

CONVERTING THE HOME INTO A MOVIE HOUSE
 Here is an actual picture taken in the home of a Berlin family showing how talking movies are received, visually and aurally, on the short waves by television. At right: two German women announcers, Fraulein Ursula Patzsche and Fraulein Annemarie Beck.



MICKEY MOUSE ON THE SCREEN
 The three pictures below show the cartoon character as actually received and two types of receivers.

German TELEVISION

Wilhelm E. Schrage

WHILE America is still of the belief that television has not advanced sufficiently for general use, England and Germany are now endeavoring, through the aid of their respective governments, to make television as popular as broadcasting. Other European countries are following in their footsteps, and it can be truthfully said that Europe is now in the throes of "television fever."

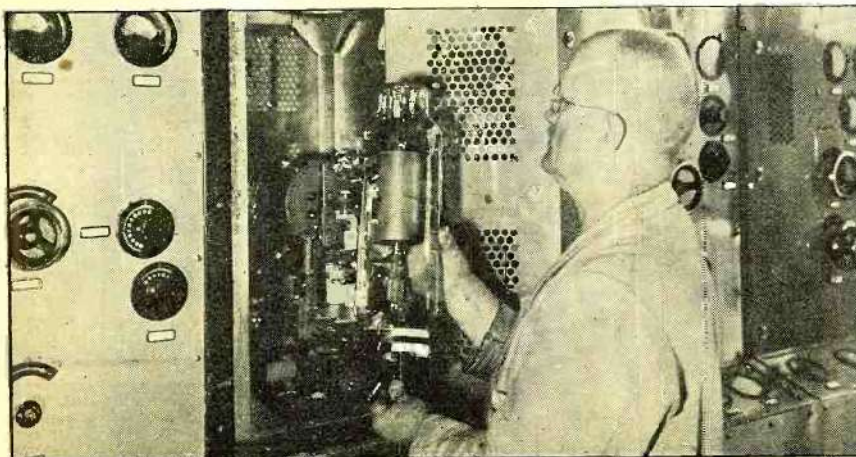
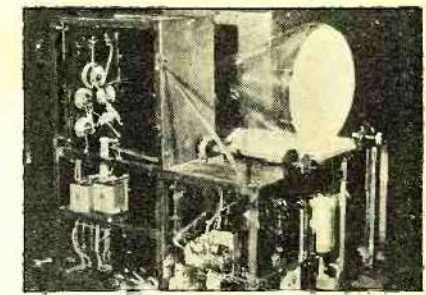
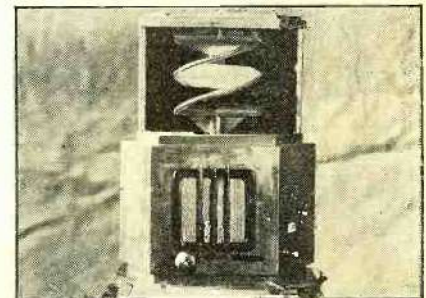
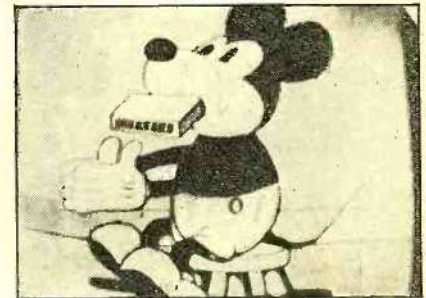
FOUR HUNDRED AND FIFTY-THREE feet in the air, rising slightly above the top of the well-known Berlin radio tower, with its famous restaurant, two copper rings appear to be growing in the sky. Each has a diameter of about ten feet, and their surfaces shine in the early spring sun like spun gold. They are symbolic of a new era—television is no longer a mere technical problem, but is being made available for the use of the general public. The golden rings are the antennas of the Berlin Television Station. From these high points, far above the surrounding buildings, radio waves of a special kind—ultra-short waves, as

the technicians term them, are radiated into the air by a force of 15 kilowatts, covering an area of about 50 miles in diameter. Each of these television stations has two ultra-short-wave transmitters. One radiates the sound impulses, as usual, while the other one delivers the picture impulses to be shown in the home transmitter. The radio listener, or should we say the "television looker," uses a special television receiver to receive these transmissions. Pictures of home-movie size are reproduced. These receivers are of two sizes, one having a screen of about 4 inches by 6 inches and the other about 10 inches by 12 inches.

It is simple to tune in on television programs, because there is plenty of space in the present wave range, which is about 7 meters. In other words, there are far less stations in this wave range than in the normal broadcast band, and the selectivity of the television receiver does not have to be as great as for plain broadcasting. Also, the "monkey chatter" does not occur, (*Turn to page 60*)

GERMAN TRANSMITTING AND PICKUP APPARATUS

The ultra-short-wave transmitter in Berlin showing one of the shielded stages being equipped with a new tube. At right: the television newsreel pickup bus on location.





Mr. E. H. Rietzke, President of CREI, and originator of the first thorough course in Practical Radio Engineering.

CREI TRAINING IS GOOD ENOUGH FOR 170 RADIO STATIONS

It Should Be Proof Enough For You!

... and when we say 170 Stations, that doesn't mean only 170 jobs because some stations employ as many as 5 men. Radio Stations recognize the superiority of men with TECHNICAL TRAINING... and a CREI Diploma has been the 'open sesame' to many good jobs. A course of instruction, constantly revised to meet constantly changing conditions; taught in radio-language to professional radio men who have the ambition to study HARD. It isn't easy, but it is EFFECTIVE!

3 Convenient Study Methods
 Complete Home-Study course for men who must be on the job while they learn.
 Residence School for those who can spare 9 months for intensive classroom and laboratory work.
 Combination Home-Study and Residence Courses, offering 10 weeks of summer training at the Residence School in addition to Home-Study.

FREE!
New 44 Page CATALOGUE
 Illustrated Catalogue describing complete facilities, methods of study subjects covered in all courses and easy methods of payment.
Write for your copy, TODAY.



CAPITOL RADIO ENGINEERING INST.
 Dept. R. N. 7
 14th and Park Road—Washington, D. C.

SERVICE DEALERS!
 ✓ Check this List ✓



Pick out what you need to bring your equipment up to the minute. You can get all

of these items free with National Union radio tube purchases. Find out how—Check items you want. Paste the list on a penny post card or slip it in an envelope and mail it now!

- HOW CAN I GET:**
- A Tube Tester
 - Service Manuals
 - An All Wave Oscillator
 - A Signal Generator
 - A Multirange Meter
 - A Set Analyzer
 - An Oscillograph
 - A Frequency Modulator
 - A Tube Carrying Case
 - A Coverall Work Coat

Name _____ RN735
 Street _____
 City _____ State _____

Check—Clip—Mail to
NATIONAL UNION RADIO CORPORATION of N.Y.
 570 Lexington Avenue, New York, N.Y.

German Television

(Continued from page 9)

because of the stations being situated so close to one another. There is also no danger of two stations showing their pictures at the same time to the surprised listener. A great number of these new receivers have to be tuned only once. Later on it is brought into operation by turning only the small switch of the power line.

For the past 9 months, the Berlin Television Station has been radiating interesting programs, daily, on 7 meters. The picture appears, as stated before, behind the surface of a glass plate. Sometimes it is in black and white, but very often, has a slightly bluish or greenish caste. If the transmitter radiates the picture in the so-called "180 lines manner", as is done in Berlin, not only heads, but the entire body may be seen. Entire scenes with all movements are easily recognized.

The average price range of the receivers is from \$250.00 to \$500.00 per set. A television receiver contains two complete receivers, one for sound reception, and the other for the reception and reproduction of the image. While the sound receiver is only connected with the loudspeaker, the picture receiver works with a cathode-ray tube which is the heart of the visual system. Another type of picture receiver uses a "mirror-screw" for reproducing the picture.

Recently, in Germany, there has been developed a television pick-up car. This car carries on its roof a standard motion-picture camera mounted on a cast-iron roof, allowing the camera to be moved in any desired direction. The hollow pillar of the camera support is used to convey the exposed film ribbon to the dark room which is in the interior of the car. By use of special apparatus and extremely fast-working chemicals, the film is developed in 1½ minutes. The still-wet film ribbon is then sent at once through a so-called "Abtastgerat", which cuts the single-film pictures in 180 lines and transforms each line in a succession of strong and weak electrical impulses. The impulses are radiated from a transmitter into the air and the radio listener, receiving these impulses through the television, may see the broadcast scenes.

Using Cathode Rays

(Continued from page 35)

rating and about ½ mfd. is connected in series with the vertical deflecting plates to eliminate the d.c. component across the condenser.

The peak magnitude of the voltage across the condenser can then be noted and assurance obtained that the peak voltage does not bring the operation above the safe rating of the filter condenser.

A peculiar and often puzzling characteristic of push-pull stages can be pictured with cathode-ray equipment. Often, a push-pull amplifier which shows very little hum without signal will produce considerable hum when excited. If this excitation is music or speech, the existence of hum is too variable to be identified as such, but may in many instances be sufficiently high to cause "hash" in the reproduction.

This signal or modulation type hum can be investigated with a harmonic or a linear sweep circuit, but in either case an oscillator of some frequency other than 60 cycles must be used for the driver sig-

nal. It should preferably be in the neighborhood of 1000 cycles.

The control circuit of the linear sweep must be connected to the power line and the sweep rate adjusted to either 60 or 30 times per second. If unbalance or signal hum is present, a trace such as Pattern 22 will result. (It is interesting to note the similarity between this pattern and some of the modulation patterns which follow in next month's discussion.)

The solidity of the pattern is due to the "filling-in" effect of the high signal frequency employed, while the depth of the "hum envelope" indicates the degree of unbalance hum which is present. Hum of this character is invariably found in amplifier designs where it is necessary to carefully select push-pull tubes by pairs in order to reduce the hum under the no-signal condition. Careful selection of the tubes simply causes the hum to balance out when no signal is applied, but it is periodically introduced as "hash" when a signal is applied.

In the absence of a linear sweep, the harmonic sweep may be employed using a high-frequency signal voltage. Pattern 24 will result if signal hum is present.

Make a Pantograph

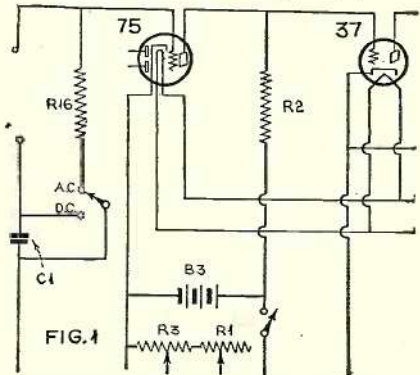
(Continued from page 10)

place where the letter is to be engraved. The master letter is now placed under the stylus and adjusted so that the base of the master letter is parallel to the baseline on which the engraved letter will appear. The stylus is now lowered until it is close to but not touching the master letter, and the set-screw tightened. No adjustment of the stylus should be made, once the process of engraving is started, until the letter is completed. Next, grasp the end of the arm into which the stylus is screwed and, slowly but steadily, draw the stylus along the lines of the master-letter. Trace the master-letter over and over again until the engraving is of the required depth. The weight of the device exerts sufficient pressure; no additional pressure is necessary.

After the letter is engraved the slight burr left by the cutter along the edges of the letter, should be removed. A good tool for this work is a small triangular file which has one end broken off. The re-touching is performed with the sharp point.

A Correction

In the article on a "Thermionic Voltmeter," by William R. Harry, on page 665



of the May issue, the following corrections should be made:

In Figure 1, the connections to the a.c.-d.c. switch from C1 and R16 should be changed to the hook-up shown here. In