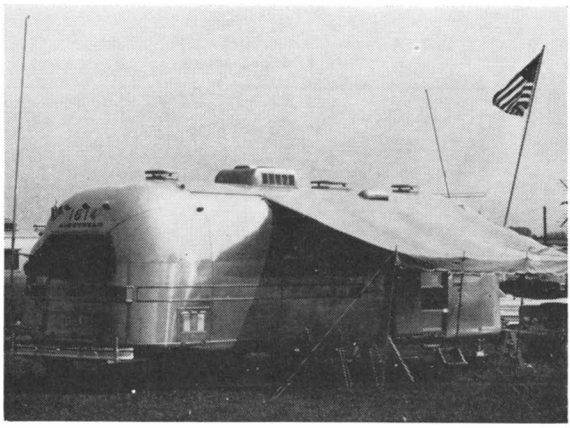
Antennas for Travel Trailers and Campers



The author's 30-foot Airstream trailer with the 75-meter Airstream Loop in place. The "tuning" mast is the one carrying the flag.

BY PHILIP S. RAND,* W1DBM

THE sport of camping, whether it be in a tent, a truck camper or a travel trailer, is growing by leaps and bounds, as evidenced by the increasing number of various types of trailers encountered on the nation's highways today. As a class, trailer owners include an above-average number of radio hams. In the United States, the ham population averages about one out of every 1000 people. A city of 50,000 usually has about 50 hams. My town of about 6000 has 6 hams. On the other hand, the New England Unit of the Wally Byam Caravan Club, an Airstream travel-trailer club, with a membership of some 500 travel-trailer owners, has over 15 hams as members. The International WBCC has about 225 hams for 22,000 trailers, or an average 10 times as great as normal.

Who knows why hams like to go camping in such numbers? Perhaps it's their Field-Day training; perhaps it is the next logical step after mobile operation, or perhaps they just cannot leave home without their rigs. At any rate, it is nice to have your own means of communication with the outside world when you are away from home in the Maine woods, at the Grand Canyon, or even down in Mexico.

One thing all hams know is that no matter how good a transmitter you may have, you cannot get out without an antenna; and the better the antenna is, the better you get out. The antenna is usually no problem for the home station. The sky is the limit, so to speak. A 65-foot crank-up tilt-over tower with a triband beam on top, and a couple of inverted Vs for 40 and 75 are not at all uncommon. But did you ever contemplate transporting such an antenna system to a state park, or some other camp ground, and setting it up while your XYL cooked supper? Obviously, the mobile operator is faced with vastly different problems than those confronting the ham who stays at home, when it comes to antennas.

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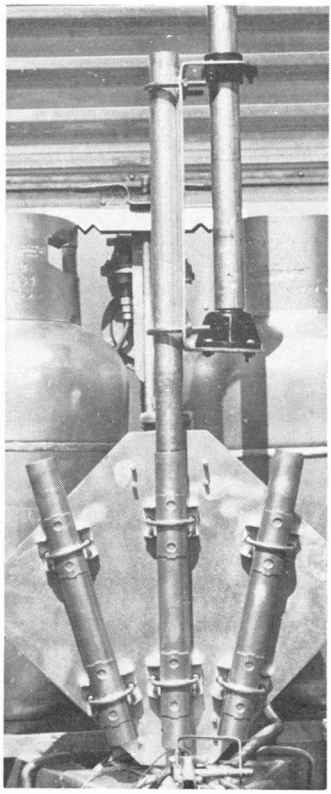
My trailering experience began in 1929, when I built my own 14-foot travel trailer, which was christened "Black Maria." Shortly thereafter, I got my ham license, and one of the first thoughts was toward a rig for the trailer. This was in the days when mobile operation was still a novelty, and the story of Black Maria was my first contribution to *QST*, in 1933. The rig used a pair of 33s in parallel operating from a B-battery pack.

Over the ensuing 35 years, many portable antenna designs have been tried, and much has been learned about their relative performance. The degree to which a trailer traveler is restricted in his choice of an antenna varies widely, of course, depending upon the facilities available at each stopping point. These are seldom known in advance, but to get the most out of his equipment, the trailer operator should be prepared to take maximum advantage of whatever facilities he may find on each occasion.

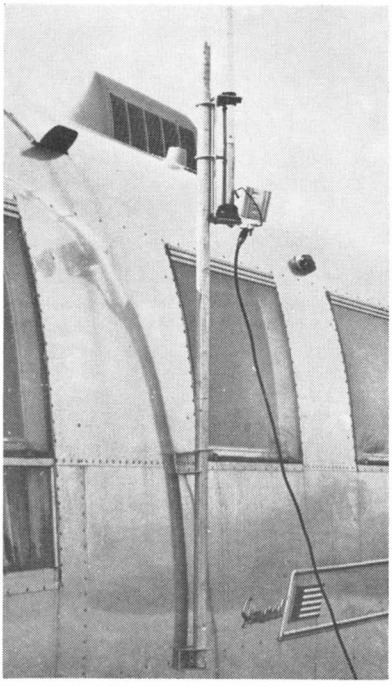
Dipole Antennas

Long ago, I found that a simple dipole for 40 or 75 would far outperform my mobile whip, even with the dipole only a few feet above ground. As I write this, sitting in the latest Black Maria — a 30-foot Airstream job — up in Port Colburne, Ontario, I am listening to the 75-meter phone band. The dipole is only 8 feet above ground. This morning I checked into the Airstream Travel Trailer Net, which meets every Sunday on 3963 kHz. at 8 A.M. local time. I worked other trailer stations in Connecticut, New Jersey, Maryland, Pennsylvania, New York and Ohio. Several times I switched to the mobile whip and could not be heard through the QRM. Such a dipole can be prefabricated and, when rolled up, occupies very little storage space.

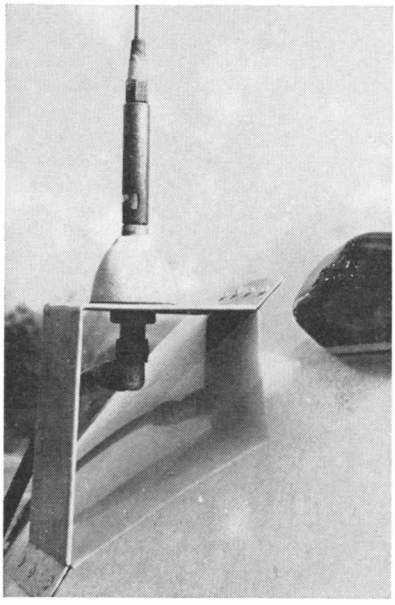


Insulated mounting at one end of the "Airstream Loop" 75-meter antenna. The "tuning" mast can be mounted directly in one of the other sockets. The tuning will vary with the spacing between masts as well as the length of the "tuning" mast. The insulated mounting can be transferred to one of the side sockets to obtain maximum spacing.

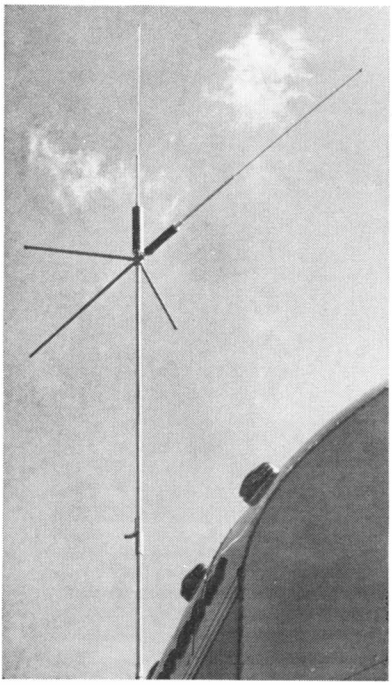
A check with a 20-watt fluorescent lamp by W1WKZ indicates the "hot" points on the Airstream Loop 75-meter antenna system.



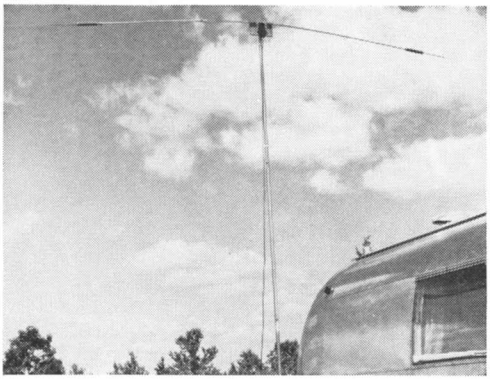
A 25-foot base-loaded antenna mounted on brackets attached to the side of the trailer.



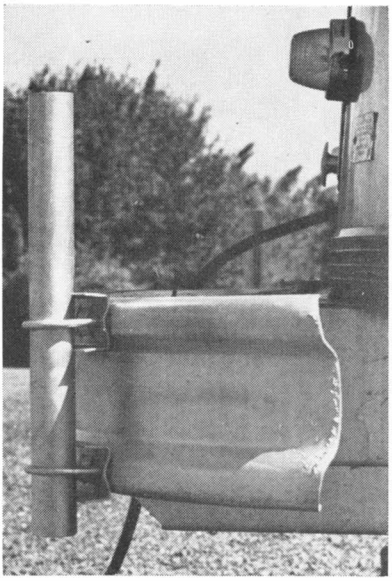
An elevated mounting for a mobile whip at a top rear corner of the trailer body. The bracket is fastened by pop rivets. This point may also be used, with the whip removed, for feeding wire dipoles.



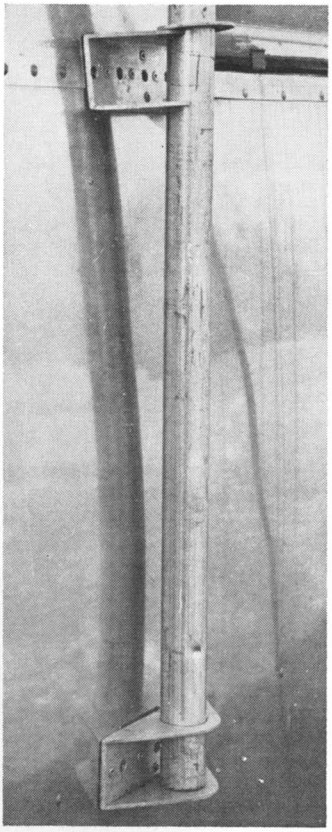
A five-band antenna system. A New-Tronics mobile antenna base section is fitted with a Waters Add-a-Band adapter. The short resonators for 10, 15, and 20 meters are Waters. The 80-meter resonator (top) is New-Tronics. A threaded stud has been added to the vacant side of the adapter to take a New-Tronics 40-meter resonator. The system is fed at the base with a single coax line.



An 80-meter dipole made of two New-Tronics 75-meter mobile whip back to back. The 15-foot mast is bumper-mounted. A 1-to-1 balun is mounted on the center insulating panel, which is secured to the mast with U bolts. This antenna is quite narrow-band when operated on 75 meters, making it necessary to retune the antenna for excursions of more than 30 or 40 kHz.



A bumper-mounted socket for TV masting.



Brackets for mounting TV masting on the side of the trailer. The upper bracket is fitted with a removable U-shaped yoke bolted to the bracket. The brackets are fastened to the trailer with pop rivets.

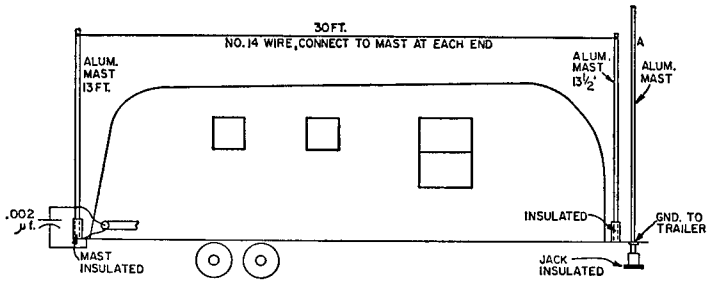


Fig. 1—75-meter "Airstream Loop"

When the length of the stay warrants it, and trees or other supports are available, the antenna will be even more effective when raised to a respectable height. I keep a bow and arrow on hand for shooting lines over taller trees. Incidentally, Hy-Gain makes a deluxe portable dipole consisting of two stainless-steel tapes in a double plastic housing. The tapes are calibrated in meters, and can be quickly reeled out to the proper length for use on any desired band. The unit is fitted with a coax connector, making installation very easy.

If only a single support is available, the dipole can be used in "inverted-V" fashion. A convenient way of putting up such an antenna is to use three or four 5-foot lengths of 1¼-inch aluminum TV masting as a center pole, mounting it on the front of the trailer. I have a mounting for such an arrangement clamped to the bumper, as shown in one of the photographs. The mast can be equipped with light nylon halyards for hoisting the center of the dipole. The ends of the dipole can be attached to whatever may be handy, but the higher, the better.

Loaded Antennas

Of course, there are many times when the surroundings, or the shortness of the stopover, make erection of a conventional dipole impractical. On these occasions, I have used one or another of several arrangements shown in the accompanying photographs and sketches. Where the antenna system is one that requires a ground for operation, I have found that a quarter-wave wire counterpoise connected to the trailer, and strung out a few feet above ground, is usually a much better "ground" than the trailer alone, even if the trailer is actually grounded to a driven rod. I carry two each of wires cut to lengths of 8, 16, 32 and 60 feet for use as counterpoise on the 10-, 20-, 40-, and 75-meter bands, respectively. One end of each wire is fitted with a large battery clip, while the other is terminated in an insulator. Trailer awning poles come in handy as counterpoise supports when nothing else is available.

"Airstream Loop" Antenna

Of particular interest is the 75-meter folded configuration shown in the sketch of Fig. 1, which I call the "Airstream Loop," although, strictly speaking, it does not function as a true loop. With the fittings that I have provided, this antenna can be put up in a few minutes, and its performance seems to be about equal to that of a low dipole. It has the advantage that it is completely supported by the trailer, and requires no external supports. It is contained entirely within your own campsite. There are no wires strung out for you or your neighboring campers to trip over or be garroted by in the dark. A 30-foot length of wire is strung between, and connected to, two poles made of aluminum TV mast sections. A third mast (A), of approximately the same length as the others, and connected to the trailer, is an essential part of the system. This arrangement appears to work as a folded half-wave antenna, the 30-foot wire and the two poles connected to it forming one half of the antenna, while the other half is formed by the trailer body and mast (A). Probing with a fluorescent lamp shows that the end of the trailer opposite the feed point is "hot" while the feed-point end is "cold." The system can be tuned by adjustment of the length of pole A, and/or changing the spacing between A and the adjacent pole. The spacing can be changed by a selection of the pole mounting sockets shown in one of the photographs. In this manner, the resonant frequency can be changed by almost 150 kHz. For any adjustment, the transmitter can be tuned about 30 kHz. either side of the resonant point before the s.w.r. exceeds 3 to 1. Since the "hot" end of the trailer is the front end in my case, the tow car must be unhitched, and an insulating block used under the customary supporting jack.

In a similar arrangement for 40 meters, mast A is omitted, and a wire approximately 21 feet long is connected to the pole at the feed-point end. The open end of the wire is supported from the pole at the opposite end of the trailer by a length of nylon rope.

40-Meter Monopole

Another 40-meter antenna that I have used with considerable success is a 34-foot length of 300-ohm ribbon line connected as a folded monopole, and strung up in the same manner as the antenna just described. One conductor of the ribbon is grounded to the trailer at the feed point, while the other conductor is connected to the center conductor of the coax line. The two ribbon conductors are connected together at the far end.

Matching

Standing-wave ratios up to 5 or 6 to 1 are hardly worth worrying about at 4 Mc. so far as

Table I

Hustler 75-meter mobile whip mounted vertically on top rear corner of trailer	S7
Same as above, with 60-foot counterpoise wire connected to trailer	S9
Two Hustler 75-meter mobile whips back to back as a horizontal loaded dipole	S9 + 5 db.
60-foot horizontal wire 8 feet high, using trailer as ground	S9 + 10 db.
Hustler 4BTV trap vertical with 75-meter resonator	S9 + 10 db.
120-foot dipole, 15 feet high at center	S9 + 20 db.
"Airstream Loop" Antenna	S9 + 20 db.
Home-station dipole 50 feet high	S9 + 30 db.

additional power loss is concerned. However, an s.w.r. greater than 1 to 1 causes the line input impedance to vary, depending on the length of the line. The output circuits of many transmitters and transceivers are not designed to work into loads departing significantly from 50 ohms. With these units, it may not be possible to load the final stage, or components in the output stage not designed for the voltages that develop with higher-impedance loads may be damaged. Use a Monimatch, or other reflectometer, and adjust the antenna for minimum s.w.r. I carry along several mica capacitors ranging in value from 50 pf. to 0.002 μf. with battery clips attached, which are used to shunt the line at the feed point. I start out with the lowest value, and double the capacitance in steps until I get an s.w.r. of 1 to 1 somewhere in the band, and then adjust the antenna length for resonance at the desired frequency.[1]

To get some idea of the relative performances, a series of checks was made at 3825 kHz. on several of the antennas described. A receiver with a horizontal antenna was set up at a distance of 8 miles from the trailer, and S-meter readings were taken with the results shown in the accompanying tabulation. All readings were made with identical input power to the transmitter, and with the antennas adjusted for an s.w.r. of 1 to 1.

[1] This method is equivalent to the use of a stepdown L network. It can be used when the antenna feed-point impedance is lower than the line impedance. To obtain a match, the antenna length must be somewhat longer than a resonant length, so that the antenna shows inductive reactance at the feed point. (This reactance serves as a substitute for the reactance of the coil of a conventional L network.) For an accurate match, it is necessary to adjust the antenna length and the value of the capacitor until the appropriate transformation ratio is obtained. — *Editor.*

To sum it all up:

1) Carry a complete set of mobile whips for lunch stops, or other occasions where you just do not have the time or room for anything better.

2) If at all possible, use a ¼-wave counterpoise clipped to the trailer when using a mobile whip.

3) If you have the time or space, clip a ¼-wave wire, instead of a whip, to your mobile antenna mount, and run it out to a bush or tree.

4) In addition to (3), clip a ¼-wave counterpoise to the trailer, and run it in the opposite direction.

5) If you are stopping for a short time, or for the night, rig up the 5-band mobile whip with five ¼-wave counterpoises, one of appropriate length for each band.

6) If you want to concentrate on one band, put up the 16-foot mobile-whip dipole, if your space is limited.

7) If you have plenty of room, put up a ½-wave dipole for your favorite band.

8) If you want to work all bands, and space for dipoles is limited, then put up your trap vertical with the 75-meter resonator tuned to your favorite frequency.

9) If you are going to spend a week in a particular camp ground, shoot some lines over a couple of high trees with a bow and arrow, and get your dipoles up in the air as high as possible.

10) The use of balloons and kites is good, but depends completely on the wind.

11) Next best to a high dipole, put up the "Airstream Loop" antenna for 75 meters.

12) If all else fails, bring your 2-kw. p.e.p. linear and your 2½-kw. a.c. gas generator along. This will at least keep the other campers awake. Don't forget a low-pass filter for TVI! QST