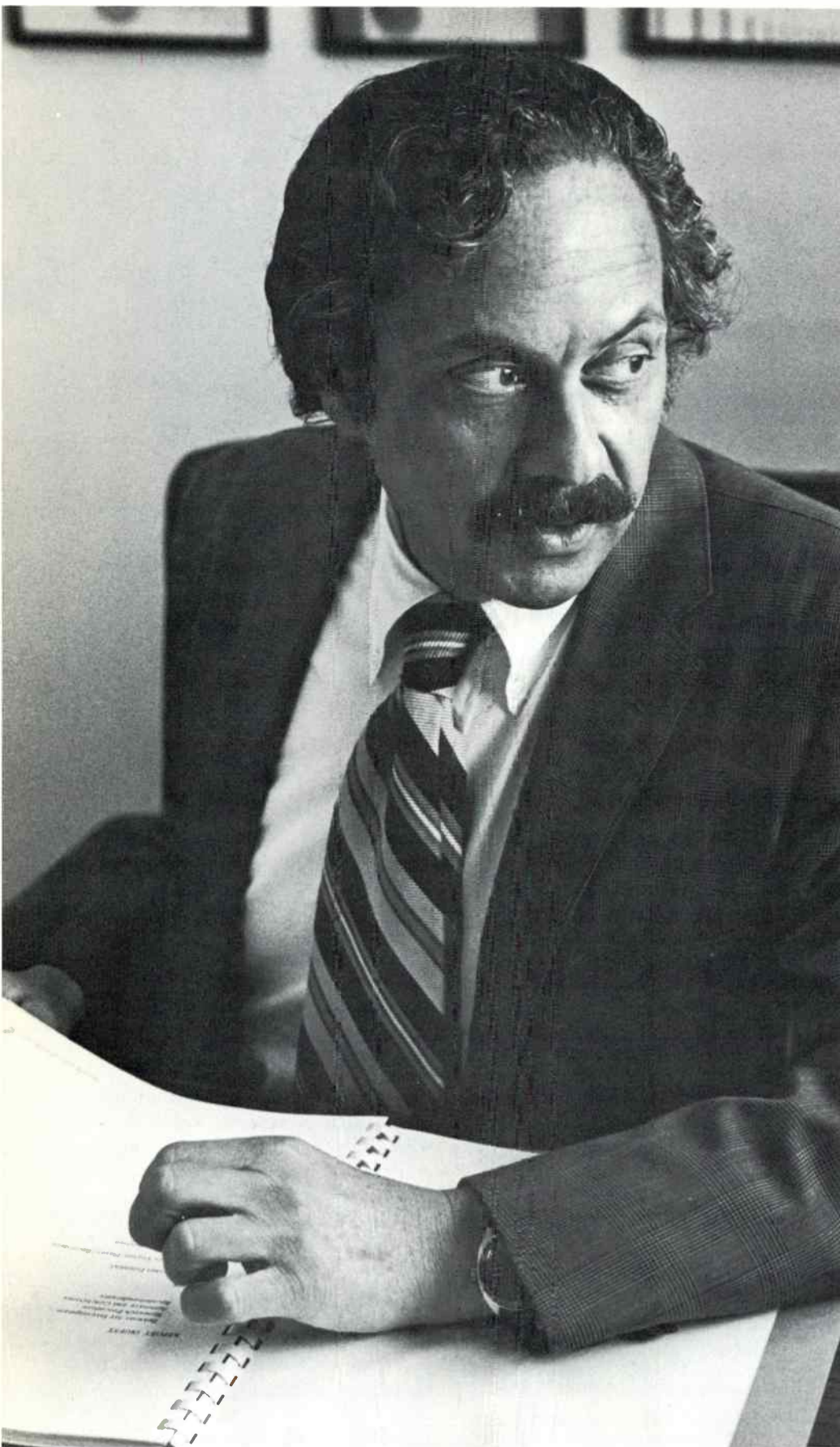
Old and new in Alascom's telecommunications. Microwave towers like the one at left are replacing earlier signal reflectors (to the immediate right of the tower).

that if he didn't get the freezer working, the village's food supply might spoil. I managed to wire the freezer up to the power station and get it working fine. I can't tell you how appreciative the storekeeper was—and what a good friend I made."

Adds O'Larey, "Practically every village accepts Alascom technicians as friends."

A letter received at Alascom headquarters in July sums up how many Alaskan natives feel about the Bush Telephone Program. Written by a health aide in remote Wales, Alaska, who had previously relied on a Navy station radio to call for medical assistance, the letter reads:

"Now that Wales has a telephone, I've been sitting, trying to think of a way to express my appreciation. I'd like to thank all who were involved in making it possible. I realize a lot of planning and work were involved . . . My work load is much lightened now that I can call the hospital myself. Not only I but the villagers will benefit from the use of the telephone."



Art For Adler's Sake

Lee Adler has found the business world tolerant, even approving, of his serious pursuit of art.

But the art world takes a harder view of his life as a businessman

"Funny, you don't look like an artist."

When an art gallery director told this to Lee Adler, RCA's Director, Marketing Research, a few years ago, Adler realized that his two careers—one as a corporate executive and the other as a serious contemporary artist—had reached a point where he had to take action. "That's when I realized I needed a second public identity, that of the bedraggled Bohemian," he says.

A Sunday painter for years, Adler had begun serious art study and work in oils in 1964, when he was a Manhattan advertising executive.

"Shortly after I began taking courses with other novices at the Brooklyn Museum Art School, my instructor encouraged me to show my work professionally," he recounts. "I was reluctant at first, but eventually I began to show my work in galleries in New York."

Adler soon had some real success—but at a price. "Shortly after my first one-man show in 1967, that gallery director made me realize I had a real image problem. During the day, I'd



always appeared in public in conventional business dress, because I believed the business world would react skeptically if it learned of my artistic work. Weekends and evenings, I dressed—and lived—the part of the artist," he says. "But when that gallery director tipped me off, I realized I had it exactly backwards. The business world in fact was very tolerant,

even interested, in my art, while the art world looked upon me and any artist who did anything serious and lucrative to earn a living as a dilettante."

After that, Adler made it a point to dress and behave like an artist whenever he appeared in art circles and to mumble when his artist friends asked him what he did to pay the rent. "I never really lied," he says "I just mut-

tered something like 'I do some things in the business world once in a while.' "

What does Lee Adler, the businessman, do? His job at RCA includes developing and coordinating corporate research projects in marketing, new product development and advertising. Together with his colleagues on Vice President James Johnson's Corporate Marketing Staff, he works with other



Artist Adler at a recent showing of his work at a New York gallery.

corporate departments and with the divisions and subsidiaries of RCA to make the company's marketing efforts more effective.

Adler is recognized as an expert in his field, having served as Vice President, Marketing Research Division of the American Marketing Association and as a director of that organization as well. He has written and edited several books on marketing, as well as many articles for business and professional publications, and has served as guest lecturer at colleges and universities.

But the fact that Adler works full time on a job he enjoys at RCA doesn't mean he's not making real progress in

his art. "My style has evolved into large oil canvases and collages which incorporate artifacts of our technology, including electronic components and other materials I get out of RCA's garbage cans. I've also gotten heavily into silk-screen prints. I've had five one-man shows, and next year my work will be exhibited at the Museum of Contemporary Art in Madrid and at the Mickelson Gallery in Washington, D.C." Many corporations, as well as private collectors and museums, have also acquired Adler's work.

Adler is enthusiastic about the future relationship between art and business. "RCA and many other forward-looking corporations have learned that

they can gain a tremendous amount from the art world. Everything from product design to environmental planning to corporate identification has been enhanced by contemporary art, and businessmen increasingly understand that they can and should help artists survive and flourish. RCA—and Robert Sarnoff in particular—are particularly strong on this point, and I'm very glad to see it."

But Adler isn't as confident that the art world will become as tolerant as the business world. That's why, when he is on his way from his office to a gallery, he still stops in a phone booth to take off his tie, unbutton his shirt and put on a beret.

Nestled in Pennsylvania's lush Susquehanna Valley lies the city of Lancaster, crossroads of one of the nation's richest farming areas and "capital" of the historic Pennsylvania Dutch community. And though it is small by urban standards, this city of 57,000 is not at all the quiet rural town you might expect. On the contrary, its hard-working and civic-minded citizens have built it into a bustling tourist, commercial and manufacturing center noted for a keen sense of community.

The 3,000 people of RCA's Lancaster Electronic Components Plant share the values of their city. On the job, they make power, industrial and color picture tubes, electro-optic products, SelectaVision black-and-white cameras and lasers. As members of the Lancaster community, they are in the forefront of efforts to make their city an even better place.

Here are some of the ways that RCA and its people contribute to Lancaster:

- **The Annual Business, Industry, and Education Day**

Held in November each year, the BIE Day brings local teachers into the plant so that they and their schools can better understand what goes on at RCA-Lancaster.

- **Junior Achievement**

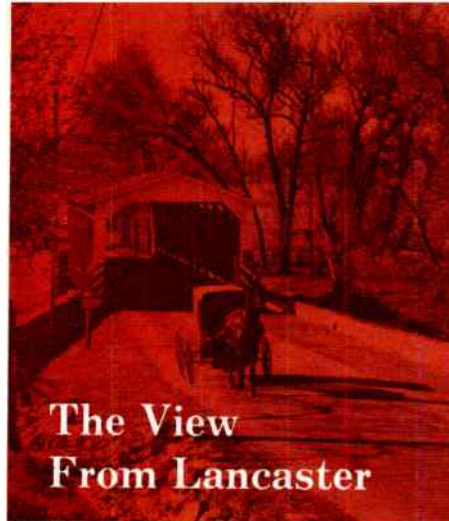
With the help of RCA-Lancaster employees, local youngsters are taught the fundamentals of the free enterprise system by forming and running their own companies. The plant and its people sponsor and work with a Junior Achievement company each year, and in 1972 the RCA J.A. company won the "Company of the Year Award" for Lancaster County and for the entire Eastern U. S. District.

- **Eagle Scout Recognition Day**

Each year Eagle Scouts visit the plant for a guided tour and a luncheon. The products and manufacturing processes are explained to them and they are encouraged to learn as much as they can about the electronics industry.

- **High School Cooperative Business Education Program**

Sponsored by the various School Districts in the area, the program brings high school business education majors



into part-time jobs at the RCA plant during their senior year. The COOP program is designed to give students supervised experience of at least 15 hours a week in the kinds of office careers they are planning to pursue. The skills, knowledge and procedures they learn at their jobs at RCA enable them to sharpen and refine what they learn in the classroom.

- **Individual Community Service**

Many RCA-Lancaster employees are helping area youth by individual voluntary efforts. Some notable examples:

Homer Mylin, Exhaust Attendant,

Large Power Tube, had long been a baseball and wrestling coach for local teams, and since 1966 has been an umpire for several baseball leagues.

C. Price Smith, Manager, Power and Electro Optics Products, serves as President of the Board of the Lancaster Young Men's Christian Association.

Claire C. Simeral, Manager, Financial Control and Planning, is Vice President of the Lancaster Council on Alcoholism and Drug Abuse.

C. E. "Tex" Burnett, who is Division Vice President and General Manager of RCA-Lancaster, gives one reason so many RCA people in the area feel as they do about their community. "Our 3,000 employees and their families are a significant fraction of the area's population—one out of every 14 in the city and urban fringe. If you use that ratio on a city the size of the greater New York area, it would translate into well over 800,000 people," he says.

"So aside from civic pride and tradition, the sheer numbers of our people help explain why they feel they have such large responsibilities to their city."



Two RCA-Lancaster activities: High school students in the Cooperative Business Education Program at their summer jobs (above); and a meeting of RCA-Lancaster's award-winning Junior Achievement company: At right, work progresses on power tubes.



Floor Coverings Division President Dick Stabile (left) spends most of his time on the road, gauging the market. Here, he shows the Coronet line to two buyers in an Atlanta showroom.

No Ceiling on Floor Coverings

The Coronet marketing system: size up the market, spot style changes, then sell what people will buy. The result: many more winners than losers

Even though it's nearly midnight, Charles Eitel has no immediate thoughts of sleep. A late movie is unraveling on the TV set in his Charleston, S. C., motel room, while a 9,000 BTU air conditioner wrings the moisture out of the humid night. Eitel, a territory manager for the Floor Coverings Division of RCA subsidiary Coronet Industries, is oblivious to all of it.

He is concentrating instead on several sentences hastily scribbled on a scrap of paper that day after conversations with salesmen and buyers at three large Charleston area carpet retailers. These notes will be translated into a memo to Southeast Regional Manager Bob Stevens, who in turn will pass it on to Floor Coverings President Richard Stabile at his Dalton, Ga., headquarters. The result of this communication—and Eitel's sensitivity to what's going on in the volatile floor covering business—might be a successful new product line. Eitel's notes are still classified for competitive reasons, but if he and Coronet are lucky, they will repeat many previous successes.

In one recent instance, Coronet introduced a variety of cut-loop fabric designs; increased production capacity; and built sales and market penetration.

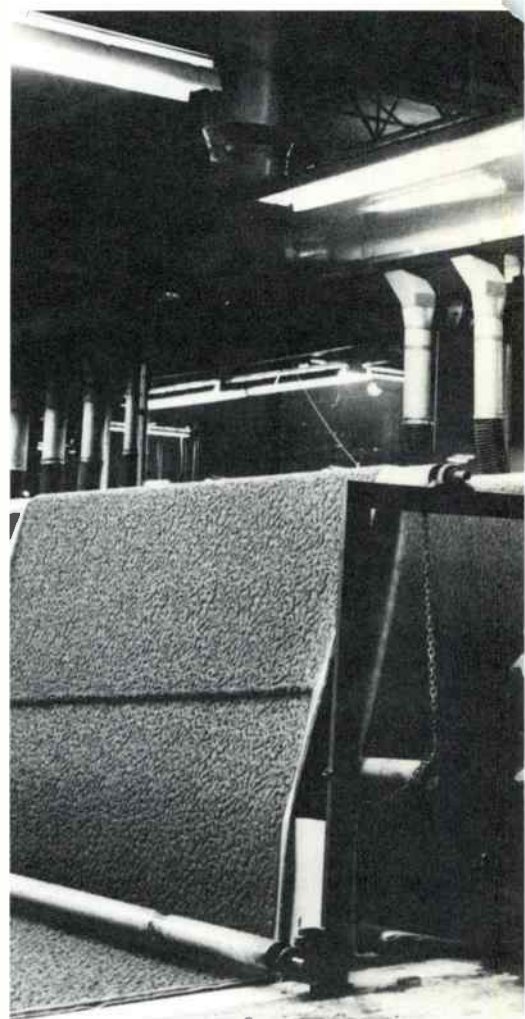
This was one example of how Coronet's highly developed production and

marketing strategy has meant success for the Dalton-based company since it was founded in 1956 by Chairman Martin Bud Sereteen, B. Jackson Bandy, and Guy Henley, Jr. And with RCA's company-wide emphasis on product marketing, Coronet's winning ways are more than welcome.

"Coronet has consistently been a market leader," Sereteen explains, "because we produce what consumers want and what they're buying." B. Jackson Bandy, President of Coronet Industries, expands on this: "Our strength is sizing up the market, spotting styling trends and changes, and then bringing the product to market. We don't tell the market what it's supposed to want. We bring the customer what he's presently buying."

How do Sereteen, Bandy, and Stabile know what's selling? And how do they get their new products on the market? "Our sales force of 75 people is trained to tell us what's hot," says Bill Talbott, Vice President of Marketing. "They really do their homework and report all the market trends they see. It's our job to evaluate whether the sales trend

The view from the factory floor at Dalton. More than two million square feet of plant space, occupied by specially designed machinery, give Coronet quality products geared to satisfy market demand.



is a solid one or just a flash in the pan. We also have to determine how much range the trend has. We certainly don't want to tool up for a product or style that's near or past its peak."

The sales force, which calls on retailers who provide 70 per cent of Coronet's carpet volume, is not alone in beating the bushes for styling trends. Stabile and Talbott and other executives are continually on the road visiting key customers. "One of us is always traveling," says Stabile, who has been with Coronet since 1964. "Bill and I rarely see each other because we're usually in different parts of the country, or maybe even the world."

Because his products have been good sellers for dealers, and because Coronet's people have been especially responsive to customers, Chairman Bud Sereteen enjoys the friendship and loyalty of the heads of the nation's largest retail carpeting chains. "Dick

and I work with stores that reflect what's happening across the country," says Sereteen. "Once we know the best selling types, we try to further improve on the styling and value by using our product development talents and our advanced production equipment. As a result, we market far more winners than losers."

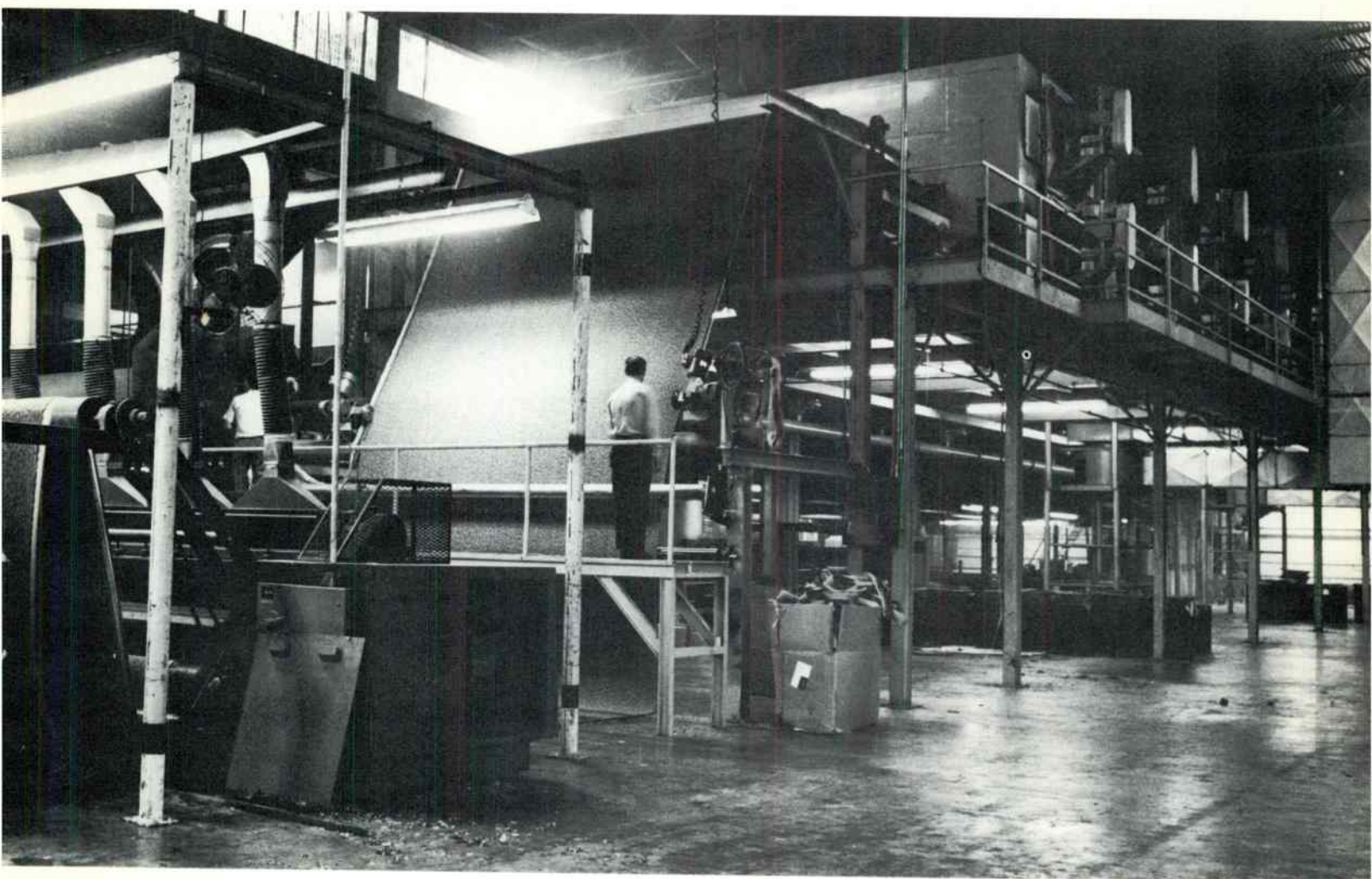
One example of the benefits resulting from Coronet's excellent dealer relations is the success of Cordoba, a fabric that has been a good seller on the West Coast. "We showed Cordoba to some visiting dealers from the East and Midwest earlier this year, and they loved it," says Stabile. "When we introduced it for nationwide distribution at the June floor covering market in Chicago, it was a national success."

Coronet's record of marketing successes is the result of a well-coordinated dovetailing of product development, manufacturing, and sales. "The

intelligence that comes from the sales organization, dealers, and distributors (the Floor Coverings Division, under the Heritage label, sells through wholesale distributors) is screened by us," says Stabile, "and then is passed on to the product development department under Pete McKone, our new Vice President of Products and Technical Development. He and his group translate this information into a product that is attractive and stylish, can be manufactured in volume, and can be priced competitively at the retail level."

What makes it all possible for the new product to reach the market so quickly—and to such good effect—is Coronet's two million-plus square feet of plant space, filled with over 60 tufting machines and other specially designed dyeing and finishing equipment.

To assure the efficiency of the manufacturing operation, Coronet's executives work as closely with their raw





Chairman Bud Sereteian (seated) and President Jack Bandy keep Coronet in the lead. While Sereteian devotes more time to expanding overseas markets, Bandy, who was reared in carpeting-conscious Dalton, Ga., deepens penetration of the domestic market.

materials suppliers as they do with their dealers. "When a fiber company comes out with a new and exciting product, we're generally among the first to know," says Sereteian.

Jack Bandy, whose recollection of carpet manufacturing goes back to the days when it was Dalton's cottage industry, points out that keeping up with styling changes is not without its price. "New floor covering trends often require different types of equipment," he says. "All the prevalent styles—shags, plushes, or tight-knit loops—are made by different machines. It generally takes a while to tool up, but once we are tooled up, we can put a style on the market within weeks of the start of manufacturing."

Because product development, manufacturing, and sales rely so heavily on the right choice of styling early in the product life-cycle, feedback on products must be as early, complete and accurate as possible. "Our sales people find out and alert us to what the consumers will be buying in the months ahead," says

marketing expert Talbott, who keeps abreast of six sales regions, plus a commercial division that sells mainly to

institutional, industrial, and business customers. "We also keep computer histories of every product we produce, their colors and styles."

Every Coronet salesman (their responsibilities really make them territory managers, explains Talbott) has a goal of opening as many new accounts as possible per season, seasons beginning with the giant January and June floor covering wholesale markets in Chicago. But there are other markets as well, crowding a salesman's calendar with commitments to significant semi-annual market showings in New York, Atlanta, and San Francisco and various local and regional showings.

Since the demand for Coronet's floor coverings are world-wide, Coronet is expanding production and sales overseas, an area to which Sereteian is devoting an increasing portion of his time. There are manufacturing operations in Canada and Belgium, a licensee in the United Kingdom, and growing exports to Japan, Australia, and Europe.

As parts of a growing and expanding company, the people of Coronet, from executives to production line operatives, are proud of their achievements. But they also know that the key to Coronet's record of success is more than pride: it's hard work, modern machinery, and most important, producing what the market wants and the consumer will buy.



Once the plant is tooled up, Coronet can put a new style carpet on the market within weeks of the start of manufacturing.



RCA's Sun-lighting Scientist

The people at RCA Aerospace Systems Division in Burlington, Mass., know Ed Wallner as a veteran Senior Engineering Scientist who works in such exotic areas as space navigation, guidance and control and electro-optical sensing and detection. But to his fellow aficionados, Wallner, is an amateur astronomer and eclipse freak who, since 1963, has been, chasing shadows to the ends of the earth.

Wallner, whose red beard and handlebar mustache make him look something like the Hollywood version of a white hunter, flew off to Africa to observe the total eclipse of the sun last June 30. In a remote, mountainous area of the southern Sahara, he measured fluctuations in the earth's electro-magnetic field during the eclipse and filmed the entire event.

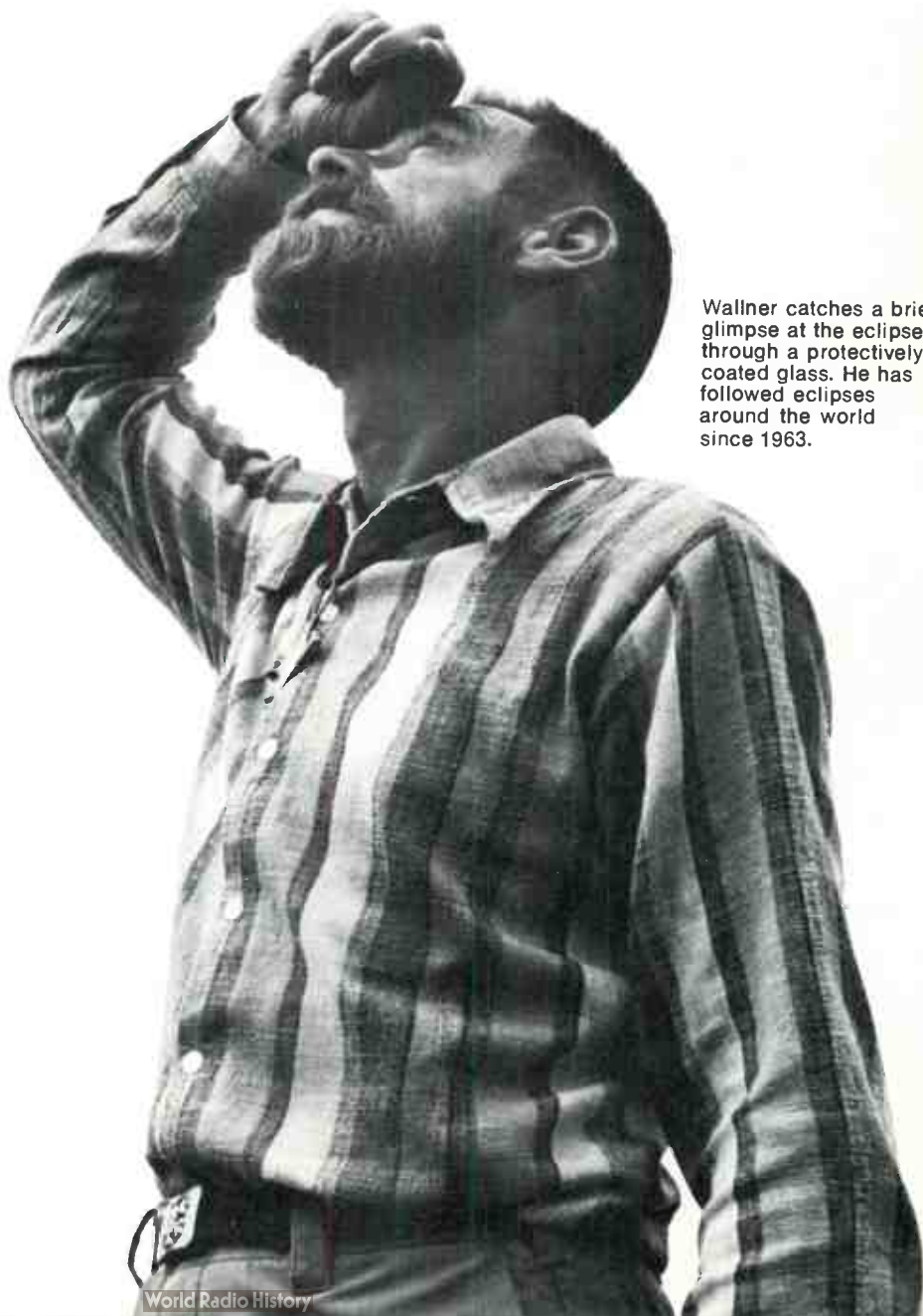
But although Wallner traveled thousands of miles, he never directly saw the eclipse. "You never look through the telescope, of course," Wallner explains, "it would harm your eyes. In fact, the telescope has heavy filters to protect the film in your camera. To aim the telescope you use a guide mechanism that is itself equipped with heavy, special purpose filters."

The recent eclipse was extremely important for Wallner who, since 1963, has traveled more than 19,000 miles to study this strange natural phenomenon. It was of unusual duration and he hoped the weather would be better than it had been when he traveled to Canada's Gaspé Peninsula for last year's eclipse, only to be frustrated by low-hanging clouds. This year he was luckier and experienced excellent

weather, and as a result, he was able to get good photo readings.

Back in Burlington, Wallner is quite excited about his results, and he plans to forward his data and photographs to the National Science Foundation where, he explains, they will be coordinated with the findings of other scientists to help learn more about the sun.

"Even though I'm a professional engineer and eclipses are a hobby, I take my study of the sun seriously," Wallner explains. "After all, I've been mixing unrelated interests most of my life. For example, after I graduated from the University of Louisville in 1947, I worked, believe it or not, as a deckhand on a river barge."



Wallner catches a brief glimpse at the eclipse through a protectively-coated glass. He has followed eclipses around the world since 1963.



Service Company's Don Naffziger discusses the RCA career development program with New York City Department of Employment/MCDA Commissioner Lucille Rose.

Getting It Together at MCDA

There are lots of good jobs
out there, and RCA-admini-
stered MCDA gets good
people ready for them

Working up the ladder is the American way, but if you're poor, unemployed or underemployed, and lack skills or education, you don't have much of a chance. And if you're also young, live in a large city and are black or Spanish-speaking, then you're virtually out of the running.

This is the conventional wisdom, but is it true? To thousands of students in the RCA Service Company's New York City Manpower Development Career and Agency program, the answer is "not any more." And to the hundreds of RCA people who work with the students, the answer is "not if we can help it."

RCA's role in running the MCDA program is not altruistic; as in many of its other businesses, the company has a contract to get the job done. The program provides a variety of vocational and basic education courses to students from the city's poverty neighborhoods so that they can get decent jobs. Operating under a contract funded by the Federal and city governments and operating out of 18 Training Sites and nine Regional Centers, the program has 317 RCA staff members whose duties range from providing



MCDA students learn how to service and repair television sets, air conditioners, and oil burners in classes at 18 training sites.

student counseling to teaching typing and English.

From his office in the program's headquarters in the old West Side Airlines Terminal on West 42nd Street, Don Naffziger, Manager, MCDA Training Programs, recently reviewed the project, which serves more than 2,000 students at one time. "Our rate of success overall is good," Naffziger explained, "because we don't sit still when an individual trainee starts having problems. Our people, whether they're instructors, teacher aides, coordinators or staff know they have the responsibility to try to help out. They usually succeed and that's one big reason why our customer, the city's Department of Employment, is enthusiastic about our program."

Gary Fleming, who is a veteran of the program and who, as the project's training manager is responsible for planning the curriculum, says that the students are enthusiastic, too. "They like the program because it is flexible enough to respond to their individual needs. We tailor each student's course load, mixing in more hours of vocational training for example, if that's

MCDA's Report Card

Total Trainees Served ..	5,062
Total Graduated	4,307
Ethnic	
Distribution: Black	49%
Hispanic	43%
Other	8%

Average Time in	
Training	18 weeks
Graduates Placed	3,187
Average Salary of Placed	
Students	\$106 per week

A Large Man in a Huge Job

Jim Morton, Associate Manager of Training Center Number Five of the RCA-MCDA program, is a large man, doing a huge job. As the top RCA man at the site (RCA manages 18 MCDA sites in New York City) Morton, a retired Army Major, pushes his 6' 7" 290 lb. frame as hard as any younger man to make sure his 180 students and staff of 28 are functioning at their best.

And when he takes you on a tour of the site, which is located in a rehabilitated office building on W. 26th Street, Morton sets a whirlwind pace. "I just have to keep going, it's the way I am," he smiles as he climbs the stairs, stopping on each floor to discuss the site's five programs.

• Servicing

In the Blue Collar Skills program students are mostly men and are trained in radio-TV servicing, air conditioning and refrigeration, oil burner repair and maintenance and basic electricity. They work in classrooms and workbenches with sample equipment. Experience has shown that most of them will have jobs waiting when they graduate.

• English

Most of the English-as-a-Second-Language students are Spanish-speaking women who, after completing the 17-week course in written and oral English, will move into the Basic Office Practices Course.



Associate Manager Jim Morton

• Basics

In the coupled Basic Education Program, students receive training in such subjects as mathematics, vocabulary and government and their work is geared to fit in with their vocational courses. The program is also aimed at equipping Students to live and work more successfully in the city.

• Office Skills

The Basic Office Practices (BOP) program is itself a series of smaller courses. Students learn touch-typing, filing, office procedures, business machine operation and basic stenography. During the 19-week program, a typical student will raise her typing speed from 0 to 40 words per minute and learn how to answer phones, meet clients, fill out and file forms and use business machines.

• Dictation

The 18-week stenography program, which is relatively new at the site, is growing fast. Through intensive drill and practice, its students are taught to take dictation at 80 words per minute, a rate acceptable to most employers.

needed. If the student is weak on the basic education side, we provide more hours of general education. And, since we instituted the open-entry, open-exit enrollment approach where the different level courses are being offered simultaneously, we can start a student at

the right level and promptly move him ahead if he's ready for it."

RCA's responsibility for the student begins with his referral to the MCDA program by one of New York City's Neighborhood Manpower Service Centers. Upon arrival, the student spends

RCA



BOPping along at MCDA. Basic Office Practices (BOP) is a mainstay among the courses at the career training program administered by RCA Service Co. More than 4,000 graduates have been prepared for rewarding careers since 1972.

up to a week being tested, oriented, and assigned to a counselor who will work with him throughout his studies.

After his orientation, the student is enrolled in one of the different vocational courses, as well as a general education and development class. As the student progresses through the program, he is moved ahead into more difficult work. Extra tutoring and help are available and at certain points in the curriculum, he receives certificates of achievement which tell him he's moved up a rung on his career ladder. During the final weeks of study, the student is given his final battery of tests and qualifies for graduation.

Naffziger and his staff at the RCA-MCDA headquarters spend their time providing coordination, assistance and guidance to the professional staff and students in each of the training sites. Explaining that "the instructional program is based on continual experimentation, research and revision," he emphasizes that "no set of materials or

techniques is sacred."

"Because we're decentralized and flexible, we can do a lot more than a rigid, centralized program. Localization encourages student progress and faculty interest, and instantaneously allows field management to monitor trainee performance," he says.

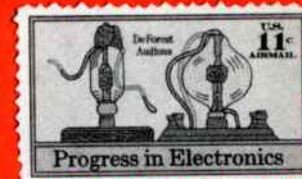
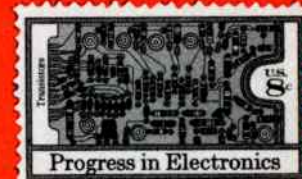
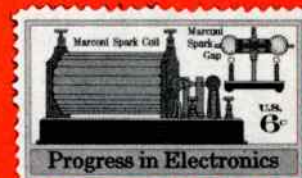
Looking ahead, Naffziger is optimistic about the course of the RCA-MCDA program. "The Service Company has built up a real expertise in the manpower training field, both here and in the other projects we've had across the country. We're in a position to really deliver, and we're doing a good job."

But keeping the city, the Service Company and faculty happy is only part of the story. It's the students, the young men and women who will have a better chance for a decent job and a good life, who are the program's real concern. And it is the students who benefit from the personal commitment and sense of responsibility of the RCA people in MCDA.

Electronics on the Mail

Although the electronics industry is a child of the twentieth century, it has grown and changed dramatically in its relatively short life. The changes are reflected in a special stamp series just issued by the U. S. Postal Service. Issued in 6, 8, 11, and 15-cent denominations, the Progress in Electronics commemorative stamps portray electronics devices ranging from a turn-of-the-century Marconi Spark Coil to a set of early DeForest Audions to a modern transistor and printed circuit board.

The 15-cent stamp is particularly interesting to RCA because it portrays several products that are landmarks in the Company's history, including a radio tube similar to those once made in Harrison and an early TV camera tube resembling those once produced in Lancaster. Also pictured on the stamp: an old microphone used in pioneer broadcasts and an old-fashioned goosenecked loudspeaker. For collectors, the Postal Service has issued first-day covers on the series.



SHOWCASE



Set 'em Up In The Next Channel

Television has come to bowling alleys with an RCA-developed automated bowling scoring system that includes a camera "eye" and a small, special-purpose computer. A special electronic camera records the number of pins left standing after each ball is bowled and converts the number to digital data, which is then transmitted as a numerical score to a TV-like screen on the bowler's console.

Says RCA Electromagnetic and Aviation Systems Division Vice President and General Manager Frederiek H. Krantz of the automated system, which is being marketed by Rapid Score, Inc., "This system will relieve experienced bowlers of keeping score and allow them to improve their games. It will also help beginning bowlers to concentrate on learning the game without being discouraged by having to learn a complicated scoring system as well."

Cape Kennedy? No, San Francisco!

The exotic looking tower on San Francisco's Mt. Sutro looks something like a launch gantry for the manned space program. In fact, the 977-foot tower is the transmitting site for eight local TV stations and the shorter structure nearby is an older two-station tower that is scheduled for demolition.

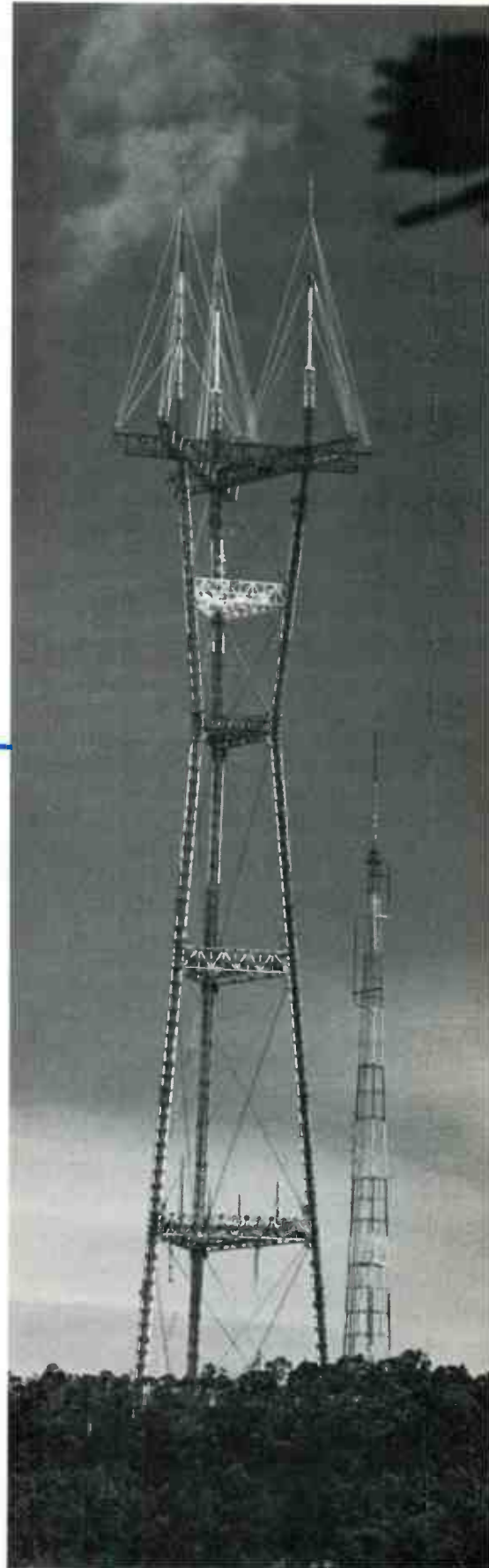
The three 210-foot antenna stacks rising from the top of the tower platform are part of the multiple antenna system designed, built and supplied by the RCA Broadcast Systems, a part of RCA's Government and Commercial Systems Division. They were put in to use in July and are providing unprecedentedly clear television coverage for the entire area. →

Happy Landings

When an airplane begins its landing run, it is usually tracked by an airport radar that helps the pilot land gently and safely. But since conventional radars use microwave frequencies that can be distorted by nearby mountains, trees and buildings, the lower the airplane flies, the less help the ground radar usually is.

A solution to this dilemma is being developed by a team from RCA's Missile and Surface Radar Division in Moorestown, under a contract from the National Aeronautics and Space Administration. The team has combined a narrow optical laser beam system with a conventional tracking radar.

Called the Laser Tracking System (LTS), the new equipment will enable planes equipped with special, lightweight laser reflectors to be tracked at both low altitude and long range, and can also be used as an automatic radar calibration aid. It will be used initially as part of an experimental runway facility at NASA's Wallops Island Station in Virginia.



A Little Something For Everybody

RCA's Solid State Division is in the middle of a minia- ture revolution—the boom- ing market in integrated circuitry

A hard core golf addict in 1980 may tee off after dark, following his game through a pair of night vision goggles activated by a tiny integrated circuit.

His golf-widowed wife may go shopping at the same time, visiting a half-dozen stores, paying for everything with her electronic credit card.

When he sinks his last putt, he might call her, wherever she is, on his personal radio phone and make a date to have a beer and a hamburger at a nearby pub.

They could even dally a bit because their home, though empty, won't be untended. An electronic security system will automatically set off an alarm in police headquarters at the approach of any stranger. The console operator at headquarters will switch on a TV camera and zoom in on the intruder. If he doesn't like what he sees, he'll get a police car there in a hurry.

Fascinating stuff in 1973, these scenes could be typical of American life by the end of the decade. That's how fast this technological revolution is coming, with the RCA Solid State Division right in the middle of it.

"There have been spectacular advances in miniature electronic circuitry," says Bernard V. Vonderschmitt, the lanky Vice President and General Manager of the Division, "and we are now on the verge of drastically different means of doing almost everything a modern society does—and a great number of things that have never been possible before—at very economical prices."

Markets for integrated circuits have bloomed almost overnight. Seven years ago, there wasn't a single RCA integrated circuit in any American-made car. For the 1974 models, RCA expects to sell more than 30 million solid-state devices to U.S. auto makers; nine mil-

lion of them will be ICs. By the end of the decade, world-wide sales of electronic equipment could reach the \$3 billion level, and integrated circuits will be employed in systems such as obstacle detectors, anti-skid braking systems, collision-avoidance equipment, and even sobriety detection devices (i.e., if you're too intoxicated to drive, the car won't start).

RCA integrated circuits now are regulating thousands of new, super-accurate solid-state watches.

In midsummer, Harry Weisberg, the smallish, graying boss of the COS/MOS integrated circuit operation, told the Retail Jewelers of America at a recent New York Meeting that by 1980 the watch industry will be producing 100 million electronic timepieces selling for as little as \$25 each.

"The watch of the future," he said, "may warn us several days in advance of birthdays and anniversaries. It can display elapsed time and automatically adjust to daylight or standard time. We can even envision watches that will provide temperature readings and function as simple calculators."

Richard Santilli, Director of Linear Integrated Circuits Products, is equally enthusiastic about his business. "It is only within the past two years," he says, "that home television set makers have moved in strength into linear ICs—and that's the heart of what

we're talking about when we refer to solid-state TV. Solid-state is transforming the communications industry."

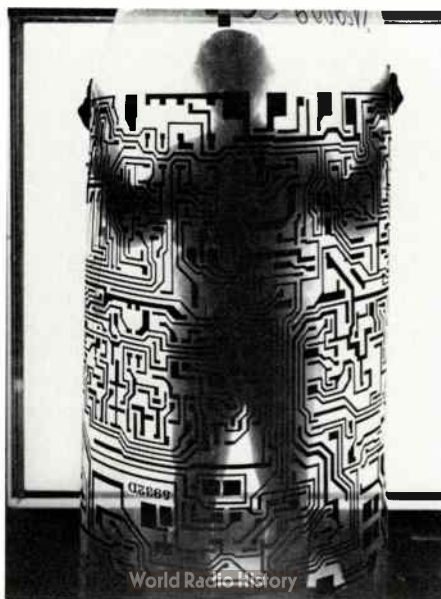
Indeed, some Christmas morning soon, a tiny TV camera may preserve your children's joy for viewing by Uncle Harry and Aunt Martha, who will watch the whole great scene after dinner through a video player/recorder on a TV set that hangs on the wall like a picture—partly because a few well-placed integrated circuits are doing their jobs.

This product revolution is being led by a device unlike any in the history of industry. A typical RCA integrated circuit is about 1/6-inch square and weighs 14 ten-thousandths of an ounce. Nearly invisible and all but weightless, it may be the most benign product ever created. An integrated circuit contains no moving parts, makes no noise, gives off no odor, and produces no waste. It works with great reliability on miniscule amounts of electric power. The energy in a 100-watt light bulb can run circuits in 10 million solid-state watches.

These tiny chips of silicon are really miniature computers. One chip may be packed with as many as 3,000 transistors. ICs are fabricated, tested, and packaged by some of the most sophisticated equipment in industry, in locations such as Findlay, Ohio, Somerville, N. J., and Taiwan. Positively and negatively charged chemicals, which form the tiny transistors in the finished product, are transferred to a 3-inch wafer of silicon in the scorching heat of electric furnaces which can maintain temperatures of up to 2,200 degrees Fahrenheit within one degree for as long as 16 hours. The transistorizing chemicals "know" where to go on the wafer because of precisely drawn masks which have been photoengraved on the chips. Some designs require as many as nine separate photoengravings, each placed atop its predecessor within a variation of 50 millionths of an inch.

The basic processing of integrated circuits takes place, as you might imagine, in exceptionally clean surround-

From large photo masks little circuits grow. This man-sized photo mask will be photographically reduced 100 times before it is printed on a silicon wafer.





How many angels on the head of a pin? This solid state integrated circuit contains over 1,200 transistors, enabling an all-electronic wristwatch to keep time within a minute a year.

ings but, suprisingly perhaps, not the "superclean" environment that has come to be associated with the manufacture of many space age devices. During the fabrication process, the silicon wafers are kept free of impurities through frequent baths in de-ionized water tanks. Those with a special gift for painstaking tasks perform many of the delicate and precise layering procedures.

The testing process begins almost at once in the 100-step process and some of this work is performed by equipment that Buck Rogers never dreamed of: photographic equipment that can reduce a 10-by-10-foot circuit drawing to matchhead size; a computerized device that can perform 120 tests a second on an integrated circuit and reject, with a red dot of ink, the ones that don't make the grade.

When 3,000 transistors are placed on a tiny chip—which RCA development engineers are able to do now—and then "wired" together with aluminum connections invisible to the naked eye, the margin for error is incredibly narrow. But a scanning electron microscope that can magnify a chip up to 100,000 times its actual size makes the job easier.

Says D. Joseph Donahue, the boyish-looking redhead who is Vice President

of all integrated circuits products, "I just can't get over the idea that we can pack so much electronic circuitry into so tiny an area."

For ICs, a whole set of special markets is starting to emerge or expand; automotive, medical electronics, point-of-sale equipment, television, calculators, telephones, clocks and watches, general communications, and numerical and industrial controls. World markets used \$1.2 billion worth of ICs in 1972. Given a continuation of present conditions, IC sales are expected to reach \$3.2 billion in 1978—an almost threefold growth in six years.

"We're hitting the business as hard as we can," says Vonderschmitt. "And we all know we've just scratched the surface."

While integrated circuits are the fastest growing part of the Division's business, they are by no means all of it. Power transistors and related discrete solid-state components, with Ben A. Jacoby at the helm as Division Vice President, account for the larger portion of the Division's sales, and it has some flourishing growth markets of its own—television receivers and automotive products, to name two.

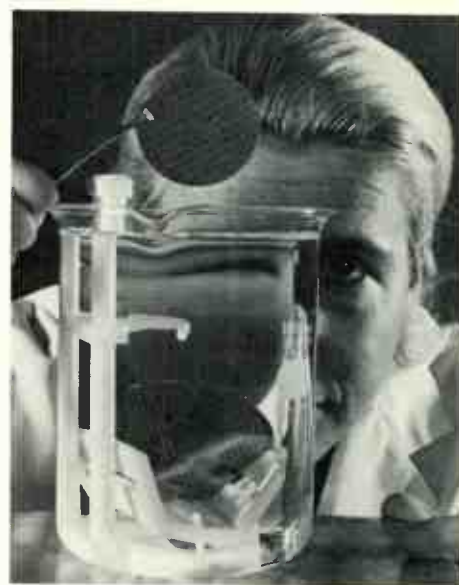
With Donahue's operation beginning to blossom and Jacoby's discrete components continuing to show steady

gains, the whole Division has more hustle and bustle about it now than at any time since it was organized in 1956.

So Vonderschmitt has his whole Division, and the 7,500 people in it, rolling up their sleeves and pitching in. He's rarely in a jacket himself, and as often as not, eschews his private dining facilities for a sandwich and a coke in the Somerville cafeteria.

"When you're Number 4 among U. S. semiconductor manufacturers in solid-state," says an aide, "and have a product (ICs) that could change millions of lives, somehow it's easier to work on your feet. After all, your next important conference with the boss is probably going to be on the fly in one of the corridors."

Geographically, the Division is well placed for a leading role in some of the mushrooming new solid-state markets. Somerville is the headquarters, and the Solid State Technology Center, organizationally a part of the RCA Laboratories but physically an integral part of the Somerville Plant, is the focal point for solid-state development both in the Division and the Corporation. The Mountaintop, Pa., plant is devoted primarily to preparation, assembly, and test work on power devices (discrete components). At Findlay, Ohio, the concentration is on integrated circuit production and testing. Sunbury-on-Thames, in England, is headquar-



A technician inspects an 800-IC wafer after cleansing it in de-ionized water to assure precise performance.

Integrated Circuits' Top Quartet



Vonderschmitt



Donahue



Santilli



Weisberg

Among the four, they are credited with 36 patents and nine engineering and science degrees. As the top quartet of managers of the Solid State Division's integrated circuits businesses, their responsibilities run the gamut from research, engineering development, and production to marketing, sales and advertising, and public relations.

The transition hasn't always been easy, especially in the mushrooming markets for integrated circuits. But, as Bernard V. Vonderschmitt, the Division's Vice President and General Manager, says, "With our technical backgrounds, I think we bring a lot more to the job than many marketing managers."

Vonderschmitt has headed the Division since January 10 of this year and is responsible for the discrete components side of the business as well as integrated circuitry. He has a master's degree in electrical engineering from the University of Pennsylvania, patents have been issued on 13 of his inventions and, in 1971, he was co-recipient of the David Sarnoff Outstanding Achievement Award in Engineering for his work in integrated circuits.

Tall, spare, and shirt-sleeved most of the time, he is a familiar figure around the Division's Somerville headquarters: he holds as many conferences in other people's offices as he does in his own.

Dr. D. Joseph Donahue is the Division's Vice President for Integrated Circuits. He has been issued patents on 12 inventions and is the only member of the top IC management foursome who holds a PhD (in physical chemistry from the University of Michigan).

Anyone who pops into his office these days is apt to find the trim, tough-minded redhead combing through the latest rack of market projections for either of his main groups of products—linear or COS/MOS integrated circuits.

"That's where the action is right now," he says, "and that's where I've got to be."

Richard A. Santilli's conservative clothes and quiet manner belie a flamboyant enthusiasm he brings to his job as Director of Linear Integrated Circuits Products. Patents have been issued on three of his inventions, and he has a master's degree in electrical engineering from the

Newark College of Engineering. In his RCA career he has moved from design work for radio and TV transistors into linear IC management. "It's a tremendous challenge," he says, "but so are the opportunities. Linear ICs are making their biggest showing now in solid-state home TV receivers. But from where I sit, that's just for openers."

Ebullient Harry Weisberg says, "I'm having the time of my life" as Director of the COS/MOS IC groups of products. Patents have been issued on eight of his inventions, and he holds a master's degree in chemistry from Brooklyn Polytechnic Institute. He thinks the advanced technology in COS/MOS (for complementary-symmetry/metal oxide-semiconductor) may well become a new standard for the industry (in many instances replacing TTL logic that has been the industry's bulwark since about 1960).

"We're in the right place with the right product in a market where there's no leveling off in sight," he says. "How many times in your life can you really say that and mean it?"

If Vonderschmitt, Donahue, Santilli, and Weisberg have their way, once will be enough.

ters for Europe, and the Liege, Belgium, plant produces power devices for the European market. RCA's facility in Taiwan is involved in assembly and test efforts on integrated circuits.

It is a good workable spread of brick-and-mortar and it underscores the other aspects that add up to opportunity with a capital "O."

"The world of integrated circuits," says Donahue, "is going to be limited only by man's imagination in putting them to use."

TV cable systems that now bring special programs to subscribers might

offer a vast array of new home services in the future—and the terminals at either end may be packed with integrated circuitry. There may be in-home shopping, opinion polling, educational testing, utility meter reading, as well as automatic home security systems. New electronic medical systems may offer new help to the sick and disabled, clothing may be able to warm its wearer electronically, simpler and less expensive anti-pollution systems for industry may ease that blight.

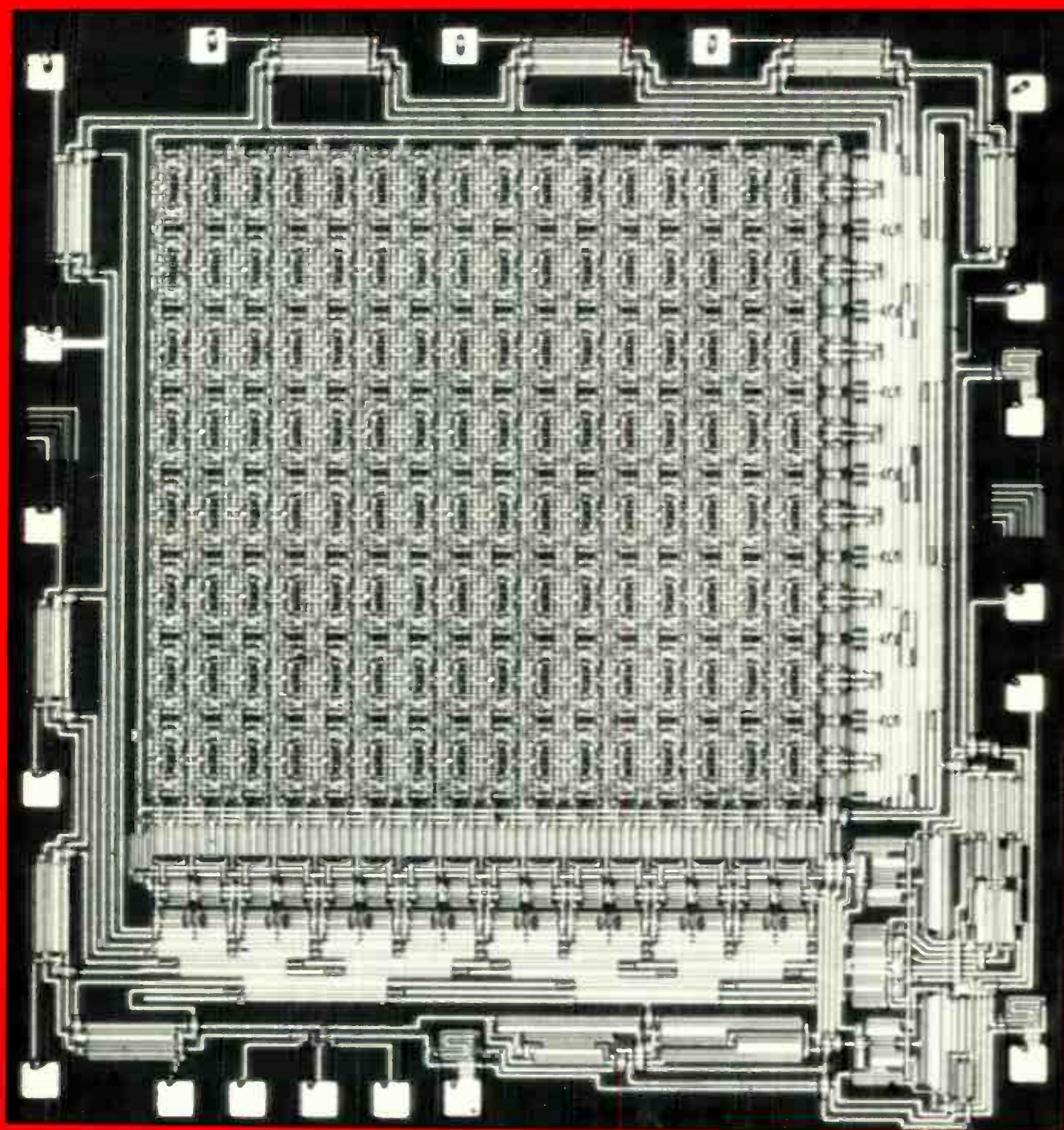
In short, integrated circuits are a little something for everybody, includ-

ing, Vonderschmitt says emphatically, "bustling, growing and profitable business for RCA."

"We're among the leaders now," he emphasizes, "and that's where we're going to stay."

Road Map for Electrons

An RCA integrated circuit, magnified to nearly eight inches from its original size of 1/6 of an inch on each side. An IC of this type contains some 1,300 miniature transistors. Total weight: about .00014 of an ounce. →



Do you know your car could have built-in reflexes?



Some drivers will always be better than others. But thanks to advances in electronic technology, *all* drivers will be better some day because their autos will have built-in reflexes.

Drivers will have electronic devices to control skidding, sense highway hazards, provide radar-accuracy speedometers, or even adjust windshield wipers and defrosters to the actual weather conditions. All automatically.

Electronic improvement of the automobile is almost limitless. It is estimated that by 1980 auto manufacturers may be spending as much on solid state electronic systems as on the engine in every car they make. Even so, in the long run, electronic solutions to automotive problems are expected to lower the cost of running a car.

Today, RCA provides the auto industry with components for the new electronic ignition systems. Tomorrow, we will provide a variety of other advances—such as electronic devices to replace inefficient mechanical methods of fuel mixture, which will cut energy consumption and aid in emission control.

Electronics is creating ingenious new ways to enhance life. And RCA, which helped create the technology itself, is still pioneering the electronic way.

The electronic way

RCA

RCA

30 Rockefeller Plaza | New York, N.Y. 10020

Bulk Rate
U.S. Postage
PAID
RCA Corporation