for the EXPERIMENTER

An Unorthodox Antenna

By Yardley Beers,* W3AWH

MANY antenna systems, though theoretically good radiators, have the weakness of radiating at angles often not effective for communication. In addition, theory cannot provide sufficiently for the presence of objects such as metal roofs, gutter pipes, BCL antennas and the like, which usually exist on the premises of most amateurs. Hence an antenna which is designed from experiment rather than theory would seem to be justified.

Such an antenna has been designed by the writer's friend, Mr. H. J. Siegel, W3EDP.[1] On first coming on the air two years ago, though he consumed over a thousand feet of wire in experimenting with antennas of the usual types, W3EDP failed to get satisfactory results. His goal was an antenna which could be operated efficiently on all bands, so he set about to design a new antenna, trying to find the best compromise between radiating angle and theoretical efficiency. The radiating angle of an antenna depends not only on the height above ground and the orientation with respect to the horizontal but also on the length. Being unable to alter the first two factors, W3EDP varied the third.

A one-hundred-foot roll of wire was hung up to his mast and tried out for several weeks on 7 mc. The results were carefully tabulated, with due allowance being made for adverse conditions. Four feet of wire was then cut off and this process repeated. Almost every reasonable antenna length was tried, and then the entire process was repeated several times. When all the tabulations were complete, a length of 84 feet seemed to stand out as being the best of all the combinations tried. It may be apropos here to state that the antenna in all cases was inductively coupled to the final power amplifier by a parallel-tuned tank circuit on all bands. This parallel-tuned circuit was arranged for variable coupling to the final power amplifier tank coil so that it could be adjusted for maximum efficiency and so that the load on the final amplifier could be controlled. It is important to mention here that low *C* in the antenna circuit gave by far the best efficiency. High *C* caused a high circulating current and looked very nice on the thermocouple ammeter but was nil for results.

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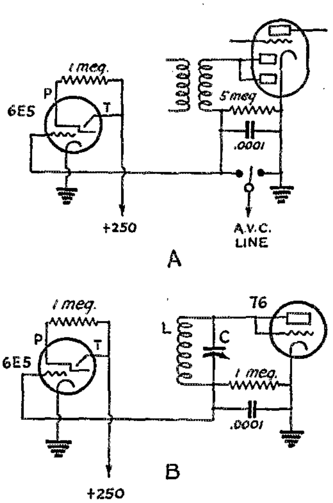

FIG. 1—CIRCUITS FOR USING THE 6E5 FOR CHECKING OVERMODULATION

A typical application to an AVC-equipped superhet receiver is shown at A. An overmodulation indicator for transmitting is given at B.

Not liking entirely the idea of an end-fed single wire antenna, W3EDP set about to find a counterpoise for the best results with his 84-foot antenna. Going through a pruning process similar to that with the antenna itself produced a counterpoise length of 17 feet as the one working best in combination with the antenna. This combination seemed to work excellently on 160, 80, 40 and 10 meters, but on 20 meters a counterpoise length of 6½ feet seemed to outshine all others. The parallel tuning arrangement remains untouched for operation on all bands. W3EDP was a bit skeptical about the operation of this system on 10 meters, so he put his transmitter down there to find out. Results were about equal operating with the 17-foot counterpoise and in operating without any counterpoise at all. The antenna is about 20 feet from the ground and the counterpoises are strung in the room near the ceiling of the first floor of his house. No lead-in arrangement was found necessary, the antenna and counterpoise both being brought directly to the antenna coil. The antenna and counterpoise are at right angles to each other.

Like most antennas, this one has its directional properties, though it is a bit difficult to say just what they are, for at most times it gives excellent results in all directions. Recently we have been getting VK, ZL and ZS stations twice daily on 14 mc., apparently by different paths; VK and ZL have been worked in the early and late mornings, early afternoon and evening and again at midnight; ZS stations at early afternoon and again just before midnight. Roughly speaking, the antenna seems to give best results in a direction at right angles to its length. It also has the unusual property of emitting a very weak ground wave. On 7 mc. W3EDP's signals have been barely audible across town, when at the same time he was QSO the west coast and getting an R8–9 report.

Though this antenna may seem unorthodox to many, the results obtained with it should justify it fully. Using a pair of 46's with 50 watts input to the final P.A., W3EDP has consistently received R7–8 reports on 7 and 14 mc. from five continents. In addition he has worked 75 countries in all continents within two years with this little rig from an average DX location, a record not duplicated by many using higher power. W3EDP has used his antenna system at two different locations with equal results. In addition the writer has used this antenna in a badly screened location, between two houses and under several trees, yet without altering the dimensions from those given him by W3EDP he has obtained excellent results on 3.5 mc., having worked Europe several times with a pair of '10's.

This antenna is not offered to the reader as a cure-all for his antenna troubles. To discover its true value it will have to be tested at more locations of different characteristics. The dimensions may have to be altered slightly in some locations for maximum efficiency. It is the writer's belief that the design of this antenna perhaps may be the basis of further antenna experiments.

The 6E5 for Checking Overmodulation

A method for checking overmodulation by the use of the new electron ray tube—the "magic eye"—is suggested by Clarence C. Moore, W9LZX. Overmodulation in either the upward or downward direction can be detected, and the gadget can be used to check incoming signals as well as one's own transmitter.

Typical circuits for both receiving and transmitting are indicated in Fig. 1. Circuit A shows how the 6E5 can be connected into a superhet receiver using a diode rectifier. The grid of the 6E5 is connected to the a.v.c. side of the rectifier load resistor. Audio coupling is omitted in the interests of simplification although the connections in the receiver would not be disturbed. The width of the shaded area on the target is dependent upon the voltage developed across the diode load resistor and hence upon the received signal strength. On the method of using the tube W9LZX writes: "The 'magic eye,' when nearly closed on a strong carrier, has light yellowish-green edges on the two sides of the opening. With modulation there is a fuzzy appearance between these edges, but with overmodulation the two bright edges themselves will shift closer together. With downward modulation the opposite occurs. The most accurate reading is obtained when the eye is open about 40 degrees. The a.v.c. on the super cannot be used at the same time because it would compensate for any carrier shift. The audio gain control may need to be turned down while the i.f. gain is brought up high enough to get proper readings on weak stations."

Incidentally, the 6E5 can be used as a tuning meter when the a.v.c. is connected in.

For transmitting, the circuit shown at Fig. 1-B is suggested. It is equivalent to that at A except that a triode with grid and plate connected together is used as a rectifier. The tuned circuit is adjusted to resonance at the transmitting frequency. The circuit must be well shielded so that the only signal pickup is through the tuned circuit.

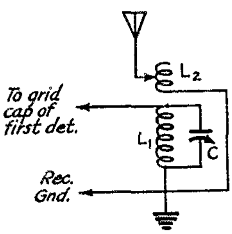

FIG. 2—A TEN-METER ADAPTER FOR PR-10 AND SIMILAR RECEIVERS WITHOUT THE TEN-METER RANGE

The circuit replaces the first-detector tuned circuit and employs the second harmonic of the set oscillator.

C—Midget variable condenser, 100 to 250 μμfd.

L_1—Grid coil, 6 turns No. 14 wire, spaced ¼ inch between turns; coil diameter 1½ inches.

L_2—Antenna coil, same construction as L_1, but 2 or 3 turns.

Adapting the Patterson PR-10 for 10 Meters

Since the 10-meter band has opened up many amateurs owning Patterson receivers would like to listen on that band but are unable to do so, because the PR-10 and smaller Patterson sets will only tune down to 16 meters. However by means of an adapter we have been using our Patterson PR-10 with excellent results on the 10- to 8-meter band.

The adapter consists of a 10-meter grid coil of the dimensions given in Fig. 2, tuned by a midget of 100 to 250-μμfd. capacity. The grid coil is mounted on the condenser. The rotor side of the condenser is grounded by mounting it on a bracket which is screwed to the chassis, which, of course, is already grounded. A short grid lead passes through a ventilator slot on the side of the receiver. The 10-meter grid lead clips on the grid cap of the first detector tube after removing the usual grid-cap connection. The antenna is then removed from the antenna post on the receiver and clipped on a small antenna coil of 2 or 3 turns coupled to the 10-meter grid coil. We have our antenna coil mounted on the end of the grid coil. If a doublet is to be used it may be coupled to the grid coil by a turn or two.

To tune on the 10-meter band first place the band selector switch to the 20-meter band. Then set the main dial at approximately 50 and proceed to tune with the band spread dial if a PR-10 model is used. If not, then all tuning is done with the one tuning dial on the receiver. After setting