Stacking and Folding the Triplex

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Operating data on applications of the popular Triplex beam, first described in CQ a year ago

IN VIEW OF THE excellent results obtained by many builders of Triplex [1] beams and their requests for further information on its performance, these additional notes have been assembled.

Folding the Ends

In order to determine the change in performance resulting from folding the ends of the Triplex, two single-section 10-meter models were erected. One had the ends folded; the other was of standard design. The orientation and 38-foot heights were identical.

On numerous ground-wave and DX contacts, comparisons were made by rapid switching between the two antennas. No consistent difference was observed. It is therefore reasonable to assume that, where space is a factor, folding will answer many problems without appreciably impairing performance. It may also be noted that where space is a factor or where it is desired to make the antenna rotatable, the diagonal distance across the folded model is much less than a half-wave and could therefore be supported by a metal "X" frame having in-

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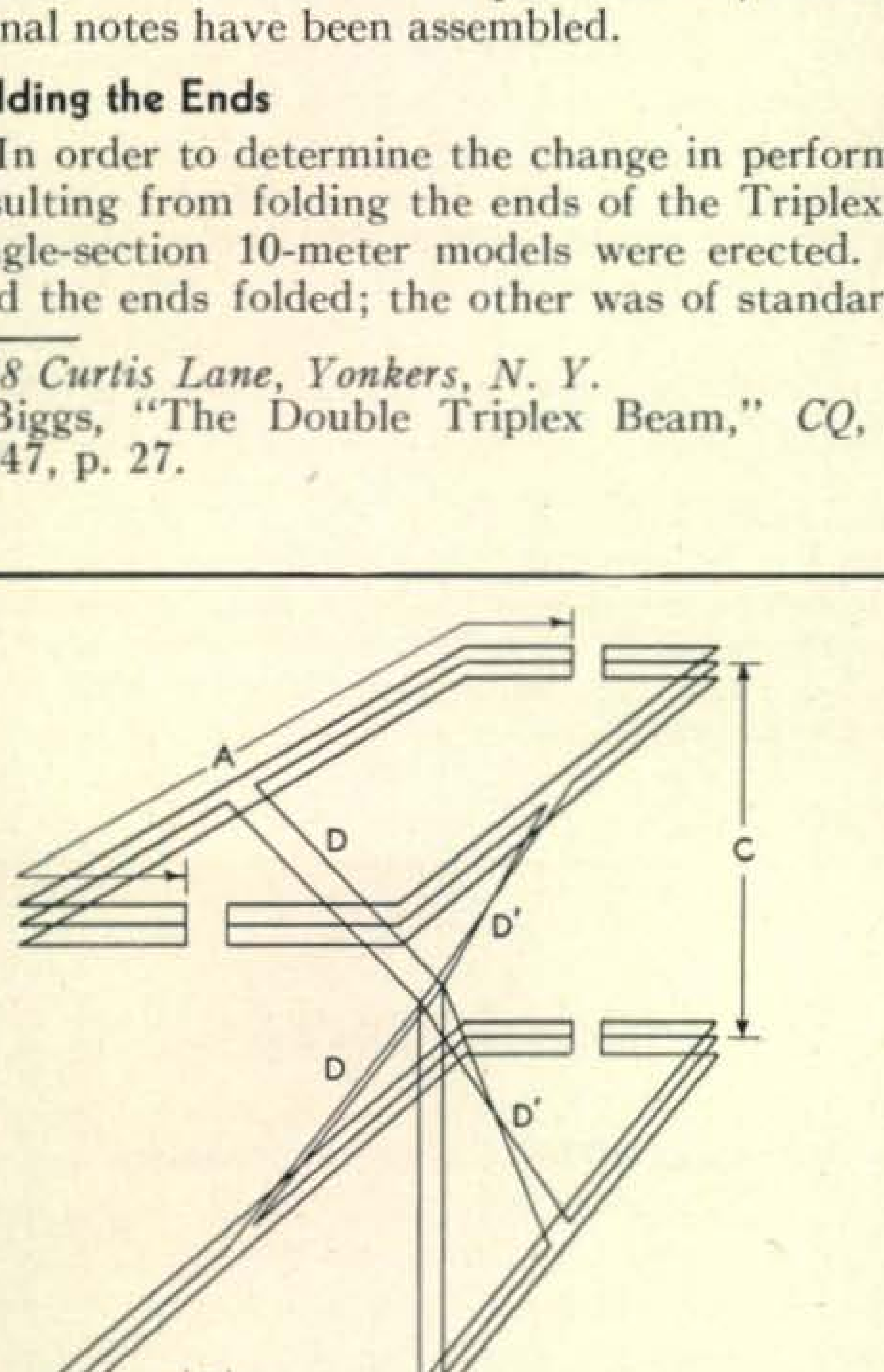
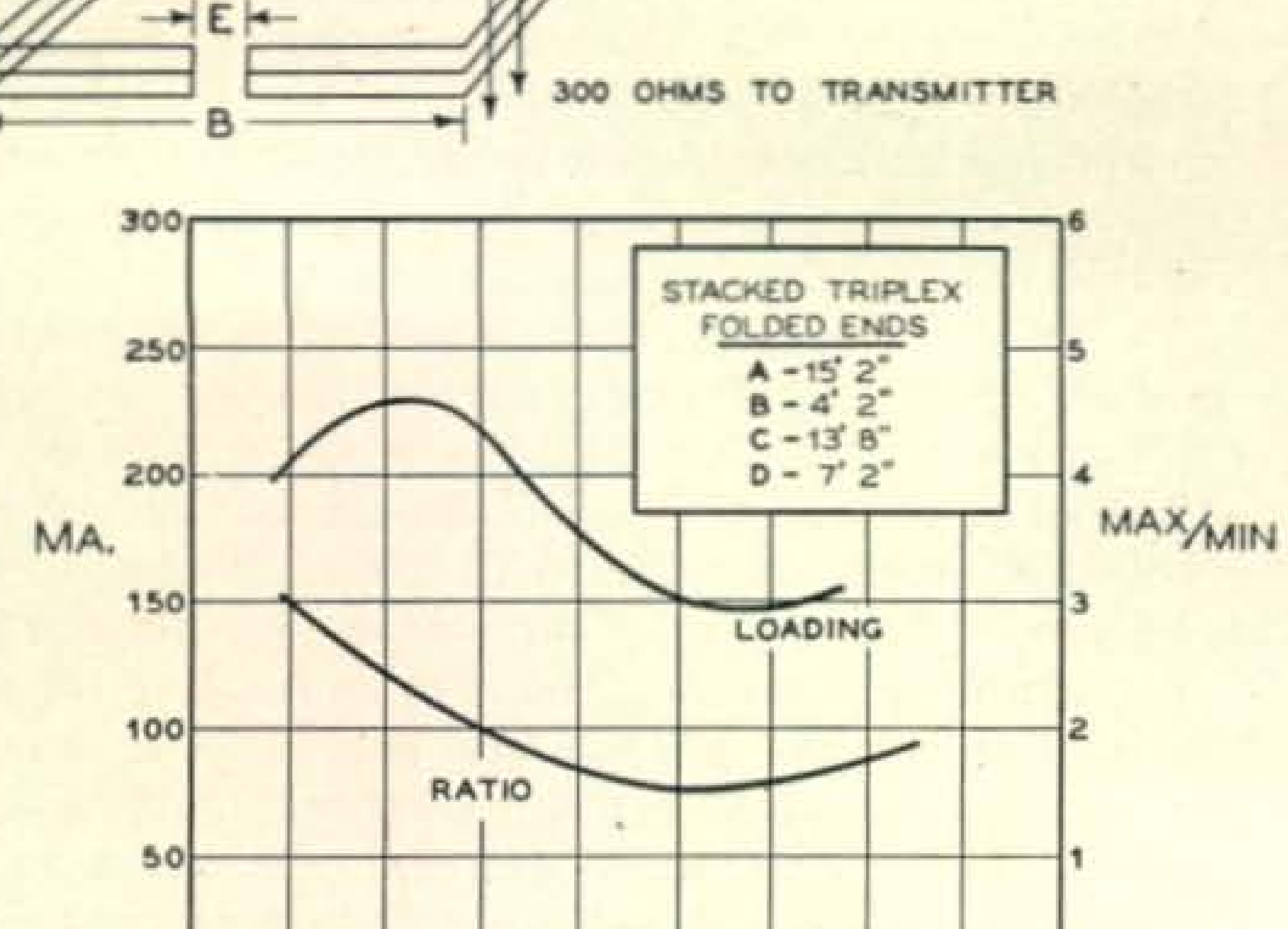
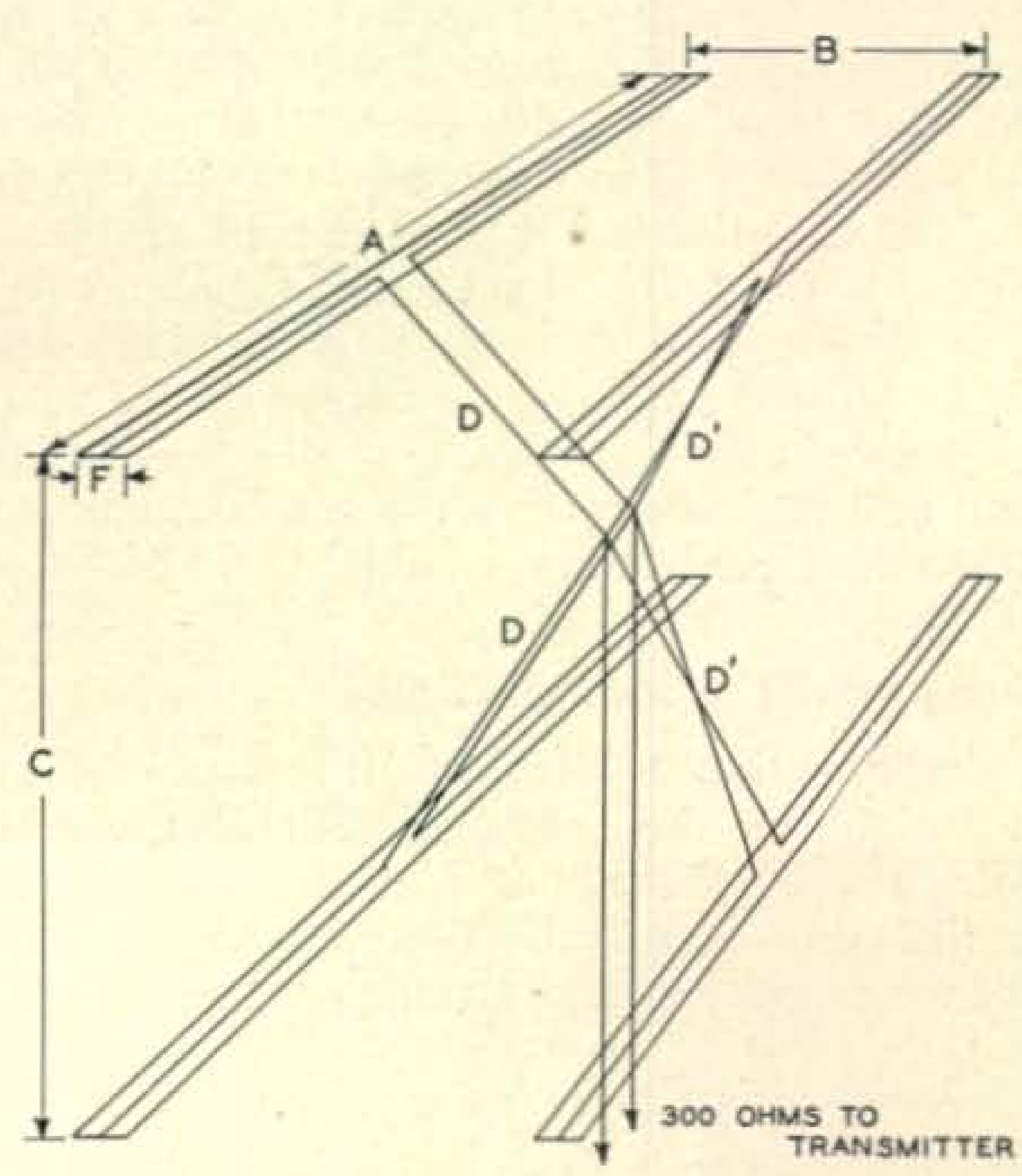
[1] Biggs, "The Double Triplex Beam," *CQ*, Jan., 1947, p. 27.



	STACKED	SINGLE SECTION
A	433/F_MC	433/F_MC
B	119/F_MC	119/F_MC
C	390/F_MC	———
D	205/F_MC	205/F_MC
E	6" TO 12"	6" TO 12"
F	3" TO 6"	3" TO 6"

ALL D SECTIONS CUT FROM 300-OHM TWINLEAD
D' SECTIONS HAVE SINGLE TWIST FOR 180° PHASING





The stacked Triplex, showing the compact variations which may be obtained by folding the ends. The dimension table provides information for construction on more than one band. The loading and standing wave ratio curve is based on a feed system using 300-ohm line into quarter-wave Q sections.

sulators at the ends. This was tried and the X was found to be completely free of r.f.

Comparison with Conventional 3-Element Beam

There have been many questions as to the comparative results between a Triplex and a 3-element parasitic beam. To make an accurate check, tests were conducted in cooperation with W2AN who uses a standard design, dual 10 and 20-meter, 3-element beam. Approximately the same power was run at W8LO/2 (now W2ZW) and W2AN. Both antennas were about the same height, between 30 and 40 feet above ground. To make the tests more conclusive, W2AN coincidentally moved his QTH during the course of the experiments. Comparisons from both his locations were roughly the same.

On 10 meters in every case the advantage was in favor of the 3-element beam. Sometimes this advantage was not too great, but nevertheless, conclusive to us that, though the Triplex on 10 was superior to a dipole, its gain at usable vertical angles (38′ height) was not nearly as great as the rotary.

On 20 the signals were more evenly matched.[2] It was very much of a tossup as to which was the better. The conclusion was that on transmitting, the single-section Triplex could very well hold its own with a 3-element rotary. Of course, on receiving, the advantage was definitely in favor of the 3 element due to its superior signal-to-noise ratio resulting from its uni-directional characteristic.

Stacking the Triplex

The dimensions for stacked Triplex beams are shown in the drawing. From the curves illustrated it may be seen that less than optimum spacing is used between the upper and lower sections. This is necessary to permit simple matching with the quarter-wave Q section of 300-ohm line with its reduced VP. The Triplex elements in both the upper and lower sections are moved closer to their neighbor so as to reduce impedance and thereby raise the impedance at the transmitting end of each Q section to a value of approximately 1200 ohms. This 1200 ohms, when paralleled with the 1200 ohms from each of the other three Q sections, results in a good match to the 300-ohm line leading to the transmitter.

On paper the gain calculated to be about 6–7 db over a dipole and 2–3 db over a single-section Triplex. Of course, these are free-space calculations and do not take into account the height above ground and the tendency of the stacked jobs to concentrate the signal at lower angle.

Performance of the Stacked Triplex

A single-section Triplex for 10 was erected at the same height as the upper section of the stacked model. The height was 38 feet and the orientation on both beams identical. Comparison checks, typical of many, with some stations are listed:

Station	*Single Section*	*Stacked*
W6VXW	s9 + 20 db	s9 + 40 db
i1VO	s2 QSB	s7 no QSB
G8QC	s5-6	s7-8
WØHQF	s9 + 20 db QSB	s9 + 40 db no QSB

It was also interesting to observe that on receiving, the stacked model seemed superior.[3]

Matching the 20-meter model was achieved in the same manner as with the 10. One was erected with the lower section about 10′ above ground. Space limitations did not permit a comparison antenna to be put up. In general the stacked model seemed to have about one S point advantage over the single section. (Although the comparison on 10 shows an average increase of 20 db, considerably in excess of one S unit—*Ed.*)

At one time or another, all of us have wondered as to the possible losses resulting from nearby trees, wires, etc., which were in the line of fire of our antenna. While not conclusive, we did run one check which showed just how serious this absorption could be. In the test the antenna in the clear had, in every instance, well over a 3 S point advantage over the one which was shooting through the metal pole and guy wires. This was on 10 meters and indicated that as much as 60 to 90% of the power was being lost.

[2] Theoretically a properly adjusted 3-element parasitic beam should be noticeably better than the Triplex.

[3] These results indicate far greater gain than theory predicts for the stacking. It should be realized that with normal 2–3 S-unit fluctuations on skywave transmissions, and with the rather loose way in which S-meters are calibrated, absolute measurements are difficult.

Postscript

Putting the Millen 90800 Exciter on 6 Meters

Amateurs using the versatile Millen No. 90800 transmitter will find it easy to put it on 6 meters by doubling in the 807 amplifier plate circuit. A new tank coil is needed, but this may be wound with a diameter of ¾ inch using four turns of No. 12 enameled over a winding length of 1½ inches. The completed coil is soldered to the two outside terminals on a Millen No. 40205 plug. A two turn link of No. 16 wire covered with spaghetti is interwound at the cold end of the plate coil for output coupling. It is soldered to the two inside terminals of the plug.

Surplus SCR-522 crystals between 8333.4 kc and 9000 kc are used in the 6L6 Tri-tet oscillator. The No. 43640 cathode coil and the No. 43012 plate coil commonly used for a 29-mc output enable the 6L6 to triple efficiently. In a test setup starting off with an 8528.57 mc crystal the 6L6 dial reading was .88 and the plate current was about 32 ma. At this frequency the efficiency of the 807 may be improved by adding a BT2 resistor of 24,000 ohms between C and the grid post on the chassis. Without the additional bias resistor the 807 grid current was 3.6 ma—with the bias resistor the grid current was about 2.4 ma. The 807 plate dial for the given coil dimensions and a 51.0-mc output was set at .8. The plate current for the 807 was approximately 92 ma.

—*W1BHD*