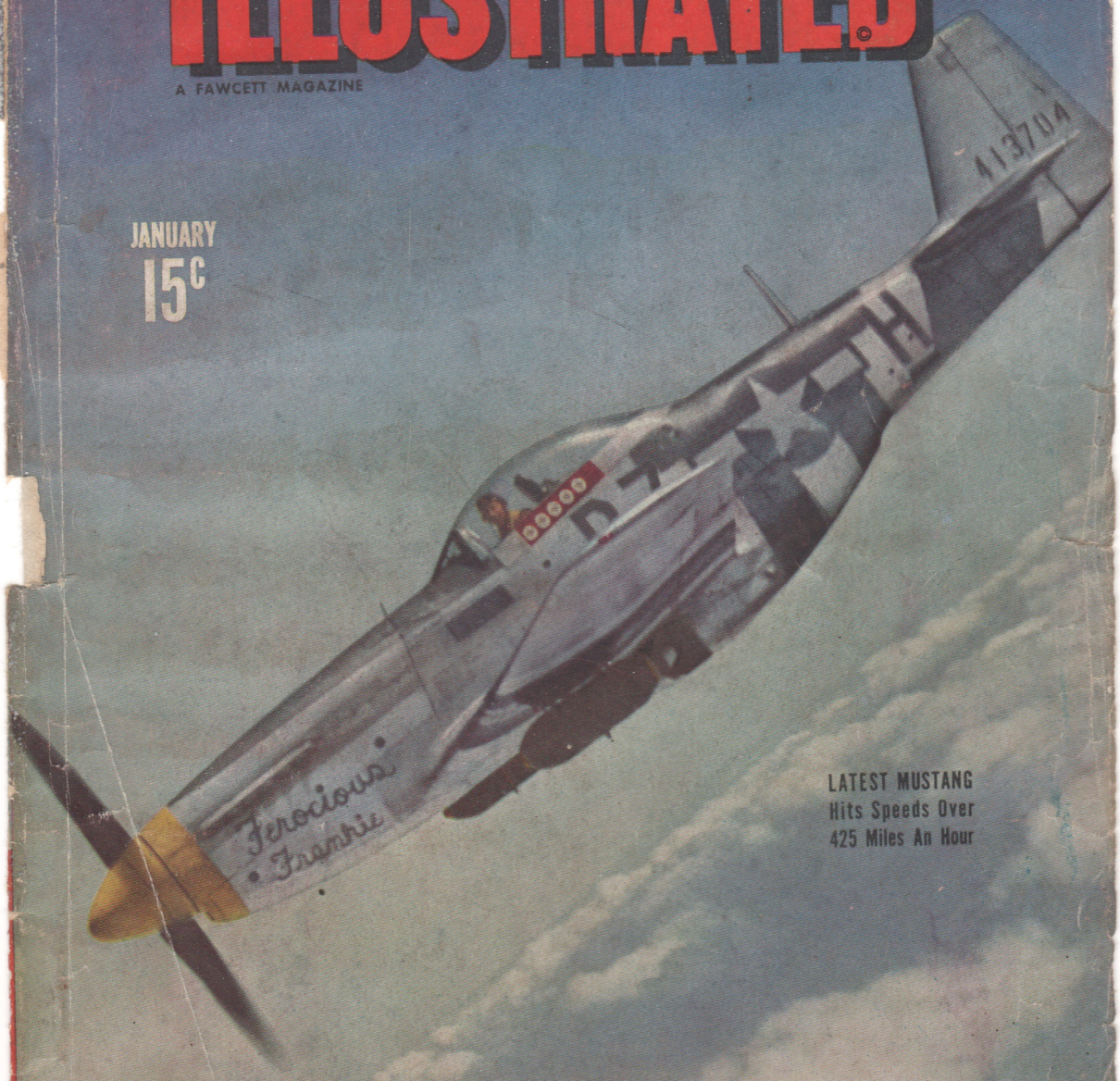
MECHANIX ILLUSTRATED

A FAWCETT MAGAZINE

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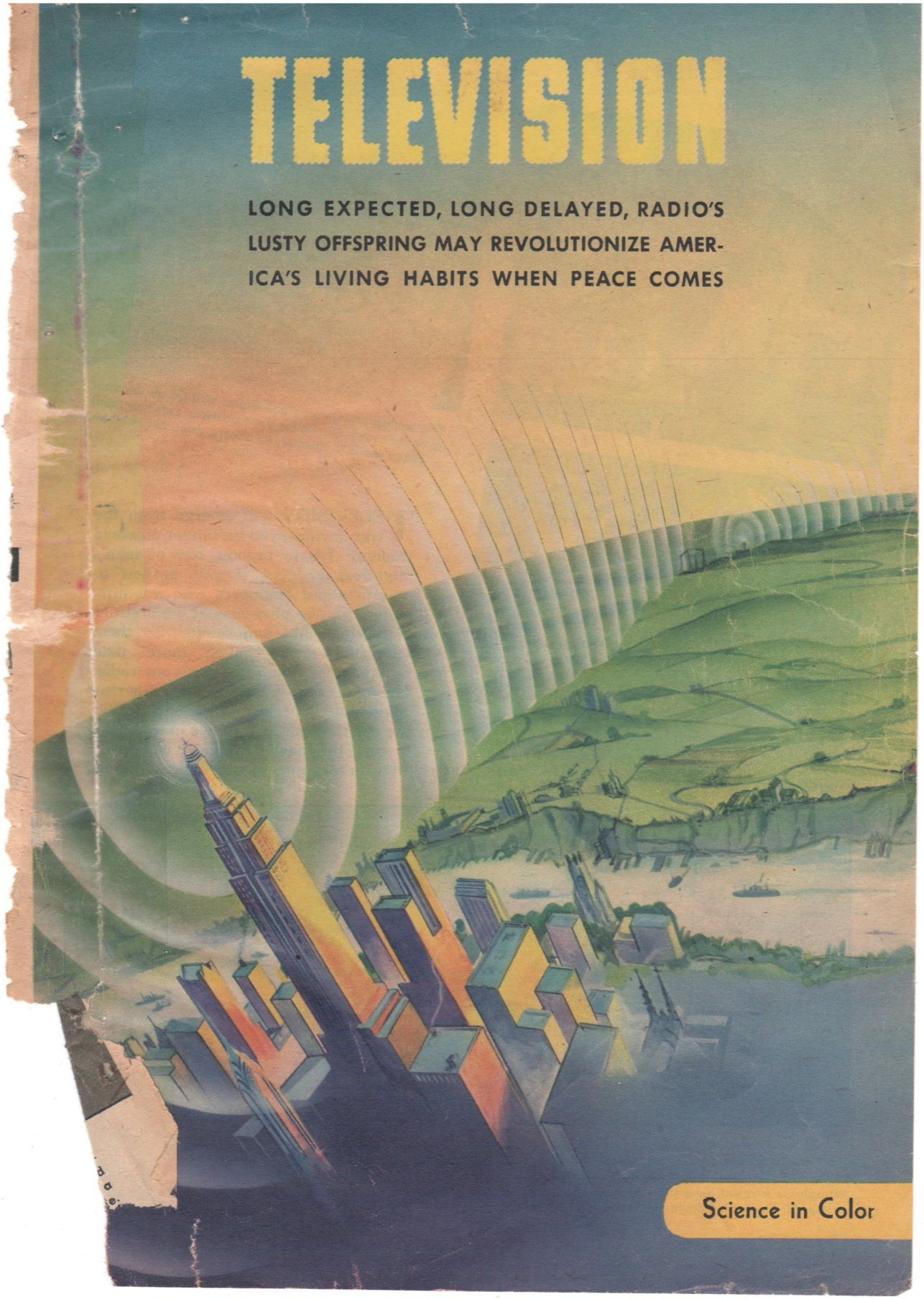
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SPECIAL FULL COLOR SECTION **BATTLE OVER TELEVISION** SEE PAGE 67

BUILD A ½ H.P. GAS ENGINE ON YOUR LATHE

TELEVISION

LONG EXPECTED, LONG DELAYED, RADIO'S LUSTY OFFSPRING MAY REVOLUTIONIZE AMERICA'S LIVING HABITS WHEN PEACE COMES



Science in Color

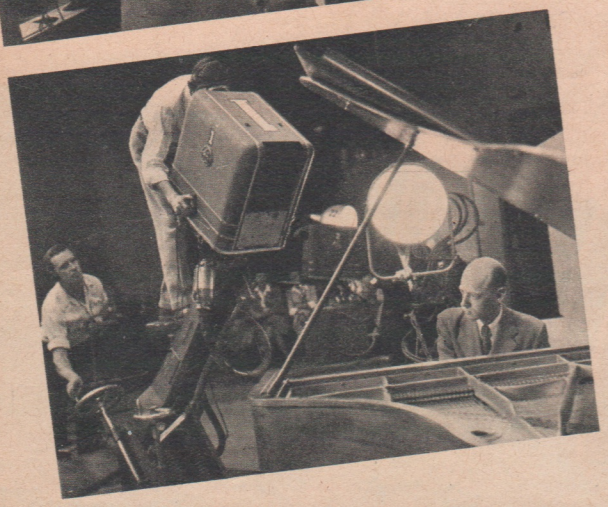
by Jack O'Brine

Member of Department of Information, Radio Corporation of America

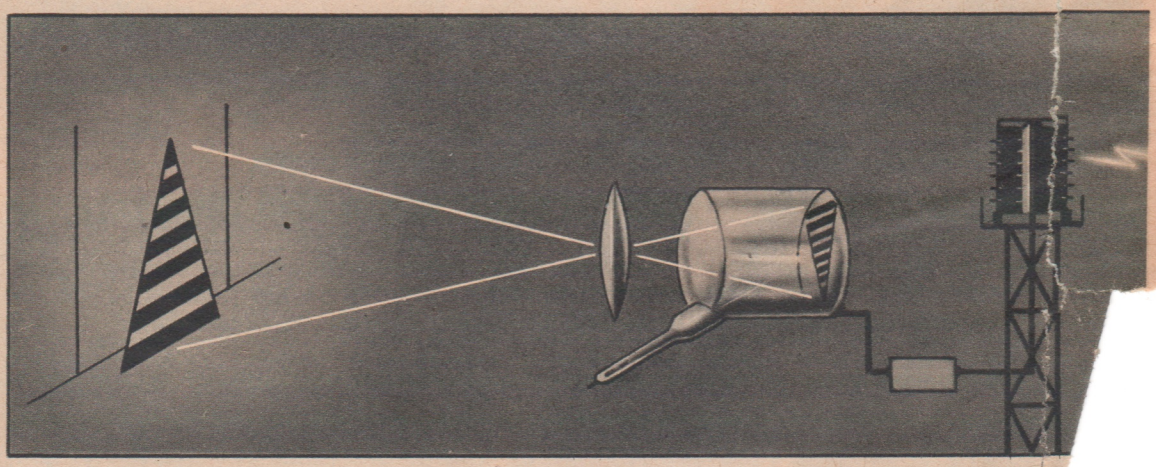




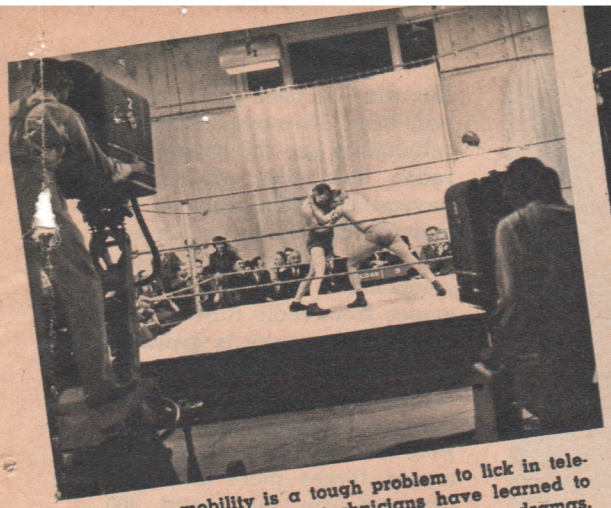
The roving television cameraman will be on the spot to cover many events for your postwar entertainment —piano recitals, marionette shows, even art exhibits.



TELEVISION will emerge from the war a wide-eyed harbinger of world change. It's to become one of man's mightiest gadgets, if you harken to scientists and engineers who are intimate with the phenomenal possibilities of linking sight and sound. To them television means much more than stripping the blindfold from your radio. They foresee it performing amazing roles—the super-cop directing traffic, the eye that can scan places inaccessible to man, the master projector of knowledge, entertainment and understanding.



Here's how programs are broadcast from WRGB, General Electric's pioneering television network. In this instance program is originating in New York's Empire State Building. The visible object (represented by striped triangle) is focused on a plate sensitive to light. A beam of electrons scans image from top to bottom in a series of horizontal lines, inducing the plate to generate electric current which varies with light-valu





Camera mobility is a tough problem to lick in telecasting, but ingenious technicians have learned to catch action in fast-moving sports events, dramas.

the superduper salesman, the "third eye" of your boss, the Johnnie-on-the-spot reporter of great news events, and so on. You get the idea that television may be quite a lively accessory to future doings.

Many surprises are in store for skeptics who think that television may remain one of radio's poor relations after the war. For one thing, television is found to be something that the American public wants—and wants badly. That means action must come as soon as humanly possible. For another thing, wartime developments in radio-electronics, as secret as they have been kept by the military, point like a hitch-hiker's thumb down a highway of miracles.

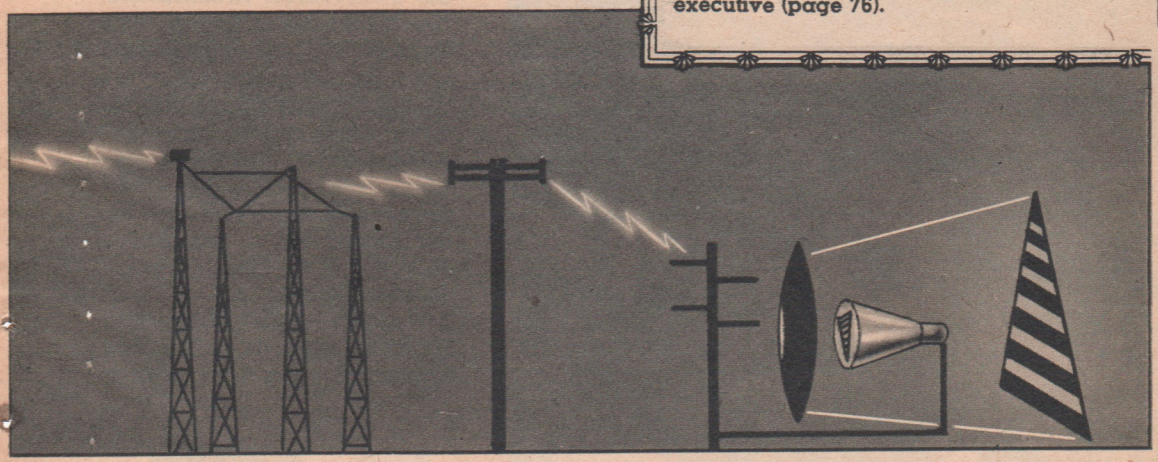
More than a hint of radio's advances during

EDITOR'S NOTE

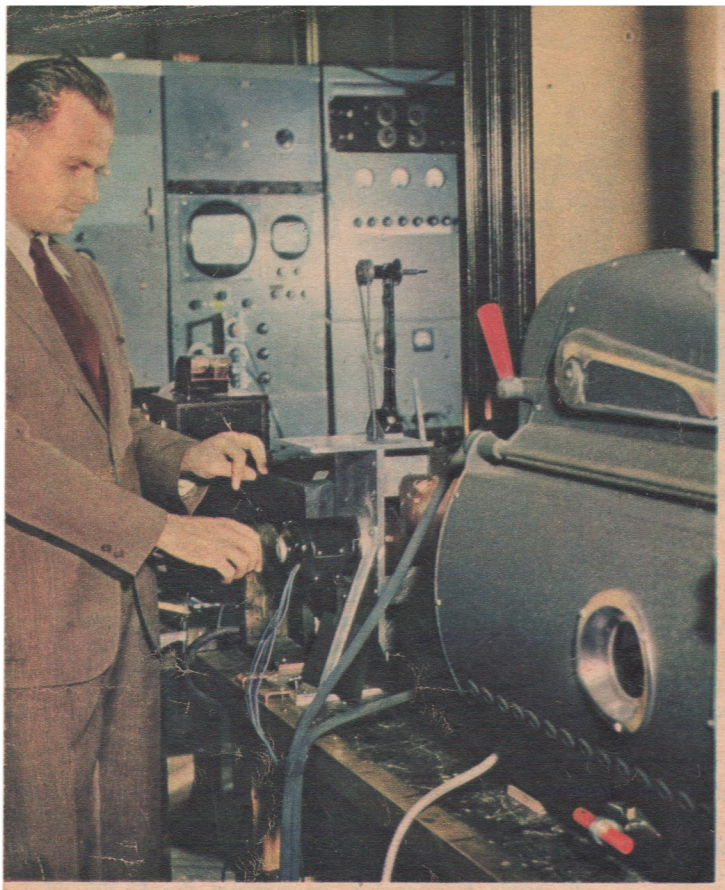
A spirited controversy is raging over television's future. Radio Corporation of America spokesmen maintain the present 525-line picture structure gives a good enough image for immediate commercial development. Columbia Broadcasting System representatives stress wartime innovations such as radar, contend a 735-line structure is now feasible and should be perfected before mass production of sets begins.

This higher standard requires a wider broadcasting channel—500-1,000 megacycle frequencies, as against the 50-300 megacycle band now assigned to television. Ultra-high frequencies, it is argued, will improve the black-and-white image, make possible a good full-color image.

To help you appraise both viewpoints intelligently, MI presents in this special feature a statement from an RCA spokesman (page 68) and a rejoinder by a CBS executive (page 76).



This current is built up by an amplifier, then beamed as a radio signal by a four-bay antenna atop Empire State, with a separate dipole antenna transmitting the aural signal. Both video and aural signals are picked up by four-towered relay station on White Face Mountain, 119 miles away. Next, the main transmitter changes signal's frequency, broadcasts it for local audience. Receiving set translates waves to visual image, enlarges it.

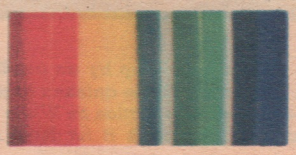


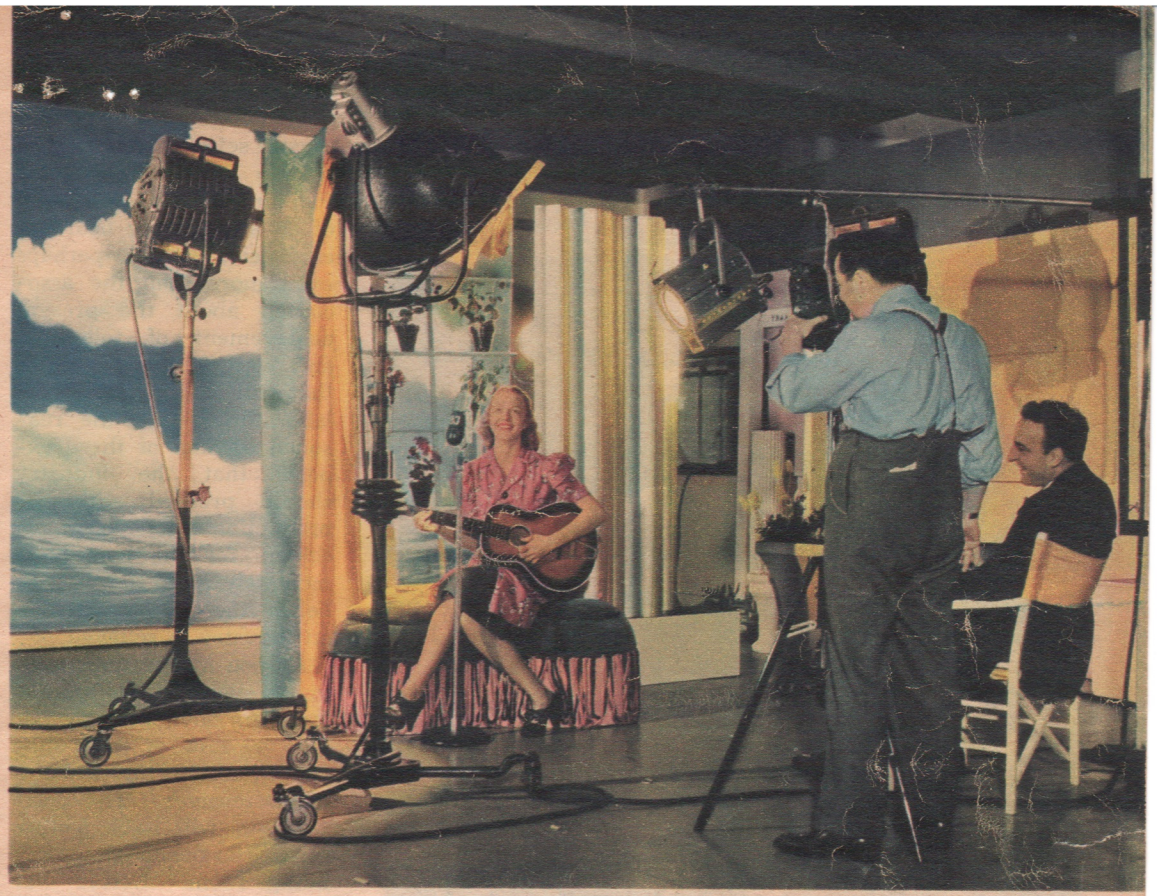
Above, Dr. Peter Goldmark, CBS television expert, examining arc-lamp of the color projector which he invented and developed (see page 76). Below, spectrum band and actual image photographed on a television screen during the first successful color telecast by CBS. Dr. Goldmark and his associates maintain that horizontal streaks will disappear when higher frequency bands are employed.



this war has been permitted to seep from GI sources. Revealed reluctantly are the wonders of radar, facsimile, electronic navigation, radio sight in fog and darkness, collision prevention, and a host of other developments that spring like genies from radio tubes. Little by little the story is growing. The Radio Corporation of America, for example, has been permitted recently to disclose that it has developed for the armed forces more than 150 new electron tubes and 300 types of apparatus not manufactured by any one before the war. General Electric has announced the perfection of a tiny tube of uncanny power as the first of a line of similar bulbs to speed the extension of television networks. Announcements of progress in developing radio equipment also have come from Allan B. DuMont, Westinghouse, Philco Corporation, Farnsworth Television, Zenith Radio and others which, like RCA and GE, have elaborate post-war plans for television.

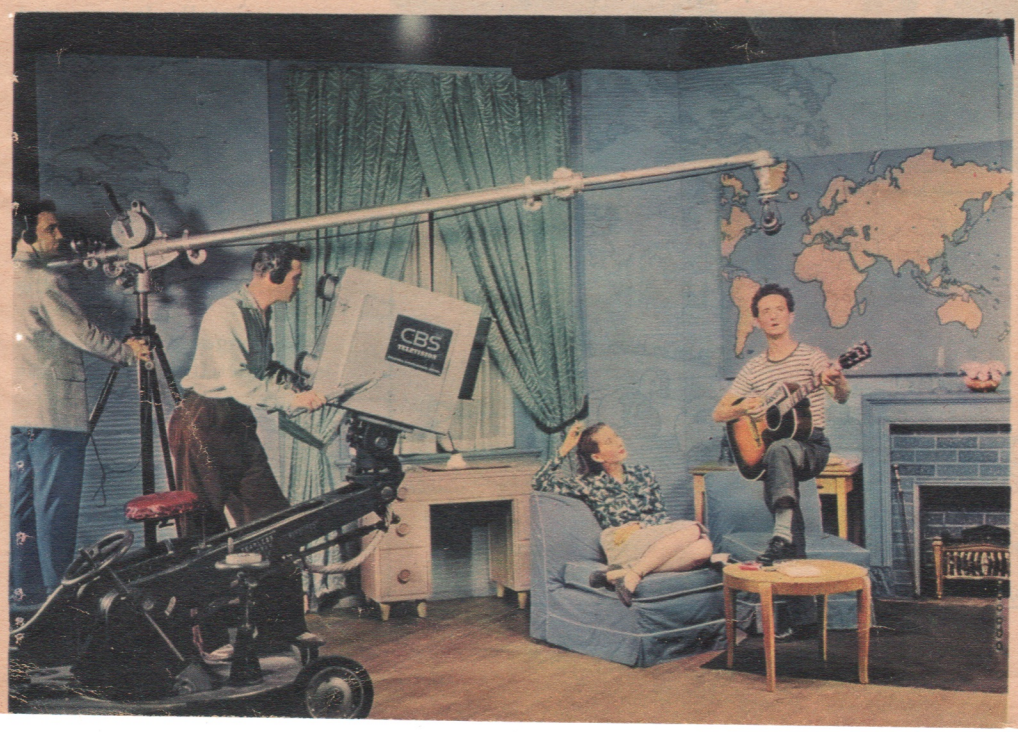
To those who would delay television service until it becomes adorned with color and flits on staticless frequencies, the Television Broadcasters' Association has an answer. This august group, representing virtually the entire video industry, recommends an orderly introduction of new home receivers starting as soon as possible. It recalls that the motion picture industry didn't wait for the perfection of technicolor and sound for the commercialization of the movies. And it reminds those who would hitch television to a star that the radio broadcasting industry





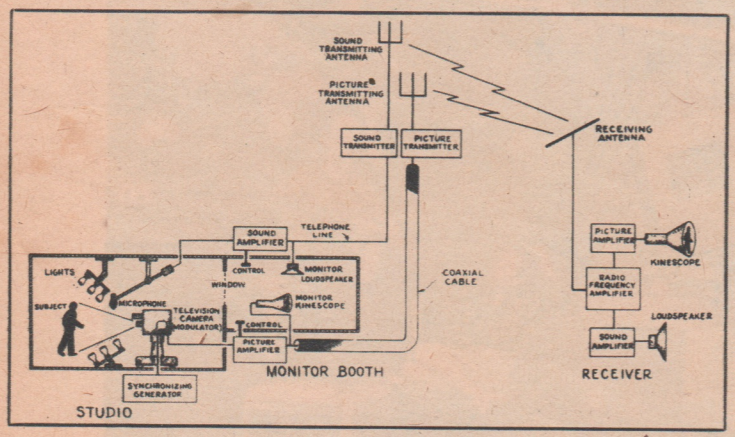
Above, technicians study the set-up for a television show during rehearsal. Lighting and stage colors are extremely important, since low light values and certain colors produce a dim black-and-white image. Man with back turned is determining intensity of set's lighting with a color viewer.

Below, a CBS studio show being telecast. Mobile camera is mounted on dollies for pan shots and quick shifts of angle. An overhead boom follows actors around the set to pick up music and voices. Both cameraman and mike-boom operator wear headphones to get instructions from control room.









did quite all right, thank you, though it started with crystal sets.

The Radio Technical Planning Board, composed of an all-industry board of engineers, knows perhaps even more than the association about the present achievement of television and wartime developments that still are progressing in laboratories. It's the reasoned opinion of these experts that the industry should proceed with the production of television receivers for the home immediately after the war, or before then if the pressure on industry is relieved.

As you may gather, television engineers and manufacturers have a pretty fair idea by now of what they can promise in the way of a home receiver. The postwar era will have picture screens large enough for any living room. Before war curtailed production, experimental home receivers with 13½ by 18-inch picture screens were demonstrated successfully. Pictures in motion 18 by 24 inches also have been produced experimentally. It is assured therefore that there will be home sets to meet requirements. And these receivers, it can be revealed, will be built to sell in the $200 price range, which a highly authoritative survey has just shown to fit the pocketbooks of some 61 per cent of the radio-buying public of the U. S.

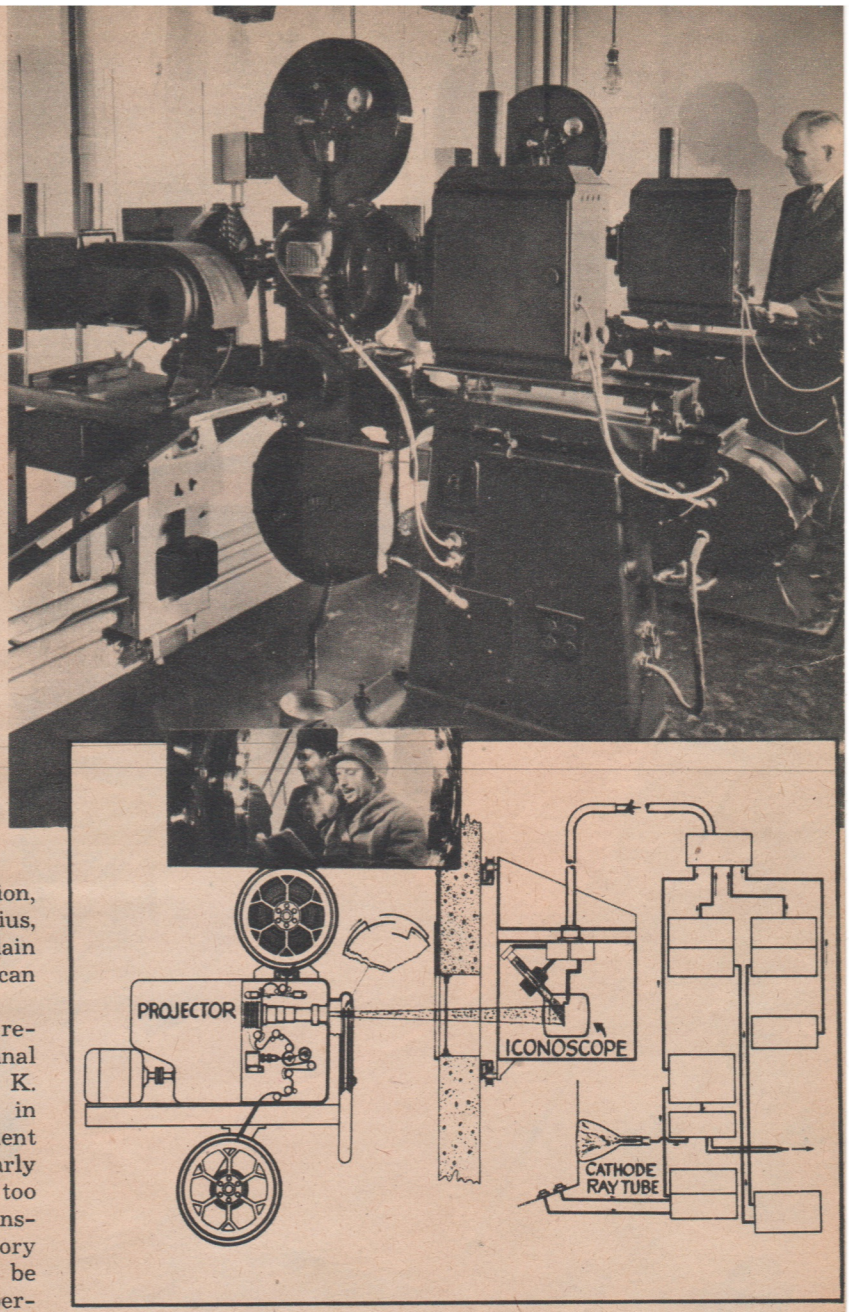
No longer a trade secret is the fact that RCA, as the

Top, view of a television studio from the CBS control room. Center, control panel with director at mike in center, audio engineers to his left and video engineers to his right. Below, diagram showing how sound and picture are sent.

recognized leader in television, has devoted to video perfection more than 20 years of exhaustive research and $10,000,000 in cash. Television has become an electronic art and practical possibility largely through the development in RCA laboratories of the Iconoscope and Kinescope. The Iconoscope, or "electronic eye," receives the optical image of the scene of action to be transmitted, stores it, analyzes it into its elements, and converts it for transmission. The Kinescope transforms the electrical impulses at the receiver back into an image for viewing. It sounds relatively simple, perhaps. But for perfection, it required more genius, patience, vision, and plain hard work than you can easily imagine.

For one thing, as remarkable as the original feat was when Dr. V. K. Zworykin achieved it in 1929, further improvement was demanded. The early Iconoscope required too much light for the transmission of a satisfactory image. Studios had to be ablaze with light, and performers complained of the glare and heat. In outdoor "shots," such as views of the last minutes of a football game on a cloudy fall afternoon, darkness descended with a blurred "snowstorm" of confused pattern resembling what a myoptic might see without his glasses. Protests, of course, came thumping in, and they were accompanied by demands of Iconoscope experts for at least a ten-fold increase in the sensitivity of their electronic eye.

That was a large order, and at first glance it seemed one destined to be unfilled. But research scientists and engineers tackled it. Their first step was to analyze once more the function of the Iconoscope. It, as mentioned earlier, stores the electrical charges produced by photoemission and then converts these charges into signal current. Photoemission has been the subject [*Continued on page* 146]



Movies may play a prominent part in your television bill-of-fare. Picture above shows movie and slide projectors used in telecasting. Projectors are equipped to move intermittently, by use of a rotating disc with apertures. Masking and unmasking of film images is synchronized with movements of the iconoscope's scanning beam (see diagram below).

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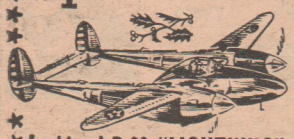


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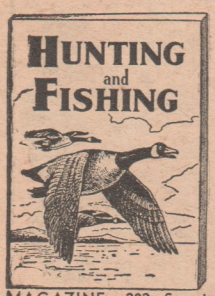
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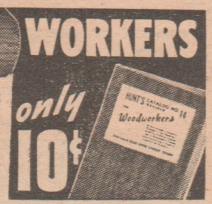
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Rotary Files

[*Continued from page* 93]

intricate designs in plastics as well as all sorts of grooves, undercuts, dovetails, and the like.

There are two kinds of rotary files on the market. "Hand Cut," and "Ground from the Solid." The former are actually made by hand; a properly shaped piece of steel is cut with special hammers and chisels, then hardened. The latter are machine ground. They belong more into the family of milling cutters and are used mostly on harder metals. For the purpose of plastics machining hand cut rotary files have been found most satisfactory. They come in four grades: rough, coarse, fine and smooth. Since plastics fill up any tool very easily, coarse rotary files are recommended, for work both in the acrylics (Plexiglas and Lucite) or cast resins (Catalin, Bakelite cast resins, etc.). Whether they are used in the drill press, the lathe, the flexible shaft or a tool like the Handee, they should be used slowly, i. e. only small cuts should be taken at a time. If the cuts are too big, toolmarks will result which need a great deal of sandpapering and polishing afterwards. It is always a good idea to repeat the last cut without changing its depth. The file will remove the slight excess of material which is almost unavoidable even in a well adjusted machine.

Rotary files are made in many shapes and varying sizes. For straight removal of material, squar-

[*Continued on page* 147]

Television

[*Continued from page* 73]

of research for many years by hundreds of scientists for multiple purposes. Primary re-examination indicated that the Iconoscope experts had contrived a photoemission surface nearly as sensitive as could be hoped for. So it was decided that research aimed at further improvement along that line would be a waste of time.

Sizing up the next step in the process, the research men agreed that only about 10 per cent of the stored electricity was finally converted into a useful signal. They estimated that it would take the increasing of conversion efficiency 100 per cent to achieve the desired ten-fold boost in sensitivity. It was well known that the 90 per cent loss of stored charge was caused by the scatterning of "secondary" electrons of the scanning beam. But there appeared no satisfactory manner of controlling the secondary electrons—none, that is, except an invention of high order that would eliminate them completely by using a low-speed electronic beam to scan the target.

The fact that no one had succeeded in focusing or controlling such a beam did not deter RCA scientists and engineers from attempting it. They welcomed the challenge, and out of their work came a development that has made television his-

[*Continued on page* 147]

Rotary Files

[*Continued from page* 146]

ing off, etc. . . . and that can be done on two sides of a piece at the same time . . . files in cylinder shape or inverted cones are best. They also come in ball form, with convex and concave radii, and some especially fancy ones are made to look like an inverted ball. If you are very ambitious you can use those, for instance, to make beads; first lay out your piece carefully, marking the beads with a compass; then take off the excess material around the beads, and then bear down on the bead spot with the tool.

Rotary files are not cheap . . . they vary according to size and intricacy of cut, but they last almost indefinitely when used in plastics, provided they are cleaned with a brush each time they are used. Too, they can be reground. Most makers of rotary files have a special regrinding service available. If you have any machine tool which holds either ⅛" or, preferably ¼" shanks . . . most rotary files are made with the latter size shank . . . you'll find endless fun with these files which are just about the only efficient tools for working in plastics . . . for squaring them off, grooving them, carving and cutting and forming them. Too, in the proper size, they are more satisfactory for drilling plastics than ordinary drills, since they don't chip the material as easily as drills do and make a much smoother hole. And, perhaps most important of all, they don't leave you in the lurch if your hand filing is none too accurate, or the famous expression of "doing something by the eye," has proven not to make you come up with the most efficient job.

Television

[*Continued from page* 146]

tory. It is an improved Iconoscope—now known as the Orthicon—which has extremely high sensitivity. This device makes possible the transmission by television of scenes which previously had been far too dim. And it opens the way for still further improvements that eventually may enable the television camera to observe any scene that has sufficient illumination to be visible to the human eye.

When the problem of increasing the size of the television image to desirable dimensions presented itself, optical men came to the fore and their research has made it possible to produce a reflective optical system of high speed that gathers nearly four times as much light as the best conventional lens. Applied to the kinescope the result is a projection type television receiver that can produce images up to almost any desired size. Moreover, RCA Laboratories have produced a plastic lens, through a moulding process that reduces the cost of manufacture to a point that assures television home receivers of unexcelled standard at nominal cost.

[*Continued on page* 148]

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Television

[*Continued from page* 147]

Portable and mobile camera and television transmitter units, such as those which were developed by RCA and used in the field by NBC before the war, will range far and wide in your own and other localities to bring news and special events to your television screen. News as it happens, whether in New York, Chicago, Washington, or elsewhere, will be telecast throughout the nation. A Presidential inaugural, a political convention, a parade up Fifth Avenue will pass in review. Baseball, football, track meets, wrestling and other athletic events; the circus, the rodeo in its native setting of the West or in Madison Square Garden will be among the many events which television can take to the home. From airplanes portable cameras and transmitter units will pick up scenes of events, floods or disasters.

Motion picture films will form another important part of television programs. As in all other types of program, much is yet to be learned as to the kind of film material which will be of interest to the public in home television, but you may expect many television stations which do not have network connections to use film recordings of programs.

Theater television—made feasible and practicable by RCA's projection type kinescope and high efficiency reflective-type optical system—is another bright prospect. Just before the war, a demonstration was staged in which a picture in motion was projected on a 15 by 20 foot screen from a balcony 60 feet away. This demonstration was witnessed by some 2,000 people in a Broadway show-house.

Television pictures of prize fights in Madison Square Garden have been sent over special wires to be viewed on the large screen. Baseball games from Ebbets Field in Brooklyn have been shown with splendid clarity. The clamor of the crowds, the thud of gloves, smack of the bat—all of the sounds that accompanied the action—have utmost realism.

Though delayed by the war, theater television is a certainty soon after fighting ceases. It has fascinating prospects, as it portends the connecting of playhouses of the nation into television networks that may transform town halls and village theaters into a Madison Square Garden or Metropolitan Opera House.

The prospect of television as a new and effective aid to industry after the war rings another bell. RCA research scientists envisage radio sight as the coming "eyes" of factories and bosses—the means of coordinating activities in giant manufacturing plants, and the means also of peering into places and situations that otherwise might be inaccessible or extremely hazardous to man.

It is now known that television can be used to extend the eyesight of the plant manager to critical operations which ordinarily would require

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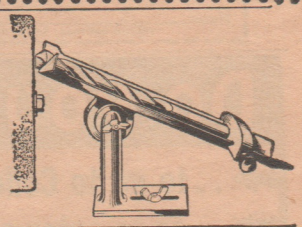


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Television

much time and effort to reach for personal inspection—aiding immeasurably in plant control.

Television cameras at strategic points can be connected by wire to receivers where production experts, foremen and supervisors can follow the flow of fabricated or raw materials and watch the progress of the work. Such setups will be particularly valuable in mass production assembly lines, and they may be extended to include loading platforms and shipping rooms.

Television cameras may be used in connection with chemical reaction chambers, making visible to the operator without personal risk the chain of events occurring in complicated chemical units, and thus enable him to control the process with optimum results. Specially-built cameras may be used in furnaces to observe steps in the formation of alloys, and others may solve vital problems of analysis in important industrial processes.

In addition, television equipment is foreseen facilitating the port movements of ships. Cameras located fore and aft, and on the port and starboard side of vessels, could lessen the hazards of docking and insure safety in crowded shipping lanes. Also foreseen is the use of television in metropolitan traffic control and along congested motor routes. Cameras could be installed per-

[*Continued on page* 153]

Television

[*Continued from page* 149]

manently at busy intersections to flash to traffic headquarters running picture accounts that should greatly aid traffic experts in easing congestion.

Among the other possibilities of television in industrial and business processes, the television receiver tube may be employed to generate fixed patterns, infinite in number and style, for the use of artists and designers. These patterns will be useful in the designs of curtains, drapes, dress material, upholstery, etc. The results are achieved by feeding such tubes with mathematically related alternating currents which are mixed in different proportions by simple control knobs.

At the present time there are nine television stations broadcasting regularly in the United States. Three of these, including the National Broadcasting Company's veteran station WNBT atop the Empire State Building, are in New York; one in Schenectady, New York; two are in Chicago, and two in Hollywood. When the war is over, there is every indication that television stations will spring up in many other cities, and that communication lines afforded by coaxial cables and automatic radio relay stations will reach out from the Coasts to bring many television stations into a transcontinental chain or network developed in the service of the American public.

It is natural that you should ask how long it will take after the war to bring television to your home. With the war yet to be won, industry to be converted to peacetime enterprise, television stations and networks to be built and apparatus to be manufactured, it is not possible to set an exact date on which television will serve you. This is known, however: insofar as war conditions will permit, plans for the manufacture of television equipment and the establishing of television networks are taking definite shape, and once Victory has been achieved, progress will be rapid.

The first of the major broadcasting companies to go on record with tentative plans for the expansion of television into an all-American network, was NBC. Its president, Niles Trammell, in a statement to NBC's 145 affiliated stations, announced that possibly within the next five or six years we will see such a network, as an extension of a television web to cover heavily populated sections of the East much sooner.

This is specifically mentioned by the American Telephone and Telegraph Company in a projected schedule for the installation of coaxial cable for the long-distance transmission of television signals. The A. T. & T. also proposes to build, as soon as the war will permit, a trial system of radio relays connecting New York, Boston and intermediate points at a cost of $2,000,000. Connected with Washington, this would cover an area with a combined population of more than 25,000,000.

It is expected that by the end of 1946, in addition to a New York-to-Washington circuit, Wash-

[*Continued on page* 155]

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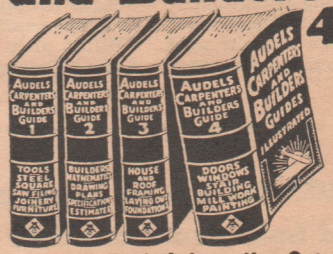
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Television

[*Continued from page* 153]

ington will be connected to Charlotte, and Chicago will have become the center from which a Midwest network will be expanding. By 1947, it is expected that there will be connecting stations as far south as Birmingham and Jackson; and in the West, Dallas, El Paso and Phoenix will have been connected with Los Angeles.

In the matter of transmitting television across country, both coaxial cables and radio relays have been used with success. A radio relay is an unattended low power station with high directive transmitting and receiving antennas mounted on a tower sometimes as high as 250 feet. The television signals received from a studio or other point of origin are beamed automatically from one relay to the next, some 35 miles distant, and through subsequent relays until they reach their destination. These relays employ frequencies much higher than those used for broadcasting television. The same relays can carry a multiple number of television channels, as well as channels for other services.

Editor's Workbench Chips

[*Continued from page* 14]

Gadabout

Your post-war car—manufacturers say the first models will be like those of '42, changes will come later—and they're keeping very mum about those changes. But Ray Russell, Detroit designer, has already built a car that looks ahead five years.

Half-Horse Engine—Plans, instructions and photos showing how to complete this newest precision gas engine. By C. W. Woodson from designs by E. A. Wall.

Checkerboard Coffee Table—You'll want to make this attractive, useful table for your own or a friend's home. Designed and executed by the Brownolds—Charles and Bertram, well-known to MI readers.

Turntable Troubleshooting—John Potts, MI's radio expert in his second article explains various radio hookups for phonograph turntables, and tells you how to repair sick turntable motors.

FIGHTING WINGS

A new book which you should include on your Christmas shopping list is FIGHTING WINGS, a pictorial history of aerial combat, authored by Gilbert Paust, Aviation Editor of MI, in collaboration with Milton Lancelot, aviation expert. It contains 45,000 words of text in addition to 266 authentic, *action* photographs of planes in combat in World Wars I and II. This book contains 250 pages crammed full of interesting facts concerning the development of the airplane as a weapon of military offense. Make sure to add it to your reference library. Publisher: Duell, Sloan and Pearce, 270 Madison Ave., New York. Price: $2.75.



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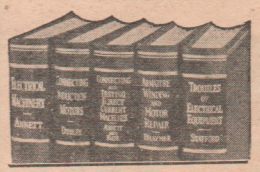
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· · · A Word of Caution
ABOUT POSTWAR TELEVISION

by J. H. Ream

Vice President and Secretary (In Charge of Television), Columbia Broadcasting System

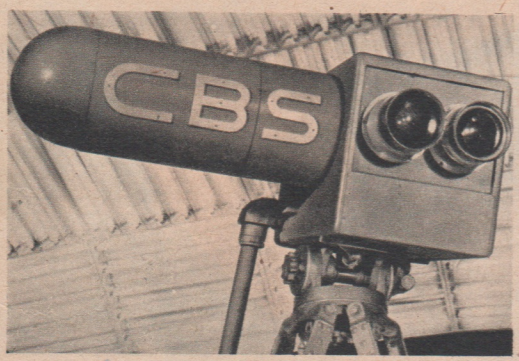
OUT of the laboratories of war-time electronic research comes the assurance that postwar television pictures can be vastly improved in quality. But with the assurance comes a warning that real improvement is possible only on much wider channels and at much higher frequencies than are now authorized as standard.

Because changed standards are necessary for its fulfillment, the promise of improvement has, in certain quarters, been received with little if any enthusiasm. Changed standards, in this case, mean instant obsolescence of all existing equipment. Television, if it is to take advantage of the opportunity offered by war-time discoveries, will have to write off past investments and start again from scratch.

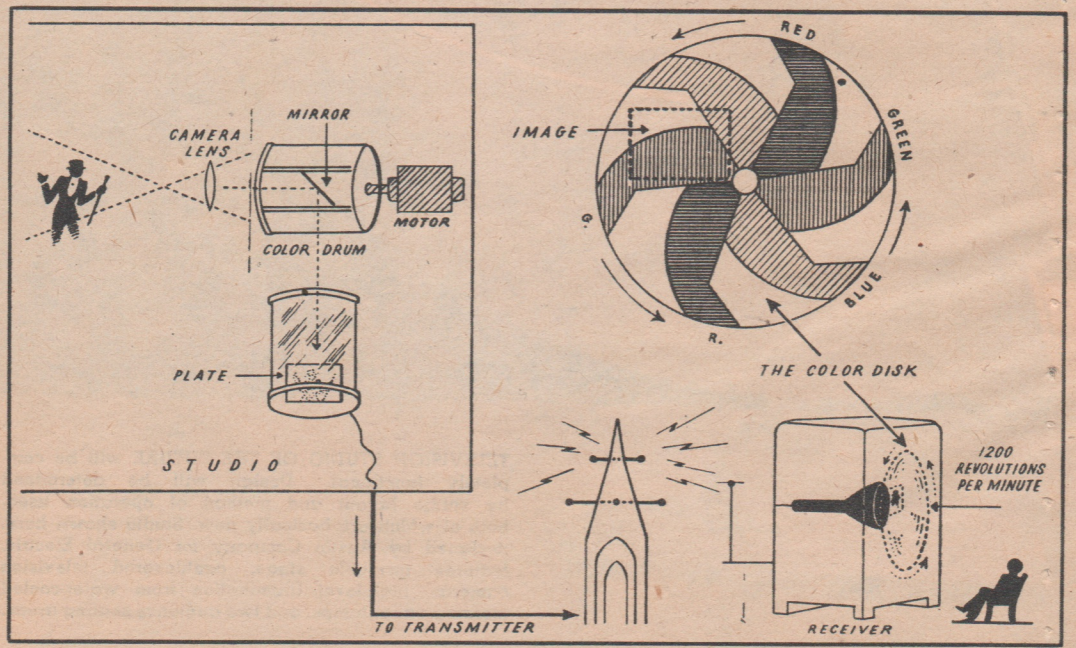
Believing that the American public is eager for television, manufacturers with sets designed on prewar standards are also eager to build and sell those sets as soon as they are permitted to do so. The Columbia Broadcasting System, among others, is of the opinion that this view, though understandable, is short-sighted.

"The American public is eager for television."

Without qualification, this statement is misleading if not meaningless. Certainly there is no public eagerness for small, indistinct and poorly lighted pictures. The sets that were available before the war sold at a speed that could scarcely be likened to "hot cakes." Public eagerness, if it exists, is based on visions and promises approaching perfection. If postwar television falls far short of public expecta-



COLOR TELECASTING: CBS has developed a color camera for television (see photo, left, and diagram below), argues that better color transmission will be made possible when a higher-frequency band in the radio spectrum is assigned to telecasters. The CBS camera breaks black-and-white image up into its color components by mechanical means, using colored filters mounted on a high-speed rotating drum. RCA, on the other hand, has developed a special camera tube for color work, insists that mechanical color systems are unsatisfactory and color dissection of images should be done electronically. With the CBS set-up, each primary color is transmitted separately to the receiver, which uses filters to build a color image.



tion, eagerness will turn to apathy overnight.

Television can and should be a great postwar industry. It can and should be the most effective advertising medium yet devised. It can also be a failure. If it is to succeed, television must attract—and hold—the interest of millions. It will gain such an audience only if the quality of its pictures is high enough to warrant a nation's interest and continuing attention.

During the inevitable period of audience-building broadcasters will have to stand the cost of producing and broadcasting programs. This they cannot afford to do alone indefinitely. Nor will prospective sponsors look favorably upon the new medium until its audience has achieved nation-wide dimensions. Nothing could stimulate audience growth more surely than a vastly improved television image in the home; one that would spread ownership of television sets through 10,000,000 homes in half the time a mediocre picture would require.

Broader bandwidths and higher standards promise:

1) Pictures in full, natural color. Color conveys greater pleasure and more information. This means heightened entertainment value for the viewer; it means heightened sales appeal for the sponsor. Color reproduces picture structure through strong contrast between different colors, instead of through indeterminate shades of gray. This means greater detail and clarity. It means viewing television with no more eye fatigue than that incurred by viewing a movie.
2) Pictures twice as large as present-standard television images, with twice as much detail. This means close-ups that reproduce details of texture; long shots that reproduce clarity of distant objects; broad fields of vision that reproduce all the details of a more panoramic view.

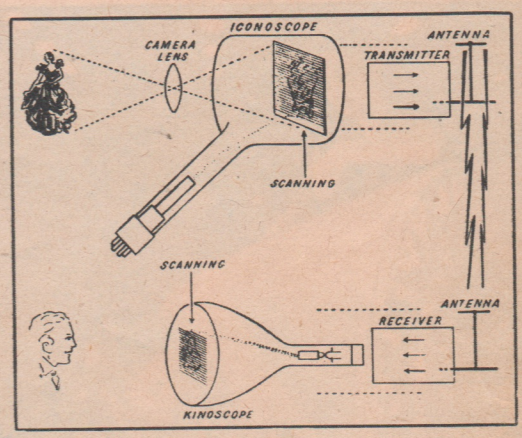
If the American public is sold something less than the highest attainable quality in television, one of two things may happen. 1. A "buyers' strike" that would halt set sales before a commercially salable audience had been built. 2. A "freezing" of standards at present frequencies and channels (because of the large public investment in inadequate receivers) that would indefinitely postpone improved television on wide bands and high frequencies.

United industry effort at this time can prevent either of these things from happening. A year of concentrated effort, perhaps less, is enough to test and prove or disprove every war-time discovery that can be applied to the improvement of television. Then, the public can be offered television at its highest attainable quality. The higher the quality, the more sets will be sold and the faster they will be sold.

Those who wish to launch television at its present level of quality draw an inaccurate comparison between television's position today and that of other industries in their beginning. Automobile manufacturers, they recall, did not withhold workable models from the public because of better models they knew were to come. Neither did radio or electrical appliance manufacturers. The fact, of course, is that in none of these industries has a new model rendered a preceding model useless. People could still use their old cars, radios and washing machines if they lacked the money or desire to buy better ones.

Because it is universally agreed that they will require wider bands and higher frequencies for their transmission, the larger, clearer, more detailed pictures in color that postwar promises for television cannot be received on any set that is now ready for manufacture and sale. New sets for this improved television, whenever they may be ready, cannot be launched except at the sacrifice of all sets that preceded them. Today, the change-over would mean the scrapping of some 7,000 sets, most of which have already rendered their money's worth in service. Tomorrow?

Suppose an all-out attempt is made to promote the development of postwar television on today's standards. That an eager public might be persuaded to buy 5,000,000 sets is not an unreasonable assumption. At an average price of $200, these [Continued on page 150]



SCANNING: The electronic beam bombarding the iconoscope's plate scans the image twice in one-thirtieth of a second, breaking each shot up into 525 horizontal lines. CBS contends that with radar and other war developments, 735-line image is possible.



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Caution About Television

[*Continued from page* 77]

sets would represent a public investment of a billion dollars. Suppose, at this juncture, that engineers demonstrated vastly improved television on wider channels and higher frequencies. Manufacturers then would be faced with the choice of suppressing the better television, which in turn would stunt the growth of a new industry, or of asking the public to scrap a billion dollars of misguided investment. Either choice would be harmful to the manufacturer, to the broadcaster, to the public and to television.

As it stands today, the television industry may accurately be compared to a group of people, all of whom are very anxious to go swimming. Before them is a new and amazingly capacious swimming pool, but water has been running into the pool too short a time to fill it to a depth of more than a foot or two. Impatience drives some of the group to jump up and down on springboards; to talk about diving in; to shout, "Last one in is a so-and-so!"

Held back by the reality of shallow water under the diving boards, others in the group take another view. "Wade in and splash around now, if you can't wait," they say, "but for goodness sake don't dive in yet or you'll break your necks." These people are just as eager as any in the group to do jack-knives and one-and-a-halves off the high board; to go swimming and to keep on swimming. That is exactly why they feel as they do, with the pool in its present condition. For a broken neck is not only painful. It can be fatal.

Credits: Television black-and-whites and kodachromes by courtesy of General Electric's Schenectady studios, Columbia Broadcasting System, Radio Corporation of America. Diagrams on pages 76 and 77 reproduced from Kingdon S. Tyler's new book, "Modern Radio," by courtesy of Harcourt, Brace and Company.

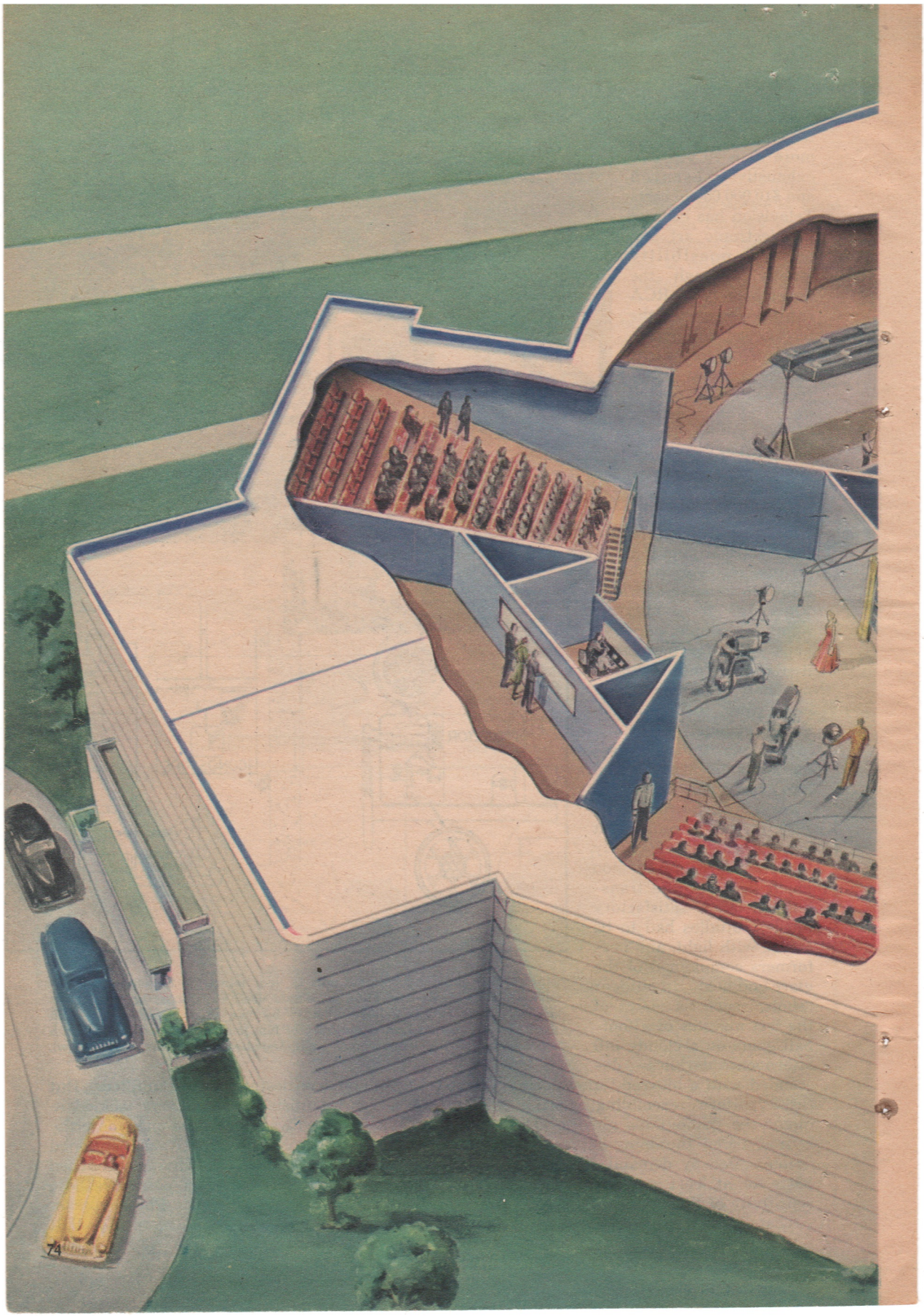
30-Million Dollar Snow

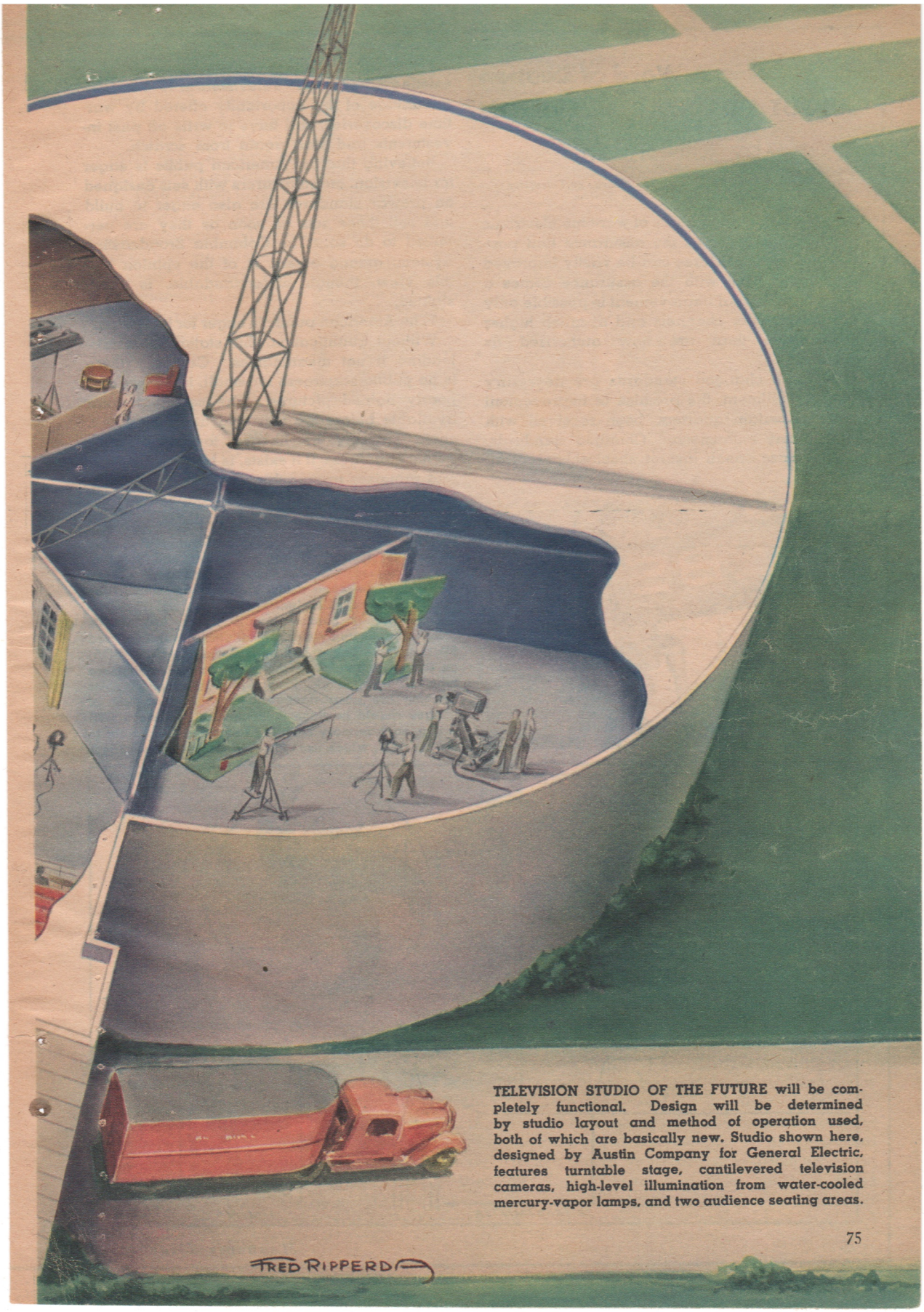
[*Continued from page* 53]

The principle behind this is similar to that of an electric refrigerator. The unit operates because heat from outside leaks in and will start and run until the heat is extracted.

If the temperature above snow keeps below freezing, it will counteract heat radiated from the ground. A warm ground temperature will destroy base rapidly. Temperatures of ground will always remain below freezing with a good start and even with temperatures of more than 40 degrees above ground, base snow will not change.

In banding legs of birds, scientists find nine standard sizes of anklets sufficient.





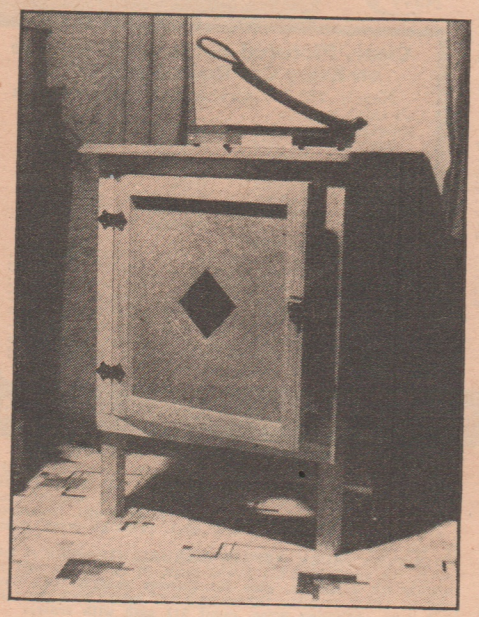
TELEVISION STUDIO OF THE FUTURE will be completely functional. Design will be determined by studio layout and method of operation used, both of which are basically new. Studio shown here, designed by Austin Company for General Electric, features turntable stage, cantilevered television cameras, high-level illumination from water-cooled mercury-vapor lamps, and two audience seating areas.



CHIPS FROM THE EDITOR'S WORKBENCH

A Great Flier Is Dead

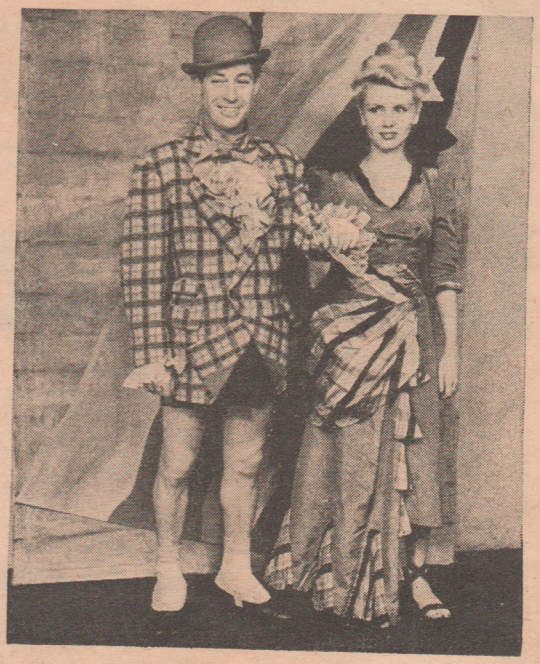
From California comes the shocking news that Milo Burcham, immediately after completing his story "Dance of the Pith Balls" (MECHANIX ILLUSTRATED, December), was killed in a test flight for the Lockheed plant. For some years Chief Stratosphere Pilot for Lockheed, Burcham was considered one of the most daring and skillful of the country's test pilots, a man who grew up with aviation in the U. S. and knew his business literally from the ground up. Burcham was the holder of many prized records in the flying business; he pioneered several important aeronautical developments, never hesitated to risk his own life so that others would be spared. Among his last exploits were the testing of the P-38 when it first was developed, and all the test flying on Lockheed's giant Constellation transport. With Burcham's passing American aviation has lost one of its most colorful and heroic figures.



DARKROOM DRYING CABINET

This attractive drying cabinet for photographic film and prints was built by George Lee of Westerly, Rhode Island. He followed plans in PHOTOGRAPHY HANDBOOK NO. 11. A certificate of Merit and a $5.00 Workbench award to Mr. Lee for his excellent work.

M. I. TELEVISES WORLD OF TOMORROW



Last month M. I. and the Charles Storm Advertising Agency put their heads together and came up with the first television show to be sponsored by any science magazine. Donald G. Cooley, whom you will remember as the author of the M. I.'s series of articles on cycles, talked for a half hour from the Dumont television studios in New York, predicting the science marvels of the postwar world and pointing up his talk with slides, miniature models, and delightfully life-size models, the latter by courtesy of Harry Conover. Above, two of the Conover models, illustrating the fashions of 1970—if the cycles hold out.

COMING NEXT MONTH

Back From The Dead

One of the most fascinating mysteries to intrigue the mind of man is the possibility of the resurrection of the dead. Out of the bloody fighting on the steppes of Russia comes word of amazing accomplishments by Russian physicians in reviving men pronounced clinically dead. John Frank tells you about it.

[*Continued on page* 155]

Invest in the 6th WAR LOAN and Bomb the Japs with Bonds