New Amateur Band Transmitter To Be University's Radio Voice

Messages In Phone, Code On Pair Of Wave Lengths May Be Sent

By WILLIAM E. SHACKLETON

Amateur radio operators the nation over will soon be tuning in on a new voice for the University, a voice whose motivating mechanism will be a recently completed 20- and 80-meter band transmitter.

Both phone and code (dot, dash) messages on the two bands will be transmitted under the call letters of W8AXZ, which is the designation of the present University code station also. The R.O.T.C. Signal Corps is expected to be the principal user of the new transmitter, although the electrical engineering department, under whose facilities the transmitter has been built, will use it for various experimental purposes.

20 Watt Output

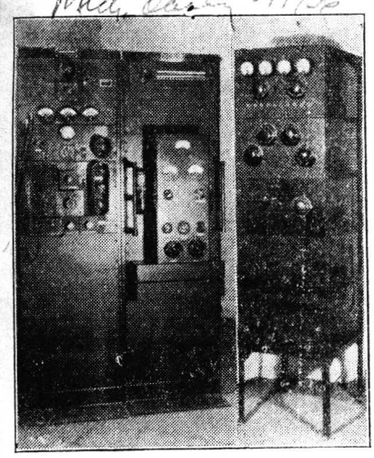
Two-way communication with the University surveying Camp Davis, with expeditions in the Near East and Central America, with Arctic explorers and with many other activities of the University are among the possible applications of the new transmitter Prof. L. N. Holland of the electrical engineering department listed.

The rated power output of the transmitter will be 20 watts, expected to be sufficient to carry the 20-meter code calls to the other side of the world. The phone calls, however, will require more power for a similar distance.

Product Of NYA

A product largely of NYA labor, the transmitter was designed by W. C. Goggin, Grad., and Professor Holland. These two also supervised its construction. A technical report upon the details of the structure and its operation has been made by Newell D. Saigeon, '36E, and it is from this report that most of the following description has been drawn.

Radio Transmitter



—Courtesy W. C. Goggin.

A front view of the new electrical engineering R.O.T.C. radio transmitter, together with the speech amplifying, monitor, power output panel and meter panel equipment, is shown here. The transmitter, whose five shelf levels can be seen, is on the right.

After the "kinks" have been taken out of the transmitter by a process of tuning and trial-and-error adjusting, the new unit will be incorporated with a speech monitor and amplifier, power supplies and controls and modulator equipment. These latter, which occupy more space than does the actual transmitter, will contribute not a little to the job of operating the set-up.

In the transmitter's oscillator stage, starting point of the electrical impulses which will eventually in modified and amplified form go out into the air, four different crystals are used to hold the vibrations exactly on their respective frequencies. To render the code and phone transmission interchangeabl erequires a pair of crystals for each wave length.

However, one pair of the crystals are of the 40-meter band type, since a crystal suitable for 20-meter wave length would be too thin for reliable operation. In the next stage of the transmitter, called a doubler, the frequency of these 40-meter vibrations is doubled, thus reducing the wave length to the 20 meters desired. When 80-meter transmission is being used, the doubler stage acts as an amplifier.

The power supply for the oscillator stage, which uses a type 47 tube, is located along with the stage on the third shelf down in the transmitter. Copper shielding separates the power supply and oscillator, and the entire shelf is also shielded.

On this, as on all the stages, jacks are provided so that meters may be inserted in the various circuits. Thus at any time the current passing and voltage present may be read for any part of the circuit.

In both the doubler stage and the succeeding buffer stage a type 46 tube is used. The two stages are mounted on the second shelf down and are separated by a copper shield. For both 20-and 80- meter operation the buffer stage acts as an amplifier. For code operation the key relay circuit may be inserted in either of these two stages.

The final amplifier, on the top shelf, includes two type 10 push-pull the radio frequency waves, which are then ready to be emitted from the antenna.

Control of the entire transmitter will be centered by relays upon a single small push-button panel.

In all some 19 tubes ranging in output from one-tenth of a watt to 250 watts will be used in the unit. It is expected that the present 400-watt code transmitter will be combined with the new system.

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The final amplifier, on the top shelf, includes two type 10 push-pull tubes. Neutralizing condensers which are used to prevent ocsillation of the amplifying tubes and subsequent formation of unmanageable radio waves are located in this stage. A bias of about 70 volts will be placed on the grids of the tubes.

Interchangeable coils for the different bands are used in all the stages. Power supplies for the stages are located in the lower part of the transmitter and include rectifying units for the crystals, for the plates of the four radio frequency amplifying tubes, for the C-bias of the final amplifiers and for the driver and modulator stages. The filaments of the radio frequency tubes are heated from individual transformer windings

In the driver stage, which performs the functions of speech amplification and power control for phone transmission, the vibrations of the sound waves are picked up and strengthened. A monitor, by means of which the operator may hear the sound as the instrument secures it, is a part of the equipment.

The output from the driver stage passes into the modulator which superimposes the sound frequency upon

bined with the new system.

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