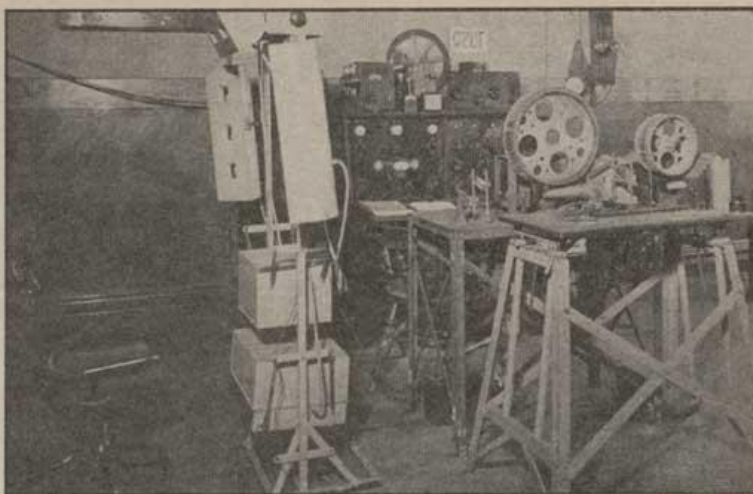


NEEDED TECHNICAL INFORMATION BY MEANS OF WHICH SKILLED

# AMATEURS *can Build* TELEVISION RECEIVERS

**T**HE expert amateur and technician and those versed in radio engineering will find the essential data for building a set capable of receiving television in this article. In the near future we hope to have definite instructions which will permit the less-trained experimenter or layman to build a television receiver.

**I**N line with RADIO NEWS' policy of keeping interested readers and experimenters informed on the latest developments in television as they happen, the article on this page gives the salient technical features of the system of cathode-ray television now in use at the Don Lee experimental television station W6XAO, Los Angeles. This is a system perfected by Harry R. Lubcke, Director of the Television Division of the Don Lee System. The first demonstrations of the transmitter and the cathode-ray tube receiver were witnessed Thursday, June 4th, by radio editors and other technicians and by many thousands of interested citizens since that time. That the system is a successful one and produces pictures of sufficient detail and clarity for home reception has been attested by many persons who have seen it work and who have been interviewed. Public demonstrations where experimenters can see and ask questions about the receiver, which is of the self-synchronized cath-



### AMATEURS CAN EXPERIMENT WITH TELEVISION

*This is the television station of a pioneer English amateur experimenter, Harold Bailey. The call letters are G2UF. At the left is the television studio with a chair for the announcer and at the right are the mirror scanning wheels and pick-up apparatus, with the control panels in the rear. Amateurs certainly have the required technical ability for television experimentation and research. Their untiring efforts would do much to make television a reality.*

ode-ray tube type are being held daily, except Sundays and holidays, in the afternoons and evenings. Mr. Lubcke, who is interested in having experimenters build home-made television receivers for the reception of these television broadcasts, has furnished the following details to encourage the skilled amateur and to give him the essential information that will enable him to build such a receiver.

"The advantages of the television en-

### TELEVISION BOOM COMING

*Most of us remember the old days of set-building and experimentation in sound broadcasting. Television will reopen interest in this scientific field among young people whose brains are alert and ever looking for new fields to conquer.*

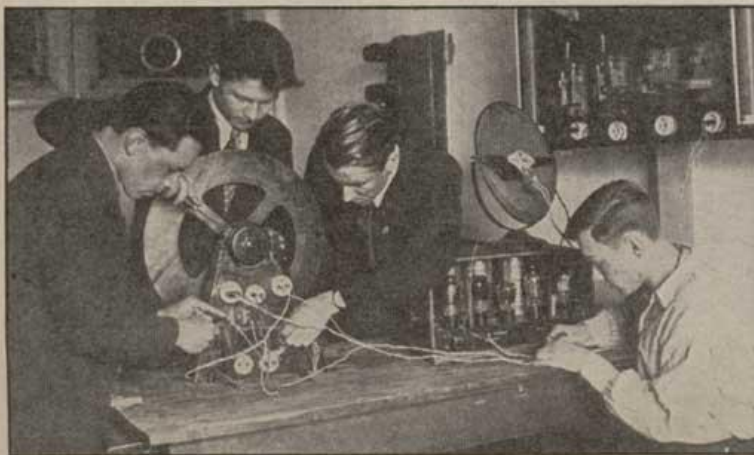
thusiasm today are far greater than were those of the amateur constructor of broadcasting's earlier days. Sufficient technical information to allow a moderately well-skilled person to construct a television receiver to receive the programs of W6XAO are given in the following paragraphs," said Mr. Lubcke as he handed them to our technical staff on a recent visit to the Editorial Offices.

"The Don Lee television transmitter W6XAO operates on the ultra high-frequency of 45,000 kilocycles (6 2/3 meters) daily, except Sundays and holidays, from 3:00 to 5:00 p.m., and from 6:30 to 8:30 p.m. Voice announcements concerning the broadcast are made at the beginning and end of each transmission.

"For receiving the voice announcements of W6XAO and for preliminary experiments, any type of ultra short-wave receiver which will tune to 6 2/3 meters may be used. Receivers designed for 5-meter amateur work are suitable when provided with larger coils. Install coils with 50 percent more turns and remove one turn at a time while tuning for W6XAO. A simple line-image of constant intensity is broadcast for a short period of each schedule, and an appreciable change in its strength after a change in the circuit or operation of a receiver is a direct measure of the effect of the change.

### Receiver Requirements

"The image broadcast is a 300-line, sequentially-scanned picture, with a frame frequency of 24 per second. For receiving these images the receiver must tune very broadly and should be of the super-heterodyne type, with band-pass intermediate-frequency transformers arranged to operate (Turn to page 313)



## Build Television

(Continued from page 267)

on an intermediate frequency of approximately 8,000 kilocycles. The RCA 954 or 955 "acorn" tubes are recommended for use in circuits carrying ultra high-frequency radio energy, except for the first detector of a superheterodyne receiver, where the metal tube 6L7 is recommended.

"The receiver 'audio' channel must be resistance-coupled and capable of substantially uniform response over a range of from 24 cycles to 800 kilocycles, in order to reproduce faithfully the high-definition picture that is broadcast. A cathode-ray tube must be used as the image reproduction device, since it is practically impossible to construct a scanning disc of sufficient accuracy. Data on cathode-ray tubes, and a gas triode for producing saw-tooth scanning waves are given in the booklet, "Cathode Ray Tubes and Allied Types," Technical Series TS-2, obtainable from the RCA Radiotron Company, 415 South Fifth Street, Harrison, New Jersey, and at large radio stores.

"The high-frequency receiver scanning source should produce a saw-tooth wave-shape of a frequency of 7200 cycles. This is applied to the pair of deflection plates, in the cathode-ray tube, which produce a horizontal deflection. The low-frequency scanning source should also produce a saw-tooth wave-shape, and of a frequency of 24 cycles. This is applied to the pair of deflection plates which produce a vertical deflection. If the image appears upside-down, reverse the connections to the low-frequency deflection plates; if printing reads backwards, to the high-frequency deflection plates.

"A negative image is radiated from the transmitter. In the particular receiver constructed, if the image shown on the cathode-ray tube is a 'negative' (white objects reproduced black, and vice-versa) one more or less, stage of 'audio' frequency amplification (following the second detector) will give the proper 'positive'.

"Synchronizing pulses are transmitted at the end of each line and at the end of each complete image for keeping the receiver scanning sources in step at the 7200- and 24-cycle frequencies, respectively. A small amount of the image signal should be supplied to the grids of the gas triode tubes to synchronize the sources.

"Extensive data on television reception is given in the December 1933, November 1934 and March 1936, issues of 'The Proceedings of the Institute of Radio Engineers'. This publication can be consulted at public libraries or obtained from the Institute of Radio Engineers, 33 West 39th Street, New York City.

"Reports on reception results are requested. Please give the date, time, signal clarity and strength, amount and nature of interference, your address, location of nearby hills and large buildings, type of receiving antenna and its height above ground, type of receiver, and your signature. Standardized reception report forms may be had from the Television Division of the Don Lee Broadcasting System, Seventh and Bixel Streets, Los Angeles, upon the receipt of a stamped self-addressed envelope." Harry R. Lubcke, Director of Television, Don Lee Broadcasting System.