What! No Antenna?

Getting Results with Indoor Radiating Systems

AFTER working several stations in a row that were all using indoor antennas, we were hit with the idea that perhaps a lot of operators have denied themselves the use of the low-frequency bands because they feel that they don't have the room necessary for the antenna. A few letters in the right directions brought back the dope on these indoor antennas, and it is presented here in the hope that it will demonstrate that you don't need a Rocky Point, j.g., to enjoy low-frequency operation.

This just represents a sample of a very few of the indoor antennas that are in use. We will be pleased to hear from operators with other different types of inside antennas that have worked well.

W2ALO, RUTHERFORD, N. J.

THE antenna used by Jules Obester, W2ALO, is an excellent example of how to keep from being licked at anything. Located on the top floor of a 4-story 28-family brick apartment house, the only spot for the 14-Mc. antenna was in the 12 by 16 operating shack. What with fire escapes, BX cable, and steam and water pipes all around, this was bound to put the antenna something less than the "several wavelengths from surrounding objects" recommended by the books. But the antenna that was evolved is shown in Fig. 1, and it works well. It is, of course, a half-wavelength dipole folded to fit into the room and fed with RG-8/U coaxial cable. The cable was made an electrical half wavelength long, so that it acts as a half-wavelength transformer and the antenna impedance value appears at the end of the line. By trimming the original 33-foot length of the dipole down to the value that showed maximum line current (for constant transmitter input), the loading effects of surrounding objects and the folding of the wire were compensated for, and the final length worked out to be something just under 30 feet. When the right length was found, it was noticed that no retuning of the final-amplifier tank was required, from no load to full load, indicating that little or no reactance is introduced.

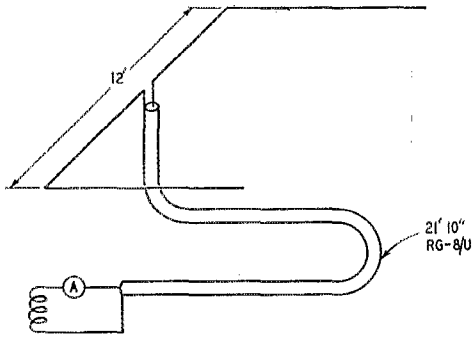

Fig. 1 — The 14-Mc. dipole at W2ALO consists of 30 feet of No. 14 wire mounted in the picture molding in a 12 × 16-foot room and fed with a half wavelength of RG-8/U. The wire length was determined experimentally (see text) and is less than the usual value for a half wavelength.

On the theory that the maximum-current portion of the antenna does the most radiating, the center of the antenna is mounted on the north wall of the room, in an effort to get into Asia a little better. However, the antenna is not too directional, and 164 countries have been worked postwar on 14 Mc., with never more than 350 watts input. The Pacific islands seem to be the most difficult to work, but this might be accounted for by the need for the signal to travel through 150 feet of apartment house before getting out into the open! However, the more distant stations — VKs and ZLs — can be worked easily, in the same direction.

Snow on the roof seems to have some effect in confining the signal, but the performance of the antenna has amazed any and all who have seen it. The wire is about 40 feet above ground.

W2HZY, BLOOMFIELD, N. J.

THERE is nothing very unusual about the indoor antenna used by George Wright at W2HZY — it is a folded dipole made of No. 14 wire spaced 2 inches and fed with Amphenol tubular 1-kw. 300-ohm line — but it gets out nicely. Located in the attic of a two-story house, it is about 33 feet above ground, and power lines and telephone wires run fairly close to the house on two sides. The antenna is used in the normal fashion on 14 Mc. and as a Marconi (by tying the feeders together) on 7 and 3.5 Mc. The location is an ordinary one, on a small hill in the residential section, and the transmitter input runs approximately 750 watts.

Results? A two-year schedule with ZL3AB with hardly a miss, several S8 and S9 reports in Asia and the Philippines, and a total of 192 countries worked! While W2HZY hastens to admit that he received some help on about 10 or 15 of these countries and might not have them if he were a "lone wolf," we submit that he had to be putting a good signal there to work them under present conditions!

W2PLR, BAYSIDE, L. I., N. Y.

LET's be practical about the whole thing — a fellow needs power or a 27-hour day to run up a string of countries these days, because he's competing against a lot of fellows with power and some mighty good antennas. So it isn't surprising to find that the lower-powered indoor-antenna fellows don't have the big strings of countries, but neither do the low-powered stations with outdoor antennas. For example, Ben Tyson, of W2PLR, runs 50 watts on 7, 14 and 28 Mc., but has managed to grab hi..self WAC on 14 and 28 Mc., and a total of 87 countries. He knocked off 64 sections in the 1947 SS Contest, just in case you think our only yardstick of effectiveness is one's countries total.

The antenna at W2PLR is shown in Fig. 2. It is a square loop, 15 feet on a side, supported in the attic of a two-story house. The house has "hip-roof" construction, and four sloping roof rafters furnish good points for fastening the antenna insulators. The transmitter is located in the attic and remotely controlled, so the feedline from the antenna to transmitter is just a 4-foot length of 300-ohm Twin-Lead. The same antenna is used for receiving, through an antenna relay and some more Twin-Lead.

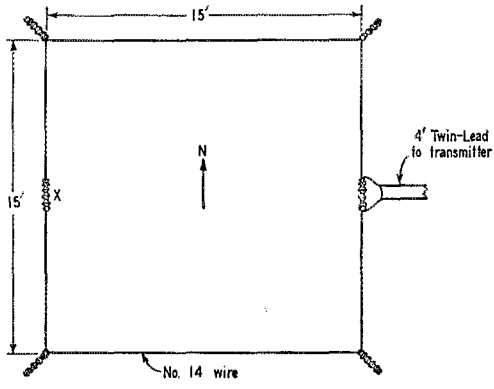

Fig. 2 — The loop at W2PLR is closed at point *X* for 14- and 28-Mc. operation, and opened when working on 7 Mc. The loop is mounted in the horizontal plane, in the attic.

As W2PLR puts it, "The antenna is a loop on 14 and 28 Mc., with point *X* shorted, but this is opened for 7-Mc. operation and the antenna becomes a badly bent-up dipole." The antenna seems to get out fairly well in all directions, with a slight edge in the east-west directions.

W5ONJ, TUCKERMAN, ARK.

THE operations of James Brock, W5ONJ, are confined to 40 meters, but he isn't complaining about the results with his attic antenna. The wire, bent as shown in Fig. 3, is located in the attic of a two-story house near the business section of town. Running 200 watts, W5ONJ has just about all he needs for WAS, which should indicate that his work isn't confined to *local* rag-chews. A three-turn coil at the center of the antenna helps to make up for the shortened length of antenna and also seems to provide a better match for the RG-8/U line. The line couples at the transmitter through a 3-turn link.

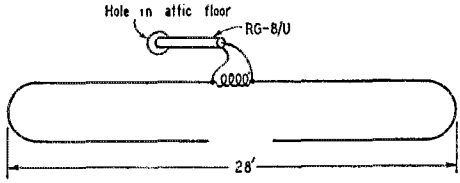

Fig. 3 — The over-all length of the 7-Mc. antenna at W5ONJ is 62 feet, crowded into a 29-foot attic. The coaxial-cable feed runs through a hole in the attic floor to the shack below.

WØEVW ST. LOUIS, MO.

RUNNING only 40 watts, Tom Million of WØEVW has little fault to find with the results he gets with a 14-Mc. folded dipole of 300-ohm Twin-Lead tucked away in the attic. The shack is located in a flat only seven blocks from the downtown section, and is surrounded by apartments, a factory, a school and a church steeple, but he gets out on 3.5, 14 and 28 Mc. The feeders are tied together for 3.5-Mc. work, and the power is fed in the normal manner for 14 and 28 Mc. Although this isn't what the book says for folded dipoles working on twice their design frequency, it doesn't seem to bother either WØEVW or the stations he works. The antenna is about 40 feet above ground. One continent is lacking for WAC, and a few states for WAS.

W2BRC, ELIZABETH, N. J.

WHEN John Nicholas built his antenna for W2BRC, he had a problem that was solved in a novel manner. While fortunate enough to have an attic long enough for a 68-foot flat top under the peak of the four-family frame house, his shack is located on the first floor and the attic corresponds to a third floor. How to feed the antenna for multiband operation? It's simple — just run an open-wire feedline up the *outside* of the house to the eaves, through the eaves to the inside of the attic, and along the roof rafters to the center of the flat top! He thus has multiband operation with a low-loss tuned feedline — if he were to use Twin-Lead or other solid-dielectric line and run it inside the house, as might seem to be a good idea at first glance, the losses would run much higher.

The antenna flat top is 28 feet above ground, and the 807 final amplifier is usually run at 50 watts input on 80 and 40 meters. This is plenty for W2BRC to work into the traffic nets on 3.5 and 7 Mc., run up good scores in the CD contests, and acquire a 7-Mc. WAC and 36 countries.

VE3PB, TORONTO, ONT.

THE first efforts of Stanley Dane, VE3PB, to work out with 40 watts and an indoor antenna from his third-story shack were not very successful. While short lengths of wire could be coupled to some extent with a "universal coupler," the thing seemed to be good for only local contacts on 40 and 80. Many tests and careful pruning on 40 meters evolved the antenna shown in Fig. 4A, which works well on the band and has given him some good West Coast contacts. The antenna is hung along two walls and down the back of a door. Anyone duplicating the antenna should secure the wire firmly on the walls, because changes in angles or even a half-turn difference on the coil will make a difference in loading. The antenna was checked by how far away from the far end a neon bulb would light, keeping the transmitter input constant for the various tests.

On 80 meters VE3PB ran into trouble. The 40-meter antenna worked against ground was unsatisfactory. An antenna similar to that in Fig. 4A but with a larger coil and longer wire lengths loaded fine. But one could light the neon bulb on the transmitter, metal ash trays, bed springs, and the frame of an aquarium. Mittens had to be worn while tuning the receiver. Reports four miles away were RST 229. It wasn't much good.

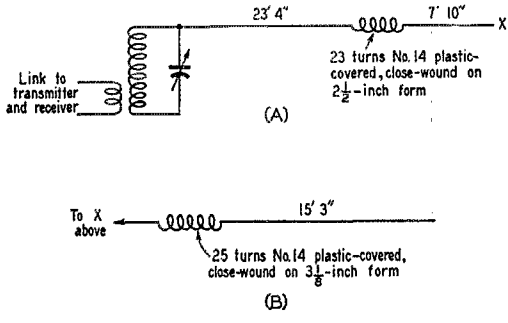

Fig. 4 — The 40- and 80-meter indoor antennas used at VE3PB. The antenna at A is used on 40, and it runs around the wall on two sides of the room and down the back of a door. On 80, the addition shown in B is clipped to the end of the 40-meter antenna. The antenna tuner is a coil-and-condenser combination that will resonate to the band in use.

But everything was cooled down and the rig worked out on 80 by adding the arrangement shown in Fig. 4B to the end of the 40-meter antenna, with this extra wire lying on the floor near the third wall. It, too, must be carefully pruned and fixed in a definite position. VE3PB concludes that the low-powered indoor-antenna operator must be careful in pruning his antenna so as not to shoot the whole system above ground, but with an indoor antenna and sensible operating he can have all of the fun and contacts he desires.

W1DX, WETHERSFIELD, CONN.

INTRIGUED by an antenna invented by W5TG and wanting a 7-Mc. skywire for the ARRL QSO Party, the antenna shown in Fig. 5 was tried at W1DX. W5TG pointed out that, since a 3-wire doublet shows 600 ohms at the feed point, half of one should show 300 ohms. Since the attic was not quite long enough to house a horizontal quarter wave at 7 Mc., the last few feet had to be dropped down, as shown in Fig. 5. The 3-

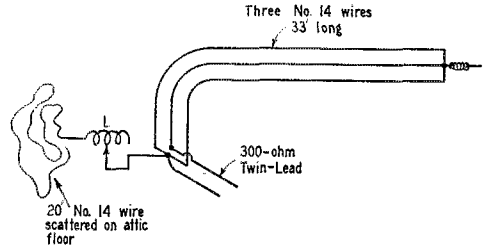

Fig. 5 — A horizontal 7-Mc. quarter-wave antenna used at W1DX. Half of a 3-wire dipole is used and fed with 300-ohm Twin-Lead. To ground one side of the transmission line and the end of the antenna, a capacity (a 20-foot length of wire scattered on floor) and an inductance, *L*, are made series resonant at the operating frequency.

wire doublet (wires spaced about 1 foot) was fed with 300-ohm Twin-Lead at the base. A good ground was not available for the quarter-wave antenna, so a counterpoise was tried, consisting of several random lengths of wire hung out a vent in the attic. This didn't work too well, as indicated by a "twin-lamp" s.w.r. indicator on the feedline, so the system illustrated in Fig. 5 was hit upon. It is a version of the old "top-loaded" antenna idea, and its purpose is to provide a low-potential (ground) point at a point removed from ground, as in an attic. About 20 feet of No. 14 wire was scattered haphazardly around on the floor, to furnish the loading capacity, and an adjustable inductor was used at *L*. (This was one of the continuously-adjustable coils salvaged from a BC-375. It has two rolling contactors on it and is ideal for this particular purpose.) The inductance at *L* was then changed a turn at a time. Nothing much happened at first, and the s.w.r. was still high, but suddenly the s.w.r. dropped and, within one turn on *L*, a setting was found in which the one lamp of the twin-lamp was completely out while the other burned brilliantly over the entire 7-Mc. band. No comparisons with other antennas are available, but the thing worked well on 7 Mc. On 14 Mc. the s.w.r. in the line runs high, but contacts have been made around the country and overseas. It is essentially a one-band antenna, of course, and is included in this symposium only to draw attention to the "grounding" method employed.

(Continued on page 103)

What! No Antenna?

(*Continued from page 17*)

Conclusions

Although the sample is small, it still seems valid to draw several conclusions from the different indoor antennas just described. It is apparent that you don't require anything approaching an ideal location for satisfactory low-frequency results with an indoor antenna. Far more important are a little ingenuity and some time to prune the antenna. Because the entire system is indoors, it is not difficult to adjust the antenna length until the system is exactly resonant or provides a good match for your feedline (if you use one). This careful adjustment pays off in results.

So, if you're a one-band man because you "don't have room for an antenna" — forget it! Look over the antennas in this article, then put up your own "improved" version, and meet an entirely new gang of fellows and conditions on some of our other bands.

— *B.G.*

Teletype Reception

(*Continued from page 24*)

clips the peaks as shown in Fig. 3. When the carrier is "on," the limiter operates and the locally-generated noise of the blocking oscillator is squelched. The carrier "on" condition thus becomes the teletype "space" position. The carrier "off" condition permits the blocking oscillator and any received noise to make the "mark" signal.

The system will operate successfully until the signal drops below the level of limiting or until local noise becomes so continuous that it keeps the receiver squelched all the time. The random nature of most received noise makes this an extremely unlikely occurrence.

Multiple-Circuit Tuner

(*Continued from page 28*)

harmonics. A rectifier-type wavemeter using a 200-μa. meter as the indicator was link-coupled to the antenna coupler for this test.

Miscellaneous Data

The amplifier-antenna coupler has been laboratory tested while coupled to loads of 75, 500, 2400 and 6000 ohms impedance. Series tuning was used for the 75-ohm load at 3.5 and 7 Mc. Parallel tuning was used on all six bands when working with the three loads of higher impedance. In order to give the antenna coupler a reasonable test, the dummy loads were shunted with both capacitance and inductance to simulate the effects of capacitive and inductive reactance that would be present with a feeder system having a fairly high standing-wave ratio. The coupler passed the test with flying colors — with

(*Continued on page 110*)