Why the Radio Set Builder

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. . . in which the Editor recalls the early days of Radio, before factory-made sets could be obtained—why the manufacturer of receivers is not unkindly disposed to the set builder—how the latter is doing some of the most important pioneering in radio design—why the enthusiastic set builder is also a purchaser of good commercial receivers—and why this great hobby is appealing year by year to greater numbers of intelligent people who find in it the highest pleasure. . . .

WHEN radio was young, in this country, you could not go out in the open market and buy a complete radio set. I refer to the time when radio first came into vogue; that is, after the appearance of the modern vacuum tube, in 1912. At that time such a thing as a radio cabinet was unknown. We used to mount our instruments of various descriptions on our table; and the more room they took up, and the bigger the table was, the better pleased we were.

This state of affairs lasted for a number of years, and possibly culminated about 1923 in the first vacuum-tube sets of the multiple type which then made their appearance. It is true that, beginning with 1918, we had possessed a few self-contained sets of the cabinet variety which, of course, had been used, not for broadcast purposes, but for listening to code.

When broadcasting finally made its appearance, the factory-made set took the country by storm; and, while previously the home-built set had been in vogue, the factory set took the ascendancy immediately. Today, at least in this country, the factory-made radio set for broadcast purposes has far outstripped the home-made set in popular demand. By this I do not mean to imply that the genus of radio constructor who builds his own set has died out. Quite the contrary. There are more sets being built this minute than ever before.

From the best available sources at hand, it seems that there are, at the present time, between 400,000 and 500,000 people who annually build sets, and this figure seems to be on the increase. Large as this figure may seem, it is small compared to the figure of factory-made sets annually turned out in this country (over 2,300,000 at the last census of manufacturers); and it may be said that the manufacturers of ready-made sets today do not worry about the home-built set, but, rather, encourage it. This, at first thought, would seem paradoxical; but it is true, nevertheless, for the following simple reasons:

Radio is an art which changes rapidly, as is well known. While no revolutionary improvements have been made in the past ten years, or are likely to be made soon, changing styles, as well as improvements, keep the trade on the jump. New condensers come out, new dials are devised, new coils are produced. At the present time the shielding idea has attained great favor, almost overnight.[1] Naturally, for this reason, set manufacturers are always anxious to incorporate the latest devices in their receivers.

But once the manufacturer is "tooled up" to turn out the season's supply, it is not always possible or desirable for him to make a change. In the meanwhile the art and progress of radio goes on, and the manufacturer naturally wants to know, in plenty of time, what the tendency will be for next year. By encouraging the set builders he gets a very good idea in what direction the tendency is heading; and he is able, at no cost at all to himself, to get this information, by simply watching the radio press and studying this tendency. When the new season comes along, the manufacturer is, therefore, apt to have a pretty good idea of what will happen, or what may be expected to happen next season. This is not to say that the manufacturer gets all of his ideas from the radio constructors. No such meaning is implied; but he gets valuable information; and for that reason most set manufacturers today openly encourage set building, because, first, they know that it cannot hurt their business and, secondly, because they derive from it valuable information which they would not have if there were no set building going on.

The set builders themselves, in the meanwhile, are having a mighty fine time, building to their hearts' content; in which they are encouraged by the parts manufacturers, who are themselves always ahead of the set manufacturers in bringing out new devices. These new devices are tried out by the set builders, and within six months it becomes known whether a certain device will "take," in the long run, or not.

This has been the case with the straight-line-frequency condensers, as it has also been with the new vernier dials.[2] It is true of shielding the various parts and many other features; none of which would, perhaps, have become incorporated

[1] Shielding a radio set involved placing electrically conductive or magnetic materials between individual components in order to reduce the possibility of electromagnetic interference.

[2] Both of these were innovations in tuning knob construction. As more and more broadcasters began to crowd the airwaves in the late 1920s, straight line frequency condensers made tuning easier by spacing out frequencies at the lower end of the dial so that the distance between stations was uniform from one end of the dial to the other. "At the lower end of

in ready-made sets as soon as they were, if the set builders themselves had not paved the way for such parts.

On the other hand, by encouraging the set builders, the parts manufacturers get, themselves, very valuable experience which they would not obtain otherwise; and, once the majority of set builders have adopted a certain article, the set manufacturers in turn will adopt it as a rule. Such was the case, for instance, with the straight-line-frequency condenser, which was used by set builders for some six to eight months before the set manufacturers adopted this type of condensers.

It may be said, therefore, that the set builders are always ahead of the game; they are forever pioneering. If you wish to see the latest circuit, or if you wish to see the latest radio wrinkle applied, you will always find it in the best home-made sets. All of this does not mean that the set builder does not use the ready-made set; in most cases he does. There is hardly a radio constructor today worth his salt who does not own two or three sets that are in constant use.

For instance, I myself have two factory-made sets in my home, whereas the set which stands on my study table is one constructed by myself. This particular set probably does not stay then for more than a month at a time, because next

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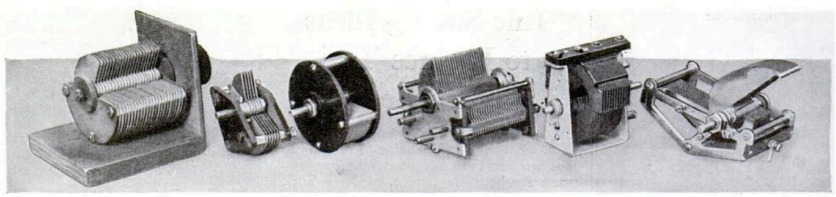
the broadcasting band, ten kilocycles do not change the wavelength nearly as much as the same change does at 500 meters, for instance." Straight line condensers were a solution to this problem.

> As the shaft is turned, the plates engage with each other more and more rapidly. The result of this construction is to give slow changes in capacity when the plates are nearly disengaged, and rapid changes when the dial is turned to the higher numbers. … This means that as you turn the dial toward zero, the condenser plates move slower and slower in proportion to the amount of motion on the dial.

Alfred P. Lane, "New Straight Line Types Separate Stations on Dials," *Popular Science Monthly*, (April 1926): 60–62

Vernier dials allowed for large movements on a knob to result in fine-grained input: "each complete rotation of the control knob causes only a fraction of a revolution of the main shaft, permitting fine and accurate adjustment." "vernier Dial," in *McGraw-Hill Dictionary of Scientific & Technical Terms*, Sixth Edition., (The McGraw-Hill Companies, 2003). It is named for the vernier scale, which performs a similar function for measurement: a secondary scale on a pair of calipers indicates with more granularity where a measurement lies *between* two marks on the primary scale. It was invented by the French mathematician Pierre Vernier (1580-1637). "Vernier Scale," *Wikipedia, the Free Encyclopedia*, March 2015, http://en.wikipedia.org/w/index.php?title=Vernier_scale&oldid=649571489.

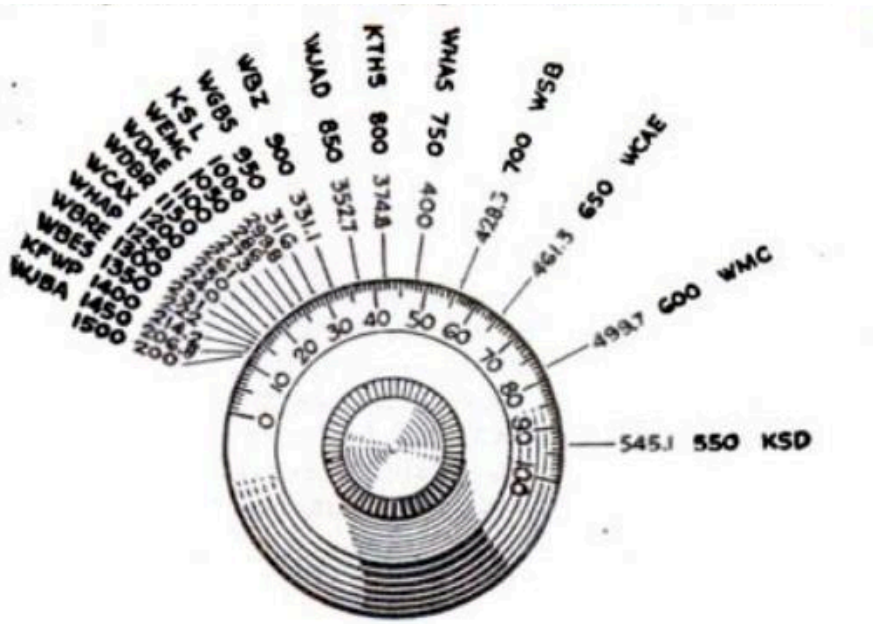


The two condensers at the left are obsolete and inefficient, but there is little to choose among the other four for electrical results. The third and fourth with a special dial give straight line tuning, while the fifth and sixth will give the same results with a plain dial

month I shall be using a later model; but in the meanwhile the factory-made sets are doing their duty and are being used constantly by the household.

This condition is found all over the country, for it is duplicated in the home of practically every set constructor.

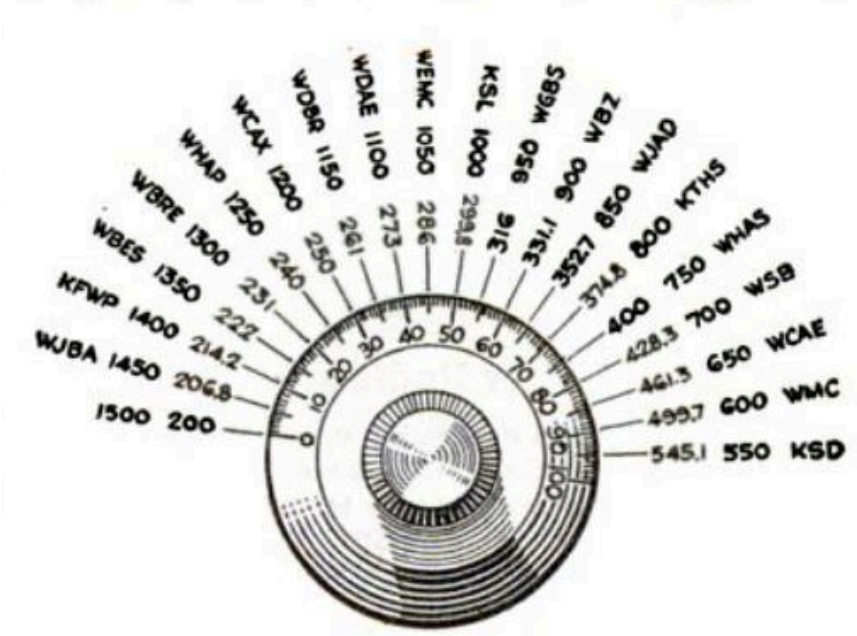
Radio set building may be said to be one of the greatest hobbies that ever came into existence. Unlike most other hobbies, it actually serves to advance a new



Because stations are separated by ten kilocycles, they are jammed at the lower end of the dial

art, and paves the way for better and bigger things.[3]

To be up to date, under conditions that change as quickly as do those in radio broadcasting, radio receivers must forever be kept up to the minute. Though the changes are gradual, they are constantly taking place, and their effect is cumulative. You would not think of using, in the midst of the heavy traffic



If your set is fitted with either of the new condensers, tuning will be comparatively easy

[3]In his editorial for *Science and Invention,* titled "Handicraft" and published in the same month, Gernsback argues that making things by hand not only gives the white collar worker a means of diversion and release after work, but serves as an education in its own right. For each material worked with and each technique applied, a whole new set of materials and techniques must be learned:

> If, for instance, you are making an elaborate radio console for your living room, you will get more information on the subject than you could possibly get from the best text-books. You will, first of all, become familiar with the various tools necessary to fashion the wood, and if you own a woodworking lathe you will learn quite a good deal about the operation of wood-turning and the tools to be used for this particular purpose. You will learn what it means to sandpaper, you will learn to recognize the different kinds of wood, and you will know the difference between green and kiln-dried variety of woods. You will soon know how to use glue, and what kind. You will study the various fillers, and, last but not least, you will get a thorough education in varnishes and paints, and the use of all of these.

Hugo Gernsback, "Handicraft," *Science and Invention*, 14, no. 10, (February 1927): 881

on Fifth Avenue or State Street, a 1914-model car that had to be cranked by hand. No more can you expect the set of 1922, built when there were but a few broadcast stations, to give satisfaction, particularly in our congested centers. It is a well-known fact that every time a station changes its transmitter, or increases its power, thousands of nearby sets are immediately found to be inadequate, because they cannot tune sharply enough to cut out the nearby station and get others at will.

Investigation usually shows, on such occasions, that most of these unselective sets are single-circuit or crystal receivers and others of ancient vintage, which are no longer suitable for present-day radio traffic. Furthermore, additional demands are being made right along on the selectivity of radio receivers, because the broadcast stations are continually increasing their power. The set builder, naturally, keeps pace with the evolution of broadcast conditions, and is forever ready to build a new and better set to meet future requirements.

Set building is continuing to increase rapidly, as it has done for five years, in this country; and, now that we stand on the threshold of television, I believe I shall not be contradicted in saying that set building will assume tremendous proportions, undreamt-of today, during the next five years.[4]

Mr. Hugo Gernsback speaks every Monday night at 9 P. M. from Station WRNY on various radio and scientific subjects.

[4]Gernsback continues here the notion that that the next great innovations, like television, would come not from the corporate R&D labs, but from the avant garde of enterprising amateurs who *could* afford to take risks and try out wacky ideas. Despite the optimism of his claims, however, *Radio News* announced by January 1929 that it would end its monthly "constructional prize contest" due to a lack of quality submissions. "The rules of the contest stated very plainly that no one would be eligible for a prize unless some experimental work had been done and the practicability of the device had been demonstrated by the builder. Most of the entries consisted merely of ideas or suggestions, accompanied by the request that RADIO NEWS do the experimental work necessary for their full development." "End of Monthly Constructional Prize Contest," *Radio News*, 10, no. 7, (January 1929): 651.