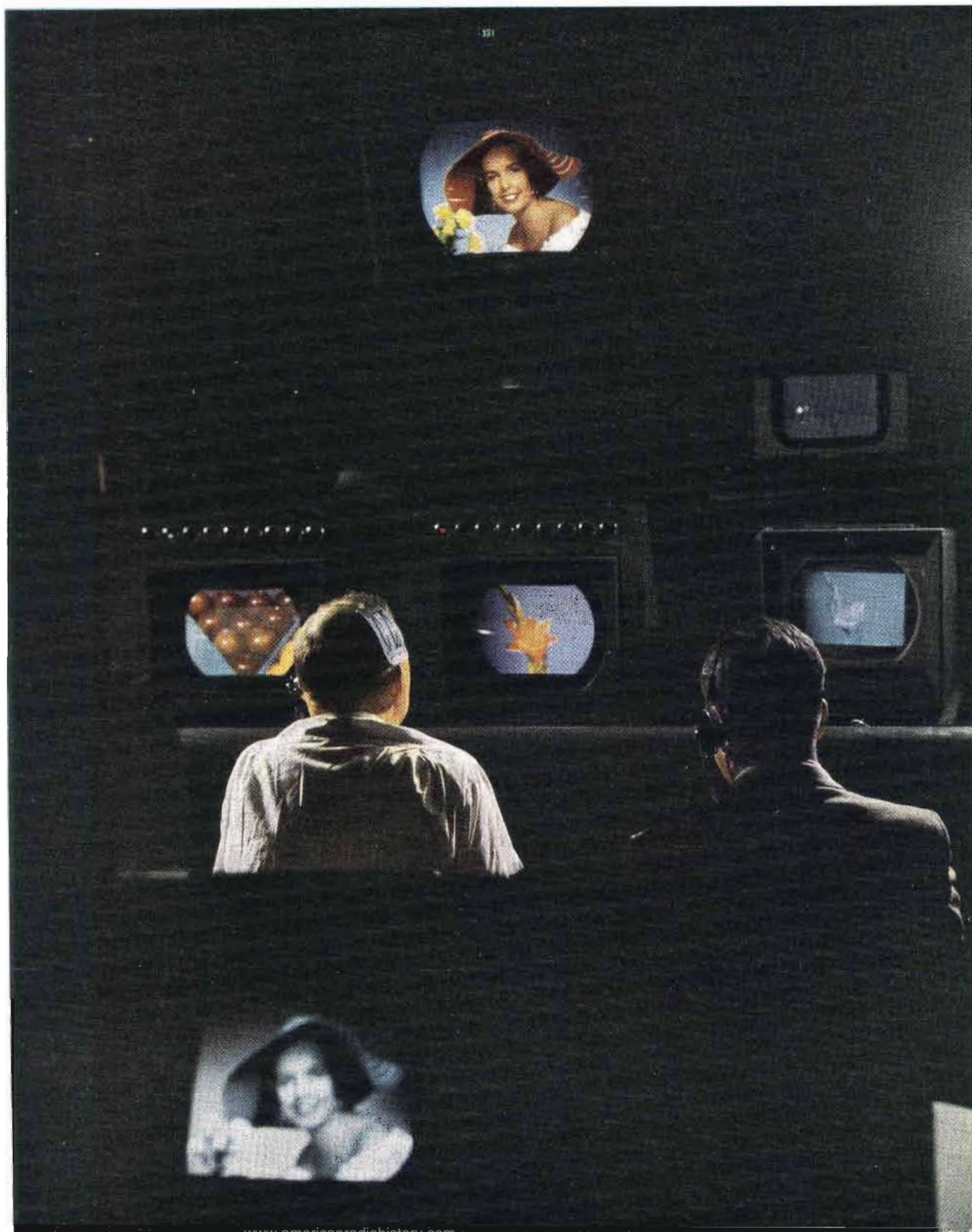


RADIO AGE

RESEARCH • MANUFACTURING • COMMUNICATIONS • BROADCASTING • TELEVISION



OCTOBER
1953

COLOR TELEVISION
Studio Control Room

**IDEAS
from RCA**



No speed limit ON THIS SKY HIGHWAY

**RCA Microwave Radio Relay offers fast, all-weather route
for two-way communication and control**

For high-speed, multi-channel communication—for communication that knows no weather problems—RCA now offers industry a new miracle in practical form—RCA Microwave Radio Relay.

At any instant this new electronic development can handle up to 24 simultaneous messages—relaying a narrow UHF radio beam from tower to tower—over distances of several miles to several thousand miles. Without the vulnerability of wire lines—without the installation and maintenance problems of wire lines—RCA Microwave carries telephone, teletype, and tele-

graph messages, remote-control impulses, and meter readings at close to 100% continuity of service.

Because "RCA Microwave stays in service when you need it most," it is fast becoming the top communication tool of all types of right-of-way organizations. Pipeline companies, utilities, turnpikes, and government agencies consider it the most dependable way to conduct business over long distances.

Write for your copy of RCA's informative booklet, "INTRODUCTION TO MICROWAVE."



RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DEPARTMENT
CAMDEN, N.J.

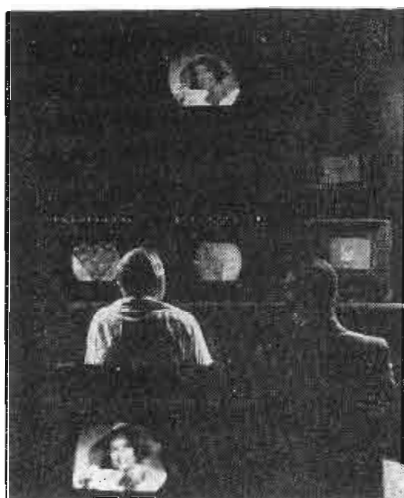
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Radio Age

RESEARCH • MANUFACTURING • COMMUNICATIONS
BROADCASTING • TELEVISION

OCTOBER 1953



COVER

Technicians in the control room at NBC's Colonial Theater in New York study color television images as they appear on RCA tricolor picture tubes.

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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RADIO CORPORATION OF AMERICA

RCA Building, New York 20, N. Y.

DAVID SARNOFF, *Chairman of the Board*
JOHN Q. CANNON, *Secretary*

FRANK M. FOLSOM, *President*
ERNEST B. GORIN, *Treasurer*

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National Broadcasting Company, Inc. • Radiomarine Corporation of America
RCA Communications, Inc. • RCA Laboratories Division • RCA Institutes, Inc.
RCA Estate Appliance Corp. • RCA Victor Distributing Corp.

EDWARD JULIAN NALLY was born on the eleventh of April, 1859, in Philadelphia. He came into the world, the son of Patrick and Mary (Cullen) Nally, at a time when Americans were being challenged to pioneer on all fronts of science, industry, commerce, and communications. Railroads and the telegraph appealed to the imagination of many a boy, and Edward Nally ventured forth on the new wire-line trails that were stringing westward across the country to spread the click of dots and dashes.

His career in communications began with the Western Union Telegraph Company in St. Louis, Missouri, on September 1, 1875, and from that day on messages and messengers were Edward J. Nally's great interest. As the copper wires of the telegraph were unreeled to parallel every mile of steel rails, so young Nally's duties increased and he continually persevered, climbing the ladder of communications. He was with the Western Union until 1890 when he took a new position as Assistant General Superintendent, Western Division, of the Postal Telegraph-Cable Company, in Chicago.

It was while he was with Postal, during the latter part of the 90's, that a young man named Marconi invented a new system of communication called "wireless." The majority of telegraphers scoffed it off as impractical; they said that even if invisible waves in the air could carry messages they were too ethereal to be dependable. Then, too, wireless lacked the privacy afforded by wires. Nevertheless, in 1901 the new-fangled "wireless" spanned the Atlantic and was heralded as a threat to both cable and telegraph. But the majority of communications "experts" continued to call it a fad and transoceanic "wireless" just a stunt—even if true!

Bold would be a telegrapher who would forsake the wires for wireless; but in 1913 Edward Julian Nally did just that. He resigned from the telegraph field to become vice-president, general manager and director of the Marconi Wireless Telegraph Company of America. Mr. Nally had faith in the future of wireless. And when he had faith in anything, or anybody it was abiding.

When, in 1919, the Marconi Company was acquired by the newly formed Radio Corporation of America for the purpose of giving the United States preeminence in communications independent of all foreign countries, Edward J. Nally was elected the first president and a director of RCA.



Edward Julian Nally

1859-1953

Paralleling his vibrant interest in the communications business, Mr. Nally's humanitarian influences radiated afar. Great was his sentiment for history and old-timers—the veterans in telegraphy and wireless—for whom he always had an everlasting thought of kindness. His smile, the twinkle in his eyes, his Irish wit, his pat on the back brought encouragement to everyone who came in contact with him. Never did he lose the common touch. And he had a God-given gift of expression through his pen, and his writings were often those of a poet.

He loved his family and cherished his friends. If ever there was a day in his life that was the brightest of all, it was June 10, 1897 when he and Lee Warren Redd were married in Lexington, Ky. That was a day of blessing for them both, for they lived 56 years of happiness together and found great pride in their two children, Mary Lee

and Edward Julian, Jr., and in the four grandchildren. Happily he counted his great grandchildren, "Total to date, two girls and four boys!"

"Mister Nally," as everyone addressed him, had undisputed claim to the title "grand old man of wireless," for he had reached 94! He was a symbol of his time; a genuine American with the interests of his country at heart. Always a scholar who avidly read everything he could get his hands on, from the classics to scientific papers. A man of God, devout in religion, he applied its precepts to his everyday life.

Fatherly was his advice, and well it might be, for in the final quarter century of his life the younger men appeared to him as his "boys." To them he would say: "Son, don't be stampeded into making hasty decisions that require study and thought. Snap judgment is often dangerous. Never lose faith in yourself. Hope not too much, fear not at all."

Always quick to appreciate progress, he was equally alert to applaud the triumphs of youth. Only a few hours before his book of life was closed on September 22, 1953, he penned his admiration of a new booklet on the phonograph art: "Verily, it is the record of records!"

So too his epitaph, "Verily a record of records." For the name "Edward Julian Nally" will endure in the hearts of men in characters of living light kindled by kindly words and friendly deeds that live in memory beyond the reach of Time.

Sarnoff Sees Horizons of Service for Radio Being Widened by New Developments in Science

A NEW era of progress for the National Broadcasting Company's radio network was opened on September 17 in Chicago when network officials met with representatives of affiliated stations for a full scale review of new radio program development and sales plans.

The broadcasters, meeting at the Drake Hotel, were given a glimpse of new horizons for radio by Brig. General David Sarnoff, Chairman of the Boards of Radio Corporation of America and the National Broadcasting Company, who spoke of present developments in the RCA Laboratories that will lead to the manufacture and use of tiny personal pocket and wrist radios. Such technical developments as these miniature sets, he predicted, will create new radio audiences for the future. He outlined NBC's goals of leadership in radio and its plans for utilizing new opportunities offered by evolutionary changes within the industry.

Frank M. Folsom, president of RCA, and other RCA-NBC officials attended the company's first meeting with the newly organized NBC Radio Affiliates Committee.

General Sarnoff was presented to the group by Robert D. Swezey, executive vice-president and general manager of WDSU, New Orleans, La., and Chairman of the Affiliates Committee.

"Besides creating new program approaches to meet changing listening habits, we can also develop new audiences through scientific progress," said General Sarnoff. "For example, tiny radio sets—no bigger than a wallet, and ultimately a wristwatch—would advance the use of personal radios, and thereby greatly enlarge the total radio audience.

"Such miniature radio sets are not a fantasy. At our laboratories we are working on the use of transistors as one of the applications of electronics-in-solids. The prototype of the tiny personal radio is already in existence. The miniature radio will reach out to bring radio to everyone everywhere, opening up new types of personal entertainment and information services. Pocket and wrist radio sets will become standard equipment for millions of people. Far from being a victim, radio is a beneficiary of science and technical progress.

"I for one will not cast a vote of 'no confidence' in the future of radio," said General Sarnoff. "I am convinced that there is and that there will continue to be a large audience and substantial advertising revenue for a national radio service. This does not mean that the field

is unlimited, or that everyone in it is sure to survive. I believe, however, that the field will remain large enough to support those networks which possess basic strength, a true sense of their obligations to the public, and a capacity to adapt themselves to the new facts of life."

"I do not see the picture in radio as one of unrelied gloom. Neither do I look upon it with the bubbling optimism that has characterized some public statements on the subject—as if resolute cheerfulness would solve all problems. Instead, I recognize that basic changes have taken place and are continuing to take place, and that they disturb the old patterns of this medium. Those changes have created new problems for radio, some of them real with menace, others exaggerated by unjustified jitters.

"But these new problems also point to new directions that radio must follow. If these directions are opened up without too much delay and are developed boldly, radio stations can continue to operate at a substantial profit, and a profitable network operation is also possible."

General Sarnoff pointed out that the number of radio sets in use is constantly increasing and radio listening is more widely dispersed throughout the home and outside the home. He called attention to the fact that in the first 34 weeks of 1953 more than 8,488,000 radio sets were sold in the United States, as compared with 6,519,000 during the same period in 1952—an increase of almost two million radios in the past year.

"For the past several years," he said, "more and more radio sets have been bought. They are going into bedrooms, kitchens, playrooms and bathrooms. They take the form of automobile radios and portable sets. Family listening is giving way to individual listening.

"In the first half of this year, the output of automobile sets almost equalled the full year's production of automobile radios in 1952. Sales of clock-radios are now higher than they were last year, and since 1947 almost half of all the radio sets sold were automobile sets, portables and clock-radios."

In calling attention to this vast new audience for radio, General Sarnoff decried the emphasis on program ratings, pointing out that the rating system leaves out of reckoning over 5,000,000 homes with three sets or more. It ignores listening to 5,000,000 sets in public places, millions of portable sets and more than 26,000,000 automobile sets. "In short," he said, "radio is judged on rat-

ings that have lost touch with the realities of the medium."

Ratings not only fail to measure the true size of the radio audiences, General Sarnoff said, but they do not even undertake to indicate the quality and influence of the medium, and concentration on this limited quantitative standard has led to a failure to recognize radio's real values.

As examples of evils resulting from this situation, General Sarnoff cited the "nostalgic" tendency to devalue radio by comparing the size of its audience today with what it was in the past, instead of comparing radio with other media available today, in terms of their relative cost and effectiveness. He also called attention to the preoccupation with top-rated programs and the failure to give adequate recognition to the composition and influence of audiences to particular programs.

"Ratings, today, simply do not reflect the real audience," he continued. "They are certainly not conclusive on the essence of the matter, which is the ratio between listening and sales. We have found cases where competing advertisers were getting about the same ratings, but where one of the programs produced many more customers than the other. And we have also found cases where

competing advertisers were getting about the same sales effectiveness from their programs, although one had a much lower rating than the other!"

As evidence of NBC's real leadership of the industry General Sarnoff referred to its establishment of the first radio network, creation of great public service programs, development of black-and-white television, pioneering in UHF and developing and fighting for the adoption of compatible color television, all with earnest support from the RCA. Such achievements in leadership are practical evidence of NBC's basic strength and adaptability which will enable it to realize the potentials of radio's future. With the cooperation of its affiliates, NBC will lead the way with new paths for further development of network radio, offering a wider diversity of programs and advertising opportunities, he said.

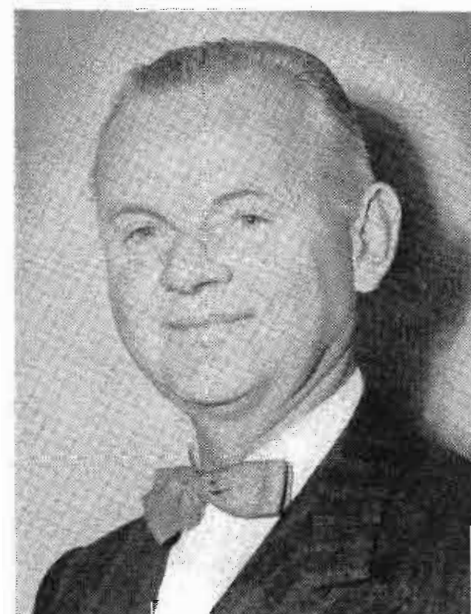
The importance of maintaining strong and solvent radio networks was stressed by General Sarnoff. Apart from their direct values to affiliated stations and the public stature they give broadcasting as a whole, the national network services are essential to the maintenance of democracy and security, he pointed out.

"Local services are important to the community," continued General Sarnoff. "But does anyone think that

FOUR OF THE MANY STAR-STUDED PROGRAMS THAT WILL



4 RADIO AGE



Lawrence Tibbett
in "The Golden Voices"
Sundays at 3:30 p.m. EST.

Fibber McGee and Molly
Mondays through Fridays
10:00 p.m. EST

radio could have become such a basic part of American life if it had been restricted to these local services? Does anyone believe that broadcasting would retain its stature with the public if network services were not maintained?

"It was easy access to nationally known performers, to great orchestras and great drama, to the products of nationwide and worldwide news organizations — in sum, to the network offerings — that made broadcasting indispensable to people throughout our land. Americans became dependent on broadcasting because network services brought them instantly the great events and issues and personalities of the day and the hour.

"Our national democracy is geared to immediate and direct availability of a national audience," he said. "This is dramatically obvious in a Presidential election campaign and in wartime, but it holds true at all times. One of the central problems in this age of peril is that of continuous contact between our citizenry and its Government. Only broadcasting can alert the entire nation instantaneously and simultaneously in time of danger. Subtract the nationwide network system, and these all-important factors for democracy and security are lost.

"Under the circumstances, would Government have any alternative but to step in and provide its own national

service? If free enterprise should fail in this aspect of broadcasting, it will be endangered in all other aspects. Let there be no illusions on that score. The very existence of the industry on a competitive free-enterprise basis would be jeopardized.

"And let us reflect also on the role networks play in the economics of all station operations. Because one independent station in a community is thriving on 'music and news', some folks assume that all stations could do likewise. They forget that such a station siphons off the major portion of a highly specialized audience. In most communities, such a specialized audience is not large enough to support more than one or two radio stations.

"Strong and solvent networks," General Sarnoff declared, "are essential to healthy station operation. As in any industry in time of transition, we can look for the survival of the fittest. But in an industry like ours, which rests on 'public interest, convenience, and necessity', the tests of fitness are highly exacting. They certainly do not include policies of expediency, flash performance, talent piracy, or the kind of practices which focus on today and ignore tomorrow. The real tests of fitness of a radio network's capacity for leadership are its far-sighted concern for the well-being of the industry as a whole, its deep

HIGHLIGHT NBC'S NEW FALL SERIES OF RADIO FEATURES



Senator Ford
in "Can You Top This?"
Mondays through Fridays
10:15 p.m. EST.

Hume Cronyn and Jessica Tandy
in "The Marriage"
Sundays at 7:30 p.m. EST.



Statement on Behalf of NBC Radio Affiliates

We were unanimous in our enthusiastic reception of the overall plans and proposals presented to us today by the NBC executives for the revitalization of the NBC Radio Network and the strengthening of the medium.

The NBC radio affiliates endorse the new program concepts which show originality and basic soundness and which, coupled with the promotional supports and fresh, aggressive sales approaches which were outlined to us, give excellent promise of success.

This effort on the part of NBC is to our minds the most significant and constructive forward step which has been taken in the network broadcasting business in many years.

We were most favorably impressed with General Sarnoff's frank and cogent analysis of the present radio broadcasting picture and his penetrating views with respect to the future of radio.

It is our intention to continue the NBC Radio Affiliates Committee as a permanent organization with the present subcommittee continuing to function as an active liaison between the full committee and the network representatives.

It is our sincere belief that today's meeting constitutes an important milestone in the history of the NBC Radio Network.

We are confident that the approach taken in that meeting will aid materially in insuring the continuing effectiveness of the network as a vital public service and advertising facility.

The NBC radio affiliates have today pledged themselves to make every reasonable cooperative effort with the network officials to keep NBC in the number one position in American radio.

For the NBC Radio Affiliates Committee:

Handwritten signatures of eight members of the NBC Radio Affiliates Committee, arranged in two rows of four. The top row includes Robert J. Lucey, H. H. H. H., and Robert B. H. H. The bottom row includes Wayne Coy, H. H. H. H., and George M. Burbach.

September 17, 1953
Chicago, Illinois

NBC's Radio Affiliates issued this statement following outlines of the network's new programming plans by General Sarnoff and other NBC executives.

roots in the field of public service, and its record for fair play in relation both to its associates and the industry at large.

"Those who have built for the future, who have laid a program and sales base of permanent value, will have the staying power. Those who operate for temporary expediency, no matter how flamboyantly, will be conquered by problems for which further expediency will hold no solutions.

"I underscore these points because it seems to me desirable at the present crossroads of our industry's history to underline the difference between a responsible leadership that builds permanent values for itself, its associates and the entire industry, and a claimed leader-

ship that rests on opportunism and concentrates on the short-term private gain, regardless of consequences to the future of the business.

"Broadcasting is not a finished art or industry and it will never be static," concluded General Sarnoff. "Nor is the promise of the future limited to television. It extends to all applications of the electronics art, and it certainly extends to radio. The transistor development is only one of the possibilities for radio. Scientific invention can also be matched by imagination and creation in programming, in selling, in operating more economically, and in finding ways for networks and affiliates to progress on a basis that will be profitable and satisfactory to both."

NBC, General Sarnoff told the affiliates, is in business

for the long range opportunities, concerned with creating permanent values for its employees, for its affiliates, for the RCA, and for the nation.

Prior to General Sarnoff's address William H. Fineshriber, Jr., vice president in charge of the NBC radio network, said that NBC's new and separate radio organization is going forward with imagination and intelligence in revitalizing the network's radio program structure and meeting present-day needs of advertisers.

Fineshriber pointed out that the NBC radio network now offers a great variety of fresh, new half-hour programs for advertisers who buy on that basis, a number of new program forms which can be bought in small units by smaller advertisers, and a variety of shared sponsorship opportunities for advertisers who want to spread their radio advertising over different periods or supplement their other network operations.

Shared participation sponsorships will be available in a strip pattern, 15 minutes, five days a week or in two solid hours of daytime programs on Saturday and Sunday. The strip programs will be "Fibber McGee and Molly", 10 to 10:15 PM, "It Pays to be Married", 5:45-6 PM, and "Second Chance", 11:45-12 PM — all Monday through Friday. Advertisers will be asked to buy a minimum of three participations, each consisting of one commercial announcement, but they can distribute these commercial messages in any of the programs. A similar participation format has been established for "The Big Preview", Saturdays, 11 AM to 1:00 PM, beginning October 3 and highlighting all the new record releases of the week, and "Week-End", Sundays 2:00 to 4:00 PM, radio's new Sunday newspaper beginning October 4.

"We are thinking ahead to our long range future in radio," Fineshriber said, "because we expect to be in radio for as long ahead as anyone can see. And we are building for leadership — the sort of leadership that is founded on a solid base and can weather any storm.

"Radio provides certain services which no other medium can provide as well and it meets needs which no other medium can meet in the same way. If we build on these values, if we put network radio to work at the things it can do best, we will always hold enough audience to support a national service. And if we and our affiliates accommodate our network sales patterns to meet new advertising needs, we will build the revenue needed to keep the business solvent and to make it profitable for networks as well as for the stations.

"With the new radio organization, the new programming and renewed concentration on our radio problems, we are ready to go. Our purpose is to win and to hold for NBC first position in public attention, in audience, in advertising values and in sales. We expect to prove by deeds — and not just by words — the continuing vitality of network radio. And the new

values we are now building are not for short term demonstration purposes but for the permanent future."

Ted Cott, operating vice-president of the radio network, announced the details of NBC's massive frontal attack in radio programming. The 28 new program series which begin the week of October 4 constitute the greatest single mass programming operation in the history of the industry, he pointed out, and demonstrate NBC's basic decision to meet today's programming needs with courage and imagination rather than by cautious, timid or tentative experimentation.

Block or mood programming has given each night of the radio week on NBC a flavor and individual character of its own, Cott explained. "Vertical mood programming of this kind in blocks means better and stronger audience reaction by engaging the attentions of the public who can settle down to mood rather than smorgasbord," he pointed out. Sunday night will feature drama; Monday, music; Tuesday, mystery and adventure; Wednesday, comedy; Thursday, comedy and audience participation; Friday, all comedy; Saturday, a "prestige" block from 6:30-8:00 PM and "hillbilly" programs after 8:00 PM.

Middle West Press Views RCA Compatible Color TV

Compatible color television was viewed for the first time by the Middle West press when the National Broadcasting Company held a special showing of the RCA compatible color system in Chicago on September 22.

The program, a variety show, starring Nanette Fabray and the "Hit Parade" dancers, was viewed in the Drake Hotel over a closed circuit from NBC's Colonial Theatre in New York, world's first fully equipped studio for compatible color. It was not broadcast.

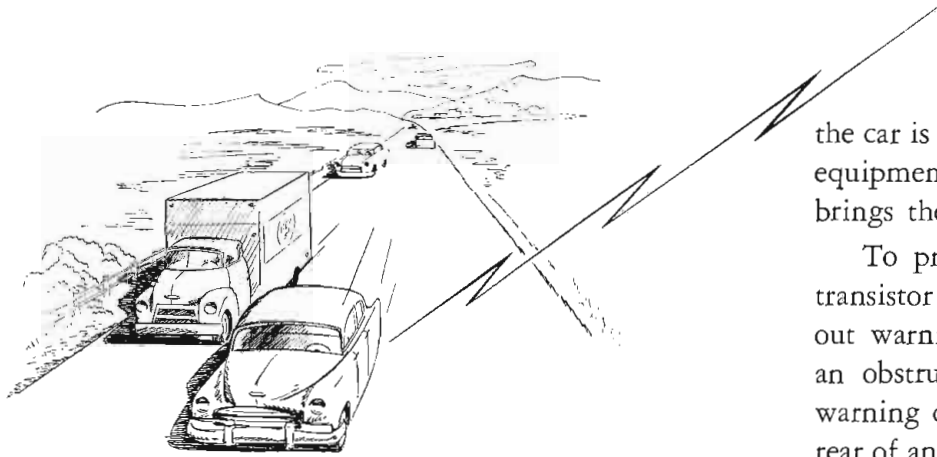
The press demonstration followed private showings at the annual meeting of the Association of National Advertisers.

The performance was viewed over developmental Radio Corporation of America color receivers, which have the same shape and dimensions as standard black-and-white console models.

Compatibility of the system was demonstrated through black-and-white receivers placed beside the color sets. The black-and-white images resulting from the colorcast had high-definition quality.

Sylvester L. Weaver, vice chairman of the NBC Board, in charge of TV network programs, and O. B. Hanson, vice president and chief engineer of NBC, were interviewed following the showing and related the network's preparations for colorcasting, and its plans for the future, contingent on FCC approval of standards.

An Automobile that Controls Itself by Electronics



AN exploration of how electronics can be put to work to reduce highway disasters and to relieve drivers of tiresome tasks on modern superhighways has been initiated by Dr. V. K. Zworykin, pioneer television and electronic scientist of the Radio Corporation of America.

Recent electronic advances, such as the tiny, power-thrifty transistor, indicate that electronic aids to many automobile driving problems are approaching the realm of practical application, according to Dr. Zworykin. Although the day of completely automatic control of automobiles is far off, Dr. Zworykin said, certain electronic devices to assist drivers in such matters as bad weather steering and collision prevention are nearer at hand.

To study the basic problems of automatic driving, Dr. Zworykin and assistants at the David Sarnoff Research Center of RCA, in Princeton, N. J., have equipped a model five-foot car with electronic equipment. This laboratory car, which is powered by a storage battery, can:

1. Steer itself along a prescribed route.
2. Stop itself when approaching a metal obstruction.
3. Turn out of its original lane into a second lane as if to pass another car moving at a slower speed.

Model Car Guided by Wire

In the laboratory set-up, the model car is guided by a wire which represents a cable that would be laid in the roadbed of a superhighway. The wire sets up a magnetic field of a certain frequency which is picked up by the two coils, one on each side of the car. If one coil receives more of the signal than the other it means

the car is no longer centered over the wire and electronic equipment controlling the steering wheel immediately brings the car back "on course."

To prevent a collision with an obstruction, simple transistor circuits associated with the guidance wire send out warning signals (of another frequency) whenever an obstruction passes or is stalled over them. These warning circuits, in effect, produce a "radio tail" at the rear of any sizable metal obstruction on the route. When equipment in the model car receives the warning signal, the brakes are automatically applied and the car comes to a halt.

To simulate two lanes in the same direction, Dr. Zworykin has parallel guidance wires with a diagonal wire connecting them. When the model car senses the radio tail of an obstruction in the inner lane, its electronic equipment shunts it along the diagonal into the outer lane so as to pass the obstruction.

A system of warning circuits in the roadbed to produce a "radio tail" when an automobile passes over would be quite impractical with electron tubes, Dr. Zworykin pointed out. Such circuits would be needed approximately every 20 feet and the electrical power to operate the tubes would be enormous, he said. But when transistors are available in large quantity at low cost, he said, such circuits become feasible because power consumption would be only one millionth of that required by tubes.

Dr. V. K. Zworykin makes an adjustment on his electronically controlled model automobile.



In experiments with the model car, Dr. Zworykin has been assisted by L. E. Flory and W. S. Pike, RCA research engineers.

Discussing the trend toward modern highways on which driving is becoming both simple and tiresome, Dr. Zworykin said that "the time has arrived for consideration of automatic driving techniques which may relieve the driver of his routine duties whenever his car enters an express highway system.

"Even now," he said, "with power steering, control devices are used to guide the car in preference to direct steering. Similarly, with power braking, the driver supplies a control signal rather than the physical force required to slow or stop the car. The automatic headlight dimmer is another device to take over a routine function of the driver.

"The number of such devices may be expected to increase and it is not too early to examine ultimate objectives of driving simplification. Long-range advance planning appears essential in this field in view of the large number of parties vitally concerned. Successful development depends on the cooperation of governmental authorities, the highway builder, the car manufacturer and the safety engineer for the benefit of the individual driver and the public at large.

Basic Requirements of Automatic System

"The basic requirements of an automatic driving system harmonize with trends in modern highway construction," Dr. Zworykin continued. "The requirements are that the roads have at least two lanes in each direction and that crossings and left turns across traffic be eliminated by cloverleaves and similar systems. With these conditions satisfied, the stage is set for a gradual introduction of measures to reduce traffic risks and simplify driving procedures.

"The changes should necessitate neither sudden abandonment of established driving habits nor wholesale installation of new equipment on roads and vehicles. This means: (1) The driver must retain the freedom of choice of speed, within prescribed limits, and of choice of either manual or automatic control. (2) Automatic control systems must be restricted, initially at least, to high-speed long-distance road systems subject to special regulation, such as turnpikes and thruways. (3) Vehicles equipped with automatic driving devices must be able to benefit in mixed traffic, consisting of equipped and unequipped vehicles.

"It is clear that car owners and purchasers will not bear the added cost of the control equipment unless it proves useful under current conditions, namely with the vast majority of cars under purely manual control. At the same time it would be both politically and economi-

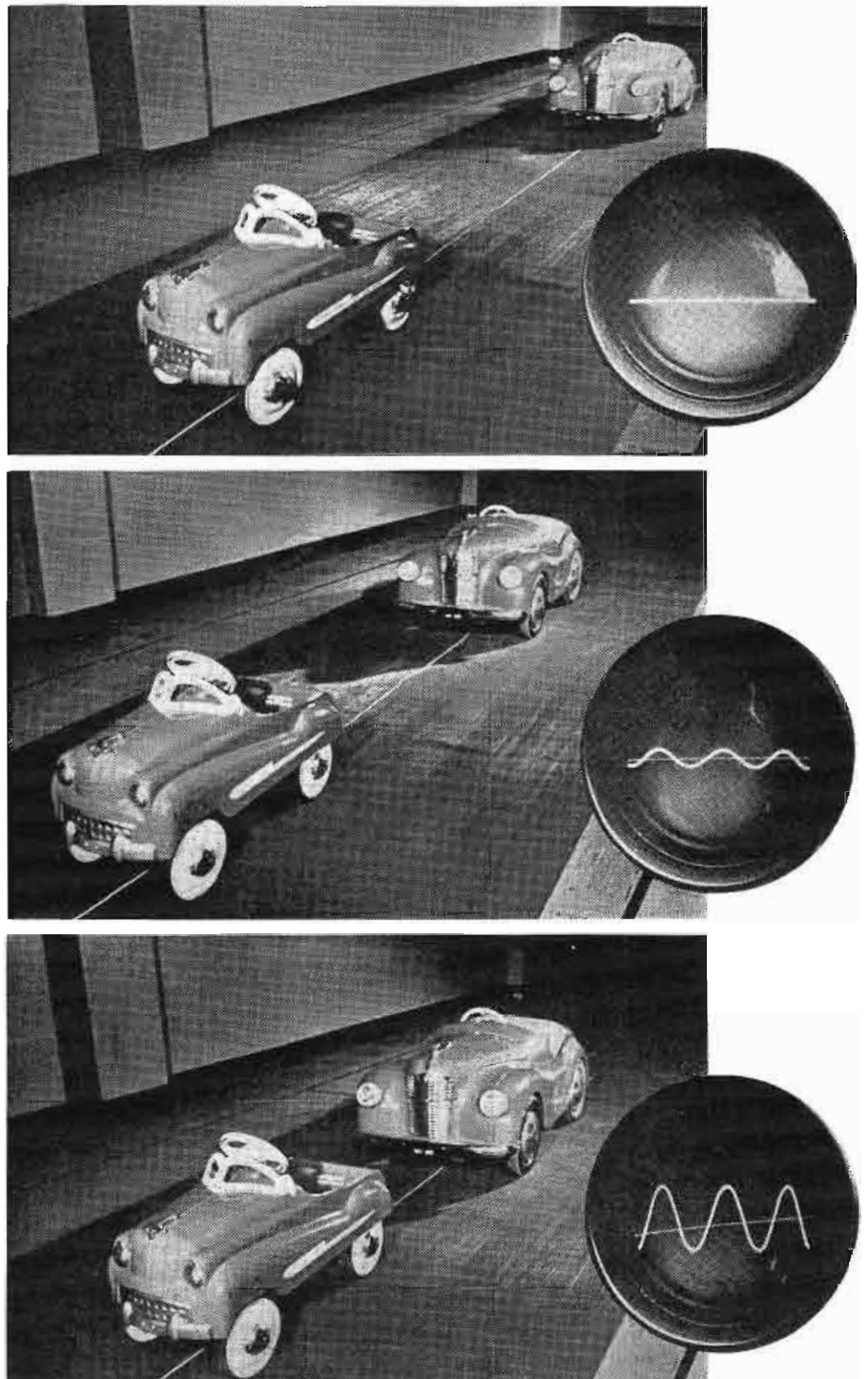


Photo by Carvello for Collier's

Electronically controlled model car receives a warning signal from the roadbed cable as it nears the leading car. Oscilloscope patterns at the right show the increasing strength of the signal at three positions of the rear vehicle.

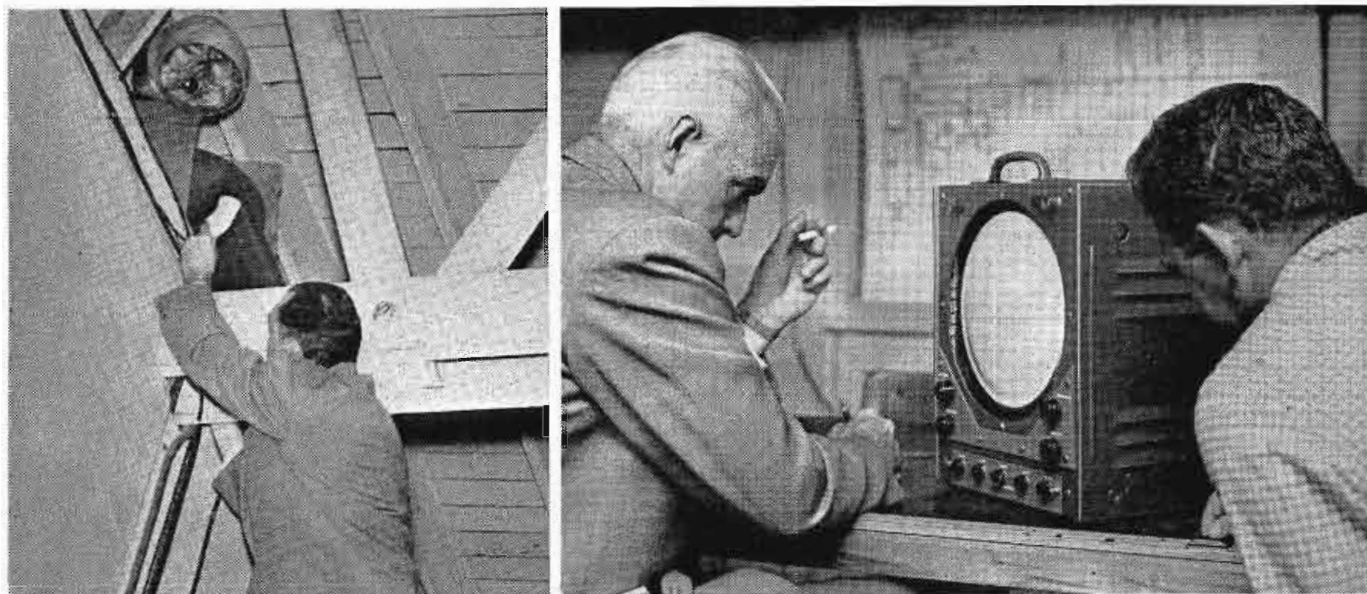
cally impractical to restrict traffic on high-speed road systems to equipped cars.

"As a first step, equipment should be provided to enable the driver to keep his vehicle centered on the traffic lane under conditions of fog and poor visibility in general. This may be accomplished by a cable, buried in the concrete, carrying moderate-frequency alternating currents (of the order of 100 kilocycles) and a pair of magnetic pickups mounted on the car. The difference in the signals derived from the two pickups may be used

(Continued on page 24)

Industrial TV Turns Detective

Vidicon Camera Unit Spots Thieves at Work and Makes Possible Quick Recovery of Valuable Radio Equipment



Technician inspects industrial TV camera hidden in air vent over warehouse loading platform to "spy" on thieves who robbed a West Coast RCA plant of radio tubes. At right: detectives watch screen which revealed culprits at work and led to their arrest.

INDUSTRIAL television turned detective recently and solved a case by giving police an eye-witness view of thieves at work.

The locale was a stockroom of an RCA television service branch in Hollywood. Inventories had disclosed that television equipment was being stolen on a substantial scale—some \$38,000 worth (covered by insurance) was missing on the initial check.

Officials on the spot, recalling the success of RCA industrial television equipment in functioning as an "eye" in locations too dangerous or inconvenient for human observers, decided to try the device as an electronic witness to the crime. Summoning the police, they concealed the camera unit among the rafters of the stockroom with the lens focused on the loading platform. The rest of the unit—the TV receiver and viewing screen—was placed in a second-floor room some distance away.

Daily for two weeks, the TV "eye" was trained on the loading platform as police watched at the receiver. The camera recorded the routine activities at the platform—but it also recorded the suspicious actions of one clerk, who casually placed a number of boxes of TV tubes on the loading platform during the lunch hour on Tuesdays and Thursdays when few other people were around. At apparently pre-arranged intervals, a pick-up truck would back into the driveway, the boxes would be put aboard with the help of the suspect, and the truck would pull

away—all before the gaze of the camera and the interested watchers at the TV screen.

Once the facts had been made clear by the TV unit, the trap was set. The police at the receiver waited until the truck took off with another load of tubes. As they moved in to arrest the clerk, a police car trailed the truck to its destination and seized the driver and two alleged confederates.

The hero of this story is an industrial TV unit which already has been put to scores of uses—patrolling, guarding, transmitting fingerprints and signatures, checking numbers of freight cars, supervising operations of machinery at a distance, riding rockets, and generally fitting itself handily into locations where direct view is required and the human eye cannot go.

Its efficiency in these operations, and in its newly-acquired detective role, stems from the compactness of the camera and the fidelity with which it transmits what it sees. The RCA Vidicon tube, heart of the system, is only six inches long and an inch in diameter. The camera that is built around the tube is no larger than a 16-mm movie camera and is easy to handle.

The unit is completed by a connecting cable and a compact control monitor with a ten-inch viewing screen. Other receivers can be attached to the monitor if required, and the controls allow the camera focus to be controlled from the receiving end.

New Microwave Relay to Carry Radiograms to and from RCA's Long Island Stations

A MICROWAVE control system capable of handling all signals between RCA's Central Radio Office in New York and the company's overseas transmitting and receiving stations on Long Island is expected to go into operation within the next few months. This radio control system, operating on ultra-high frequencies, eventually will replace almost all wire lines presently linking the same points under lease from the New York Telephone Company.

The map gives an indication of the path of the new system. Signals from the Central Office will go out from transmitters on the roof of the City Bank Farmers Trust Building in downtown Manhattan. At a point some distance out on Long Island, transmitting and receiving equipment, housed atop a tall antenna tower, will relay the signals to and from Riverhead and Rocky Point. This relay station is situated approximately half way between the two extremes of the system.

Microwave relays are not new to RCA operations. As early as 1934, the company operated VHF channels between New York City and Philadelphia.

To some extent this present system is unique. It operates in such a way that all signals are transmitted simultaneously over duplicate facilities to assure uninterrupted service. By sub-dividing a radio channel the same signal can be transmitted on different frequencies over duplicate transmitters and receivers working independently of each other. Thus if the equipment on one

channel should fail the signal will still get through.

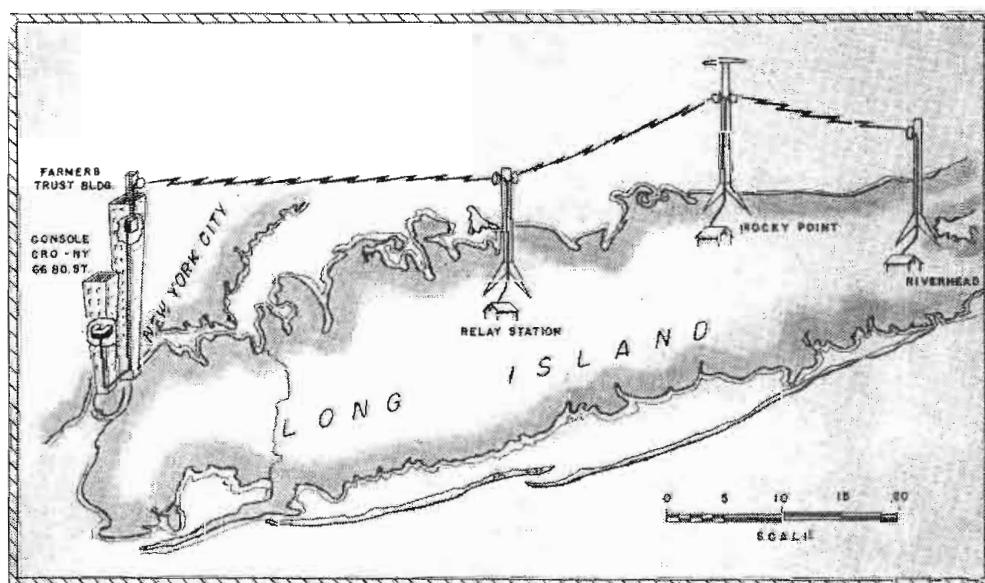
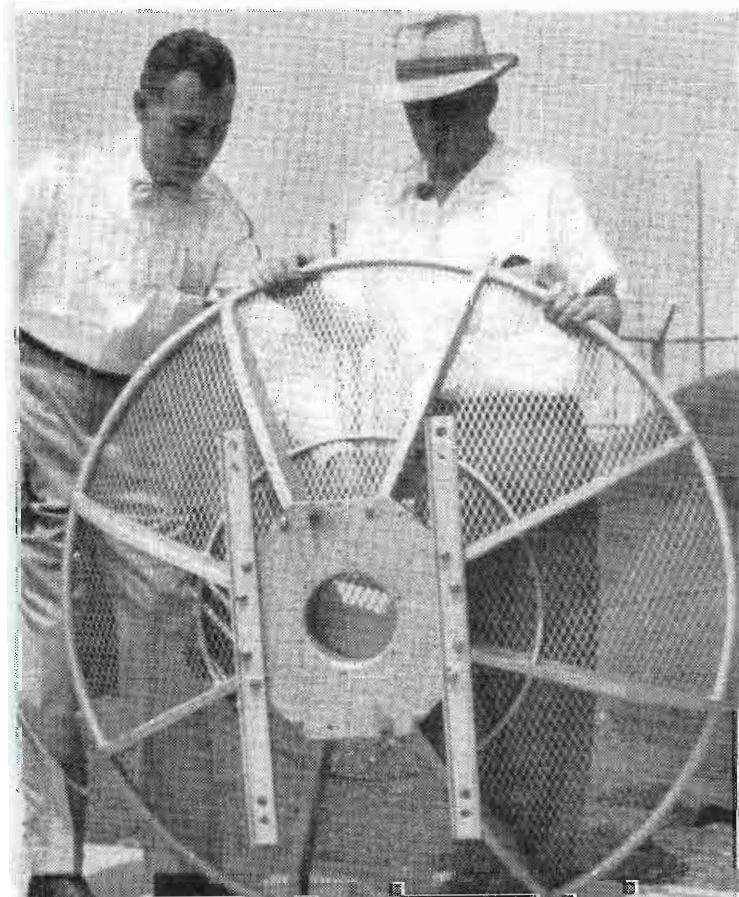
This duplication of facilities is important. Continuous public service twenty-four hours of every day and experience has shown that no single piece of equipment can withstand this constant strain.

In designing this system RCA engineers placed reliable public service above everything else. All equipment is designed to operate automatically and to signal at either end of the system in the event of emergencies such as power failure, high temperatures due to fire, etc. The automatic signalling will also warn of equipment failure, including even a black-out of the flashing beacon on top of the tower.

The microwave equipment used in this system is the RCA Victor Type CW-20 consisting of 12 three-watt transmitters and 12 receivers. It operates on unusually short antenna elements. Compared to the average TV antenna, which is approximately 24-inches long, this system uses a three-inch antenna element backed up by parabolic reflectors measuring 4 to 10 feet in diameter.

The system will operate in the 2000 megacycle band by authority of the Federal Communications Commission. This part of the spectrum has been assigned for similar radio control system such as those in service along pipe line routes and along the New Jersey and Pennsylvania turnpikes. Signals operating in this frequency band are less subject to fading due to rain and

(Continued on page 23)



Left: RCA engineers Williamson and Sadler inspect one of the microwave parabolic antennas used in the Riverhead-to-New York relay system.

This electronic memory device NEVER FORGETS

*In a Few Millionths of a Second it Accepts,
Holds and Releases any Part of 10,000
Units of Information*

By Joseph L. Blotner
RCA Laboratories Division,
Princeton, N. J.

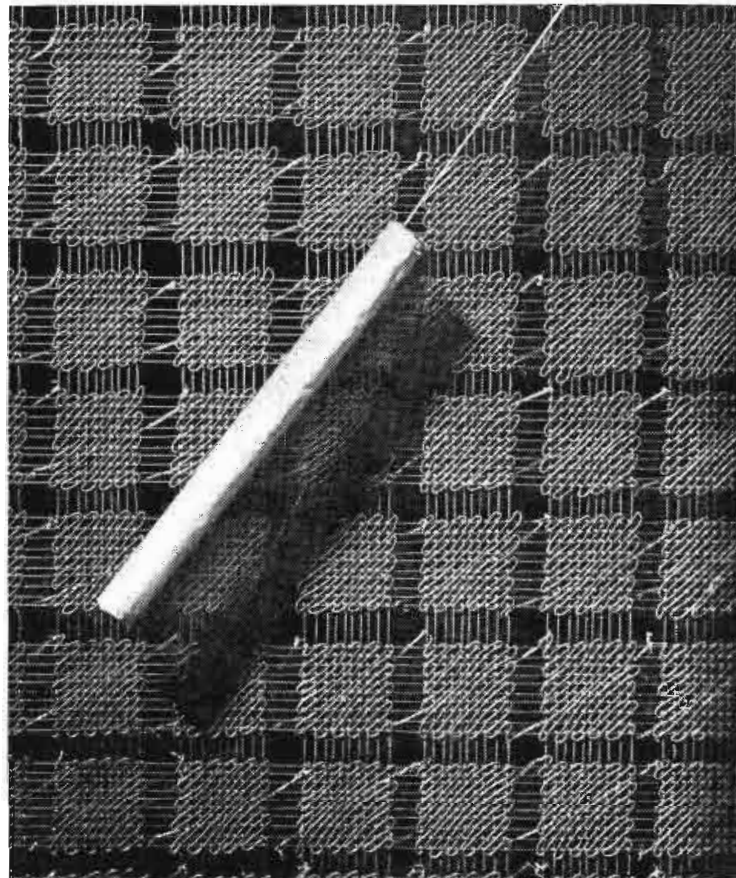
IN the short time since World War II, the electronic computer has grown from infancy to a healthy adolescence. Its next step to full-fledged adulthood will be helped along by one of the research projects under way at the David Sarnoff Research Center of RCA at Princeton, N. J.

The need during the war for fast, accurate fire control equipment and radar networks pointed clearly to electronic tools as the solution. Targets sped too fast for the old mechanical fire directing computers, just as the acoustical air-raid warning system was unable to cope with the new tactics of air warfare.

The computers which resulted from this war-spurred development took two basic forms called, respectively, the *analog* and the *digital*. In the analog system, voltage or current is varied to represent different quantities in the complicated equations to be solved. In the digital system, all the information is converted into numbers rather than varying voltage or current. The numbers are coded in terms of "on-off" signals. In the binary code, numbers take the form of a sum of powers of two. In the decimal code, numbers take the form of a sum of powers of ten. The code is chosen by balancing efficiency and versatility against practicality.

With the end of the war, research recognized the great value of these instruments. They could relieve scientists of long, wearying computations. In some cases, they could be used as a sort of crystal ball, to find out whether or not equipment would work even before it was built. Progress in their development was rapid and a fairly standard computer design soon took shape.

The Input, perhaps in the form of a teletypewriter and tape, puts information into the Memory. The Control executes orders stored in the Memory. Next, the Control actuates the Arithmetic Unit to perform the cal-



Minute size of the Myriabit elements is emphasized here by the cigaret which spans more than three groups of wires and cores comprising 300 units of information.

ulation, and then transfers the result to the Memory. Finally, the Control transfers the result to the Output.

It was soon obvious that the range and value of the computer depended largely upon its memory. The memory could be made very large, but if it was, it took too long to get information into and out of it. If this access to the memory's information was speeded up, it meant a sacrifice in capacity. To evolve a large memory unit with speed of operation was the problem which Dr. Jan A. Rajchman and his colleagues at the Research Center set out to solve.

It is possible to construct memories of various types. They can be tele-typewriter perforated paper tape, modern magnetic tape, or a rotating magnetic drum. In all of these types, unwanted information, often a lot of it, has to be passed over to get to the desired information. To eliminate this delay, Rajchman and his group developed a selective electrostatic storage tube which gave immediate access to any specific storage element without traversing many others. This was the first practical random access high speed memory.

The tube contains 256 tiny metal eyelets called storage elements. These elements are kept at a positive or negative potential to represent the information to be stored. The information is held prisoner in the eyelets by constant electron bombardment, which keeps the negatively charged eyelets negative. A mechanism depending upon secondary emission, keeps the positively charged eyelets positive. On one side of the eyelets are rows of parallel wires, one row vertical and the other horizontal. The wires thus form a window around each eyelet. The electron bombardment can be stopped at all but one selected window by applying negative signals to appropriate groups of wires.

How Information is Inserted

To put information into this element after it has thus been selected, an electrical signal is fed to all the eyelets. But only the selected eyelet is receiving current at that instant, hence it is the only one that can register the information. The current is then immediately restored to all the other elements so that they will retain the information they had.

To read information out from a specific eyelet, it is again selected. If it is at a positive potential, some of the current directed to it will go through the tiny hole in its center and strike an output electrode, showing that the eyelet is positive. If the eyelet is at the negative potential, the electrons do not pass through the hole because the eyelet acts like the grid of a radio tube and effectively cuts off the current. This absence of current shows that the eyelet is negative.

This 256-element tube was put into production and

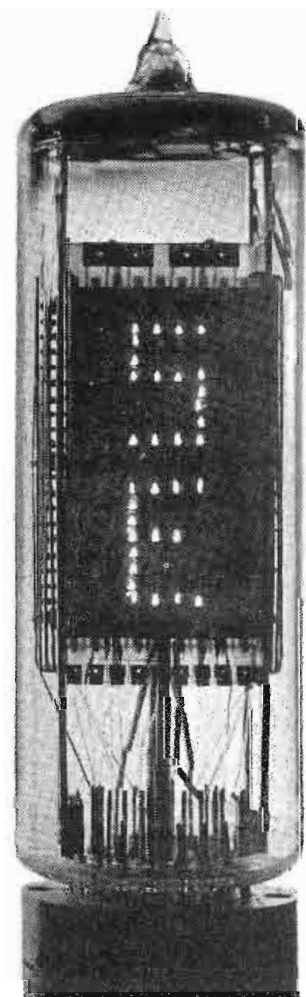
used successfully in several computers. Even so, Rajchman and his group realized that it was only an intermediate step in the development of the ideal, high-speed electronic memory. The tube was limited in storing capacity and relatively expensive.

Rajchman and his co-workers went on to develop the Myriabit Magnetic Core Matrix Memory. Myriabit is a descriptive term made up of the Greek word "Myria" meaning "ten thousand" and "bit" which means, in computer language, one unit of information. The heart of this advanced form of memory is two sets of a hundred wires each, one set running at right angles to the other. At every point where two wires meet, they run through the center of a magnetic core. The wires are spaced into groups of ten, so that the cores are separated into one hundred groups of a hundred each.

The thin, tiny cores, about the size and shape of a typewritten letter "o", are made of a special ferromagnetic material. A current flowing through two of the wires will switch the polarity of the core at their intersection. Whether the polarity is positive or negative depends upon the direction of the current. A core is affected only when it receives a signal from both wires running through it. Current in one wire is not enough. By establishing the core's polarity, the current fills it with as much information as it can take.

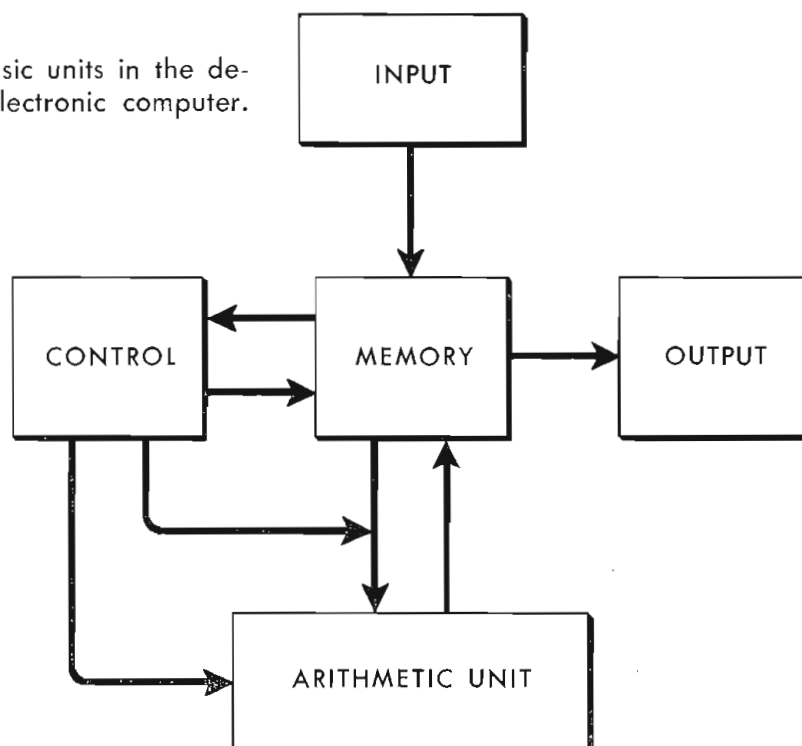
Device Holds Information for Years

Information is taken from the memory in much the same way. If the currents, when they reach the core, trip it from positive to negative, or vice versa, this change sends a signal through a wire running through all the



Selective electrostatic-type storage tube with capacity of 256 units.

Typical relation of basic units in the design of a standard electronic computer.





Dr. Jan A. Rajchman holds one of his Myriabit Magnetic Core Matrix Memory units which is capable of retaining 10,000 bits of information until needed.

cores. If there is no reversal, there is no signal. But whichever happens, the contents of the core are thus known. If a reversal of polarity does take place in this process, associated circuits immediately return the core to its former state, so that no information is lost or changed. The cores never wear out, and they are able to hold the information for years.

The Myriabit Memory represents a tremendous advance over tubes and the other devices that went before it. The present capacity is 10,000 units of information but the prospect is for millions of units. Speed of input and access is a few millionths of a second. Its simplicity and economy of space are outstanding, particularly when compared to the relatively huge vacuum tubes.

Some Possible Applications

Impressive as the Myriabit Memory is by itself, it is most striking as a functional part of a working computer. The jobs a computer may be asked to do fall roughly into three types: scientific computation, bookkeeping, and control.

In the first group are problems like this: A scientist wants to test a theory for gross weather prediction—weather for the whole United States, for instance. He goes to last week's weather maps and turns the data from each weather station into numbers. These numbers, representing readings on precipitation, pressure, temperature, and wind direction and velocity, are fed into the computer's memory. The theory is turned into formulas

and thence into arithmetical operations which are also put into the memory. The control unit is then programmed to make the arithmetic unit process the weather data from the memory in accordance with the theory. After this is done, the control transfers the result to the memory and then to the output. The scientist takes the result and compares it with the weather that actually occurred to verify or disprove his theory. In this way, the electronic computer quickly and efficiently solves what would have been a tremendously complex problem for one man using ordinary computing methods.

Computer Able to Solve Flight Problems

The computer is equally able to attack problems of supersonic flight. A scientist in that field might be faced with this problem: What kind of turbulence should be expected at various sections of an experimental wing at varying speeds, altitudes, temperatures, and attitudes of flight? To get the answer, he puts all the variables into the memory, adds the known laws or theories that govern, and programs the control to solve the problem. The result may tell him that an aircraft with this wing will stay together and fly at supersonic speeds. On the other hand, it may tell him that it should go no farther than the drawing board.

When the computer has a bookkeeping function, its job may be, for instance, computing gas and electric bills. The solutions to the previous problems depended heavily on the computer's manipulation function. In this case, it is the storage function which is more important; the arithmetic part is elementary. For each new bill to be correct, the computer is required to remember these facts: the previous meter reading, the current reading, the current rate being charged, the type of customer, the date of billing and whether or not the last bill was paid.

A similar job for the computer exists in the insurance business. A computer would remember what the premium rate was, when it was due, and whether or not the policy had been converted. It would authorize the sending of overdue warnings, and the payment of dividends and claims.

A good example of the control function is in the making of nylon. Qualities desired in the final product—elasticity, wearability, washability, etc.—are complex functions of how the ingredients and processes in the production are varied. Since mass production is a continuous process, the production factors must be continuously related to the desired qualities. This process involves fairly complex computation, now performed by a staff of human operators. An automatic computer could be introduced here, almost as a straight substitute.

Some problems combine the bookkeeping and control functions. Take, for instance, a large Army supply depot.

(Continued on page 24)

High-Fidelity Phonographs and Recording Techniques Developed by RCA

HIGH fidelity sound reproduction, until recently the province of the music-loving hobbyist, made its debut as a new RCA development for the mass market in a public demonstration held on October 8 at the RCA Exhibition Hall in New York.

Before an audience of reporters and music critics, officials of the RCA Victor Division and scientists of the David Sarnoff Research Center surveyed the progress of recording and phonograph development over the past fifty years and predicted a future in which high fidelity equipment will be a standard feature of the American home.

Against this background was demonstrated the new high fidelity line of "Victrola" phonographs in the popular price field and the new RCA Victor series of intermatched components for home assembly of more elaborate high fidelity systems. The ready-made units, designed for the mass market, included a table model instrument priced at \$139.95 and a console priced at \$275 with a companion speaker at \$89.50. The series of components, comprising various combinations of record players, tuners, amplifiers, speakers and enclosures, permits the assembly of systems costing up to \$1,000.

Henry G. Baker, Vice President in Charge of the RCA Victor Home Instrument Department, expressed the RCA conviction that public interest in high fidelity sound reproduction is far more than a passing fad.

Demand May Triple Sales in '54

"It gives every evidence of being a logical progression in the development of more mature musical tastes by the American people," he told guests at the demonstration. "And it coincides with the perfection of new sound reproduction equipment that makes it possible for the industry to provide the quality of home musical listening that the public wants and is ready for."

Mr. Baker described the growing interest in high fidelity as both an opportunity and a challenge to the entire industry. Depending upon the willingness of the industry to respond to the challenge, public demand may boost this year's estimated sales of \$70,000,000 worth of high fidelity components to a total of between \$200,000,000 and \$300,000,000 in 1954, he said.

George Marek, Director of Artists and Repertoire for the RCA Victor Record Department, credited public interest in high fidelity with "far-reaching" impact on

repertoire and predicted that volume production of high fidelity records and phonographs will open new fields for classical music recording. The higher standards of musical enjoyment that can result from the expansion of high fidelity listening holds out the prospect that record sales may increase from the present \$225,000,000 annual volume to more than \$300,000,000 within the next five years, he said.

A Glimpse of the Future

The steady progress of sound reproduction from the earliest type of phonograph portrayed in the RCA Victor trademark, to the new high fidelity home instruments was outlined to the guests by Dr. H. F. Olson, Director of the Acoustics Laboratory at the David Sarnoff Research Center. Dr. Olson is the designer of the famed duo-cone speaker, which is used for the first time as a home instrument in the largest of the new RCA high fidelity units.

After referring to past development of faithful sound reproduction, in an effort to improve motion picture sound and radio broadcasting, Dr. Olson presented a glimpse of the future with the first public audition of a new recording and production system involving an improved variation of the binaural technique. The system achieves its dramatic and lifelike effect through dual sound-track recording and the use of double amplifiers, sound pickups and loudspeakers for reproduction. Although the system is not yet ready for the home, Mr. Baker pointed out that it indicates the great progress being made in the developmental stage.

The demonstration also marked the first public playing of multiple-track recordings by any major record company, with a presentation of the experimental RCA Victor recording of the "Roumanian Rhapsody" performed by an orchestra under the direction of Leopold Stokowski.

The high fidelity phonographs, which are being introduced through RCA dealers throughout the nation, are capable of handling records of all three speeds and are equipped with an interchangeable "slip-on" spindle for 45-rpm records. Both models contain Olson-designed speakers — an 8-inch in the table model and a 12-inch in the console — and both are capable of driving external speakers.

Radio Frequencies Measured to Order

Precise Instruments Developed by RCA for its Measuring Laboratories on Both Coasts Instantly Detect Transmitters that Stray from their Allotted Channels

MORE than a million radio stations of all kinds on land, sea, and in the air, have been authorized by the FCC. Each one of these stations is licensed to operate on one or more specific frequencies from which the operators may not deviate without facing severe penalties. If a station, as in broadcasting for instance, should stray a very small amount from its proper channel, its signals would clash with those on the adjoining channel. If this situation were allowed to exist generally, complete chaos would follow. The result could lead to a complete breakdown of the country's radio communications.

RCA foresaw the need for strict policing of the air waves soon after the company was founded in 1919. At first the measuring service was conducted only for RCA's own transoceanic circuits, but in 1931 its highly precise monitoring service was made generally available on a commercial basis. Monitoring facilities were established at Point Reyes, California, and Riverhead, N. Y.

The first users of the service were the broadcasters. With monitors operating on both coasts, service could be provided for any radio station in the country. Then, as additional types of radio usage were developed, facilities were expanded to cover the widening frequency spectrum. Today, RCA's Frequency Measuring Service can make measurement for transmitters within the range of 13 kilocycles to 500 megacycles. Included in this range are aircraft and police radio, maritime transmissions, FM and television broadcasters, to mention only a few. Measurements can be made for foreign stations as easily and as accurately as for domestic transmitters.

Wide Variety of Antennas Required

In order to render accurate measurements throughout all bands in the useful spectrum, a wide variety of antennas is required. These range from Beverage Wave Antennas, seven to nine miles long, serving the very-low-frequency classification, to small, directional ultra-high-frequency dipoles.

Television and FM stations are currently measured by RCA at distances up to 500 miles, depending upon antenna heights, intervening terrain and transmitter power. With activity in this type of broadcasting increasing, every effort is being made to extend the service range by providing the maximum practical height of receiving antennas on both coasts, together with extreme sensitivity of the associated tuner units.

On the remainder of the spectrum in use, however, RCA frequency measuring stations provide essentially worldwide coverage.

The equipment at RCA's Frequency Measuring Laboratories has been designed for measuring operations of the highest attainable precision. In line with this advance, modern crystal controlled equipment long ago supplanted the original temperature controlled wave-meters of the Twenties.

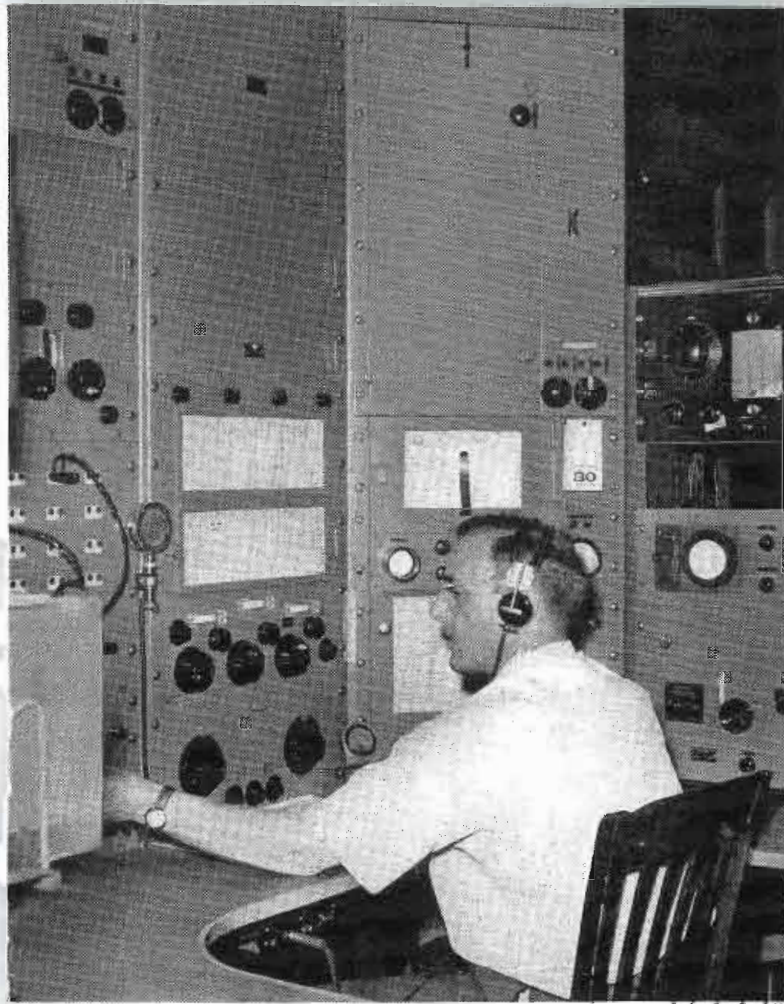
After the signal to be checked has been selected from the air through proper antenna facilities, it is tuned in on a highly sensitive receiver. Provision is made for comparing the frequency being measured with the exacting frequencies of harmonic generators, which are controlled by the output of a 100 kilocycle primary standard. This primary standard is carefully regulated with respect to temperature, air pressure and humidity. To prevent possible service failure, two identical standards are maintained, each completely housed in a separate container.

Standards are Checked Daily with Observatory

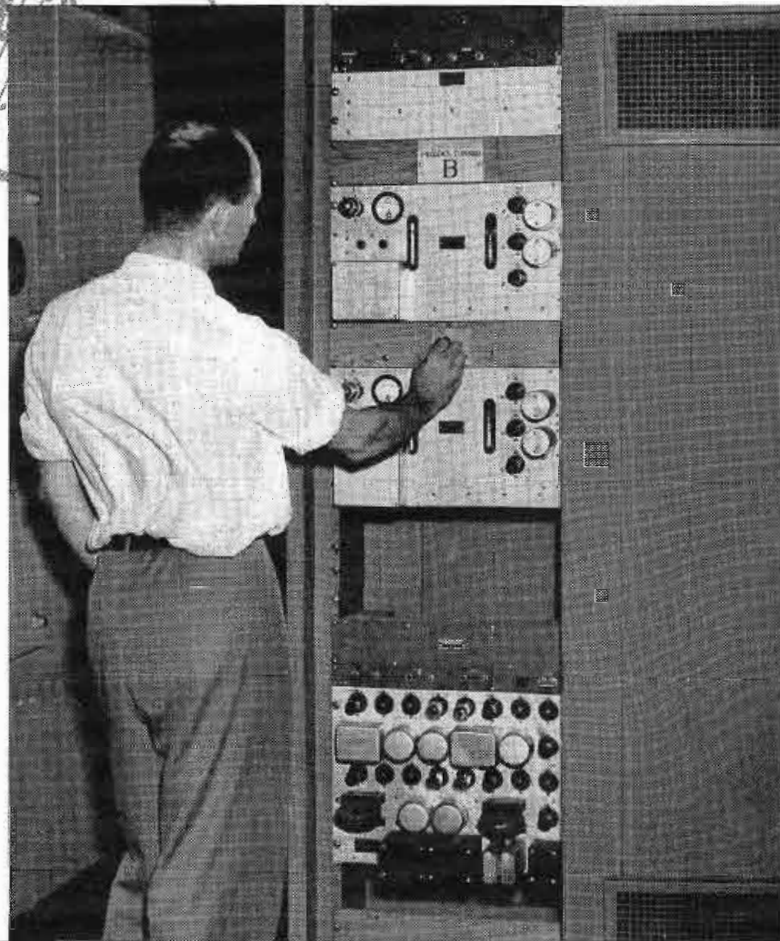
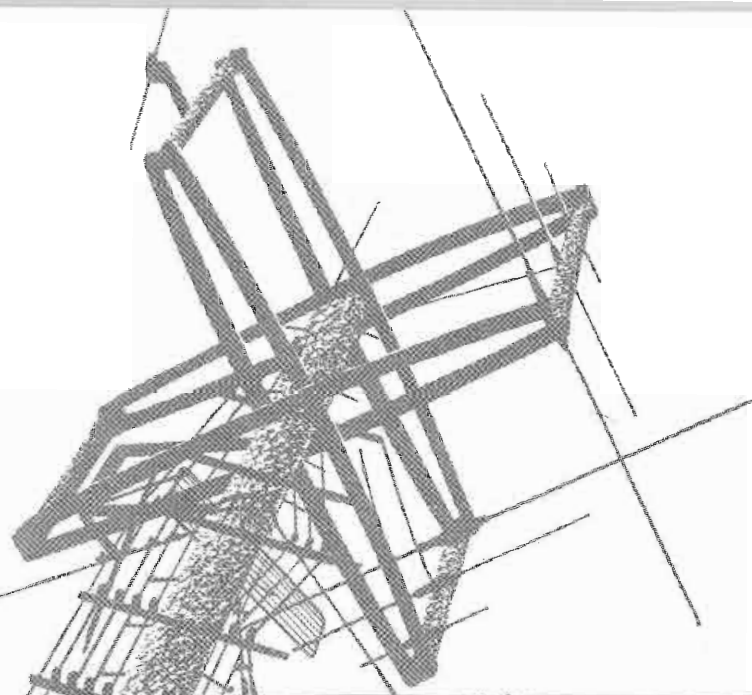
The standards are checked daily against time signals from the Naval Observatory, which maintain an accuracy of better than four parts in ten million.

To the uninitiated, it might seem a formidable task to select a signal in a part of the spectrum where many stations are operating, sometimes on the same frequency, as in the upper portion of the broadcast band. Actually, this problem is not a difficult one. So selective are the instruments at the two Measuring Stations and so effective are the special antennas that, normally, the signal to be tested can be easily singled out from all others. When this is not possible, arrangements are made for the station to transmit a constant tone after it has signed off programs for the night. The tone permits the engineers at Riverhead or Point Reyes to pin-point and check the station's frequency even though other broadcasters using approximately the same frequency, are still on the air.

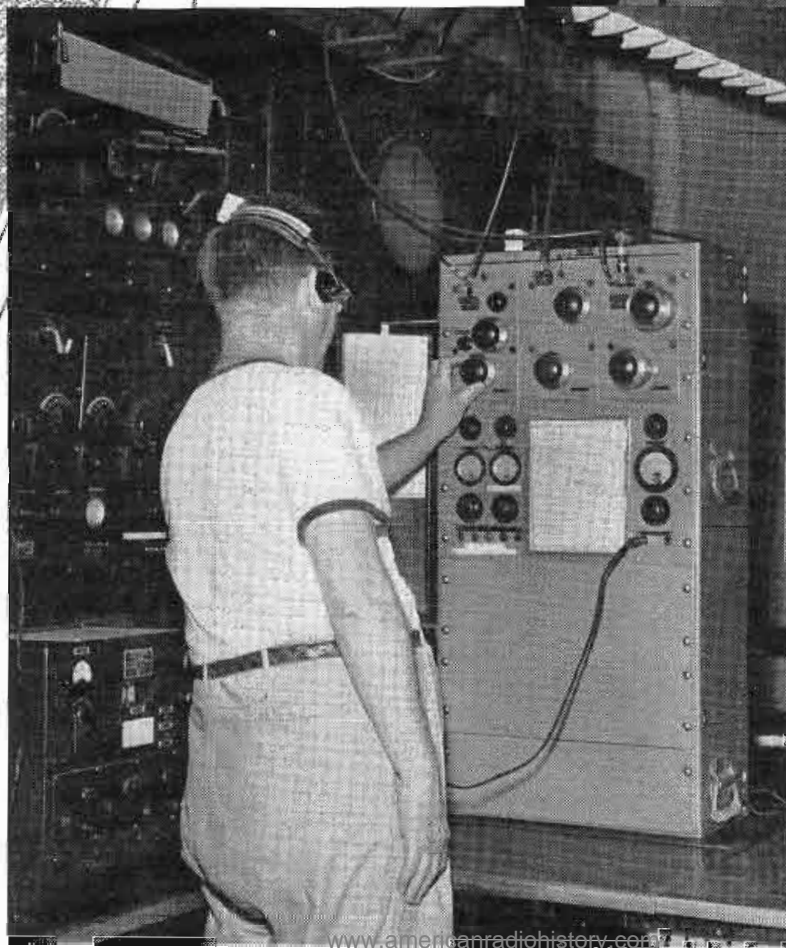
Considering these items of equipment, aided by the experience and skill of the laboratory personnel, RCA's Frequency Measuring stations can be described as being among the world's most completely equipped and accurate installations available for its types of commercial service.



Technician F. B. Kennell at the main operating position of RCA's Frequency Measuring Laboratory tunes in a radio station which is to be checked for accuracy of transmissions.



Station Engineer John M. Etter adjusts a crystal controlled frequency standard to which the frequencies of transmitters under test are compared.



F. G. Echeverria operates one of the highly accurate receivers at the RCA Frequency Measuring Laboratory, Riverhead, N. Y.

You've Got to be a Diplomat

To Film Washington News for NBC-TV

By Robert Abernathy

General Assignment Reporter, WNBW-TV

National Broadcasting Co.,

Washington, D. C.

ONE of the touchiest jobs NBC's Washington Bureau has to do is to cover the news of the Capitol on film. It's not enough for the cameramen and soundmen to know their trades technically—they've also got to be rare combinations of athlete, artist, and, most of all, diplomat.

From time to time Washington gets its share of good spot news like train wrecks and moonshine raids and, once, an assassination attempt on President Truman. The film crews get their share of drama, too, like the time one of the cameramen was thrown twice into a Cuban jail. But most of the time the big news in Washington is what somebody says or thinks—statements, opinions, arguments.

And this is where the diplomacy comes in. How do you tell the President he'd look a lot better if he'd comb his hair? How do you tell a United States Senator that the statement he's prepared is just plain too long, and he'd better cut it to one minute? How do you convince a wary new Cabinet member that he should explain his ideas for the cameras so the nation's TV audience can get to know him?

Somehow, through excellent contacts and Old World tact, NBC's Washington camera crews get their stories. Usually, they get them as they want them, with hair combed and statements cut.

Eight Years to Develop Techniques

Bringing the personalities and ideas of Washington into millions of television homes, through film, is a technique NBC has been perfecting for over eight years. The Washington film crews shoot for the Camel News Caravan, TODAY, the syndicated Daily News Service, New York's 11th Hour News, and Washington's Richard Harkness. Brad Kress and John Langenegger cover the Capitol. Al Simonson and John Hofen cover the White House. Irving Heitzner takes the rest.

Each morning in the NBC newsroom, Central News-



Soundman John Langenegger and cameraman Brad Kress of NBC's Washington news staff prepare for a film pickup at the Capitol. Two-way radiophone keeps the truck in constant communication with the network newsroom.

desk Manager Art Barriault and Camera Assignment Editor Bill Corrigan survey the stories that seem most important for the day and contact the crews. There's an important arrival at the National Airport, and Irving Heitzner is on his way to get 100 feet of silent footage. There's a hearing on the Hill that may get hot. Brad Kress and John Langenegger set up to record whatever happens. A key Washington figure visits the President. Simonson and Hofen are waiting for him when he comes out.

As the day's Washington news breaks, it's up to Barriault and Corrigan to dispatch the crews so that the top stories are covered—without exception. Sometimes the crews have to make mad dashes across town to be on hand for the next news conference. But they make it. A big help in speedy coverage is the NBC station wagon, equipped with radio-telephone for contact at all times.

Once the film is shot, it's picked up by NBC's motor-

cycle courier, Jim Curtis. He threads his way through Washington's crowded streets to the lab where the film is processed, or to the airport where it's shipped direct to New York. Always, Curtis has to move in a hurry. In 1949, Senator Tom Connolly announced at seven o'clock one evening that the first appropriation for Western Europe had just been passed to implement the North Atlantic Treaty. Brad Kress shot the statement and handed the film to Curtis. Jim ran for his motorcycle and headed for the lab, three miles away. The film was processed and edited and handed to Jim again. This time he took it to the studios, five miles from the lab. The film was on Camel Caravan that night, fifty minutes after it had been shot. Such feats, incredible at the time, have become standard practice.

David Brinkley supervises the editing of all Washington film for the Camel program. After conferring with the Caravan staff in New York, Brinkley edits the day's top stories, writes a script to back them up, and goes on the air with the report at 7:45 (EST). Jean Montgomery helps Brinkley with the contact work necessary to set up the special features for which the Caravan is famous.

Through the years of TV news film development, NBC's Washington Bureau has pioneered in the business of making the expression of political opinions interesting to watch. It has been a cooperative effort—TV has adapted to politics, and politics has adapted to TV.

The problem, of course, is mainly one of equipment. You could tape-record a Congressional hearing with relatively little paraphernalia and interference. But to



Jean Montgomery, Art Barriault and Bill Corrigan of NBC's capital newsroom look over possible news events that should be covered by camera crews.

cover it for TV, is another matter. Cameras and the necessary lights take up a lot of room. Committee chairmen in the Congress have understandably hesitated to permit film crews to cover their hearings because of the creation of what some of them call the "circus atmosphere." But, gradually, the Chairmen have become more tolerant as they have learned to know the crews and, equally important, the effectiveness of TV coverage.

Once when Senator Hoey was conducting hearings involving the famous "five-percenters," NBC's Capitol Hill cameraman asked him if he could shoot the proceedings. "Yes," said the Senator, "so long as I don't know you're doing it." The cameraman opened up his lens and filmed the hearing without lights. It's not a recommended photographic technique, but it worked, and it showed the Senator and his colleagues how NBC could adapt to their wishes.

Some rules stand inviolate. There has never been film coverage of a debate in the House or Senate, nor has there been sound-on-film coverage of a Presidential news conference. But the political leaders do adapt to television. Many times a Member of Congress will agree to express himself on an issue for the camera and when he does so, the statement turns out to be several minutes long and somewhat repetitious. The cameraman quietly points out that the take would be much more effective



Jim Curtis, of the NBC courier staff, passes the Lincoln Memorial on his way to the airport with a shipment of film intended for television.

if it were shorter—and also, if cut, would stand a better chance of being used. The Member of Congress usually sees the light.

NBC has pioneered in shooting statements in several takes, changing the camera angle and distance during a statement, to make the story more interesting to watch. NBC was first to use a hand camera so a story could be shot anywhere. And NBC was first with the idea of getting film interviews in interesting locales.

Radio Unit Tours Soviet Embassy

Vice-President Nixon and David Brinkley discussed the problems of the new administration while riding in a government Cadillac. It was filmed for Camel that night. NBC crews have gone into the Senate Dining Room, the Senate Barber Shop, and a Senate elevator to get stories. They filmed one conversation between Senators Humphrey and Morse while the Senators rode horses on Morse's Maryland farm. NBC was first to take the nation's television audience on a tour of the highly-restricted Russian embassy.

But the work is not all statements and how to make them interesting to the eye. Sometimes there is news of a more tangible nature. One morning last March the NBC cameramen were on their way to work when a bulletin went out over the radio that something had

happened at Union Station. To a man, each cameraman went over to see what was up. The result was the best footage shot by anyone on the now famous wreck of the Boston train, the "Federal Express," that had lost its brakes.

NBC's White House cameraman was on duty a few years ago when he heard shots from the street outside. He picked up his Auricon portable sound camera and ran out to see what had happened. The resulting pictures, on NBC that day, told a vivid story of the assassination attempt on President Truman in front of Blair House.

Brad Kress and John Hofen recall with much enjoyment the time they tramped through the Virginia hills with a posse of Federal revenue agents. While Kress shot, the revenue men ambushed, and destroyed, one of the most productive moonshine stills found in recent years. The only problem was that the dynamite used to destroy the vats blew their contents sky high. For what seemed like an eternity, it rained fermented mash. Kress and Hofen spent days trying to get their equipment clean again, and had some difficulty convincing their colleagues that the scent they bore came from an external source.

Cameraman is Jailed Twice

And then there was the time Kress was thrown into jail, twice, by a Cuban dictator. Brad was in Key West with President Truman when Julian Goodman, Washington's Manager of News and Special Events, called him up at two o'clock one morning. Could Brad get over to Cuba right away? There had been an insurrection and Juan Batista had taken over the government. Kress and John Langenegger contacted a Cuban airline near Key West. No luck. People could get out of Cuba, but nobody could get in. The NBC team climbed aboard anyway and brazened their way into Havana. They shot some silent footage of the Palace and then went out to a nearby fort where Batista was entrenched. In sound-on-film they recorded the strong-man's proclamation that he was now dictator of Cuba. But then there was the problem of getting the film back to the States. John Langenegger, under pretext of being no longer needed, tucked the film in his shirt and boarded a plane for Miami. Kress was so jubilant he got on the phone and called Julian Goodman in Washington to report the feat. Twenty minutes later he was picked up by the Cuban police and thrown into jail. What Kress didn't know was that all telephone lines were tapped.

But no sooner had Kress talked his way out of jail than he was picked up again, this time by the Army. Brad was back in his old cell before he could convince the militaristi that he had just been released, and was no criminal. By this time Langenegger had bluffed his



NBC cameraman Al Simonson discusses camera technique with President Eisenhower's press secretary, James C. Hagerty.

way back to town and the pair again went out to Batista's fort. They shot the first interview, in English, with the new dictator. Langenegger flew out with the film, and this time Kress didn't call Washington to report.

NBC's Capital film crews don't often get locked up, but their problems are many, just the same.

Al Simonson and John Hofen, who cover the White House, sometimes get word only a few hours before the President takes off on a sudden trip. But they make the plane, and follow Mr. Eisenhower wherever he goes. These trips take their toll on the crews, as well as on the speech-maker. During the 1952 Presidential campaign, Simonson and Hofen spent most of their time on the Truman train. Sometimes there were a dozen whistle-stops a day, each with its rush to set up equipment, shoot the speech, and then get self and camera back on the train before it started again. When President Eisenhower flew to Minneapolis and Mount Rushmore in June, Simonson and Hofen made the usual last-minute dashes to catch the next plane. But on this trip there was time out for ceremony. Along with the President, the NBC crew was initiated into the Sioux Indian Singing Tribe of the Wahoo. Al Simonson is now "Bad Wound" and John Hofen is "Chief Ghost Bear."

Excitement with the President

Once, with the President, there was suspense and excitement that came too close to home for Hofen. He and Simonson were at Augusta, Georgia, with Mr. Eisenhower, making arrangements to return to Washington the next day. John had just received word from his wife, who was visiting in Charleston, that she and their three-year-old daughter were returning to Washington that night on the Atlantic Coast Line *Champion*. He was awakened at one in the morning by a call from New York. The *Champion* had jumped track at Dillon, South Carolina and he and Simonson should start moving immediately to cover the tragedy on film.

The rest of the night, the two drove from Augusta. They arrived at dawn to shoot their story and, for John, to search the wreckage. Finally they found a railroad official. This train, he said, was the coach section of the *Champion*. John's family, with Pullman tickets, had passed through in the advance section just fifteen minutes ahead of this one. They were safe, by that time, in Washington.

"That was a long night," says Hofen.

In addition to the trips, another problem is caused by Washington's complex local government. In order to move freely about town for his pickups of film during the 1948 inauguration, Jim Curtis, NBC's courier, had to have seventeen different passes. He pinned one on top of another and then folded them all up with a little tab

holding them together, pinned to his blouse. At one intersection a policeman stopped him and said he couldn't cross, didn't have the right pass. Jim unbuttoned the tab, deadpan, and let all seventeen credentials cascade to his knees.

"Take your pick," said Curtis. He crossed the street.

Some Officials Need Persuasion

NBC's Washington TV film men have to know their trades and be able to move fast, but mostly their success depends on their diplomacy. Sometimes government officials, new to their offices, are reluctant to make statements when they're in the news. It's up to the crews and Assignment Editor Corrigan to persuade them that what they have to say *is* important, and that the nation should be able to see them say it.

And it takes a good deal of the same commodity to convince the President, when outdoors, that he'd really look a lot better on film if he'd take off his hat and let people see his face. Shadows over the eyes do not help.

What would Washington be like if the TV film men could have their say? Art Barriault sums it up for all of them.

"The millennium will come when every Senator and Cabinet officer can clarify the most complicated of political issues in a well-rounded, colorful, one-minute statement."

The millennium isn't here, but NBC's diplomats with tripods are bringing it closer.

New York Graduate Engineer Wins David Sarnoff Scholarship

Harold S. Rothman, 21, of 960 Grand Concourse, Bronx, N. Y., has been awarded the David Sarnoff Fellowship at the New York University College of Engineering for 1953-54.

The fellowship was established in 1952 by the Radio Corporation of America in honor of Brig. General David Sarnoff, Chairman of the Board of RCA. Providing an annual grant of \$2,700 for predoctoral study, the award is part of a program to assist in the education of scientific personnel for leadership in the growing electronics industry.

Mr. Rothman was the applicant among a class of 175 graduating engineers who, in the opinion of the Scholarships Committee and the RCA Education Committee, had the necessary high qualifications for the award.

With the aid of the Fellowship, Mr. Rothman will pursue studies in the microwave field, a subject of specialization in which he became interested during his undergraduate course in electrical engineering. His career plans center on design and development in the microwave field.

Technical Details of RCA Basic Color Receiver Made Available to Competing Set Manufacturers

IN a move believed to have few precedents in competitive industry, the Radio Corporation of America has turned over to engineers representing virtually all television set manufacturers full details of design and performance of RCA's basic color television receiver.

This important technical information on the RCA color set was presented to 250 representatives of the television industry at a color television symposium arranged by RCA at the Waldorf-Astoria in New York, on October 7. It was in line with the Corporation's policy of making available to RCA licensees its inventions and technical "know-how" in compatible color television, as it did in black-and-white television six years ago.

The color receiver described to RCA's competitors is the latest field-tested design from which will be evolved the production design for color sets to be built and marketed under the RCA Victor trade-mark, according to Ewen C. Anderson, Vice President in Charge of the Commercial Department.

Mr. Anderson, who presided at the symposium, presented a program in which the industry group received full details on special color receiver components, tubes, and circuitry, as well as testing equipment.

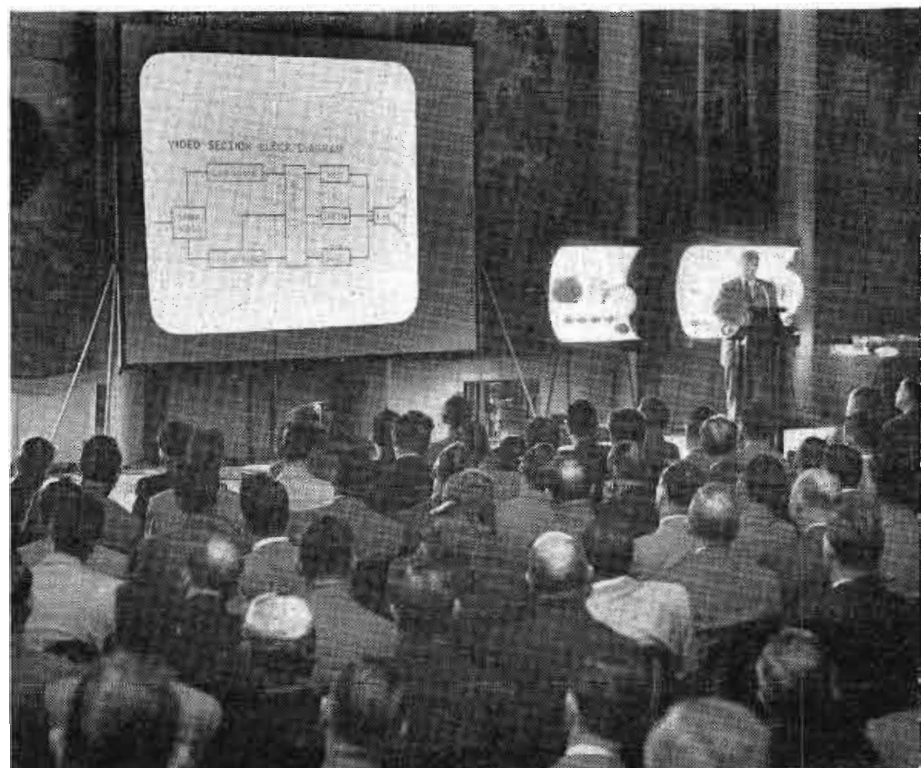
Latest technical information was provided on the RCA tri-color tube, heart of home color television receivers. Attendants at the meeting likewise were briefed on the progress of color broadcast station equipment, programming and networking plans of the National Broadcasting Company, steps by the RCA Service Company to help prepare the industry to meet color television servicing problems, and efforts of the RCA Industry Service Laboratory to aid the industry over technical hurdles.

No NTSC Color Television System

Commenting on information made available on RCA's basic color television receiver, Mr. Anderson declared:

"In supplying you with such information, I would call your attention to the fact that we are making no representations concerning inventions of others, if any.

"In this connection, you have heard much of a so-called NTSC color system. We do not know of any NTSC color system. NTSC, which is comprised of



Representatives of 250 television set manufacturers attend a symposium on color TV receivers arranged by RCA at the Waldorf-Astoria Hotel in New York on October 7.

scientists and engineers of virtually the entire television industry, has unanimously agreed on certain signal specifications and recommended them to the Federal Communications Commission as standards for color TV broadcasting. If the FCC adopts these standards they will become FCC standards, just as the NTSC standards for black-and-white TV became the FCC standards under which we operate today.

"We call the apparatus we use — as distinguished from the signal specifications — the RCA compatible color system. The RCA color system operates on the standards recommended by the NTSC, and we participated in the development of these standards and joined in recommending that the FCC adopt them. We have no doubt that American ingenuity will from time to time devise new and improved apparatus which will also operate on these same standards."

Although the first color-receiver production line is still several months away, Mr. Anderson said, it is within RCA's announced schedule of six to nine months after FCC approval of compatible standards. "And we

hope to beat that promise," he declared, continuing:

"As you are well aware, in March of 1950, RCA promised to make available to its domestic receiver licensees complete manufacturing information on the first RCA color receiver when the receiver is placed in commercial production. This information is to include complete manufacturing drawings, bill of material, sources of supply, and inspection of our production setup. RCA will keep that promise. It will invite its licensees to the RCA plant before the commercial release of a color receiver.

"I know that you probably want as much information as is available at the earliest possible time in order to meet your respective schedules for getting color receivers to the public. Therefore, it appeared desirable to hold this meeting now — well in advance of our planned production information program — in order that you may have available color receiver information you might not already possess."

The engineering position in which the industry finds itself today is the result of many years of hard work in getting a compatible color television system which can be started in an economically sound manner, asserted Mr. Anderson, adding:

"We in RCA take pride in our part in this endeavor. Our achievements in color represent hundreds of man-years of work by outstanding electronic engineers, and tens of millions of dollars of investment. We feel that the time and money already spent, and the large amount that will be spent in placing this new service before the public represent a sound investment in insurance, covering the future success of this industry.

"We strongly believe in the economic and social importance of a compatible system of color television, and we believe that this new service to the public will enable the electronics industry to repeat the success story of black-and-white television."

Mr. Anderson pointed out that as precedent for the October 7 meeting on the RCA color television receiver, RCA held a symposium on its tri-color tube in July of this year for licensed tube manufacturers. This, he said, was done as soon as the design was completed on a type for early production, thus providing the tube industry with advanced information shortening the time required to get a satisfactory design of color receiver into production.

Regarding a color television picture tube recently announced by another company, Mr. Anderson said:

"RCA has read with some interest that another company — a company which, by the way, went all out for incompatible color and said that compatible color was impractical — has finally come around to adopting RCA's type of color tube with three guns, and using a

shadow mask with all the holes. As we read the information released by that company the only difference is that the phosphor dots are on the rear of the face plate instead of on a separate plate directly behind the face plate.

"Following RCA's lead in adopting a 15-inch glass envelope, this tube is also enclosed in a 15-inch glass bulb and uses the principle of a face plate sealed in with metal rings. As this tube uses the basic principles of the RCA tri-color tube it should — if it functions satisfactorily — work in the all-electronic compatible color receiver developed by RCA."

Color-TV "Kit" For Manufacturers

During the symposium, an offer was extended by the RCA Victor Division to supply television set manufacturers with a limited quantity of developmental kits, containing specially designed tubes and parts required for the RCA compatible color receiver.

Although each of more than twenty tubes and components in the kits is in a developmental stage, they are being offered at this early date to enable the industry to initiate experimental design and production programs for color sets. The contents represent the most advanced results of RCA's developmental work on electronic components for its basic color receiver.

Among items in the kits are a complete developmental RCA tri-color picture tube, specially designed receiver tubes, developmental transformers, coils and other associated necessities of a color receiver. With each kit is complete technical and application information.

New Microwave Relay

(Continued from page 11)

snow storms and other atmospheric conditions than the higher frequencies.

RCA engineers underscore the importance of this new microwave control system by pointing out the following advantages and improvements to be expected as a result of the installation:

- 1—It is hoped that within a few years the system will pay for itself and result in a saving of many thousands of dollars a year in control line rentals.
- 2—Records kept on former microwave systems show that fewer signal failures occur over a year than with low quality control lines. This reliability factor is extremely important to RCA operations.
- 3—Throughout the design of the system heavy antenna support structures, modern antenna design and fireproof building construction have been utilized to guard against possible damage from the elements.

Auto Controls Itself by Electronics

(Continued from page 9)

either to indicate the off-course position of the vehicle on the dashboard or applied directly to the steering mechanism so as to maintain the car in the center of the lane. Feedpoints for the cable may be provided at intervals along the highway.

Driver Retains Control of Speed

"In this system the driver not only would retain complete control of the car speed, but, in addition, could switch at will from manual to automatic steering. The automatic setting could be linked to an external indication on the car to inform road supervisors and other drivers of the fact that the car is under automatic control.

"The second step in the evolution of the automatic driving system, the prevention of collisions, is a natural extension of the guidance equipment.

"The essential feature of one proposed collision prevention system is the transfer of energy from a high-frequency power cable, to a series of tiny oscillators or transmitters along the lane. The transfer of energy is controlled by the passage of a car and a long time constant circuit or 'memory' causes the transmitter to function for a time after the car has passed. The oscillations are transmitted backward along a high-attenuation cable and sensed by pickup coils on the following cars. Thus every car, whether equipped with automatic driving devices or not, would be followed by a 'flying tail' of warning signals. Their amplitude would increase as the car slowed down and become a maximum for a stalled car. Conversely, the sensing system of the following cars would be coupled with the car speed indication in such fashion that the warning signal would increase with their speed.

"In a completely automatic system this warning 'tail' could be used to switch a car from one lane to another at specified cross-over points. In this case, the sequence of events as a car approaches another vehicle which is either stalled or moving at a lower speed is: As the signal picked up from the 'flying tail' of the preceding vehicle reaches a certain level, the guidance setting would be shifted to the left lane. Then, the car would pass over to the left lane at the next cross-over point and pass the slower vehicle unless:

- a. The turn-off is blocked by signals from a nearby vehicle which is already in the left lane, or
- b. The slower vehicle impedes further progress even before the turn-off point is reached.

"In the second instance the signal from the 'flying tail' would continue to increase in intensity; its indication to the driver may be either auditory or visual—in the

form of a sound of rising amplitude or a flashing light of increasing frequency, warning him to decelerate or apply the brakes. As an alternative, the signal, from a certain level on, may reduce the fuel intake and, at a still higher level, actuate the power brakes.

"Full automatization of the driving process can be envisaged as the final stage of the development. In addition to the installation of guidance and collision prevention equipment on the roads and in the vehicles, this would involve automatic inspection of the vehicle equipment and a continuous recording of traffic conditions at the gate stations. Indications of the position and velocities of the vehicles along the road section between successive stations would aid supervising personnel in the problem of traffic distribution.

"Freight transport along the highways presents one of the most challenging applications of full automatization. The establishment of a network of truck routes, separate from a highway system designed for passenger vehicles only, has been discussed repeatedly.

"With full automatization, it offers the possibility of driverless freight transport over long distances, with route terminals taking the form of marshalling yards. Here, small dispatching crews would send out the loaded trucks to their distant destinations and assign incoming vehicles to drivers for local delivery of the consignment. Assuming a cruising speed of 30 miles per hour, a separation between vehicles of 100 feet, and an average truck load of 5 tons, a one-lane route could handle nearly 200,000 tons a day. This large shipping capacity provided with minimum manpower requirements would do much to alleviate present bottlenecks in the delivery of consumers' goods and industrial raw materials."

Electronic Memory Device

(Continued from page 14)

Each day, great quantities of different kinds of supplies arrive in various ways. The outbound shipments are just as complex. Each day, thousands of questions have to be answered. Is there room in Number Three Warehouse for ten thousand woolen blankets? Are there enough overcoats in Number Eight Warehouse to fill a requisition from Fort Dix? Did the last shipment reach Camp Kilmer? Are there any field kitchens left? How many? Should we order more? In this situation the computer remembers, works out problems, and gives the results which determine the decisions to be made.

The computer is one of the great new tools of the future, a ready servant in man's constant effort to solve the complex, to learn more about his world. And in their laboratories, thinking about bigger, faster memories, about better, more accurate arithmetic units, Jan Rajchman and his group are making their contribution.

Transistor-Operated Radio Receiver Runs 500 Hours on Flashlight Cells

A COMPACT experimental radio receiver that harnesses a new and greatly improved type of junction transistor to provide sensitivity and fidelity comparable to conventional table model receivers several times its size has been developed at the David Sarnoff Research Center of RCA, Princeton, N. J.

Six small-size flashlight batteries—the set's entire power supply—will operate the laboratory receiver for at least 500 hours, according to its designer, Loy E. Barton, RCA research engineer, who demonstrated the instrument at meetings of the Institute of Radio Engineers and at The Franklin Institute.

The remarkable performance of the RCA experimental transistor-operated receiver is made possible, Mr. Barton said, by the development of junction transistors that provide useful amplification at radio frequencies as high as 10 megacycles, in contrast to

previous junction types that usually perform well only at audio frequencies.

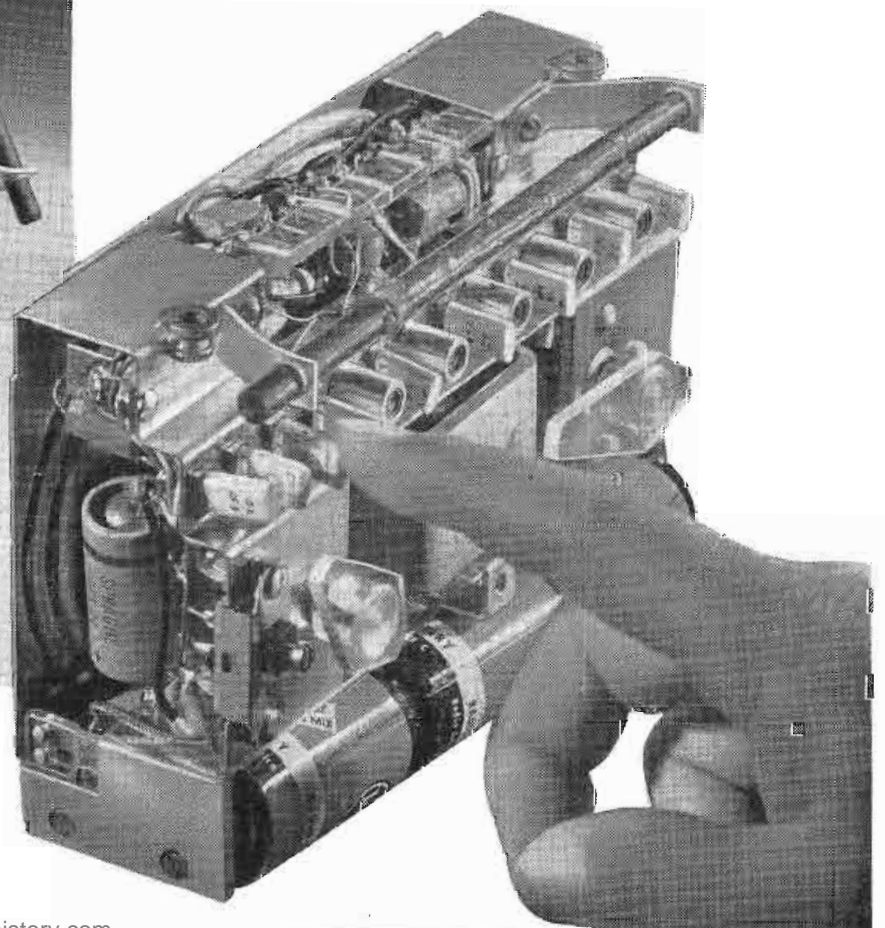
Before receivers of the type demonstrated can be produced commercially at reasonable cost, transistor techniques will have to be refined and new materials and associated miniaturized components will have to be developed and mass produced, it was pointed out. At the present stage of development, the cost of the transistors and of the new components would be far in excess of comparable mass-produced, tube types of receivers.

The new type of transistors is the result of research by Dr. C. W. Mueller and Jacques I. Pankove, of the RCA research staff.

Though still in the laboratory stage, Dr. Mueller said, the new transistor is of relatively simple triode construction, thus giving promise of eventual quantity



Front (left) and rear views of the experimental completely transistorized radio receiver developed at RCA Laboratories. The row of transistors is pointed out below.



production. The large frequency span it opens up, he said, should broaden considerably the potential application of transistors. Unlike its predecessor types, it can operate in IF (intermediate frequency) stages of AM broadcast receivers, and in the video amplification stages of television receivers.

Receiver Boasts Large Speaker

The transistor receiver used in demonstrations by Mr. Barton has six transistors of the new radio-frequency type and three experimental junction transistors of the audio-frequency range. Although not much smaller than conventional portable radios built with tubes, the set employs the space saved by use of transistors (and miniaturized IF transformers) for a 4- by 6-inch loudspeaker.

In comparing the experimental receiver with a typical portable tube receiver, Mr. Barton said the former required only one-ninth the battery power yet produced roughly twice the audio output.

To show that a variety of receiver designs are possible with the new transistor, Mr. Barton has made another transistor-operated receiver that uses six standard penlight batteries as a power supply good for 50 hours. This set has a smaller speaker (3 inch) and its size is less than half that of the higher performance receiver. Smaller size was achieved by sacrifice of speaker size and playing life, he said.

Studies Lead to Basic Changes

Dr. Mueller explained that higher frequency operation of the transistor had been obtained by studying in detail the physics of the RCA audio-frequency alloy junction transistor and determining the characteristics which reduced its frequency response.

As a result of these studies, he said, basic changes were made in the geometry, the type of germanium, and the alloy used. A thicker wafer of germanium is employed in order to reduce resistance between the junction region and base connection, thereby giving higher gain at higher frequencies.

At the same time, the distance between the two junctions of impurity material has been markedly reduced by drilling a hole that almost perforates the wafer, he said. The two junctions, of smaller area than in previous designs, are then formed on either side of the paper-thin layer of germanium that remains. Of great importance, also, he said, is the use of an alloying material which already contains some germanium.

The experimental transistor type described by Dr. Mueller was of the p-n-p (positive-negative-positive)

TV Problems — as Viewed in 1929

The instantaneous projection through space of light images produced directly from the object in the studio, or the scene brought to the broadcasting station through remote control, involves many problems. Special types of distribution networks, new forms of stagecraft, and a development of studio equipment and technique are required.

New problems would rain in upon the broadcasting station. New forms of artistry would have to be encouraged and developed. Variety, and more variety, would be the cry of the day. The ear may be content with the oft-repeated song; the eye would be impatient with the twice-repeated scene.

DAVID SARNOFF (1929)

variety. Similar methods can be used to make n-p-n transistors that operate at the higher frequencies, he said.

The new radio-frequency units, he said, can provide a power amplification of about 10,000 to 1 (gain of up to 39 decibels) at 455 kilocycles, the common intermediate frequency of broadcast receivers. Their amplification is somewhat less at higher frequencies, but amplification of about 16 to 1 (gain of 12 decibels) is available at frequencies as high as 10 megacycles. The transistor may be used as an oscillator at frequencies as high as 40 megacycles, he added.

Toscanini and NBC Symphony Open 17th Season on November 7

The NBC Symphony, under the leadership of Arturo Toscanini, will open its seventeenth season on the air with a broadcast from Carnegie Hall in New York on November 7, starting at 6:30 p.m., EST. For the sixth successive season, Guido Cantelli will share the podium with Maestro Toscanini, directing eight of the 22 scheduled weekly concerts.

Among the features planned by Toscanini for the new season are a two-part concert performance of Verdi's opera "Un Ballo in Maschera," Brahms' "German Requiem," Zoltan Kodaly's "Psalmus Hungaricus," and concerts featuring the works of Sibelius, Wagner and Mendelssohn. The eight performances to be directed by Cantelli will include such works as Debussy's "The Martyrdom of Saint Sebastian," Hindemith's "Concerto for Strings and Brass," and Frescobaldi's "Four Pieces."

During the season, Toscanini also will direct the NBC Symphony for a number of RCA Victor recordings.



George Folster, home from the wars, faces a microphone in an NBC studio

THE FAR EAST IS HIS BEAT

From Australia to Panmunjom George Folster has Followed
the Tides of War and the Korean Armistice as NBC's
News Correspondent in the West Pacific Area

“WE don't abandon the story even after it cools off.”

This is the terse and simple phrase which George Thomas Folster uses to describe the manner in which NBC's news covers the world's hot spots.

Folster is a man who should know.

NBC's chief correspondent in the Far East, it was Folster who directed the network's coverage of the three-year Korean war.

Folster is on another of his visits home. This time he traveled on a short timetable, for he allowed himself all of ten days in the States.

But in spite of that, Folster has spent much of his time consulting with William McAndrew, manager of news and special events; Joseph Meyers, Central News Desk editor, and other members of the staff.

The last time George Folster came home, he made the trip in his own 50-foot ketch, a sailing yacht, crossing the vast Pacific from Toyko to San Francisco

in 47 days. He was compared to a swashbuckling Magellan. He was on an official vacation, his first in years, and he used it to satisfy a lifetime ambition—to make a round trip through 5,000 miles of shark infested sea across the Pacific.

In 1940, he left Worcester, Mass., where he had been born on May 6, 1906, of a New England whaling family, to accept a job as assistant director of the Fahnestock Expeditions. His duties required that he captain the three-masted schooner *Director Second* across the Pacific.

The expedition which Folster organized was commissioned by the American Museum of Natural History to collect birds and to record native music on South Sea Islands. It was on this same trip that he did his first broadcasts for NBC, on a special arrangement.

Nine months after the expedition weighed anchor, the *Director Second* was forced onto the treacherous

coral of Australia's great barrier reef. Folster and a handful of men continued the expedition through the Solomon Islands, in native canoes and small boats, traveling 3,000 miles by sail and paddle, and finally reaching Australia.

Once he was at his destination, Folster was able to settle down to the more conventional job of writing and broadcasting news for the Australian radio network. In 1941, Folster did something which was eventually to serve America well: he helped align and test radio circuits between there and the U.S.A. which subsequently proved to be of immense importance when the war spread to the Pacific.

The Japanese attack on Pearl Harbor marked the appointment of George Folster as a war correspondent in Sydney. He moved to Darwin and was the only American to cover General MacArthur's arrival in Australia.

Thereafter Folster moved island by island through the Pacific with MacArthur's and Admiral Nimitz' forces as they beat back the Japanese. He made the first broadcast from bloody Guadalcanal on Nov. 6, 1943, and broadcast first from the front lines on Bougainville in March, '44.

Folster plowed ashore with the First Cavalry Division at Luzon in 1945, and made the first post-War broadcast from inside Japan the morning of the first landing at Yokosuka. Folster and his wife, the former Helen J. Fausey, of Grand Rapids, Mich., became NBC's correspondents in Tokyo at the war's end.



The outbreak of the war in Korea three and a half years ago found NBC on the spot with a fully staffed news bureau, in contrast to other networks which at that time depended upon "stringers". When former President Harry S. Truman made it clear that the United States would regard the Communist attack on South Korea as an act of aggression and would send American forces into the country to help resist the invasion, NBC's staff in the Far East—backstopped by seasoned personnel, many of them former war correspondents themselves, at home—moved into action to report developments for America.

War Coverage has no Parallel

The coverage which was then given the war by NBC has no parallel in radio and television history. Reporters were accredited to the United Nations armies, broadcast from the front lines under fire with the troops. Cameramen established a routine for newsfilm coverage destined to give a new dimension to journalism.

Jim Robinson; Wilson Hall; Robert Hecox; Jung Su Kwan; Irving R. Levine; John Rich; William J. Dunn, these were among the names of NBC radio reporters who helped bring the meaning of this war against Communist aggression home to the vitally concerned people of the United States.

The NBC combat correspondents, exposing themselves to the same dangers to which troops were subjected, moved forward with the armies; Pusan Perimeter . . . Inchon landing . . . Wonsan landing . . . Operation Little Switch. . . .

During the first week of the war, NBC had its tape recorder machines and other broadcasting equipment on the front lines, to the surprise (and consternation) of competitive networks. The first "actuals" heard from the combat area by the people of America, were made by NBC, inaugurating a long series of news breaks for the network's listeners. One oldtimer recalls that correspondents, often caught short in their determination to get their stories back home, were forced to wrap the tape around old beer cans and ration boxes so as to preserve it.

Folster estimates that NBC news broadcasts, not including special events, originating from Korea or dealing with the war and originating in Tokyo, during the three-year period ending July, 1953, exceeded 3,500. No one has a record of the film footage made by the network and flown to the States dealing with the Korean war, but if laid end to end, it would probably reach the moon and back.

Jim Robinson, NBC wartime reporter, is typical of the combat correspondents who kept the homeland informed of Communist aggression in the Far East.

In This New Field of Custom Recording Even Cows are Made to Talk

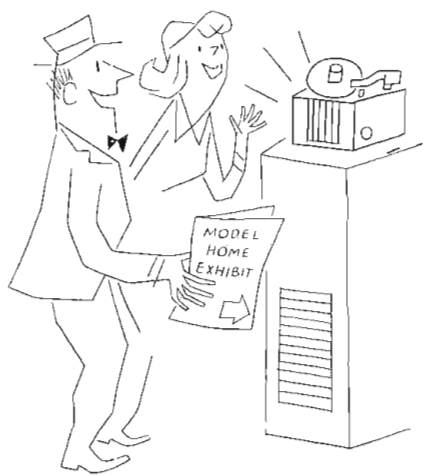
Phonographs and Special Discs are being Widely Adopted by Many Branches of Industry as Effective Aids to Sales

By James P. Davis

*Manager, Custom Record Division
RCA Victor Division*

TIME was when cows were expected only to moo, automobiles to honk their horns, and refrigerators to purr gently. Now you'll find some that talk.

This phenomenon is an accomplishment of the RCA Victor Custom Record Division, which, among its other activities, has recorded some brisk sales talks for delivery by the most unlikely parties. For example, there is Carmelita, a cow associated with Kraft Foods, who spoke to customers in retail grocery stores around the country some months ago during a special promotion of the firm's caramels. There is also the Crosley refrigerator, which has intrigued customers in numerous showrooms by delivering its own commentary to anyone who opened its door. Now automobiles in the hands of certain dealers are preparing to do the same, and it is likely that the habit will spread among hitherto non-talking commodities.



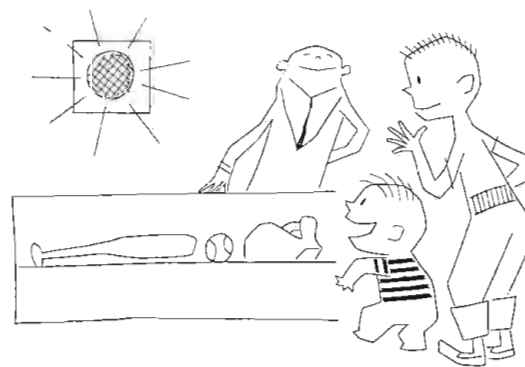
It is, of course, the familiar phonograph record that is behind these unusual activities, and they simply confirm that this time-honored means of sound communication is making itself more useful than ever in modern sales promotion. Aside from these occasional spectacular phases, the custom-made record has been steadily moving up into a role of considerable importance in the business world.



Last year, the RCA Victor Custom Record Division filled orders for millions of transcriptions, phonograph records and slide-film recordings for customers ranging from the International Civil Aviation Organization to an advertising concern promoting bridal photographs. This year, orders have been running at a rate 20% higher than in 1952. The recorded contents, aside from talking cows, automobiles and refrigerators, have run a gamut from animal calls to the conventional human voice. The array has been recorded on a wide variety of discs, from the 6½-inch pure vinyl "spinner" to the 16-mm slide-film, designed for use with slides and filmstrips.

Musical Recordings Predominate

A large percentage of the custom record business consists of musical recordings for more than 100 commercial record companies who lack recording facilities of their own. But the growth of the versatile custom service since its establishment some eighteen years ago points also to the greater effectiveness of the spoken over the written word in numerous situations. A voice is peculiarly effective as a consumer attraction when it emerges from something that is not ordinarily expected to talk, although the bulk non-musical custom record buyers have called on the service as an extremely handy



way of getting a statement, a set of instructions or a spot announcement around to a scattered audience in a manner that makes more of an impression than does a letter or a circular saying the same thing.

Prominent among the orders filled during the past year by the RCA Custom Record Division have been those placed by firms anxious to reach dealers, salesmen or customers. Sears Roebuck, for example, ordered 45-rpm records bearing spoken messages from two of the firm's sales executives to managers and sales personnel outlining a major scale sales campaign in the 400 Sears Roebuck stores. A similar venture was a four-minute statement of company plans recorded by John C. Sharp, president of the Hotpoint Company, for more than 10,000 dealers and distributors handling company products. Both companies reported themselves pleased with the results.



Other organizations and individuals have made use of custom records as a convenient vehicle for reaching a wide membership or a scattered constituency. The American Legion ordered a 6½-inch disc to introduce its new commander to Legion posts and to push a campaign for new members. And a candidate for a Rotary International office reached all prospective voters ahead of time with a recorded message as part of his successful election campaign.

Discs have long been used as language aids, but a new wrinkle was added last year through the RCA Victor Custom Record Division by the International Civil Aviation Organization in the form of multilingual basic radio communication lessons. Flying vernacular being what it is, the pilot holding radio conversation over foreign territory these days is likely to find himself coping with a tongue bearing no resemblance to anything in his phrase book. The ICAO recordings, featuring aviation trade talk in several languages, are designed to smooth the path for him.

Other instructional uses to which the recent crop of custom records has been put include the instruction of retail sales personnel in selling techniques, the training of secretaries and clerical workers, and tips to display

staffs on the proper way to feature given products. Under the last heading came another oddity in the form of a talking display case used by Kraft Foods to point out that improper display loses customers.

While the human voice has accounted for the greater volume of non-musical record production at RCA Victor, the engineers of the custom record division have been called upon at one time or another to handle everything audible, from a foghorn to a set of apparently meaningless tones and vibrations.

Recorded Foghorn Saves Money

The foghorn was recorded for use—logically enough, as a foghorn—in a West Coast area where amplification of a record turned out to be far more economical than installation of an actual horn. On the other hand, certain tones and vibrations were put on a disc for the benefit of sinus sufferers at the order of the International Hearing Institute. It seems that application of suitable vibrations through earphones opens the sinuses.

In addition to these two samples, the division has recorded a vast collection of bird and animal calls, underwater sounds (for Navy instructional use), bells, heartbeats, and, of course, a very great quantity of music.

About half of the users of custom records send in their own tape, wire or discs to be processed and pressed at the New York plant of the Custom Record Division. The other half arrange for original recording by the division at one of its three studios, located in New York, Chicago and Hollywood. The studio recordings are made first on magnetic tape, then transferred to discs, processed and pressed through the most up-to-date facilities and shipped out according to the customer's specifications.

Experience in the custom record division up to now indicates that apparently there is no limit to which the recordings can be put by both business and non-commercial users. The RCA Victor engineers who fill the custom requests have learned by now not to be surprised at what they are called upon to record. By the same token, the buying public had better brace itself—there's no telling what may be talking next year.



RCA-NBC "FIRSTS" IN COLOR TELEVISION

The foundation for a color television system was laid by RCA's pioneering in research and engineering development of black-and-white television.

Throughout the 1930's field tests and experimentation with black-and-white television continued. In April, 1939, at the opening of the New York World's Fair, RCA-NBC began the first regular television broadcasting service to the public, and RCA Victor introduced television receivers for public use. Fundamental developments in all-electronic black-and-white television provided the base for RCA's pioneering research in color television that led to the following advances:

1940 Color television, produced by electronic means, was demonstrated to the Federal Communications Commission by RCA at Camden, N. J.

1940-1941 NBC started work on a field sequential color system and transmitted the first color signals from that system over station W2XBS, Empire State Building, on February 20, 1941. On December 1, 1941, NBC gave a closed circuit demonstration of color television using the NBC field sequential system with 441 lines. Purpose of the demonstration was to prove to the FCC that the field sequential system, when limited to the same bandwidth as the black-and-white system, was lacking in resolution as compared to the latter.

1941-1945 RCA-NBC devoted its research and engineering resources to wartime military applications of electronics including television.

1945 RCA demonstrated field sequential color television and 3-D color television to the industry, and started post-war evaluation of color TV.

1945 RCA gave full attention to the development of an all-electronic color television system after further tests and demonstrations proved that a mechanical color system had fundamental limitations. Two main objectives were: High standards of performance, and compatibility with black-and-white television.

1946 An all-electronic projection type color television receiver with a 15 x 20-inch screen was demonstrated publicly for the first time at the David Sarnoff Research Center of RCA at Princeton, N. J.

1947 All-electronic color television pictures projected on an 8 x 10-foot screen were demonstrated by RCA at The Franklin Institute, Philadelphia, Pa.

A color television camera for use with the RCA all-electronic color television system was demonstrated to the FCC and others at the David Sarnoff Research Center, Princeton, N. J., studio and outdoor pick-ups were featured.

1948 RCA continued its research and development work to improve and simplify the all-electronic color television system.

1949 RCA informed the FCC it had developed a new high-definition all-electronic color television system operating on a 6-megacycle channel and completely compatible with the existing black-and-white television system.

Field tests of the RCA all-electronic compatible color television system operating on 6-megacycle channel, began in Washington, D. C., over NBC station, WNBW, and a demonstration was held for the FCC. Tests also were conducted in Washington over an experimental UHF station simultaneously over VHF.

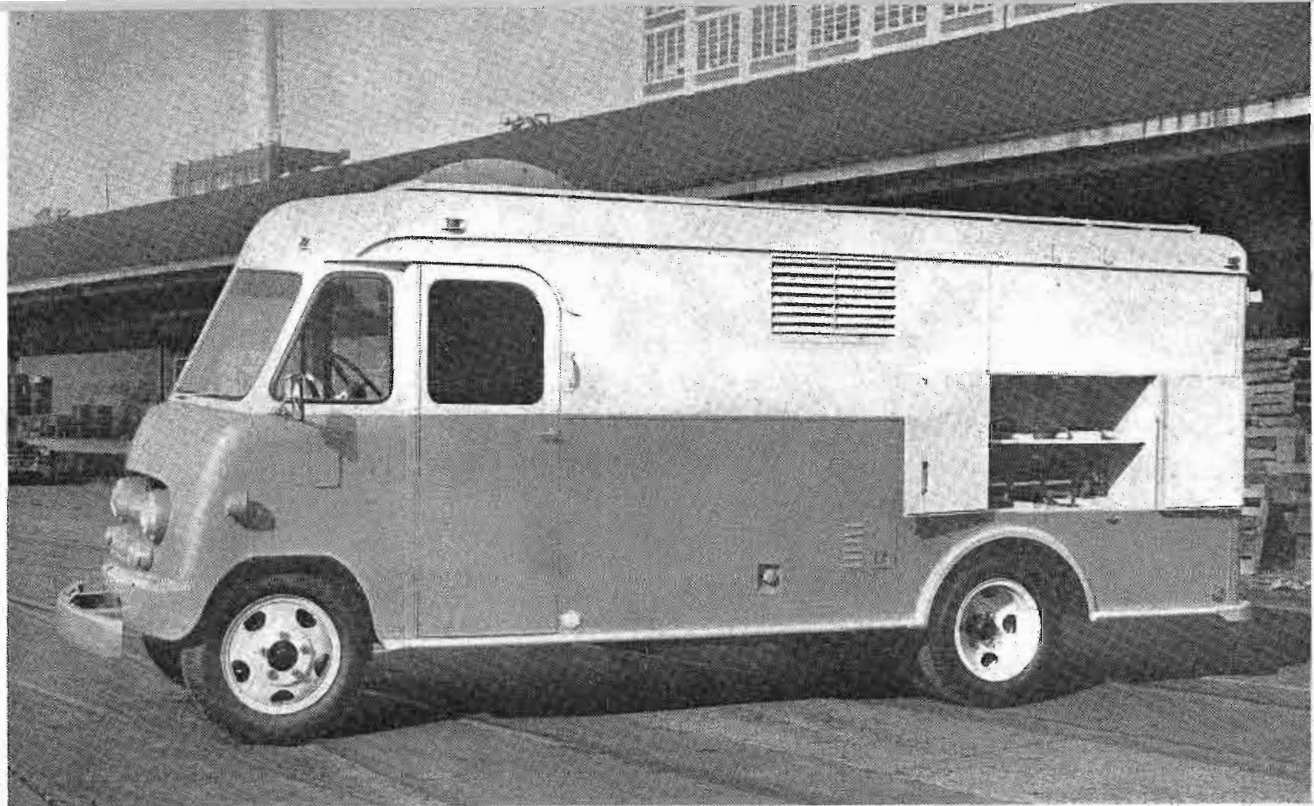
NBC conducted compatible color television tests in Washington D. C., for the first time during regular broadcast hours. The puppet show, "Kukla, Fran and Ollie", televised by color cameras in Washington, was fed to the NBC-TV network. It was the first regular TV program to be seen simultaneously in color (in Washington), while viewers in other cities on the network viewed the show on standard receivers in black-and-white.

RCA-NBC transmitted color television over a microwave relay loop between Washington, D. C., and Baltimore, Md., in a demonstration to the FCC.

1950 RCA demonstrated its compatible color television system and the RCA tri-color tube to the FCC, to other government officials and to the industry. One tube utilized a single electron gun and another three electron guns. Also a new transmission development to make color television programs produced by the RCA all-electronic system available to broadcasters over coaxial cable networks, as well as over radio relays, was demonstrated between Washington and New York. The color images, after transmission over the cable, were broadcast by WNBT, New York on VHF (very-high-frequencies), and were also sent by radio relay to NBC's experimental UHF (ultra-high-frequencies) station at Bridgeport, Conn., for rebroadcast.

(Continued on page 32)

In this mobile TV truck are complete facilities for picking up remote programs and for relaying them to the main studio or transmitter.



New Mobile Unit Carries All Equipment Needed For Remote TV Pickups

A mobile unit to carry all equipment needed to pick up, monitor, and relay remote television events to a TV station, has been developed by the RCA Engineering Products Department.

The newly-designed television studio on wheels is mounted on a standard 1½-ton truck chassis. It has a separate air-conditioned control room with seating facilities for driver, program director, and up to three operating technicians. It has a separate "air-exhaust" enclosure for power supplies, complete storage section for up to three camera chains with large cable reels at rear, and a reinforced roof to support personnel and operating equipment when on location.

As a complete studio, the mobile unit is ready to move when needed, and ready for operation in a minimum of time.

RCA-NBC "Firsts" in Color Television

(Continued from page 31)

1951 RCA presented detailed technical and engineering information on its tri-color tube to competing tube and set manufacturers, at a series of meetings it organized to aid in the further development, testing and introduction of color by the industry.

Network color television tests conducted by RCA-NBC, originating in Washington, D. C., were transmitted by microwave relay to New York and re-broadcast to the David Sarnoff Research Center at Princeton, N. J.

Tests of the RCA compatible color television system began in New York over NBC station WNBT. Field tests featured reception on the RCA tri-color picture tube and outdoor pick-ups by the color television camera.

RCA conducted public reaction tests of compatible color television with receivers in the Lounge of the Center Theatre, Radio City, N. Y. The programs were also produced on a 9 x 12-foot screen at the Colonial Theatre, New York.

RCA color television signals originating in New York were transmitted in a test via microwave to Los Angeles and looped back to New York over an 8,000-mile circuit.

1952 Compatible color television tests were conducted in New York for the first time by NBC during regular broadcasting hours. The Colonial Theater in New York was equipped with color studio equipment making it the first studio to be made ready for large scale television programs in color.

1953 RCA demonstrated its compatible color television system to the Committee on Interstate and Foreign Commerce, House of Representatives, to the FCC and to the industry. A color television camera equipped with a single tri-color tube, instead of three color pick-up tubes. Both outdoor and indoor pick-ups were presented.

RCA made available to competing manufacturers in the radio-television industry the latest information on design and production of its improved tri-color television picture tube at a technical symposium in New York.

RCA-NBC petitioned the FCC on June 25, 1953 to adopt the compatible technical signal specifications used by RCA color television system as standards for commercial color television broadcasting.

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