spring-return, such as a Carling #2GM54, can be used. Incidentally, the manufacturer is Carling Electric, Inc., West Hartford 10, Conn.

First, disconnect the Viking and turn it upside-down. Remove the bottom screen by removing the 22 screws. Remove wires from the existing plate switch one terminal at a time, and as you do, solder a teardrop terminal on each. On two of the terminals there are two wires; these are the a-c wires. To prevent a mix-up, solder these two wires to one teardrop terminal in both cases. Now make up a jumper

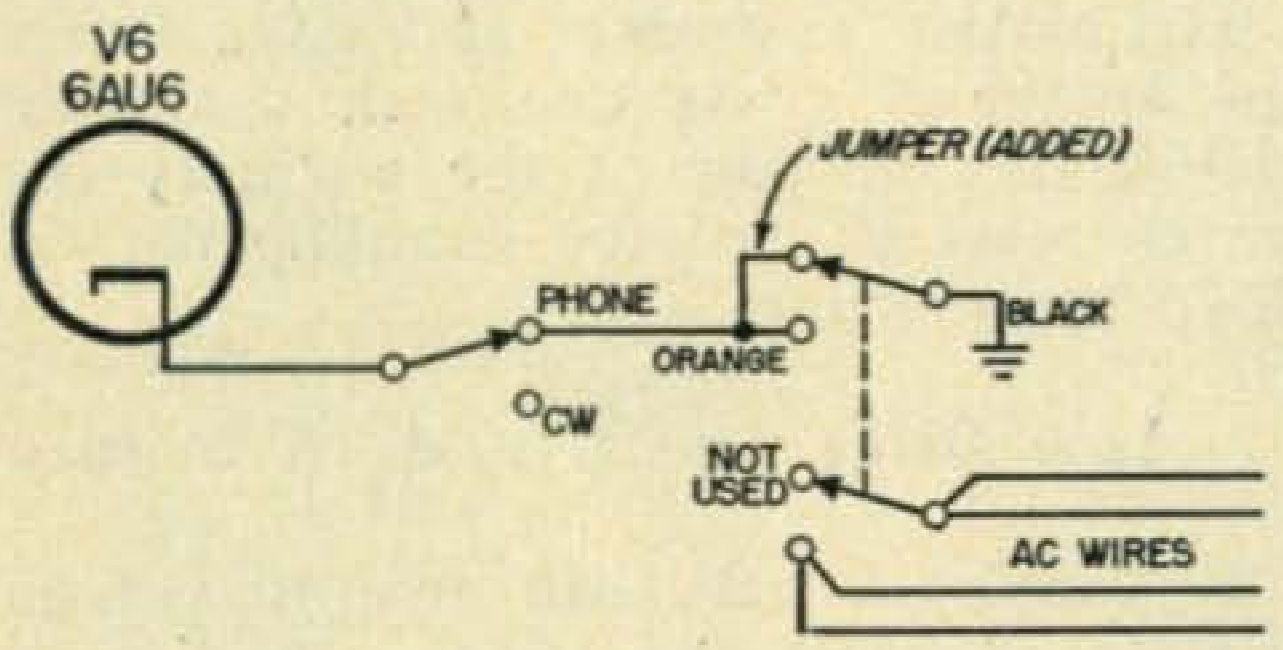

Fig. 2

wire about two inches long from insulated hook-up wire and solder a terminal on each end.

Carefully, so you don't scar the panel, unscrew the nut on the front of the transmitter which holds the switch in place. You will probably now find that an additional nut is located on the switch between the front panel and the chassis. If so, unscrew the switch out of this nut, maintaining a slight pull on the switch to prevent the hidden nut from turning. When you remove the switch the nut may fall out of place, so follow the bat handle of the old switch with a pencil to keep the nut captive. Install the new switch, pushing the pencil out with the bat handle so that the hidden nut is not allowed to escape. Adjust the collar nut so the switch protrudes the right amount and loosely install the nut on the front of the panel. The switch will be properly positioned if the "momentarily on" side of the switch is toward the bottom of the transmitter (which will be "up" as the Viking is now upside-down).

Refer now to *fig. 2* and use an ohmmeter if you aren't sure of toggle switch operation. Connect the jumper and the four terminals to the new switch as shown in *fig. 2*. Tighten the nut on the front panel (carefully) while making sure that the switch is not allowed to turn and that the terminals and switch connection screws cannot short out. If the light bulb for the red jewel touches the switch body, relocate the light bracket slightly to clear. Re-install the bottom screen, invert the transmitter and hook it up.

Turn on the low voltage supply switch, and turn emission switch to "Phone." After tubes are warm, hold the new switch in the "momentary" position. The red jewel should *not* be lighted. Still holding the switch in this position, you should be able to zero-beat and also to tune the oscillator and buffer stages of the transmitter and to adjust grid drive to the final. If these checks are satisfactory and you haven't changed frequency too much, flip the new switch up to the "normally on" position and resonate the final.

This modification can be accomplished on the Viking 1 transmitter, also. Electrically, the switch replacement is identical; mechanically, there will be some differences, but any amateur who is careful can accomplish the change.

While it is still fresh in your mind, change your transmitter schematic to show the new switch circuitry. Write "See CQ for Oct. 1956" on the margin so that when you have used the rig with this modification for awhile and found how convenient it is you can tell the other boys where they can find the article. And I'd suggest you get half a dozen of the switches; after I began telling on the air about it my stock of switches was soon gone. ■

a Vertical without a Ground Plane

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Vertical antennas have enjoyed increasing popularity recently on the 40, 20, 15, 11 and ten-meter bands. However, there are many locations where the vertical antenna is impractical because the feed point is near the ground and the ground plane is sometimes difficult if not impossible to construct due to lack of space. The vertical antenna described herein is fed at the center, needs no ground plane and is very easy and inexpensive to construct.

Basically, this antenna consists simply of a half-wave folded dipole hung vertically from a tree, or a pole, or a clothesline strung between two trees, etc. The optimum height at which to hang this antenna to achieve maximum radiation at low elevation angles should receive some consideration. If the antenna is placed over a perfectly conducting ground plane of infinite extent, the center of the antenna should be ¼ to ⅜ wavelength above the ground plane[1], or in other words, the lower end of the antenna should be within ⅛ wavelength of the ground plane. This theory does not apply, however, when the antenna is located above a ground that is not a good conductor, or when there are obstructions such as houses, hills, trees, etc., which would shield the reflected image of the antenna in the ground plane, and perhaps even shield the radiating antenna itself for low-angle radiation. In the case of the city dweller who is surrounded by obstructions, there is no effective image in an earth ground; therefore, the antenna should be placed as high as possible so that the direct radiation from the antenna will provide low-angle radiation. Anyone fortunate enough to be located in the wide-open spaces with few or no near-field obstructions may find better low-angle radiation if the lower part of the antenna is located within ⅛ wavelength of the ground. The optimum height to use will be dependent on ground conductivity and the antenna should be tried both at ⅛ wavelength and at the maximum obtainable height to determine which will furnish the best results. Do not try to improve conductivity under the antenna by chemical treatment or buried radials as the area of reflection for low-angle radiation will extend quite some distance from the antenna. The blessed operator that lives on a clear hill-top will definitely want to use this antenna within ⅛ wavelength of the ground, and it would be to his disadvantage to elevate it above this height unless for some reason he desires high-angle radiation.

There are several ways to construct the dipole. The easiest would be to use 300 ohm open TV lead-in as shown in *fig. 1*. The length of the antenna should be selected for the desired band as shown as ($l_1 + 2l_2$) in table I. If it is desired to use flat TV twin-line, the

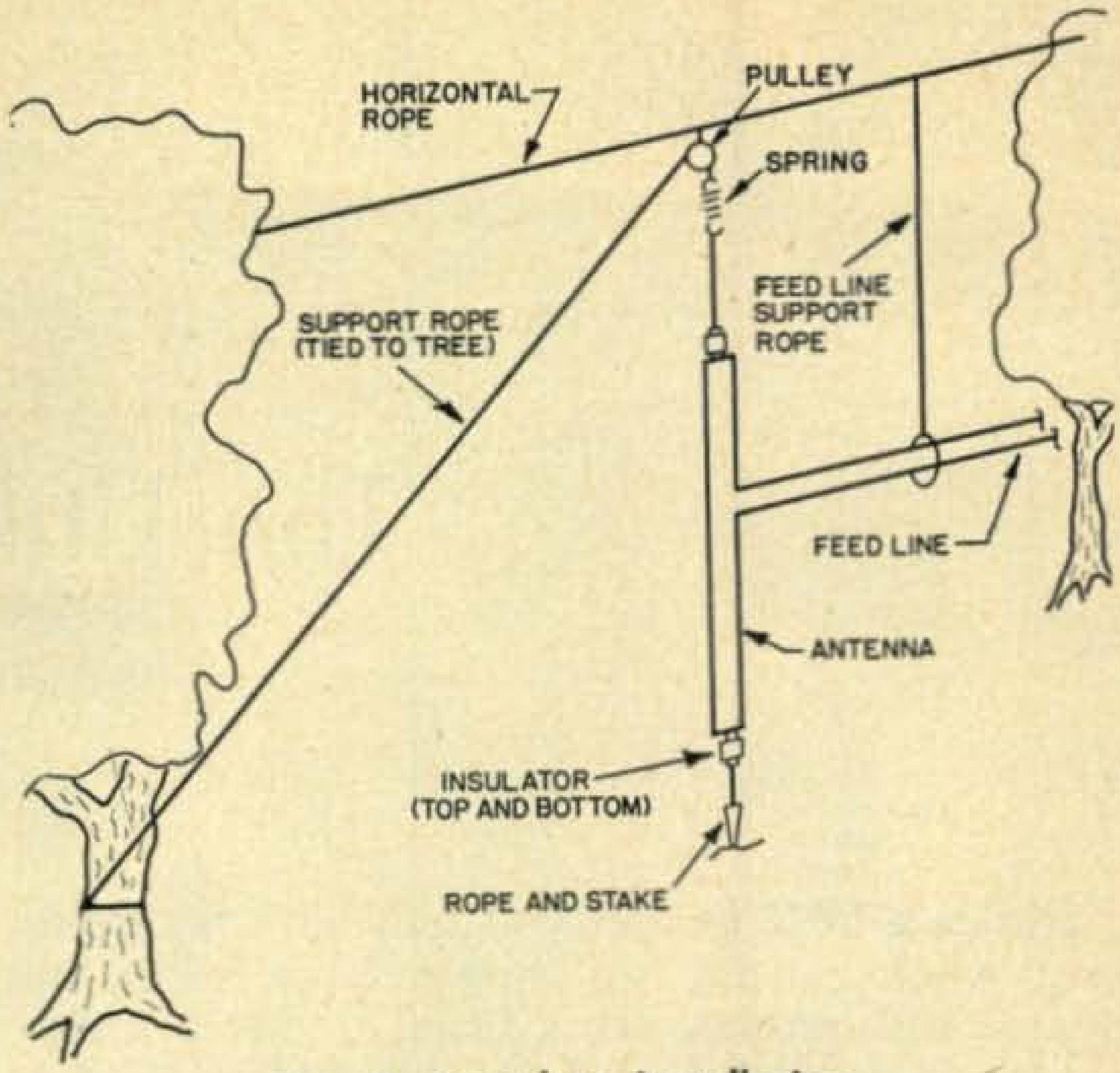


Fig. 3—Complete installation

impedance match and bandwidth characteristics of the antenna may be improved by constructing the antenna as shown in *fig. 2*.[2] The point at which the twin-line should be shorted is indicated in table I. If other than flat twin-lead or open-line is used, the lengths l_1 and l_2 may be calculated easily. The length l_1 is .94 x (free space half wavelength) x (velocity factor of the transmission line used.) The wire ends are cut to such a length that the overall length of the antenna is .94 x (free space wavelength), or it may be expressed in feet by 462/(frequency in megacycles). The velocity factor of the transmission line used should be obtained from the manufacturer and is defined as the ratio of the wavelength in the line to the wavelength

[*continued on page 114*]

	6M	10M	11M	15M	20M
L1	7' 9.2"	13' 11.8"	14' 10.9"	19' .4"	28' 6.0"
L2	6.7"	12.0"	12.8"	16.4"	24.6"
L1+2L2	8' 10.6"	15' 11.8"	17' .6"	21' 9.2"	32' 7.1"

Table 1

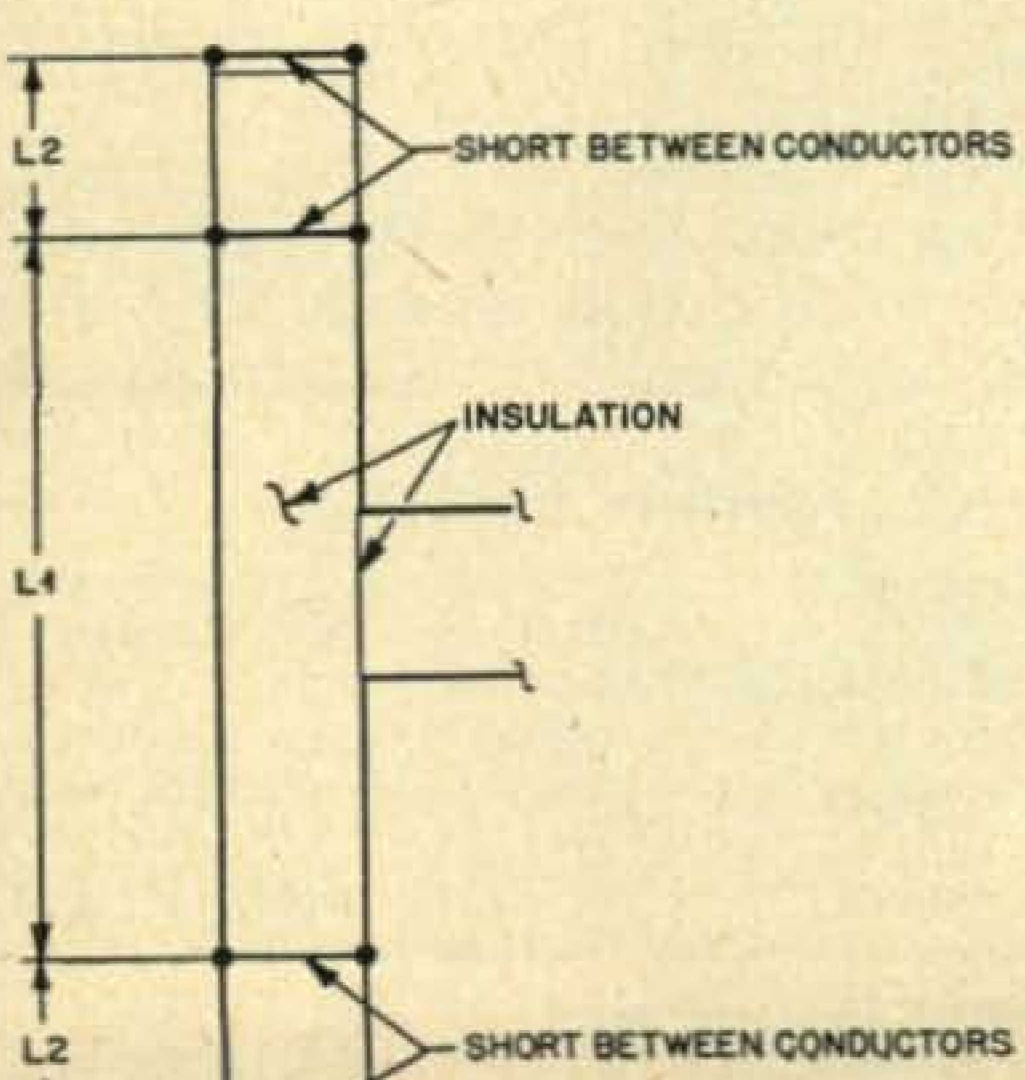
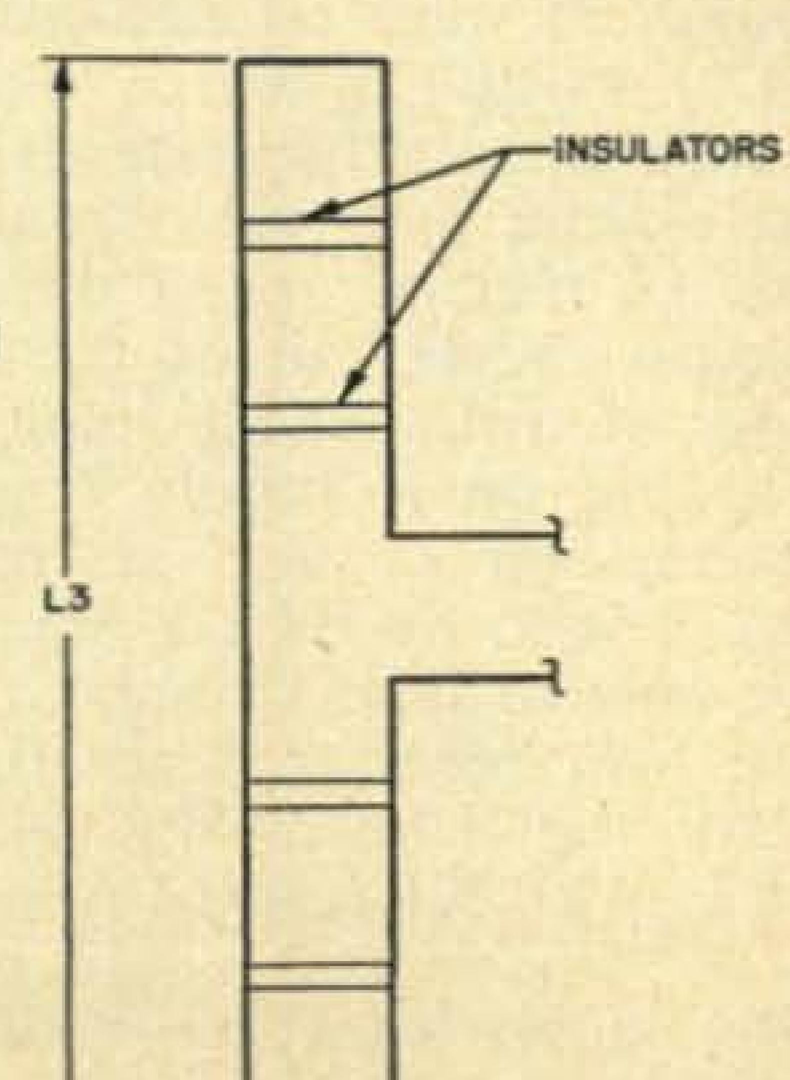


Fig. 2

Fig. 1



1. "The ARRL Antenna Book" Fifth Edition, pages 48 and 58.

2. "The Radio Handbook" Thirteenth Edition by Editors and Engineers, page 300.

bug if you can; harken to these humble words, if you can't. All comments can be directed to the author on 144 Mcs. No agonizing, frustrating DX-shenanigans up there. Just fresh air and wide open spaces.

If you must persist, here's a hearty cheer for you.

Good Dxing, OM, but *no* more power to you! ■

Vertical

[*from page 37*]

in free space. A single wire (either stranded or solid) may be used instead of the twin lead for lengths l_2 if desired.

The author suspended his test antennas, one at a time, from from an insulator and spring located on the end of a clothesline as shown in *fig. 3*. This clothesline ran through a pulley supported by another clothesline which was fifty feet high and supported by two large trees. The lower end of the antenna under test was secured by another clothesline and insulator combination to a stake driven into the ground directly under the antenna. The 300-ohm feed line ran horizontally from the antenna to the house, then down the side of the house to a window beside the transmitter. This feed line should be approximately at right angles to the antnena for as large a part of the run as is possible. This makes the antenna ideal for operators that are located in second floor or higher operating positions.

The length of the feeders is unimportant as they are untuned and can be fed by any balanced output circuit, such as a balanced antenna tuner, balun, etc. The author uses a set of *B & W* type 3975 bifilar balun coils which are in turn connected to the pi-output section of the transmitter by a short transmission line. ■

Yasme

[*from page 44*]

thought in those brief moments, and I wondered how the folks at home were taking this day. The parade over, everyone trouped back to the camp for a good feed and that evening they presented themselves at the American Club house to give everyone a perfect evening's entertainment with their singing. The few Fijians employed by PAA were there too and they, in their ceremonial dress, gave us an example of their very tuneful singing and dancing.

On the whole, the evening turned out very successfully, and the Americans certainly showed their enthusiasm. It is just as well that these little incidents occur here to break the monotony, otherwise I feel very sure everyone would go nuts.