PLUS OR MINUS?

Ever wondered why two new valves of the same make should give widely different readings when checked in a valve tester? Or wondered at the difference in performance when used in the same receiver?

This official RCA list reveals that there may be as much as a plus or minus 25% variation from the usual published figures.

In those days we were quite happy to accept a plus or minus 20% variation in the stated value of carbon resistors, yet, had we known, would we have been just as happy with an even worse tolerance in the case of valves?

– *from ELECTRONICS, Nov. 1938*

EXHIBIT A—RECEIVING TUBE TOLERANCES

Based on the "customer limits" maintained by the RCA Radiotron Division and representative of the values maintained by the industry as a whole

Type No.	Plate Current I_b (ma.)			Screen Current I_{c2} (ma.)			Trans-conductance (grid-plate)			Trans-conductance (screen-plate)			Trans-conductance (oscillator)			Screen Current (ma.) $I_{c2} + I_{c3}$		
	Low	Av.	High	Low	Av.	High	Low	Av.	High	Low	Av.	High	Low	Av.	High	Low	Av.	High
6A8	2.1	3.1	4.0	....	3 1	....	.....	.....	.....	325	490	700	1150	1600	2100	....	3.4	....
6K8	1.6	2.6	3.6	2.6	3.5	4 6	.....	.....	.....	230	350	490	2200	3000	4000	3.6	6.3	9
6K7	4.9	7.0	9.1	0.9	1.65	2.4	1200	1450	1700	.....	.....	.....	.....	.....	.....	.....	.....	.....
6J7	1.3	2.1	2.9	0.2	0.5	1.2	1000	1225	1450	.....	.....	.....	.....	.....	.....	.....	.....	.....
6J5	6.4	9.0	11.6	....	....	....	2075	2600	3125	.....	.....	.....	.....	.....	.....	.....	.....	.....
6F5	0.5	1.0	1.6	....	....	....	1175	1550	2000	.....	.....	.....	.....	.....	.....	.....	.....	.....
6Q7	0.6	1.05	1.5	....	....	....	950	1250	1550	.....	.....	.....	.....	.....	.....	.....	.....	.....
										(Power Watts)								
6N7	5.	7.	9.	(Per section)			2725	3210	3700	4.2	5.4	....	.....	.....	.....	.....	.....	.....
6F6	25	34	43	4	6.	8.	2075	2500	2925	2.75	3.4	....	.....	.....	.....	.....	.....	.....
6L6	62	72	82	....	5.	8.	5450	6050	6650	5.4	6.5	....	.....	.....	.....	.....	.....	.....
25L6	38	49	60	....	4.	5.5	7000	8200	9400	1.7	2.2	....	(110 v. plate)			.....	.....	..
5Y3G	125	145	....	(400 v. Epp, 4 uf capacitor, 4000 ohm load)								....	.....			.....	.....	.....

All ratings at 250 v. plate unless otherwise noted.

Market place

Members' classified advertisements are inserted free of charge, subject to availability of space — no assurance of insertion in a particular issue can be given. Short ads. will be given preference when space is short. Address to The Editor.

FOR SALE OR TRADE

Large collection old European and U.S. valves, 3-pin to 8-pin, inc. side-contact. Some new in cartons. Jack Patrick, 3 Charles St., Takapuna, Auckland, 9.

Will trade Loewe 3NF valve for a 2HF type. Mark Burgess, 12 Amapur Drive, Khandallah, Wellington.

WANTED

Glass dial scale for Pye PE80. Fred Pond. Phone Auckland 404-6606 (Collect).

Philips valve E415 for Philips model 2515. Buy or exchange. Jack Patrick, 3 Charles St., Takapuna, Auckland, 9.

1935-36 AWA Radiolette radios with black, green, or ivory cabinets. Clarry Schollum, 34 Pentland Ave., Mt. Eden, Ak. Ph. 607-011.

Two bakelite-cased AF transformers for Fada mod. 160. Any cond. Mark Burgess, 12 Amapur Drive, Khandallah, Wellington, 4.

Parts for Radiola 17. AF transf. assembly or can only. Porc. voltage divider from power supply, volume control, and one knob; also Radiola speaker to suit. Dave McLaren, 25 Aotea St., Dunedin. Ph. 44-777 (Collect).

Tech. data and circuit diagram for German WW2 comm. receiver type E52b-1. George Newlands, 42 Old Porirua Rd., Ngaio, Wellington, 4.

NZVRS BULLETIN

Vol. 2 No.2 · Aug.1981

NEW ZEALAND VINTAGE RADIO SOCIETY

An organisation devoted to the preservation and restoration of early radio equipment, and collation of associated information

ATWATER KENT

Model 70L

NEW ZEALAND
VINTAGE RADIO SOCIETY

PRESIDENT: Des. Wright
3 Coquille Place
Bucklands Beach
Ph. 535-8928

SECRETARY: Eric Kirby
10/29 Owens Rd.,Epsom,
Auckland 3
Ph. 603-054

Correspondence, membership enquiries, subscriptions: To Secretary, at address above.

Regular meetings of the N.Z.V.R.S. are held on the THIRD Monday of each month except December. Out of town members are cordially invited to attend meetings when in Auckland. Venue: Supper Room, Dominion Rd. Methodist Church, 426 Dominion Rd. Time 7.30 p.m.

BULLETIN

EDITOR: John Stokes
617 Dominion Rd., Mt.
Roskill, Auckland 4
Ph. 604-213

Contributions to the BULLETIN, and advertisements, should be sent to The Editor.

EDITORIAL COMMENT

A complaint sometimes heard from collectors is that the high prices being charged for old radios by dealers are making it increasingly difficult for new collectors to get started.

Whilst it is quite obvious that today's prices are much higher than they were a few years ago, I don't believe that dealers are entirely to blame for this state of affairs. Old radios, like most other commodities, are not exempt from the law of supply and demand, and while it may be true that some dealers have earned the reputation of being 'sharks', the fact remains that no dealer's prices can be higher than the market will bear.

Unfortunately for the serious collector, the advent of people with a casual or 'gimmick' interest who are prepared to pay crazy prices for a single receiver has obviously had the effect of pushing prices up. And there are a lot of such people about nowadays. Certainly I would hate to have to pay current market prices for all the stuff in my own collection, which is probably the reason why it hasn't been growing much lately!

KNOW YOUR SLOGANS (3)

Not all these British-made receivers were sold in New Zealand, but they are all well-known makes.

1. Radio's Richest Voice*
2. Clear-cut Reality
3. Masters of Power
4. The Real Thing
5. Kings of the Air
6. The Radio that never lets you down
7. The Aristocrats of the Radio World

* This slogan was also used by Sparks Withington (Sparton) in the U.S.A. at much the same time, but it is not known that there was any connection between the two Companies.

1. ULTRA. 2. EKCO. 3. FERRANTI. 4. MARCONIPHONE. 5. COSSOR. 6. McMICHAEL. 7. R.G.D.

THE GOOD OLD DAZE

The following Intermediate Frequencies were in use in the U.S.A. between 1930 and 1937 . . .

105	180	264	470
115	181.5	265	472.5
125	235	370	480
130	250	445	482
132	252	450	482.5
140	260	455	485
175	262	456	490
177.5	262.5	465	500

Unbelievable ? Remember that of those only three — 175, 262, 465 — constituted about 90% of the total.

Still we've got a long way to go before our prices approach those ruling in the U.K. For example, early in 1979 (and that's well over two years ago) a 4-valve A.J.S. receiver and horn speaker sold for 420 pounds sterling at Christies in London. As an indication of prices this year, old radio magazines of the 1930's are being advertised at two pounds each, quite ordinary 2-volt battery valves at six pounds, and a Marconi V24 triode at thirty two pounds.

So, although local prices may seem high, don't despair. There are still bargains to be found, if not in second-hand shops then at garage sales. At least so I have been told.

– J.W.S.

THE DEVELOPMENT OF THE ATWATER-KENT MODEL 70

by Peter Lankshear

Following the release of the UY-224 screen-grid tube by RCA, early in 1929, receiver manufacturers — Atwater Kent among them — were quick to develop models using the new tube, in order to take advantage of the benefits it offered. By the end of 1929, A-K's model 55 was on the market.

The 55 was a 7-tube set using two SG RF stages and had a pair of push-pull 45's in the output; it was the first A-K to be equipped with a moving-coil ('dynamic') speaker.* Following this came the model 60, which differed in having an extra stage of RF. Both models, although usually supplied mounted in metal 'tin trunk' cabinets, were also available in 'chassis only' form, complete with wood grain metal panels for fitting into console cabinets. These two models were the last to use A-K's method of ganging individual tuning capacitors by means of phosphor bronze drive belts.

Modifications were soon appearing; such as improved low-frequency sensitivity and an improved volume control circuit. The need for the latter was brought about by the basic problem of obtaining satisfactory gain control without distortion when using sharp-cutoff screen-grid tubes. Not until the advent of variable-mu tubes, 35/51, in 1931, was this difficulty finally overcome.

Released at the same time as the model 60 was a high-powered version, the 66, using push-pull type 250 tubes in the output stage. Other versions were the model 61 battery set, and the model 67 for DC mains operation.

All these models featured a distinctive heavy-gauge nickel plated chassis of very shallow dimensions. Power transformer, choke, and filter capacitors, were housed in brown enamelled metal cases, and other capacitors were encased in tin cans. The finish of these chassis was first class, making them showpieces in themselves. The console models are a serviceman's dream, as chassis removal can be accomplished without the need to remove the knobs or even a single screw. The chassis with its attached metal front panel simply slides out of the cabinet, while the speaker can be removed by lifting it off its two hooked mounting brackets.

The highly competitive market of the period led to frequent (usually annual) model changes, and by the end of 1930 A-K were set to launch the model 70 family, based on the 60C which was the first A-K to use a unitised 4-gang tuning capacitor. They were the best, most handsome, and the last of the TRF's. A massive 12-inch speaker was used in all AC-mains models in the series. Also featured was an arc-type dial calibrated in Kilocycles, which had a counterbalanced drive and an ingenious mechanism to reduce the 180 degree rotation of the ganged capacitor to about 100 degrees on the dial.

The full range of combinations of chassis and cabinets is set out in the accompanying table. The most common version seen in N.Z. is the model 70 chassis L in a lowboy cabinet.

Now for a few comments on the L2 circuitry: As the technique of using high-impedance primary windings on aerial coils to overcome tracking problems had not yet been developed, the then common method of using a tapped primary for long aerials was used. A combination of inductive and capacitive coupling between primary and secondary was used in all coils. Local-distant switching was achieved by disconnecting the screen voltage from the first RF stage. One section of the ganged volume control varied the screen voltage of the RF tubes, while the other section acted directly on the aerial circuit.

Anode-bend or 'biassed' detection (by now standard practice) was used, but this

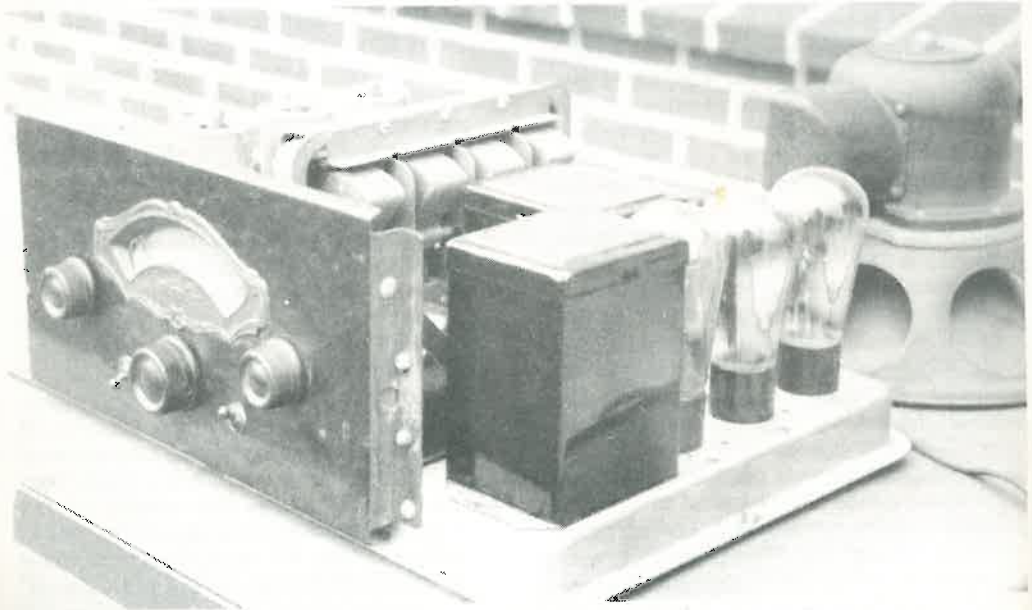
* PHL later informed me that it was not the first to use a dynamic speaker

writer has been unable to discover the reason for including a 2-meg resistor between the bottom of the detector grid coil and chassis.

The output stage consisted of conventional transformer-coupled push-pull 245's, with bias derived from a divider across the speaker field coil wired in the negative HT lead. The main filtering was provided by two large chokes, the first of which had an overwind tuned by a 0.225mF capacitor to the ripple frequency. This was really a 'trick' circuit to avoid using large paper filter capacitors, in the days before electrolytics had come into general use.

Today these chassis often show deterioration of the carbon resistors, not to mention the interstage audio transformers. For the benefit of those contemplating rewinding the latter, the following data may be helpful: Primary 5000 turns, secondary 15,000 turns centre-tapped, using 44SWG enamelled wire.

Not long after the release of the A-K 70 series, RCA marketed their first AC model superhet — the Radiola 80 — and also for the first time licensed others to manufacture superheterodyne receivers. This move initiated the greatest revolution in the history of receiver design, for henceforth the 'super' became, and remained, the most widely used circuit. Atwater Kent responded immediately by producing a superhet version of the 70L chassis, known as 'chassis H'. When mated with a highboy cabinet it became the model 72, and is pictured on p.63 of McMahon's *Flick of the Switch*. Thus did A-K's first superhet arrive as a modification of their last TRF. In less than two years the screen-grid TRF had become obsolescent.



ATWATER KENT RADIO

TABLE OF PRICES, TUBE EQUIPMENT, AND OTHER DATA FOR MODELS 70, 72, 74, 75 AND 76

	Power Source	Price Complete Less Tubes	Type Chassis	Part No.	Type Speaker	Part No.	Color Code	Tubes	Shipping Weight: Chassis	Shipping Weight: Spkr.	Shipping Weight: Cab.
Model 70 Low-boy	60 cycles 110 volts A. C.	$119.	L	16000	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	54 lbs.
	25 cycles 110 volts A. C.	129.	F	16100	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	51¼ lbs.	21¼ lbs.	
	110 volts Direct Current	129	D	16700	N-3	16900	Blue	3-UX-222 2-UX-112A 2-UX-171A	44½ lbs.	22½ lbs.	
24¾" wide 15¾" deep 38¾" high	Battery	99.	Q	16800	J	15920	Orange	3-UX-222 2-UX-112A 2-UX-171A	36 lbs.	10¾ lbs.	
Model 72 (Super-Heterodyne) Low High-boy	60 cycles 110 volts A. C.	133.	H	16500	N	16400	Green	3-UY-224 3-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	26½ lbs.
Model 74 Table	60 cycles 110 volts A. C.	125.	L	16000	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	51 lbs.
	25 cycles 110 volts A. C.	135.	F	16100	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	51¼ lbs.	21¼ lbs.	
24½" wide 16½" deep 30¾" high	110 volts Direct Current	135.	D	16700	N-3	16900	Blue	3-UX-222 2-UX-112A 2-UX-171A	44½ lbs.	22½ lbs.	
Model 75 Phonograph-Combination 26¾" wide 17" deep 40¾" high	60 cycles 110 volts A. C.	195.	P	16600	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	45¾ lbs.	21¼ lbs.	85 lbs.
Model 76 High-boy	60 cycles 110 volts A. C.	145.	L	16000	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	78½ lbs.
	25 cycles 110 volts A. C.	155.	F	16100	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	51¼ lbs.	21¼ lbs.	
	110 volts Direct Current	155.	D	16700	N-3	16900	Blue	3-UX-222 2-UX-112A 2-UX-171A	44½ lbs.	22½ lbs.	
26" wide 16¾" deep 45¾" high	Battery	125.	Q	16800	J	15920	Orange	3-UX-222 2-UX-112A 2-UX-171A	36 lbs.	10¾ lbs.	
Inductor Type Speaker	(Price $28.00)	For use as additional speaker or in multiple-speaker installation.			JB	17010	Black			20¼ lbs.	

December, 1930. These prices are subject to change without notice. WEST COAST PRICES SLIGHTLY HIGHER.

TYPE L-2 CHASSIS, VOLTAGE TABLE AND DIAGRAM

The Type L Chassis has three stages of screen-grid radio-frequency amplification, plate detection, one stage of resistance-coupled audio, and a "double-audio" output stage. It is designed for 110-120-volt, 50-60-cycle alternating-current operation.

Type F Chassis is similar to Type L, but it is designed for operation on 25-cycle alternating current. The filter circuit is different from the L.

Type P Chassis is similar to Type L, but instead of a "local-distance" switch, it has a "radio-phonograph" switch.

VOLTAGE TABLE FOR TYPE L-2 AND P CHASSIS

Set in operation. Volume control at maximum.
L-D (or 'phono) switch up.

Use High Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V. LINE

TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	2.4	180	5	85
2nd-R.F.	2.35	180	4.5	86
3rd-R.F.	2.35	180	4.5	86
Detector	2.35	110	14**	—
1st-A.F.	2.35	70	2	—
2A	2.45	250	55*	—
2Aa	2.45	250	55*	—
Rectifier	5.	—	—	—

* Use 250-volt scale.
** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.
All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

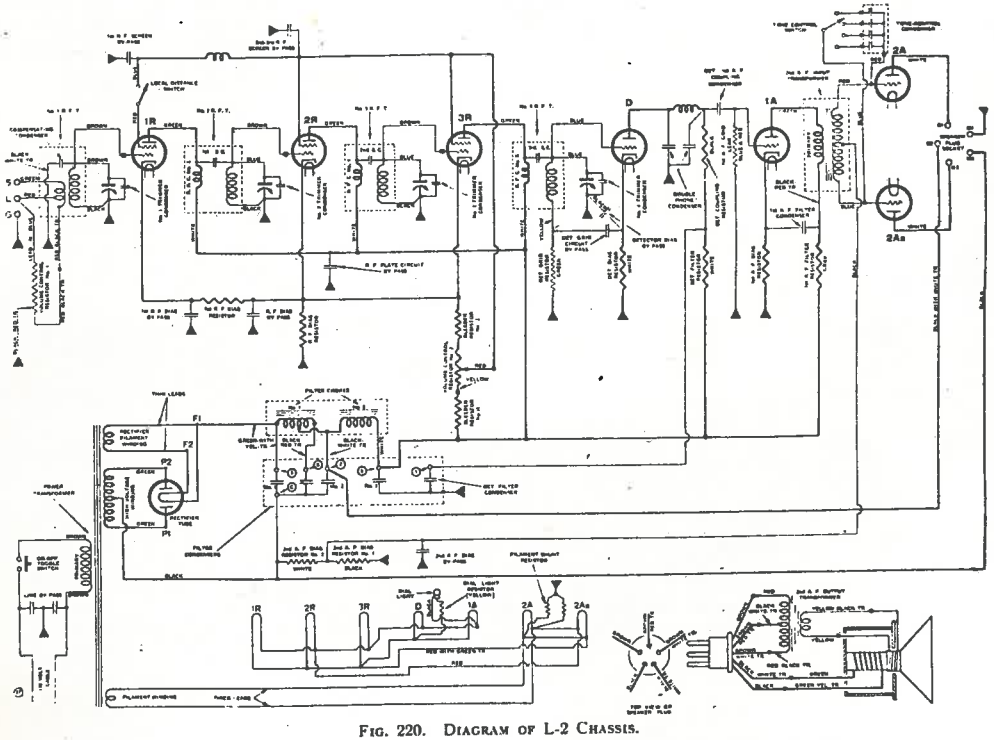


FIG. 220. DIAGRAM OF L-2 CHASSIS.

In the majority of L-2 sets the filament shunt resistor is connected across the R.F. filaments, as shown in Fig. 219. Also, a 2-ampere fuse is connected in one side of the 110-volt line.

December, 1930

AT THE EXHIBITION

The recent N.Z.V.R.S. exhibition turned out to be highly successful, and served to prove (if any proof were needed) just how much public interest there is in the subject of vintage radio. There was an excellent attendance over the three afternoons on which the exhibition was open. As the N.Z.A.R.T. annual conference was being held in Auckland during the same weekend, advantage was taken of the opportunity to publicise our show amongst those attending, and we are indebted to the organisers for the free publicity accorded to us in the official conference Programme. The 'hams' even arranged a bus trip to the exhibition as an alternative afternoon programme for those interested.

The venue chosen, Dominion Road Methodist Church Hall, was central and easy to locate for out-of-town visitors, and there were no parking difficulties. We are indebted to the Rev. Ted Grounds for making the hall available to us at a very nominal rental.

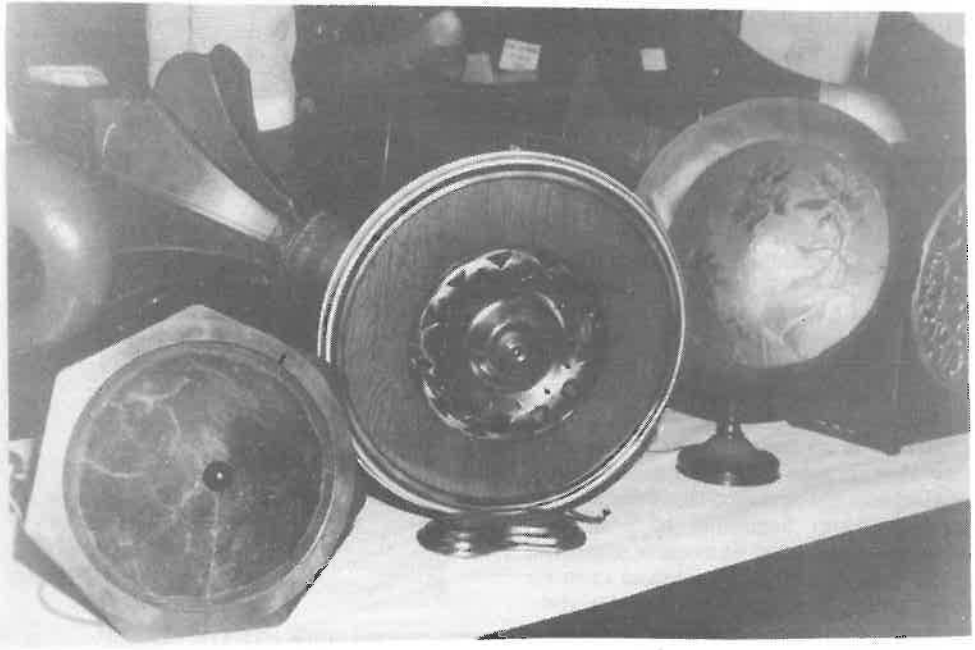
Security had been taken care of by ensuring that at least two people were in attendance at all times. On Saturday and Sunday night two members slept on the premises, but in the event they were undisturbed. Those members who had previously expressed concern over possible damage to items on display found their fears to be groundless. During the time when the exhibition was open, a posse of eagle-eyed 'shopwalkers' constantly patrolled the floor, but it was notable that they did not have to 'arrest' anyone. An exceptionally well-behaved crowd left on-duty members free to spend as much time as they liked to describe the various exhibits.

Now it is all over it is most pleasing to be able to report that no problem of any kind was encountered throughout the weekend. From beginning to end the whole operation went extremely smoothly, and not a single item received even a scratch. Altogether a most impressive and successful occasion — even if we do say so ourselves.

Ross Paton(r) with a visitor

1927 SPLITDORF

AMPLION, CELESTION, PHILIPS



PHILIPS, MARCONIPHONE, STERLING

AT THE EXHIBITION

Those members who earlier expressed misgivings as to the financial success of the effort will no doubt be pleased to learn that we came out of it well 'in the black', in spite of being restricted by a shoestring budget which limited the amount of prior advertising. However the main object was not to make money but to publicise the existence of our society. In the latter respect we were successful in signing up quite a lot of new members on the spot.

For the benefit of those unable to attend, a brief description of the exhibition follows: The earliest items on display were a Marconi magnetic detector, a British Siemens morse recorder, and a Hamilton-Wilson quenched spark gap. Crystal sets were poorly represented, there being only four altogether.

Featured amongst early battery sets were such well known names as Atwater-Kent, Browning-Drake, Crosley, Fada, Gecophone, Grebe, Gilfillan, Radiola, and McMichael. New Zealand names included a 5-valve Hinemoa (Johns Ltd.) neutrodyne, a 3-valve Courier, a 4-valve Macks, and two 4-valve Ultimates. An uncommon set (lent for the occasion by a non-member) was a 5-valve home-made effort featuring two S625 screen-grid valves — and looking most impressive with its shining copper partitions and green silk-covered coils. Two different models of Loewe 3-in-1 receivers attracted considerable interest.

Early metal-box AC sets were represented by Atwater Kent, Crosley, Loewe, and Philips — all complete with their original separate speakers. Row upon row of cathedral models formed the biggest single group of receivers, and included such names as Atwater-Kent, Brunswick, Crosley, Philco, RCA-HMV, Majestic, and Rogers, as well as two NZ brands — Companion and Courtenay.

Later table models included Atwater-Kent, Patterson, Philco, Pilot, Ekco, Stewart-Warner, and locally-made Courtenay, Pacific, Skyscraper, Stella, and Ultimate. Amongst 'midgets' were Atwater-Kent, AWA Radiolette, RCA-Victor, and Silvertone. A separate display of Zeniths featured nine different models.

Amateur communications receivers displayed in a special section included well-known models by Hallicrafters, Hammarlund, and National, and included the famous little SW3 regenerative set. Portables ranged from a gigantic 1925 Radiola Super to a 1951 NZ Philco which had its loop aerial contained within a plastic covered shoulder strap.

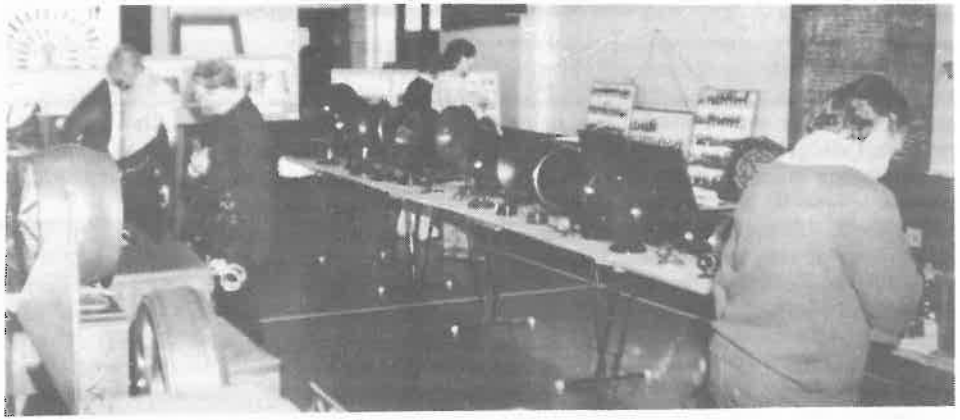
Last but not least there was a most impressive display of horn speakers, which included eight Amplions as well as other makes — such as ATM Claritone, Brown, B.T.H., Burndept, N. & K., and Rola Amongst the cone speakers were Amplion Philips, Radiola, and Sterling.

Of the 200-plus receivers on display, practically all were in working condition, and many had been lovingly restored by their owners, and were a sight to behold! A selected few were kept in operation throughout the time the exhibition was open. A tape recording of appropriate music was 'broadcast' via a closed loop to provide a continuous programme to which any set could be tuned.

Flashlight photographers were much in evidence, and one was observed to be photographing every single receiver on display. Another keen type was seen to be carefully writing down details of every exhibit. Several people came back for a second time, presumably in case they had missed anything the first time around.

Finally, it was most gratifying to hear the appreciative comments from so many departing visitors and to know they had enjoyed seeing the show. More than anything else it made one feel that all the effort had been worthwhile.

GRAHAM JESSOP tunes in on a Browning-Drake



Horn speakers on parade

GEORGE WESTON discusses horn speakers with a visitor