

VALVE

VINTAGE AUDIO LISTENERS AND VALVE ENTHUSIASTS

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an amp & preamp by Ron Sawyer

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October 2, 1994
Power tube shootout
at Classic Audio

TENTATIVE
November 13, 1994
Mac MI 200's, JBL Hartsfields,
KLH 9's
at Steve Schneider's

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VALVE

*is the newsletter of
Vintage Audio Listeners and
Valve Enthusiasts
dedicated to the preservation
and dissemination of vintage
audio knowledge.*

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magazine. We believe electrons
flow from minus to plus, and
they can kill you along the way
if you're not careful.
Vintage audio equipment
operates at potentially lethal
voltages. Always treat it with
respect.*

editor's thing

What an unbelievable month! First we have a cool meeting with neat equipment and hours of bull session.

Mean time the phonecalls and mail start coming from as far as Europe, in response to our plug in Glass Audio.

I introduce myself to the Pacific-Northwest Audio Society at their monthly meeting and invite them to Charlie Kittleson's talk on collecting, with future plans for other cooperative events.

Joe Robertson, Editor of Sound Practices, calls and offers to give VALVE a plug in an upcoming issue.

Charlie K. gives a great talk to a record crowd at Classic Audio, which Dave tapes on a vintage Nagra with a vintage RCA lapel mike, no less. A bunch of members from PAS attend.

Ron Sawyer, distinguished Glass Audio contributor, sends a letter and photos of some of his projects with a promise to visit us in the future.

Meantime I'm running a second printing of the September newsletter to fill requests for sample issues.

Along the way I negotiate trades for an Ampex tape transport, Harmon Kardon Citation III tuner and Citation I preamp, and putz with a crusty PAS 2 in a never ending struggle to complete our vintage reference system.

Yesterday I realize that it's time to do another newsletter, just when I got back up to speed working for a living.

Today I get 33 more requests for info about VALVE in my mail.

If you had any doubts, Vintage Audio interest is growing like topsy. And heavy duty tube homebrew is hot on its heels.

So get out your soldering iron, your latest swap meet find, and your word processor. Brew some glowbottle and write us a story!

Don't let the blue smoke out,

DAN

letters from fred

great recollections from Fred Suffield, P.E.

2 Sept. 94

Dear Dan,

Like your new format. Very good, easy to read, and also easy to file.

Appreciated your copy of the Cinaudagraph advertisement, been many years since seeing one.

Have three transformers that I may want to sell on of these days, a Triad HSM-186, and 189 and a Peerless 265-Q.

We think we have problems today with new ideas, but in 1939-41 when Westinghouse Baltimore was manufacturing the SCR-270 radar, the one that detected the incoming aircraft at Pearl Harbor, no one had built other than lab models of a radar, and no test equipment existed. The set was comprised of two Army Vans, one Army Stake Body, one prime mover and a trailer with the folded antenna tower on it.

Fred goes on to describe in detail the containment of the equipment used here, including a 150kW transmitter and 72 element antenna tuned to 106 megacycles, which I am sorry to say must be omitted due to space limitations. Radar buffs may call me for a copy of the original letter.

Now the purpose of this note is to tell of the antenna testing and alignment problems. There was no antenna range either in the area or in Baltimore for the antenna test and tuneup. The test men and the engineers came up with a real tricky method of adjusting 74 possible variables, all interactive!

Across the water from Sandy Hook, where the test area was, one on a clear day could see Brooklyn, New York. There was located a large natural

gas storage tank. A very nice radar target.

So the test procedure was to physically aim the antenna at the tank. One man would climb the tower with a length of wood in his hand, the other worked at the radar indicator, and tuneup consisted of disconnecting two of three bays, adjusting by banging shorting stubs and trombone sections of the parallel lines for the strongest target return. Then the next bay was cut in, the procedure repeated, then the third one, and some repeat touch up.

By rocking the azimuth one could check that side lobes were sufficiently low, and then if the Glen L. Martin plant in Baltimore was flying any of their airplanes high enough to get around the curvature of the earth (they were about 180 miles away) and flying slightly North of their plant one could detect the airplanes at 150 miles range!

If the Brooklyn Natural Gas people ever had to remove their tank, they would have put the antenna range out of business!! The radar put out 150Kw peak power at 106 MC, about a 10-15 microsecond pulse width, and a 620-625 cycle repetition rate. This was the first radar I worked on and the start of a long number of years in the radar field.

Thought you would be interested.

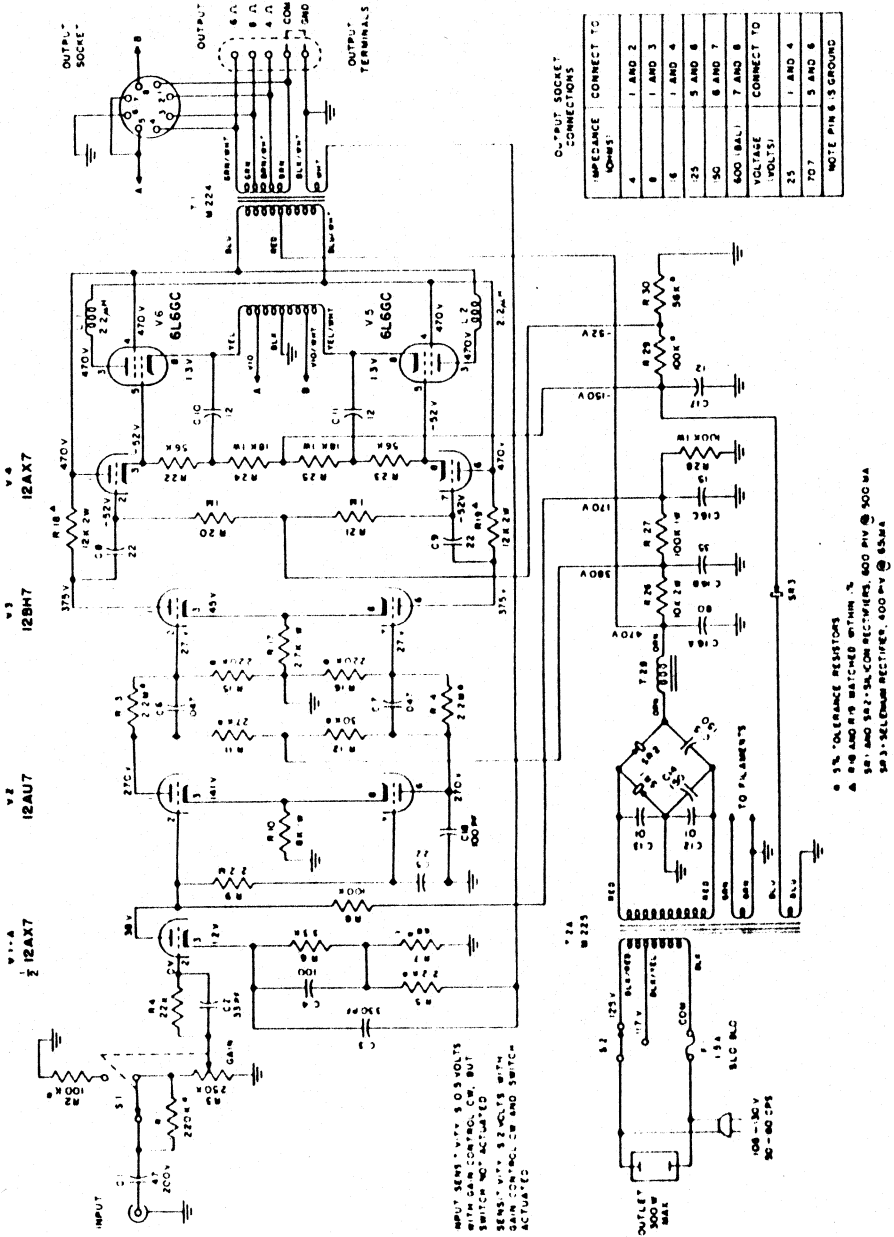
Incidentally I have a Knight Audio Signal Generator and a Heath Signal RF Generator, some one gave them to me when they were cleaning house. As I have two General Radio Audio Oscillators, and a General Radio 1001 Signal Generator, and a Marconi Sig. Gen. covering from 5KC to 410 MC, plus microwave klystrons from 4-10GMC, I do not need them. Will donate to the club. (Thanks! -- dan)

Still want to get over, but we will be spending a week or so in Oregon-Cannon Beach and Lincoln City, the latter part of September.

Kindest regards,



MC40, two tube preamps, and a 'stealth speaker'



Schematic diagram for McIntosh MC40 power amplifier.

September's meeting was another of our small and therefore very informal meetings (which are among the most pleasant we have).

Dave and Steve supplied the audition pieces, a PAS 3 stereo preamp, a Fisher 50C mono preamp, a McIntosh MC40 monoblock, and a wacky Hungarian bookshelf speaker made to look like a book, called the "Musical Encyclopedia".

The PAS 3 was brought in response to the requests for a tube preamp to use instead of my Apt/Holman. In an A/B comparison of Beethoven's Violin Concerto on vinyl, the two sounded pretty close, with the expected results of a slight sweetening of the strings with the PAS and a slight increase in detail and transient clarity with the Apt.

I must say that this was the first PAS that I liked, and I have listened to several this year, getting the same impression of wiryness to the highs.

This PAS 3 was stock, as were the others, so I don't have an explanation for the lack of wire this time, other than guessing that the MkIII's we used were better in combination with the PAS than the other amps (Stereo 70, Ampex 6973 Ultralinear, homebrew Williamson) tried in the past. This makes sense if one considers the MkIII's strengths to be in the mid and low ranges, as I do.

I found a PAS 2 in a pile of junk a while ago, and will experiment further. It will function as a simple preamp to compare against a rather complicated HK Citation I acquired this week for restoration.

We also A/B'd Dave's MC40, which had new caps, against the modified MkIII. A detailed three page description of this circuit can be found starting on page 606 in the Audio Cyclopedia. The facing page is a schematic reproduced from this article.

Results were pretty close, except

for a bit of veiling and grunge in the Mac. Part way through the comparison the Mac stopped playing. Eventually our massive combined intelligence figured out it was just a loose contact in the signal chain, but I managed to talk Dave into replacing the rectifier diodes so it looked like we really made a decisive repair. Well, darned if that simple replacement didn't clean away the veiling and grunge!

I happened to mention this to Charlie Kittleson the other day and he heartily concurred that all components, not just capacitors, as most restorations focus on, deteriorate with time. A typical diode checker on a DVM puts so little voltage through a high voltage silicon rectifier that the positive result you may get indicates little about the diode's actual performance in circuit. At 50 cents a piece for 1kV 2.5A PTC205's, I say don't even bother to check the old ones, just replace 'em.

Which leads to another point. Any auditions or comparisons involving vintage equipment are valid only if the equipment has been gone through. A comparison of tube tuners vs. new tuners in a well known audiophile publication used a tube tuner that was essentially untouched, meaning it was probably full of leaky caps, drifted resistors, and detuned coils. Sure the new stuff sounded better!

Please keep this in mind when reading reviews of vintage gear, even in this rag. I can't vouch for the condition of every piece I opine about. I will try to include a little info on what's been done to it when I can.

The next fun piece was Dave's Fisher 50C, which he had thoroughly gone through. We connected it to the Mac, which was Dave's planned usage, and he set the EQ switches for LP's. We dug up some nice mono recordings, most notably an old Decca "Melmac" LP of Segovia.

Boy, that is a NICE preamp! I used to own it, and liked it OK, but now

it sounded great. Proof again that you gotta restore 'em to really enjoy 'em. Dave has since bought a Mac C-8, and we'll have a shootout when it's ready. should be a close call.

The last item we auditioned was a very silly novelty speaker Dave found in a thrift store. It was about a foot tall, four inches wide and maybe eight deep. Two three inch mid woofers and a two inch tweeter pretty much covered the whole front baffle. The foam surrounds on the woofers had turned to a texture resembling shredded wheat, but the suprise was that the wacky thing sounded pretty decent. the Baltic ply used for the cabinet may have something to do with the lack of boxiness (as well as the leaky surrounds!). The 'binding' was actually a deceptively real looking grill cloth, printed to look like a book cover and fastened with Velcro. A true 'bookshelf' speaker. -dan

october's meeting

The other day Eric asked me what ever happened to our planned comparison of 6L6 family tubes. Well, we're gonna do it.

We hope to have enough combined fortitude to sit through a comparison of the following:

6L6 metal

6L6G

6L6GA

6L6GB

6L6GC, US & Russian

5881, US & Russian

KT-66

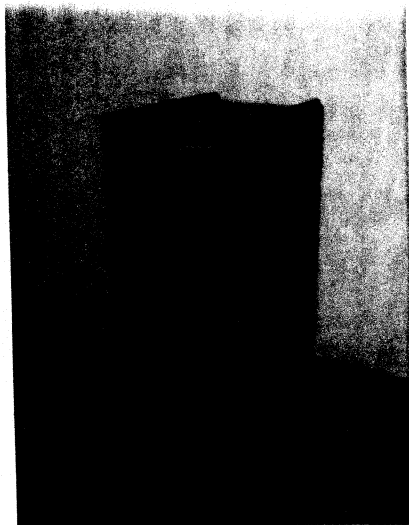
807 in an octal adapter

807W "

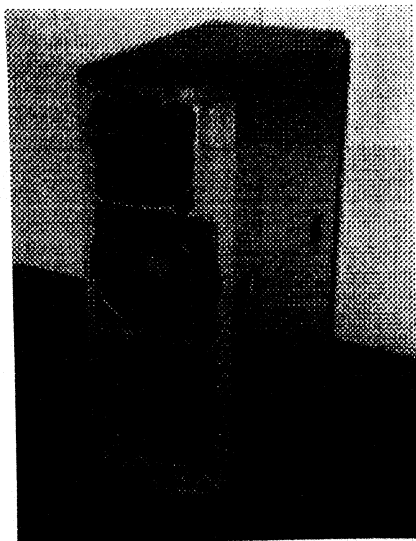
1614

and anything related which you may bring.

We'll meet at Classic Audio, 7313 Greenwood, Seattle, at 10 a.m., Sunday, October 2.



The Musical Encyclopedia in its 'literary stealth' mode



Surprisingly sophisticated design shows when undressed

**Got your new Antique Electronic Supply catalog yet?
 Check out the prices on some of the bigger Hammond output and
 power transformers.
 Man, they really came down!**

type power	old price	new price
400-0-400V,465mA, 6.3Vct,6A	\$ 92.68	\$ 64.40
375-0-375V.175mA,5Vct,3A,6.3Vct,6A	\$ 87.49	\$ 49.87
output		
60w 4300CT, screen taps (MkIII?)	\$ 65.04	\$ 42.25
100w 5000CT, screen taps (6550 PP?)	\$ 71.90	\$ 55.17
120w 1900CT (EL34 PPP?)	\$ 85.97	\$ 48.19
and my favorite:		
280w (YES!) 1900CT	\$164.33	\$155.00
(304TL AB1 PP, 8417 AB1 PPP?)		
AES has Hammond chassis and cages too. One stop shopping!		

the library -

New item this month:

Fisher 50C manual

Thanks once again for your contributions!

Remember, members get copies of any of this material for just a nickel a page.

I finally got back with Bill about borrowing some manuals from his extensive files. He has pulled my requests, and I shall be copying them this month. I'll list what I added to our library next month. Thanks again, Bill!

***Does anybody have early
 AUDIO or AUDIO ENGINEER-
 ING issues?***

***I'd really like to get a set for our
 library.***

what's brewin' ?

Picked up a Harmon Kardon Citation I preamp and Citation III tuner this week. The tuner is a sleeper. Hot sensitivity and separation. But it's eating it's old filters up. Preamp is grungy sounding, but I will replace the zillions of caps and resistors inside. It's full of 'striper' caps. GROSS!

Found a neat old horn loaded Jensen Coax speaker, and suggested Dave pick it up for his mono system. We ran impedance curves with Dave's multithousand dollar HP dynamic signal analyzer. curve looked good, but tweeter sounded muffled. Dave says replacing the original, leaky x-over cap made a big difference. We will put our heads together on a zobel network and higher order X-over, and report our findings.

What are you brewing? Drop us a note, or better yet, write an article. We'll help write it if you like. Call Dan at Classic Radio, 206-697-1936 for info.

dlinkn' around

tech tips and other unsolicited advice

experimenting with FM tuner tubes

I do a lot of tube FM tuner service around these parts. I love it because I get to listen to so many different designs. One important area of tuner evolution which becomes apparent when going back through various vintage designs is the improvement in RF stage tubes through the years.

In an effort to extract performance from tube tuners that was similar to my solid state, 7 tuned circuit, analog Kenwood L07-T, I began experimenting with various tubes to increase gain in the front end. One of the best tube tuners I've run across is the Fisher FM-1000 and its little brother the FM-200B. Both use 6CW4 nuvistors and 6DJ8's in the first couple of stages. Just about any tuner which uses a nuvistor front end is going to give very good RF gain.

Well, I may come up with a 6CW4 nuvistor (which I must say is the ultimate FM front end tube) add on for tuners in the future, but there's a lot to be said for the 6DJ8's used in the Fisher's as well.

For one thing, they are a pin for pin replacement for a whole family of medium mu dual triodes which are used in various tuners.

I have reprinted data from an article by Jim Kyle in September 1960 *Electronics World* called "Cascode Circuits: How and Why". It shows the relative gain of nine different dual triodes including 6BK7, 6BQ7A, 6BZ7 and 6BS8, all of which are commonly found in FM tuners, and all of which have less gain (in cascode configuration) than the 6DJ8.

There is, of course, a hitch. That being the low 130V maximum plate voltage of the 6DJ8. One must check the plate voltage before throwing one of these in

and firing up the tuner. Better yet just use a 6922 instead. It is a mil spec 6DJ8, but with a Vmax of 300V.

I have found that in about 4 out of 5 cases increased gain is visible on the tuning meter and audible on weak stations when replacing any of the lower gain tubes mentioned, and tweaking the RF alignment is usually unnecessary.

If you must tweak, (me too) Kyle recommends subbing a 250 ohm composition pot for the first stage cathode resistor which will allow you to trim for maximum gain. Connect the pot with shielded cable and adjust it for best reception of a weak station. Replace the pot with a resistor of value equal to the pot setting. Truly something for almost nothing!

Some tuners use a high mu triode in the front end, most often a 12AT7 or 6AQ8. The only potential substitution is the 6DT8/12DT8, but there seems little to be gained (bad pun) from this swap.

Early FM tuners often used a VHF pentode like the 6AK5 for the first stage. While I haven't tried replacing this sharp cutoff pentode, the tube manuals show that a 6CB6A/6CF6 with pins 2 & 7 tied together, or a 6BC5/6CE5 might give a hair more gain.

Oh yeah, put up a real antenna too. There's no point in trying to squeeze a little more performance from 6 feet of twin lead.

type	rel. gain	characteristics
6BC8	97	low cross modulation
6BK7B	147	high gain to 300mHz
6BQ7A	100	low noise
6BS8	113	HI cascode transcon.
6BX8	105	low plate voltage 65v
6BZ7	107	low noise
6BZ8	125	low cross modulation
6DJ8	196	high gain 130v max
6ES8	196	high gain 90v max

books for constructors

Last month I printed a list of books for collectors. Most of those mentioned are useful to the constructor as well. This month I have an additional list for homebrewers and modifiers:

Audio Anthology by Radio Magazines Inc.

This cool set of construction article reprints from the early days of Audio magazine shows the classic circuits, from tuners through amps to speakers. Five volumes are now reprinted and available from Antique Electronic Supply, and I think OCSL has them too. A must have. Of course if you're really cool you have the originals, like me. Good luck finding 'em.

Radiotron Designers Handbook by RCA

This is the Bible. From it you can create your own designs with only a pocket calculator, a stubby pencil and a napkin. Big, fat, and crammed with info on how tubes work. They go for \$30 to \$50 these days. Consider it a necessary investment if you're hardcore.

Glass Audio

The current do it yourself mag for tube guys. Their forte is using new technology to improve classic designs and concepts. This will become a classic reference series in the future, much as Audio anthology is today. When you subscribe, get the back issues too. Rumor has it that so many people have gotten into tube gear that GA's circulation is now larger than its older sibling, *The Audio Amateur*. Both are worth having, as is *Speaker Builder* if you swing that way.

Sound Practices

A magazine devoted to non mainstream audio. Publisher Joe Robertson called me last month. He tells me Single ended, horn loudspeakers, Vintage 78's, and equipment designed by artists

instead of engineers are a few of the cool topics dealt with in these pages. It's got to be a cool publication, because Joe is the first guy I've talked to who knew about using 6CK4 triodes as output tubes.

Sam's Photofacts

Sam's are what the corner TV repair guy used to scope out the circuits on your Dad's Magnavox. Everybody I know who's into antique radio and vintage audio repair has a ton of these, and they're always trying to get me to buy their excess. I have a little secret. The amount of vintage audio information contained in the entire series (before they went to an annual Hi-Fi format) is about an inch thick out of a stack of schematics ten feet high.

Just pick up an old index from a TV repair shop, and make copies from the set at the public library. That way you'll have some room left in your house for audio gear.

The Radio Handbook by the editors of RADIO. This is one of the two annual handbooks for hams that is full of info applicable to tube audio. The older editions (my earliest copy is the fifth edition, 1938) have great data tables on transmitting triodes and winding chokes and power transformers; some of the later editions (i.e. 16th ed., 1962) even have audio amp projects.

The Radio Amateur's Handbook by the ARRL. This is the other ham handbook.

The highpoints here are chapters on power supply construction and antennas. Mid to late fifties editions are good, and a more current edition is nice if you use solid state rectifiers and such.

Well, that's a start on a basic library. There are certainly more sources, with reprints coming out all the time. We'll update this list in future issues.

--- dan



the amp



the preamp

A letter from Ron Sawyer

Those of you who read Glass Audio will recognize Ron Sawyer as the author of "A High Quality Vacuum Tube Voltage Regulator" in GA 1/92. Ron is a local, living in the south end of Seattle, so I sent him a letter a couple of months ago. Here's his reply:

Dear Dan,

Thanks for sending me complementary copies of your newsletter, and inviting me to attend your meetings. I'm recovering from a broken leg which is going to put a crimp in my style for several months, but thought I'd send a note of thanks anyway.

Enclosed are a couple of snapshots of recent projects.

One is a refurbished pair of fifties vintage monoblocks - totally stripped and rebuilt. Note the generous choke filtered B+ and (for a "20-watter") generously sized output transformer. They are built from old Bogen dB-20's.

This particular amp uses a tertiary winding to apply local feedback to the output tubes (6L6), to reduce the effective plate resistance of the pentode connected 6L6's. The amps were originally rated at 20 watts, but I get 24 out of them after the rebuild.

They originally had preamp and tone control circuitry, which I removed. With the extra space left over, I installed a 320 volt voltage regulator which supplies the input tubes and the 6L6 screens. Only the 6L6 current is unregulated. The regulator uses a 6UBA amplifier and 12DT5 series tube.

The input circuit is a parallel connected 12AX7 single ended voltage amp and a 12AU7 (long-tailed pair) common cathode phase inverter with a FET current source.

The other photo is a tube preamp which uses octal tubes. It has been through several incarnations. It is a line

level control unit (no phono amp).

Originally I used a metal tube 6SR7 with a 6AC7 cathode follower output. The 6SR7's were a bit microphonic, so I tried something else: Triode connected 6AG7 tubes running very hot with 2Kohm plate loads (no cathode follower required!). Sounded good, but a bit too noisy.

Next I tried a 6SN7 common cathode differential amp, which has the desirable property of not inverting the signal polarity - but again I found the noise level (hiss) to be a bit noticeable.

In the current guise - I have wired the two sections of the 6SN7 in parallel with a 6AC7 cathode follower. Back to basics! It sounds good this way. Well, maybe I'll get to Poulsbo a few months from now - best wishes with VALVE.

Sincerely,

Ron Sawyer

the Kittleson tape

Dave says the tape he made of Charlie Kittleson's presentation on collecting Vintage Hi FI came out well.

If you missed the talk or would like a copy for reference, here's the deal.

Dave will dub a copy of the program which we'll keep in the library for members to borrow.

We may be able to make copies available to non-members for a nominal fee. I will be discussing this possibility with Charlie in the near future.

- dan

classifieds

*Ads are free to members.
Non member ads cost .25 per
word.*

*Call Dan at Classic Radio of
Liberty Bay, 206-697-1936
to list your ad.*

*Deadline is the 25th of the
month.*

Wanted - Audio - the older the better -
acoustic records, wind up phonographs.
I specialize in acoustic phonograph
repair. John, 206-373-7315.

For Sale - Pair KLH Model 12
loudspeakers, \$150.
Pair Scott HiFi speakers Model S10?
12x231/2x9 walnut cabinets \$50.
Scott 222C int. amp, recommended in
Vintage HiFi Spotter's guide, \$100.
Scott 350 tuner, \$100.
Bogen AP30 stereo int. amp., PP 6V6's
\$25.
Grommes 10LJ stereo int. amp.,
SINGLE ENDED 6BQ5's! \$20.
Grommes 24PG stereo int. amp., PP
6BQ5, \$20.
Rauland rack mount power amp
SA51A-25/70, 6CA7 output, \$60, no
output tubes.
Pair Dynaco MkIV's, excellent, all fresh
caps, \$350.
Want Fisher components, particularly
50AZ, 125AX.SA-1000. Crazy Eric,
206-871-5921.

For Sale - New Miracord 4 spd.
changer, never out of the box. Excellent
for vintage 78 archival work. Bill,
206-859-3592.

Wanted - QUAD power amplifier or
power transformer. Stan, 206-697-6936.

For Sale - Triophoni, the custom built
triode output monoblocks described in
the August issue. These amps feature
true triode output, a Mullard style input
circuit, gaseous regulation of input and
driver stages, polypropylene coupling
caps, and adjustable bias and balance.
And they're beautiful too.
\$900 the pair with a one year warantee.
They can be auditioned at Classic
Audio, 7313 Greenwood, Seattle, or call
Dan at Classic Radio of Liberty Bay,
206-697-1936, for more info.

Sorry, everything I advertised last
month is sold, except for the Stereo
150, which I'm keeping while I give it a
custom inlaid bird's eye maple finish.
Truly vintage audio -
I will be restoring a 1939 E.H. Scott
Phantom console in an Acoustcraft
cabinet this winter, and possibly a 1939
20 tube Midwest console. Both are
available for sale, as is or restored.
Also watch for my next triode amp, Trio-
phoni II. This will be a stereo version
with a solid state power supply and
7247 drivers, priced around \$ 600.
Dan, 206-697-1936.

VALVE assumes no responsibility for
the integrity of those advertising in
these classifieds. Caveat emptor.