A Simple Directive Antenna

By Manfred Asson,* ES2D

AMATEURS living in the forlorn wilds of Eastern Europe usually have great difficulties in purchasing even the simplest short-wave equipment. Long-distance contacts actually carried out with flea-power, and the receivers are of almost prehistoric design. So it is only natural that in such conditions amateurs take refuge in more effective antenna systems.

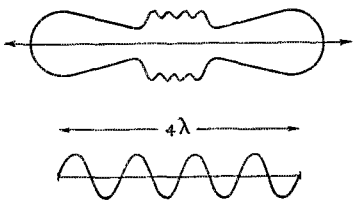

FIG. 1—CURRENT DISTRIBUTION AND APPROXIMATE FIELD PATTERN (FOR 25-DEGREE VERTICAL ANGLE) OF A FOUR-WAVELENGTH ANTENNA

As it may be of certain interest to some of the amateur fraternity in the U. S. what kind of gear we are using here, we jot down a few lines concerning an inexpensive unidirectional array for 14 Mc. with simple means for reversing its directivity. The basic idea is simple to understand. A long wire antenna of four wavelengths gives intensive low-angle radiation in line with its ends, the radiation angle being approximately 25 degrees (Fig. 1). This long wire makes by itself an effective bi-directional antenna. Still, to increase its efficiency and to reduce interference from the unwanted side we have to add a reflector.[1] This is done in a simple manner by placing a similar wire near it, so that its distance from the radiator is a quarter of a wave when viewed from the beam direction, that is, 25 degrees from the horizontal. It is evident from Fig. 2 that radiation will be greatest at the right side when the reflector is shifted to the left, and *vice versa*. That means, we may reverse the system's directivity by simply moving the reflector from the left to the right.

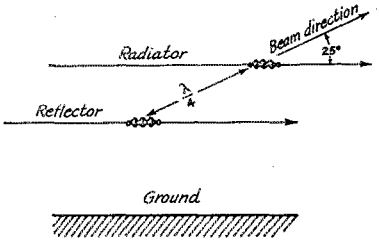

FIG. 2—ARRANGEMENT OF ANTENNA AND REFLECTOR FOR CONCENTRATING RADIATION IN ONE DIRECTION

Now for the practical details. The radiator is 260 feet long, of hard-drawn enameled No. 14 wire, this gauge having proved sufficient to stand the strain when the location is not extremely stormy. This radiator was hung up about 40 feet above ground and its one end connected to the usual tuned feeder system. Ample space was provided between the antenna poles to allow sufficient reflector shift. Because a rather tight coupling resulted, the reflector wire had to be given a greater length; 268 feet was chosen, a length which while theoretically perhaps not the best, yet gives satisfactory results. The reflector was made of the same gauge wire and hung up exactly 8 feet below the radiator. Two halyards, a couple of pulleys and a weight made a simple arrangement for moving the reflector from the shack (Fig. 3), the ropes being adjusted so as to allow a total shift of 28 feet.

No attempt was made to change the data given above, as the results were most gratifying when compared with the simplicity of the system. With the free end of the array pointed to northeast, Japanese and Siberian stations came in sometimes with S8 on a two-tube receiver, similar reports being obtained when the antenna was used on the 25-watt m.o.p.a. transmitter. On the other hand, South American stations came in consistently with the antenna directivity reversed. An S9 report was received from CX2AK and an S8 report from CP1AC, both with 25 watts.

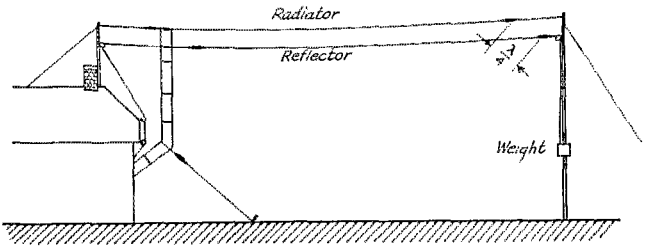

FIG. 3—SKETCH OF THE INSTALLATION AT ES2D, SHOWING THE METHOD OF MOVING THE REFLECTOR

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* Kloostri, 9–3, Tartu, Estonia.

[1] The principle of operation resembles that of the RCA Model B antenna. See Carter, Hansell and Lindenblad, "Development of Directive Transmitting Antennas," *Proc. I.R.E.*, October, 1931.—EDITOR.

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How does that sound to the low-power boys? It was extremely thrilling to move the reflector with the receiver on and to watch the DX signals weaken and fluctuate, while signals from the opposite side rose out of the background. The array was tested for a whole month and was then given up due to leaving the place. The new antenna, a vertical half wave, does not stand any comparison with the old one, although it is known as a not bad DX radiator. It is hoped, however, to resume the experiments with long wire antennas in the summer of 1937.

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occurs just before sunrise, and seems to tie in with the appearance of the sun's rays."

The phenomenon still intrigues us.

Boy Scout:

We feel rather good at this point, in view of a letter received from Gordon Kempton, VK2CI. Says Mr. Kempton: "I am pleased to give you a big 'Thank you' for being the means of reuniting me and my long-lost cobber (VK for 'pal') Bill McCutcheon, W2CET. He saw the bear and self in *QST* (October) and I got a letter from him before I got my *QST*. He was at one time ZL2JX and VK2OX, and I had not heard from him since he went back to the U.S.A."

Does anyone know the bear?