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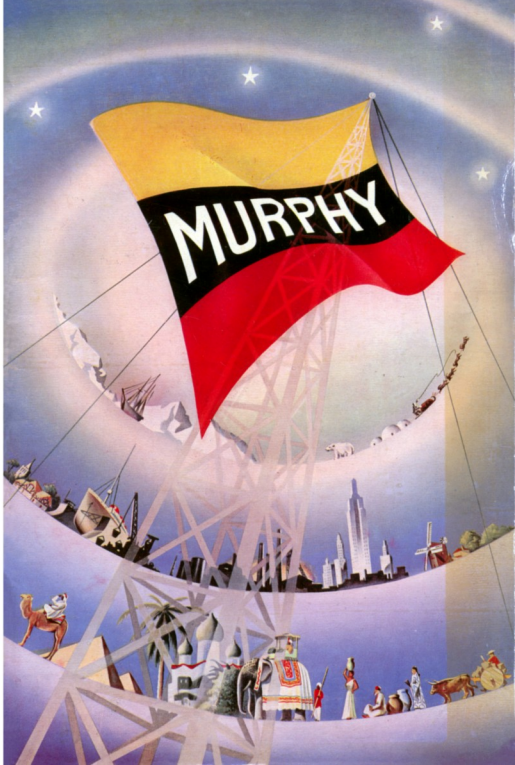


MURPHY

“Good morning”

THERE ARE MANY FAMOUS NAMES IN RADIO. In Gt. Britain and in many other parts of the world the name Murphy has come to stand for two main qualities—reliability and fine, faithful reproduction. Murphy Receivers have many other qualities, simplicity of controls for instance, ease of servicing. But our good name rests, we think, mainly on those two fundamentals; that a Murphy Set reproduces faithfully—and goes on doing so with the minimum of trouble.

Some of the special features of Murphy design are described in this booklet. They help to explain why the British Broadcasting Corporation, Government Departments and many great newspapers have adopted Murphy Sets for their routine foreign listening posts.

It is a matter of pride to us—and of great thankfulness too—that we have been able to serve our country and the allied cause during the years of war. Tens of thousands of soldiers, sailors and airmen have used and relied on Murphy equipment. We prize not only the friendly and generous praise of Government and Service authorities but perhaps even more, the spontaneous letters from serving men written from many parts of the world to tell us how, in tight corners and tough conditions Murphy equipment has not “Let them down”. Such tributes from fighting men leave us proud and humble.

The years of war have not changed our aims as radio equipment designers. On the contrary they are confirmed and strengthened. First—reliablity; next, reproduction as faithful as we can achieve.

To know that however difficult the conditions, your set will stand up to them and go on working. To know that what you listen to will be as clear, as little distorted as possible from what is being transmitted. Those are the qualities that matter when men's lives depend on radio communication.

We think they matter most in peace as well as in war; to the ordinary listener as well as to the fighting man. Every Murphy receiver has these qualities built into it. It is tested and tried through every stage of manufacture and under every condition that it is likely to meet, wherever it may go.

Well, there's what we have to say about ourselves. Now we shall wait to hear what you have to say about us. Which, of course, is far more important!

MURPHY TA92 RECEIVER

A.C. MAINS-OPERATED SUPERHET

105–115 AND 200–260 VOLTS, 50–100 CYCLES (CONSUMPTION 70 WATTS)

WAVE RANGES

Short Waves	(1)	13-metre band	(21.0–22.2 Mc/s)
	(2)	16-metre band	(17.4–18.4 Mc/s)
	(3)	19-metre band	(14.8–15.7 Mc/s)
	(4)	25-metre band	(11.5–12.2 Mc/s)
	(5)	31-metre band	(9.4–9.9 Mc/s)
	(6)	41-metre band	(7–7.4 Mc/s)
	(7)	49–130 metres	(2.3–6.3 Mc/s)
Medium Waves		190–550 metres	(545–1580 Kc/s)

PRINCIPAL FEATURES The TA92 receiver has been designed to provide the maximum entertainment value from radio listening. Accordingly, good quality and ample power output are available for local station reception, and on short waves, which figure so largely in overseas demands, a number of important refinements have been introduced to make tuning easier and more consistent.

Each of the higher frequency bands has separate tuning coils switched into circuit by the push-button switch. The capacity variation of the tuning condenser has been reduced so that the band occupies practically the whole condenser travel. By this means, tuning a short-wave station requires no more care than on ordinary broadcast frequencies.

SHORT-WAVE STATION NAMES on the TA92 make tuning on the short waves easy and accurate. The handsome oak cabinet is distinguished by the large bakelite escutcheon housing the scale, control knobs, and push-button wave-change switches. The continuously variable tone-control is recessed on the left-hand side.

The oscillator circuit on short waves is specially chosen for stability of frequency, and compensating condensers are employed to render the calibration independent of temperature variations.

The anode circuit of the R.F. valve incorporates an image suppression circuit designed to reduce this form of interference to very small proportions. The valve itself has been developed for short-wave amplification and has the very high slope of 8.5 mA per volt. The ratio of signal to valve-noise is correspondingly high.

CIRCUIT The aerial circuit has a built-in I.F. rejector circuit; high slope pentode R.F. stage, used on short waves only giving high sensitivity and low noise-level; separate tuning coils for each S.W. band selected by push-button switch, with band-spread tuning for extreme ease of operation. Special image suppression circuit reducing interference to low level; triode hexode frequency-changer (465 Kc/s I.F.); pentode variable-mu I.F. stage; double-diode-triode for A.V.C. and signal rectification, and A.F. amplification; beam tetrode power output valve rated to deliver $4\frac{1}{2}$ watts to output transformer. Gramophone pick-up sockets are provided.

CONTROLS *Wave-range switch*, with eight push buttons, one for each short-wave band from 13 metres (21.0–22.2 Mc/s) to 41 metres (7.0–7.4 Mc/s) then in ranges up to 550 metres (550 Kc/s).

Tuning knob, with slow-motion drive, operating variable condenser and vertical station-name scale.

Volume control.

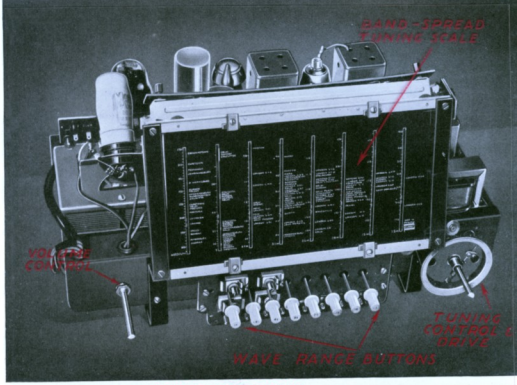
Combined on-off switch and tone control on left-hand side of cabinet.

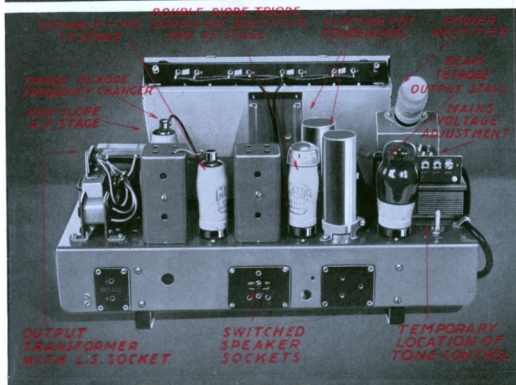
Loud-speaker switch at back of chassis to enable internal, external, or, both speakers to be used.

MECHANICAL CONSTRUCTION A feature of the mechanical construction is that the coil and switch assembly is built as an entirely separate unit housing the push buttons, their associated switches, the inductances and the trimming condensers. This unit can, if necessary, be detached bodily from the chassis, and, apart from keeping the leads short, it has the advantage of making the trimmers easily accessible when the moulded escutcheon is removed.

CABINET DESIGN The central feature is the removable moulded escutcheon covering the scale and the condenser and inductance trimming screws, and housing the push-buttons which project at the lower edge of the moulding. The buttons are of white bakelite with lettering in black. The tuning control is on the right and volume control on the left of the buttons, while the combined on-off switch and tone control is recessed on the left hand side of the cabinet. The cabinet is substantially built

ESSENTIAL DETAILS in the design of the TA92 are clearly marked on the back and front views of the chassis shown opposite.





of oak, rounded at the front edges and polished a dark shade. The loudspeaker opening is diamond shaped and faced with fabric.

SENSITIVITY The signal input required to give 50 milliwatts output ranges from 1 to 8 microvolts at 50 per cent. modulation on short waves, according to the band in use, and has an average value of 10 microvolts on medium waves.

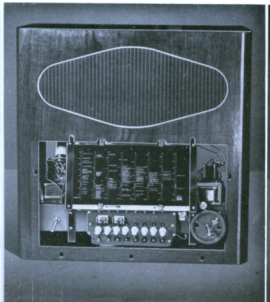
QUALITY OF REPRODUCTION An 8-inch speaker of generous design provides as wide a frequency response as is consistent with freedom from interference. A 9 Kc/s audio filter provides a sharp cut in the audio response to remove heterodyne whistles caused by stations on adjacent channels. A special treatment of diaphragm prevents distortion in damp atmospheres.

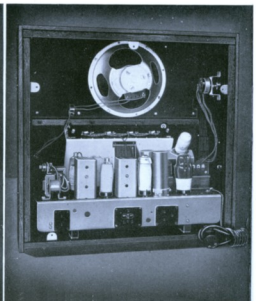
DIMENSIONS Height, 20⅜ in.; Width, 19¾ in.; Depth, 10 in. excluding projection of control knobs.

WEIGHT 37 lb. (17 Kilos) unpacked.

LEFT:
EASY ACCESS to the scale and trimmer adjustments is obtained simply by removing the two control knobs and the moulded escutcheon.

RIGHT:
THE NEAT INTERIOR of the "92" is seen in the picture below, taken with the back removed. Note the generous loud-speaker and the large baffle-area of the cabinet.





MURPHY SA98 RECEIVER

A.C. MAINS-OPERATED SUPERHET

105–115 AND 200–260 VOLTS, 50–100 CYCLES (CONSUMPTION 55 WATTS)

WAVE RANGES

Short Waves	16.7–50	metres	(17–6 Mc/s)
Medium Waves	190–550	metres	(1580–550 Kc/s)
Long Waves	970–2000	metres	(390–150 Kc/s)

PRINCIPAL FEATURES The "98" model concentrates on performance in an essentially straightforward and substantial design. Emphasis is laid on sensitivity and, in particular, on short-wave reception. Short-wave tuning is facilitated by a geared logging scale, and independent wave-band illumination is used on the main tuning scale.

CIRCUIT Supersonic heterodyne receiver, comprising aerial circuit with built-in I.F. rejector circuit and provision for plug-in aerial filters in areas very close to strong stations; triode-hexode frequency changer (465 Kc/s I.F.); pentode variable-mu I.F. stage; double-diode-triode for A.V.C. and signal rectification and A.F. amplification; power output valve; substantial output transformer.

CONTROLS *Wave-range switch* of the push-button type to enable signal-frequency leads to be kept short, and for ease of operation.

Tuning knob with fast-slow drive operating the variable condenser, the pointer on the main tuning scale and the rotating logging scale for short-wave stations. Wavebands are separately illuminated to show the band in use.

Volume control.

Combined on-off switch and tone control placed conveniently to hand on the left-hand side of the cabinet. Sockets are provided for connecting an extension speaker and a pick-up.

MECHANICAL CONSTRUCTION The chassis is divided into two easily-separated sections—a front plate carrying all the signal-frequency components, and a chassis proper with all parts from the frequency-changer onwards. The design leads to greater reliability, while features such as the detachable front plate will facilitate servicing.

CABINET DESIGN A black moulded cabinet with separate moulded escutcheon mounting. Centrally mounted three push-button wave range switch, with tuning control on the right and volume control on the left. Combined on-off switch and tone control mounted in a recess on the side of the cabinet. For ease of service this side control is connected to the set by flexible leads, which are long enough to permit the chassis to be moved from the cabinet to stand on the bench.

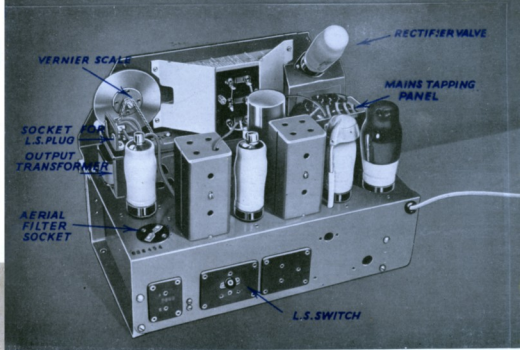
THE "98" CHASSIS

SENSITIVITY A signal of 10 microvolts modulated to 30 per cent. will give an output of 50 milliwatts. This is an average figure, the actual sensitivity varying over each wave-band.

MAINS SUPPLY A.C. Mains only 105–115 and 200–260 volts, 50–100 cycles.

DIMENSIONS Height, 17½ in.; Width, 16½ in.; Depth, 9¾ in., excluding projection of control knobs.

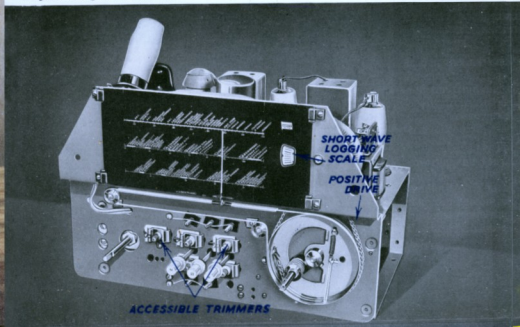
WEIGHT 34 lb. (15½ Kilos) unpacked.



ABOVE:
A TOP VIEW, on which, apart from the details marked, the short-wave logging scale can be clearly seen to the left of the pilot-lamp holder enclosing the main scale.

BELOW:
THE COMPLETE CHASSIS with the front plate on, showing the push-button wave-range switch and complete tuning drive assembly.

THE "98" CHASSIS



MURPHY SAD94S RECEIVER

UNIVERSAL TABLE MODEL

A.C. OR D.C. MAINS-OPERATED SUPERHET

200–250 VOLTS D.C. OR A.C., 25–100 CYCLES. 100–125 VOLTS MODEL AVAILABLE

WAVE RANGES : 16.7m–50m. 200–550m.

PRINCIPAL FEATURES The SAD94S has been designed to provide reliable listening from a light weight handy receiver of the Murphy standard at low cost. Though simple in construction the SAD94S provides excellent reception from all but the most distant stations.

Sensitivity is sufficient for all normal requirements. Selectivity is up to the standard of more expensive sets, while the audio response has been carefully chosen to avoid undue whistle and other interference, without losing crispness on speech.

CIRCUIT Four valve (and rectifier) supersonic heterodyne receiver for medium and short wave bands capable of operation on A.C. or D.C. supplies. Aerial circuit of the conventional type employing separate medium and short wave coupling coils and provision for a plug-in aerial filter in areas close to strong stations; triode hexode frequency changer; pentode I.F. stage; diode triode for signal and A.V.C. rectification and L.F. amplification; and beam tetrode output stage. All H.F. coils have adjustable dust-cores, and condenser trimmers are of the very stable type used on the more expensive current receivers. An intermediate frequency of 465 Kc/s is employed.

CONTROLS *The tuning scale* is of the horizontal type marked with station names on medium waves, and bands with the principal names on short waves.

The tuning knob in the centre operates the variable condenser through a fast-slow motion drive.

The combined on-off switch and volume control is on the left, and on the right the two-position *wave-range switch.* A pilot lamp is provided to indicate when the set is switched on.

Extension loudspeaker sockets are provided in parallel with the speech coil of the internal speaker.

MECHANICAL FEATURES The chassis takes a form suitable for the moulded bakelite cabinet construction both as regards the general shape and also in the mounting arrangements. The cabinet has been kept shallow for acoustical and other reasons, so that a narrow chassis results. This makes a strong, girder-like construction, and the method of mounting also minimizes any possibility of distortion of the chassis during transit.

NOT A MIDGET, but a small high quality universal mains receiver for short and medium waves. The cabinet of the "Universal" is a most distinguished design in bakelite, with black-and-white as the colour scheme. The station-name scale is clear and the controls are simple to operate.

CABINET The cabinet is a compact-looking moulding, with strong vertical lines. The front edges are swept forward and the speaker bars also project boldly and are carried right over the top of the cabinet. The moulding is black, enlivened by the many high-lights of the detail, and by white speaker material, a white scale, and white letters on the knobs.

DIMENSIONS Height, 13⅜ in.; Width, 12⅜ in.; Depth, 6¾ in.

WEIGHT 13 lb. (6 Kilos) unpacked.

CONSUMPTION Approx. 60 watts at 230 volts.

MURPHY RECEIVERS

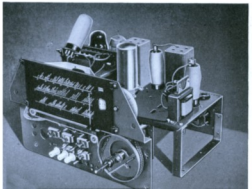
FEATURES OF DESIGN A great deal of space could be used in supporting, by detailed analysis of typical sets, the general claim for good design in Murphy Radio's products made in the introduction to this booklet. It should, however, be sufficient to describe a few of the more important principles embodied in them, with notes of their particular application to the models described.

MECHANICAL DESIGN

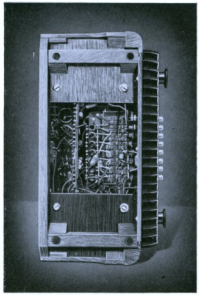
Rigidity and general robustness have always been outstanding characteristics of both the design and manufacture of Murphy receivers. These overseas models not only maintain the normal high standard, but, in addition, all metal work liable to deterioration under tropical conditions has been specially protected, and moulded materials have been chosen for their moisture-resisting properties.

Turning to the actual layout of the receivers described in the preceding pages, it will be seen that the TA92 and SA98 models use a push-button wave-range switch mounted on a detachable front plate carrying all the radio frequency components. This principle of constructing the receivers in two readily-separated sections confers a number of advantages:

(1) The lengths of high frequency leads between coils and switches have been kept to a minimum with consequent advantages in performance, particularly on short waves.



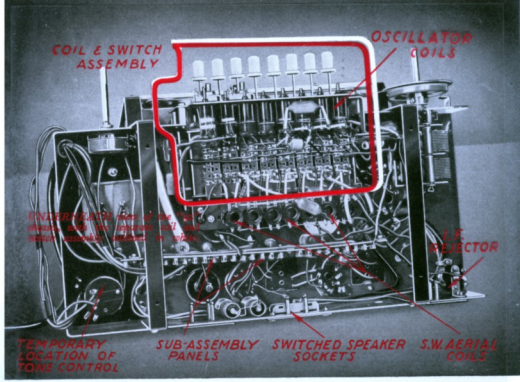
THE DETACHABLE FRONT PLATE of the "98" chassis is clearly shown here. It carries all the R.F. components and considerably simplifies service work.

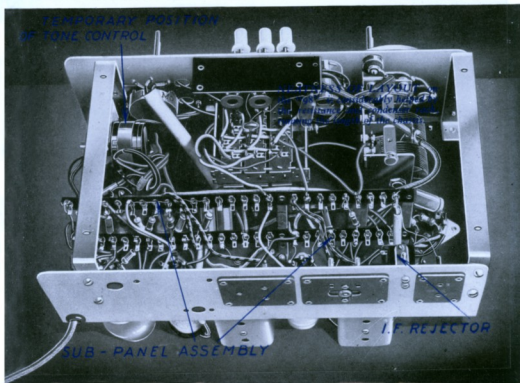


OPEN BOTTOM TO CABINET of the "92" chassis gives ready access for servicing sub panel and main chassis wiring without removing the chassis.

(2) By the simple process of removing the front plate from the main chassis, all components of either section are readily accessible for adjustment or service purposes.

(3) The principle allows the condenser and inductance adjustment trimming screws to be brought to the front of the chassis, and hence to make them easily accessible without removing the chassis from the cabinet. By simply removing the four screws which hold the bakelite escutcheon in place, the trimmers can be reached from the front of the cabinet—and, of course, in the same way the tuning scale and pointer can be very easily adjusted or changed.





(4) Lastly, grouping the signal frequency components around the wave-range switch on the front allows the rest of the receiving chain to run in an orderly fashion down the back of the chassis.

Another characteristic of Murphy design will be seen underneath the chassis. An inclined "skeleton" panel extends the whole length of the chassis and carries resistances and condensers as close as possible to their appropriate circuit positions. This again results in a reduction of long leads, and in a much neater under-chassis appearance, as well as in some easing of service work.

The internal loud-speaker connection is also designed with the needs of the service engineer in mind. It takes the form of a 4-pin plug on the speaker-leads, with the corresponding socket accessibly mounted on top of the output transformer. Separate handling of the speaker and the chassis is therefore quite easy.

All overseas models have sockets for connecting an extension loud-speaker.

ELECTRICAL FEATURES

The circuits used in the Murphy overseas models are detailed separately under the appropriate headings in previous pages. All receivers are, of course, of the supersonic heterodyne type, using an intermediate frequency of 465 Kc/s.

The I.F. transformers are specially designed for freedom from drift. The coils have been wax treated so as to be unaffected by extreme humidity and employ adjustable iron dust cores. The silvered-mica condensers are also carefully sealed against moisture and are very stable in capacity. Signal-frequency coils are also dust-cored, and the trimming condensers are of a specially stable type.

British Mazda high-slope valves are used throughout. It is, perhaps, desirable to point out that European practice in valve design and arrangement differs somewhat from American technique. Valves giving a high gain per stage are favoured, and, generally speaking, more multiple-stage valves are used.

The result is that a British 4- or 5-valve superhet is at least equal in sensitivity to conventional American designs using substantially more individual valves. This has led some English designers to attempt a definition of a set's performance by using the term "stage", e.g. "5-valve, 8-stage receiver". Even this, however, is not a really adequate description, and hence is not used by Murphy Radio.

The emphasis on high gain has been taken a step further in television practice, and a slope of 8.5mA per volt has been attained in the Mazda Sp.41 valve. This valve has been used in the radio-frequency stage in the T.A92 receiver, where, besides giving a high gain, it leads to an exceptionally low noise level.

SHORT-WAVE TUNING

Of all the available methods for making it easier to tune and re-tune short-wave stations on a commercial receiver, electrical band-spreading is demonstrably the most effective. The principle has been known to engineers for a long time, and has, in fact, been used by many advanced radio amateurs, and in design of specialized "communications" receivers.

Murphy Radio first successfully applied the principle to a commercially-produced, low-priced domestic receiver; since that time a great deal of knowledge and experience has been acquired.

In the TA92 each of the principal short-wave bands has its own series of tuned circuits, which are independently selected by means of the push-button switch. At the same time, the capacity-range of the tuning condenser is restricted by a series condenser, so

MURPHY RECEIVERS

that a large rotation is available to cover a short tuning range. The effect of these arrangements is that when one of the wave-range buttons is pressed—say, the one for the 19-metre band—the whole of that single band is spread out over almost the full range of the tuning condenser, and individual short-wave stations are as broadly spaced on the tuning scale as are the stations on the normal broadcast bands.

Band-spreading of this kind depends largely for its success on the electrical stability of the tuned-circuit components, for just as the band-spreading makes tuning easy so it shows up to an equal extent even the smallest amount of "drift" in capacity or inductance in the tuning circuits.

One form of drift, familiar to everybody who uses a short-wave set, normally takes place in the first few minutes after switching on. As the valves warm up, changes take place in the inter-electrode capacities, and the tuning point for a given station moves a few degrees along the scale. This form of drift has been almost completely eliminated in the design of the TA92. As each short-wave band has its own separate inductance, the associated fixed capacity can be of a value high enough to "swamp" the effect of any small changes in valve-capacity, and "warming-up drift" as it is known, does not therefore become apparent in the tuning of a station.

Another form of drift occurs due to changes of temperature affecting the electrical values of the tuned circuit components. This causes drift not only as the set itself warms up but also with changes of room temperature. To overcome this in the TA92, a special type of compensating condenser is used with a temperature coefficient chosen to maintain the frequency of the tuned circuit independently of the temperature changes.

Thirdly, changes in atmospheric humidity are liable to affect seriously the electrical value of the tuned circuit components. This effect is likely to be specially serious in tropical conditions. It has been overcome by the development of stable sealed capacities whose value is unlikely to change noticeably with humidity, and by special impregnation of the S.W. oscillator coils.

The combination of the band-spread system—with its effect of giving every short-wave station plenty of tuning space on the scale—and the freedom from drift in the tuned circuits has resulted in the TA92 in an unusually high degree of calibration accuracy, both initially and during long period of use. We have therefore been able to complete the job of making short-wave tuning as easy as on the broadcast bands by printing station-names on the short-wave scales. It will be found that, within reasonable limits, the stations marked on the short-wave bands will, in fact, be found at the places indicated whenever they are working and conditions permit their reception.

* * *

On the "98" receiver, although considerations of cost do not permit band-spreading to be employed, ease and accuracy of short-wave tuning have again been borne in mind. Stable components are used in the tuned circuits, and, in addition to an automatic slow-motion drive on the tuning condenser, a special logging scale is provided to simplify the tuning and subsequent identification of stations on the short-wave bands.

This logging scale rotates eight times faster than the tuning knob, and operates from it by means of a positive chain-drive. Once a station has been identified on a particular set at a certain number on the logging scale (which is graduated from 0–100), that station will continue to appear close to the same figure whenever it is re-tuned.

QUALITY OF REPRODUCTION

In these days, quality of reproduction—or "tone"—tends to be taken somewhat for granted, but it is the case that nothing like finality has yet been reached in the search for greater *truthfulness* in the reproduction of speech and music.

It does not matter how excellent are the sheer station-getting properties of a radio set, it is certain that, except in the most unusual circumstances and locations, it will be used for the greater part of its life for "local station" reception. For this reason, Murphy Radio have always tried to build into their sets the best standard of quality possible within commercial limits of size and price.

The conflicting requirements of selectivity and width of audio frequency response have led us at various times to the introduction of many features not at the time previously used in commercial sets. These features have included such developments as two-stage audio filters, negative feedback tone-correction circuits, forms of variable selectivity and so on. In addition, the principle of automatic frequency correction, to ensure accurate tuning of stations in the interests of best quality, was first developed in the Murphy engineering laboratories, and has since been adopted by many designers both in Europe and America.

In the "luxury-price" market in Great Britain, Murphy receivers give a fidelity of reproduction not previously available in factory-produced instruments. In the more moderately priced sets, such degrees of refinement are naturally not possible, but in its particular class the TA92 model, with its specially designed loudspeaker and heterodyne filter, reaches a very high standard of reproduction. The SA98 gives a quality not generally available in sets of similar specification and price.

MAINS SUPPLY EQUIPMENT

A.C. Receivers. The power transformers for the sets described here have been very carefully designed to give reliable service under difficult conditions. They are generous in size to keep the working temperature low and to allow ample insulation. The windings are enamel and silk insulated, with every layer separated by interleaving paper, the whole bobbin being afterwards vacuum-impregnated with a high melting-point compound. No varnished cotton tape or similar material unsuitable for tropical conditions is employed in the transformers. Tappings are provided at suitable intervals for voltages from 105 to 115 and 200 to 260.

Electrolytic smoothing condensers are of a special "tropical" construction, adapted for operation in hot atmospheres, in aluminium cases for further protection.

A ventilated fibre back is fitted to all Murphy receivers, giving protection to the set itself and preventing accidental shocks.

MURPHY RADIO LTD

WELWYN GARDEN CITY

HERTFORDSHIRE · ENGLAND

You are buying "SOUND"

It is easy to write a great deal of highly technical talk about Radio Sets. But so far as the user is concerned, there is only one thing that he really wants to know. Is his set a good reproducing instrument? When you choose your set you may have to listen—or even like to listen—to a great deal of talk about the wonderful circuit inside the cabinet; or you may be very attracted indeed by the cabinet itself; or you may be fascinated by some amusing or interesting feature of the set. There is no harm in that, for you are buying all of these things. But if you would take advice from us we should say to you: when you have finished listening to the salesman and examined the set, turn your back on it and ***listen*** to it. ***You are buying sound.*** Whatever you may think while you are in the shop, what you really want is to be sure that the sound coming out of the set is as near as possible the same sound that comes from the Broadcasting Station. No set in the world can give you completely perfect reproduction, though some may claim to do so. We believe, with some reason, that no set gives truer, more faithful reproduction than a Murphy set. But that, of course, is a matter on which you are now making up your own mind!

MURPHY