

RADIO BUILDER & HOBBYIST

No. 36

No. 36

FOR THE EXPERIMENTER

By Subscription: 12 Issues \$1.50; 6 for 80¢;

3 for 40¢. Per Copy 15¢. Only available

back/numbers 25, 26, 27, 28, 29, 30,

31, 32, 33, 34, 35 at 15¢ each.

Litho. in

U.S.A.

by

MRL.

Published by

Modern Radio Laboratories

Redwood City, Calif., U.S.A.

"Books are the Best, most Generous and least Exacting of Friends." Bruce Barton

CONTENTS

Editorial Noise Level.....	1
Old Timer's Column.....	1
Short Wave QSL's. Anglado.....	2
Points of Interest on 40.Mills	2
MRL 4-Tube Receiver.....	2
Japanese NYK Line Opens.....	3
Water is an Alcohol?.....	3
Television Hazards.....	4
Radio History Scraps. Anglado.	4
"Radio & Hobbies.".....	4
A DX Operating Table.....	4
Building Transistor Set. Grace	5
Mexican BC Stations. Anglado..	6
World Trade Fair in S.F.....	6
Varian Associates' Open House.	6
Dodge San Leandro Plant.....	7
Anent the Spanish Operators...	7
National Amateur Rdo. Council.	7
Note to Bum Writers.....	7
Some Points on Crystal Lattice	
and Band Theory.....	8
Transistors Will Come Down....	8
Did U Work the Puzzle in #35?.	8
P.O. asks for more Money.....	8
New Postage Rates.....	9
Announcements.....	9
MRL Classified Ads.....	10
MRL Correspondence Club.....	10
Temperature of Bread Toasters.	10

EDITORIAL NOISE LEVEL.

Well, slap me in the slats and call me Slattery - if RB isn't out again! - now the 3rd one for this year. For awhile we had our doubts, but finally made it.

For the past months we have been busy, on the side, building a 9-unit apartment house - what, along with furnishings, etc. it was a wonder we got out alive. RB-36 was almost finished, when it came time for us to move.

We are only 3 blocks north of Broadway, in RC, and close to all chain stores, etc. - making it quite handy. A little more room than Valota Road, and as nice a place to work. However, this is of very little interest to our Radio Fans, so will proceed.

With our original plan for p. 1-10 of CAT. we figured we had its revision licked. But, again, we find so much of it intermingled with other sections, etc. that our CAT. still looks like a fishnet. In our effort to get the job over, we have taken a little more time and photo'd 4 pages instead of the usual 2. You will note that much helpful data is

added, not shown in other's.

Getting lots of good reports on HB-4 and the 1-tuber. Also we use a lot of midnight oil trying to keep up-to-date on coil orders. Several repeat orders show the little Rig is "speaking for itself." Have assembled, wired and tested a number of them and find they go together fine. When soldering the Antenna wire onto the Ant. Cond. tin the eyelet & wire, and just touch the iron, as Celluloid burns right now! On wired sets, we balance the series secondary condenser with our signal generator - but you may change it, if desired.

It's still amazing how many hard-headed Dealers and Fans are still discounting the Xtal's ability to pull DX. Will cook up an article about an Australian writer who says "Xtals are still only good for 25 miles." He sure would be laughed out of town by many of our Miss. valley customers who pick off 1000 miles the first crack with a #2, 2-A, or a #10. We hear these rebuffs every day - so we just ignore them. Every day some large new company starts making Diodes or Transistors, to the tune of Big Biz - so it seems no end to their developments, in the Labs.

From the looks of recent mail, the fellows are running into cold nights - and getting the old Soldering iron warmed up. While we can't blame anyone for not messing with Radio in the hot, sultry summer days - nevertheless, our biggest months are getting to be July and Aug. For years, in the past, most Dealers went fishing because nobody came in. Times do change, and how!

In this "RB and H" we have tried to interest you in this & that. Our files are bulging, so guess the only way we can empty them, is to get more data out to you. Some fellows have graciously sent some splendid material in for future RBs. Well, if we had your subscription, maybe you'd get as much kick out of it as we do. What say?

YE OLD TIMER'S COLUMN. (B4. 1924)

Maybe a little column on Ye Old Timers may not be amiss. BC started in about 1924, so we'll

say Fans b4 1930 are really Old Timers. Will list them as space permits. Boy, we got a lot of them on our lists. Here are just a few:

O. E. Scholen, Alderwood Manor, Wash. has been in Radio since 1911. We are proud to say he began with MRL in 1933, and had received "MRL Oscillator" #1, now out of print. He has renewed his subscription from time to time, and usually keeps paid ahead. He has beat EO's service by 2 yrs.!

Earle M. Shearer, Miami, Fla., started Radio in 1919. He is a recent 12 issue Subscriber, and hope he stays with us.

Edward Lindberg, Buffalo, N.Y. started in 1928. Has been active with MRL since 1949. May not seem long, but it's 25 yrs.

E. D. Tressler, Oxford, Nebr. in 1922 bought a 3-tuber from Wm. B Duck Co., Toledo, and went on the air. He has been with us since 1951.

H. H. Parker, Los Gatos, Calif. a good College man, writer, Philatelist, farmer, Radio Experimenter, and a swell fellow. Started with us in 1934 with #3 RB, and keeps subscription away ahead.

Hugo J. Andreoni, San Francisco began Radio in 1928. He has been with MRL since 1951. A good subscriber to RB.

Frank E. Johnson, W6JWF, San Francisco started away back when - anyway, he began with us in SF in 1934, received #2 "MRL Oscillator." Has always had a Ham sta. as far as we can remember. He kept contact with us, even during the War in England. Collaborates with the Red Cross in CD work. Steady subscriber to RB. Is an official of National Amateur Radio Council.

Walter Johnson, East Palo Alto, Calif. has really been on our FB list a long time. In fact, since 1934, starting with #3 "MRL Oscillator." Has been a good buyer of MRL a long time, - and raises barnyard nuggets while not operating his Hammerlund Receiver.

SHORT WAVE QSL'S.

By Geo. Anglado, 719 Dorries,
Biloxi, Miss.

From the reports I see coming in on the 1-tube DC set (HB-4), I wonder how many of its users have made a Hobby of becoming a QSL Collector. "QSL" means "receipt" in Radio language.

Every broadcasting station in the World is interested in knowing how its transmissions are heard around the World. They invite every listener to send in reports on the quality of their reception. In return, they send you a verification in the form of a QSL card. Some of them also send stamps, souvenirs, booklets, etc. However, there are some as the BBC in London, that do not verify.

A properly filled out report will result in your receiving more cards than a report that isn't made up properly.

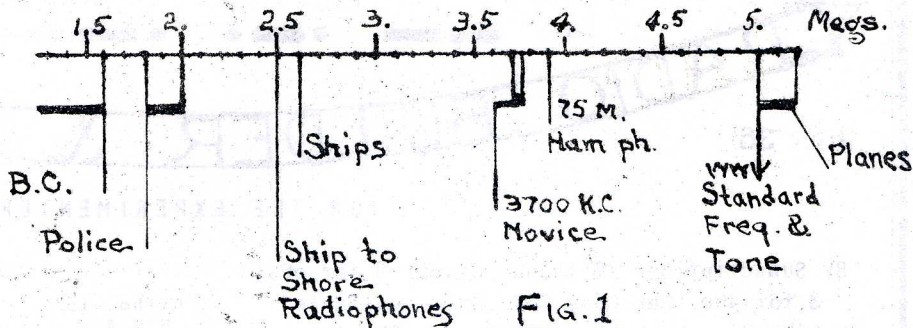
Reporting is simple, and in most cases, may be written in English, except perhaps some So. American stations, which prefer theirs in Spanish. The most important thing, is to be sure you write to the correct station you have heard, as a wrong report is not answered. A station requires that you mention, in your report what you have heard for at least a half-hour, with the exact time given in G.M.T. (London time). If you cannot give the name of the music you have heard, then U may get it if you say "song by a man" or "piano solo," etc., with the exact time it was heard.

The stations, and their technical staffs are very interested in having as full information as possible, and prefer it in the following order:

- (1) Frequency & wavelength, as megacycles and meters. Date and time (GMT) program is heard.
- (2) Strength and intelligibility, given by QSA code and R codes shown below.
- (3) Fading, including the rapidity of fading, and if the station fades out completely.
- (4) Interference from other stations, given by means of the QRM code.
- (5) Atmospheric electricity as Static, given by means of the QRN code.
- (6) Description of receiver U are using, as battery or AC, no. of tubes, and if working into a speaker or phones.
- (7) Type of Antenna used, with length, height, and direction it is pointing.
- (8) For comparison information as to how other stations, on the same wavelength are heard at the same time.
- (9) The kind of weather.

If you want to make your report especially effective, you may listen to the same station for several days, and report on each period, altho this is not necessary.

The following are the codes that stations prefer. Use them



for each station:

QRM---Interference by other stations.
QRN---Disturbance by static.
QSB--- " " fading.
QRG---Wavelength or frequency.
QTH---Address.
RX---Receiver.
QSA---Signal strength of station.
QSL---Send verification card.

The QSA of the station is rated in the following grades:

QSA 0---Hear nothing, or disappears.
" 1---Weak, hardly audible.
" 2---Readable, but weak.
" 3--- " , some difficulty.
" 4--- " , without " .
" 5---Perfectly readable, good.

There is also another code that is used, especially by Amateur transmitters, called the "R.S.T." code. "R" means readability and goes from 0 to 5. "S" means strength, and goes from 0 to 9. "T" means tone, and also goes from 0 to 9, where a CW sig is used.

In broadcasting, too, "R" with about 9 degrees, with the following values, is used for the strength of signal:

R 0---Not heard.
R 1---Hardly audible.
R 2---Weak, few words distinguished.
R 3--- " , fairly intelligible.
R 4---Intelligible.
R 5---Med. quality, understood.
R 6---Fair intensity of sound.
R 7---Rather powerful.
R 8---Powerful.
R 9---Exceedingly powerful.

Some countries request an International reply coupon, and if necessary, one should be sent. This is the amount, in their funds, necessary to send a letter back to you. They can be obtained at the local Post office.

It is a great Hobby, and a lot of fun listening to SW stations, but it is a bigger thrill when receiving a beautifully printed QSL card. And, don't forget, some stations also send souvenirs, stamps, etc. This reminds me of the time HCJB, Quito, Ecuador, verified to me. Besides receiving the QSL card, I also received a booklet with photos, and complete information on the station.

However, before you start QSL-ing, do you have your subscription to RB? If not, you had better get it in soon as possible, as "RB" is a growing mag. and

some very fine material is coming up in future issues.

Watch for my next article on "Wave Bands & When to Use Them" which will appear in RB-37.

Happy QSL'ing.

POINTS OF INTEREST ON THE 80 METER BAND.

By Richard Mills, Gallipolis, O.

It took me a long time to learn all the Ham bands. I have heard everything from 32 megs. to WIAW.

In the diagram, Fig. 1, we run into the Police frequencies at 1.8 meg./C.

Next is the 2.5 megs. for the ship-to-shore Radio phones and the ship code.

From 3700-3750 KC we find the Novice CW band, which is the interesting part of the 80 meter band. Be sure to have the BFO switch on, so you'll get the CW code. Here you will be hearing a Novice calling "CQ" - and slow enough for a beginner to copy.

Next is the 75 meter Amateur phone band.

Now we move up to 5 megs. and get WWV, Washington, transmitting music, every hour on the hour. You may set your Oscillator, or mark your dial on this station, as it is a standard.

Moving up about 5 KC you find the Aircraft stations.

Station at Del Rio, Texas, is XERA, which used to be XERA.

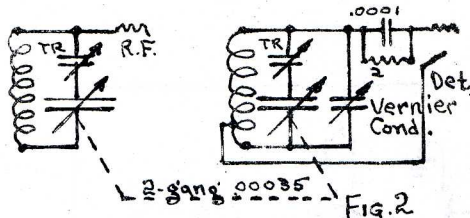
Nothing like RB and CATALOG

(EDITOR: We have shown his dial in comparison to our 80 m. and 160 m. coils. We figure the Ham bands run about the middle of each. For instance, in the 20, 40, 80, 160 octaves, they run about the center of the dial when using a .00014 mfd. tuning condenser. Or, the same if you use our .00035 Var. cond. with a 25-280 mmfd. trimmer in series.)

MRL 4-TUBE ALL-WAVE RECEIVER.

Many have asked details on our diagram, shown on page E-2 of the MRL Catalog. For lack of time, we haven't been able to make up a plan or Handbook for this rig.

This set is really a hum-dinger, and may surpass many a commercial set, if carefully built. You can sit down and almost tune in the World with it. When we used to build this set, in the 30's, we got amazing reports.



Perhaps in the near future we may be able to make up a Handbook, or something, giving all the details. (You know it takes several months to get up a Handbook!)

However, for the present, the layout is about the same as we would use today. The main difference is that the 2-gang mid-gate .00014 Variable condenser is almost impossible to get, at a good price. About the time we get used to specifying a mid-gate condenser the manufacturers limit their production to Government buyers. Rather than being left out on a limb in the future - we are eliminating them from all our plans. Nevertheless, we find the new combination to work as well, and at much less price.

If you'll refer to Fig. 2, you will see how we use a 2-gang .00035 Var. cond. in series with (2) 25-280 mmfd. trimmers to get .00014, or near. The beauty of this combination is that you can adjust the combination to cover a band where you want it.

The 2-plate vernier condenser, shown at right on panel, for SW stations is most important. It is not necessary to hook one across the RF stage, as it doesn't tune sharp enough on SW bands, & no vernier is needed on the BC band. It is a good idea to separate the 2 plates of the trimmer condenser - so you'll get better band-spread - even as much as $\frac{1}{2}$ " is good. You can then really sneak up on those whistlers!

We adjust the 25-280 trimmers on BC band, around 1000 KC. You will find them to work OK on the SW bands. So, working in reverse - we do not need the Vernier 2-plate on the BC band, but the RF tunes sharper in this range. But we need the Vernier on SW bands, but the RF tunes broadly.

If you are using our coils, it is a good idea to use an Oscillator to get the 25-280 Trimmers lined up so the coils cover the bands as shown in our Handbook 4 on page 14.

When mounting the speaker onto the Aluminum panel, be sure to place some Celotex, or other soft baffle between the speaker frame and the panel, to keep down surplus vibrations.

Following is a list of parts, which can all be furnished, except the Aluminum panel. We no longer cut it because it is dangerous with our metal saw, & we don't have a metal shears in the Shop.

Be sure to add postage to the following prices:

- | | | |
|--|------------|------|
| 1 2-gang .00035 Var. | 8-10. | 1.75 |
| 2 25-280 Trimmers. | 8-117. (2) | .30 |
| 1 2-plate Ant. Condenser layout, same as 1-tube. | 8-118. | 1.50 |

- | | | |
|--|-----------|------|
| 1 .0001 Mica Condenser. | 8-18. | .15 |
| 1 .00025 " " | 8-19. | .15 |
| 2 .01 x 600 Bypass. | 8-40. (2) | .20 |
| 3 .05 do | 8-43. (3) | .36 |
| 2 .1 do | 8-44. (2) | .30 |
| 1 .5 do | 8-46. | .25 |
| 1 25 mfd. x 50 v. By. | 8-38. | .35 |
| 1 10 " x 450 Filter. | 8-73. | .60 |
| 1 8x8 " x 450 v. " | 8-72. | .87 |
| 1 10M Vol. Con. & Sw. | 19-15. | .75 |
| 1 50M do | 19-14. | .75 |
| 1 15M Bleeder Res. | 19-9. | .90 |
| 1 2 meg. x $\frac{1}{2}$ w. resistor. | | .05 |
| 1 250 ohm " " | | .05 |
| 1 400 " x 1 watt resistor. | | .05 |
| 1 5000 " do | | .05 |
| 1 15,000 do | | .05 |
| 1 75,000 do | | .05 |
| 2 100,000 do | | .10 |
| 1 500,000 do | | .05 |
| 1 RF Choke. | 6-2. | .30 |
| 1 8 Hy Filter Choke. | 6-6. | 1.00 |
| 1 5" Dynamic & Trans. | 21-17. | 3.50 |
| 1 Power Transformer. | 24-10. | 3.00 |
| 1 Double Phone jack. | 17-32. | .25 |
| 3 Octal wafer sockets. | 25-11. | .30 |
| 2 4-prong do | 25-6. | .20 |
| 1 5-prong do | 25-7. | .10 |
| 1 7x10 Compo. Base, | 16-2. | .19 |
| 1 7x12 Alum. panel, you furnish. | | |
| 2 6SK7 tubes. | (2) | 1.70 |
| 1 6V6 tube | | 1.00 |
| 1 80 tube. | | .70 |
| 1 Set MRL RF Coils. 20,40,80,160 meters. | 7-16. | 2.00 |
| 1 Set O, for above. | 7-11. | 2.50 |
| 1 MRL RF-HF BC Coil. | 7-18. | .50 |
| 1 MRL RF-LF " | 7-19. | .50 |
| 1 MRL O-HF " | 7-13. | .75 |
| 1 MRL O-LF " | 7-14. | .75 |
- Wire, Hardware, see CATALOG.

JAPANESE NYK LINE OPENS IN S.F.

In May, 1953, the NYK line opened again in S.F., first time since the War. No doubt it is an offspring of the old TKK line. Most of their big World-wide ships were blown up during the War. They were all large, white ships that used to steam into S.F. Bay.

I remember in June, 1920, when 3 of us came to S.F. to go to Sea. At that time I lived in Los Angeles, but possibility of getting an Opr. job out of San Pedro was very slim. So, we'd all come to S.F. and stick around the old RCA office on Stuart St. and wait for a Ship.

We arrived on Saturday, and me without a job, or even a prospect for one, spent almost my last \$20 for a camera on Sunday, to get a picture of the "Tenyo Maru" one of the TKK Line. However, the next a.m. I got a job in an Electrical plant, so could eat my beans OK.

These ships almost took over shipping on the Pacific coast. Used to go down and watch the Picture Brides arrive, when we had nothing to do, or "on the beach." Used to sail up the Columbia River, and seldom met one of their ships. When I quit, in 1923, almost every other ship was a Japanese cargo ship.

However, they weren't nice, clean ships like their passenger boats, but very dirty. Wash water was thrown on deck to keep it clean, and save fresh water. Also, an old-fashioned pump handle was located on deck, to pump up

fresh water from the tanks below deck. Paint was seldom used, due to the expense. Standard used tons of paint, so it made their ships look dingy. Women were also carried aboard the ships.

In St. Helens, Oregon I went aboard the "Denmark Maru" one time we layed over. It was just before dark. The lights were so dim, all you could see were the wires. The Op. said it was from the Accumulator (storage batt.). He was very nice and polite, and of course, in uniform, no matter how dirty the ship!

His equipment was very peculiar, even to us at that time. He had large slider coils - with threaded rods that turned, and moved the slider along. This rod was turned by a 1" crank on the front.

His key was what we used to dub the "teakettle knob," and was placed on the front edge of the table, and he grabbed it and worked it up and down. The English also use the same knob, so we used to ask "what foot was he sending with now?"

My first SOS I picked up was from the "Tokuyo Maru" (JTW) off Tillamook, Oregon, in 1921. It was loaded with lumber from Portland to Japan. I picked up the SOS about 4:15 pm, with the phones on the table. He was so close, it almost scared me to death! Was Op on the old "El Segundo" of the Standard Oil Co., at the time. All hands were rescued by the USAT "Buford" by 6 pm. Later saw a picture in the World-wide Wireless News (RCA) - which I still possess. Sure was a hot bonfire, no fooling! The Op said "hurry up, come quick," and I really believe he meant it - with smoke 1000 ft. high!

The Jap Ops used to have a good laugh on us. Their big 5 KW spark sets used to jam our 6-8 pm Position reports (TR's) and other traffic we could dig up. They used to send for hours, on full steam, in the Japanese code that none of us could read. So, we didn't know if they were "on business" or chewing the fat, so we couldn't turn them in! Hi. So we'd shut down and go back aft for coffee and --.

A Jap Op. was required to pass a 25 WPM code test in Continental and 30 WPM in Japanese code to get a job. You could always recognize their swing, which was very rhythmical, even tho they kept "swinging on the old Teakettle."

WATER IS AN ALCOHOL???

Removing the Hydrocarbon atom CH₃ from Ethyl alcohol twice - gives us water, as

C₂H₅OH (Ethyl alcohol) - CH₂ = CH₃OH (Wood alcohol) - CH₂ gives H₂O (water). Or, take Ethane C₂H₄ away, and you get the same.

However, nobody can make me believe some of these Sunday drivers have been drinking too much WATER?

TELEVISION HAZARDS.

(1) Don't repair TV unless you are qualified. High voltage secondaries may run around 1500 v. A.C. Several have been killed by reaching into a TV chassis, when it was hot and their feet wet.

(2) Do not cover up the louvre holes for ventilation, as a TV set needs plenty of cooling.

(3) Install a good Lightning Arrester outside the window. You may use 2 of our CAT. 1-34.

each with one side of each connected to the ground. Run the 2 outside to the TV leads. A TV Aerial increases the chance of lighting striking a house.

(4) Do not place a magnifying lens where sunlight may start a fire by focussing.

(5) Be sure your TV set you buy is Underwriter's approved.

RADIO HISTORY SCRAPS.

By Geo. Anglado, 719 Dorries, Biloxi, Miss.

Heinrich Hertz, German Professor, discovered the actual existence of electromagnetic waves by demonstration. They are known today as "Radio waves."

Sir Oliver Lodge worked out the idea of determining the length of a Radio wave on the principle of sympathetic vibration.

Marconi signalled the letter "S" across the Atlantic from Poldhu in 1901. That is, from Poldhu, England to Newfoundland. His Antenna consisted of 400 ft. of wire lifted by a kite.

Dr. Reginald Fessenden, a Canadian scientist, was the first to succeed in transmitting sound by means of Radio waves. This was accomplished, using a continuous wave (CW) transmitter.

John Fleming, English scientist, invented the elementary Radio tube. This was in 1904, and the tube was called the "Fleming Valve."

In 1905, Dr. Lee DeForest inserted the grid in the tube.

Radio was used for the first time in Sea rescue when the White Star liner "Republic" was rammed and sunk. The SOS was sent by Wireless operator Jack Binns. The signal was CQD (come damn quick), before SOS was invented.

Radar was invented by Taylor & Young in 1922.

Radio beacon was invented by Donovan in 1928; Radio broadcaster by Stubblefield in 1902; Crystal oscillator by Nicolson in 1918; Radiometer by Crooks in 1918; Receiver cascade tuning by Alexanderson in 1913; Heterodyne receiver by Fessenden in 1913.

What have you to invent?

"RADIO & HOBBIES"

Our good friend, P.J. Kavaleski Mich. has given us some data on subscribing to "Radio & Hobbies" of Australia.

Send \$3 in U.S. paper dollars, or Canadian, or U.S. Money or-

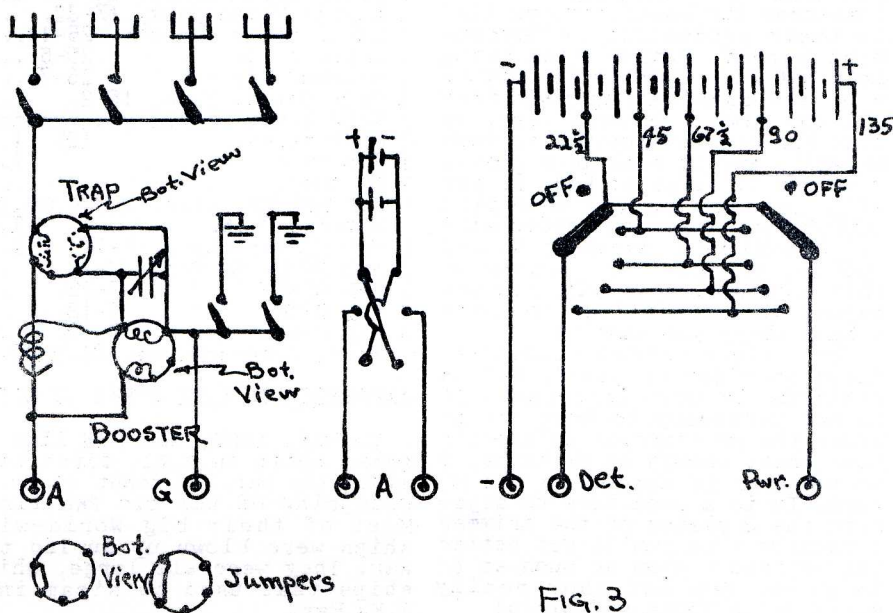
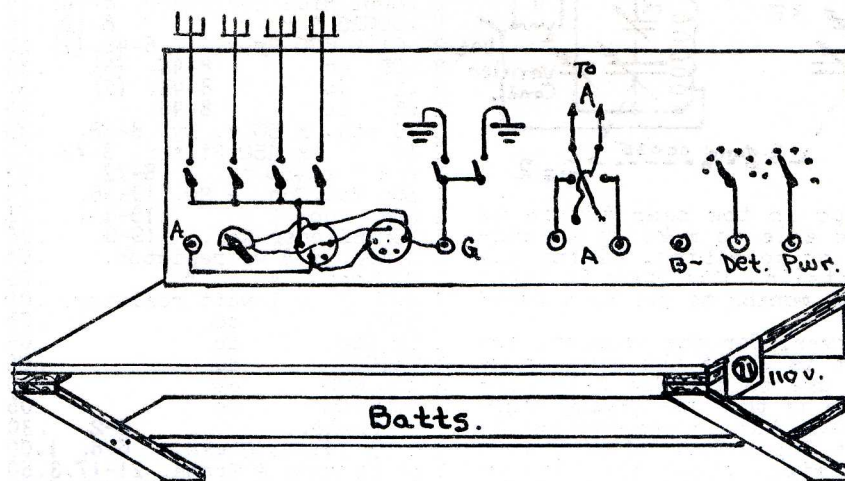


Fig. 3

der, payable in Australia. If U send it by Air-mail at 25¢ per half ounce, it will get there within 8-9 days. If by ordinary mail - it may take 4 months b4 you'll get your Magazine.

Mr. Kavaleski has gotten 32 replies from Australia, from a notice he ran in the mag.

You'll find several good Radio articles in each issue - lots of them are constructional, and all are down to Earth for the likes of us! Much other interesting Hobby data is also very well put up.

Older copies, we have on hand, run 100 pages, 7½" x 11½".

You may get special treatment, if you mention Mr. Kavaleski, or Modern Radio Labs.

A DX OPERATING TABLE.

Parts list:

- 6 SPST Toggle sw.
- 1 DPDT knife sw.
- 2 MRL Switch levers.
- 10 " " points.
- 4 " " stops.

- 7 Tip Jacks.
- 1 Set 5-A SW coils.
- 1 5-A HF BC coil.
- 1 5-A LF BC "
- 1 5-A Long wave"
- 2 5-prong wafer sock.
- 1 .00035 Var. Cond.
- 1 1½" Bar. & Scale.
- 2 Sm. 5 pr. bases.
- Hookup, solder.
- 2 Large drycells
- B-Batts. 22½ v. to 135 v.
- Lumber, panel, see text.

Most DX'ers have a mess of wires laying around- always getting in the way - always blowing out tubes. Besides, they can't log anything down, as they forget how it was hooked up "when I got that 5000 mile station - and how was it tuned?"

The layout, in Fig. 3, is somewhat of a variation of our MRL "50-in-1 Tuner" (DP-61, -), except we have it layed out on a large panel in front of you.

The shelf may be built of a piece of ½" plywood, 18" wide by 3 feet long. Put a 1x4 cleat on the wall and let the edge rest

on it. Then, run a couple of 1x2 pieces under the table to make it stronger. Fasten 1x2 braces down to the baseboard to hold it up rigidly. A small shelf for the batteries can be fashioned underneath, to keep them out of the way.

The only seemingly complicated part is the arrangement of the 2 5-prong wafer sockets, for the wave trap in series, or the parallel booster, and both using the same .00035 variable condenser. You will see we plug in a 5-A SW coil, or BC, etc. at will - either with the tickler in series with the Aerial and Set, or across the Aerial and Ground, as a booster, just by changing position of the coil.

Then, we have 2 small dummy tube bases of 5-prongs, with the jumpers across as shown. One of them shorts between Aerial and Set, in case you don't want the wave trap in use. The other dummy connects the .00035 Variable condenser in series with Aerial and Set for primary tuning. If U happen to get the dummy plugged into the parallel socket, nothing will happen.

When tuning around 40 meters, for instance, plug the 5-A 40 m. coil into the wave trap socket. You can then separate a couple of CW, or phone stations, if they are bothering each other, or if you have a strong Ham down the street.

Likewise, if you plug the 40 m. coil into the booster socket, & the dummy jumper that shorts the Aerial to Set, you then use the .00035 to boost the signal. You will then get a thrill out of tuning in DX stations, as it seems to "push out" the station from the others. In hooking up this booster socket, just wrap an insulated wire lead from the grid side of coil loosely around the Aerial lead, as shown. If you connect it directly, it may tend to keep the 1-tube sets from working properly. If you are using a stage of TRF, you may connect this lead direct, provided the set uses a primary. The same boosting effect results.

You will note several SPST toggle switches - one to each of your Aerials. We have always been in favor of several Aerials, as some stations work better on an Aerial of a certain length. At one time we suggested using a SPDT knife switch from one Ant. to another. But, this doesn't allow use of both Aerials at one time. So, with a SPST toggle on each Aerial, you may use one, none, or all at your pleasure.

While most fellows usually rig up all grounds together - it is a good idea to use the same idea on the ground system where you may use 1, all or none.

Another good stunt is the use of a DPDT Knife switch on your filament battery line. MRL has made many tests on the 1-tuber, and other rigs, and have found it to work better in one direction than the other. With certain SW bands it works better poled one way. Even a 1Q5 tube works differently than a 1C5, etc. The Old

Timers may remember that some of the designers put A-B- together, while others use Aplus and B-. We never could see what makes the difference, but when you get this panel to working, you'll find there are differences. And, especially on DX, you'll find a remarkable difference.

Another good stunt is that you may pull the DPDT knife switch straight out and disconnect the A batteries altogether. You will make them last longer if you hook 2-drycells in parallel, to get 1.5 volts. In this way they seem to last forever.

For the B-batteries, we hook them all up in series, but run taps from 22½, 45, etc. to the switch points. By having your B-batteries connected up this way, you will prevent them from becoming shorted, and possibly you may save a tube, as well. Each lever runs to a tip jack on the panel. This will give you a very quick throw from one voltage to another.

All in all - we believe this DX Table will be well worth its time to construct. It is a lot better than most of our benches, which have wires dangling all over them. Probably the saving in tubes, shorted batteries and a pair of wrecked phones may soon pay for its construction.

It isn't especially constructed for our 1-tuber, but may be used for any battery, AC or Xtal set.

It may also be handy to hook up a 110 v. receptacle at the lower right, to take a soldering iron, 110, etc.

There are lots of variations in tuning. We hope, in our meager effort, that we have succeeded in giving you some idea that may be of use in shootin' DX stations.

BUILDING A TRANSISTOR SET

By Dr. W.H. Grace, Jr.,
New York

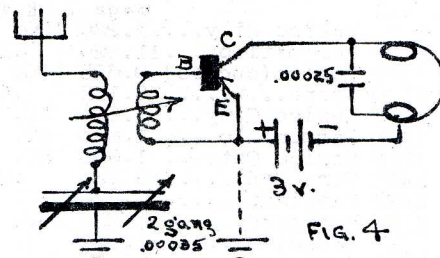
The current issue of RB #35 came today, and it is excellent. My congratulations!

I note your reference to the little article I did for "Radio Electronics" magazine, pertaining to the Transistor rig. You mentioned that such a hookup may be adapted to almost any crystal set, using a Transistor in place of a diode. That is correct, but I think your readers may find better overall results with a grounded emitter circuit, rather than with a grounded base type of connection.

Some of the Transistors, with which I have experimented, seem to work best as detector/amplifier when employed in grounded emitter circuits, while a few gave loudest signals only when the base was grounded. The W.E. Co. Transistor, used in the tuner in RE, was a 2-point contact variety. However, the Raytheon CK-722 is more easily procurable to your average reader. This is a junction type device, and is of the PNP design. The minus side of the battery must always go

to the collector, in this kind of a crystal Triode. Naturally, with any NPN Transistor, the reverse holds true. This is a good point to remember, - it will save a lot of money, as running the voltage in the wrong direction is a fine way to burn out the Triode - but quickly!

The advantage of the grounded emitter is that the input impedance is approximately 1000 ohms. The output about 20,000 ohms. CK-722, in the "grounded" base, is about 50 ohms input and about 100,000 ohms output.



If any of your readers want to build a simple Transistor set, requiring no more skill than an ordinary Crystal rig, the following may prove useful as an introduction to Transistor applications. This circuit is built around a Raytheon CK-722. It uses the very minimum of parts, & gives a fine signal in the headphones about 3 to 5 times that of a diode under the same conditions of operation.

The coil is 160 turns #28 DCC, tapped at 5-10-20-60-100-160 and run to switch points. The secondary of 25 turns #22 DCC, 1½" in diameter, fits inside the 2XM 2" form upon which the primary is wound. Arrange the secondary so it may be pulled in and out, possibly with a ¼" wooden shaft as a handle. Or, it may be turned around on a pivot, or shaft, operated from the panel. The identical effect is obtained. The primary is tuned by a 2-gang in series with both stators hooked together. (CAT. 8-10.) If you pull out the secondary, it will help in selectivity. Any type of Crystal set tuner, shown in our circuits may be adapted to this Transistor.

There is nothing tricky about it, except the adjustment of the coupling between coils. If oscillation takes place, or the signal is rough, decrease the coupling accordingly. Disconnect the battery when the receiver is not in use. A single battery will last a very long time. One other caution, never allow more than 2 mls. to pass in the collector circuit.

Perhaps some of the boys will enjoy doodling around with this rig. It plays a speaker quite nicely on strong signals out here. (Ed. A magnetic speaker is preferred, altho maybe an output transformer may be used with a PM speaker).

A NEW MARKET FOR TELEVISION.

A woman, in San Pedro, Calif., keeps 5 snakes, as pets, and she says they enjoy watching TV.

Due to so many requests for a list of Mexican BC stations, Mr. Anglado, Biloxi, Miss., has obtained the following list direct from Mexico. We have re-arranged them alphabetically by call letters, and again by frequencies so you will find this a handy chart to follow. They often make a change, so we cannot guarantee the accuracy for all times.

Call		mgs.	K.W.
XEP	Mexico City....	1.220	100.
XEBR	Hermosillo....	11.820	.15
XEBT	Mexico (cuckoo)	9.625	10.
XEOC	Norte.....	6.135	.05
XECY	Mexico City...	1.000	10.
XEDM	Hermosillo....	1.580	30.
XEDP	Mexico City....	1.060	50.
XEBT	Vera Cruz....	9.545	.25
XEFW	Tampico.....	.810	50.
XEG	Monterrey....	1.050	100.
XEHH	Zempoala.....	11.880	1.
XEHL	Guadalajara...	1.010	10.
XBJG	"	4.820	.2
XELW	Morelia.....	6.030	.5
XELO	Juarez.....	.800	150.
XENN	Mexico City...	11.780	.50
XENT	Nuevo Laredo..	1.140	50.
XFOI	Mexico City...	6.010	2.5
XEOY	"	1.000	10.
XFOY	"	.940	100.
XFOB	Bolivar.....	1.110	20.
XFOH	"	6.130	.1
XELG	Mexico City...	9.680	1.
XBP	XERA Del Rio, Tex.	Discon.	
XERB	Rosario.....	1.090	50.
XERF	Villa Acuna...	1.570	50.
XERQ	Mexico City	9.610	5.
XETT	Delores.....	9.555	.5
XFTW	Tampico.....	6.045	.1
XFTM	Mexico City...	.860	5.
XELW	Vera Cruz.....	6.020	.25
XEW	Ayuntamiento..	.900	250.
XEWA	"	.540	100.
XEWK	"	9.500	10.
XEX	Mexico City...	.700	250.
XHX	Mexico City...	.730	250.
XFXA	"	6.175	.1
XFXF	"	11.900	10.
XFXE	"	15.205	10.
XEXF	"	9.535	5.
XEXG	Cordoba.....	6.065	5.
XEXO	Nueva Laredo..	1.550	50.
XEYU	Mexico City...	9.600	.25

Megs.	Call	K.W.
.540	XEWA Ayuntamiento..	100.
.700	XEX Mexico City...	250.
.730	XEX "	250.
.800	XELO Juarez.....	150.
.810	XEFW Tampico.....	50.
.860	XFUN Mexico City...	5.
.900	XEW Ayuntamiento..	250.
.940	XEQ Mexico City...	100.
1.000	XECY "	10.
1.000	XEOY "	10.
1.010	XEHL Guadalajara...	10.
1.050	XEG Monterrey.....	100.
1.060	XEDP Mexico City...	50.
1.090	XERB Rosario.....	50.
1.110	XEQB Bolivar.....	20.
1.140	XENT Nuevo Laredo..	50.
1.220	XEB Mexico City...	100.
1.550	XEXO Nuevo Laredo..	50.
1.570	XEFF Villa Acuna...	50.
1.580	XEDH Hermosillo...	50.
4.820	YFJG Guacalaajara...	2
6.010	XEOI Mexico City...	2.5
6.020	XETW Vera Cruz.....	25
6.030	XPKW Morelia.....	5

You will note the jumps in the wave bands, as 1.580 kc to 6.010 and 6.185-9.500, 9.680-11.780 & 11.900-15.205. However, you will also note that when you get a Mexican wave band, you'll have a good pick of stations within a short range on your dial.

Years ago old XDA was our favorite - he sent too fast for us, but we liked him, anyway! Their accuracy at code is amazing. It has been said they have sent by a hand key some 25-30 messages, without a break, or mistake. You modern Ops, just try and do this and see how hard it is. Then, to add to the confusion, they'd insert their 4 dashes for "CH" and tilde Ens, etc. They had a number of code stations in the 20's, all operating by spark Xmtrs.

We could get XDA, and others, from Los Angeles, with a 1-tuber with good volume. Most of the point-to-point stations operated on long waves, around 5200 M.

During our visit to Mexico City, in 1949, we noticed several Radio towers, but did not realize there were so many stations as listed above. Mexico City, itself, is one of the most modern Cities of this continent. If you'd like a little story about our trip, drop us a card, & we'll "unscrew" a few of the important happenings of our trip.

On June 28, 1953, Mabel and me went to the Fair in the Gold and Concert Rooms of the Palace Hotel, in San Francisco. The KCBS studios are upstairs.

It was quite an exhibit. The Orient was represented more than any other - having as one part, the Asia Room. Even Korea had a small exhibit. The Chinese always turn out en masse whenever there is an exhibit, parade, etc. in S.F. - if they have nothing else they have a swell parade of the Chinese.

From the Shortbreads of Britain to the stuffed vine leaves & stuffed egg plants of Turkey - U never saw as many kinds of food. We understand most all of them can be purchased in S.F. at the City of Paris, and other stores.

Canada had a wonderful exhibit - mostly literature - take your pick! It is easy to get beautiful pictures of this country, as it is mostly all picturesque.

Several movies were in pro-

gress - Japan, Mexico, Europe,
etc. - very interesting.

We button-holed a U.S. Dept. of Commerce official about our difficulty of doing foreign biz via MRL. He said there was no difficulty with Canada, which we have always known, as we have thousands of customers there.

However, all we get from the British Commonwealth of Nations is "we have no money, would you send it free?" or "we are not allowed to send money, would you help the cause of Radio?" etc. Furthermore, they make no attempt to send anything in exchange, not even rocks! The U.S. is well known for being a sucker, and with the money we throw away to them - there should be some form of reciprocation toward us. If they'd be allowed to buy from us - we could find something to get from them - and we'd all be much richer as a result.

The Official said it was a ruling of London, over its Commonwealth, and not the fault of the individual nations. As to money, he said they were right, they didn't have any to send. He hopes it will be ironed out in the future. Before the War 2, we sold to over 52 Foreign countries with very little difficulty - so maybe we should say that "Hitler wrecked our overseas business" - eh what?

On July 1, 1953, Mabel and me attended the open house in their new Palo Alto plant. We have previously described some of the Varian activities in previous issues of Radio Builder.

Their main plant is in San Carlos, which is termed the Electronic center of the Pacific Coast. We have never been in the San Carlos plant. They manufacture the Klystron tubes, as well as other allied products.

The Palo Alto place is an Experimenter's paradise. It is composed of several buildings, each running out from a center, the entrance to the plant.

One is the administrative, with well designed offices, etc. How we'd like to have an office and desks like that. All the sides of the buildings are heavy glass plate. Down about half way is a row of small casement-type windows that open in from the top to give ventilation. They claim no draughts are felt here, which is one of the hardest problems in an office to control. Incidentally, we saw one of our #1250 Multiliths, like ours, going strong!

The experimental buildings are very elaborate. They must conform to standards layed down by the Stanford development Company, as to architecture, etc. They are held up from the center supports with very little weight on the walls. The walls are movable. A flue forces out all gases, after giving them a water bath, so no impurities can get into the air. Most of the buildings are pressurized, to keep down floating

dust particles, that might get into the tubes and affect them. At least, a good part of this is controlled. All electrical circuits and gas lines run in the outside walls, and are easily tapped into at any point.

You never saw so many Oscilloscopes, Oscillators, etc. in Ur life. Many of the rooms are restricted, as so much government work is carried on in them. A large drafting room is one of the adjuncts to the Experimental Laboratory.

A certain experimental project was set up for the benefit of we lockers. A large, round, motor driven signal generator, - some description, was shooting a sine wave into a Scope. A vial of Ethyl alcohol was placed between two points, and the scope turned up a distinctive pattern, with a bright "pip" following the pattern. Any other liquid could be placed there, but would give a distinctive pattern of identification on the Scope.

A vibration test was made of a Klystron tube, whereby a metal ball was rolled down a track to hit the tube, with no appreciable change in frequency shown on the Scope.

The Klystron tubes are very peculiar looking objects, when we think of a Radio tube. Several of them are plug-ins, but others have large pigtail connections. The tube was developed by two Amateurs, in Stanford, several years ago. The idea is to tune the circuit within the tube - which gives them a higher frequency much more easily. Believe they said it could tune up to 9800 mcs. with ease. This could not be done if leads were run to an outside tuning device.

They have one small building to house the Hydrogen gas, used in making tubes. There were various other buildings we did not get into. They have lots of room for expansion - and expect to take on more space later. No land, owned by the Stanford Co. is sold - only leased.

Mabel said the best part of the trip was the Orange juice & cookies, served in the Cafeteria on leaving. She also made a mental note of the nice-looking guide we had on our trip.

More power to Varian.

THE DODGE SAN LEANDRO PLANT.

In June, 1953, Mabel and I visited the above plant, when it celebrated completion of the one millionth Dodge. Apparently we weren't alone, as an estimated 80,000 others attended. It took us about 2 hours to make the tours they had layed out. The plant was spotlessly clean, and a masterpiece of planning.

This is an assembly plant only and it turns out a Dodge every 2 minutes for 2 shifts. It also makes propellers for the Navy & Air forces. Some of the plant is restricted, due to government work that is carried on.

Sections of bodies, and other components come from Detroit, &

hundreds of suppliers along the way. Stampings are spotwelded into larger units on a 196 ft. "merry go round."

The paint dept. is on the 2nd floor - where paint booths cover a half mile of space. They are illuminated by shadowless fluorescent lamps. A 750 pound body is turned with finger tip ease.

Piles and piles of parts - but making 480 autos per day does require a terrific stockpile.

The plant uses enough electricity to light 7000 homes, and gas consumption is 50,000 cubic feet per hour.

It was really quite a reception, and was planned very well. Several refreshment stands for Cokes, ice cream, cookies, etc. were at your pleasure. They had so much ice cream left, that the Carnation wagons were giving it away in armloads near the end. Can say we had a very enjoyable trip, and learned a lot about cars and how they are built.

ANENT THE SPANISH OPERATORS.

Mr. W.L. Galten, of Brisbane, Calif., a veteran Radio Operator of the Airlines, dropped in to make a purchase. He prefers the Pinole Special Crystal Set (DP-65, 7¢) to any other. He has been a good customer of MRL.

Anent the Spanish Ops. he says the Mexican Operators at Meriden Yucatan, etc. are the most speedy with the Cubans next, and then the Brazilians. He says they tie their arm, in some manner, and operate a bug, to the neighborhood of 50 wpm.

He has spent years in the Airline service, as Operator, including Rio de Janeiro, Buenos Aires, Overseas, etc.

Outside of some Foreign planes - the Radio Op. is now OUT, it being taken over by the Pilots in the U.S. planes. This is another repetition of the Morse telegraph Operators in the 20's, being taken over by Teletypes & girl operators at low wages.

While the Union has done a lot for the lonely Operator, - lonely because he is by himself, not being a member of the Deck gang, nor the Black Gang. He has had to fight most of his battles, if lucky, with the aid of only the Skipper. The Op. was "allowed" a privilege of eating at the far end of the Officer's table, possibly because, to let him go in to the Sailors' mess may be a means to his telling all the Ship's business! hi. You know the Old Man is to know all the news first, and he lets it trickle down to the Messboy, Ordinary Seaman and Fireman. Most Ops are to bear the brunt of most jokes. The first one they used to tell me was about the Operators that had jumped overboard as suicides - as the Wireless waves made them all goofy! We were always told about how much Press the previous Op used to get, when there were only a couple of Stations, at that time, and it was impossible to get over 10% of what they claimed he had done.

In 1920, I got \$125 clear, the equivalent of \$225 per month, & it was good money, then. In 1921 we pulled a strike, and lost \$20 per month. When I quit in 1923, I had 6 extra free jobs wished on me, besides the operating. A distinction the crew could never understand, was that the Operator had a better education than anyone else on board. Now they get some \$450 on some ships.

In view of his estimation by the Shipping companies and other officers, and his audacity to hold up ships in a strike, ask for more pay, etc. the companies will eliminate his services if it is possible. The Law requires operators - altho many ships would risk it without one.

Most Ops. preferred Freighters because they lay over longer. I always got the Tankers. To make it worse, the companies, like Standard, installed pressure pumps, to load a ship in 8 hrs. instead of 24. This made life less enjoyable.

Most of this discussion has been about Operators, instead of Mr. Galten. Maybe he'll have the laugh on us, if he gets that big ranch in Argentina - and how we envy him!

NATIONAL AMATEUR RADIO COUNCIL NEWS.

Our good friend, and customer of MRL since 1934, Mr. Frank Johnson, W6JWF, 1403 1/2 San Bruno Ave., San Francisco, has offered to send a copy of the NARC News to anyone sending a 3¢ stamp. It lists important changes in Amateur laws enacted, or pending in Congress, and info. re the FCC, that may help the Amateur keep out of jail! Hi. It usually leads the mags. in this information by 1 to 2 months.

It also lists data on Hamfests and other doings. Also data on Bulletin transmissions, politics and other info. needed by the transmitting Amateur.

Membership in the Council is \$2.00 per year, which includes 8 bulletins mailed to you.

When you join, or write for a copy, be sure to mention MRL. Incidentally, Mr. Johnson is connected with Amateur networks that handle matters, in case of disaster, air raids, floods, etc.

NOTE TO BUM WRITERS!

I am the worst writer in the World - I can't even do as well as the proverbial kid that could read his own writing - something nobody else could do. Luckily - most of my writing is done on the typewriter.

If we can't decipher YOUR kind of writing we cannot keep track of your cards, subscriptions, orders, etc. You know, you might even get a bill that belongs to someone else.

Won't you help us, and help yourself at the same time, by getting some labels (MRL 500 for 50¢) with your name and address on them? Or, make up a rubber stamp - or type your name.

SOME POINTS ON CRYSTAL LATTICE & THE BAND THEORY.

In RB-35 we promised a discussion of some points of the Band theory in semi-conductors, which we present as follows:

Shapes of crystals help the Chemist and Metallurgist determine a substance. Crystals may be classified into 6 fundamental systems of shape. For reference, they are (1) regular, or Isometric; (2) Tetragonal; (3) Orthorhombic; (4) Hexagonal; (5) Monoclinic and (6) Triclinic. You may study them further in your Encyclopedia.

Different substances that may crystallize into the same system are called Isomorphous. Others that may have several crystal forms are called Allotropic. For instance, Carbon may go to the Diamond, in the regular system, or Graphite in the Hexagonal. Sulfur may also form into two different shapes, etc.

Crystals are formed in orderly lines and planes. Plane surfaces are called Faces. An imaginary line drawn from one point to the opposite high point is called the Axis (like the Earth).

When a Monochromatic (1 wavelength) beam of X-ray is shot at the face of a crystal it will reflect the "grain" at a definite angle. During the War, while working at Electrical Products Corp. plant, in Oakland, we shot Quartz crystals with X-rays to get the position of the cut. If they were cut wrong, they would not oscillate. The naked eye can not detect this "grain."

So, this "grain" is a mass of Atoms, built up like a brickwall in 3 dimensions. This is called Crystal Lattice, or space Lattice as you wish. It reflects the X-rays just as if there was a layer there.

Most salts generally have the Crystal lattice made up of Ions.

The Crystal lattice of Carbon, Sulfur and metallic elements are made up of uncharged atoms.

Ductile metals, as Gold, Silver and Copper crystallize in packed atoms, called Face-centered lattice. Ductility (state of being drawn out, as wire, etc.) depends on the ease with which each layer may pass over another layer of atoms.

Organic compounds form Crystals of Molecules.

The Band theory is one of the latest explanations of semi-conduction.

Particles in the Crystal lattice are held together, in orderly fashion by electrical attraction. If this attraction is weakened by Electricity, heat, water absorption, etc. the crystals fall apart.

There are often "holes," or current carriers, in this "wall" - or Crystal lattice. Pure crystals rarely detect - so some impurity must be added to make up the "holes."

Electrons, which always possess a negative charge, may be given up by one element, to combine with another, thereby creating

"holes." This completes the circuit. Conductivity is then obtained by breaking down the resistance. As a "hole" is filled by an electron - it leaves another "hole" to be filled. As the current passes from one crystal switching electron to another, thru the Crystal lattice, we get the effect of detection, rectification, or semi-conduction.

Metals, insulators and semi-conductors all have their electrons arranged in bands, or levels, or like a brick wall, as you may prefer to call them. Each band ordinarily contains one electron.

In metals some bands are filled; others partly filled, and some are empty. An applied electric field may force some of the electrons from the highest filled levels to the empty, which allows the current to flow.

Insulators have a band structure of a filled level, and above this a number of vacant, or forbidden bands. Because all bands of an insulator are full - they cannot be exchanged with empty bands. Conduction of current is now impossible because electrons in a band must exchange energy with the field.

Semi-conductors (detectors or rectifiers) are assortments of good conductors (metal) and poor ones (insulators), due to hazardous mixing. Impurities added to a pure metal will give it the power of a semi-conductor. Impurities added to Silicon make it a "p" type, whereas those added to Germanium make the latter an "n" type.

Our good friend, and customer, Mr. R. Dorneal (M.A. Chem.) of Stanford, has helped explain a few of the above points.

We hope the above has helped to straighten out some of the points. We don't understand it either - do you?

TRANSISTORS WILL COME DOWN.

While Transistors are now at a very high price, they will eventually come down. Prices are always high at first, until the market gets supplied and competition creeps in. Their present cost equals 5 or 6 tube cost to do the same work. As to parts, they are overpriced in comparison to tubes, with all their complicated construction.

Be patient - they'll come down in time. Maybe by the time they become reasonable, the Labs. will have figured out a lot of new wrinkles for us.

At this writing we heard about Raytheon's CK-722 pricing at \$4.50, but do not know where it can be purchased. Was made possible by the greatly increased production of these units. Seems every large company now is making Transistors or Diodes.

DID U WORK THE PUZZLE IN RB-35?

Tom Nichols, Milwaukee, Wisc., wrote in asking where the Bplus 45 to 90 v. tap went, in our 1-T Audio stage, on page 7, RB-35.

WELL - we done forgot it! It is connected to #4 on the power tube. Seems some guy did write in, saying he couldn't get it to work. Evidently, he didn't work the puzzle???

Tom refers to our RB-34, page 2, showing diagram for a TRF for the 1-tube. He says "S-2 is as needful as a dog with 2 tails" - well, you have to shut off the B somewhere. You can't hook the A- and B- together, or you wouldn't have a C-bias, running thru the 500 ohm resistor (R-4). As we had to put a B switch somewhere, we figured it safer to insert it in series with B plus.

We like fellows to find these mistakes. As much as we double-check this stuff, our minds are on so many things around here, that we often slip. Maybe Old Age is beginning to take its effect. Hi. We thank Mr. Nichols for his good power of observation - he'll make a good Radio Man.

POST OFFICE ASKS FOR MORE MONEY.

Why the P.O. must directly pay its way is a big question. What about the Dept. of Agriculture, Bureau of Mines, Dept. of the Interior, or any other branch of government? Why pick out the P.O. to make money? Why should the users of the mail (you and I) be singled out for another dig? Not since the inception of the P.O. dept., in Franklin's time, has it been meant to run at a profit - let alone, pay for itself. The Coast Guard, for instance, costs the taxpayers 243 million per year, and this is only one dept.

We also pump billions into England and France and they get 2 or 3 residential deliveries per day, against our one.

The deficit can be accomplished by economies right in the P.O. department. Just one instance in our mailing. When we mail RBs we pay by check. We are given a receipt (made out in trip.) and in a few days we receive another one by mail. One fellow has recommended motor scooters for the carriers instead of foot power.

The "fly in the ointment" is because the large publishers are mailing their mags. for about 1¢ per pound. The more they mail, the less it costs. In some communities, due to certain mailing circumstances, they are mailed for free. Certain county mags. are mailed free within their own counties. Also, certain government employees are allowed the franking privilege of mailing their letters free.

Postmen spend days sorting out and delivering heavy mags. - at a big loss. Why? Because the large publishers lobby in Wash. and raise such a smell - their rates are not increased. You and I cannot do that, so we pay regular rates.

The P.O. went into debt 750 million dollars the last year. 242 million was paid by publishers, of which it cost the government 290 million to transport their mags. alone - not counting

Pages 9 and 10 unavailable.