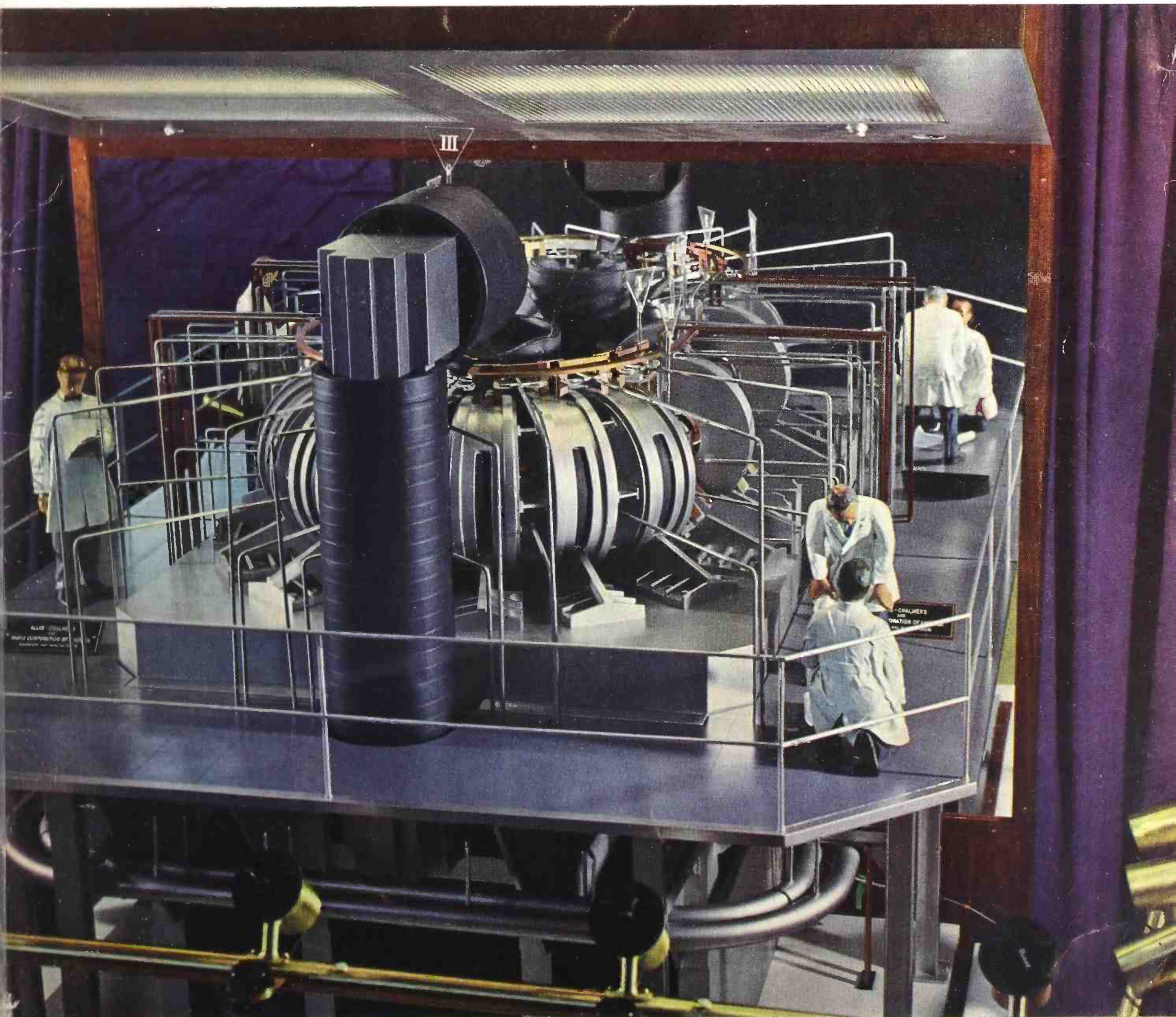




OCT 21 1958

Electronic Age

OCTOBER 1958



STELLARATOR - FUSION POWER

Preserver of Peace...

*It sees...
thinks...
warns...*

BMEWS

SECRET

SECRET

OUR WATCHDOG OF THE FIRMAMENT

BMEWS—Ballistic Missile Early Warning System—is under development to provide a scientific answer to the detection of intercontinental ballistic missiles. In its various functions, it will be one of the electronic wonders of the age. The unblinking eyes of its strategically located radars are being developed to detect an onrushing missile

thousands of miles away. Almost at once electronic computers will determine altitude, course and speed, and set in motion the necessary defense apparatus. RCA acknowledges its tremendous responsibility as prime contractor for the design and construction of BMEWS—so vital to our country's defense and so effective as an instrument for peace.



Tmk(s) ®

RADIO CORPORATION of AMERICA

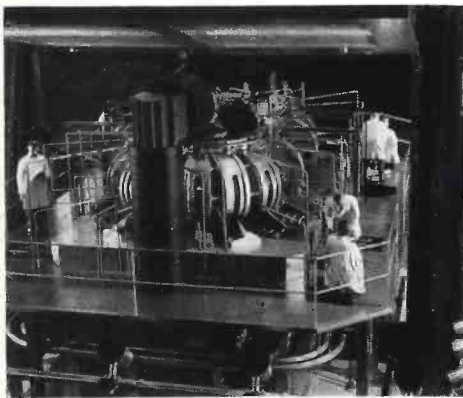
DEFENSE ELECTRONIC PRODUCTS

CAMDEN, N. J.

OCTOBER 1958
 VOLUME 17
 NUMBER 4

Electronic Age

RESEARCH · MANUFACTURING · COMMUNICATIONS · BROADCASTING · TELEVISION



COVER

Model of the Stellarator nuclear fusion research facility shown on the cover was displayed at the recent international conference on the peaceful uses of atomic energy in Geneva, Switzerland. See story on page 24.

NOTICE

When requesting a change in mailing address please include the code letters and numbers which appear with the stencilled address on the envelope.

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New Federal Branch Urged



RCA President John L. Burns addressing 50th Anniversary Conference of Harvard Business School Association.

John L. Burns Proposes Permanent Council on Plans and Policies

LONG-RANGE planning to strengthen America's Cold War defense calls for the creation of a new branch of the Federal Government, John L. Burns, President of RCA, declared on September 6 in an address at the 50th Anniversary Conference of the Harvard Business School Association.

Mr. Burns declared that the need for over-all planning is so urgent that the new body—a Permanent Council on Plans and Policies—should be established immediately by Executive Order, while steps are under way to make it a constitutional agency.

Speaking on "The Businessman and National Security," the RCA President warned that the period just ahead is the "most critical" in our history because "for the first time, we are in danger of nuclear annihilation."

"I believe," he said, "that there is an overriding need for changes in our nation's defense posture—both short-range and long-range. To meet this need will require bold new approaches in many areas, especially on the part of Business and Government as Partners in Preparedness."

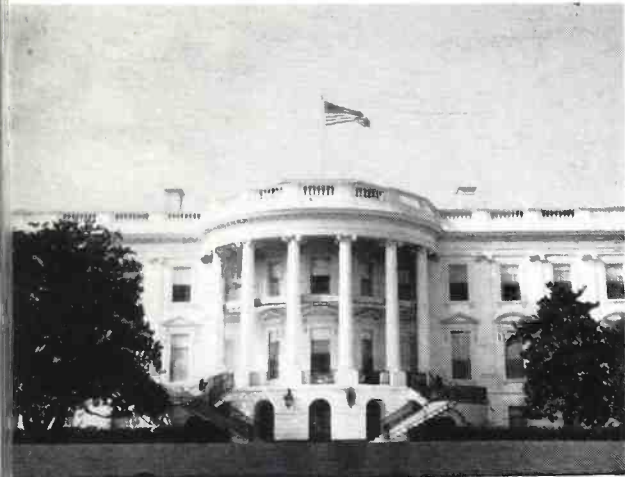
Functions of the Council

Mr. Burns said that because of the permanency of the Cold War crisis and the complexity of the problems inherent in it, this country "must establish far-sighted objectives and plans which will not be affected in a major way by short-term considerations."

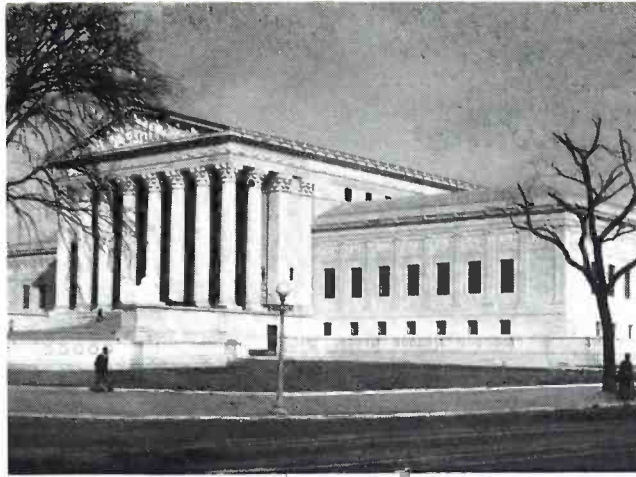
"I believe," he said, "we should establish a fourth major branch of our Federal Government—one that might be called the Permanent Council on Plans and Policies. This new branch—ranking in importance with the Legislative, Executive and Judicial branches—would have responsibility for over-all planning. . . ."

"The primary function of this Permanent Council would be to formulate our long-range objectives, policies, programs and strategy as related to the total needs of the nation. Unlike the other three branches of Government, this new one would look primarily to the future.

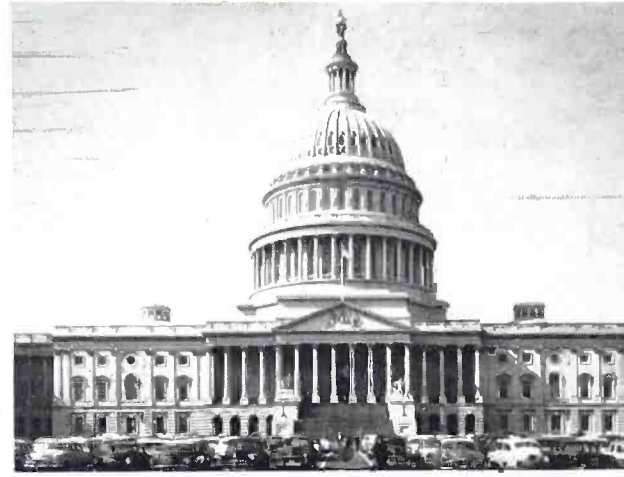
"Although it would have the right only to evaluate programs, to recommend their implementation, and to persuade the other three branches of Government, it is



EXECUTIVE



JUDICIAL



LEGISLATIVE

my deep conviction that, in time, the new concepts and ideas emerging from such a top-level group would stimulate greater leadership and direction at all levels of our society. . . .”

Steps By Business and Government

Mr. Burns listed the following specific steps which he said would “contribute materially to achieving the changes needed in our defense posture:”

By Business:

- Become acquainted to the fullest possible extent with the nation’s military establishment to the end that national security requirements, present and future, are understood.
- Take the initiative in identifying, defining, studying, and solving the problems now facing our military establishment.
- Come up with better equipment and better procedures to meet our military needs.
- Make better utilization of industry’s engineers.
- Make available more and increasingly better scientific, technical and managerial people for service with the Department of Defense and the Armed Forces, and allow them to serve for more than the one-year period that has become standard.
- Offer training programs in technical and managerial skills for military personnel to help develop a better understanding of the way business operates.
- Voluntarily go after cost reduction with resolution, even though it may mean less profit.
- Do the best job possible regardless of any limitations on incentives.

By the Government:

- Devise defense contract terms that will offer genuine incentives for cost reduction, early delivery and peak efficiency.

- Allow defense contractors the reasonable rates of profit which were intended and provided by the law in order to make defense work adequately attractive in a free economy.
- Reimburse contractors for all legitimate costs incurred on a job, instead of ruling out such charges as interest, accelerated amortization of facilities and similar items.
- Encourage business to do independent research and development of its own origination, thereby releasing the great forces available through the decentralization of brain power and genius.

Mr. Burns asserted that in dealing with the short-range threat from Russia, the Government must stimulate and encourage our free-enterprise system.

“In our defense effort,” he said, “we have not taken full advantage of the superb strengths inherent in our free-enterprise system. We have tried to operate with insufficient incentives and with highly centralized governmental control.”

Need for Reducing Lead-Time

Citing a Pentagon study that showed the United States takes ten years — twice as long as the Russians — to conceive and produce air-weapons systems, Mr. Burns declared that both business and Government must “exert every effort” to trim this lead-time.

“Business must be willing to experiment constantly with new techniques and adopt them whenever they can improve on existing methods,” he said.

“Government should give business greater authority and responsibility for making decisions on materials, components and techniques. There have been some encouraging advances in this direction just in recent months, and it is to be hoped that this trend will continue. For one of the prime strengths of the private enterprise system lies in the creativity of individual contractors.”

Upswing in Color TV

RCA's color television push for 1958-59 is gaining momentum in every section of the country. With set sales well above a year ago, more and better color programming, and with a hard hitting sales and promotional campaign off to a running start, the new season shows good promise.

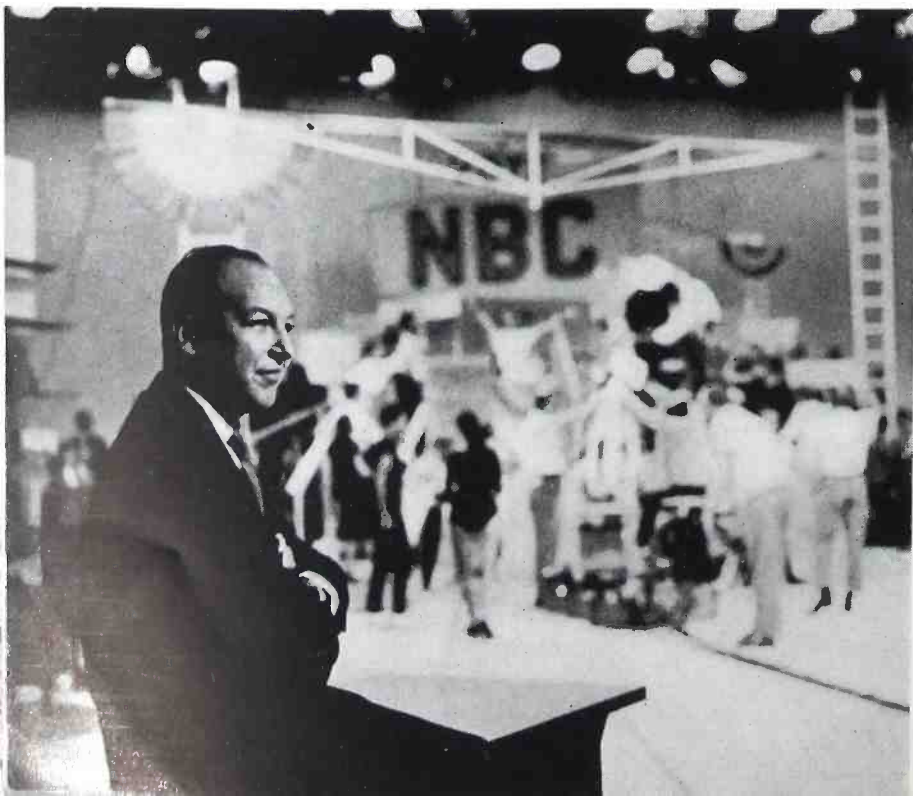
This optimistic report comes from James M. Toney, Vice President and General Manager of the RCA Victor Television Division. Mr. Toney says that sales of color receivers as of the first three weeks of September were twenty-five to thirty per cent above the figure for 1957. During the general business recession of the past few months, color television was the only major product field in which sales forged ahead.

A trade-in program in selected markets has been a factor in upping sales of color sets. In Baltimore, Johnson Bros., a TV specialty store, has scored what *Home Furnishing Daily* called a whopping success with the promotion of RCA Victor's Westcott console and other color models. Reports from other sales areas throughout the country indicate a satisfactory turnover in trade-in sales.

The most extensive lineup of regular color television programming in NBC's history (more than 600 hours of color scheduled for the coming season) is expected to spur color set sales.

Color shows were given special emphasis in an all-star color closed-circuit preview of NBC-TV programs for the 1958-59 season on September 11. The show

Robert W. Sarnoff, Chairman of the Board of NBC, introduced closed-circuit preview of programs.



All controls on RCA Victor's Worthington, including "color" and "tint" can be operated by remote control, the "Wireless Wizard."

was seen by representatives of the press, affiliated stations and advertising agencies in more than 140 cities across the country.

Introduced by Robert W. Sarnoff, Chairman of the Board of NBC, and Robert E. Kintner, President, the show featured fifty top NBC-TV personalities, the largest number of stars ever to perform before NBC cameras on one program.

"It will be a season of greater variety, higher quality and more color than ever before," Mr. Sarnoff said.

In a separate announcement to the press, the NBC Chairman said the schedule had been devised so that color programming will reach the greatest possible number of viewers at the most convenient hours. "There will be color every night and during weekday afternoons," he said, "and a solid two and a half hours of it on Sunday evening alone."

The fourteen regularly scheduled color programs on the network this fall will afford at least one hour of color viewing every night of the week and one hour of color Monday through Friday afternoons. Four of these color programs are new nighttime shows — "Northwest Passage," "Arthur Murray Party," "Milton Berle Starring

In the Kraft Music Hall," and "The Further Adventures of Ellery Queen."

Football games scheduled to be colorcast include two Big Ten contest on October 11 and November 1, the Notre Dame-Iowa contest on November 22 and the Oregon-Miami game to be seen in most of the country on December 6. The World Series games played in Yankee Stadium were seen in color.

Among the "Specials" to be done in color from now until December 31 are: Three Hallmark Hall of Fame presentations, "Johnny Belinda" on October 13 (9:30-11 p.m., NYT), "Kiss Me, Kate" on November 20 (9-10:30 p.m., NYT) and a special Christmas show on December 14 (7-8 p.m., NYT); one Fred Astaire show, on October 17 (9-10 p.m., NYT); two of the Bell Telephone series, "Gateways to the Mind" on October 23 (8-9 p.m., NYT) and "The Strange Case of Cosmic Rays" on November 23 (6-7 p.m., NYT); one program in the Shirley Temple Storybook series, "Mother Goose" on December 21 (8-9 p.m., NYT).

An Advertising First

Six million American homes will be on the receiving end of one of the most effective ads in RCA Victor's history when they receive the December 1 issue of *Life*. Said to be an advertising first, the display will feature a full-color center spread, holding a 12-page catalog-type shopper's guide.

The full-color detachable booklet describes eighty-four RCA Victor products, black-and-white TV, color TV, radios, "Victrola" phonographs and records.

Promoting color television among the men who directly market color receivers, RCA during September conducted 148 dealers from its southwest region on a three-day tour of eastern manufacturing facilities, laboratories and NBC's colorcasting operations.

The response from this specially selected group, made up of the leading color dealers in the area, was overwhelmingly enthusiastic.

The dealers were first taken on a tour of the tube plant in Lancaster, Pa., where they saw a demonstration of color reception and were given the details of the various types of color kinescopes.

Most impressive point the demonstrations brought home to the dealers was the fact that color sets have been vastly improved, are easier to handle, cost less to service, and offer opportunities for greater profits.



Perry Como was one of fifty top NBC-TV entertainment personalities in a preview of coming programs.

Color TV-Stereo Promotion

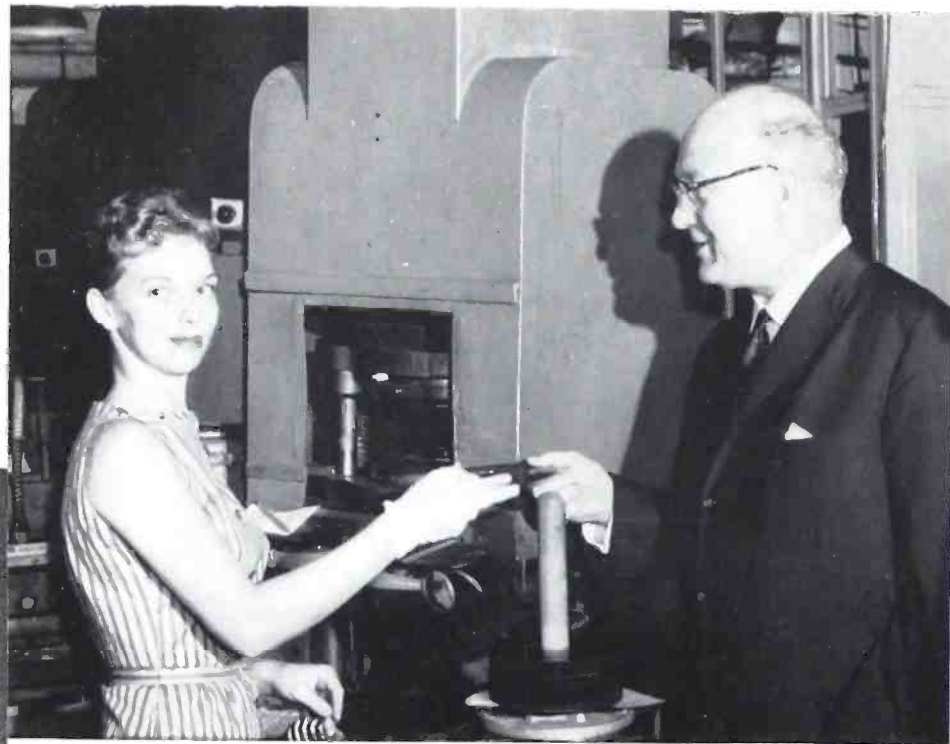
The effectiveness of color reception will be highlighted in a radio and TV demonstration on October 21 of color combined with stereophonic sound. On that date the George Gobel Show in black-and-white will be simulcast nationally over the NBC radio and TV networks to an estimated forty to fifty million viewers.

A special triple gatefold advertising insert in the October 18 issue of *TV Guide*, which features a four-page, full-color photo of one of the scenes in the show, will be one of the cardinal props of this audience-participation promotion. At a certain point in the show the action will be stopped at exactly the scene portrayed in the *TV Guide* insert. Viewers will be asked to place the insert over the bottom half of their TV screens for a demonstration of the tremendous difference color makes. The top half of the screen will be in black-and-white, the bottom half in color. Stereo effects will be gained by sound reception on both TV and an AM radio.

The color TV advertising campaign for the season got under way during September with four-color ads in *Sports Illustrated*, *Time*, *Sporting News* and *The New Yorker*. These ads were built around colorcasts of outstanding sports events, such as the World Series, and the theme of "See the Difference Color TV Makes."

To support the color campaign among college football fans a separate promotion kit for in-store use, consisting of sixty-inch streamers with four football posters has been prepared. Dealers will give out a special football handbook full of gridiron facts and history. Autographed baseballs were furnished dealers for World Series fans.

PLANT INSPECTION TOUR



A tour of RCA's midwestern plants has been completed by John L. Burns, President of the Corporation. He was accompanied by R. A. Seidel, Executive Vice President, Consumer Products, and the Vice Presidents and General Managers of the RCA Victor Television Division, and the Radio and "Victrola" Division.

The group inspected manufacturing facilities for television receivers, phonograph records and electron tubes in Indianapolis, Ind.; the television plant in Bloomington, Ind.; the plant in Cambridge, Ohio, which turns out record players, radio receivers, tape recorders and parts fabrication; and the facilities in Findlay, Ohio, for making television deflection yokes and components, ferrite products and transformers.

Miss Mary Roberts, press operator in the Indianapolis plant, hands Mr. Burns one of some 80 million records being produced at the plant during 1958.

OPPORTUNITIES IN ELECTRONICS

THE OPPORTUNITIES afforded by a career in electronics were outlined by Martin F. Bennett, Vice President, Merchandising, RCA, to the 1958 graduating class of RCA Institutes at ceremonies held on August 8 in the auditorium of the School of Education, New York University. One hundred ninety-seven students received certificates from the Institutes, which during the coming year will celebrate the fiftieth anniversary of its founding.

"It must be very apparent to you," Mr. Bennett told the graduates, "that few fields of science offer such diversity for the application of the talents of youth. No one, of course, can hope to cover the entire range of electronics. Your best bet is to select the area in which you are most interested and concentrate on that—whether it be industrial TV, electronic computers, radio, television, radar, semiconductors, solar energy or nuclear electronics."

Mr. Bennett stressed the career opportunities in the television field in industry, in education, in space exploration, and national defense.

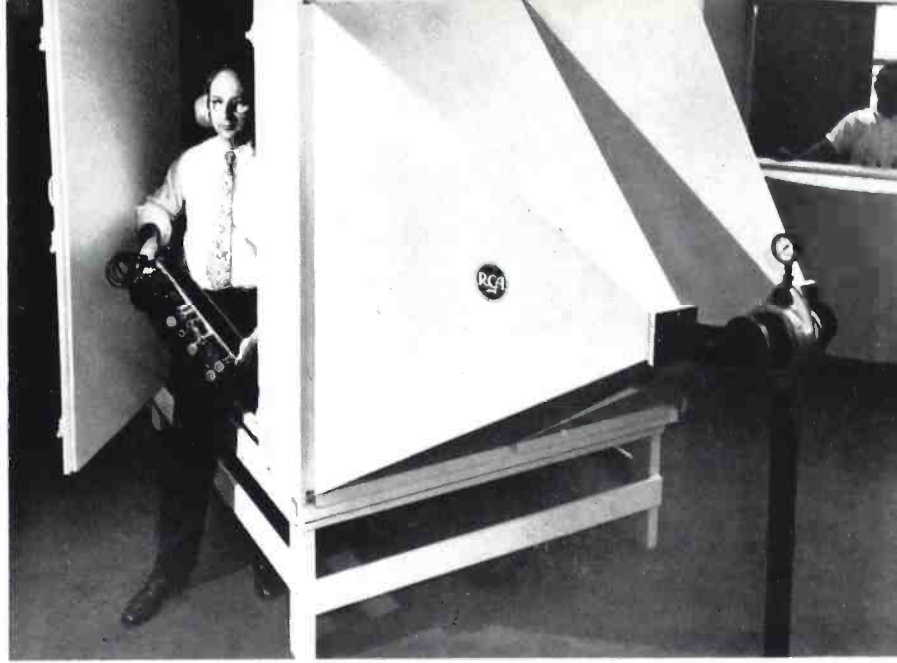
"You are all aware, I am sure, of the vital significance of electronics in our national defense," he said. "That field in itself will continually call for engineers, tech-

nicians and servicemen. Electronics provides the nerves, the voice and vision of modern military, naval and air force installations. Man, however, still has the responsibility of thinking; electronics simply relieves him of details and routine and speeds his work."

Mr. Bennett said that only recently RCA had organized a completely new division to handle the problems of astro-electronics, which in the future would offer a tremendous field for growth. In the field of atomic energy, he said, electronics will offer further opportunities for the engineer, technician and serviceman.

"Many other new ideas," he said, "are being tested and developed in our Laboratories, among them—electronic air conditioners, electronic light amplifiers and an electronic traffic control system for highways. A visitor to the Laboratories is always amazed at the innumerable developments under scrutiny, and we may be sure that many of them will open up new avenues of research and commercial applications as did the electron microscope and electronic tape recorders. I am sure that you have all heard of stereophonic sound which already has demonstrated its revolutionary effects in the field of recorded music. Stereo disks and stereo tapes are opening a new era in music realism."

World's Biggest Noise



RCA's CAL was developed to test the effect of high intensity noise on electronic equipment.

RCA engineers produce what they believe to be the loudest controlled sounds ever contrived

IN A sprawling red brick building close by the Camden bank of the Delaware river, RCA Industrial Electronics Products engineers have developed an instrument that they believe will produce the loudest controlled noise in the world. It is the RCA Compressed Air Loudspeaker or CAL.

The RCA researchers haven't yet had an opportunity to turn the CAL loose in full cry, but they are certain the dual-horn noisemaker can throw the human voice ten miles or more and out-shout 450 conventional loudspeakers.

The engineers didn't put CAL together out of a sheer love of bedlam. They were motivated by a need to produce higher intensity noise levels than ever before in order to test and develop sensitive electronic equipment for the jet and space era.

Standard electronic instruments cannot withstand the terrific noise levels attained in today's jets and rockets. Extreme noise plays havoc both with humans and the instruments they carry or send aloft at supersonic speeds.

In the case of the human body, the sound levels attained at the wingtips of a jet plane cause a vibration that reaches unbearable proportions. The same noise intensity can shatter electronic or mechanical equipment, or cause malfunctioning. A radar unit or altimeter without proper protection against such buffeting can give pilots and ground observers false information.

RCA began experimenting in acoustical test engineering thirty years ago. Out of those experiments came a high intensity noise testing system, using electrical power alone.

By means of banks of loudspeakers and a soundproof chamber, the RCA engineers were able to create "in flight" noise for most test applications in the pre-jet and pre-space period.

As a comparison, an elevated train has a noise level of about 100 decibels. But the difference of forty-five decibels doesn't tell the whole story. A sound of 110 decibels is ten times louder than one of 100 decibels, a sound of 120 decibels is ten times as loud as 110 decibels and so on.

With the coming of more advanced modes of aerial travel, the engineers searched for a bigger noise source that didn't involve complicated and bulky test systems.

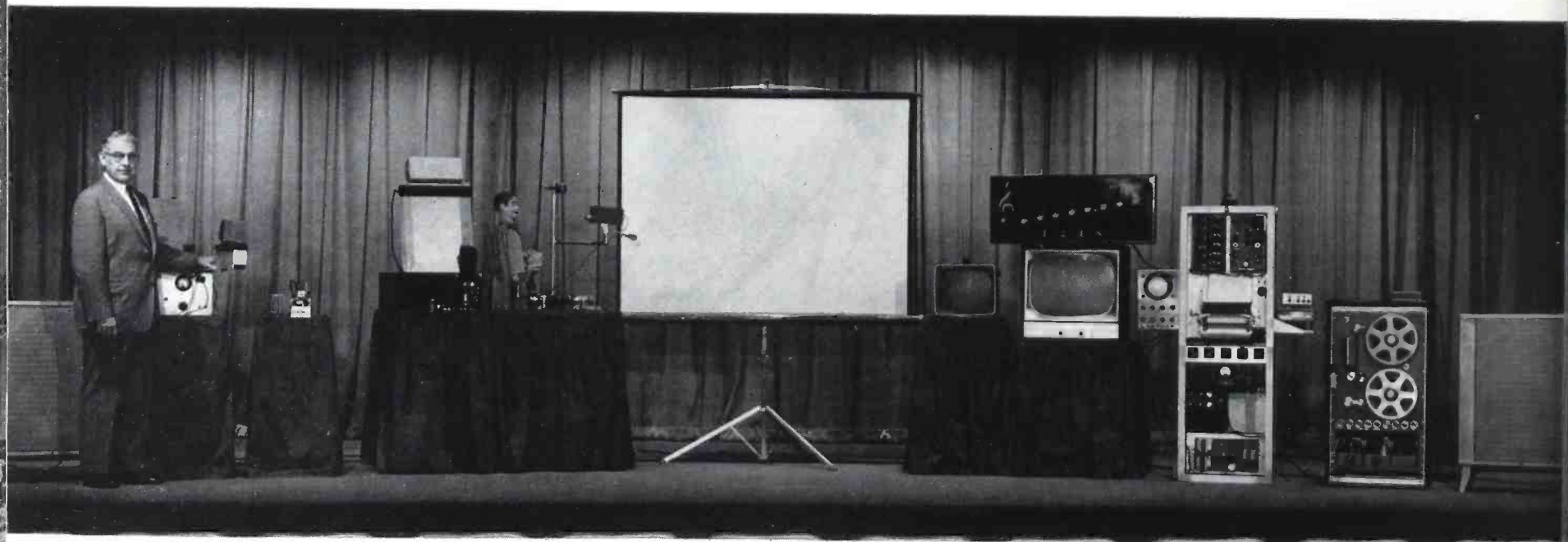
In their search, they turned to compressed air—in effect taking a page from the book of the small boy with a lungful of air and a gap between his teeth.

In the developmental stage, CAL consists in large part of a plywood box, five feet by five feet by six feet, eight inches. Projecting from one end of the box, the horns resemble a pair of overturned pyramids. Attached to the tip of each is a metal pipe extending out to CAL's "plumbing system," the compressed air source.

Drawing on an electrical power source of only 180 watts, CAL produces an output of 3,600 acoustic watts when the transducer is supplied with air at thirty pounds per square inch, 170 cubic feet per minute. To achieve the same sound level in the old type noise maker, a power source of 18,000 watts would be required.

The RCA CAL, with its ten-mile range is expected to find employment at jet airfields, on the flight deck of jet-age aircraft carriers, in industrial plants where there is a high noise level, and in civil defense work.

Scientist with Seven-League Boots



*It takes a lot of doing to transport the RCA story
and 1,400 pounds of luggage 30,000 miles a year*

by Cyril N. Hoyler

Manager, Technical Relations, RCA Laboratories

THE TRAIN had come to a halt at a railway siding somewhere in Utah. Looking out the window I thought the place looked vaguely familiar, and suddenly I knew where I was. Four or five years before I had gotten off a train here for one of my demonstration lectures at a nearby college.

I strolled up the aisle to the door and stood looking out at the gray landscape. A railway laborer was standing on the tracks, leaning on a sledge hammer. All at once he straightened up and walked over to the bottom of the steps. "Hi," he said, grinning amiably.

I didn't recognize him but I knew what was coming. "Where have we met before?" I asked.

"Aren't you the fellow who came through here a few years ago with all those heavy black boxes?" he asked. Obviously, he had been one of the men I had recruited to help me unload my demonstration luggage.

"Yes," I said, "and if you'll look in my drawing room you'll find that they're still with me."

In a decade of travel in every part of the United States and Canada putting on demonstration lectures for the RCA Laboratories, I've met quite a few railroad

men. And always, they remember me as the man with "the heavy black boxes."

Fourteen hundred pounds of luggage, divided into twelve to fifteen separate items, add up to a headache in any traveler's language. And, when that luggage includes extremely delicate scientific equipment, such as color television tubes, it calls for the tenderest care.

Almost all of my journeys are by train or in a three-quarter-ton panel van. The van in many ways has advantages that train travel cannot match. With the van we can go direct to the lecture hall and unload at our own leisure. Getting 1,400 pounds of luggage into and out of train drawing rooms day after day on a four-week tour, with frequent changes of train, having it transported from the station to the hall, then, after the lecture getting it repacked and on the next train is no joke. It takes tact, careful planning, brass and an abundance of the folding green for the redcaps. I've grown used to handing out dollars like handbills to a line of redcaps or porters.

The purpose of all my travels is to dispense serious information in an entertaining way about the activities and achievements of the RCA Laboratories. You might call it technical public relations at the semi-professional level, with the aim of promoting goodwill in the academic and professional community.

My audiences are engineering students in colleges and universities, professional engineering societies such as meetings of the Institute of Radio Engineers and American Institute of Electrical Engineers and, occasionally, even a "sewing circle" group.

I slid into a lecturing career gradually. During the war, while I was still a research engineer, I was sometimes asked to escort technical visitors around the RCA Laboratories and explain the work then underway. Later

I accompanied many leading RCA scientists and engineers on demonstration-lecture tours, and also did recruiting of technical personnel at universities all over the country.

Dr. E. W. Engstrom, Senior Executive Vice President of RCA, suggested that the part-time lecture arrangement evolve into a full-time function and I've been hard at it ever since.

We try to arrange a series of lectures, one or two days apart, in a particular region of the country. My next tour, in the south, begins at the University of North Carolina in Raleigh on October 6 and winds up on November 5 in Knoxville, Tennessee. There are eighteen speaking engagements in North and South Carolina, Florida, Alabama, Mississippi, Georgia and Tennessee.

My show, which is currently presented under the general title of "Electronics in Solids, Space and Sound" usually consists of six to eight demonstration pieces, each illustrating the basic electronic facts about an important development of the RCA Laboratories. As these devices are brought more and more into general use, I replace them with later developments in electronic technology. For instance, the main feature of my presentation for several years was a demonstration system showing in detail how color television works. Now that the principles of color television are widely known among engineers, and academic courses in the subject are available, I have replaced that demonstration with other developments, such as all-electronic refrigeration, Electrofax, the music synthesizer, electroluminescence and light amplifiers, the transistorized TV camera, and a discussion of astro-electronics and electronic highways.

I've no idea of the total mileage I've covered in my tours throughout this country and Canada. In an average year I deliver about sixty lectures from coast to coast.

Mr. Hoyer travels an average of 30,000 miles a year, delivering some sixty lectures from coast to coast.

Months of preparation precede Mr. Hoyer's tours and he keeps a carefully prepared record of each.



My tours usually last two or three weeks but occasionally one will stretch into five or even six weeks. Four or five such tours a year will add up to approximately 30,000 miles in travel.

I guess it's the ham actor in me, but I *like* to stand up before an audience and talk. And, although I present virtually the same material in lecture after lecture, I vary the presentation every time. It's amazing how often you can come up with a newer, simpler and more original way of presenting an idea that you thought you had down pat from a dozen previous lectures.

For more than a decade, Cyril N. Hoyler has been criss-crossing the country with the gospel of electronic progress being achieved at the David Sarnoff Research Center of RCA, Princeton, N. J. Although a research engineer in RCA Laboratories during the war, he offered little resistance to suggestions that he take to the lecture circuit to carry the story of RCA's outstanding developments in electronic technology to schools and engineering societies. A highly stimulating encounter with college dramatics during his undergraduate days may have contributed to this decision.

Born in Edmonton, Alberta, Canada, Mr. Hoyler graduated from Moravian College at Bethlehem, Pa., in 1928. He received a Master of Science degree in physics from Lehigh University, and in 1957 the professional degree of Electrical Engineer.

Before joining RCA in 1941, Mr. Hoyler taught school in New Jersey, and was later instructor, then professor and head of the Physics Department at Moravian College. He is a Senior Member of the Institute of Radio Engineers, and a member of the American Institute of Electrical Engineers and Sigma Xi.

Mr. Hoyler lives at 183 Hamilton Avenue in Princeton with his wife and three sons. The oldest son, Carl, is a senior at the University of Pennsylvania, where he is pursuing a pre-med course. He is active in campus activities, which include the presidency of the dormitory council. Bob entered Cornell University this fall with a 5-year scholarship in electrical engineering, after receiving the RCA prize at Princeton High School for the outstanding senior in science and mathematics. Dave is in grade eight and has not developed any major interest except to lure fish out of nearby Carnegie Lake.

Knowing how to capture an audience and holding its attention throughout the evening is the key to success in the lecture circuit. On one of my tours I started off my talk with an anecdote, the punch line of which coincided with a light flashing on one of the demonstration pieces. If that light brought a big laugh I knew I had that audience for the evening. Once, I was telling this warmup anecdote to an impressive audience in Seattle, a group with which I very much wanted to achieve rapport. I came to the point of the story and pressed the light button. There was a dead silence. It was a shattering experience and I now know how an actor feels when his big scene falls flat. I was sure I had lost them—until I happened to notice that the light was not plugged in. A quick recapitulation of the point of the story, with the light working, brought that welcome burst of laughter and the evening was made.

One of the high points of my lecturing career took place in Toronto. Having been born in Edmonton, Alberta, I always enjoy going north of the border and seeing old friends. On this occasion I was asked to address the Royal Canadian Institute, which is composed of Canada's leading scientists and researchers. The affair was held in a huge circular auditorium, and every seat was filled. I was escorted to the dais by the president of the Institute, followed, in solemn procession by the board of governors. The audience arose as we entered and sang "God Save the Queen." On the spur of the moment I began my lecture with, "Fellow Canadians—". That audience was with me all the way and it was one of the most moving experience of my career.

Crossing the Canadian border is usually a routine matter but occasionally you run into a regulation-minded customs officer who insists on inspecting every item of your luggage. My driver-helper, Harry Yeatts, was once returning from Ontario where we had put on several demonstrations. I had traveled on ahead and Harry was to meet me in Cincinnati. It was sub-zero weather and late in the afternoon when he drove up to the customs barrier. The official thought he might have caught an illegal exporter of Canadian merchandise. He ordered Harry to unload every item to make sure they were of United States manufacture.

"You'll have to give me a hand," Harry said. "They're too heavy for one man to handle." The first item the two of them wrestled off the truck weighed well over 100 pounds. The customs man took one look at the fourteen remaining pieces and had a quick change of mind. "Okay," he said, "you're cleared."

It takes six to eight months to put together a demon-

stration piece for my lectures. We can't just take, say, a color television receiver out of stock and set it up on a lecture platform. One of my chief exhibits, the music synthesizer, was fabricated out of an old typewriter, circuits especially built by the lab technicians, carefully machined parts and commercial components.

You may wonder why I don't just check all that luggage through and let the railroad worry about it. For one thing, as I've mentioned, it's extremely delicate equipment and baggage car porters are not noted for their delicacy.

Once, I did check my equipment on the baggage car and it was a near catastrophe. One of my colleagues and I went to Montreal several years ago to put on a lecture and demonstration of color television. I had some misgivings about putting that kind of delicate equipment in the baggage car, and sure enough when we reached Montreal the color tube was broken.

This was in the days before color receivers were in production and the only replacement for that tube was an experimental one from the RCA Laboratories in Princeton. We called the lab and they sent Harry Yeatts shooting across New Jersey to La Guardia field with a replacement. We got the tube just in time, and

I've never checked my equipment on a baggage car since.

I must say, though, that the railroads have been more than cooperative on all of my travels. Before starting on a tour through the Pacific Northwest several years ago I wrote a letter to the traffic manager of the Chicago and North Western Railway Co. explaining my difficulties in transporting my equipment. A very courteous letter came back in a few days promising the railroad's cooperation. I saw what he meant by cooperation when in every station along the way there was pinned on the bulletin board a special order asking all personnel to "give Mr. Hoyler every assistance."

Occasionally, people ask if my family objects to my being away from home twenty or more weeks out of the year. The answer is that sometimes they do. Every so often my wife will say: "Why did you have to go and get tied up in a traveling job? Why can't you stay home and raise beautiful flowers, like so-and-so."

I have a stock answer for this. "My dear," I say, "I'll bet that every now and again Mrs. so-and-so will say: 'Why can't you have an interesting job like Cyril Hoyler? Those fascinating trips! All you ever do is stay home and raise flowers.'"



General Sarnoff at Marconi Tomb

During his recent visit to Italy, Brig. General David Sarnoff, Chairman of the Board of the Radio Corporation of America, placed a wreath at the tomb of Guglielmo Marconi in the village of Bologna, birthplace and home of the wireless inventor. The two men were close friends over a long period of years. Marconi died on July 20, 1937.

Paar's 'Paartisans'

Elsa Maxwell's ad lib interchanges with Paar have provided columnists with a wealth of material, and touched off a much-celebrated feud with Walter Winchell.



5 million people regularly watch an inspired comic "defend himself" on the "Jack Paar Show"

AS CLOCKS tick into the late-evening hours across the U. S., an estimated 5,000,000 people stop whatever they're doing to look at Jack Paar. Beamed from 115 television stations on the NBC network, "The Jack Paar Show" has won unprecedented popularity for the old "Tonight" time period and made its star the most talked-about TV personality of the year.

In bars, conversation slows down . . . beers get warm. In living rooms, husbands who have been drowsing through a "B" movie perk up and pour a cup of coffee as Jack Paar comes on the stage of the Hudson Theatre in New York.

In bedrooms, "Lolita" is laid aside . . . bedlamps are snapped out . . . pillows propped up . . . Jack Paar is on.

Regardless of the locale, the situation is basically the same. The same expression of expectancy appears on the face of each viewer. "What's he going to do tonight?" "What new talent and what unusual characters is he going to present?"

Next morning in ad agencies on Madison Avenue, in gas stations in Chicago, in grocery stores in Kansas City, viewers with blood-shot eyes swap notes on the latest Paar bon mot, the latest exchange between Paar and Zsa Zsa Gabor or Cliff Arquette, or the fractured English of French singer Genevieve or Cuban-born pianist Jose Melis.

There have been those well-intentioned citizens who have said to themselves, "I'll just watch the first half hour . . . then I'm going to bed." This is fallacy! For the pull of Paar is a mighty pull and Mr. Viewer is stuck. Stuck until Jack Paar and the network release him at one in the morning, New York time.

Paar has a soft-spoken manner and easy delivery, coupled with a disarming boyishness. Once he was a wise-cracking GI, cutting officers to ribbons with his stinging wit during camp shows in the Pacific. Now he is a network personality who brings out the motherly instincts of his female viewers, and is the sympathetic

comrade of every other American male who is confused by women and has trouble with crab grass.

Once he worked in low-budget movies, disk jockey shows, and daytime TV shows with low ratings and few sponsors. Now as a king-pin of nighttime TV, he has more sponsors, more viewers, more stations carrying him than any of his predecessors. And his success has driven rival stations to revise their late-night programming.

Self-Defense

Paar's formula: "I just come out here for an hour and forty-five minutes and defend myself." While applying his formula, he has given new talent a chance, and old talent a reprieve.

Muscular singer Danny Scholl was on his way out of show business when Jack brought him on the show. His phenomenal reception by the studio audience and home viewers prompted recording and club dates, and Scholl is once again on his way up.

Few people north of the Mason-Dixon line ever heard of comic Dave Gardner, whom Jack calls "The Wild Man," until he appeared on "Tonight." Now, with an NBC contract, Decca recordings and nightclub offers pouring in, Gardner is moving toward stardom.

Dody Goodman became a celebrity under Jack's guidance. Hans Conried, Peter Ustinov, Hermione Gingold and Genevieve have all contributed bright conversation on "the panel." And Elsa Maxwell's ad-lib conversations with Paar have given TV columnists a wealth of material and touched off a much-publicized feud with Walter Winchell.

Jack's success has put him on the cover of *Time* and other top magazines. He has been "Person to Person-ed" by Ed Murrow, and guest starred on many of the other top network shows.

Radio-Television Daily's 16th annual poll named Paar as "Man of the Year," and "Tonight" as "Best Comedy Show of the Year." "Tonight" was named "Best Novelty Show of the Year" by *Look* and "Outstanding Comedy Series of the Year" in the Sylvania Awards.

But Paar has taken easily to success, and is the first one to admit it if something goes wrong. After one Miami Beach origination, beset by bad weather and technical difficulties, Jack quipped, "I don't know whether last night's show was bad or not, but when I called for room service this morning, the guy told me to come and get it myself."

Perhaps his highest tribute was paid recently when a bleary-eyed man stopped Jack in a hotel lobby, and pointing to the dark bags under his eyes, said irately, "Thanks a lot."



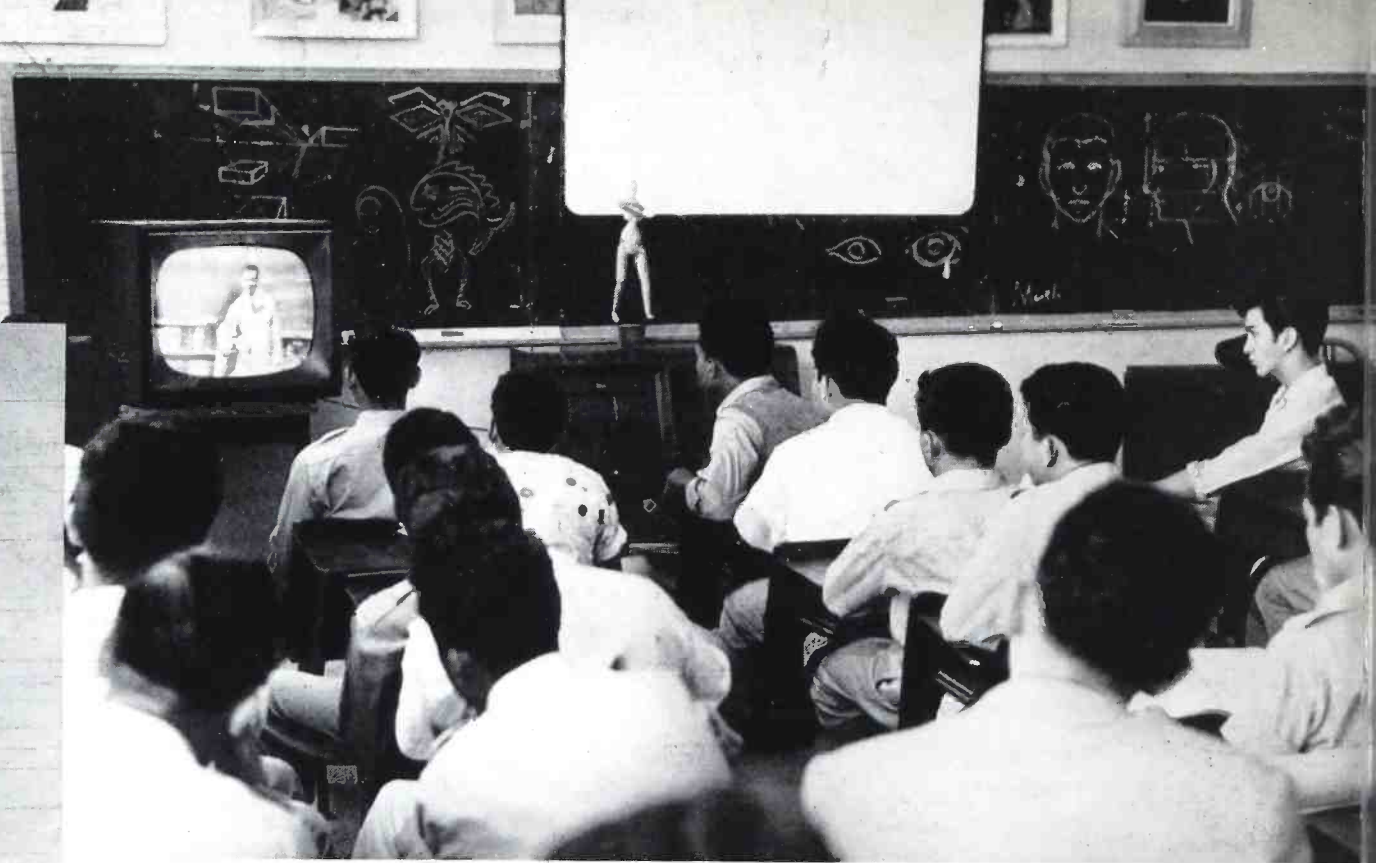
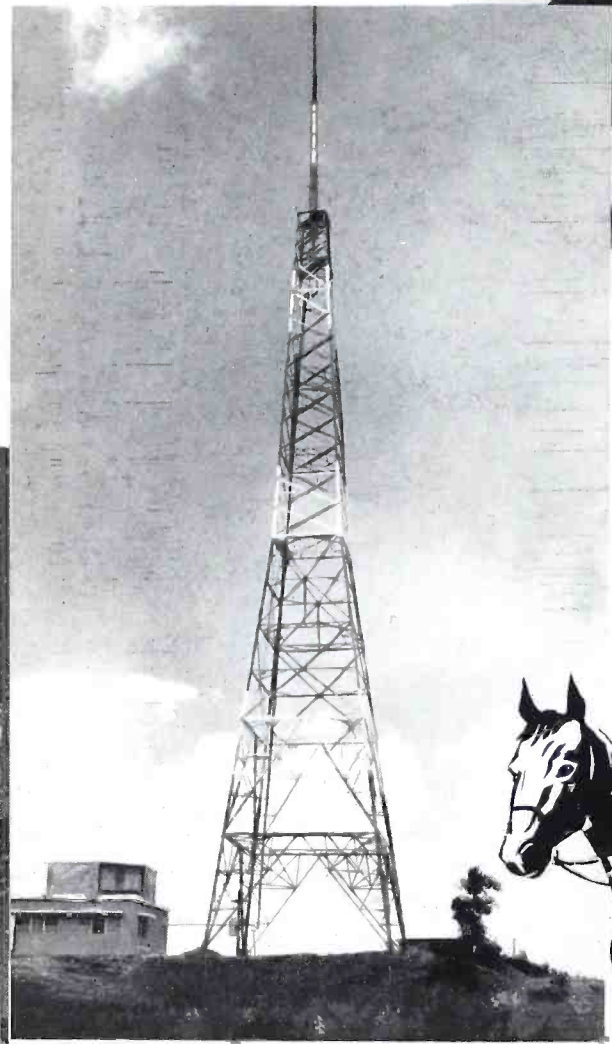
Many top stars appear again and again on the "Jack Paar Show," such as Hermione Gingold.



French singer Genevieve and Cuban-born pianist Jose Melis are frequent guests.

Paar, shown with Genevieve and comedian Cliff Arquette, was once a GI entertainer in the Pacific.





Venezuela has pioneered the use of instruction by television in the classroom. Government now plans to introduce medium into all primary and secondary schools.



TV Teaching - *'South of the Border'*

IN TWO LANDS "south of the border" — Puerto Rico and Venezuela — teaching by television is now an accepted part of the educational program. The success of these experiments is attracting visitors from all over Latin America, where inadequate school facilities and a shortage of qualified teachers makes educational TV seem like an ideal solution to a heretofore insurmountable problem.

Puerto Rico

Delegations of observers from foreign countries are an old story in Puerto Rico. For years visitors from all over the world have journeyed to the island to observe the Puerto Ricans' efforts at self-betterment, at government-directed plans for industrialization, public health and education schemes, all aimed at raising the general

standard of living and at relieving the age-old poverty of the island people.

The success of what is said to be the world's most powerful television station devoted exclusively to educational broadcasts has brought fresh streams of visitors to Puerto Rico. Inaugurated early this year, WIPR-TV in San Juan has been the focal point of study by delegations from India, the Philippines, Pakistan, most of the countries of Latin America and many others.

WIPR-TV is equipped with a 25,000 watt RCA transmitter, located near San Juan, and has the most modern studio equipment, including five RCA cameras, projectors for 16- and 35-mm films, and a mobile unit for remote telecasts.

The entire project is directed by the government's Department of Public Instruction and it does not com-

pete in any way with the commercial TV stations in Puerto Rico. No advertisements of any kind are permitted.

The programs presented on WIPR-TV introduce a wide assortment of cultural and entertainment material into Puerto Rican homes. Direct instruction courses for credits are telecast in the evening hours, aimed at high school students, adults enrolled in night schools and adults who have had a ninth grade or equivalent education. These courses include mathematics and the sciences at the high school level. A course in conversational English is aimed at islanders planning to emigrate to the United States.

"La Hora del Nino" ("The Children's Hour") uses films and puppets to present instructional material on social activities, family relations, care of pets, geography, reading and English. "Estudio Musical" is a music appreciation course presenting popular, opera, classical, religious and folk music.

The home is spotlighted in the daily program "Esta es su Casa" ("This Is Your House"), which dramatizes the care of children, gives cooking demonstrations and lectures on hygiene, dress design, dress making, budgeting and other home topics.

"Ask the ABC" is a weekly information program presenting three professors from the University of Puerto Rico. "La Ultima Hora," the final program each day Monday through Friday, presents local and international news, including sports and stock market reports.

About forty per cent of the material presented originates live in WIPR-TV's two studios. The balance is on film, some of which comes out of NBC's educational television library.

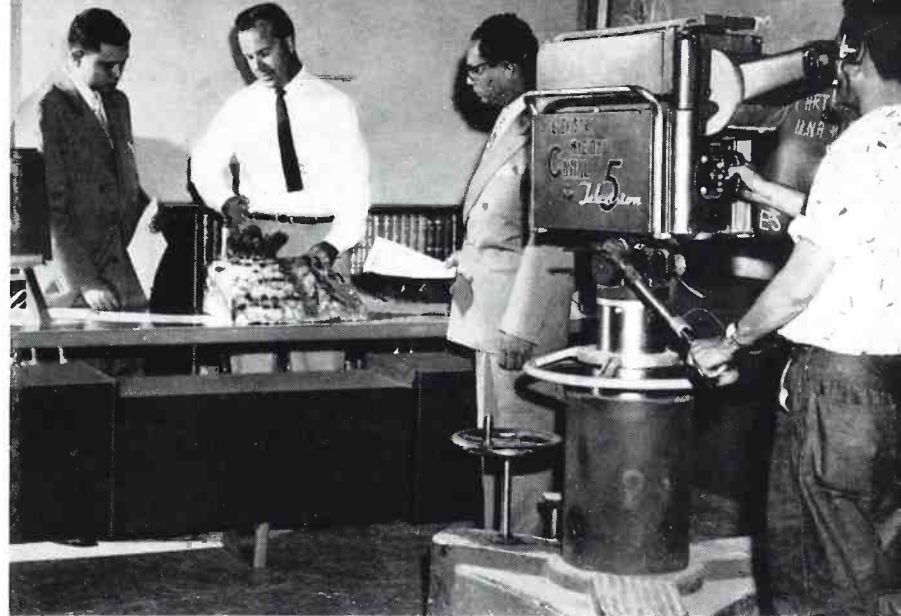
At the opening ceremonies for the new station, Puerto Rico's Governor Munoz Marin declared that these television facilities were dedicated to the people and culture of Puerto Rico and to the broadening of the understanding of man.

Venezuela

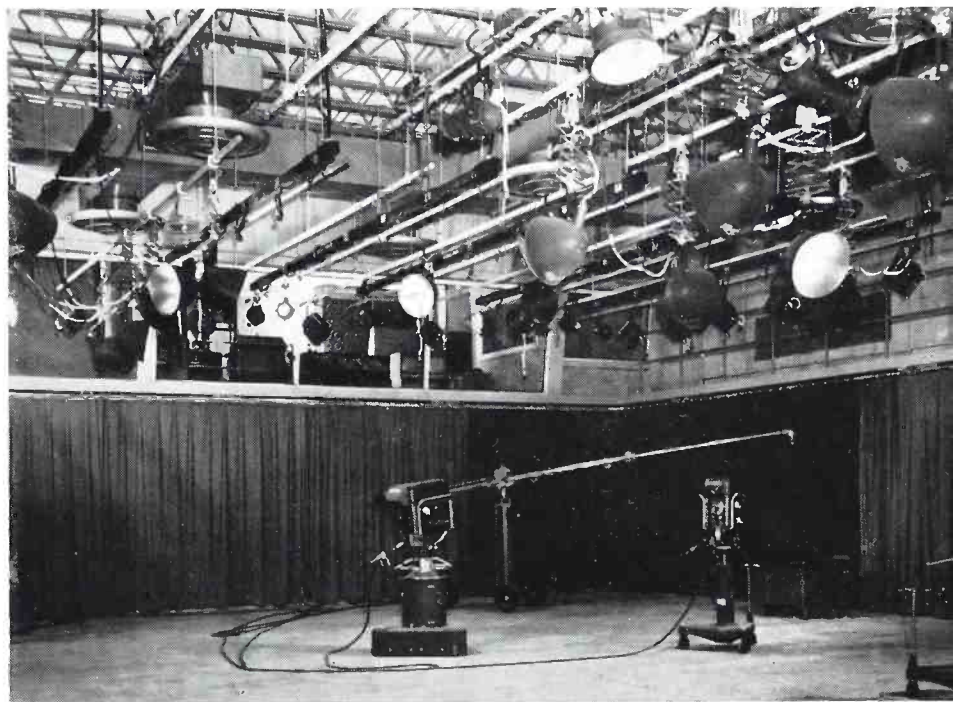
Whereas in Puerto Rico the main effort so far has been on educational television programs beamed directly into the home, Venezuela has pioneered the use of the medium in the classrooms.

Experimental in-class television in Caracas was so favorably received that the government plans to introduce educational TV nationally in all primary and secondary schools.

The quick acceptance of educational TV resulted from a five-month study carried out by the Venezuelan National Commission for Educational Television followed by a two-week demonstration of broadcasts to selected schools in Caracas. One-hour courses in biology,



One-hour courses in biology, chemistry, mathematics, sociology and teacher training were offered in preliminary experiments in selected schools in Caracas.



WIPR-TV in San Juan has the most modern studio equipment, including five cameras and a mobile unit for telecasts in remote areas of Puerto Rico.

chemistry, mathematics, sociology and teacher training were seen daily by students, teachers and the general public.

The educational television project in Venezuela is under the direction and control of the government's station YVKA-TV, Televisora Nacional. All transmitting equipment, cameras and receivers were installed by RCA.

In both Puerto Rico and Venezuela, the educational television techniques developed in the United States have been adapted to meet local conditions. Instructional materials, films, documentaries and so on have been furnished by private organizations in the U. S.

VARIETY

CALLS IT:

'A HUSTLING, HEADS-UP OPERATION'

by Arthur W. Hepner, NBC News

WHEN THE crisis erupted in the Formosa Strait, and when the Marines landed in Lebanon, *NBC News* carried the story first to every spot and cranny in the United States; when Soviet Marshal Zhukov was demoted, when the Little Rock school crisis hit the headlines, when earth satellites zoomed into orbit, *NBC News* was on top of each development and carried the story in full to the entire country.

Take a case in point:

It was early Sunday, August 17, 1958. The earth and moon were just right. The sky was clear at Cape Canaveral, Florida. The stage was set, the countdown neared completion. The Air Force was ready to try for the moon.

One day before, the public had learned that it could have a front-row seat for this history-making attempt.

Poised to follow the recent moon shoot, NBC cameramen are reminiscent of the Marines raising the flag on Iwo Jima.



NBC News announced it would report the event on television and radio almost as it happened. Once more, *NBC News* planned to be first — and it was.

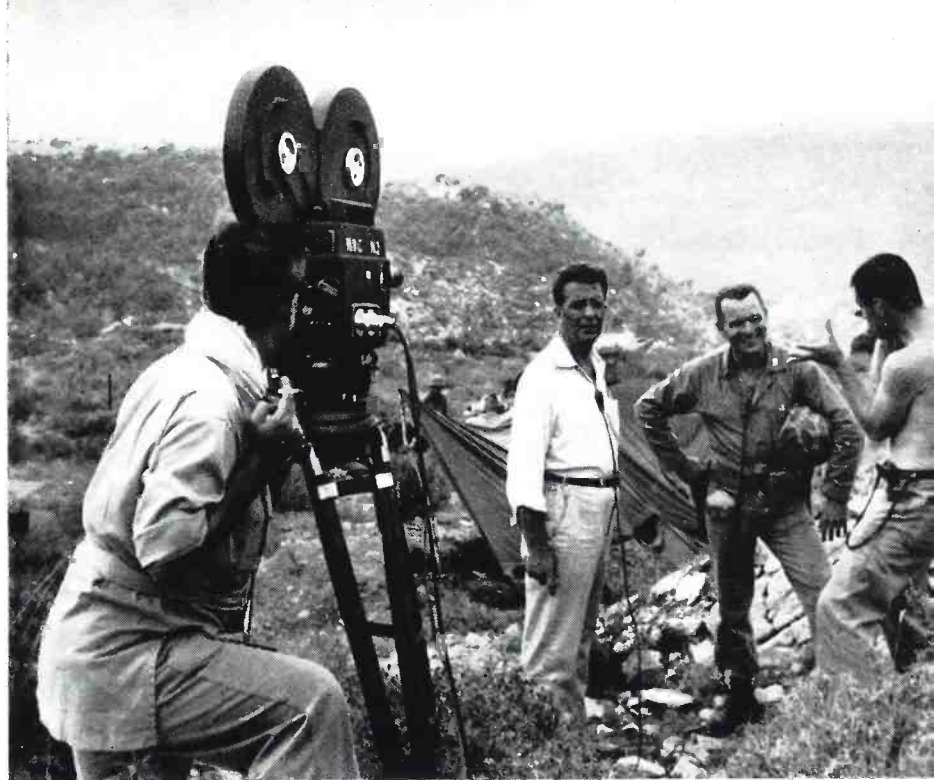
Even before blastoff, its live TV cameras began coverage. From Cape Canaveral, they fed pictures all across the continent to videotape recorders at NBC studios in Los Angeles. At the same time an open phone line from the Cape led into Radio Central, New York.

At 8:18 a.m., Eastern Daylight time, the command, "Ignition," sounded. In a cloud of white flame and smoke the Thor-Able rocket and its lunar-bound cargo took off in full view of the *NBC News* reporters and cameramen. One minute later, a radio bulletin announced the firing. At 8:21, live cameras at NBC New York focused on Correspondent Frank McGee, telling the facts so far and advising that NBC would be switching in moments to Hollywood for the first pictures of the launching.

At 8:26, less than ten minutes after the rocket was fired, NBC audiences could watch it all — the final seconds of the countdown, the firing, the ascent, and then that moment of frustration when the rocket blew up in space only seventy-seven seconds following takeoff.

NBC News had the only live record of the occasion, providing immediacy of both time and quality. While others awaited processing of film, *NBC News* presented two half-hour programs on the attempt to probe the

When President Eisenhower addressed special session of U.N., NBC-TV mobile unit carried it live to nation.



NBC TV commentator Chet Huntley interviewing GIs in Lebanon for a special "Outlook" program.

moon. Pickups were made from New York, Cape Canaveral, and the Air Force tracking center at Inglewood, Cal.

Later that day, a third half-hour report also switched to Washington for another aspect of the story. All this was finished before anyone else had gotten anything comparable on the air. As many newspapers noted the next morning and afternoon, *NBC News* stood out in front all the way. Coming in the same week that *NBC News* was cited for superior coverage of the UN General Assembly opening session, at which President Eisenhower spoke, this supplied further evidence of the *NBC News* department's revitalization. During the first phase of the Middle East crisis in July, *NBC News* preempted more than 30 regularly scheduled network TV programs and broke innumerable times into radio programming for up-to-the-minute coverage of that unscheduled news event.

Jack Gould commented in *The New York Times*, "If a willingness to accept financial sacrifice is one criterion of public service in television, chief honors went to the National Broadcasting Company." In the *Chicago American*, Janet Kern wrote that "if NBC erred, the error was certainly on the side of the public and national interest."

Perhaps more significant was another Gould article that said: "No longer does CBS have an overwhelming leadership in the realm of news coverage, as once was the case. NBC is on its toes and manifestly has the encouragement and support of top management."

For the last year, this has been a continuing story. Last fall, a *Variety* streamer read: "UPBEAT AT NBC NEWS MILL." In August 1958, another one



Egyptian Independence Day found NBC-TV cameraman Henry Toluzzi in Cairo to record event on film.

GIs hit the beaches in Lebanon before an interested audience of sun bathers and NBC-TV cameramen.



News stories in metropolitan areas are often covered on the spot by NBC News mobile units.

said: "YOU CAN SEE IT NOW ON NBC." Both were tributes to the kind of performance that brought the entire News Department a Sylvania Award, the first time an organization was ever cited thus.

To cover the French crisis in the spring, for example, *NBC News* augmented its already extensive coverage of a troubled area by moving in three extra correspondents and two extra cameramen. Direct radio circuits from Paris to Radio Central remained open for bulletins as much as 3½ hours at a time. In addition, NBC News Senior European Correspondent Joseph C. Harsch, Berlin Correspondent John Rich and Paris Correspondent Leif Eid were presented live each day during the crisis over the circuit on "Today."

Producer Reuven Frank sent Chet Huntley to Paris for a first-hand look as part of an "Outlook" report on the French situation. He was joined by Edwin Newman, then Mediterranean (now Paris) Correspondent, who was brought in from Algiers for the "Outlook" telecast. The coverage was broad, accurate — and fast.

On the principle that mass media have an obligation to answer the widespread demand for full, responsible information, *NBC News* has left no story uncovered. At Little Rock, its spot-news reporting and in-depth programs brought nationwide reaction. Transcripts of a radio discussion by the high school students themselves — white and negro — were printed widely in both North and South. The crash of planes off Ireland and on Nantucket, the collision of inflammable ships off New York and Newport, the Canadian visit of Princess Margaret, the American visit of Queen Elizabeth, the humor and controversy over the American rôle at the Brussel's World's Fair — all these were covered speedily and fully by *NBC News*.

Variety called the turn, describing the "heads-up, hustling news-digging operation the like of which hasn't been seen around 30 Rockefeller Plaza in several years." The credit for this upsurge had to go, it said, to NBC President Robert E. Kintner and to William R. McAndrew, Vice President, News.

A little over a year ago, Kintner set up the news department as an independent unit under McAndrew on an equal basis with the program department of the network. This move lit the fire under *NBC News*.

Aided by Joseph O. Meyers, Director of *NBC News*, McAndrew has kept that flame burning round-the-clock, day-in-day-out.

What has happened is only the beginning. With this kind of a record established and a growing audience demanding more, *NBC News* looks with confidence and readiness to the future.



Rock and Roll



MENACE OR MUSIC?

by Steve Sholes

Manager, Popular Artists & Repertoire, RCA Victor Records

“ROCK AND ROLL” has been assailed as everything from evil hysteria to a cause of juvenile delinquency.

Yet, few people, outside of the music business, have taken a calm approach toward understanding what this current musical trend really *is* or the *reason behind* its great popularity.

The process of change which produced Rock and Roll began roughly about ten years ago. The music business of that era was divided into three distinct categories: popular, hillbilly and rhythm and blues. Songs rarely extended into more than one category.

Then, multiple forces got underway to break down these barriers and integrate the three categories. One of them was the decline of the dance band business, which by the late Forties was no longer a profitable endeavor. The few surviving bands like Benny Goodman, Woody Herman and Stan Kenton tried their hand at jazz and other “far out” music, and the *dance* band as known in the Swing Era of the 1930's disappeared from the scene.

In the meantime, singers rather than orchestra leaders were emerging as the new stars of the day. And soon thereafter rhythm and blues records suddenly began to sell to the pop market. The reason why is not too difficult to understand. The new material had excitement. More important, the vocal disks were danceable, and the teen-agers loved the beat.

The manufacturers of rhythm and blues disks sensed the new trend, quickly broadened their channels of distribution and set out to milk the full potential of the pop market. Simultaneously, several powerful disk jockeys, especially Alan Freed, started to promote this new music, and the trend snow-balled into an all-out invasion of the pop field. Even the ballad—always a perennial seller—showed a decline in popularity and was replaced by the blues. Statistics prove that last year about 30% of all single disks released were blues.

Not too long ago another major force entered the Rock and Roll picture—hillbilly music in the form of Elvis Presley. Elvis sang country-western blues, which



Elvis Presley's music is a combination of deep-South blues and hillbilly, known to some as rock-a-billy.

differs slightly from the traditional blues in that the hillbillies use guitars and fiddles instead of horns in their instrumentation. The merger of blues and hillbilly music was a most natural one.

Elvis brought to the record industry a new “sound”—termed aptly by some as Rock-a-billy, the unification of deep-South blues and hillbilly.

Whether or not Rock and Roll is “blankety-blank musical junk,” is impossible to judge except with the passing of time. The waltz was considered a Devil's device in its heyday, and each previous musical rage has stirred up bitter controversy.

One fact is undeniable, and that is that young people of all generations must have a chance to express their enthusiasm in some musical form. Youngsters are not inclined to be musical snobs, and this is much to their credit.

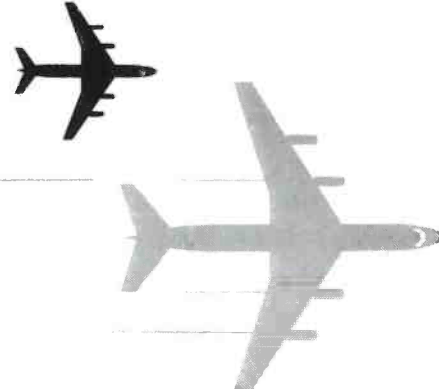
I think perhaps that teen-agers instinctively agree with Henry Wadsworth Longfellow who said: “Music is the universal language of mankind.”

JET-AGE



Chicago's Midway Airport is the nation's busiest, handles 450 arrivals and takeoffs daily. Inset: radar unit checks departures at New York airports.

Air Controls



***Electronic air-ground automatic communications system
to be developed by RCA to speed traffic control***

TEN YEARS ago a lumbering 200 miles an hour was considered high speed in the nation's commercial airlines. Today jet transports fly at speeds beyond man's capacity to think and act. And suddenly the need is urgent for new techniques in air traffic control.

In our ever-shrinking air space, velocity is the pilot's greatest enemy. On the average, an image seen by the human eye takes one-tenth of a second to register on the brain. At 600 mph, a jet travels eighty-eight feet in that one-tenth of a second, placing the pilot eighty-eight feet closer to the sighted object than he thinks.

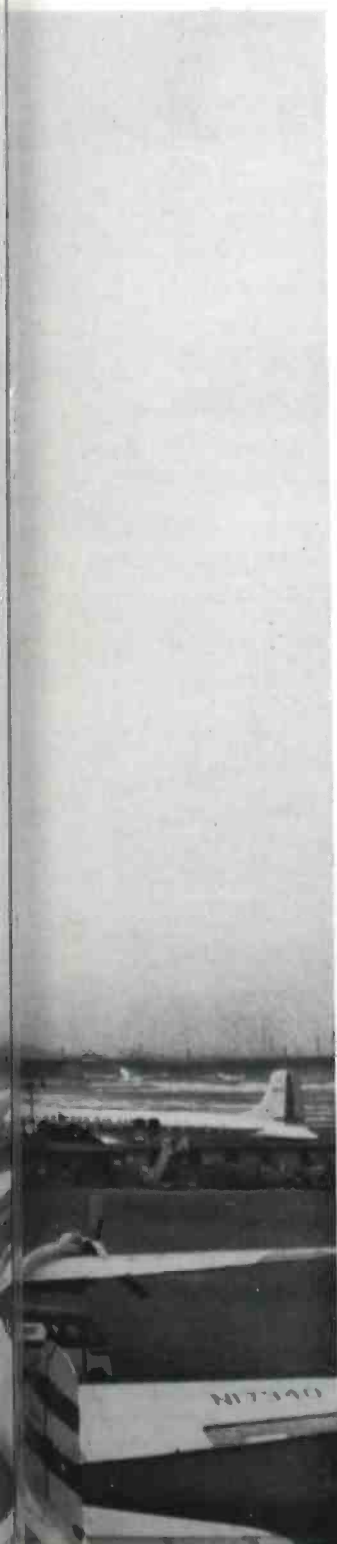
Add other seconds for decision and reaction, and one of the new jet transports might hurtle half a mile farther along its course before the pilot could take evasive action after sighting another aircraft. In a head-on course, this closing speed would be doubled.

Such speeds multiply the potential hazards of traffic congestion. At present, 1,400 commercial airliners in this country carry three million passengers a month. The nation's busiest airport (Midway Airport, Chicago), in a typical 24-hour period handles more than 450 arrivals and departures. During peak hours as many as one plane every forty seconds is either landing or taking off from Midway.

The need for automatic communications between aircraft and ground control personnel to cut air traffic delays and help solve the problem of mid-air collisions was emphasized in a special aviation facilities planning report recently submitted to President Eisenhower.

On the President's request, Congress set up the Airways Modernization Board to look into the problem of bringing air-ground communications equipment into line with the requirements of today's supersonic speeds.

Under a \$1,400,000 contract awarded by the AMB, RCA Defense Electronic Products will develop a system, known as the Air-Ground-Air Automatic Communications System (AGACS) which will query aircraft electronically from the ground for flight information. J. M. Hertzberg, Marketing Vice President, RCA Defense Electronic Products, said that AGACS will furnish this



information automatically and instantly, without intervention on the part of the pilot.

Electronic engineers and scientists of RCA — anticipating air congestion — began research and development work on air traffic control more than twenty years ago. A pioneering RCA undertaking in this field was an experimental system called "Teloran," described as "ahead of its time." This was an attempt to build a system within the then available techniques, and covered a period of more than ten years prior to 1950.

Teloran, consisting essentially of a combination of radar and airborne television techniques, with which RCA had wide experience, was devised to provide pilots with a pictorial display of flying data. This included information for traffic control as well as navigation.

The concept of visual displays in aircraft thus gained acceptance among aircraft operators and by the government. Through adoption of RCA's Weather Radar, a display tube is now on the instrument panel of most airline and many smaller planes.

But not until the AMB was set up last year did the government take the long-needed step toward automaticity of air-ground-air communications and aircraft beaconry. The government turned to RCA for development of experimental equipment in these fields.

The AMB contract calls for production of experimental equipment capable of obtaining flight information by electronic means from up to 500 aircraft in two

minutes. This is twenty-five to fifty times present voice channel capacity.

Voice communication will remain in use for non-routine messages and for emergency use in aircraft not equipped for the mechanized communications. The new system will operate in conjunction with a ground-based data-processing and display system being developed for AMB by General Precision Laboratories, Pleasantville, N. Y. The data-display system will either store the flight information for use in up-dating flight plans or make it immediately available to the traffic controller in digital form.

As part of the AGACS development program, studies will be made to determine the most satisfactory and economical means of adapting present military and civilian aircraft communications equipment to the new system.

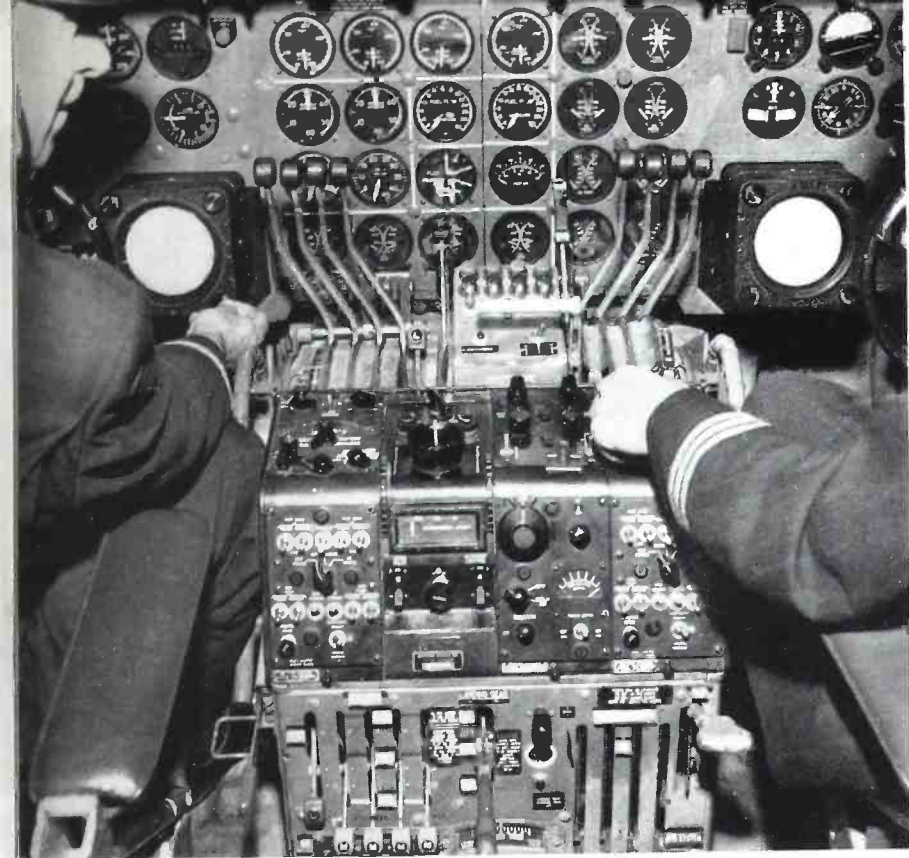
The AGACS contract calls for the experimental equipment to be developed by August, 1959, and tested and modified as needed during the rest of the year. It is planned that the system will go into operation in the New York area in 1960.

A means of precise aircraft identification which would immeasurably speed the disposition of incoming air traffic also is under development by RCA. An AMB contract calls for delivery in the near future of twenty experimental transponder beacons.

The beacons are to be placed on CAA planes to test the capabilities of new types of ground communications



The Air-Ground-Air Automatic Communications System, to be developed by RCA, aims at development of electronic equipment to improve traffic control on today's heavily-traveled air lanes. Signing AGACS contract for RCA is J. M. Hertzberg, Vice President, Marketing, DEP, right; E. R. Quesada, AMB Chairman, is on left. Standing are C. K. Law, Manager, DEP Data Link Projects, left, and T. L. Bartlett, Manager, DEP Special Aviation Projects.



Most major American and many foreign commercial airlines are equipped with RCA Weather Radar.

systems now under construction by CAA. It is hoped 266 airports and military installations will eventually be equipped to receive identification information from the RCA beacon equipment.

The airborne air traffic control beacon, queried electronically from the ground, identifies its airplane by a series of pulses returned electronically to the ground. The pulses are projected in blip form on a ground radar screen, where the blips of approaching planes already have appeared. The pulses group themselves on the radar screen around the blip representing the particular plane from which they emanate.

Effective up to 200 miles, the beacon is capable of transmitting sixty-four different codes representing a limited number of messages other than plane identification. The AMB-Air Traffic Control beacon has a potential of some 8,000 codes.


Summarizing, AGACS represents a major step forward in solving problems of communications, identification and flight control on the country's busy air lanes. As air speeds go up and commercial and military air fleets increase in size, the need for a completely automatic, overall system of air traffic control will become more and more pressing. AGACS heralds the day when airliners will be under constant electronic control, reducing air traffic hazard to a minimum.

The AMB contract calls for experimental equipment capable of recording flight information by electronic means from up to 500 aircraft in two minutes.

At present, air traffic is directed by voice from control towers at airports. RCA is in the forefront in developing automatic air traffic controls.



ENERGY



The C Stellarator Project is expected to play a key role in harnessing the fusion process, thus releasing the energy locked in sea water for the benefit of mankind.

by Kenyon Kilbon

LOCKED within the waters of the world is enough energy to supply the power requirements of all mankind for millions of years to come. In each cubic mile of the sea is untapped energy that would meet the needs of the whole United States for the next 15,000 years at our present annual rate of consumption.

Finding the combination that will free this virtually infinite energy for the benefit of humanity has today become a major goal of scientific research in the United States, in Great Britain, in Russia, and in other nations of the world.

The answer lies in the control of thermonuclear fusion — the process that goes on continuously in the sun and the stars. Man already has succeeded in recreating the process on earth, but only in the furious, uncontrolled blast of the hydrogen bomb. The fuel for the process — deuterium, or heavy hydrogen — is plentiful and easily obtained. The amount of deuterium in only one gallon of water, if it were completely fused, could supply the average household with all of its electrical energy for a year or more.

The problem now is to achieve the means of control, so that the fusion process, once started, can be held tightly and continuously within bounds to supply endless power for the homes and factories of the world.

By any standards, it is an imposing problem. And an imposing array of scientific and engineering talents have been brought to bear upon it. In the United States, the principal effort is being directed by the Atomic Energy Commission through a group of related research programs under the name of Sherwood Project. RCA scientists and engineers are playing a vital part in a most promising phase of this effort, now under way at Princeton University.

Project Matterhorn

The Princeton program is based upon a concept of Dr. Lyman Spitzer, Jr., chairman of the University's Department of Astronomy and director since 1951 of Project Matterhorn, the name given to Princeton's part of the over-all Sherwood Project. To carry on this program, the University and the AEC have selected RCA and the Allis-Chalmers Manufacturing Company to design and build a great new fusion research facility known as the Model C Stellarator — a name coined from "stellar" and "generator."

The C Stellarator facility, to be completed in 1960, will be comparable in cost and complexity to some of the largest "atom smashing" particle accelerators now in existence. It is being designed not as an operating reactor but as a flexible research facility for a variety of research programs in the controlled thermonuclear field.

The two companies have assigned many of their outstanding scientists and engineers to an unusual engineering staff organization known as C Stellarator Associates. Today, this staff is at work at the University's James Forrestal Research Center, two miles from the Princeton Campus, meeting and overcoming unprecedented problems of electronics and electrical engineering.

In principle, the fusion process is quite simple. The snag arises in translating principle into practice. Basically, fusion is comparable to ordinary chemical combustion, in which the combination of burning molecules releases energy in the form of heat that may be put to various uses. Ordinary combustion requires a means of ignition (a match, for example), a fuel (such as coal or oil), and, if the heat is to be used, a combustion chamber (such as a stove). The fusion process involves

UNLIMITED...

this same sequence of events, but with a staggering difference in the conditions that must be met.

In fusion, the means of ignition — the "match" — must somehow produce a temperature of 100 million degrees centigrade or higher. The fuel must consist of light atomic nuclei capable of combining into heavier nuclei and releasing considerable energy in the process. The "stove" to contain these happenings must be capable of withstanding the 100-million-degree heat — a requirement somewhat complicated by the fact that there is no known material that will remain solid above 3,000 degrees centigrade.

The solution as conceived for an operating fusion reactor is to raise the initial supply of deuterium fuel to extremely high temperature by ohmic heating, comparable (but on a vast scale) to the action that takes place in an ordinary toaster. The result is a hot gas composed of free electrons and ions — atoms from which electrons have been torn. The hot gas, known as plasma, is in turn raised to the required thermonuclear temperatures by magnetic pumping, causing the particles to move at such enormous speeds that they will collide and fuse to produce the desired release of energy. Once the process has been started by ignition, it would continue as long as it had fuel on which to feed.

Matterless "Walls"

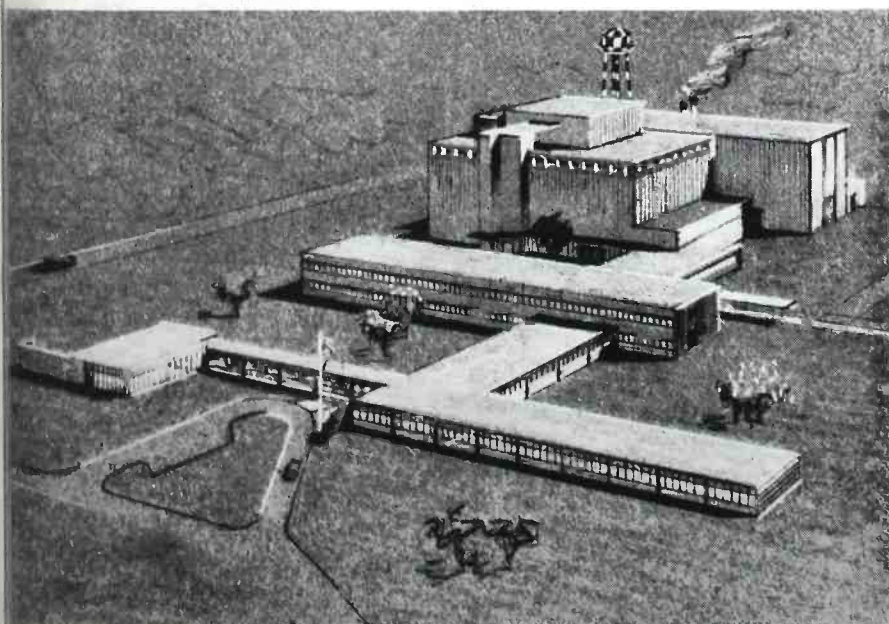
Somehow, this process has to be contained by a force that will hold the plasma together so that the

collisions will continue to occur. Since there is no known material that can be used as a "stove" for this purpose, the scientists have turned to matterless "walls" consisting of extremely strong magnetic fields, up to 100,000 times more intense than the magnetic field of the earth itself. In the Stellarator, this magnetic "container" will be created by external currents within a closed endless tube having the shape of either a figure 8 or a racetrack.

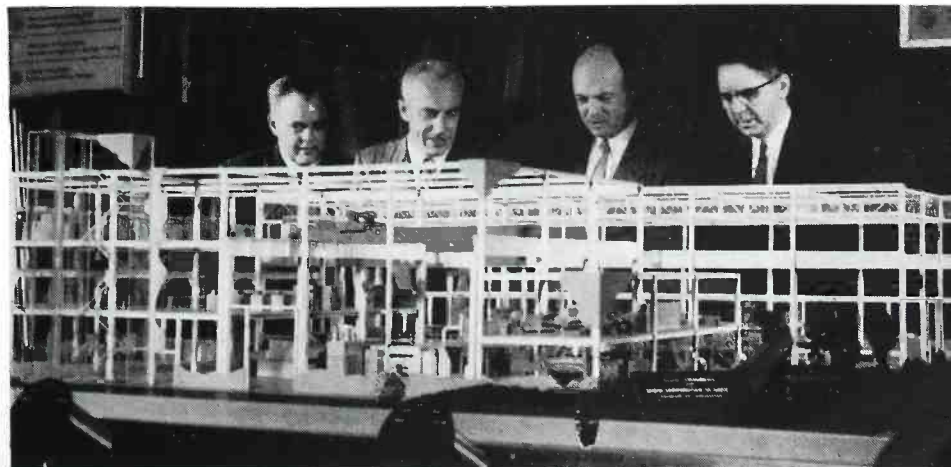
The awesome physical plant that will comprise the C Stellarator and its associated electronic and electrical equipment already is beginning to take shape at the James Forrestal Research Center in Princeton. The physical appearance of the Stellarator itself was disclosed for the first time on September 1 with the display of scale models at the international conference on peaceful uses of atomic energy in Geneva, Switzerland.

The engineering organization, working closely with Dr. Spitzer and his associates of Project Matterhorn, consists of both RCA and Allis-Chalmers personnel. The project manager is Leonard J. Linde, Allis-Chalmers director of electrical engineering. Associate Project Manager is E. W. Herold, director of electronic research laboratory of RCA Laboratories. Business director of the project is George M. K. Baker, who was administrator of government contracts at RCA Laboratories. Technical directors are Dane T. Scag, of Allis-Chalmers, and Philip T. Smith, of RCA.

Artist's sketch of C Stellarator project.



L. to r.: Dr. James Hillier, Vice President, RCA Laboratories; Dr. D. H. Ewing, Vice President, Research and Engineering, RCA; N. W. Landis, Manager, Northeast Region for Allis-Chalmers; Roy Casper, General Manager, Allis-Chalmers Nuclear Power Div., with Stellarator model.



Missiles to Masks



THE PLAY'S the thing — even among men trying to shoot the moon.

At Patrick Air Force Base in Florida, where minds are turned usually to the task of getting missiles into flight and satellites into orbit, there still is time for the kind of drama which is produced on stage. In fact, within a few weeks, the Patrick Players, composed largely of personnel of the RCA Service Company's Missile Test Project, will open their second season with a presentation of "A Streetcar Named Desire."

Because of the very nature of the project on which they work, an odd assortment of men and women form the cast and the stage crew of any production put on by Patrick Players.

Colonels and corporals have swapped rank in their stage parts.

Men from the missile contractors have played high military officers — even enemy officers.

The wife of the commanding general of the Air Force base, Mrs. Donald N. Yates, paints scenery.

And an RCA design engineer uses a timing sequencer such as those employed in missile tests to get lighting effects on stage.

Patrick Players were formed as a little theater group last year to provide entertainment — and an outlet for the theatrically inclined — in the Patrick-Cape Canaveral area where more than 15,000 men and women are engaged in the huge missile program.

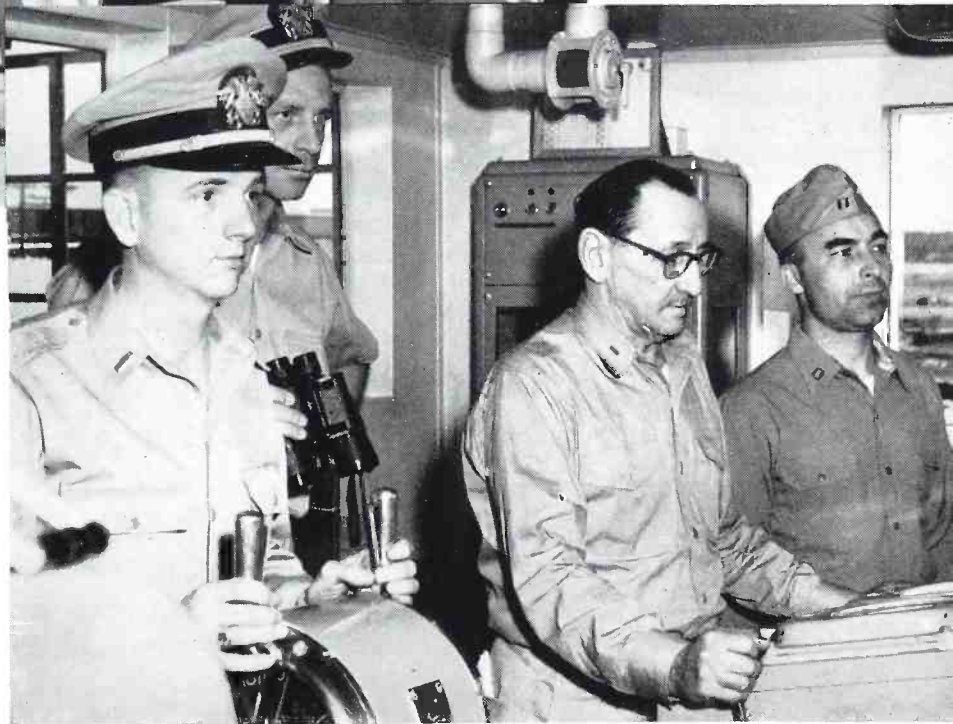
About 100 persons belong. President is Mrs. Irene Eichel, wife of Col. H. H. Eichel, assistant commander of the Air Force's Ballistic Missiles Division. Vice-

German-born Willy Licht, an RCA film technician, gave an authentic touch to the group's production of "Stalag 17" in his portrayal of the S. S. captain.





In "Mr. Roberts," the head of the Navy missile testing project played an Army M.P.—and the head of the Army testing project acted as a shore patrolman.

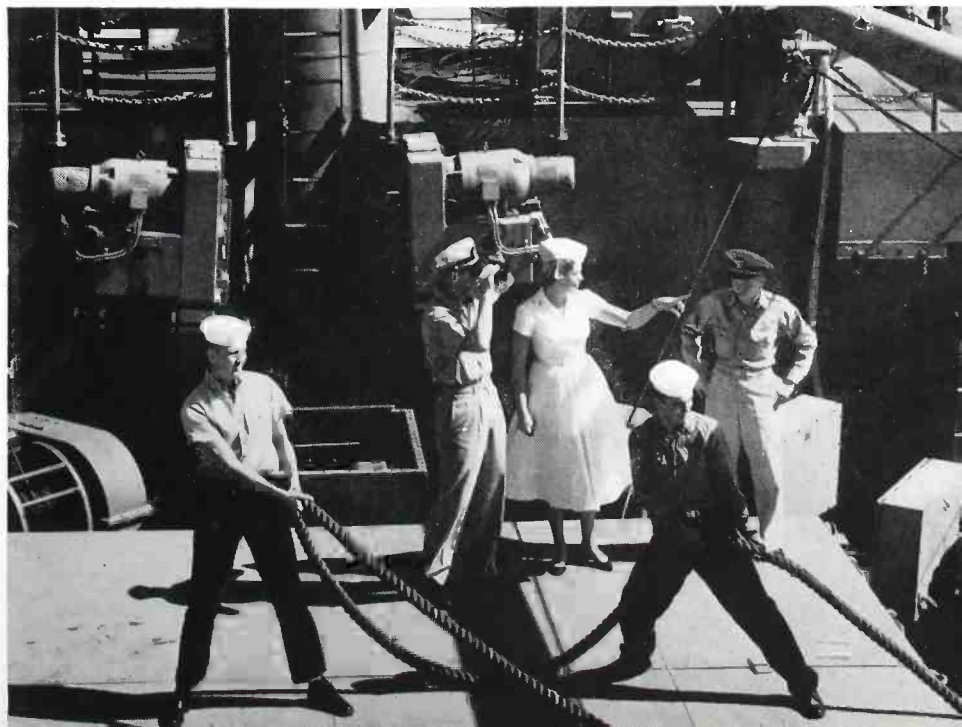


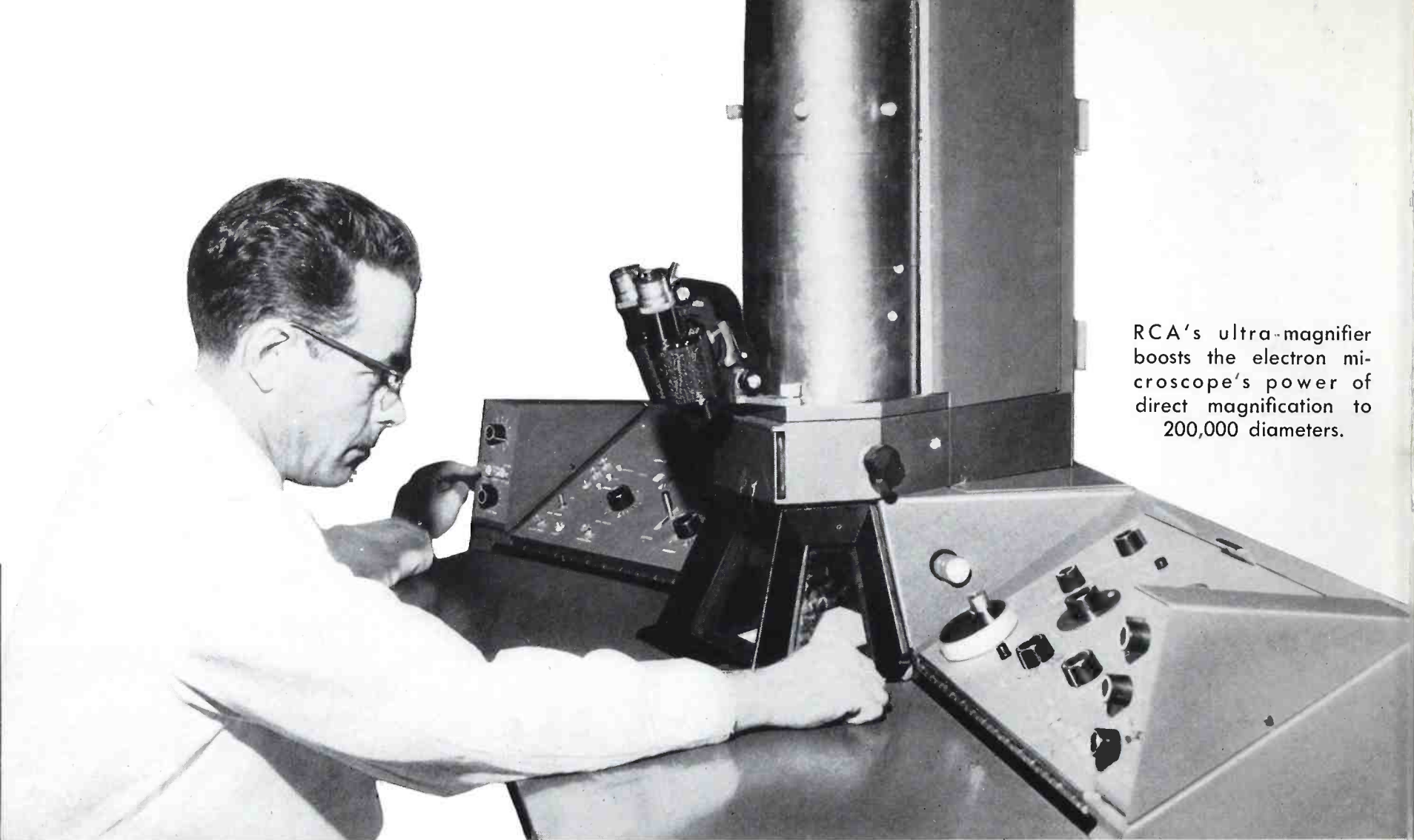
"Mr. Roberts" was the most popular production last season, 1,400 people attending over the 3-night run.

president is Lt. Col. James Weldon, chief of the data-processing division. Secretary is Mrs. Evva Porter, an RCA film technician and wife of Master Sgt. Walsh Porter. And General Yates' wife is an associate member of the board.

Mrs. Porter was producer of the last three productions — "Stalag 17," "Mr. Roberts" and "Two Blind Mice," the latter a Washington farce. She had an expert technical adviser on "Stalag 17" — Col. Weldon, who was shot down in World War II and was himself imprisoned in Stalag 17. And she had an authentic type for the S. S. captain in the play — German-born Willy Licht, an RCA film technician, whose guttural commands on stage brought a remark from one first-row spectator, "Gosh, he speaks real German." And it was here that the timing sequencer was used effectively to flash lights, presumably from the prison-camp towers, past the windows in the set.

The group plans to put on five or six productions a year. Each one is given four times at the base theater before near-capacity audiences. In addition, benefit performances have been given for the Melbourne Lions Club, Melbourne Art Association, Satellite Beach Community Center and McCoy Air Force Base at Orlando.





RCA's ultra-magnifier boosts the electron microscope's power of direct magnification to 200,000 diameters.

Probing "Invisible" Worlds

FOR UNTOLD years, researchers, using the most advanced tools at their command, had attempted to peer into the world of the infinitesimal, the sphere of the lethal microbe and virus. Vital discoveries had been made but success remained elusive. A long step forward was taken in 1940 when science delivered the electron microscope which, since that time, has proved to be one of the most productive and versatile contributions to medical progress since Pasteur's epochal discoveries more than a hundred years ago.

It was the electron microscope which first enabled biologists to see the virus causing many of our most stubborn diseases, and to probe the "invisible" worlds of matter comprising the products of this industrial age.

First Production Models

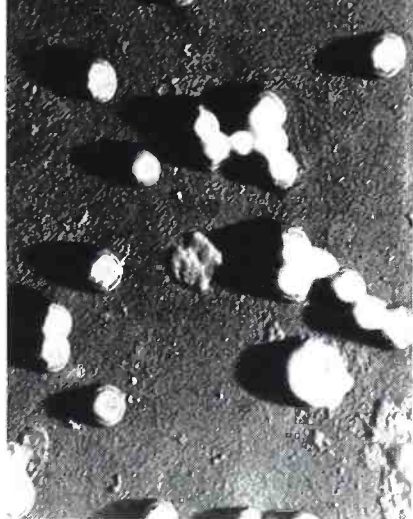
The first commercial electron microscope to be produced came out of RCA eighteen years ago. These early models gave useful magnification of 50,000 to 100,000 diameters, as compared to the optical microscope's maximum of about 2,000 diameters.

Early this year RCA announced production of an "ultra-magnifier" which boosts direct electronic magnification of one of its latest models to 200,000 times specimen size, and extends photo-enlargement capabilities of some specimens to nearly 1,000,000 times. The sizes, shapes, and molecular structures of particles less than 1/12,000,000th of an inch in diameter can be clearly photographed through this instrument.

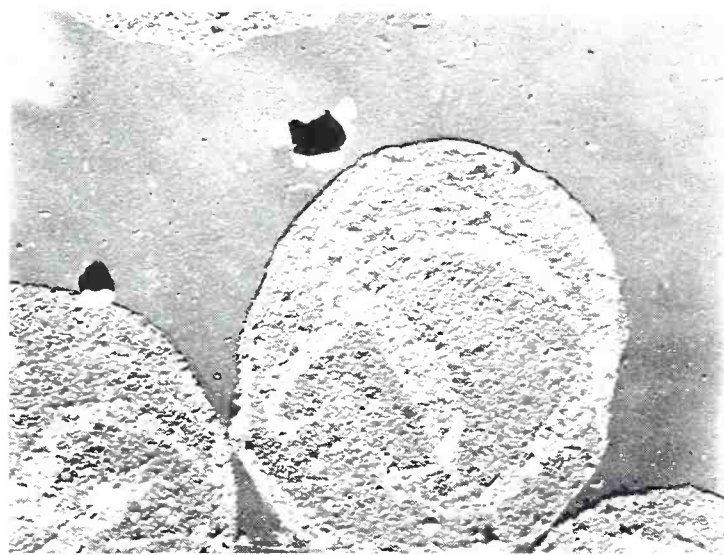
Essentially the electron microscope is a large upright cathode-ray tube inside which a beam of electrons is concentrated on a specimen. The beam pattern is altered by the shape and thickness of the specimen, and this pattern is then enlarged and focused on the viewing screen and on a photographic plate to make a picture. The image is not directly observed, as in an optical microscope, but is seen as a pattern produced on a fluorescent screen—something like the image on the screen of a television receiver.

The electron microscope is, in fact, an outgrowth of television research. It was pioneered and developed at RCA Laboratories by Drs. V. K. Zworykin and James Hillier.

The electron microscope has opened an infinitesimal world to researchers into the cause of disease. At right are elementary bodies of Feline Pneumonitis from a chick embryo.



The microscope made it possible for biologists to see the elusive virus, cause of man's most stubborn diseases. At left is enlargement of necrosis virus.



The sizes, shapes and molecular structures of particles less than 1/12,000,000th of an inch thick can be photographed with ultra-magnifier. Above are so-called "ghosts" of red corpuscles.

Use in Medical Progress

At the M. D. Anderson Hospital and Tumor Institute, associated with the University of Texas, Dr. Leon Dmochowski, the noted cancer specialist, has used the electron microscope in his studies of virus particles "strongly suggestive" as the causative agents of breast cancer and leukemia in mice.

Further studies of viruses, under way at such centers as the Rockefeller Institute and the University of California, are expected to throw new light on heredity and mutations in all forms of life.

In New Brunswick, N. J., at the Squibb Institute for Medical Research, the electron microscope is used to inspect antibiotics, such as Streptomycin, Neomycin and Aureomycin, at intervals during the production process.

Significant contributions were made by electron microscopy in the development of the Salk polio vaccine and the latest cold vaccine at Johns Hopkins. It revealed the influenza virus for the first time and produced the first picture of nerve-cell damage caused by multiple sclerosis.

While the end results of the use of the electron microscope in medicine have bordered on the spectacular, the instrument has won equal success in industrial research. Because of it, a vast number of new and improved products, and better manufacturing processes have been developed.

Chrysler, Ford and General Motors have found that

microscopic inspection is the best method for controlling the quality of steel, paints, brake linings, and other automotive ingredients by providing a closeup of metal, rubber and asbestos structures, and by recording the effects of wear-and-tear.

In the canning industry the electron microscope has helped solve the problem of contamination. By photographing various types of can linings it gives a picture of porosity and adhesion characteristics, and supplies visual proof of corrosion resistance.

About 60% of the electron microscopes manufactured in this country are purchased by universities and research organizations, and 40% are bought by industrial laboratories. Major chemical, paper, petroleum, metal, textile, and drug companies make use of batteries of microscopes in their laboratories. Universities such as Harvard, Cornell, Columbia, the Massachusetts Institute of Technology, and the University of California at Los Angeles consider electron microscopes essential tools in their research activities.

The electron microscope reveals a world of strange and beautiful forms. The polished surface of a diamond resembles a plowed field. The diffraction pattern of a crystal appears as a solar system in miniature. Lead oxide particles might be mistaken for delicate flower petals. But many of these pictures have practical value. Today the electron microscope is helping scientists explore the basic structure of matter, and its electron beam is lighting the way to new discoveries.

"STEREO" steps out

Widespread interest in stereo, the newest dimension in home entertainment, brings many questions from the public. Here, Raymond W. Saxon, Vice President and General Manager, RCA Victor Radio and "Victrola" Division, answers those asked most frequently and in doing so defines stereophonic sound in laymen's terms.

STEREOPHONIC sound equipment for the home has been available for several years. Why are we hearing so much more about it right now?

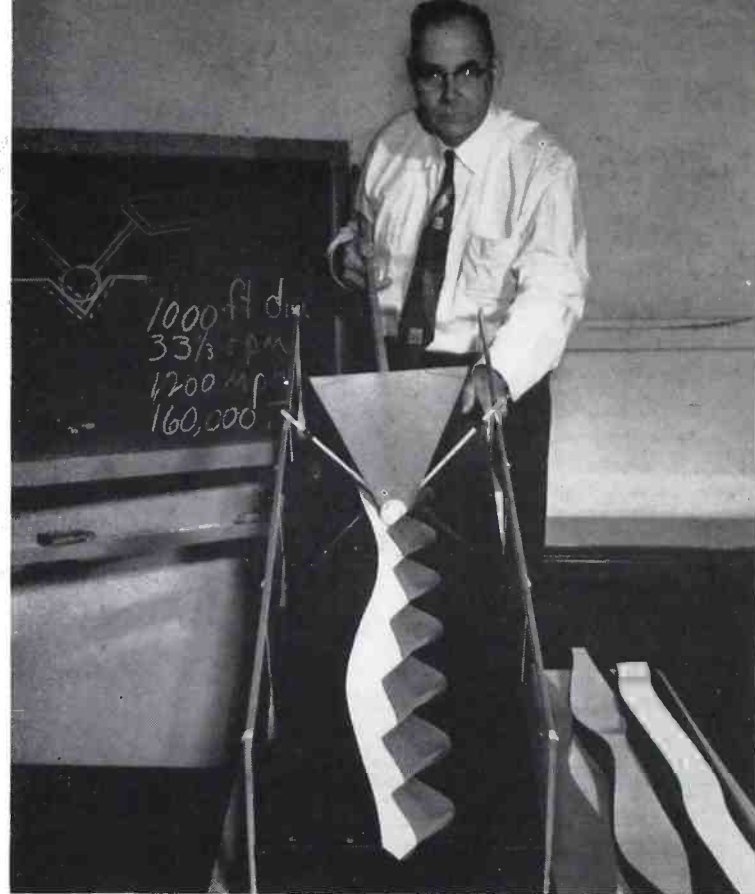
Because of two new developments which bring home stereo into the price range of most family budgets. Until a few months ago we could only get stereo on reel-type tapes which were expensive and hard to handle. Now the stereo disk is available at only about \$1.00 more than monaural (single channel) LP records. High fidelity stereo disk players are available at very little more than conventional hi-fi sets. For those who prefer stereophonic sound on tapes, RCA has introduced the magazine load tape cartridge and recorder-players for their use. The tape cartridge will offer the same amount of music at about one-half the cost of conventional stereo tapes.

What is stereophonic sound?

It may be called true three-dimensional sound because it has depth, realism and direction. These dimensions are achieved, first, by recording the original performance with two microphones or two sets of microphones, placed on each side of the orchestra. The recording is played back over two separate speakers, placed several feet apart to approximate the two sides of the orchestra. You then hear the left side of the orchestra through the left ear and the right side through the right ear just as you would in the concert hall.

If I buy a new stereophonic "Victrola" phonograph, will I be able to play my old record collection?

Yes. One of the major advantages of the new in-



Model of a stereo groove, with a golf ball representing stylus. On stereo records, each groove has two sound tracks; sound is picked up by two arms, one on each side of the stylus.

struments is that you get even better reproduction of monaural records because the new styli are thinner and get deeper into the record groove.

It should be remembered, however, that the reverse is not true. Stereophonic records should not be played on monaural phonographs because they may be damaged.

Stereophonic records look the same as monaural records. Where are the two separate signals carried?

Each stereo record groove has two walls and a separate signal is recorded on each. When the playback stylus rides in the groove, one side picks up the signal of the right wall and the other side the signal on the left. These signals are transmitted through a dual amplifier into two separate speaker systems.

In order to get true stereophonic sound I must have two separate speaker systems. Isn't this much more expensive?

Not necessarily. You may get a good stereo effect by plugging into a good television or FM radio speaker for your second sound source. RCA Victor is producing seven auxiliary speakers nationally advertised at \$9.95 up to \$125. The lowest priced portable Stereo-Orthophonic "Victrola" phonograph, the Mark XIV, at \$129.95, has an extra speaker system in the lid.

What are some of the rules for placing speakers for maximum stereo effect?

The first thing to remember is that the listener should experiment with different speaker placements

until he gets the effect most pleasing to his own ear. If speakers are too close, the reproduction will be similar to monaural. If they are too far apart the effect may be one of confusion. If he will station himself as far away from the speakers as they are from each other, he should get optimum effect.

With the increase in stereophonic records will conventional records become hard to get?

Not at all. Even though stereo is expected to catch on rapidly, there are still some twenty-five million phonographs in American homes and this is the manufacturer's principal market.

Is it possible to convert my present high fidelity set to stereo?

Many high fidelity sets may be effectively converted by modifying or replacing the record changer. A different motor is essential as is a stereophonic pick-up. The present amplifier may be replaced with a dual amplifier or an additional one added to the present amplifier. You cannot get stereo by merely replacing your present pickup. A new pickup will only allow you to play stereo records without damage. They will not give you a second sound source.

To convert present RCA Victor New Orthophonic High Fidelity "Victrola" phonographs, the Company has introduced several conversion kits. A qualified service man should do this unless the owner has a good knowledge of phonographs.

Since the new tape cartridge has reduced the price of music on tapes by half, would it be advisable to switch to tape equipment when switching to stereo?

This is a matter of personal preference. Tapes last longer. They do not deteriorate as rapidly as records. On the other hand, they are still more expensive than records.

How much more expensive are tapes than records?

A good example is the sound-track recording of "South Pacific." The conventional reel-type tape is advertised at \$18.95. The tape cartridge is \$8.95 and the stereo disk, \$5.95.

How is it possible for the tape cartridge to sell for less than half the cost of reel tapes?

RCA Victor research has developed new techniques which make it possible to put four times the amount of recording on a tape as before. Tape formerly traveled at seven and one-half inches a second to maintain sound quality. Improved equipment now permits recording at three and three-quarters inches per second to achieve the same standard. The speed has been cut in half

with the resultant saving in tape used. Further saving was made by recording four tracks of sound on the tape cartridge rather than the usual two tracks.

In addition to lower cost, what are some other advantages of the tape cartridge system?

The cartridge is as easy to handle as a phonograph record. Enclosed in a plastic case, it has self-contained reels that are held securely until the brake is automatically released when placed on the player. The tape never has to be touched by the user. In rare cases where the tape does break, the cartridge can be opened easily by removing two screws, the tape spliced and replaced.

To play the machine the user has to turn the player on and insert the cartridge. It plays through its entire length, equal to one side of an LP record, and in fully automatic models, reverses itself and plays the second half. When it has played through it is in position to play again from beginning. No re-winding required.

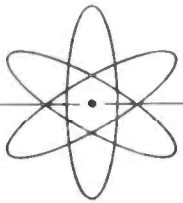
Does the cartridge require a new type machine or can old tape recorders be converted?

The cartridge can only be played on the new cartridge players and attempts at conversion would be impractical if not impossible.

Stereophonic sound gives a true three-dimensional effect because it has depth, realism and direction.

Stereo requires more elaborate equipment for recordings than monaural sound. Below, RCA Victor artist Morton Gould conducts stereo recording session.





Briefly Told . . .



Grasshoppers a la Carte . . .

Gourmets among the RCA personnel working on the Missile Test Project in Florida have a rare opportunity when their palates yearn for something slightly different from the ordinary. There is a restaurant in their midst—at Cocoa Beach—which specializes in sea food, but also offers such exotic dishes as: French Fried Japanese Grasshoppers, \$1.25; Chocolate-Covered Giant Ants from South America, \$3.50; Roasted Japanese caterpillars, \$1.50; Diamondback Rattlesnake in Sauce Supreme, \$3.75; Smoked Eel Livers, \$2.50; Alligator Soup, \$3.50; Chocolate-Covered Bees, \$2.95, and numerous other mouth-watering concoctions, including buffalo and kangaroo steaks.



Outboard Across the Ocean . . .

With Mount Everest scaled, the supply of *new* adventures this side of the space barrier is growing thin. Three men who recently accomplished something said never to have been done before are a Dane, a Swede and an American who crossed the Atlantic in a motor boat.

The sea-weary trio — Ole Botved of Denmark, Sven Orjangaard of

Sweden, and Jim Wynne of Miami, Florida — tied up in New York harbor last July 24 after an exhausting 10½-day battle with squalls, storms and ever-growing fatigue. The voyage gave Mr. Botved a chance to prove the stamina of his firm's outboards. The motor boat, the 22-foot *Coronet Explorer*, followed in the wake of a Swedish steamer, and covered 3,433 statute miles at an average speed of 16.3 miles an hour (14.2 knots).

Twice each day the motorboat pulled alongside the escorting freighter for refuelling. Communications between the two craft for this ticklish operation were provided by two RCA radio-telephone units, a Golden Sentry and a Golden Courier.



"Effective Partnership" . . .

An "effective partnership" between the military services and private industry has brought "impressive advances" on the Atlantic Missile Range during the past five years, Charles M. Odorizzi, Executive Vice President, RCA Sales and Services, said on September 10. He spoke in Melbourne, Fla., at a dinner marking the fifth anniversary of the RCA Service Company's participation in the tracking of missiles at nearby Cape Canaveral and the down-range islands.

Under sub-contract to Pan American World Airways, Inc., RCA handles the planning, engineering, installation, maintenance, and operation of the electronic and optical equipment used for tracking.



The Veterans of Foreign Wars' Gold Medal Award is presented to Robert W. Sarnoff by V.F.W. Commander-in-Chief Richard L. Roudebush.

On behalf of RCA President John L. Burns, Mr. Odorizzi presented to K. M. McLaren, Vice President, RCA Missile Test Project, a plaque saluting the company's employees on the Atlantic Missile Range. In addition, lapel pins were given to twelve employees who have completed five years of service with RCA on the missile range.

Gold Medal Award . . .

The highest honor that can be bestowed on an individual by the Veterans of Foreign Wars, the Commander-in-Chief's Gold Medal Award, was presented to Robert W. Sarnoff, Chairman of the Board of NBC, at the organization's annual convention in New York.

In making the award, Commander-in-Chief Richard L. Roudebush cited Mr. Sarnoff "for his outstanding leadership and fearless advocacy of broadcasting as a vital instrument of national communications, and for his staunch support of fundamental principles of Americanism as seen in National Broadcasting Company public service programming."

In accepting the award, Mr. Sarnoff announced that NBC is now projecting five years ahead to develop a broad range of public-service programs that will be produced in association with the Office of Civil and Defense Mobilization, and will be devoted to the problems of man's adaptation to the nuclear age.



Telegraph **Via RCA** to ships at sea

"Via RCA", radiograms to ships at sea are serviced by the largest network of marine radio stations in the United States.

The stations are strategically located on all coasts. They reach ships equipped with radio anywhere in the world.

The equipment of these stations is the finest — and includes the newest of RCA's own advancements in the fields of radio and electronics. Inter-office forwarding, too, is completely modernized. Transmission between RCA offices in New York, Washington, D. C.,

and San Francisco and key coastal stations is by the same automatic tape transmitting system which has built for RCA an outstanding record for speed and accuracy in radiotelegraph transmission to foreign countries. In marine service, as in overseas service, overall speed and accuracy depend in large measure on the efficiency of inter-office forwarding.

Consider these facts and send your marine radiograms "Via RCA". To obtain RCA service, be sure to mark your message, "Via RCA". There is no charge for this routing specification.

RCA COMMUNICATIONS, INC. • RADIOMARINE DEPARTMENT
A SERVICE OF RADIO CORPORATION OF AMERICA





Leadership...

SINCE television began—and every year thereafter—one brand of TV has been the consistent leader in public preference, sales, and technical achievements. That brand, of course, is RCA Victor. Again this year, RCA Victor is first. A recent impartial survey

by leading newspapers—the Consolidated Consumer Analysis—shows RCA Victor TV in first place in 21 out of 22 key markets. And tied for first in the 22nd. This continuing popularity has led to an amazing television milestone...

This year RCA Victor builds its 10 millionth TV set and puts that unequalled experience into TV's greatest advances

In the new RCA Victor TV sets, you'll find advances like "One-Set" electronic fine tuning . . . "Wireless Wizard" electronic remote control that lets you tune from your easychair . . . new Mark Series Color TV with performance-proved dependability, easy tuning, and

improved "Living Color" picture.

With constant advances like these, RCA Victor continues to play a major part in the growth of television. For RCA Victor has brought to Americans more of the 47,000,000 TV sets now in use than any other company.



RCA VICTOR
TRADE MARK
RADIO CORPORATION OF AMERICA



First in black-and-white TV • First in Compatible Color TV