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THE HORN SPEAKER

Atlantic City—1947

Part I—How We Got Our Present Amateur Bands

BY A. L. BUDLONG,* W1BUD

• For the amateur who desires to keep himself well informed, this series of articles is must reading. Part I, in this issue,[1] sets forth briefly the facts, figures and dates in the history of amateur frequency assignments, a subject of vital interest to ARRL members as we enter upon the period of another world telecommunications conference. Part II, to follow in May *QST*, will describe how an international conference does business and outline the preparations taken in the U. S. for the Atlantic City Conference, which starts May 15th.

To the average person, Atlantic City is a summer resort, home of the famous boardwalk and site of the "Miss America" beauty contests, located somewhere on the East Coast of the United States. To the average amateur, it is the 1947 location of that periodic nightmare known as an international radio conference, a place where the "commercials" always triumph and where the amateur always gets gypped out of some more frequencies. There is no question about the gypping business because we now have to operate in certain narrow bands whereas once — as the fable goes — we had everything from 200 meters down, all for our very own.

These ideas are firmly implanted in the amateur mind; they are almost universally accepted as basic fact. Were we to say that the international treaty under which we now operate affords us U. S. amateurs precisely the same frequency bandwidths as our very first international allocation, in 1927; that no U. S. law ever gave amateurs an exclusive assignment of all the territory from 200 meters down; and that neither any U. S. law nor international treaty so much as mentioned amateurs or amateur radio until 1927 . . . were we to assert that these are the facts, it would appear that explanations are in order.

And indeed we think they are. Certainly it is true that the average amateur has only a hazy idea of what we ever had, how we got it, why we have international conferences, and how they do business. What we propose to do here, therefore, is to give a brief factual account of amateur frequency assignments, both domestic and international, from the very first days, and to follow with a short description of the hows and whys of an international conference. This is being written in the belief that the information will be valuable to all amateurs and because it is felt it would be more widely read now than at some time when interest in such subjects is not so high.

A History of Amateur Assignments

Why do we have to have international agreements on radio? Broadly speaking, there are three reasons:

1) Since stations of one nation are frequently in communication with stations of another nation, it is necessary to have agreements on such operating details as calling procedure, distress signals, call assignments, methods of collecting tolls on radiograms, etc., unless utter confusion is to be encountered when any two stations try to do business over the air.

2) Because it is possible to operate radio stations throughout a wide range of frequencies, it is necessary to agree in advance where the various services will locate themselves in the spectrum, so that stations will know where to find each other.

3) Since radio signals are not confined to the borders of the country in which they originate, international agreements on allocations to services are also necessary in order to prevent chaotic conditions on the air and hopeless interference between services.

The first two were probably the major considerations in the early radio conferences. The third was not so vital in the early days of radio but

(Continued on page 2)

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[1] The substance of this first installment appeared originally in January 1938 *QST*, and has been revised only to the extent necessary to bring it up to date.

Around the Dial

By THE DIAL TWISTER

HISTORY OF RADIO ASSIGNMENTS

Turning around on the dial of a fine oldie, a radio collector can see stretches of radio frequency paths that were established by the pioneers of radio. Several reasons for world wide get togethers are mentioned in a series of articles in QST starting in the April 1947 edition (substance which was taken from the January 1938 edition) under the title "1947 Atlantic City Report." Fortunately, the article begins as early as the first international conference in 1903. Don't miss reading about the reasons for social order in the beginning of radio.

Wide range collectors are very aware of the progression of something like slide contact coils with no marked increments, next in time to incremented dials of 1 to 100 used for logging a place on the dial, and later in time, actual marking of meter lengths and kilocycles frequencies. Early in the history of radio, we start seeing the who (identification by call signs,) the place (frequency location marks on the dial,) and the time (usually printed in the many periodcals and newspapers.)

The progression of the organization of wavelengths can be understood not only by the oldies but also by a study of the international conferences.

(Continued on page 10)

today is extremely important.

Pursuant to the international agreements, each nation, both as a matter of common sense and agreement, arranges its own domestic laws so that they conform to the international commitments. Obviously, it would be silly if the various nations, after carefully working out solutions to their problems, disregarded the remedies by permitting the stations within their borders to operate on some entirely different basis.

Now let us trace the course of all the international conferences and all our own national laws to see how the amateur got taken care of as the laws came along. We'll cover the international treaties first, and then cover our domestic (U. S.) radio laws set up under these international treaty provisions.

International Regulation

The very first international radio conference, though it doesn't really belong in this story, was held in

1903

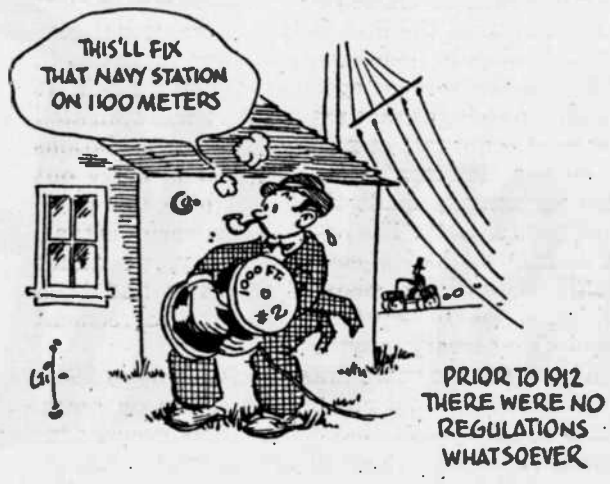
It was held in Berlin. It didn't say anything about wavelengths, operating procedure or anything of this sort and was held primarily for one reason: there was getting to be considerable trouble because of the fact that stations using Blotto Co.'s equipment would communicate only with other Blotto-equipped stations and would turn studiously deaf ears to calls from stations using Bliffsky or other gear. Such nonsense obviously had to be stopped and this first conference, participated in by eight nations (including the United States, which was to participate in all subsequent conferences) was called mainly for the purpose of putting an end to such shortsightedness. A few clauses regarding charges for messages and priority of distress calls completed the brief document.

The next conference, resulting in the first actual treaty, was the one that really started things off. It was held in

1906

Like the first, it took place in Berlin. Twenty-seven nations participated. Perhaps it would be well to say right now that the principal objective was the setting up of arrangements to deal with ship-to-shore work, that being the main thing radio was then used for. In fact, the only services defined in the treaty regulations were coastal stations and shipboard stations — a station, presumably, was either one or the other!

Judged by present standards, the conference resulted in a pretty simple treaty and an even simpler set of regulations to go along with it. However, it is of interest to us because it was here that we see the *very first* agreements of any kind on wavelength assignments. These agreements were exceedingly simple: coastal stations open to general public service had to be able to use both 300 and 600 meters; ship stations were to use 300 meters for a normal wavelength but could use others if they did not exceed 600 meters; small boats unable to "get up" to 300 meters were authorized to use "a shorter wavelength"; and finally — get this! — coastal stations, apart from their two specified waves, could use *any* wavelength, so long as it was either below 600 meters or above 1600 meters. Had coastal stations in those days wished to use any of the territory represented by our present amateur bands, they were free to do it.



There was no mention of amateurs in the treaty and no provision for them except that if any nation had licensed amateurs at that time (none did, including our own United States) it presumably would have had to see to it that they stayed below 600 or above 1600 meters.

In addition to these matters, the treaty and regulations specified three-letter calls, limited shipboard power, normally, to a kilowatt, outlined details of hours of service for coastal stations, the posting of "wireless" telegrams, rates, collection of charges, etc., specified the use of the International Morse code for radio work, designated SOS as a distress call and outlined some very rudimentary regs on methods of calling and working.

This second Berlin gathering also decided on the principle of holding similar conferences from time to time and, as a matter of fact, the next was held six years later in London. So we come to

1912

Forty-three nations from all over the world participated in this London conference; our radio gatherings were beginning to amount to something! Not much was done to change the 1906 treaty and regulations but they were enlarged on somewhat. As before, general public-service stations had to be able to use 300 and 600 meters, but now they could also use 1800 meters. Ship stations were 300 and 600 meters. A curious addition to wavelength specifications was one prohibiting stations used exclusively for sending signals designed to determine the position of ships from using a higher wavelength than 150 meters. Here was the first "short-wave" assignment, as such, and it was to radio-bearing stations! However, this was by no means an exclusive assignment, because, just as in the 1906 treaty, any station could use any wavelength (except that the compass stations had to stay under 150) as long as it stayed under 600 or over 1600 meters.

Ship power was still limited, normally, to a kilowatt; additional power could be used if needed, however, for distances over 200 miles or under unusual circumstances. The Q signals came into being. Revisions and additions were made to other operating details but not a great deal of change shows up in this treaty in these matters as compared with the earlier one. Our old friends, the coastal stations and shipboard stations, were still the only defined services.

At this gathering it was agreed to hold the next conference in 1917, but the first World War and its aftermath upset things so badly that it was fifteen years before another radio conference took place.

1927

The 1927 conference was held at Washington. Nearly eighty nations participated; as of that time, this was the largest international gathering ever held on any subject and the *first* since the advent of "short waves."

The delegates were confronted with a perfectly stupendous task because of the tremendous strides made in radio development since the previous gathering. All the old concepts of radio had been discarded and new theories evolved; new uses for radio had been found with a resulting terrific enlargement in the number of services; telephony had been developed and had given birth to the broadcasting industry; the short waves had found use. As may be imagined, the conference regulations were numerous and detailed, bearing but little resemblance to those in the former documents.

Radio services had segregated themselves into dozens of different distinct classes by this time, so the services mentioned in the list of definitions were considerably more detailed. One of the definitions was that of "private experimental stations." There were two subheads to this definition: the first explained that the definition included stations of the kind we now recognize as "experimental"; the second stated that the definition applied also to "a station used by an 'amateur.'" We had arrived. Here, for the first time, we find ourselves mentioned in an international radio document.

More than that, the radio spectrum — heretofore virtually wide open to everybody — was now split up into channels, from 10 kilocycles to 23,000

kilocycles, and the various services allotted certain specified channels or groups of channels for their use. And in this table, we amateurs were allocated the following bands: 1715–2000 kc., 3500–4000 kc., 7000–7300 kc. and 14,000–14,400 kc. Since the regular table of allocations did not go above 23,000 kc. and since we amateurs urged assignments still higher, special assignments were designated at 28–30 Mc. and 56–60 Mc. jointly for the use of the amateur and experimental services. All these bands are the same width specified as available to American amateurs in the international regulations under which we are now operating (Cairo 1938).[2]

Licenses were required of all amateur operators and it was further stipulated that each such licensee would have to demonstrate ability not only to transmit the Continental code but to receive it — "by ear." The code speed required of licensees was left to each country to determine for itself, however.

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Of course, the regulations also went into great detail on all other matters such as revision of the Q-signal list, calling procedure, rates, methods of collection, license requirements (commercial), etc., but we take it for granted that by now our readers are aware that each set of regulations in the international treaties includes these matters and we will not refer to them further. From now on we will treat only those portions of the treaties that deal with amateurs and amateur radio.

Following the Washington Conference, came a five-year interval, and then the second of the really "modern" conferences, in

1932

This was held in Madrid. Very little change was made in the previous treaty or its annexed regulations. Our amateur frequency bands were continued intact. However, we had not been satisfied in the Washington regulations with having the definition of an amateur included only as part of a definition of the "private-experimental-station" class; at Madrid, therefore, we sought to have amateurs recognized as a separate and distinct class. The effort was successful and at Madrid, for the first time in an international treaty, we see the amateur service recognized strictly as such.

The next international meeting, which produced the regulations under which we are now operating — and which will be revised at Atlantic City beginning May 15th — was in

1938

The location was Cairo, Egypt. By now, the increasing pressure on the high-frequency spectrum brought about by expansion of existing services and the introduction of new ones was creating serious problems in the allocations table. The spectrum between 3 and 25 Mc., once thought to be of virtually limitless extent, was full to overflowing — with more customers clamoring for admission every day. As might be expected, those countries having little interest in amateur radio regarded our amateur bands as legitimate areas for the spotting in of some of the overflow, and the aggregate initial proposals of the other countries (particularly those in Europe) for a revised allocation table cut heavily into all our bands. Only the unswerving stand of the U. S. delegation in our behalf, supported by our neighbors and sister republics in the Americas, saved all our previous bands for amateurs in this region — we in North and South America emerged without the loss of a kilocycle. Elsewhere, however, amateurs did not fare so well: in the European region, the 3.5-Mc. band was severed, and amateurs permitted only in the portions 3500–3635 kc. and 3685–3950 kc.; outside the American continents, too, amateurs no longer enjoyed exclusive rights to the entire 7-Mc. band, and both amateurs and broadcasting could be permitted to use the territory between 7200–7300 kc.; in Europe, the 5-meter band was reduced, at least in practical effect, to less than half its original width of 4 Mc.

Aside from these allocations matters, there were few other developments of even passing interest to amateurs, and all the other strictly amateur provisions were continued without change.

National Regulation

We have now shown, very briefly, what has happened from the early days up to the present time in terms of *international* regulation. During all this time, however, we were confronted with changing laws and regulations on amateur radio here in the United States under the terms of the United States laws, so let us go back now, see what those laws were and what kind of *domestic* treatment we got under them.

The outstanding thing about early radio law in this country is that it was an awfully long time before we got the first one!

There was no United States radio law in 1903 at the time of the first Berlin international conference already mentioned, nor was there one in 1906, at the time of the second Berlin affair. It might be thought that this country was obligated to have some sort of national law or regulations after the 1906 conference, in order to carry out the agreements made there to which the U. S. had been a party. The reason there wasn't is that, although we had *signed* the treaty, we didn't *ratify* it until six years later; there had been quite a lot of squabbling and disagreement about that treaty, anyway.

So we see the years dragging on through 1906, '07, '08, '09 — and still no U. S. law on radio. This doesn't mean that no law was needed; indeed, by the latter part of this period "wireless" was assuming considerable proportions in the daily life of the world. But with no laws here all stations, whether amateur, government or commercial, could operate with whatever call, wavelength and power they wished, subject to no regulations whatsoever — and that is precisely what they all did!

In 1910 a very brief law was passed requiring ships of a certain size to carry radio equipment, but it said nothing more than that and has no real bearing in the present discussion. The act was subsequently modified slightly by another similar act in 1912 but that, also, is of no concern to us.

Nevertheless, the year 1912 is highly significant from our standpoint, for in that year three things happened: first, our Senate finally ratified the 1906 Berlin agreement; second, we participated in the 1912 London Radio Conference and signed the resulting treaty (it was promptly ratified early in 1913); third, the United States wrote its very first radio legislation. This was the so-called 1912 Law, under which we were to operate for the next fifteen years.

Now, we want to direct particular attention to this law because this is the one of which it has been said that it granted amateurs all the territory from 200 meters down, for their own exclusive use. Did it? Let us examine that law and see.

To begin with general considerations, it may be said that the law required that henceforth all transmitting stations in the United States must be licensed. Authority to issue licenses was delegated to the Secretary of Commerce and Labor. There were sections calling for the use of a pure and a sharp wave, etc., one requiring listeners to observe the secrecy of messages, provision for punishment of violation of the regulations or the transmission of false distress calls. No individual services were defined except our old familiar stand-bys from international treaties, the coastal stations and ship stations.

This is all fine, but what about wavelength assignments, and particularly that part of the law giving amateurs 200 meters and down? All right, here goes for the wavelength assignments: the 300-meter wavelength was specified for general public-service work, per the international agreements of 1906 and 1912. Furthermore, with one exception, all stations were authorized to use any wavelength they chose, provided they stayed below 600 or above 1600 meters — this again being simply a duplication of the international specification of the time. Now, some readers have by this time noticed that phrase "with one exception." Yes, that exception is the one about which there has been so much controversy; that exception is the one that is supposed to have given hams everything from 200 meters down. To end the suspense, we will quote that article, in full. Here it is:

General Restrictions on Private Stations.

Fifteenth. No private or commercial station not engaged in the transaction of *bona fide* commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wavelength exceeding two hundred meters, or a transformer input exceeding one kilowatt, except by special authority of the Secretary of Commerce and Labor contained in the license of the station: *Provided:* That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of the requirements of the third [3] and fourth [4] regulations to the penalties of one hundred dollars or twenty-five dollars, respectively, provided in this section, unless the person maintaining or operating such station shall have been notified in writing that the said transmitter has been found, upon tests conducted by the Government, to be so adjusted as to violate the third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

[Following this was regulation No. 16, stating that any station of the above class within 5 nautical miles of a naval or military station had to keep under 200 meters and under *one-half* kilowatt in power.]

It may be added, that's all that was said on the subject, in the 1912 law.

Now, did this grant amateurs the exclusive use of the territory below two hundred meters? Alas, it did not! To begin with, this was not a grant of privilege to certain classes of stations; it was, instead, a restriction. Unless certain stations were engaged in transacting business, or developing apparatus in that connection, they couldn't go above 200 meters.

Were amateurs the only ones so restricted? Not at all; as a matter of fact, amateurs are not even mentioned. Read the start of the quoted section; it will be seen that the restriction applies equally to private and commercial stations. If this section can be interpreted as granting amateurs "200 meters and down," it also grants certain classes of commercial station precisely the same privilege. However, it is important to note about this time that "private station" and "amateur station" are not the same. As we have already pointed out, the section doesn't mention amateurs as such. To be sure, amateurs at that time were classified as "private stations" — but so were a number of other classes! School and training stations were "private stations." So were many of what we now think of as "experimental" stations. Stations set up by a firm to enable it to conduct its own business between its various branches were private stations. About this time, it becomes apparent that between the broad interpretation of "private station" and the inclusion of that "or commercial" the Fifteenth regulation was meant to apply to virtually every station, unless it was conducting commercial business (or developing apparatus in that connection). Correct! It was!

Nor is that all; we point again to the fact that the section says only that the specified types of station cannot go above 200 meters (or over 1 kw.) without special authority. Well, how about the regular commercial stations that were allowed to operate above 200 meters; could they also go below 200 if they wished? The answer is that they could. The authority is contained in the second regulation, which we quote:

Second. In addition to the normal sending wavelengths, all stations, except as provided hereinafter in these regulations, may use other sending wavelengths: *Provided* that they do not exceed 600 meters or that they do exceed 1600 meters . . . [there then follows some dope on use of pure and sharp wave].

The only "except as provided hereinafter" contained in the law was the Fifteenth section already quoted.

Let this, then, be said: the 1912 law, to the extent that it gave amateurs the territory from 200 meters down, assigned precisely the same

[3] The third regulation required the use of a "pure wave."
[4] The fourth regulation required the use of a "sharp wave."

privileges, by law, to every other class of station in the country.

Except for a period during World War I, when all radio stations were closed down, this is the law which we operated under for fifteen years. Incidentally, since another part of this law stated that stations should specify their operating wavelengths in their applications, practically all amateurs gave "200 meters" as their operating wavelength, and then tried to edge up higher than that if they could get away with it! As a matter of interest, no amateur license issued in the United States ever stated that the licensee was entitled to use all the territory from 200 meters down.

Although not affecting any very large group of amateurs, special arrangements were effected during this time between the ARRL and the Department of Commerce whereby certain "above-200" wavelengths were made available to outstanding relay stations.

We have said that the 1912 law was the only one we had until the Communications Act of 1927 was passed. Now, it is apparent that nothing in the 1912 law creates special bands for the various services (we have quoted all the 1912 law which applied to wavelength grants or limitations), yet it is a fact that, three years before the 1927 international conference, amateurs in the U. S. were operating in specific bands of frequencies in the short-wave spectrum.

How come?

All right — brace yourself, for we suspect this will be news to many — those bands were not assigned under law, they had no legal standing, and we had them solely on the basis of temporary and informal agreement with the other radio services of the United States.

Here's the story:

Following the 1912 law, nothing much happened to disturb the tranquillity of two-hundred-meter operation until around 1923, when a small group of amateurs (and commercials, too, if we are to be truthful) began going to the wavelengths well below two hundred, to see if they were feasible for communicating purposes. As we now know, they most certainly were, but it took a transatlantic QSO [5], to make the average ham believe it, at that time. An interesting sidelight here is that since all amateur stations at that time were required to specify their operating wavelengths, and since these were invariably of the order of 150, 175 or 200 meters, it was necessary for the first short-wavers to get special permission to operate on such wavelengths as 100, 90 and 60 meters — these not having been specified in the licenses!

At any rate, when the short waves began to demonstrate their worth around 1924, everybody in creation made a headlong rush for them. Remember: under the ancient 1912 law, still in effect at that time, every single service in the United States had equal rights with everyone else for the use of the short waves!

Now, keep a firm grip on everything up to this point while we backtrack a couple of years to 1922 to pick up some dope that is going to constitute part of our 1924 picture, when we finally unveil it.

Around 1922 it was apparent to the then Secretary of Commerce (Hoover), who was charged under the 1912 law with the duty of administering radio, that the law was hopelessly inadequate for existing conditions. A new law was badly needed, but Congress, with the same slowness which characterized its belated enactment of the original law, simply couldn't seem to get around to making one. So Secretary Hoover called the first of what came to be known as the "Hoover Conferences" at Washington, participated in by representatives of all the radio interests in the country, to see if some mutual agreements couldn't be worked out and some recommendations for the legislators evolved.

The first of these advisory conferences, in 1922, didn't do very much so far as we are concerned, except that it recommended enactment of proper legislation to deal with radio, suggested certain amateur frequencies (of no interest to us, at the moment, since they were around 200 meters), suggested a definition for amateurs (the 1912 law had no such definition), and recommended that amateur status be defined by law and amateur wavelength assignments ditto. Another recommendation was for the creation of amateur deputy inspectors, possibly at a dollar a year, to help out in amateur regulation! Unfortunately, although a number of radio bills were subsequently introduced in Congress, nothing was actually done in the way of legislation to carry out any of these recommendations. Perhaps it was for this reason that the recommendations of the succeeding Hoover conferences actually became regulations by reason of their adoption as such by the Department of Commerce — not with authority of law, however, but purely on the basis of mutual agreement among services. This curious regulatory status lasted until the "blowup" of 1926, of which we shall speak shortly.

The second conference took place in 1923; the short waves had not yet opened up, and the conference recommendations for amateurs were all in the vicinity of 150-200 meters. Amateur radio would have kicked like the dickens if they had been anything else.

The third conference was in 1924; between it and the second the short-wave business had split radio wide open! The 1924 conference was tremendously important, therefore.[6] However, bear in mind that nothing any of these Hoover conferences did had any actual legal status. The recommendations were nothing more than recommendations; such agreements as were reached were on the basis of mutual understandings between services, temporarily (and illegally) incorporated into the regulations by mutual consent and thereafter observed by all until a new law came along. Actually, by this time everyone in radio realized that the wording of the 1912 law was such that the Secretary of Commerce had been given no authority whatsoever to enforce any wavelength assignments other than those set forth in the law

(*Continued*

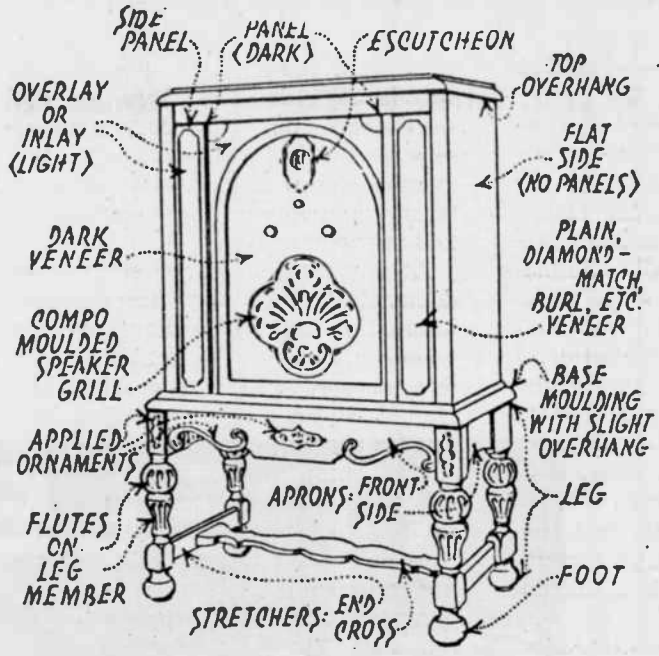
[5] 1MO-XAM (U. S.) with 8AB (France), Nov. 27, 1923.

[6] Since the short waves "broke" several months before the conference, the ARRL had negotiated several special low-wave bands for amateurs, pending the decisions of the conference. The resulting conference agreements were considerable expansions over the space made available by these temporary assignments.

QST for April 1947

Cabinet Materials *Construction*

By H. L. PARKER



The Parts of a Radio Cabinet

EVERY radio salesman should know something about the various kinds of woods, their finishes, and the methods of construction used in the furniture which houses the radio chassis. While this information is often essential in closing the sale of any receiver, it becomes doubly so if the furniture is to conform to a certain period.

Walnut is used in perhaps nine-tenths of the cabinets now being made. It has a fine grain and takes a high polish. Its uniform grayish-brown shade, with black streaks running in all directions, can be easily matched in "occasional" pieces for the home. Its chief drawback is its susceptibility to injury from rough handling. As ordinarily used as a veneer for exposed surfaces it may be more expensive than mahogany.

The popularity of mahogany is due to its beautiful grain and its ability to take a high polish easily. It can be shaded from a deep red to dark brown, is not likely to shrink, is easy to work, and holds glue better than any other wood. Less expensive and less desirable woods, like beech, cherry and birch, can be stained to imitate it.

Maple, birch, oak and gum are used for sides and sometimes tops and fronts of medium and low-priced cabinets. Some of these woods are used for legs and stretchers in quite high-priced cabinets. As shelves for chassis, separators of speaker compartments, reinforcing, etc., pine and gum are satisfactory in any priced cabinets. Redwood is particularly desirable for such use because it is "dead."

The use of metal cabinets will probably not become extensive until an acceptable finish is discovered. Some attempt has been made to imitate wood finishes on sheet metal, but this has not yet appeared in a form that is accepted by many women for use in homes. For a time, table model receivers in metal cabinets sold extensively, but novelty metal finishes were employed rather than any attempt to imitate wood.

Veneers

MANY people still have a lurking suspicion that veneered woodwork is somewhat of a sham. This is probably due in part to its more general meaning "to gloss over, thinly, superficially," and also that veneer formerly had a tendency to peel off. If the ancient cabinet makers had possessed the modern veneering machines and understood the chemistry of glue as it is now known, veneers would have been more generally used.

Most wood has a tendency to warp or shrink. A laminated or plywood board is built up of three or more layers of equal thickness, with the grain of adjacent layers laid at right angles to each other. (Fig. 1.) When the surfaces

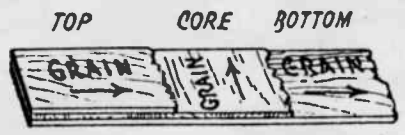


Fig. 1. Construction of Three-Ply Board

are carefully prepared and properly glued together with good glue at the right temperature, a board is secured which is more expensive and better in many respects for cabinet work than a solid board of equal thickness because it will not shrink, warp, crack, or split as easily as the solid board.

Cabinet plywoods are generally three-ply or five-ply, ranging in overall thickness from ¼ to ¾ in., in which each ply, or layer, varies from 1/16 to ¼ in. All woods vary in density, hardness and appearance of grain, and therefore vary greatly with respect to their susceptibility to various stains, varnishes and lacquers, and methods of applying these finishes. In plywood, the outer layers, or at least one outer layer, is some wood which has a more beautiful appearance or finishes more easily, while the core of inner layers is often of a different wood, probably less expensive or more abundant, but which has equal or greater strength than the outer layers. To insure against warping or shrinking, better veneering boards use a "dead" wood for cores.

Veneered wood is plywood in which the outside plys are thin sheets varying from 1/30 to 1/16 in. in thickness of some rare and beautiful wood. The most beautiful woods are too small and too rare to cut into thick boards. These perfect, attractive, but small pieces are sliced into thin sheets, each slice numbered as it is cut so that grain appearance will be uniform when several of the small, adjacent, numbered slices are glued on to a wide surface of some less expensive wood core. Some of the most beautiful veneered woods are the mottled, variegated shaded "burls" which are sliced from knots in a tree. For more decorative panels, rare woods (for veneers), such as rosewood, Italian olive, satinwood, African cherry, French walnut, sandalwood, ebony, etc., are imported; and native woods like birdeye maple, pear, mulberry, etc., are used. Some of the small pieces of these imported rare woods are more expensive than hand-carved ornaments of native woods.

THE art of decorating flat surfaces by cutting away parts of the solid wood of the ground board and inserting pieces of different colored woods, or pieces of ivory, pearl, tortoise shell, etc., is called "inlay." Both the cost of the actual operations plus the artistry required for "inlay," which keeps the whole surface flat and smooth, is more expensive than for "overlay" which easily describes the placing of pieces of odd colors of wood over a flat surface. Marquetry differs from inlay and overlay, in that an added design is partly set into the flat surface and partly raised above the flat surface.

"Compo"ornaments, in which 90 per cent of the material is ground wood, are today available in beautiful designs. Their component parts are stronger and less likely to break than real wood carvings. Compo ornaments made of material other than ground wood are questionable, because they are likely to chip off easily.

Because of additional labor costs and superiority, plywood should be more expensive than solid boards; and in the case of veneered boards, the still greater cost of securing and preparing beautiful specimens is warranted, because without the use of veneers it would not be possible to have the beautiful cabinet work available today. When a cabinet is described as "solid mahogany" or "solid walnut," it is quite apt to be less desirable in strength and durability than a plywood cabinet with veneers of these woods used for outside surfaces.

Therefore, today, to say that a cabinet is veneered is more apt to be a mark of distinction and superiority than a sign of inferiority.

Constructional Details

THE purchaser of furniture is at the mercy of the manufacturer to a greater extent than in any other type of commodity sold through retail trades. Outward appearance can sometimes be misleading even to experienced furniture buyers; therefore the latter lean heavily upon the trade reputation and general integrity of manufacturers.

There are many grades of furniture, and the output of different factories is definitely classed as low-priced, medium-priced and high-priced furniture, because, as a policy, certain factories cater definitely to only one of these classes. Their factory equipment, class of workmen, factory methods, etc., are deliberately planned to meet the standards for a certain grade of furniture, and the reputable factories make no false claim as to the grades they produce. As in almost any line of business, there are unscrupulous manufacturers who take advantage of the inability of the purchaser to easily identify quality of wood, construction details normally concealed in completed pieces, and especially in the matter of [illegible], wherein the purchaser is almost [illegible] solly dependent upon the word of the maker.

If good materials are used, corners well reinforced, joints well made and properly glued, it can be more easily sold even though its style may not be right up to the moment. But if it is poorly constructed, poorly finished, in addition to being off style, it is apt to stay on the dealer's floor for some time, or to revert to him after it is sold. When sold on long-time payments, it should stand up at least until the dealer collects his last installment.

When properly made, even a square, plain-glued joint will be stronger than the board itself, without using tongue and groove or dowel pins. Glue, for instance, should be kept at a uniform temperature by use of thermostatically controlled heat. If allowed to reach—say 150 degrees temperature, its life will be lost; but unless the workmen are properly supervised, they can easily let out hundreds of pieces that will later cause the retailer much grief.

Dovetailed corners are seldom used nowadays, except for drawers. Cheap furniture from a poorly equipped factory may have butt or rabbeted corners; but a mitred corner joint is preferred because the end grain cannot be seen at outside corners. All of these should be reinforced.

Cross members should always be joined to uprights by a mortise and tenon. Shelves for support of chassis, power packs and speaker units should be of thick wood, not less than ¾ in., preferably a dead wood that will not warp and throw the chassis out of line with the control knobs and escutcheon plates on the outside front, or twist the frame to an extent that will put ganged condensers out of trim. About the only place a nail is ever used in a good cabinet is to temporarily hold shelf cleats in place until the glue sets to hold them securely. Screws and dowel pins only are used by good factories wherever joints require anything other than glue.

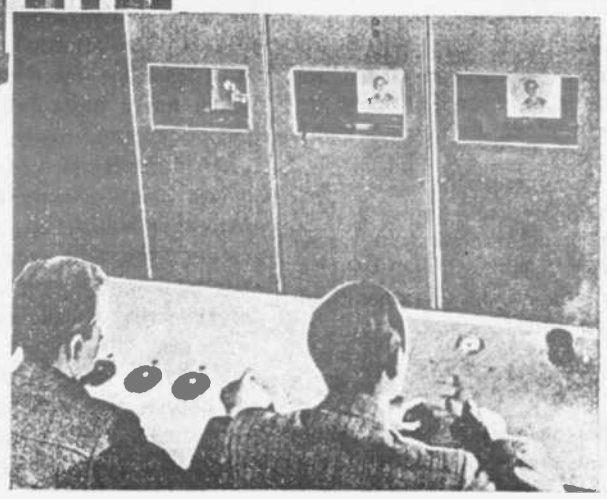
A two-part cabinet body, illustrated in Fig. 2a should have as the bottom part a separately constructed framed member which is securely screwed to the top section. This type of construction will be from 15 to 20 per cent

(Continued on page 8)

1937 TELEVISION

THESE INFORMATIVE ILLUSTRATIONS AND TEXT ARE REPRINTED FROM A DECEMBER 1937 EDITION OF POPULAR MECHANICS.

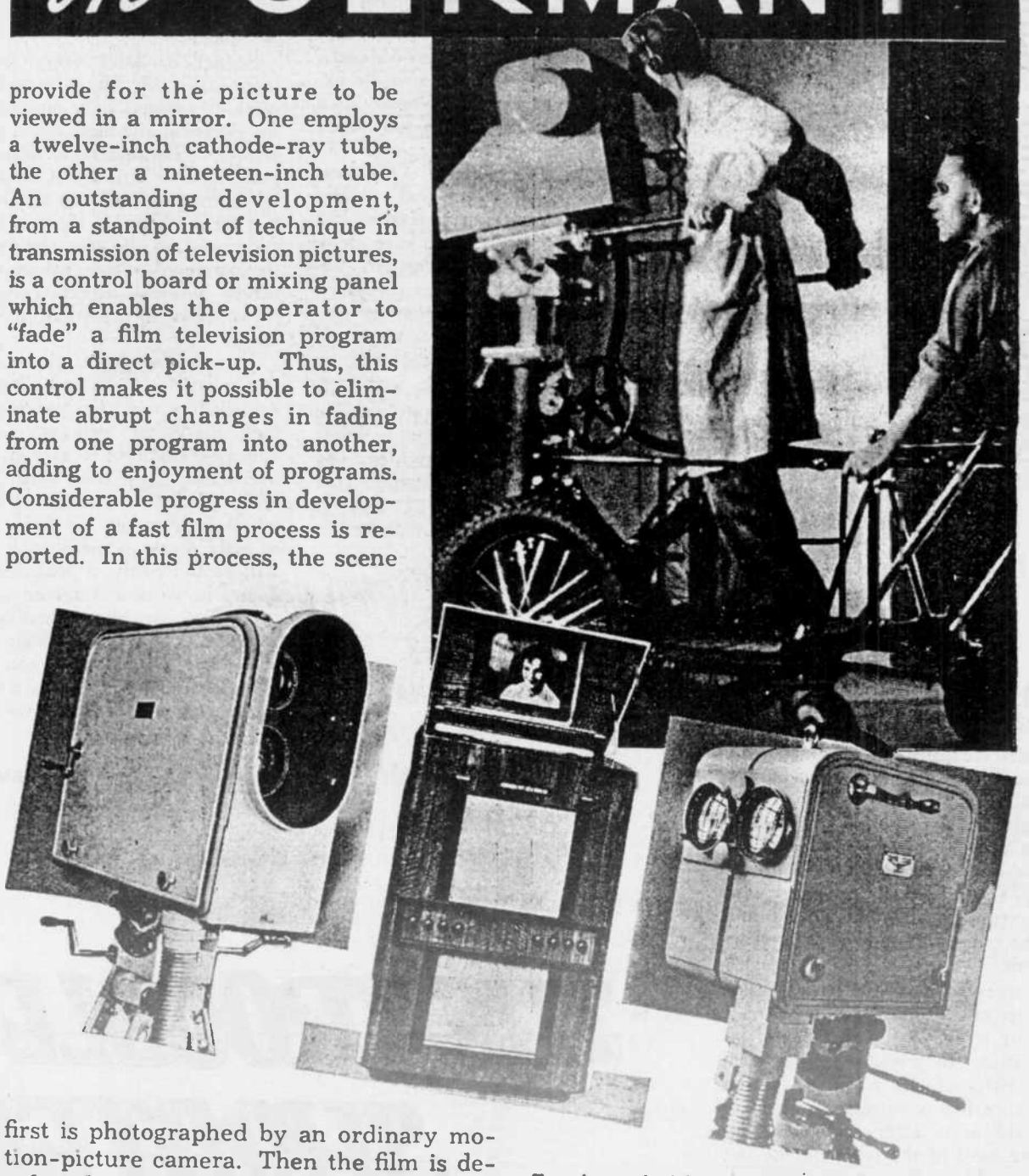
PRACTICAL television receivers for the home are ready for Germany's radio fans as the result of extensive experiment with various types of apparatus necessary for transmission and reception. Latest developments include the announcement of a combination of television, radio and phonographic reproduction in a single cabinet. The radio is an all-wave receiver of the superheterodyne type. Another cabinet is a projection-type television receiver, which uses a very small cathode-ray tube and three mirrors and lenses to project a picture approximately thirteen by eighteen inches upon a ground-glass screen. One model has a screen which folds down. A third development is a projection-type receiver which reproduces on the screen a picture about thirty-nine by forty-seven inches. Two other sizes of home receivers



Top, preparing to shoot a scene for television. Center, photo and diagram of home receiver. Bottom, regulating the quality of television in broadcasting station by means of monitor panels

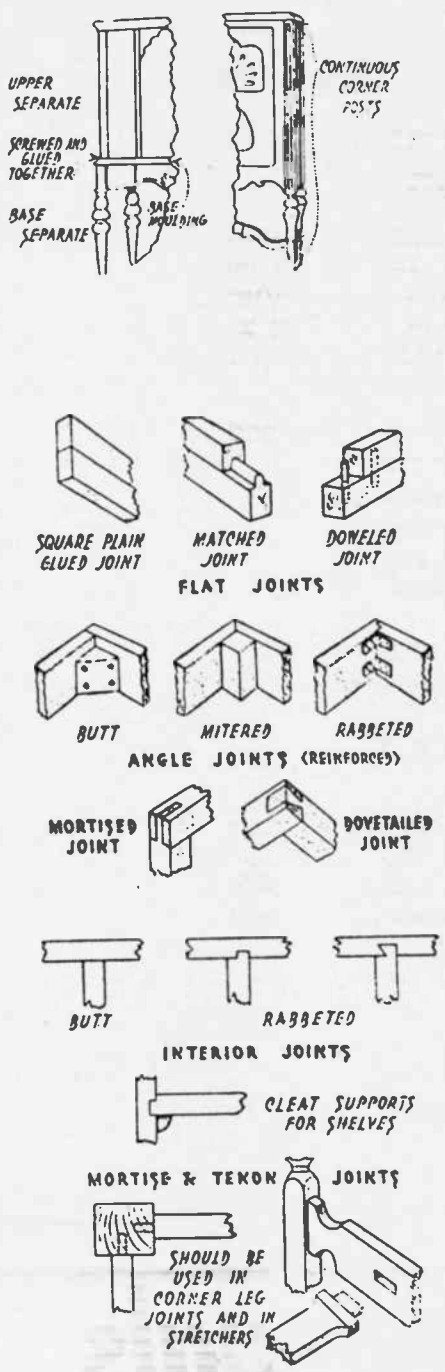
in GERMANY

provide for the picture to be viewed in a mirror. One employs a twelve-inch cathode-ray tube, the other a nineteen-inch tube. An outstanding development, from a standpoint of technique in transmission of television pictures, is a control board or mixing panel which enables the operator to "fade" a film television program into a direct pick-up. Thus, this control makes it possible to eliminate abrupt changes in fading from one program into another, adding to enjoyment of programs. Considerable progress in development of a fast film process is reported. In this process, the scene



Top, how television pictures are taken. Bottom, left, electron-tube camera for use in stage work. Center, receiver with nineteen-inch cathode-ray tube. Right, small, easily portable television camera for indoor and outdoor work

first is photographed by an ordinary motion-picture camera. Then the film is developed quickly and the part intended for television is taken from the film and transmitted. The process employs the high technique of modern motion-picture camera and newsreel. One German company has perfected an intermediate film apparatus which is quite compact, the whole device, including the film-developing equipment, being enclosed in a box not much larger than a standard radio receiver. New film and chemicals for speedy developing have been brought out for use with the apparatus so that the lag between time of photographing the scene and of placing the development on the television transmitter is ninety seconds.



Farious Kinds of Joints

more expensive than that shown in Fig. 2b, where the corner posts are continuous and form the main structural frame for the whole cabinet.

Doors should be hinged with invisible hinges, and be constructed so as not to mar the finish on front or sides when opened flat against those surfaces. Other things being equal, doors add to the cost of a cabinet. Other visible hardware, latches, etc., varies greatly in price. Brass or bronze is most expensive; but cast-iron, with clean, well-defined details and the outside plated finish protected or insured by a heavy under coat of copper plate, will outlast brass with a cheap plated or sprayed finish.

To a radio user, nothing can be more annoying than the howl set up by the combination of a microphonic tube and sympathetic vibration of the speaker diaphragm. A construction of the body of the cabinet which avoids thin, long members, or thin supports for speaker or chassis, lessens the opportunity for this annoyance. Cabinet resonance, especially the deep boom in the tone of many receivers, is likewise objectionable to many listeners, and is the result of cabinet-body materials and design, for which there is no excuse. The use of wood of sufficient thickness and strength application of suitable sound-absorbing overall material, the proper placing and size of openings in the back of cabinets, or some combination of these factors, can entirely eliminate this fault before the set leaves the factory.

Finish

The finish of furniture is one point upon which the dealer must rely upon the word of the manufacturer. This is a good reason for knowing something of the reputation of the furniture factory that makes the radio cabinet. On lowboy cabinets for sets listing under $125, the cost of finishing may be less than 50% in labor, and over 50% for materials. On $200 sets, labor may cost 60%, materials 40%. And on sets over $350, the labor may cost 75% to 85% of the total factory cost of finishing, and materials from 25% to 15%. The trade standards are enameled, varnished, lacquered and waxed. The three last may have the final coat applied so that the result is either high polished or plain.

Good finishing must start with a smooth surface. Then a "filler" applied to fill up the tiny holes; then stain, separately or mixed with the filler where color is desired; then varnish lacquer or wax, as the case may be. To better appreciate the fact that labor is such an important part of good finish and therefore susceptible of cheating, the method employed by a firm noted for the excellence of its finishes on polished surfaces is summarized by the finishing foreman as follows:

"In order to secure a good piece of work, it is absolutely necessary that the woodwork be made perfectly smooth with fine sandpaper before starting. Then: (1) fill with best grade of filler; (2) if color is required, color with filler or with stain after filler is applied; (3) apply a thin coat of best shellac. After dry and hard, smooth with fine sandpaper; (4) apply three coats of best varnish, allowing each coat to dry for at least two days; (5) when dry, rub down each coat of varnish until very smooth surface is obtained, with pumice stone and felt, allowing one more day to dry after each rubdown; (6) final rubdown with a roller stone, and for extra fine finish rub only with palm of hand; (7) clean entire surface with equal mixture of raw linseed oil and turpentine, then rub down with clean cheesecloth."

The process is approximately the same for enamel and lacquer, as for varnish. In inferior work, saving in labor starts with omitting to work the filler well into the pores of the wood, or in not rubbing superfluous varnish (or lacquer or enamel) away after each coat, but in putting most of the labor on the last coat only. These finishes may look attractive when new, but shortly scratches will show up, the surface chip easily, and after the top coat is worn through in spots the whole area peels or changes in color or otherwise shows up the attempts to save in its costs.

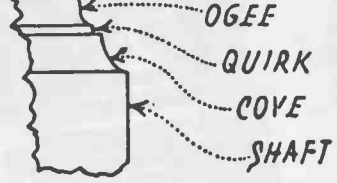
About the only saving that modern methods have to cut the cost of really good finishing is in the use of spraying equipment instead of hand brushes. While spraying varnish, lacquer or enamel reduces labor costs, it is really more efficient because a more uniform thickness of each coat can be applied, therefore requiring less labor for rubbing down. For any of these finishes, each coat adds from 15% to 20% to the actual factory cost for finishing.

Enamel is paint in which varnish replaces linseed oil, or is oil-paint with varnish added. The pigment is a part of the mixture. A real enamel surface can be built up, layer after layer as described for fine varnishing, which is beautiful, smooth, easily cleaned, neutral and permanent.

Wax finishes are secured with various waxes in place of varnish or lacquer in the last one or two coats applied. It can be highly polished or left dull, as desired.

Only when honestly and properly done, can varnished finishes be considered today as desirable from a trade standpoint as modern lacquer finishes. Layer for layer, lacquer is more durable than varnish, and will not check nearly as quickly as varnish, especially if the latter is of poor grade, or poorly applied. On very cheap radio cabinets, two coats of lacquer, only, may be expected; three coats a fair average on a little better grade of goods; four coats on medium-priced furniture; and six coats on high-grade cabinets. Of course there still exists the chance that rubbing labor will be skimped between coats, but as lacquer can be well taken care of by fine sandpapering between coats, and because it dries very quickly as compared with varnish, one is more apt to get. these days, a more durable lacquer job than a varnish job on radio cabinets.

A checked varnish surface is difficult to repair; the most expert finishers are lucky to get satisfactory results in about three out of five such jobs tackled. On higher class work, the last lacquer coat will be carefully hand-rubbed; and on cheaper work the rubbing will be replaced by a finish coat of "flat" lacquer, which is lacquer with a pigment added to kill the high gloss and give a rubbed-effect. It surely is all up to the factory. The average radio dealer can only hope for the best where so many radio cabinets are made in wood working factories under contract with the radio receiving set manufacturer.



Descriptive Trade Terms

Packing marks, paper marks, hot-dish spots, heavy lamps, vases, etc., can cause any dealer a lot of grief, even when the customer is honest and admits cause of the fault. The better the original finish, the better are the chances of repairing such blemishes. Dented wood and scratches can be filled with melted stick-wax and colored to match the original finish; then rubbed and treated by various means.

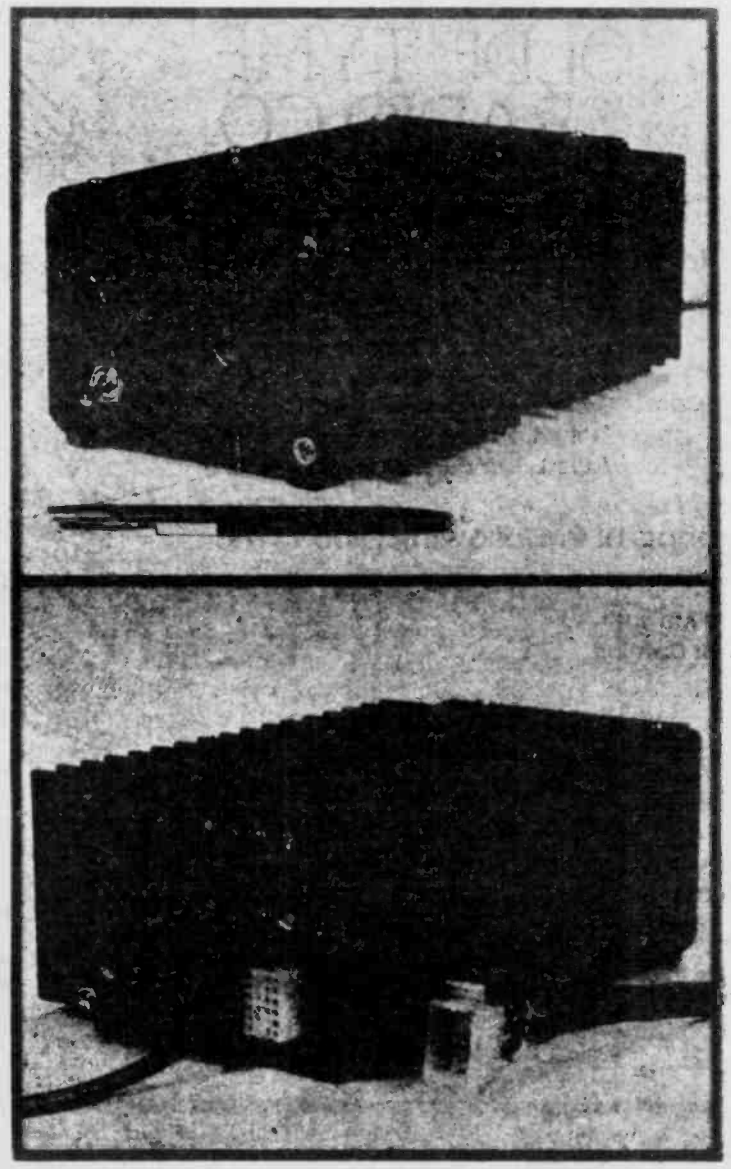
Sooner or later every dealer must learn as much about servicing woodwork on cabinets as he now knows about the electrical and mechanical parts of the receiver. Because radio dealers in general know so little about woodwork and wood finishes, there is always more or less feeling between them and their factory suppliers, because the radio dealer, inexperienced in the customs of the furniture business, expects every piece of merchandise to reach him in perfect condition.

Experienced furniture dealers know just what to expect, and all of them are equipped to touch up packing and shipping marks as well as more serious damages, counting it as a part of their overhead. Most good furniture dealers will also alter the shade of finish on a whole bedrom set, or dining room set, to make a sale. Sometimes, if refinishing will be too costly, a price is quoted for doing the work and agreed upon by the purchaser. A radio cabinet can often be refinished, at least in shade, at a cost of $5 or $10, which can either be absorbed by the dealer in a high-priced set, or charged for on a lower list priced set.

RADIO FOR NOVEMBER, 1930

THE TROUBLE SHOOTER

26-42. Repair of Leather Suspension Ring.—In most dynamic speakers, the outside edge of the cone is cemented to a flexible chamois, leather, or cloth suspension ring for support. This is in turn clamped to the frame of the speaker. If leather is used, it has a tendency to dry out and harden in time. This results either in a "fuzzy" sort of sound similar to paper rattle, or, poor low-frequency reproduction results. Often, it dries out and hardens unevenly at certain spots, resulting in poor reproduction. It is often possible to soften a stiff leather cone-edge by carefully applying and rubbing in a small quantity of mineral oil or a good leather dressing such as Neatsfoot oil. When this does not soften it sufficiently, or when the leather or cloth ring is worn or cracked, the entire cone and voice-coil assembly should be replaced.



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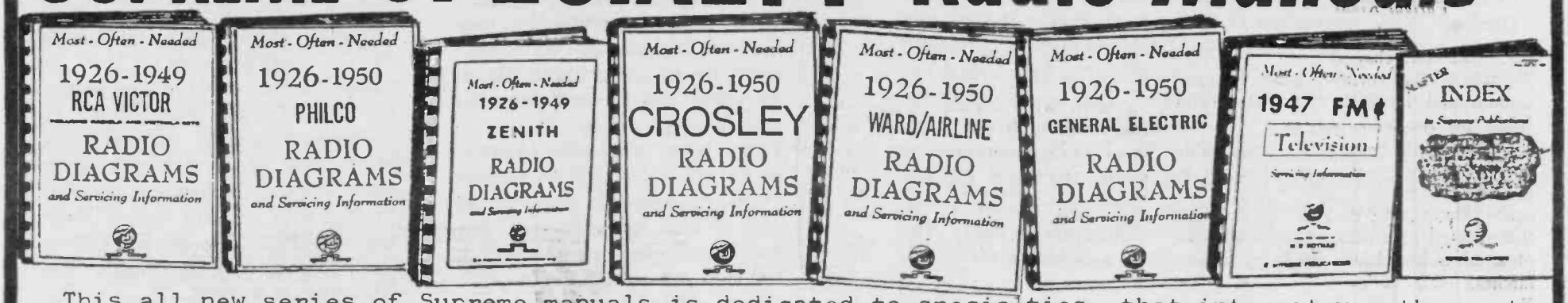

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In the event that the leather or cloth ring loses its "body" and becomes flabby, insufficient support is given to the cone and it may work out of alignment, and cause rattling. In this case, the entire assembly should be replaced.

The ring which clamps the leather cone edge to the frame of the speaker should always be screwed down tightly, for, if it loosens, rattling will result. It is often necessary to insert paper or cardboard ring washers between here in order to prevent rattling.

26-43. Removing Iron and Dust Particles from Air Gap. —The presence of small iron and dust particles in the gap between the voice-coil form and the central pole-piece frequently causes "raspy" and "rattly" reproduction. In some cases, this may be eliminated by placing the speaker in an inverted position and gently moving the cone backward and forward, so that these particles may fall out. Usually, however, it will be necessary to dismantle the speaker and wipe the voice coil and pole piece clean with a wad of soft cloth. Speakers of recent manufacture are constructed with the air gap entirely enclosed so that iron particles and other foreign matter cannot enter it.

26-44. Repair of Permanent-Magnet Type Dynamic Speakers.—While most dynamic speakers employ an electromagnet for supplying the field magnetism, this type of speaker is also constructed with a permanent magnet field—the usual movable voice coil, spider and cone construction being retained. All of the troubles, and their remedies, which have already been described for the voice coils, spiders and cones of electromagnet type dynamic speakers hold for these units also. The only trouble experienced with the permanent magnets is that of loss of magnetic strength. These may be remagnetized (see Art. 26-18) by the service man, but it is preferable to have them remagnetized strongly by an automobile ignition repair shop which possesses a large electromagnet for remagnetizing the magnets of magnetos.

26-45. Repair of Condenser-Type Loud Speakers.—Another form of loud speaker which was employed in at least one make of receiver in the United States several years ago (the Peerless receivers which were made by the United Reproducers Corp.) is the *electrostatic* or *condenser* type speaker (for details of its construction and operation see Ghirardi's *Radio Physics Course*). The construction of this type of speaker is extremely simple. Each section consists of a stationary plate of perforated metal and a movable plate consisting of a thin tinfoil sheet approximately 0.0001 inch thick. Between these, and stuck to the movable tinfoil sheet, is a thin insulating sheet of rubber compound which acts as the dielectric. The movable plate acts as the diaphragm, vibrating in accordance with the signal and imparting its motion directly to the air, resulting in sound waves. A high d-c polarizing voltage (about 500 volts) is used. The complete speaker is made up of several 8 x 12-inch units of this type.

The main trouble which occurs in this type of speaker is that of deterioration of the rubber dielectric, followed by its breakdown due to the high polarizing voltage which must be applied across it. When the dielectric becomes punctured, it should be replaced, but replacement of this dielectric is extremely difficult and not lasting. In fact, so far as the author is aware, it is no longer possible to secure this material. Perhaps the most practical thing to do if called upon to service a speaker of this type in a Peerless receiver is to replace it with a dynamic speaker. A speaker having a push-pull output transformer designed to work out of push-pull '45 tubes should be employed. Its field resistance should be approximately 500 ohms. The connections in the receiver should be changed so that the plates of the '45 output tubes go direct to the two outside ends of the speaker output transformer primary. Connect its center-tap to the *B* plus lead. Remove the choke in the output of the filter circuit and connect the 500-ohm field coil of the dynamic speaker in its place. Remove all the apparatus which was employed for securing the d-c polarizing voltage for the condenser speaker. The receiver is now ready for operation with its new dynamic speaker.

the Dial

Remember, prior to 1912 there were no government regulations of any kind. It is interesting to see how we evolved to present situations of regulations and divisions of places on the dial. When you read the article from the QST source, you will notice how who gets what on the dial.

CABINET DESIGN AND CONSTRUCTION

Veteran collectors know that the quality ranges of old sets can be judged with competence not only by a knowledge of electronics, but also by knowing what houses the real essence of the radio. In the accompanying article in this issue of THE HORN SPEAKER trade terms are illustrated in addition to a discussion of different woods. Even the importance of cabinet resonance is explained. Interestingly, the article writes that as the cost of a set rises, the relationship of cost of labor rises in a higher percentage, compared to a rise in material costs.

FINDING SETS

Establishing a good reputation with people who search for saleable merchandise is an advantage used by the most successful collectors. Dealers or traders from whom you buy must be trained or informed on what you want and what you will pay, so that they will always be looking for sets that you like. Importantly, they must not pay too much for a set, which raises the price of old sets in general buying conditions, but can cause despair by your finder being stuck with something he can not sell. Easy to see how if you can keep him happy the more sets he will locate for you. Many a collection has grown rapidly by how well the collector can get others working for him or her.

COMING ISSUES

We are still looking for the good pictures of Michael Payne's winning sets. A lot of information has been gathered for a future discussion of how R.C.A. maintained its lion's share of the superhetrodyne sales to the American home.

Social Events

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THE ANTIQUE RADIO CLUB OF ILLINOIS, one of the clubs that conducts large meets of national prominence in the Chicago area. For more information contact: Joe Willis, P. O. 14732, Chicago, Il 60614.

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HOUSTON VINTAGE RADIO ASSOCIATION, 6110 PECAN LANE, KATY, TEXAS 77449.

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NORTHWEST VINTAGE RADIO SOCIETY — Annual dues $12.50. monthly newsletter, THE CALL LETTER. Write: Ed Charman, Northwest Vintage Radio Society, P. O. box 02379, Portland, OR 97202.

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ARIZONA ANTIQUE RADIO CLUB, a lately formed club that publishes RADIO NEWS, a quarterly bulletin with informative articles and ads. Annual dues are: $10.00 for a year. Write: Lee Sharpe, treasurer, Arizona Antique Radio Club, 2224 W. Desert Cove #205, Phoenix, AZ 85029.

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CALIFORNIA HISTORICAL RADIO SOCIETY is a popular group that publishes a journal six times a year and provides swap meets four times a year for its members. CHRS, P. O. Box 1147, Mountain View, CA 94042-1147.

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VINTAGE RADIO AND PHONOGRAPH SOCIETY, an organization that is famous for its yearly conventions in the Dallas area. Also it publishes a journal approximately six times a year. Both phonograph and radio collectors are invited to join this society from all over the country. Dues are $13.50 a year. Write: Vintage Radio and Phonograph society, P. O. Box 165345, Irving, TX 75016.

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THE SOCIETY TO PRESERVE AND ENCOURAGE RADIO DRAMA VARIETY AND COMEDY, P.O. BOX 1587, HOLLYWOOD, CALIFORNIA, 90078.

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THE SEVENTH ANNUAL HVRA SHOW AND AUCTION will be on Saturday, May 3, at Memorial City Shopping Center. Mark your calendar and plan to attend, for this is truly a grand day and event. Interested? If so, contact HVRA at the address at the top of this column.

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INDIANA HISTORICAL RADIO SOCIETY AND ANTIQUE WIRELESS ASSOCIATION REGIONAL SPRING MEET - SATURDAY, APRIL 19, 1986 AT THE AUBURN-CORD- DUESENBERG MUSEUM IN

AUBURN, INDIANA — FRIDAY, APRIL 18: Early registration 4:00 p.m. "Old Tyme Movie" 7:00 p.m. —— SATURDAY, APRIL 19: Swap meet 9:00 a.m., Old equipment contest (classes to be announced) Auction of personal and donated items 1:00 p.m. Banquet and awards (best of show receives the Grebe trophy) 7:00 p.m. — All club member and guests are welcome. For complete motel and program information, write: Ross Smith, 1133 Strong Avenue, Elkhart, IN 46514.

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FOR SALE — CATHEDRAL, BATTERY, AND A. C. radio. Photo list four times per year. Send S.A.S.E. to J. Albert Warren, Box 279, Waverly, PA 18471.

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SPARTON AC62, PHILCO 95, AK 86, AK 185A, DeFOREST DT700, ROGERS MAJESTIC, BENDIX 115, AK-H HORN SPEAKER, JACKSON TUBE TESTER 648, 500 TUBES... WANT: EARLY WOOD CASED ELECTRONIC TEST EQUIPMENT, ESPECIALLY OAK CASED OSCILLOSCOPE. JOHN KENDALL, 600 REMINGTON ROAD, FALLSTON, MD 21047.

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KELLOGG 510 COMPLETE WITH KELLOGG TUBES $195.00. Deforest F5 with Deforest tubes like picture October issue of THE HORN SPEAKER $250.00. .... WANT Ozarka V16 chassis, Ray Miner, 1215 Avenue B, Fort Madison, IA 52627. (319) 372-1271.

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AK, CROSLEY, STEWART WARNER TOMBSTONES, PHILCO, JAX, GLORITONE CATHEDRALS. INTERESTING ART DECO WOOD PLASTICS. SASE for big list. Edward Ripley, 2276 Holloway Avenue, Maplewood, MN 55109.

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10 BOOKS, JOHN RIDERS — I to V - VI to XIV, 30 speaker or phone jacks for old battery radios. Russell Schoen, Route 1 Box 224, Clintonville, WI 54929.

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FOR SALE: TUBES, 1R5, 1U4, 1U5, 5AQ5, 5BE8, 5DT8, 6BC5, 6CQ8, 6EB8, 12AU6, All N.O.S. in original boxes and name brands. 10 for $15.00 p.pd. in the 48 states. No C.O.D. please. You may mix or match. Rider radio manuals vol.s 8 through 14, these are in very good condition. $10.00 each p.pd. Parts and tube list available in late February. C. F. ENGLAND, 98 Montague Avenue South, Zanesville, OH 43701.

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1 PHILCO CATHEDRAL MODEL 50, 1 Philco cathedral model 60, 1 Philco cathedral model 3784, 1 AK cathedral model 84, .. Russ Schoen, R # 1, Clintonville, WI 54929.

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HEATHKIT TEST EQUIPMENT 1940's tube type and color bar generator F.M. sweep generator, television alignment generator. .. Charles Kaelber, P. O. Box 3335, Spring Hill, FL 33526. Phone (904) 683-7202.

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RADIO SCHEMATICS $1.25, give make and model number. TV schematics, give make and model number, $3.50. Newly printed tube manuals of antique tubes containing tube specifications tube diagrams VT guide substitution guide $5.00. Books tubes and other parts. Send SASE for list. Willis Housel, 1816 S.W. 12, Lincoln, NE 68522.

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WANTED

WANTED: DYNASCAN 1000 IN STILL GOOD CONDITION. OK ON SMALLER TUBES MISSING. CONDITION ON C.R.T. IF KNOWN?. IT MAY BE REJUVINATED IF NOT COMPLETELY DONE IN, SHOULD HAVE SOME EMISSION, NO SERIOUS SCREEN DEFECTS LIKE HALOS OR SILVERING. KNOWN SUBSTITUTE?. DYNASCAN PICKUP AND RF GENERATOR USING 931-A. GOOD CONDITION PREFERABLE. OK ON MISSING TUBES SAVE PHOTOMULTIPLIER. CBS COLOUR WHEELS, COLOUR SLAVE 15"-17" GOOD CONDITION. COLOUR PHOTOS, SLIDES 16MM COLOUR MOTION PICTURES FROM STUDIO MONITOR OR OTHER. WOULD WELCOME CORRESPONDENCE FROM COLLECTORS OF CBS MATERIAL. D''ARCY BROWNRIGG, P. O. BOX 292, CHELSEA, QUEBEC, CANADA, JOX 1NO.

WANTED: ELECTRON TUBES AND EARLY audio/ stereo equipment. Ex. — Marantz, McIntosh, W.E., etc. Tubes - 50, 250, 350, 450, 45, 245, etc. — plus many W. E. types. Please contact me with anything of interest. Charles Dripps, 4331 Maxson Road, El Monte, CA 91732 (818) 444-7079.

WANTED Crystal set radios, varible condensers, coils, variometers, crystal detectors, carborundum detectors, galena crystals, cat whiskers, headphones, terminals, tap switches, headphones, circuit diagrams, pictures, books, detector holders, coil forms, etc. Starting vintage radio company to supply kits, plans, parts to interest young people in radios instead of just computers. MIDCO, 660 North Dixie Highway, Hollywood, FL 33020.

S.A.S.E. is a self addressed stamped envelope.

WANTED COAXIAL OR TRIAXIAL SPEAKERS of Jensen, Trusonic, Tannoy, Altec 604's. Western Electric equipment (tubes, amps., drivers, horns, speakers, microphones and parts). Radio tubes (50's, 211, 845, 8005) David Yo, P. O. Box 832, Monterey Park, CA 91754. Tel. (818) 576-2642.

EVERYMAN'S GUIDE TO RADIO, VOLUMES two, three and four. (copyright 1926-1927) Brian Rhodes, 90 Francis Avenue, Stanhope, NJ 07874.

NORDEN HAUCK SUPER 10 cabinet, Norden Hauck R.F. coil A-6 for super 10. Federal 61 cabinet. Philco Predicta. J. Cunningham, 675 W. Ardmore, Roselle, IL 60172.

TV'S WANTED! pre 1955, 12" or smaller round tube (pot holes), Pilots, Philcos "swivel head," magnifier color wheels, early color sets, RCA CT-100. And, of course pre war sets! Buying bakelite and plastic radios, novelty sets, rep-woods, etc. B&K TV analyst wanted. Harry Poster, Box 1883, South Hack., NJ 07606. (201) 794-9606/ 956-6680.

HALLICRAFTER SX-71 receiver, Roy Schmitt, Rt. 1, Box 800 Lot 84, Converse, TX 78109, (512) 658-2669.

CATHEDRAL RADIOS, MUST BE NICE AND WORKING CONDITION. WILL PAY TOP DOLLAR. ALSO WANT OTHER UNUSUAL AC RADIOS. HAROLD PERKINS, 4468 SUN VALLEY DRIVE, LAS VEGAS, NV 89121.

WANTED: INSTRUCTION MANUAL FOR E.I.C.O. VOLT - OHM METER - MODEL 249, SERIAL # 8141, XEROX COPY O.K. M. J. POWELL, BOX 72, HOPE, ND 58046.

WANTED. PARTS FOR GREBE CR 9. All small parts, no cabinet or panel. Walter Reichert, 217 East Lyons Street, Marissa, IL 62257.

STRONG BUYER! Wanted colored "bakelite" radios. All manufacturers, also mirrored radios! Mark Honea, 13201 N.W. 81st, Parkville, MO 64152. (816) 891-2441.

WANTED: DOES ANYONE HAVE A DeFOREST PROFESSIONAL DETECTOR BOX? NEED DIMENSIONS FOR PANEL PARTS, PLACEMENT AND LETTERING INFORMATION. ROSS SMITH, 1133 STRONG AVENUE, ELKHART, IN 46514.

February

THE HORN SPEAKER

1986

MY DIARY *Midnight*, **JAN. 16, 1923**

Love's Old Sweet Song

The fire in the grate burns low, and but for the ticking of the old clock and the occasional crackle of the embers in the fireplace, there is no sound. Even the single light on the extension cord over the receiving set, half covered by the dusty paper shade, casts a quiet glow; and the shadows, from my testing cords that hang near the wall, seem like the phantoms that pass over them.

Then of a sudden, comes that melody! No matter what the music or what the concert, or where, but that voice, coming to me through the far, cold, and silent starlit spaces of the night – well, it makes you think, that like a wonderful sunset, or a mountain view or a beautiful flower, there is something more to life than its joys and sorrows that we know, its work – and its ending.

Anyway, tonight as I pull the switches numbly, and put out the light, I know that I am glad to have a receiving set, and know a little about the stupendous possibilities of radio; and I am glad, too, that I have good apparatus – it's all Kellogg – because it helped bring that singer to me.