



RADIO BUILDER & HOBBYIST ^{No.} 37

FOR THE EXPERIMENTER

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"Nothing is a Waste of Time if You Use the Experience Wisely." - Auguste Rodin.

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EDITORIAL NOISE LEVEL.

Well, bump my Electrons and call me A. Tomic - if RB isn't out again. Business has been coming in so fast sometimes I get that funny feeling! Maybe it's from Mabel's upside-down-cakes, and me having to stand on my big head to eat 'em! Yerp - we got to working on RB & H a dozen times - only to land back on the bench, or in a maze of correspondence on my desk. But, we love it! Keep them coming. Mabel had to clear out for a few days to Los Angeles - but she found more smog there than here - so she came back.

Well, we spend more time with our biz than our new apartment house - so there can't be any drag there.

However, we have accomplished quite a bit since the last RB & H. Our HB-3 "Crystal Detectors" Handbook has been finished and hundreds mailed out. We have made up 2 CAT. sheets, and some new letterheads. Have done some experimenting on coils, as per our article this issue. Orders for parts and literature have been filled as promptly as possible.

We keep aiming at 4 RB's per yr. so we always have something to shoot at.

We are forever grateful for the articles, results of experiments, etc. sent in by Readers. We are only sorry we can't put them all in. Amorose suggests our making up an extra large issue, to sell for 50¢ - of just articles sent in. It sounds easy - but we're lucky to get an RB & H out this big. Hi.

Mabel has been circulating a lot of Old Timers - and bringing a lot of them back to MRL, with big orders. Fellows - you can't stay away from Radio forever - after the Electron Bug has bitten. I've been fighting it for almost 40 years - and I'm still as interested as ever. Oh, - I don't sit up nights for DX anymore - I let some of you do that. But I have thousands of circuits we hope to try - but won't be around long enuf! hi.

As an experiment, we are trying a picture page, and see how it comes out. Display ads can be worked in on future sheets, if you care to send them in.

Followers of RB & H have noted how we have tried to keep the small set Hobby alive. From increasing results the last few years - and the growth of ads in the mags. - we feel our goal has been made. It is an enjoyment to work with competitors - and we even run their ads in our sheet. To us they are not competitors, but just fellow Dabblers. As said before, none of us could make a dime if we were alone in the game - and we'd get chased out of town for being dippy! The big chain stores all work together, so why not us? My theory has proven up 100% in the results it has accomplished for all of us in the game. Let's have some more dabblers. Anent another old Mail/order axiom in "trying to sell what others are advertising the most" if you'd like to stay in the MO biz. Experimenting with TV is too big a deal for most of us - but the field is untouched in the Small Set Hobby.

QUICK TUBE BASE CHANGEOVER.

RCA puts out a Triple Pindex book for 75¢. Pages are divided

into 3 parts, for checking present tube base, as well as the one you are changing over. This is probably a very simple way if you have the book.

However, we figured out a much quicker deal, by making up a chart. Sometimes one is apt to shift onto some other diagram if too much data is at hand.

Lay out a chart as follows showing the present tube base markings, as per tube manual. Draw connections from underneath which is the standard method now of marking bases, as all wafers wire from underneath. Years ago most tubes used base sockets and wired from the top. Here are a few examples for your chart:

oct	oct	oct	min	6-p	oct	4-pr
1C5						
EL 105	6G6	3Q5	1S4	6C6	6SK7	3Z
G...	5...	5...	3...	cap.	4...	cap
G2...	4...	4...	4...	8...	6...	3
G3...				4...	3...	
P...	3...	3...	2,6...	2...	8...	2
C...	8...			5...	5...	
F...	2...	2...	7...	1...	2...	1
F...	7...	7...	1,5...	6...	7...	4
Fet...				8...		

Above chart is too extensive, but shows how it can be arranged for several tubes for 1-tuber. For a changeover, all you'll require is for 2 tubes, so it will be very much simplified. Usually a changeover sounds hard, but a chart may show only 1 or 2 connections to be altered.

Be sure to re-check your diagram unless you have green lettuce to pay for a new tube!

Elements may be added to the chart, but leave them off if you can do so. Some connections have duplicate points, but this is to save wiring space. Mfrs. may also stump the Serviceman by using a "no con." lug for a tiepoint, so check tube chart first.

Also, when soldering to socket lugs give the wire a yank to see if it is solid. Much erratic reception comes from rosin joints. One may use a magnifying glass to look for loose joints.

You will find tube base numbers in tube manual. They are always numbered clockwise. On an octal socket they start from the pin. One soon learns them.

When changing over, red pencil each prong to re-check work.

WAVE BANDS & HOW TO USE THEM.

By George R. Anglado,

The scales of most present day Short wave receivers fall within certain groups of wavelengths. They usually comprise the following bands: 11-13-16-19-25-31-41-49 and 60 meters. However, some receivers are only able to receive on the 16-19-25-31-41 & 49 meter bands. Between these bands are numerous other stations which are used for purposes other than Broadcasting. Amateur transmitters use the wavelengths of 10-13-20-40 and 80 meter bands.

One of the most frequent problems arising in SW reception is the right time for the use of a certain wavelength for the best reception. You may ask - when is the best time to use the 16 m. band, and when is the right time to use the 31 meter? It is a known fact that in Winter, and also during the evening and night hours, longer wavelengths (or lower frequencies) must be used than in the summer, and by day.

Most stations use several different wavelengths for the same broadcast, and in this way, the listener has the opportunity of selecting the most audible. If U cannot receive a station on a certain wavelength, try one of the others used by the same BC station. If one or more stations are so near in frequency to the station, to which you are listening, and is being interfered with - tune a little away from the correct tuning, and the station that is doing the interfering.

Reception conditions on Short waves are variable. The wavelength where you picked up that DX yesterday, may be only noise and whistling today! Therefore, you cannot always count on hearing a station you desire.

It is an old superstition that it is necessary to sit up all night, or most of the night, to hear DX stations. Most stations will, or can be gotten before 10 o'clock at night. This is with the exception of Australia or Japan. Also, there is an Australian station that signs off at 10:15 C.S.T. in the 19 m. band.

Once you have found a station, and you want to find it another day, the easiest way would be to paste a piece of millimeter paper along the full length of your dial scale. This concerns dials that are calibrated in megacycles. Divide the piece of paper into figures from 0-100, the full length of the dial. It is now possible to find your way back to a certain station, with an accuracy of a half or whole millimeter. Most receivers have vaguely marked dials, and if you make notes (like I do) of the stations received, of their degrees on the millimeter dial, U will be able to find new and interesting stations between them.

If you happen to receive a station transmitting in Chinese, Spanish, or some other language, it is not necessarily coming

from one of these Countries, but may be from New York, Moscow, Switzerland, etc. - especially if it is strong. You must wait for the announcement to be sure. Most stations identify themselves about every 15-30 minutes.

Every SW station has its own identification signal, consisting of 3 to 5 letters, or a combination of letters and numbers. The first one, or two, indicates the nationality. Having a knowledge of interval signals and distinguishing numbers is an invaluable help. Also a quick grasp of figures when the station gives its wavelength or its frequency.

A station does not always give the name of the town from which it is transmitting, but usually gives a special slogan. This is especially the case of South American stations. Many stations employ fixed times and days to give listeners their regular transmission hours. It is wise to always have a pad and pencil near the receiver at all times.

As a general rule, there will be some powerful stations in all the bands, which are easy to identify. Start with them and note whether the new stations you receive are situated above or below them, and how much. Always remember that the most interfered, and weakest station is perhaps the most interesting DX.

If you profited from reading this article, subscribe to RB & M now, and watch for future articles slanted to all SW listeners. Next RB will contain a Time Table of all Countries. This will enable you to turn to your set the exact time the station begins transmission.

(Editor) Note Mr. Anglado's ad this issue. Our Logging Dial (see page 1-1) may help on a rotating type dial. Over the years, we have found that many try for a station, that isn't there, and blame it on the set. We hope this dissertation will help you.

COLOMBIA SW STATIONS, by Freq.

By George Anglado

Call mags. KW. Address.

- HJEF 4.768 3. Radiodifusora de Occidente, Cali.
- HJAB 4.783 2.5 Emisoras Unidas, La Voz del Comercio, Armenia.
- HJFU 4.797 .5 La Voz del Comercio, Armenia.
- HJDU 4.805 .5 Universidad de Medellin, Medellin.
- HJBB 4.815 .75 La Voz de Cucuta Cucuta.
- HJED 4.825 1. La Voz de Valle, Cali.
- HJKE 4.835 2.5 R. Continental, Radiodifusion, Columbiana.
- HJGF 4.847 2.5 R. Bucaramanga, Bucaramanga.
- HJTV 4.855 .5 R. Neiva, Neiva.
- HJFA 4.865 1. La Voz de Pereira R. Cadena Nacional, Pereira.
- HJEG 4.870 2.5 La Voz del Norte, Cucuta.
- HJCH 4.895 2. La Voz de la Victor, Bogota.
- HJAG 4.901 1. Emisora Atlantico Barranguilla.

- HJAP 4.930 1. R. Colonial, Calle del Porvenir, Cartagena.
- HJCW 4.945 1. Emisora Sur America, Correo 8A, #11-57, Bogota.
- HJOC 4.955 1. Radiodifusora Nacional, Ministerio de Educacion, Bogota.
- HJAE 4.965 1. Emisora Fuentes, POBox 31, Cartagena.
- HJFW 5.020 1. Transmissora Caldas, Manizales.
- HJDW 5.065 5. La Voz de Medellin, R. Cadena Nacional, Med.
- HJXH 5.060 1. Accion Cultural Popular, Sutatenza.
- HJCF 5.964 1. La Voz de Bogota, Bogota.
- HJKD 6.000 5. Emisora Nuevo Mundo, Bogota.
- HJFC 6.010 1. La Voz de Armenia Armenia.
- HJCX 6.018 5. La Voz de Colombia, Bogota, P.O.Box 2665
- HJEX 6.065 2.5 R. Pacifico, Cali. Apartado Nacional 559.
- HJFK 6.098 2.5 La Voz del Amiga, Pereira.
- HJFD 6.105 4.5 R. Manizales, Manizales.
- HJEV 6.135 1. La Voz del Valle, Cali.
- HJED 6.145 5. La Voz de Antioquia, Cia Colombia de Radiodifusora, Mara Caibo 46-80, Med.
- HJKJ 6.160 5. Emisora Nueva Granada, R. Cadena Nacional, Bogota.
- HJOC 6.203 10. Radiodifusora Nacional, Bogota.
- HJKE 6.220 5. Emisora Nuevo Mundo, Bogota.
- HJOC 11.680 3. Radiodifusora Nacional, Bogota.

More Calls Next Issue.

THE TRANSISTOR IS NOT NEW.

By Leslie Hulet, Rt. 4
Lakewood, New Jersey.

The only thing new about the Transistor is its name. As the principle was known and used way back in 1913 by Prof. Branly, also Alfred P. Morgan, (see in "Wireless Telegraph Construction" by Morgan, 3rd Ed. 1913).

Neither is Germanium new, as it was known as a detector of "remarkable power" as far back as 1919, (see Scientific American of Aug. 30, 1919). Small quotation from article: "Experiments with Germanium demonstrate that this body presents the highest thermo-electric power, next to Silicon. These two substances, Silicon and Germanium resemble each other in many respects, particularly their remarkable power of rectification of the Hertzian oscillations. (Radio Waves)."

The Bell Phone Co's claim that "it is something entirely new, and works on entirely new principles" is a lot of hocus. The Director of Research, of the Bell Phone Labs., tells me in a letter, that their selection of Germanium was due to their endeavor to secure a mineral that "can be processed in quantity." In other words, a crystal that is suitable for quantity output on a production line.

Crystal-Detector Amplifying Circuits were developed to practical perfection back in 1924,

W2OLH



This nice-looking young fellow is Tom Ordon W2OLH, 13 Cady St., Amsterdam, N.Y. He is one of our most ardent Fans. If you don't believe he gets good DX on our 1-tube (HB-4), just see page 3, RB #33 for a FB report. In the upper right you can see our little 1-tube. And the power supply, in the center, also looks very much like MRL! He has his license pegged on the wall, in the good old Ham manner. His best 1-tube DX was Melbourne, 10,457 miles, plus a lot more good ones.

"RB & H" PICTURE PAGE.

Here is the Hallicrafter's receiver that became the prizes of David Kurtz and Gene Hermann for stations logged on our DP-29, 1-tube. Because these donors of prizes are so particular (we never could win one) it is quite an accomplishment to be able to win such a nice prize. Their best DX was 11,500 miles, from Australia.



S-53A



Edwin Armstrong

Major E.H. Armstrong, 63, died on Feb. 1st, 1954, in New York. He was one of the real Old Timers of Radio and a great inventor.

Most of our present circuits are in some way related to his findings. He was an independent inventor of the Regenerative circuit. Old Timers always refer to it as the Armstrong regenerative. He also invented the Superhet., Superregenerative and FM. His own FM station, KE2XCC was known around most of the World. He was usually connected with RCA, Bell Labs., etc. Many of his Radar developments are still secret.

He served in the Army Signal Corps, in the first World War.

Andreafski used to be Akulurak, on the delta of the Yukon. It is flat here for hundreds of miles. Here Brother Benish, one of our old Customers, is stationed at the St. Mary's mission. It is 150 miles from the Nome Radio station. They teach full blooded Eskimo children here. They hand draw and color their stationery we get from the Mission. They are very artistic and have lots of patience. Most of them have never seen a Radio before. He has purchased #2.1-Tube and other items from us.

Below is an Eskimo drawing of an Eskimo Dance, as received on stationery.



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P. M. MENAGER



Les Hoffman

M. Leslie Hoffman, president of the Hoffman Radio Corp., predicts the Electronics industry will surpass the Automotive industry within the next few years. He expects the Electronics industry, excluding TV,

to gross 7½ billion dollars within the next three years.

He is the principal stockholder of Radio Diablo (Devil), where they expect to build a TV Xmt. on VHF in channel #13.

People around the Bay can always see Mt. Diablo, near Danville. The view takes in 35 Counties, which includes the Sacramento and San Joaquin Valleys, with a total population of 4½ million.

It is hoped they would operate their studio from KGDN, Stockton. They would be the first on the Pac. Coast to originate color in their own studios. He contemplates they may have 300 color TV receivers all ready to go soon.

It is too bad TV Xmt. in S.F. cannot bunch their Aerials onto one mountain. Instead, they are all over. They do it on the Empire State building, N.Y., where there are several different transmitters and no interference from either.

the electrical principle being that of producing what is termed a "negative resistance" like the regenerative action of tubes. (See Radio News, Sept., Oct. and Nov. of 1924) close to 30 years ago.

Naturally, from a commercial angle, any crystal-unit that may take the place of a Radio tube, must be "cashed-in-on." Therefore, an expensive and rare mineral must be selected. Germanium costs \$1.50 per gram, and is sold by A.D. Mackay, 198 Broadway, New York City, who is the producer of rare minerals.

In addition, the contacts must be "set with a microscope" - all this fumadiddle means that the Experimenter must cough up his \$7 to \$18 for a Transistor, instead of making one himself.

The writer of this article has most available data on Germanium and its many interesting alloys, its atomic structure, its solubility in other metals, etc.

Silicon (Trade name Silverite) and Molybdenite are worthy of the earnest study of all Radio Experimenters - a word to the Wise should be sufficient.

Incidentally, I have one of the original "Telefunken Crystal Detectors" made by the imperial German Wireless, that can't be beat. It is built like an expensive watch, with every possible adjustment, put together with very small machine screws (they must have used a microscope). It is housed in a steel case, with two plugs for mounting in a socket. These were never on sale to the public, as they were used exclusively by the Telefunken Government Wireless. Have been offered \$10 for it, but I consider it worth more. Research experts of the Bell Phone asked me to loan it to them just for study, but I only let them look at the outside of the case.

Editor: HB-3 "Crystal Detectors" has lots of info. on all these crystals.

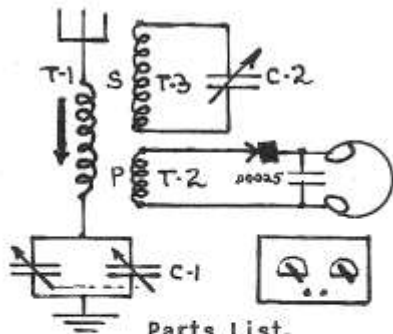
VARI-LOOPSTICK CRYSTAL SET.

By Milton M Schuman.

Enclosed find some data on the Vari-Loopstick. The name is a little misleading. Altho it is used to replace the conventional loop, to good advantage, it is not in itself a loop, as we are familiar with the term. If you take off the 12" of loose wire, the coil has little or no pickup of itself. This is the principle of hi-gain used by the Midget companies. In the latter, a pc. of wire is connected to the hot input side (Ant. or P) and wrapped loosely around the grid of the following stage.

The Ferro-magnetic core raises the Q of the inductance to a surprising degree. It is about 250 Q.

What is of interest to us is the fact that it can be used in a Crystal set, preferably in the Primary, or Antenna circuit. It will deliver more "soup" to the secondary than any type of air-wound inductance.



Parts List.

T-1	Loopstick.	CAT. 7-479	.75
T-2	Pri. AC-DC Coil.	7-45	.80
T-3	Sec. same		
C-1	2-gang .00035	8-10.	1.75
C-2	.00035 variable.	8-7.	1.25
1	1N34 Diode.	9-37.	1.25
1	.00025 mica cond.	8-19.	.15
1	4x6 compo. panel.	16-2.	.10
2	1/4" Bar knobs.	10-23.	.18
2	0-100 Scales.	10-31.	.10
2	Phone tip jacks.	17-26.	.16
	Wire, solder, etc.		

Using a simple inductively-coupled circuit, as shown above, it produces exceptional volume, along with excellent selectivity and operation. Operates a speaker with comfortable room volume, on 4 of the 8 locals. On an output meter, with a scale of 0-500 micro-amps. it rang up a maximum reading of 425, with a pair of Trimm 24,000 imp. phones in series with the meter.

Dr. Grace tried the circuit in New York, and logged 18 stations in the first hour.

Place coils as close together as good volume, with selectivity will permit. The proximity of the core increases the Q of T-3 many times. Keep slug pushed in for highest inductance.

I have been playing with cat-whiskers for 30 years, and my interest has never abated.

TWO MRL FANS WIN "BOY'S LIFE" MAGAZINE PRIZES WITH MRL 1-TUBE SET (DP-29) THEY BUILT.

David Kurtz (15), of 608 Myrtle Ave., and Gene Herrmann (17) Box 105, both of Terrace Park, Ohio, won 6th & 7th prizes in a nation-wide DX Contest sponsored by "Boy's Life" mag. recently. The prizes weren't to be sneezed at - either. Each was a \$100 net Hallicrafters' model S-53-A, as you can see on page 3, our Picture page. Uses 8 tubes, in an all-wave communication set.

On what did they get it? Two of our One-tube Sets (DP-29), which they built themselves and from our plans.

Let Mr. Kurtz tell us: "MRL has scored again! I got 6th place, using the DP-29 circuit. I logged 63 Countries and all States during the 2-month's contest. Our total scores were only 9 points apart; I got 1624 and Gene got 1615. Each reported 24 pages of 33 stations listed on each page. Our best DX was a station in Western Australia, a distance of

11,500 miles.

"Gene logged 59 Countries but used an MRL 1-tube Crystal Set Amplifier circuit on his 1-tube and got 7th place.

"On the BC band alone, I logged 150 stations. Some of the farthest were KNBC (1950); KNX, KFI (1900); KMJ (1800); KWSC (1700); KENO (1600); KGLU, KVOA (1473); XEBM (1450); KSL (1300).

"I wonder how many other MRL Fans won prizes in the 'Boy's Life' DX Contest.

"It is a fine set for both SW and long waves.

"Gene is right across the St. We use our 1-tubes as transmitters, by making them regenerate, and talking into the phones. It works OK except when the wind swings the Aerial too much.

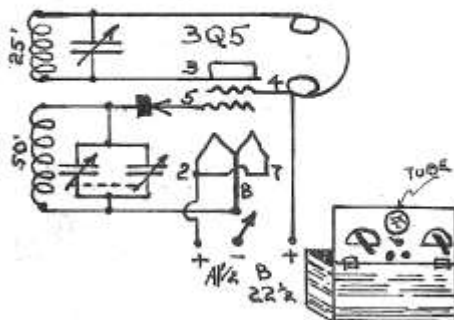
"Have also had good results on your Regenerative Crystal Set (DP-55). Best DX is WWL, WBZ 750 miles away. Best DX on BC here is about 2 to 4 a.m.

"RB & H is a fine mag. It is the only one that deals with our Crystals and 1-tubes. Your DPs are the best money can buy. Keep up the good work."

Editor: Gene & David have been with MRL since 1950. Thanks a lot for a fine report. We couldn't add a thing to it!

MY ONE TUBE PORTABLE SET.

By Denzel Radabaugh,
Co. 15 VAC, Dayton, Ohio



Parts List.

100'	Loop wire.	1-14.	1.00
1	2-gang .00035	8-10.	1.75
1	.00035 Var. cond.	8-7.	1.25
1	1N34 Diode Xtal.	9-37.	1.25
1	SPST Toggle sw.	23-1.	.30
1	Octal wafer sox.	25-11.	.10
2	1/4" Bar knobs.	10-23.	.18
2	0-100 Scales.	10-31.	.10
2	Phone tip jacks.	17-26.	.16
1	3Q5 Tube.		1.00
2	Flashlight cells.	3-1.	.24
1	22 1/2 v. B. Batt. You buy.		
1	Large cigar box.		
	Screws, solder, etc.		

I mounted the parts on the lid - in the center as much as possible. The stators of the 2-gang are connected together, to make .0007, and cover the BC band OK. For a box, I used a Dutch Masters but any will be alright.

For the secondary I used a 50' piece of Antenna Loop wire, and wound around the lower part of the box, as shown. About 3/8" up from this I wind 25 ft. piece of the same wire for tickler. Leave tickler so it can slide up or down for adjustment.

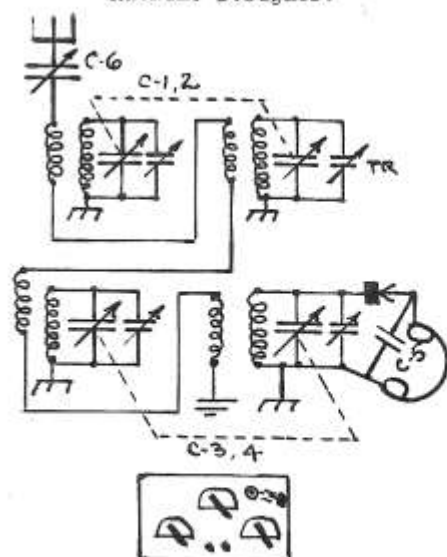
Try reversing the 1N34 Diode to see which way works best. If regeneration squeals too much, pull it farther away from the secondary, or take a turn or so off. When tuning condenser is clear in, the tickler condenser should also be clear in. It will work OK over rest of band then. Secondary coverage can be regulated by adding, or taking off a turn or so.

I have 2 of the sets and they both work fine. They separate the stations well. If one wants a little more pickup, hook a ground wire to a pipe, stove, etc. If you open the lid on the box it usually gives more volume but there seems to be enough anyway. Outside of our building it has lots of power. I got WWL New Orleans at 800 miles as well as Nashville (800).

I find a battery clip makes a good wire Skinner.

A FOUR CIRCUIT CRYSTAL RADIO.

By Raymond F. Cole,
Machine Designer.



Parts List.

C-1, 2. 2-gang cond.	8-10.	1.75
C-3, 4. same.	8-10.	1.75
C-5. .00025 mica.	8-19.	.15
C-6. .00035 var.	8-7.	1.25
4 Trimmers for cond.	8-15.	.40
2 Sets AC-DC coils	7-44, 5.	1.60
3 1 1/2" Bar knobs.	10-23.	.27
3 C-100 scales.	10-31.	.15
2 Tip jacks.	17-26.	.16
1 k/d xtal stand.	9-14.	.20
1 MRL Steel galena.	9-1.	.25
1 5 1/2 x 7 com. panel.	16-2.	.10
10' 20 solid hookup.	26-2.	.10
3 ft. solder.	26-17.	.10

This "4-circuit" Crystal set circuit is the result of several year's search for a circuit, which would give good selectivity in the Chicago locality. Here a large number of powerful stations are located in a small area. Excellent selectivity is required for weak signals from distant stations.

At least 30 of the most promising, or highly praised circuits

were tried, and many other odd circuits were experimentally made up and tested. Results were generally poor; a half dozen gave fair results and only one circuit (a popular simple one) together with two of its variations, gave results in the good class of circuits.

The tuning of that circuit was greatly affected by changes in Antenna length, and to gain selectivity, the listener was constantly tuning a knife-edge between the two.

Extremely great improvement was finally found with a ganged "4-circuit" shown in the diagram above. Three circuits gave results about 25% poorer, while 5 showed little, or no increase in results. This was probably due to a total of the losses in each circuit reaching a critical point. The #4 circuit acts as the detector tuning unit, while the other three are boosters for desired signals, and tend to trap out the undesired ones.

The Antenna series condenser was added after testing the set itself, and resulted in further great improvement, with no appreciable sacrifice of sensitivity. The sum of the high impedance primaries is now cut down to near the natural period. The condenser tunes the primary circuit to correspond with the 4-ganged tuning circuits. This resonance increases both the signal at the detector, and the selectivity at that particular frequency.

All of the Chicago area stations are heard on an 85' Ant. They are interference free from adjacent stations as close as 50 KC apart. Several 50,000 watt transmitters are within 15 mi. In addition, some of the suburban locals and Cincinnati, Louisville, Nashville, Minneapolis & a powerful Texas station were logged within 48 hours after the set was completed.

A 1N34 Germanium diode was also tried, but with much poorer results on distant stations when compared to Galenas now in use. The rough Steel galenas have yielded results thus far, as good as the shiny plain Galenas, which are harder to adjust and keep in adjustment. A wooden match stick is used to make delicate tickler contact changes. A small cardboard pillbox is kept over the detector, when not in use, to keep out the dust.

The original set was made with a 4-ganged .00035 tuning cond. from an old set, using the same TRF coils, and with dial calibrated in KC. Because most of these are too bulky, and hard to get, the change has been made to two sets of 2-gang .00035 condensers with 2 dials. This makes it easier to align the condensers with the coils. Be sure all four circuits are properly connected to ground.

A modern .00035 Var. cond. in the Aerial circuit will suffice for most Aerial combinations. The corner of one end may be bent so it shorts when clear in.

Setting of this condenser depends on the length of Aerial.

Assemble the parts on the panel. Parts should be mounted so the coils are at least 2" apart.

The catwhisker is a fine one. Good phones from 2000 to 5000 DC are essential. An Antenna 75-100 ft. long is best, altho bed-springs will give good results. A good waterpipe ground is very necessary for real performance.

In adjusting, set the #4 cond. first. Then, back thru 3, 2 and 1, and occasionally re-setting the Antenna condenser. After it is fairly aligned, tune a weak station near 1000 KC and make a final adjustment of trimmers on the variable condensers. A log sheet should be kept for quick reference when tuning in.

HB-4 - 1-TUBE NOTES.

H. Sutton, St. Helena, Calif., comes up with a good one - for you AC Hounds.

Buy a 6G6 tube from us for a \$1.50, and make your 1-tube an AC set. Connect (8) cathode tap on socket to ground by hooking it over to (7) on socket. Then hook up a 6.3 v. fil. transf'r (CAT. 24-8. \$1.50) across the A- and plus. You can use the same B voltage as the battery tube.

Several report a 22 1/2 v. B. is hard to get. Maybe some of the smaller stores don't get enough call for them. Here are some of the brands and numbers:

RCA - V8084, V8085, V8102.
Burgess - 5156, 4156.
Eveready - 768, 778, 763.
General - H15B5, H15B, H15A.
Rayovac - 4151, P5151.

They range from \$1 to \$2. We don't carry B-Batts at present, due to high shipping cost. If you have a large batt. you may dig into it and locate a 22 1/2 v. tap; check with voltmeter. Seal up the hole with paraffine. Another thought is to get DP-49, and make up a power supply from AC line.

In RB-35, page 7, B-plus also goes to (4) on power tube - our mistake.

The tube in HB-4 is 1C5 or 1Q5 - a 3Q5 may be rigged up with 3 volts filament, with same socket connections. In case you decide to use 1 1/2 v. - take the (7) tap off (8) instead. With more A voltage - the tube will naturally have more output. We sell 3Q5 tubes for \$1.25.

FLASH! COIL USERS ATTENTION!

It is amazing how one can go along, year after year - doing something wrong. However, one must admit it - it happens to all of us at some time.

We have had trouble getting our types A, 5-A and B coils to oscillate over the whole 20 m. band. We have tried interwinding the tickler with the secondary, which seemed to help some. Also, more capacity to ground for regeneration also has helped, but tended to throw the set off balance and make it hard to control in some parts.

NOW - it happens. We found out

that by pushing the secondary up closer together from 3/8" to a winding space of 1/4" we had it licked. This now makes it oscillate over the whole 20 m. band. In other words, we were short on distributed capacity between the turns. A simple thing after it's been done. On the C and O coils, with cathode taps, the extra winding space didn't make much difference. However, we suggest you push these up to 1/4" too. We played hundreds of stations on the 20 m. type C and O coils, so know it wasn't as detrimental as with tickler regeneration.

As for ticklers, just use the same one, but re-wind it at the top end, like the 40 m. coil. The latter has been our most efficient coil because turns were wound closer than the previous 20 meter band coil.

We now recall, back on Liberty St., S.F., in the 30's - while doing extensive experiments with SW coils, we found the 20 m. oscillated all over when close-wound. But the theorists all claimed this was taboo, and the spaced winding was the thing. So maybe we overdid it.

RESEARCH AT YOUR OWN WAITING.

Often a well-meaning fellow will send us a big circuit, complete with many pages of details - and asking us to make it over into something workable. Or, he may even ask us to build up some large rig of some kind. And, - he may even ship us a pile of parts - just to show he means business - or send a deposit.

Anyone with time on his hands, can't realize how anyone else can be busy, like we are here. Frankly, we'd love to sit down with each of you (all 35,000), draw up a blueprint, and make U very happy. As you can see, it's a physical impossibility.

So, - if you're one of these well-meaning fellows, who may thoughtlessly send us a "big deal" to work out - don't "blow your top" if we don't answer at once. Some even accuse us of stealing their parts and ideas! Any research must be sandwiched in between orders and jobs. Most of our correspondence must necessarily be limited to a few short paragraphs.

Many, in appreciation of our limited time - write questions & leave blank spaces for the ans. They even send a stamped return envelope. These fellows will get their answers sooner.

Now - to get back to the diagrams. Neatly draw up a diagram, that you are going to build up. Send it to us, with stamped envelope, and we'll check it over and mark any changes necessary for a good rig. Then, give us an extra week - and maybe we can meet you all half way.

A firm that can do a lot of research "for free" - hasn't any business to keep them busy! Try some of the real big outfits, & you won't get an answer for ANY KIND. We eventually try to answer all letters, but don't like to be pushed. H1.

HOWEVER - we do welcome long letters, if they are results of experiments, etc. for the "RB & H." The fellows are eating up this kind of data, since we recently changed our policy of running more from contributors. We'd appreciate your noting on the bottom of your article for RB - if you want your address under your "byline." If you do, you'll get lots of letters. If we don't get your OKeh, we'll just put your name at the top.

We'd like to express our appreciation for the many grateful fellows' articles that have been sent in. It takes a lot of time to whip up an article - how well we know. We will re-edit all of them, to make lines come out OK, etc. or for betterment of the circuit.

OUR CATALOG.

Slowly, but surely we're getting it into shape. Just about 8 more pages to go.

USE THE INDEX. A new index will be made up after all sheets are done. In the meantime, try to expedite your order, and make it more accurate, by using CAT. numbers, as well as descriptions. They are shown so we can double-check your order - and get it right. Also, write CAT., parts, prices in columns, or we may now and then skip something. On your end - check parts against the invoice. Sometimes a blonde may go by the window - and cause us to overlook something (not her!)

Maybe you'll find a duplicate page now and then - but don't worry - just stay with us. We love you!

NEW METHODS FOR THE ORIENT.

After World War 2 the defense departments dumped at 10¢ on the dollar - millions of dollars in good war equipment. Consequently when we entered the Korean war, we were hard-pressed for materials. The Ordnance dept. started making use of burned-out Jap factories.

The Japanese weren't used to American workbenches, but preferred to squat on the floor. If he was given a workbench, he upped and squatted on top. He held a hammer by the head, etc. At best his efficiency was but 70% of an American worker.

However, they trained 55,000 to work with a bench, and managed to salvage millions of dollars in equipment from the war areas. They even found tires in still perfect condition.

"THE LISTENING POST."

Official organ of the Rio Hondo Radio Club. A very interesting bulletin for Hams, on ARRL doings, reports of operations of stations, kinks, etc. Am sure if you'll send 10¢ to cover cost of mailing, etc. to Roger Root, 11141 See Drive, Whittier, Cal., he will mail you a copy. Very FB for DX Fans.

Don't forget postage on orders..

#2 CRYSTAL SET TO A BOX KITE

By Harry Gage, Woodville, Penn.

I have received CHOL, Montreal Canada (500 miles) in the 53 m. band on #2 Crystal set. This was on a 100 ft. Aerial, and very loud; without fading. It was received as if it was a local.

However, I hooked up 300 ft. of #22 Enameled wire to a box kite. (Editor: Be careful of the power lines!) Then the air was literally swarming with Short-wave stations. This seemed to put to shame the theory about longer Aerials giving too much interference. Also, the theory that SW stations become weaker on an extra-long Aerial.

However, such was not the case. When I tried the kite the longer the Aerial was made, the stronger were the signals. This was so with both long and short wave stations, which became proportionately stronger as I added more wire.

When I got a length of 300 ft. I found the SW stations to be strong and with little, or no interference.

Have made an addition to my #2 Crystal circuit. I put a binding post between crystal and phones, for another Aerial lead. Another on the opposite side of the head phones, which I use for another ground post. I can throw 5 ft. of wire over a weed, or to a tree, and sit on the ground wire and receive two locals good.

Editor: This long Aerial biz is very interesting. It is against all rules in the books. The greatest increase in signals is due to height. However, the length also has its own share of benefits. In some past issues of Science & Mechanics, and other mags. we have seen articles for building "speaker crystal sets," and they all specified huge Antennae.

Theoretically, one should have their fundamental Aerial frequency as near the received signal, or slightly higher, if possible. As we de-tune the Aerial by making it shorter - why, as Mr. Gage says, can't we make it longer and obtain the same de-tuning effect?

We'll have to stay with the books in that you'll get more static and other electrical disturbances. I remember our old Ship Aerials of 75 ft. high and 4 #10 wires 300 ft. long. Going thru a hail storm meant "hot stuff" coming off the Aerial series condenser. On a shorter Aerial it wouldn't have been as noticeable.

Never being satisfied - how would 2 kite wires, separated 50 ft. apart and their lower ends tied together, work? Or, to be crazier - what about using one 4 an Aerial and one for the ground in a counterpoise effect?

Again, we want to stress the extreme danger of hi-power lines and a metal kite wire. It is curtains if you touch the hi-lines. Don't even trust 110 volt insulated wires. The insulation may be frayed from weather, or even squirrels may chew it off.

May we add our bit—that not all Squirrels are found inside the Radio Shack!

There is another point one may consider in selectivity. When U have a large inductance, which a large Aerial happens to be, you use low-capacity when tuning. As you know, this gives you plenty of selectivity, as example the HF stations on your BC dial.

AN INSIDE CEILING LOOP AERIAL.

By H. Sutton, St. Helena, Calif.

Intended to tell you about my results with an Antenna I built for my Hallicrafter's 8-40 communication receiver. The input impedance to set is about 400 ohms. Set has 1 TRF stage and 2 IF stages in Superhet circuit.

I made a horizontal loop 9 ft. x 10 ft. around the room at the ceiling. Above the ceiling about 2 1/2 ft. is a corrugated iron roof. I go twice around the room—or a total of 80 ft. of your Loop wire. (CAT. 1-14. 1 1/2 ft.) I do not use a ground wire.

The loop's distal end comes back and can either twist it around the set lead of the loop, or else hook to the outside of a coaxial condenser, which has its center conductor for the lead from set to loop. Seems to work best that way. It is not as good any other way. Have tried a variable condenser across the ends of the loop, and also from loop to chassis, but no good.

For this frequency range of 6-16 megs. this wiring gets the best signals of any I've tried. But, if I tune to 20-30 megs. this isn't as good as an outside Antenna. Have not tried all conceivable kinds of combinations, only a few, as my time is limited. I may get another 80 ft. and add it to the 80 ft. I now use.

Have not had any luck with any booster I ever tried; they must be intended for Xtal sets, and not tube sets.

Have never had a high outdoor Antenna, nothing over 15 ft. above ground. This loop gets the big stations in Africa and Far East nearly regularly. Thought maybe this may be interesting to "RB & H" readers. I always remember the good work you are, and have been doing for Hams during these long years.

Also tried a 6 ft. piece of 72 ohm coaxial cable hung vertically on the wall. The same results were obtained if I used the inside or outside of the coaxial.

On one of the first nights I used this Aerial there occurred an extraordinary display of Aurora Australis, seen only in the Land Down Under. It came in so loud the volume control had to be turned down, about as far as a Frisco station on the BC band (Quick! Watson! The needle!) These signals were early morning here. You could hear the wind go past the announcer's tonsils, or a dollar bill rattle in the feathers in the Melbourne newsroom. Within a few minutes a Chinese voice roared in, but not sure if it was a Chinese station. That condition shortly after the Au-

ror display is a queer thing.

I still wonder if it wouldn't be an improvement to wind coils of larger wire, similar to size of Antenna leads, etc.

Found an article back from the year 1946 suggesting a single IF stage as preferable to several for gain. Also, maybe if the oscillator gain could be controlled it may help.

Would like to have any info. on an RF booster, different from the RF regeneration scheme.

Editor: No doubt Mr. Sutton's inside Aerials are greatly influenced by the corrugated iron roof. Just the same as when you drive your Auto Radio under a trolley wire where extra energy is picked up, or carried along. Also, in AC-DC sets, where the house wiring has an added RF pickup. Trouble with most corrugated roofs is the corrosion, loose joints, etc. found in them that gives erratic reception. If one soldered all the sheets together with some wire jumpers, the efficiency would be greatly improved and the noise lessened. As most iron roofs are insulated by the wooden frame of the dwelling, they make good Aerials.

As for the HF working better, it is possible the size of the roof has a resonating effect on waves of this frequency, especially since he states the lower frequencies work better on an outside antenna.

Boosters will work good on any set. However, the main trouble is connecting them up. One side is to be grounded, but the "hot" connection should not be hooked direct to the Aerial leadin, but must be gently wrapped around the insulated leadin. Or, a 3-plate midjet coupling condenser between booster and Aerial may serve to make it more efficient.

The study of the Aurora is very interesting. It always affects the Radio frequencies—many circuits have to shut down operations until it is over.

If one wound coils with too large wire we would lose our distributed capacity effect that is desired to tune a coil. The larger wire works to our benefit up to a certain point. For instance, if we wind a magnet with a core 1/2" in dia. we cannot effectively wind over 1/2" deep of magnet wire around the core, or we start losing efficiency of the winding. This is because the resistance begins to work against the added inductance. Therefore, for stronger magnets we must wind miles of fine wire over the 1/2" core to get the added amount of inductance desired for our coil. Naturally, the smaller wire again adds resistance, but there is a happy medium to be found for a high efficiency coil.

Re the 1 stage of IF for a Superhet, it can be assumed that the per stage gain from a single tube is greater than for several in cascade. You can see how this works with the Ultra-audio detector circuit we use in our 1-tube sets. Tube-for-tube there has never been such hi-gain as

with the single detector working directly off the Aerial. No doubt the oscillator gain control may be regulated by adjusting the RF coupling between detector and oscillator.

Only TRF booster with the most efficiency uses a small amount of regeneration. It is usually controlled by varying the amount of resistance in the TRF cathode circuit. One can be allowed but a few turns for regeneration in the TRF stage or it may be a disadvantage in regulating. No doubt there will be circuits in the future that may use some other method than regeneration in a booster circuit. It is to be noted "booster" here refers to a circuit using a tube, and not the type of our QRM Coils, working independently of the other tuning circuits.

ANNOUNCEMENTS.

CANADIANS.

We can allow full face value on Canadian paper money. But, we must take a 10% discount on the silver, as that is the best we can get at the bank, due to the transportation back to Canada. If you buy your money/order in Canada, payable in U.S.A., you may save a little. A Canadian Cashier's check, drawn on a New York bank is OK at face value, as you pay a slight premium tax to your own bank.

Parcel post to Canada is 45¢ for 1 lb.; 2-67¢; 3-89¢; 4-1.11; etc. or 22¢ for each additional pound. Same price from Redwood City as anywhere in U.S.A. Small packages thru 8 oz. run 2¢ for each 2 oz., which, of course, is not 45¢ per lb. hi.

Customers up there tell us our prices are much better—even after paying any duty. At least, we sell a lot of items nobody else makes—even in Canada.

10¢ AIR LETTERS ANYWHERE.

You may be interested in a 10¢ Airmail letter you can get at the P.O. You may write all over the inside, fold and seal it, but no enclosures allowed. However, it goes Airmail all over the World for 10¢, against up to 50¢ per oz. by regular Airmail. The P.O. will still take the others, if you forget. Hi.

GIVE BOX NUMBER ON ROUTES.

Many give their addresses in dribbles. First, they leave off their zone number in a city. The others send in their town and State. Gradually we get the route number and finally the box. It is nothing to be ashamed of to live on a farm. We could carry on this mail/order biz as well on a farm as in a City, as we do very little local biz. Lots of times we envy the Farmer for his independent life, away from some people that just annoy you. We couldn't say what percentage of City or rural customers we have, but it must be about 50/50. In time, we can save both types a

lot of money in scrounging around for parts, etc. Just remit in any convenient form and you will soon have your order - no gas, parking problems, higher prices or abuse.

C.O.D. ORDERS.

We'd prefer you would send 25% of the order, or \$1, whichever is the largest, for a deposit on C.O.D. orders. Besides, the more you send, the less it costs for a C.O.D. Here are the rates you pay, in addition to postage: up to \$25 the cost is 40¢ extra; to \$10 it is 55¢; to \$25 it is 85¢. A C.O.D. does automatically insure the package, however.

INSURANCE.

We have connections with the Liverpool, London and Globe Ins. Co. to insure your packages up to \$25 for 5¢ fee, which is much cheaper than P.O. rates. This is insurance against loss and damage.

SUBSCRIBE TO "RADIO BUILDER & HOBBYIST" NOW.

Subscriptions coming in all the time. We got snowed under on orders, but finally got #37 all on the way. We hope next time to come out sooner. Non-buyers and non-subscribers are continually being eliminated from our files. Be sure to keep-up-to-date - even if only 3 issues for 40¢. We'll love you for it. Even WE believe the "RB & H" is getting better.

MRL HANDBOOKS.

We now have 6 Handbooks completed, and ready for immediate delivery at 30¢ each. They are #1, 2, 3, 4, 17 and 25. We have several in mind, but no announcement will be made on future numbers until completed. Another deal is on the fire for some new literature, which will probably be announced next issue. Many R ordering all 6 Handbooks at one crack. Some ask why we don't get \$1 each for them. Well - it does take a lot of work to complete one of them. The only objection we get is that we haven't enough titles to offer. One of our first ones, #25, we have sold 6500 to our retail customers, so there is a big demand for them. If you lack any - be sure to order.

Rheostats. Can still supply a few, while the stock lasts, in the following ohmages: 2½, 6, 10, 15, 20, 30, 60, each..... .15

Electric Juicer. Sunkist, Jr. usually sells for \$10. In good condition. 10" high, wt. 8 lbs. OK for fruit stand, etc. Parts may be removed for cleaning. The motor is worth price asked. 5.00

Emery Wheel Grinder. Fits on bench to sharpen tools, or can be rigged into a coil winder. An emery wheel furnished. Crank runs wheel fast. 7 lbs. 1.00

8" Knap Auto Electric Fan. All overhauled and tested. Adjustable base. Works on 6 v. storage batt. in car. 3 lbs. wt. 1.75

Soldering Lugs. Latest prices. No less than 20 of a type sold, as we pack them that way.
Types C, F, N or R. 20 for .05
" D, K or M. " .06
" A, E, G, I or P. " .12
Sherman lugs. 3 for .05

WANTED: TUBE BASES. Can use 4, 5 or 6 prong. Must be 1-3/8" in dia. same size as OIA, 80, 42, 27, etc. We allow 2¢ each on the 4 and 6, and 1¢ on 5 prong, plus postage at 3rd or 4th class rate - just bust off the glass and ship. No need to clean them.

Rider's Manuals. In fine condition. You save over half. The shipping charges are extra.
No. Years. List wt.
10 1938-9. \$19.80. 12 lbs. \$10
11 1939-40 19.80. " \$10
12 1940-1. 19.80. " \$10
Or - 3 for \$25, plus Express.

G. E. TV Service Guide. 84 large pages of late cir. Good TV data. Reg. \$1. Good condition. .75

Practical Delta Projects. For the woodworker. Plans 31 p. .10

How to Find the Job you Want. 36 pages about quick ways of getting a job. Also, how to make up your own ads. Both for 1.00

New Magazines for Sale. All R sent postpaid at these prices & in good condition. Most are unobtainable elsewhere.
Radio Electronics for Mar., Sept. Nov., 1953. April '54. Ea. .35
Radio & TV News. Jan., '54. .40
Science & Mechanics. June, 1952. April, 1953. Each. .25

Permeability Super-het Kit. Essential tuner parts. Just a few left. BC Band. 180 deg. dial pulley. Tunes det. & osc. coils and padder coil. Plans for building 5-6 tube superhet, using a line cord res. 1 lb. 2.95

1/4" square slider rods. In short pieces about 3" long. At a special price of, each..... .05

Litz Coils. Some taken out of Grebe DX sets. Best coil for BC. Tunes with .00035. 1-5/8" dia. x 3" long. Also a 2" dia. x 3 3/4" long. Either at75

Magnet Wire. Complete list all in stock for quick shipment. Per 100 ft. Don't forget postage.

20 Double Cotton.	7-88.	.50
22 " "	7-89.	.40
24 " "	7-90.	.30
26 " "	7-91.	.25
28 Single cot. Enam.	7-92.	.20
30 " "	7-93.	.15
34 Double Cotton.	7-95.	.15
36 " "	7-96.	.15
38 " "	7-97.	.15
12 Enameled.	7-70.	1.75
14 " "	7-71.	1.25
18 " "	7-73.	.60
20 " "	7-74.	.40
22 " "	7-75.	.30

24 Enameled.	7-76.	.25
26 " "	7-77.	.20
28 " "	7-78.	.15
30 " "	7-79.	.15
32 " "	7-80.	.15
34 " "	7-81.	.15
36 " "	7-82.	.15
38 " "	7-83.	.15
40 " "	7-84.	.15
44 " "	7-181.	.15

TUBES. We promised a complete list this trip. As near as possible, our prices are about 50% off. Prices depend on our cost. All tested to work OK.

Type	List	MRL
OZ4.....	1.65	1.10
OIA.....		.50
1A7.....	2.45	1.00
1C5gt.....	2.60	1.25
1D8gt.....	4.05	1.50
1H5.....	1.95	1.00
1L4.....	2.25	1.00
1Q5gt.....	3.05	1.50
1R5.....	2.35	1.10
1S4.....	2.45	1.50
1S5.....	2.05	1.10
1T4.....	2.80	1.00
1U4.....	2.25	1.00
1V.....	2.55	1.00
2A3.....	4.15	1.00
2A5.....	2.30	1.15
2B7.....	3.40	1.00
3Q4.....	2.25	1.10
3Q5gt.....	2.80	1.25
3V4.....	2.20	1.10
5W4gt.....	1.75	1.00
6Y3G.....	1.35	.75
5Z3.....	2.00	1.00
6A7.....	2.75	1.25
6B5.....	3.35	1.25
6B7.....	3.35	1.00
6B8g.....	3.60	1.10
6BA6.....	1.95	1.00
6BK6.....	2.05	.90
6BJ6.....	2.10	1.10
6C5gt.....	1.65	.80
6C6.....	2.50	1.10
6F6gt.....	1.65	1.10
6F8g.....	3.90	1.25
6G6g.....	2.75	1.50
6H6gt.....	2.10	1.00
6J5gt.....	1.80	.90
6K5gt.....	2.40	1.00
6K7.....	2.10	1.00
6Q7.....	2.40	1.00
6R7gt.....	2.65	1.00
6R7g.....	2.65	1.00
6SD7gt.....	2.90	.90
6SK7.....	2.00	.85
6SQ7gt.....	1.75	.90
6U6gt.....	2.20	.90
6V6gt.....	2.00	1.00
6X4.....	1.50	.90
6X5gt.....	1.55	.90
6Y7gt.....	3.20	1.00
6Z4/84.....	1.80	1.00
7B6.....	2.90	.90
7N7.....	2.20	1.00
12A.....		.75
12J5gt.....	1.80	.80
12SL7gt.....	2.65	1.00
19.....	3.35	1.10
22.....	3.20	1.10
24A.....	2.70	1.20
25L6gt.....	1.95	.90
25Z5.....	1.80	1.00
25Z6.....	2.60	1.00
26.....	2.05	.90
27.....	1.75	.90
30.....	2.25	1.20
32.....	3.70	1.10
33.....	3.35	1.10
34.....	3.50	1.10
35.....	2.35	.90
35L6gt.....	1.95	1.00
35Z5gt.....	1.40	1.00

Tubes, continued:

Type	List	MRL
38.....	2.30	1.00
39/44.....	2.75	1.00
40 Arcturus.....		.50
42.....	1.90	1.00
45.....	2.10	1.00
46.....	2.90	1.00
47.....	2.90	1.00
50.....	5.15	.75
50B5.....	2.10	1.10
50L6gt.....	1.95	1.10
51.....	2.35	.90
53.....	2.75	1.00
56.....	1.85	.95
70L7gt.....	3.90	1.50
80.....	1.55	.80
81.....	4.65	1.25
82.....	2.75	1.00
84/6Z4.....	1.80	1.00
89.....	2.30	1.00
RA-1 Sonora 15 volts.		.30
205-D.....		.50
608 det. UX, 15 volt.		.30
" RF do		.30
" AF do		.30
876 Voltage regulator		.50
GE 200 watt proj. lamp		
110 v. 1 1/2" x 5 1/2" long.		.50

Large Coil Forms. Cardboard. 3 1/2" x 21" long. Suitable for a Tesla coil form. Wt. 2 lb. Ea. 50

Vernier Dial Knobs. Used but OK condition. Mount at bottom of old 2-3-4" dials for fine tuning of SW stations. Each..... 10

Insulated Shaft Couplings. Old style. Set screws into 1/2" shaft on each side. Insul. Each 10

Drum Dial. 1 left. 3 1/2" drum works parallel with panel. Removable cell scale: 0-100. Cond. may work to left or right of the drum. Illuminated escutcheon plate on front of panel, with a 1/2" shaft. 10-57. 1 1/2" wt. 1.00

New Dynamics. 3" ext. field. A neat speaker. 21-1. 1 lb. 2.00

Double Phone Cords. With either lugs or tips. Net price to us went up. New price is 50¢.

New Germanium Diodes. 1N63 for general purpose. Regular \$4.10. Special buy. 9-43. 1.00
1N69, similar 1N84. 9-44. 1.00

Double Fahnestock Clips 9-30, 31 discontinued for present. Use 2 of 3/4" or 1" clips, with screw thru center to make double ones. On orders for these, we will ship 1 dozen of the others. 10

1/4 watt Resistors evidently going out of mfr, as impossible to replace stocks. They are now being made so small a 1 watt is same size as a 1/4 watt previously - will substitute next wattage.

Transformers. Some closeouts. Add postage to each.

Heavy duty output trans. for a 105 or 105. 2 lbs. wt. 1.50
2 1/2 v. Heavy duty fil. trans. with tapped pri. 2 lbs. wt. 1.75
150 V. and 35 v. secondaries power trans. Cased. OK for experiments. 24-19-1. 4 lbs. .50

New Soldering Lug. Spade #S same as E, except #4. 20 for .12

#18 Stranded Hookup now back in stock. 25-4. Per foot. .014

New Copper Busbar. Heavy tin-ned. Complete list:

No.	CAT.	Foot
10 Round.....	26-7.	.03
12 ".....	26-8.	.02 1/2
14 " or square.....	26-9.	.02
16 ".....	26-34.	.02
18 ".....	26-28.	.01 1/2
20 ".....	26-35.	.01
22 ".....	26-36.	.01
24 ".....	26-37.	.00 1/2

2-gang 50 mmfd. SW Condenser. By a special buy we have a new 2-gang SW cond. 1 1/2 x 2 1/2 x 2 1/2 deep and standard mounting. 11 wide-spaced plates each section. May be used in 2-stage set, or hooked together and used as .0001.
CAT. 8-8. 8 oz. wt. 1.50

Large metal Binding posts. 1 1/2" long. Silver plated. 8-32 screw. Slot opens as BP is unscrewed. A good solid post. 4-30. Each .10

C-type Ground Clamp. Will fit over 1-3/8" dia. pipe. Screw digs into the pipe for solid connection. Wire to screw. 1-17. .20
If you want the strap, order a 1-18. Ground strap..... .08

Handy Snapper. Works with your thumb and 2 fingers to pick up a small part in a tight place. Encased in plastic tube. 7" over-all. Spreads 1/2" apart. Red or black. 20-21. 6 oz. each 1.20

MOSCOW ON MRL #10-A CRYSTAL SET.

We are getting some good DX reports on this set. The 10-A, with the selective coil that is usually furnished with the kit, isn't meant for a DX set. It is more for City reception. However - here is a real good DX list from our good friend Clifford Brown, 231 Concession St., Kingston, Ont., Canada. He uses a Crystal Diode with the 10-A and a 100 ft. Aerial. "Clif" has been a good customer of MRL for over 2 years. Here is his list, received last winter:

Call.	Station	Miles
	Moscow (1 hour).....	7000
	BBC, London (every night for 1 hour).....	5200
WLWO,	WCKY Cincinnati.....	800
WWVA	Wheeling, West Va....	500
WKJD	Fort Wayne, Indiana..	500
WJJD	Chicago, Ill.....	600
CFCO	Windsor, Ont.....	350
CKLW	Chatham.....	300
WQXY	New York.....	200
CHOL	Montreal.....	200
WSYR	Syracuse.....	200
WWNY	Watertown, N.Y.....	175
CBL	Toronto, Ont.....	165

Also amateurs in N.Y., Ont., Que., Me., Ohio, Pa.; Ships on the Lakes; planes at Ratcliffe airport, Ottawa, and locals.

We have had some Fans, located in remote poor receiving locations, that got poor volume on some stations, while others were smaller stations that came in better. This is a characteristic of reception in remote places. If you are away from any powerful stations, you may get a #10 coil, with large primary of 160

turns, and use it in place of the regular #10-A coil. The connections are the same otherwise. It will give closer coupling and it should bring in more DX stations than the other. Or, you may rewind the present one, as per DP-34, Country Set. A new coil will cost \$1.50 from us.

As said on DP-34 - the #10 was fine around Reno, with only a few stations. Here it is a different matter, as we are close to KNBC and other hi-watters with a strong ground wave. The coil may be changed without disturbing the balance of the set. The coils and set were designed with this in mind - using the same switch points, layout, etc.

If you want closer coupling with the present #10-A coil - you may unwind the 30 turns #26 en. and scatter it over the primary. This will give your closer coupling.

If ordering the new coil - be sure to state you want the broad tuning one for the Country. 1.50

WHAT'S IN THE MAGS.

Lots of the fellows like this section to help in their dabbling. With this issue we are starting a different system. As it is impossible to find space for all the mags. we will begin with the latest and go back and cover as many as possible. No current mag. is listed unless it has material of interest to us.

Radio Electronics. April, 1954.

"Cosmic Generator." p. 48. A very interesting article on the Transistors and Diodes as pertains to Cosmic rays. Where they get all this data is beyond me!

"Ground Loops & Hum." p. 56. An interesting article on some of our hums. Shielding grids of amps. (7) is always good. Cutting .1 x 600 v. condensers across the 110 v. line is good. Much of our hum comes from cathodes, as in case of the old 47 tubes.

"Transistor Regenerative Set." p. 71. Manipulating one of these rigs into a regenerative. Signal feeds back thru a Loopstick (CAT 7-179. .75). Regen. is obtained by varying voltage to base of Transistor. A 1N34 (9-37. 1.25) or any diode, is OK, to detect the signal. The Selenium power supply is shown on page 76. We can furnish all these parts.

"Transistor Sub-harmonic Gen." p. 97. Interesting data on another use for the CK-722. Uses 1 1/2 v. battery only. Another deal on feedback regeneration.

"Hi-efficiency Wave Trap." 113 The 50M VC to ground just cuts down the amount of signal entering the set. It is then controlled by tuning the trimmer to the unwanted signal. Looks good.

Radio and TV News. April, 1954.

"The Signal Bouncer." p. 47. A good simple trick, bouncing the plate output of the superhet back to the Ant-ground circuit. Larger variables may be used. He got the idea on lo-loss coils, Continued on page 10.

MRL CLASSIFIED ADS.

4¢ per word; 3 insertions same ad 8¢ per word. Count all words. Circulation above 3500 per issue plus back numbers, which continue selling over a long period of time. Numerals (3-39) means 3 issues, ending with #39. In preparing an ad, always consider the Reader's point of view; not your own. A 3-timer ad always pulls better than a 1-timer.

Attention! New JIFFEY detector. Write for details. Address Jiffey, Box 30, Abita Springs, Louisiana. (3-37)

I have 3 Radio books - 1 big diagram book, all new, will sell for half, if anybody wants them. Write B. Borgelin, 2134 West 29th Ave., Denver 11, Colorado. (3-38)

BARGAINS! Electrical and Radio Supplies. Write for free list. Charles Pilgrim, 538 South Washington, Dillon, Montana. (3-38)

WANTED ZENITH "Zenette" Portable in excellent condition. Write Donald Woolsoncroft, Rt. 1, Boone, Iowa. (1-37)

FLORIDA - Help wanted - Real Estate, groves, farms, business opportunities. Classified ads mailed 25¢. Name City paper ads wanted. P.O. Box 753, Winter Park, Florida. (3-38)

SOUP UP your Radio 50% More volume, more stations. Use screw-driver. 5 ways 50¢. Anglado, 719 Dorries, Biloxi, Miss. (1-37)

EXTRA-LOUD Crystal, sensitive catwhisker, latest Radio plans & catalog, Circuit list 30¢. Amorose, Route Four, Richmond, Virginia. (3-39)

EXchange Radio Parts and wire. Write Wilburn Clay, 1803 Childress Drive, Atlanta, Ga. (3-39)

Crystal Radio Fans! A Ferri-Loopstick used as Antenna coil for Crystal set, gives uncanny results! Increases DX on the set. Only 70¢ postpaid. Chas. Sonberg, 17 Hillside Avenue, Peekskill, New York. (1-37)

Used Radio Equipment - Variable condensers, tubes, coils, filter chokes, variable resistors. Write for list. David Stoike, 840 South Edgewood, LaGrange, Illinois. (1-37)

An advertiser says: "Got 55 orders out of the other ad so far, from all over the World."

PAEC-GUAR guaranteed crystal. instructions, catalog. Only 15¢. Wesley Hamilton, Route #3 Box 878, Albany, Oregon. (3-39)

ISN'T TV A MESS? There are over 2000 soldered joints in a good TV Receiver.

MRL CORRESPONDENCE CLUB.

2¢ per word, per insertion. Count name, address and interests as words, the same as for ads. Numerals the same as for ads. Many friendships have been made by use of this column.

P.J. Kavaleski, Box 17, Franklin Mine, Michigan. Ham Radio; Crystal sets; Minerals; Swap Radio magazines; letters. (8-42)

John Redfern 3rd, Box 1747, Midland, Texas. 14 years old. Novice; Crystal sets. (1-37)

WHAT'S IN THE MAGS.

Cont. from page 9.

but ours would be superior, and at 15¢ - are cheaper. We have all these parts, including tube.

Science & MECHANICS. April, 1954

"Atomic Battery." p. 78. Some good theory, etc. that may give you some ideas.

"Portable SW Receiver." p. 149. Not a bad deal, but could be improved by using our A or 5-A coils, as there is ample room. A tube with more gain than the 30 will give more volume, and take less A current. Tube base coils are out, as far as efficiency is concerned.

"Fountain Pen Radio." p. 153. A loopstick could be used. Also a tiny Diode, as CK-706, etc. RF coverage is increased by the use of fixed cond. which we do not stock in this shape.

"Winding Small Coils." p. 155. An old stunt, by using hand type drill. It is a knack to do it this way. The direct drive, as shown in HB-2 (30¢) is more sure in your winding. Another way is to fasten the wire in a vise at a distance, and gradually walk toward the vise as you turn the coil. This gives an even winding to your coil. It is still better to buy our plug-in coils. Hi.

Mechanix Illustrated. Jan., 1954

"Radio's Second Childhood." 116 Shows Philmore's production line where our Philmore sets originate. He gives a bit of history as concerns the catwhisker sets. In 1920 there were 300 mfrs. of Xtal sets. Now he says "a couple - maybe" - including HIM! There are indeed many of us making up these rigs. He expects to sell around 150,000 xtal sets this year. We have never estimated how many we have built and sold but it would run up into the thousands. The only difference is that ours always work - and play lots of DX, as we take time to build them, and not cram them into a small box, which destroys their DX ability. We have showed (CAT. page F-5) how to improve these Philmore sets. We have also written Granat about it but they ignore the possibilities!

"3-tube Radio Transmitter." 124 A good simple layout for the new Novice Ham. Other tubes and parts may be substituted.

Popular Science. February, 1954.

"Color TV." p. 108. Gives good data on new color.

"TV Ant. Made Him Rich." 117. From \$32 per week to 12 million gross in 6 yrs. isn't bad - even in Russia! Get your noodle to working and collect some of it!

"UHF Converter for TV." p. 221. Make one for less than \$20. It doesn't look too hard to make.

Radio Electronics. March, 1954.

"Transistor Code Set." p. 78. Uses point-contact 2N32. As the the Transistor naturally feeds back a little - raising the base with the transformer helps it along. The volume control varies the pitch by throwing it off balance. Looks OK.

"Transistor Wrist Radio." 84. Uses 3 Transistors and 2 Diodes in peculiar circuit. Our phone man has heard them work.

"Hi-gain Portable." p. 84. It isn't the superhet cir. as much as it is the 1N34 diode as 2nd det. and Transistors as 2 audio stages. Like flies - they'll soon be into everything!

"Transistor Trigger." p. 128. Now they are making pulses.

"Sensitive All-wave Set." 130. A conventional circuit that will work OK. However, our coils are fine for this. As usual, there's the familiar "gimick" to the Aerial, when they should use a remotely controlled 2-3 plate. Don't worry about res. values, approximate work just as well.

Radio & TV News. March, 1954.

"Building a Multimeter." p. 71. A simple layout for an 0-1 m.a. Use small selenium rectifiers, or diodes may be used.

"Superregenerative Transistor Receiver." p. 72. A 4-Transistor receiver. When we get super-regeneration, we can get down into the short waves. Oscillation is result of splitting plate coil, and feeding back thru condensers to input. 3-stages of audio.

"Transistor Applause Meter." 82. Variable input to 1st stage. Be sure to hook them right.

Radio Electronics. February, 1954

"Transistorized Ukelele." 30. Somebody has spent a lot of work on this circuit for a 4-unit amplifier.

"Push-pull Volume controls." p. 36. Various types explained.

"UHF Converter." page 52. Another simple rig to change bands on your TV set. Sel. rect. and a 9002 HF tube, and diode.

Science & Mechanics. Dec., 1953.

"Phone Amplifier." p. 188. 2-stage audio & mike. 1Q5 is OK 4 last stage.

"Radio Symbols." p. 192. Study them over, if beginner.

"Giant Loop Crystal Set." 192. This is the secret to loud sigs. on locals. Turn loop for volume.

"30" for this time - CUL...

another MRL Handbook...

by Elmer G. Osterhoudt

HB-3

30¢

5½ x 8½
24 pages
10 drawings

CRYSTAL DETECTORS

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Why are crystals preferred to tubes at high frequencies? p. 3.
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Where does Boron come from and is it found free? How was it used as an impurity? p. 6.
With what is Cadmium usually associated? How does it compare with Zinc? p. 6.
How do cadmium sulfide crystals compare with the Photo-electric cell? p. 6.
What are uses for Cadmium? 6.
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How was Carborundum discovered and when? How does the furnace work? How is it stacked? p. 7.
Which Carborundum crystals are best? How does platinizing one side help? What about ratio? 8.
What is best way to hook up a Carborundum? Proper voltage? 8.
What makes best catwhisker? How much pressure? p. 8.
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With what detectors is Cerussite usually found? p. 9.
What is rectification ratio of Chalcocite? How associated? p. 9

What are some impurities found with Chalcopyrites? How is it used as a Perikon detector? p. 9.
How can Ferro-silicon crystals be made? Varying ratios. p. 10.
How is Galena found? What are its characteristics? p. 10.
What points on Galena are the most sensitive? Best catwhisker? Galena/galena detector. p. 11.
How much battery may be used with Galena? How mounted? p. 11.
What is difference between the Galena and Steel galena? p. 11.
Why is Steel galena the most popular detector? How does its sensitivity compare with plain Galena? Describe crystals. p. 11.
What is best catwhisker for a Galena? What about re-adjustment on DX stations? p. 12.
How does selectivity compare with Germanium? p. 12.
How can you make synthetic Galena? What about adding some impurities? Sensitivity? p. 12.
How is Germanium produced? What metals does it resemble? p. 12.
How does Infra-red light affect Germanium's conductivity and resistance? p. 12.
Why are impurities added to Germanium? Which ones? p. 12.
Where is it generally used in H.F. sets? Catwhisker? p. 13.
Where is Iron pyrites found? Describe it. Association? p. 13.
Is Iron pyrites more sensitive than Carborundum on weak sigs? How about Short waves? p. 13.
Where were most IP crystals used in the 20's? p. 13.
What catwhiskers best? How about pressure? Size? p. 13.
How can you tell Fool's gold from real Gold? p. 14.
How does Lead peroxide differ from other Oxides? p. 14.
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How was Moly cleaned? What about its sensitivity? p. 15.
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When was Silicon discovered to be a good detector? By whom? 17.
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What dopes work best with Silicon? What catwhiskers? p. 17.
How much battery may be used with Silicon? Other uses? p. 17.
How are Hessite crystals used as detectors? p. 17.
What associated ores are found with Zincite? Describe it. p. 18.
How long has Zincite been used and how? Catwhisker? p. 18.
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Which are best for higher frequencies? Which are best for a crystal set? p. 20.

Describe different types of Transistors. How much do they amplify the current? p. 21.

How do Transistors compare to tubes in operation? How are they used in Computers? p. 21.

Why should crystals be mounted in low-melting alloys? p. 21.

What is a Eutectic mixture? 22
How do you change Fahrenheit to Centigrade? p. 22.

How do formulae and color vary in crystals? p. 22.

Is a larger crystal better for detector than small? p. 22.

How do crystal shapes vary? 23
What are poor contact rectifiers? What are their relation to dopes in crystals? p. 23.

How do some crystals react to light, and what does it do to their resistances? p. 23.

7000 miles on a Crystal set in the 20's, with poor transmitters - see page 23.

Description of HB-4. p. 24.

This is a complete revision of our original Handbook, published in 1938. Lots of material has been added, and the book brought up-to-date in many ways.

Detailed data is given on most minerals used as detectors. This includes formulae, source, description, commercial uses, best methods of operation, use of the battery, and many other items of interest to the Experimenter.

On page 19 all 31 minerals are classified for easy reference. This shows formula, active element, battery use, if any.

On the same page is a classification by trade names, so you will know what you're buying.

Crystal diodes and Transistors are well covered. As most material on them is highly technical, we have brought it down in an easy-to-read manner, to make it more usable.

From the general outline of the Handbook, the Fan may be able to try other minerals in his experiments. Many hints are given that will help him along the way to proper manipulation.

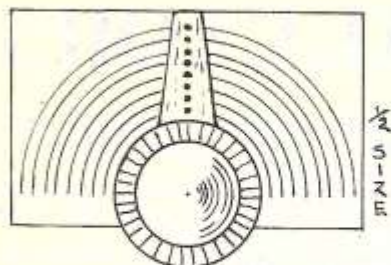
L.C., Welland, Ont. says: "I think it is great. Learned a lot about Xtals I didn't know. My best DX on HB-4 set is Melbourne Australia (10,200 miles)."

M.R.H., Victoria Harbor, Ont.: "You did a swell job there, digging up all that info. for us, and presenting it in such an interesting form. I know everyone will be as pleased as myself."

H.H.P., Los Gatos, Cal.: "New HB very interesting. Gives good ideas on Diodes and Transistors."

MRL Handbook No. 3.....30

Dials, Knobs, Cable, Pilot Lights, Sockets

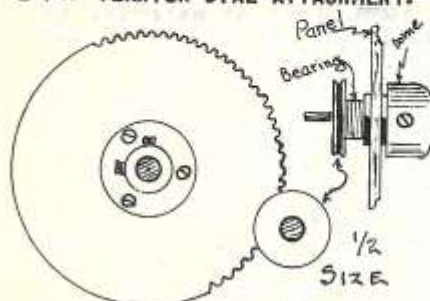


MRL LOGGING DIAL & SCALE.

Ideal for logging stations directly on the dial scale. Large 1 1/2" knob rotates a heavy celluloid pointer. Latter has 8 holes for 10-20-40-80-160-HF-LF-LW bands. Scale 2 1/2 x 3 1/2 is printed on light cardboard. When you locate a station, mark it with a soft lead pencil thru the hole on the proper band. Move dial and lightly mark the call letter on the scale. May be erased later. You can now refer to the station in a jiffy. Glue scale onto panel and mount knob. Slide scale around to make holes follow the lines. Directions given. Will go on HB-4 1-tuber panel.

MRL Log Dial & Scale, with directions. 10-72. 6 oz. \$1.00

2-Pc. VERNIER DIAL ATTACHMENT.



The large gear fits over your condenser shaft. The small one goes thru one of our bearings. It may be necessary to ream out the bearing on some. A 3/4" dome knob may control the rig. The Cond. shaft may extend out thru panel, and operate a pointer, or bar knob on scale. Ratio 3:1.

2-Pc. Vernier Dial Attachment.
CAT. 10-8. 6 oz. .40
Bearing, 1". 8-104. .25
3/4" Round Dome Knob. 10-11. .10

BAR CONTROL KNOBS.



Bakelite knobs, with engraved pointers, fit 1/4" shaft. Standard on all our kits and plans. Along with the scale, they make a neat dial layout. Replace old round dials.

2" Black Bar knob	10-27.....	.16
2" Red " "	10-28.....	.16
2" Walnut " "	10-73.....	.16
1 1/2" Black " "	10-23.....	.09
1 1/2" Red " "	10-24.....	.11

MRL DIAL SCALES.

Neatly printed on light, white cardboard. Cut out the scale, including the 1/4" hole in center. Use glue, or MRL Heavy Cement (7-58. 15¢) to fasten on. After condenser is mounted, slip scale over the shaft and line up.

0-100 for 2" Bar.	10-74.....	.05
100-0 " "	10-75.....	.05
Celluloid cover for large scale.		
Tack or screw on.	10-76.....	.10
0-100 for 1 1/2" Bar.	10-31.....	.05
100-0 " "	10-32.....	.05
Celluloid cover for small scale.		
Tack, or screw on.	10-65.....	.05

ROUND CONTROL KNOBS.



All for 1/4" shaft, unless otherwise noted. Bakelite, very neat. Descriptions show uses.

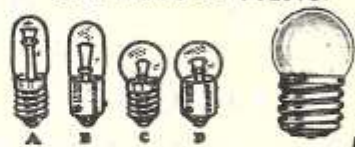
- (1) Small black pointer. 11/16" dia. Fit 1-tuber. 10-9. .10
- (1) Same, except walnut. Many uses on tiny sets. 10-10. .10
- (2) ROUND dome knob. 3/4" dia. Walnut. Use on Verniers, midgets or vol. controls. 10-11. .10
- (3) Round dome knob. 7/8" dia. Walnut. Same use. Fancy for most midgets, VC, etc. 10-12. .10
- (4) Pointed dome knob. 3/4" in dia. Walnut. OK for same use, or for small spaces. 10-21. .10
- (4) Same, except 7/8" dia. OK for Xmtrs, midgets. 10-22. .10
- (5) Arrow knob. 1 1/2" dia. Black engraved arrow. Good for Xmtr. switches, panels, etc. 10-13. .10
- (6) Same, except no arrow. Has walnut finish. Many uses as console sets, Xmtrs, etc. 10-14. .10
- (6) Same, except 3/16" shaft. Many uses around shop. 10-15. .08
- (7) Black pointer knob. 1-5/8" dia. 3/16" shaft only. 10-16. .08
- (8) Push-on knob. For 1/4" dia. knurled shaft. Various shapes, sizes & colors. 10-20. .05

DIAL CABLE.

Some like to fit cables on the set themselves. Eleven years in a Radio shop told us we couldn't substitute thread for cable. The prices are per foot. Allow some extra, when ordering.

Light linen, strong.	10-36. .03
Heavy " "	10-37. .03
Linen & Phos. bronze.	10-38. .03
Heavy braided, same.	10-39. .03
Heavy " steel.	10-40. .03

DIAL LAMPS or PILOTS.



Mostly Mazda lamps. Miniature. Give Mazda number when ordering.

(A) Tubular, screw base:				
Mazda	Volts	Amperes	CAT. #	Each
41	2.5	.5	10-42	.10
42	3.2	.35	10-43	.15
40	6.8	.15	10-44	.10
46	6.8	.25	10-49	.10
48	2.	.06	10-66	.15
(B) Tubular, Bayonet base:				
43	2.5	.65	10-67	.10
44	6.8	.25	10-68	.10
45	3.2	.35	10-69	.15
49	2.	.06	10-70	.15
47	6.8	.015	10-45	.10
(C) Round, screw base:				
50	6.8	.5	10-46	.10
(D) Round, Bayonet base:				
51	6.8	1 cpwr	10-47	.10
55	6.8	2 "	10-71	.10
(E) Philco-Victor. 110 v. 1 1/2" dia. Frosted. 10 w. 10-48. .15				

DIAL LAMP SOCKETS & JEWELS



(1) Min. screw socket.	10-50. .15
(2) Bayonet type "	10-51. .15
(3) Red jewel screw.	10-56. .40
Green " "	10-60. .40
Red bayonet type.	10-61. .40
Green " "	10-62. .40
(4) Miniature pigtail socket for dial or flashlamps.	25-33. .10

DIAL & FLASH LAMP COLORING

Color your dial lamps or flash light lamps red or green. Screw lamp into pigtail socket, and hook to battery. Dip into coloring and let dry, when lit. Remove coloring with Wood alcohol.

Red, 1 dram bottle.	10-53. .10
Green, " "	10-54. .10

BEZELS, or PANEL WINDOW.

About 1" dia. Screen allows light or air to circulate thru the panel. 25-31. Each, 2 pc..05

PROPER PANEL LAYOUTS.

It is a good idea to lay one's panel plan on a sheet of paper. Place dials and knobs where you want them, for operation and appearance. Then center-punch into your panel when Okeh.

Mount tank cond. in upper left and RF gain & Ant. cond. below. Upper right place vernier cond. and below this the volume & Reg. controls. Place speaker on extreme right. Jack may be under speaker, or lower center panel. This is for a right-hander.