

SCOTT



NEWS

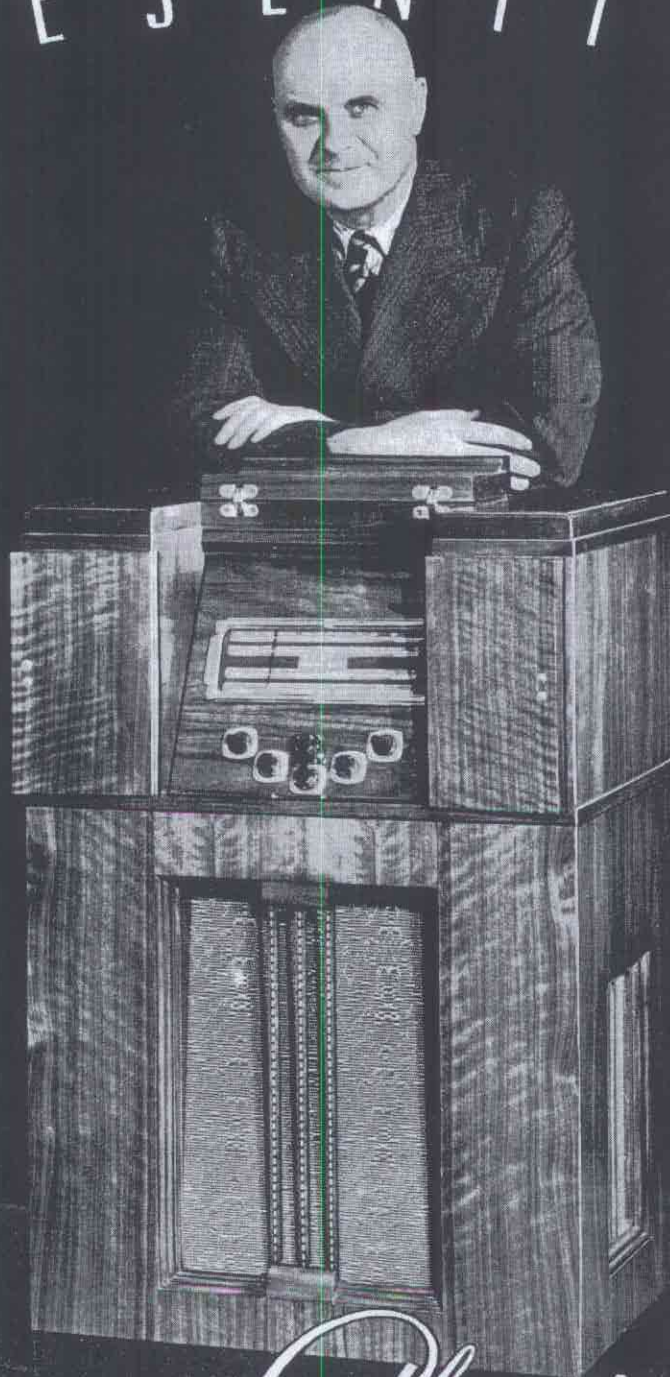
NEWS OF LATEST DEVELOPMENTS IN THE SCOTT RESEARCH LABORATORIES

VOL. II

AUGUST 1938

No. 3

P R E S E N T I N G



THE NEW SCOTT *Phantom*



A Remarkable New Receiver

DESIGNED BY SCOTT RESEARCH LABORATORIES CREATES NEW FIDELITY AND PERFORMANCE STANDARDS

Incorporating Entirely New Principles of Advanced Radio Receiver and Double-Doublet Antenna Design, giving—(1) More Noise-Free Reception from the Remote Shortwave Stations of the World, and Distant American Stations on the Standard Broadcast Band (2) Greater Selectivity to Tune Out Interfering Stations on Adjacent Wavelengths, and (3) Higher Fidelity Reproduction of Both Radio Broadcasts and Recorded Music.

THE new design principles incorporated in the SCOTT PHANTOM and the New Scott Super Double-Doublet Antenna System will, I believe, revolutionize reception from distant foreign stations, for as compared to present day standards, it brings them in so much more quietly and clearly, and with so much finer tonal quality, that I believe you will find yourself tuning in each evening to the programs of foreign stations for your entertainment just as regularly as you now tune from one local station to another.

Scott Custom Built receivers, largely due to their ability to bring in distant foreign stations regularly with clearness and good volume, are today in use in 148 foreign countries, and have probably established more Verified World's Long Distance Reception Records than any other make of radio receiver. *The Laboratory measurements and final air tests have provided convincing proof that the new SCOTT PHANTOM is one of the most selective, sensitive and efficient receivers that has ever come out of my Laboratory, and is, I believe, as far ahead of the mass produced receiver in design, performance and construction, as the latest 24 passenger 250 M.P.H. luxury airplane liners are ahead of the ordinary regular commercial planes, which can carry only half this number of passengers, and fly at half the speed.*

The new Custom Built SCOTT PHANTOM has only been made possible by the fact that in my Research Laboratories all work is carried on *with the sole purpose of securing greater efficiency and better performance*, for Scott radio receivers are designed and built to order in very limited numbers for those who want something better, and are not satisfied with the results secured on the ordinary mass production type radio receiver.

Incorporated in the design of the SCOTT PHANTOM and the Scott Super Double-Doublet Antenna System are several new principles that so greatly reduce the effects of "man-made" static such as interference from automobile ignition systems, vacuum cleaners, oil heaters, and other types of electrical interference, that distant American and foreign programs which are often completely blotted out or badly marred by this interference and noise on the average radio, can be brought in on the SCOTT PHANTOM with the noise and interference so greatly reduced that the programs can be enjoyed.

Hundreds of circuits and their variations have been experimented with in the intensive work that has been carried on in my Research Laboratories, and at last, by a combina-

tion of several radically new developments, have secured reception of distant domestic and foreign stations so quiet that it often makes it extremely difficult to realize the programs are coming from stations many thousands of miles away.

I am sure there are many evenings when you have tuned over the dial and could not find a local program you cared to hear. This is the time when the owner of a SCOTT PHANTOM will switch to the shortwaves and choose his program from the European or South American stations. I believe these new developments now make foreign broadcasts so much quieter, more interesting, and satisfactory, that every owner of this instrument will quickly acquire the habit of regularly listening for an hour or so each evening to the stations of Europe and other Continents, not only to hear the latest news of the events taking place in other parts of the world, but also for the fine music and entertainment broadcast from these foreign stations.

It is significant that the SCOTT PHANTOM has been brought to its present state of perfection when the whole world is in such a state of political and social unrest. Our American daily papers tell what is happening in other parts of the world as their correspondents see it, but the broadcasting stations of England, Germany, France, Italy, Russia, Japan, and many other foreign countries present the story of these same world events from their view point, which is often quite different to what we read in our own daily papers. Only when you have heard these foreign broadcasts on the new SCOTT PHANTOM, will you realize the degree of perfection and quietness the reduction of noise that our new developments have made possible in receiving them, for they make the nations of the world seem only a few hundred, instead of many thousands of miles away.

Scott Custom Built receivers have for years been the choice of world-famous musicians, and in the SCOTT PHANTOM you will discover High Fidelity reproduction brought to a higher standard than ever before. I know when you hear this new instrument you will agree that never before have you heard such perfect tonal realism.

On the following pages you will find described some of the new features which have made its sensational performance possible.



A Study OF THE TECHNICAL DETAILS

A STUDY of the Advanced Exclusive Features Engineered Into the New Custom Built Scott PHANTOM and a Comparison of Its Overall Fidelity, Sensitivity, Automatic Volume Control, Selectivity, Power Output, Loudspeaker Response, and Noise Suppression As Shown by the Laboratory Curves On the Following Pages, Will Clearly Show Why a Scott Is Today Generally Recognized As the—"World's Finest Radio Receiver."

1. *Overall Fidelity* practically flat from 30 to 8,500 cycles—approximately twice the Fidelity range of an ordinary radio.
2. *New Selectivity Expander and Contractor System* makes it possible to secure razor-sharp Selectivity from 3.4 Kc. for DX reception to 12.5 Kc. for High Fidelity reproduction.
3. *New Automatic Noise Limiter* reduces the effects of interference from automobile ignition systems to such a low point that foreign shortwave programs which are practically blotted out on the ordinary radio can now be enjoyed.
4. *Improved Scott Supershield Antenna Coupling System* practically eliminates local interference now picked up on the Antenna lead-in from vacuum cleaners, oil burners, and other electrical appliances.
5. *New Scott Super Double-Doublet Antenna System* provides not only an additional degree of noise reduction, but also gives greater antenna response on all wave bands from 550 Kc. to 22 Megs.
6. *Useable Sensitivity* (net distance getting ability) so tremendous that a special shielded attenuator had to be added to the finest available signal generator before it was possible to even measure the extremely weak transmissions which can be tuned in and amplified with this new receiver.
7. *Two Automatic Volume Control Systems* (instead of the usual single system) which keep transmissions from distant stations at even volume level.
8. *Inverse Feed-Back System* which automatically maintains practically flat acoustical response over a very wide frequency range.
9. *Tone Balanced Volume Control* which makes both the bass tones and higher frequencies sound as distinct and perfect at low volumes as they do at normal or high volumes.
10. *Specially Designed High Fidelity Loudspeaker* which scientifically distributes and diffuses higher frequencies to all parts of the room.
11. *Separate Continuously Variable High Fidelity Control* to secure fine quality reproduction even when Variable Selectivity Control is at maximum Selectivity.
12. *Separate Continuously Variable Bass Control* which does not affect higher frequencies in any way even when set at maximum.
13. *Special R.F. Amplification* on all bands giving efficiency of two stage R.F. Amplifier on ordinary radio receivers.
14. *Three Stage I.F. Amplifier* one of the most powerful and highly advanced ever incorporated in a superheterodyne receiver.
15. *Highly Efficient New Circuit Arrangements* practically eliminates tube hiss, providing still quieter reception of weak transmissions from distant foreign stations.
16. *Calibration* guaranteed to be accurate within .2%
17. *Twenty-two Tube Performance* obtained by using eighteen latest type octal base tube, four of them Double-Purpose.
18. *Power Output of 16 Watts* (3 times that of average radio) providing ample reserve power to smoothly reproduce without detectable distortion the "peaks" which occur in both radio broadcasts and phonograph records.
19. *Scott Needle Scratch Suppressor* automatically eliminates surface noise when playing records without affecting High Fidelity reproduction at normal volumes.
20. *Tuner and Amplifier Mounted on Two Separate Chassis* (instead of using only one base for both) secures tremendously increased efficiency and avoids the objectionable hum present in many modern superheterodynes.
21. *Both Chassis Finished in Gleaming Chromium* (instead of the commonly used cadmium) for maximum protection from salt air, dampness, or extreme climatic conditions.
22. *Custom Built to Order* for DX enthusiasts, musicians, scientists, and critical laymen listeners who want the finest instrument that specialized hand-craftsmanship can produce.

MORE ADVANCED ENGINEERING FEATURES, WE BELIEVE, THAN ANY OTHER RADIO RECEIVER IN THE WORLD.



Higher Fidelity—Greater Sensitivity More Noise-Free Reception—Greater Selectivity WITH THE NEW SCOTT PHANTOM RECEIVER

The Basic Circuit

The SCOTT PHANTOM uses an advanced superheterodyne circuit incorporating many new, exclusive, and patented developments of the Scott Research Laboratories. All of the specialized knowledge gained in nearly 14 years of continuous radio engineering research, and the custom building exclusively of high quality powerful superheterodyne radio receivers has been incorporated in the design of this precision instrument.

Wave Lengths Covered

The SCOTT PHANTOM has a continuous tuning range (no gaps) from 550 Kc. to 22.2 Megs., which are covered on four bands as follows:

Band A	550 Kc.	to	1510 Kc.
Band B	1490 Kc.	to	4.7 Megs.
Band C	3.9 Megs.	to	9.6 Megs.
Band D	8.8 Megs.	to	22.2 Megs.

New Type Dial

Each of the four wave bands are very accurately calibrated on an etched glass scale, and illuminated by an indirect lighting system, making the calibration stand out in gleaming figures of light against the background—yet without glare, and easy to read either day or night.

Tuning is accomplished with a combination two speed knob, one fast speed to quickly tune over the complete scale, the other a special slow speed vernier planetary, that makes it easy to tune in every station exactly.

The Antenna System

A new, entirely different, and extremely efficient Scott Super Double-Doublet Antenna System has been designed for the SCOTT PHANTOM that has taken over a year's work in the Research Laboratory to develop to its present extremely high degree of efficiency.

On shortwaves it has lower loss, greater signal pick-up, and broader band coverage than the conventional doublet, while on the broadcast band a special matching transformer holds up the antenna efficiency to the lowest frequency in the tuning range, thus greatly increasing the effectiveness of the antenna signal pick-up at these frequencies over the pick-up obtained from the regular antenna.

In the regular conventional type antenna, as the frequency decreases, the signal is brought down close to ground potential with consequent loss in the signal strength. In our new Antenna, the efficiency is held up to a high order down to the very lowest frequency in the tuning range. In other words, it accomplishes the same effect you would obtain if

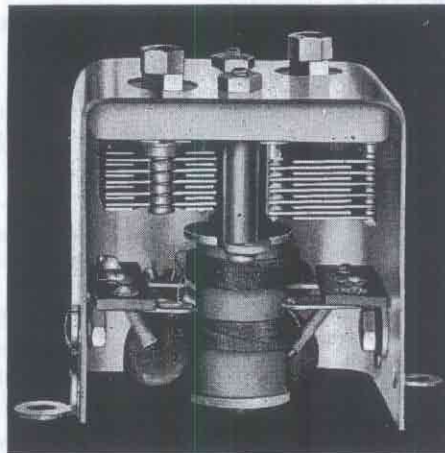
you were able to erect an antenna two or three time higher, and at the same time considerably increase its length but without the undesired effect of a long antenna lead-in which decreases the efficiency of signal pick-up. It is obvious that with this increase in efficiency the signal strength, particularly of weak distant stations, is increased many times over that now obtained.

The new Scott Super Double-Doublet Antenna System has a matching transformer located at the center of the flat top of the antenna proper and couples thru a transmis-

sion line directly into the antenna primary coils on all wave bands, automatically providing the proper impedance matching and maximum signal transfer at all frequencies, without the use of external switches.

In addition to securing maximum signal transfer from the flat top of the antenna, it actually boosts the signal sent thru the transmission line on the broadcast band from 8 to 10 times over the conventional doublet, and in conjunction with the Scott Supershield Antenna Coupling System built into the receiver, effects a further decrease in the effects of local interference, not only on the short-wave lengths, but on the broadcast band as well.

We believe the new Scott Super Double-Doublet Antenna System represents the greatest advance in high gain, transmission line Noise Reducing Antenna Systems that has been made since this system was first introduced and pioneered for use in allwave receivers by the Scott Laboratories in 1930.



New Highly Developed Double Tuned R. F. Transformer

The Antenna Circuit

In many locations foreign shortwave reception is at times impossible or very unsatisfactory due to interference picked up on the antenna lead-in from vacuum cleaners, oil burners, and other types of local electrical interference. A certain amount of noise reduction can be secured by the use of either an external or built-in antenna coupler, but our laboratory tests prove that an appreciable portion of the actual signal picked up on the flat top of the antenna is lost when this type of coupler is used. In other words, the noise reduction is secured only at a great sacrifice of signal strength, which means that many signals from weak distant stations are lost before they reach the receiver.

The new Improved Scott Supershield Antenna Coupling System not only avoids the loss of signal strength which occurs with both the external or built-in antenna couplers, both actually improves the ratio of desired signal to noise picked up on the antenna lead-in by a factor of approximately 100 to 1, as compared with the usual type of antenna coupler, and has an average discrimination on the shortwaves of approximately 1,000 to 1 in favor of the desired signal against noise or interference picked up on the regular type antenna lead-in.

This system, which is a development of the Scott Research Laboratories and is used exclusively in Scott receivers, effectively doubles the Sensitivity or distance-getting ability of the antenna and receiver combination, as compared with the best results we have heretofore obtained with either the regular type antenna

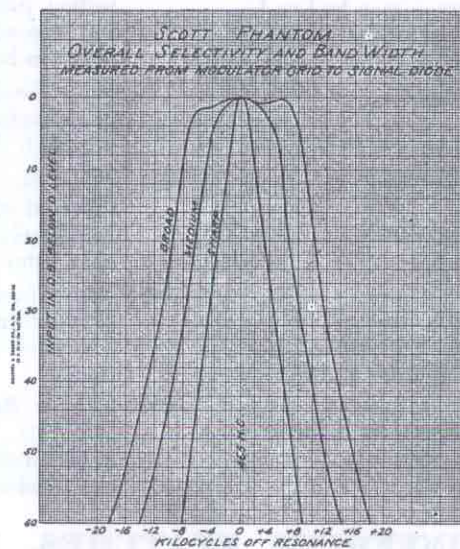


Fig. 1



or noise reducing antennas with their associated shielded couplers.

New Automatic Noise Limiting Circuit

As has been pointed out, interference of a continuous nature such as that which is produced by vacuum cleaners, oil burners, refrigerators, etc. picked up by the antenna lead-in on the short-waves, is trapped and prevented from passing into the SCOTT PHANTOM by the New Improved Scott Supershield Antenna Coupling System. However, up to this time there has been no practical method of reducing the noise transmitted from the ignition systems of passing automobiles, when listening to foreign shortwave programs except to adjust the tone control, thereby cutting off the higher frequencies. While this reduces the effect of the noise, it obviously impairs the Fidelity to such an extent that it is often quite impossible to understand speech or hear any of the overtones of musical instruments above about 2,000 cycles. A most amazing feature of the Automatic Noise Limiter is that it effectively reduces automobile ignition interference without affecting either the Sensitivity or Fidelity of the receiver.

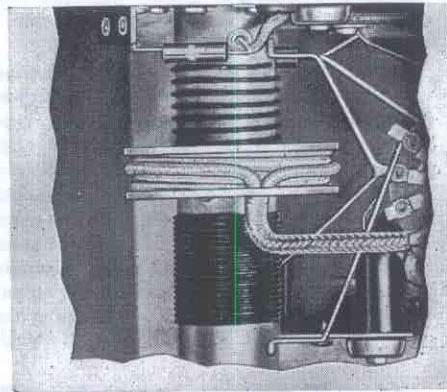
The circuit operates by allowing the demodulated signals to proceed thru the audio system *only to the extent of the signal itself*, cutting off completely any voltage in excess of the normal signal voltage. This excess is noise or unwanted over-modulated signals, and ceases to be a factor insofar as intelligible reception is concerned so long as the noise voltage is not more than the peak modulated audio voltage available, and all voltage in excess of either the maximum or laboratory pre-determined modulation percentage is squelched. This simply means that only voltages less than this pre-determined threshold value are admitted into the audio system.

Automobile ignition noise, or any other extraneously generated peaked voltage picked up on the antenna constitute a signal, but one which unfortunately is not very pleasant to listen to. Such a "signal" is ordinarily rectified by the second detector, and this rectified voltage generates an AVC voltage in much the same way as an ordinary radio signal generates an AVC voltage. In other words, when crashes of static or other types of noise with heavy peaks reach the antenna, enough AVC is ordinarily generated by the AVC system of an ordinary radio to reduce considerably the Sensitivity of the receiver in just the same way the AVC cuts down the Sensitivity when a strong signal is tuned in. It is for this reason that when the noise is stronger than the signal from a weak station, the signal is often obliterated. In the New Automatic Noise Limiting Circuit used in the SCOTT PHANTOM, the rectified voltage is actually used to *subtract* rather than add to the AVC voltage, and so makes possible reception of ordinarily weak foreign stations which would otherwise not be heard at all on account of noise.

This means that foreign short wave reception is now possible in many locations where it is not possible to erect an antenna outside the zone of automobile ignition interference.

New Type R. F. Amplifier System

The specially developed R.F. Amplifier used on all wave bands in the SCOTT PHANTOM has approximately twice the efficiency of the R.F. Amplifier used in conventional mass-production radio receivers. In the ordinary type of receiver, the R.F. tuned circuits usually use separate primary and secondary coils between the R.F. Amplifier and the converter tube. This means that the signal is transferred by means of electro-magnetic coupling between the primary and secondary to the R.F. Amplifier tubes, and this causes a considerable loss of signal strength on weak distant stations. In the SCOTT PHANTOM, highly efficient tuned circuits operate *directly* in the plate circuit of the 6U7G amplifier tube and connect directly into the grid of the following tube. This prevents any signal loss whatsoever



The Scott Supershield Antenna Coupling System Used on Short Waves and Broadcast Bands to Reduce "Man-made" Static.

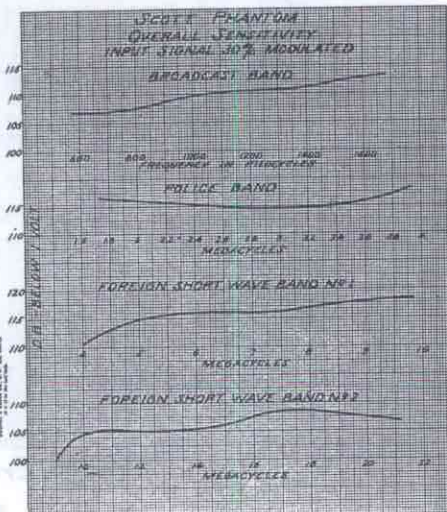


Fig. 2

and greatly increase the amount of amplification.

The high amplification developed by this powerful R.F. Amplifier is especially valuable in foreign shortwave reception and is one of the reasons why the SCOTT PHANTOM is able to bring in with good volume many distant stations which are ordinarily quite beyond the range of most receivers.

The Oscillator

A low capacity high mutual conductance 6J5G oscillator tube is operated in a special Electron Coupled oscillator circuit developed in our Research Laboratories, completely stabilizing the oscillator circuit at all times and maintaining exact calibration.

Complete thermal isolation from heat generated in the voltage dividers, and the use of micrometer adjustment air condenser for trimmers and padders, further assures more precise dial calibration and circuit alignment on all tuning ranges.

All oscillator potentials are completely bypassed and filtered at the oscillator tube to prevent indiscriminate surging. Tube hiss is kept at an absolute minimum in the converter tube by applying an unusually high oscillator voltage to its injector grid, thus producing maximum conversion gain efficiency.

Another new feature is the incorporation of a Negative Co-Efficient circuit that offsets the small remaining drift which normally occurs with changes in temperature due to the fact that practically all insulating materials have temperature capacity co-efficients. Instead of using ordinary mica fixed condensers which change capacity under temperature changes, isolantite silver plated electrode condensers are used which are very stable under great extremes of temperature. A special metallic grid resistor is also used in the oscillator circuit as a grid leak to further insure stability.

Laboratory tests show that by the use of this special circuit the oscillator frequency is held constant within 1 Kc. at any frequency to which it may be tuned, regardless of the temperature of the receiver or the room in which it is being operated.

The I. F. Amplifier

High gain with extreme quietness of operation, as well as exceptional Selectivity, are secured in the newly developed three stage I.F. Amplifier which is perfectly filtered and by-passed.

Instead of the usual 5 or 6 tuned circuits, 13 high "Q" tuned circuits (in addition to the oscillator) are operated in cascade at all times in the SCOTT PHANTOM. The I.F. transformers are wound with Litzendrath on special low loss forms, and are tuned with permanently stabilized air condensers.

Coupling between inductors is by means of separate coupling coils to avoid the usual excessive capacity coupling which results in dis-symmetry of the I.F. transmission curve shape. By using high capacity tuning condensers in the I.F. system, the effects of variation in tube capacity and location of grid leads are rendered negligible.



To prevent the usual loss of efficiency due to eddy current losses when small shield cans are used, all I.F. transformers in the SCOTT PHANTOM are mounted in shield cans $3\frac{1}{2}$ " in diameter. Each I.F. stage is so thoroughly shielded, filtered, and by-passed, that every trace of interstage coupling and instability is eliminated, thus making it possible to utilize fully the high gain in the I.F. Amplifying System.

The advanced engineering design of this new I.F. Amplifier reduces noise and tube hiss to such a low point that you can tune in *and really enjoy* programs from distant domestic and foreign stations.

Variable Selectivity

To secure satisfactory reception from distant stations whose wave lengths are close in frequency to powerful nearby ones, it is necessary that a receiver have a high degree of Selectivity. In the SCOTT PHANTOM a special three-position Expansion and Contraction System is incorporated in the I.F. Amplifier. An examination of the laboratory curves of the overall Selectivity characteristics of the I.F. Amplifier (See Fig. 1) shows that in the sharp position the band width is 3.4 Kc. at 6 db down, giving ample Selectivity to powerful locals. Such distant stations would ordinarily be blanketed by interference from powerful nearby stations on adjacent channels on the production type receiver.

When extreme Selectivity is not required, and the finest possible reproduction is desired, the Selectivity control can be switched to the broad position and the receiver instantly adjusted so that it will pass all frequencies up to 8,500 cycles. This simply means that the overall frequency range of the SCOTT PHANTOM equals or exceeds the tonal range of every standard broadcast band station on the air, and to the best of our knowledge, no other make of radio available today incorporates such a wide Fidelity and Selectivity range as the SCOTT PHANTOM. It is an ideal instrument for the DX enthusiast who is interested not only in merely hearing distant stations, but also in bringing them in with clearness and fine tone.

The Fidelity

Purchasers of Scott receivers require (1) Extreme distance getting ability, and (2) Superior Tonal Fidelity. An examination of the actual Laboratory Measured Fidelity Response Curve in Fig. 3 shows that the Overall Electrical Fidelity of the SCOTT PHANTOM covers all frequencies from 30 to 8,500 cycles, proving that it is capable not only of reproducing perfectly every tone and overtone being transmitted by the finest High Fidelity stations on the broadcast band, but also the latest High Fidelity recordings. However, until you actually hear a program from one of the high quality broadcasting stations or one of the newer High Fidelity phonograph records reproduced by SCOTT PHANTOM, it is quite impossible to realize the tremendous difference there can be in radio receivers. When you

do hear it, you will realize why internationally famous musicians buy it for their personal use, and recommend it so highly to their friends. We will be glad to send you copies of letters we have received from many of them, including Arturo Toscanini, Lauritz Melchior, Gennaro Papi, Director of the Metropolitan Opera, Eugene Goossens, the internationally famous composer and conductor, and many others.

Continuously Variable Bass Control

An outstanding feature of the new SCOTT PHANTOM is the specially designed high "Q" Bass Bi-Resonator System, another development of the Scott Research Laboratories (Scott Patents Applied For) which provides a bass boost of approximately 5 times (14 db) in the maximum position *without in any way affecting or muffling the reproduction of the speaking or singing voice, or any of the higher frequencies.* This means that if you enjoy a rich full bass in music merely set this control at maximum, but when a speaker or singer is heard the voice will not have that deep, boomy, and unnatural quality obtained from conventional bass-boosting systems, for it always remains clear, crisp and natural.

Almost invariably when a good bass response is obtained in the ordinary radio receiver, it is accompanied by considerable hum, especially when the Bass Control is set at maximum. By means of the new Scott Bass Control System this hum has been virtually eliminated, being only 6 microwatts maximum at the plates of the 6V6G output tubes. The bass response is *Continuously Variable*, and in the minimum position it provides an extremely effective cut-off of the lower frequencies. A listening test on the new SCOTT PHANTOM will quickly

prove the tremendous improvement in bass reproduction this new system provides.

Continuously Variable High Fidelity Control

Due to the expense involved, only a very few high priced radio receivers have Variable Selectivity, and we know of none that offer both Variable Selectivity and a separate Treble or High Fidelity Control. This means that when a receiver having only a Selectivity control is switched over to its most selective position, Fidelity is greatly impaired as extreme Selectivity can be secured *only at a great sacrifice in tone quality.* Nothing is more annoying than failing to understand an announcement from a distant station because the extreme Selectivity necessary has cut off the higher frequencies of the speaker's voice, making it deep and boomy.

It is to compensate for this natural impairment of Fidelity when the set is switched to the extreme selective position that we have incorporated a separate High Fidelity Control in the SCOTT PHANTOM, so that the higher frequencies may be boosted or amplified at any time—even when the Selectivity Control is in the extremely selective position! This highly advanced system at last makes it possible for the listener to enjoy fine quality reproduction when the receiver is set for razor-sharpness.

The musician's ear can immediately detect the absence of the higher overtones that are entirely missing on the ordinary radio receiver, and for this reason there are many thousands who have never been completely satisfied with any reproduction they have so far heard on either radio or records. For such discriminating listeners, the High Fidelity Control incorporated in the SCOTT PHANTOM

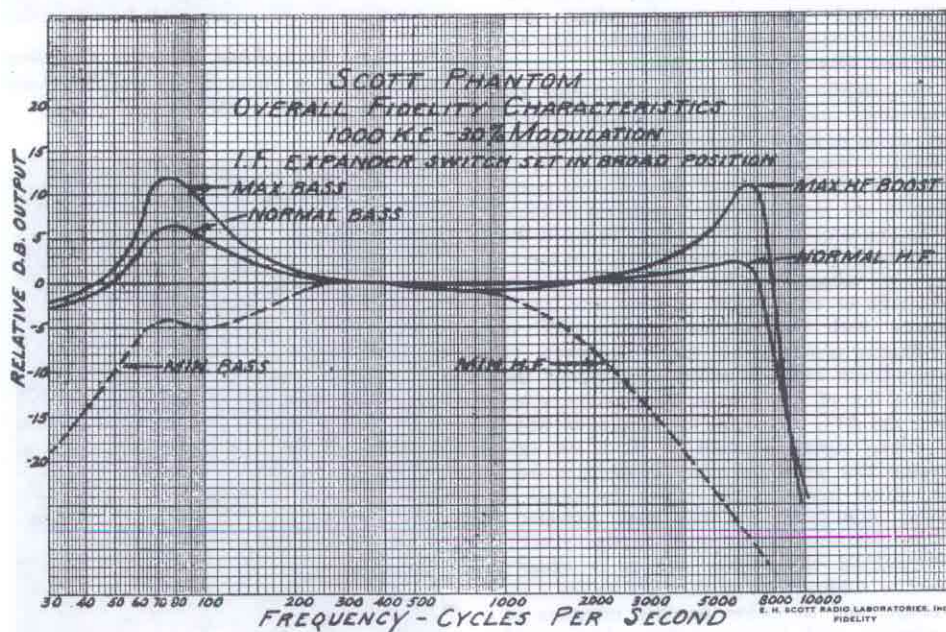


Fig 3



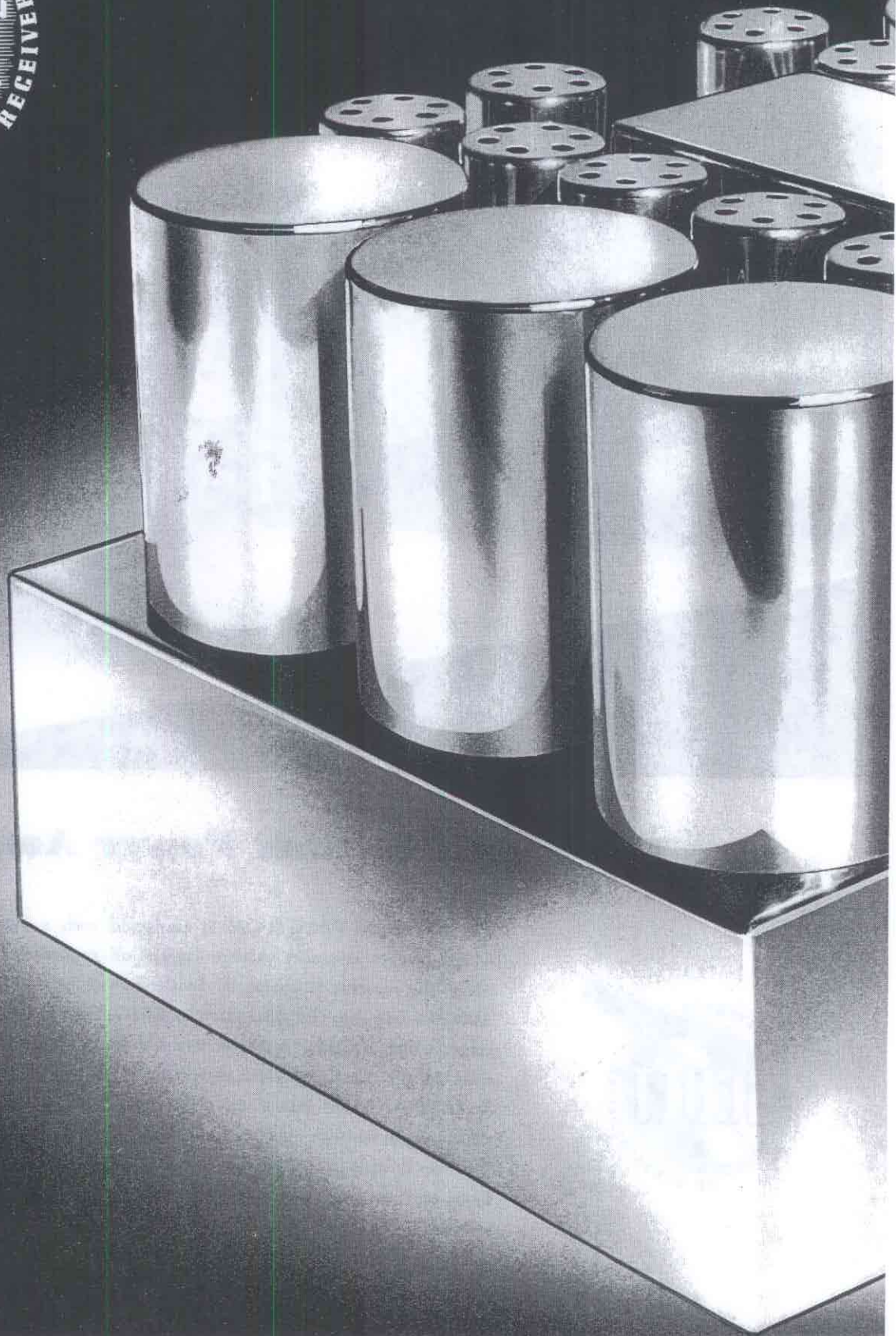
The Scott Phantom Power Amplifier



The New Scott PHANTOM is equipped with a very heavy duty power supply which assures constant voltage regulation regardless of the circumstances under which the receiver is operated. In the Power Amplifier is the 6J5G Phase Inverter Tube feeding into the dual-purpose 6F8G Tube acting as a push pull driver audio stage, which operates into the two 6V6G beam power output tubes. Two heavy duty 5V4G tubes are used as rectifiers. Enough reserve power is built into the Scott PHANTOM Power Amplifier to permit the receiver to be worked at maximum output without overloading. The Power Transformer, which alone weighs 8½ lbs., has built into it the Scott "chimney action" cooling system to dissipate excess heat, and an electrostatic shield to prevent line interference being fed into the receiver.

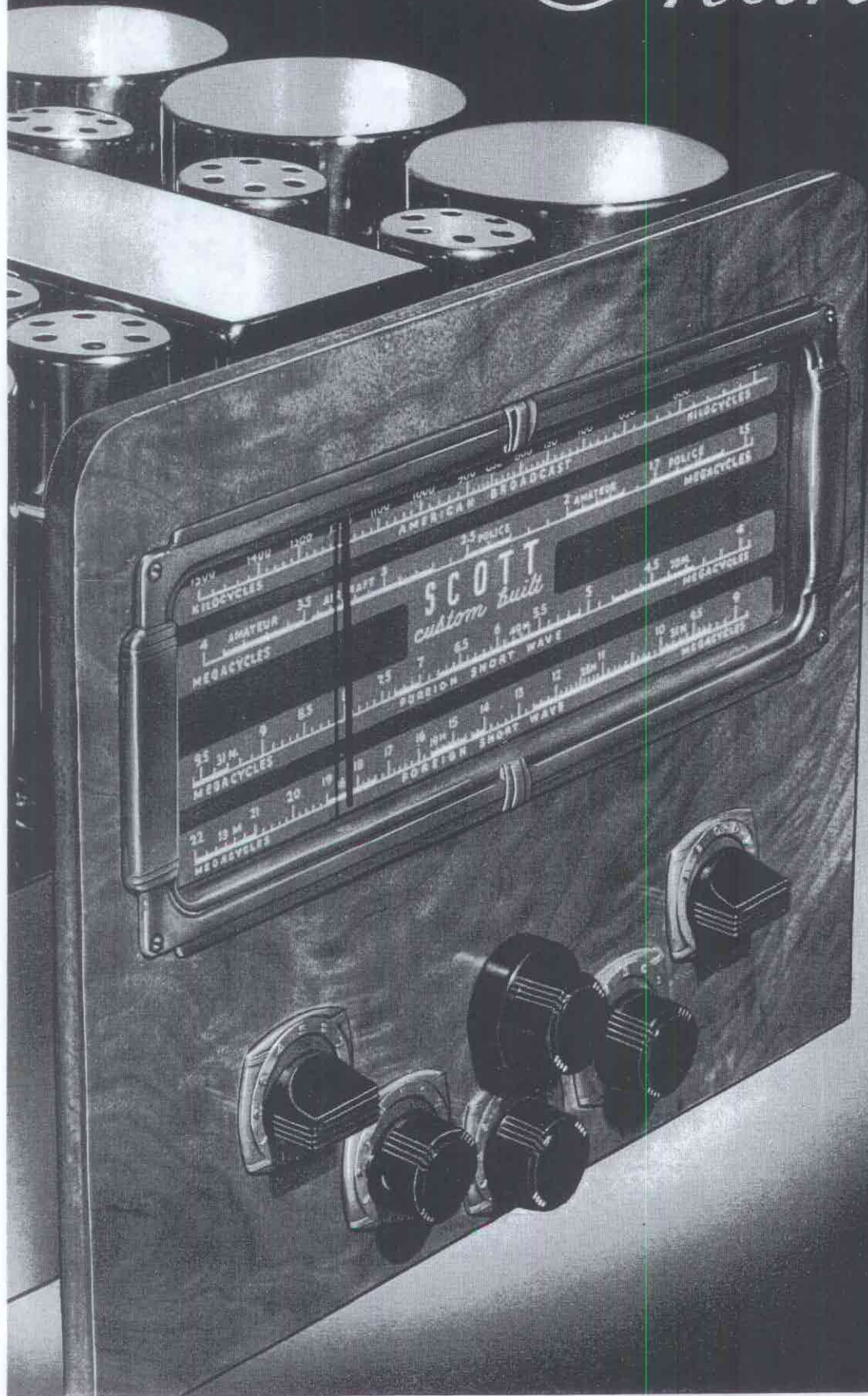


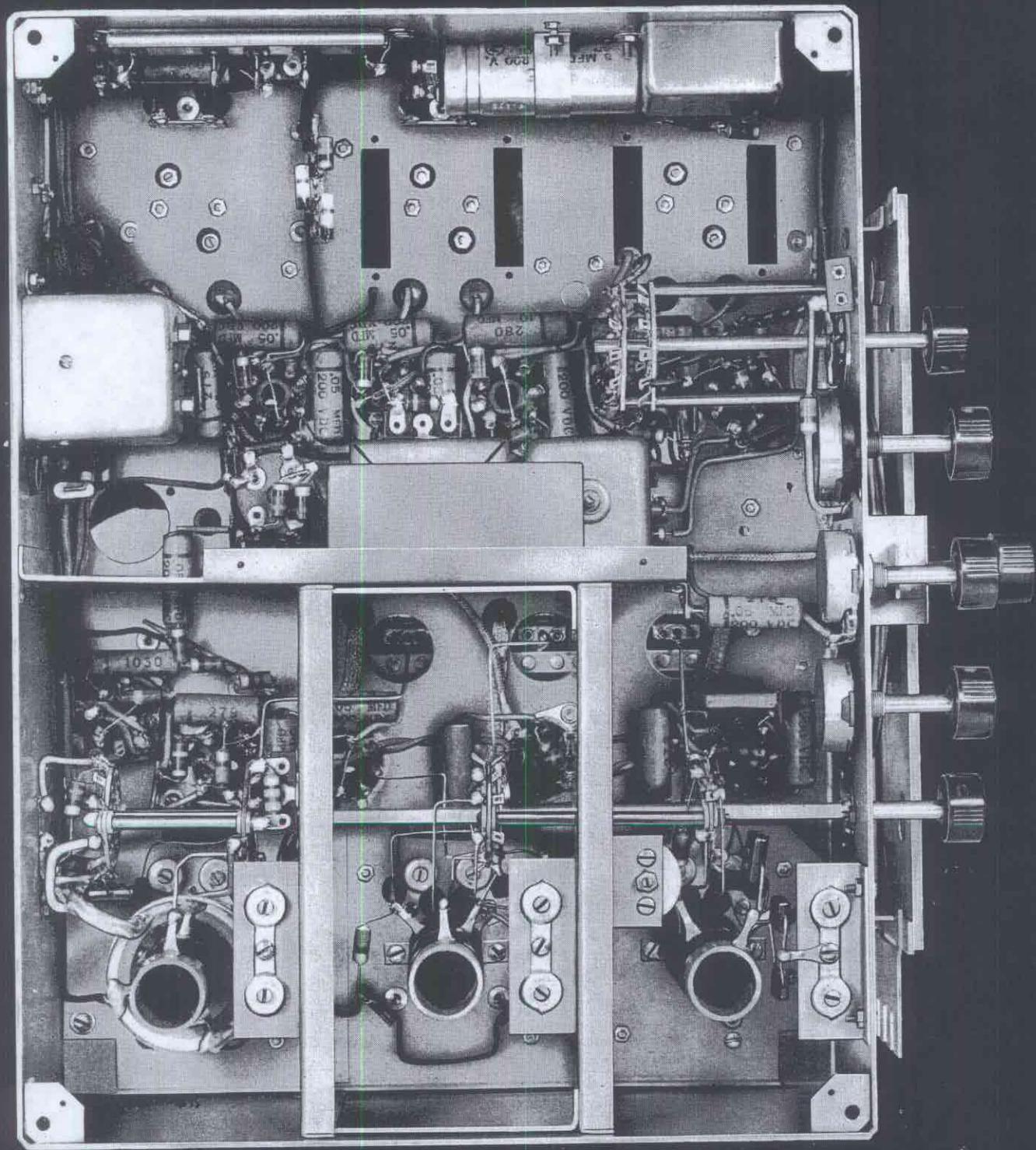
Chassis OF T



THE NEW SCOTT

Phantom





View under Chassis of New Scott Phantom



will be a continual source of pleasure, for it enables you to quickly adjust the High Fidelity response so that the timbre is restored to all musical instruments making them sound as clear and natural as if they were being actually played in the room.

Tone Balanced Volume Control System

The Tone Balanced Volume Control System built into the SCOTT PHANTOM is much more than a control which raises and lowers the volume of the receiver, for incorporated with it is a Tone Balancing System which has been designed to follow almost exactly the Fletcher curve, named after Dr. Harvey Fletcher the famous acoustical engineer who carried out a great number of scientific tests in the Acoustical Division of the Bell Laboratories to secure this data.

In many radio receivers, when the volume is lowered, most of the lower frequencies or bass tones and a great many of the higher frequencies are lost, leaving only the tones in the middle register audible and distinct. Actually these frequencies are still being reproduced, but unfortunately the human ear loses Sensitivity to the very low and the very high notes when they are reproduced at low volume.

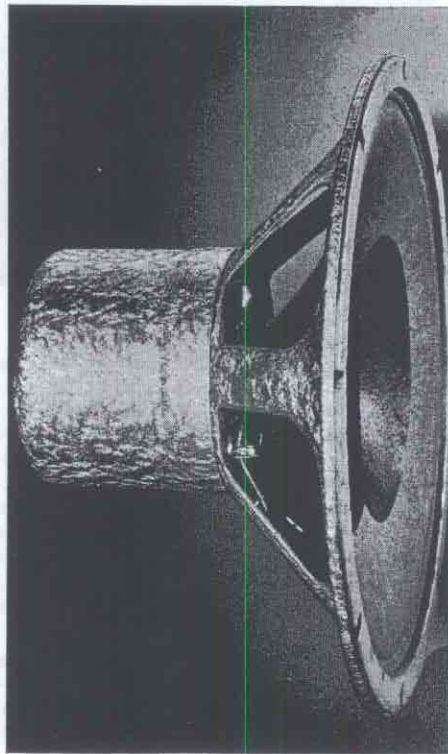
The Tone Balanced Volume Control System incorporated in the new SCOTT PHANTOM has been scientifically designed to gradually increase the strength of both the bass and high frequencies as the volume is lowered so that it automatically follows the response of the ear to the lower and higher frequencies at varying degrees of volume, maintaining at all times a perfect balance to your ear between the bass and the brilliant higher frequencies or overtones with the middle frequency range.

The result of this highly developed system is that when the volume is turned down even to the lowest levels, the rich low bass tones as well as the highest overtones come thru perfectly balanced so that they are as clear and distinct as the frequencies of the middle register. Thus it is possible to enjoy music as thoroughly and completely at low volume as it is at normal or high volume. This feature of the SCOTT PHANTOM will be particularly appreciated by those who live in apartments and must habitually listen to radio or records at lower than the normal volume.

Loudspeaker Acoustical Response

Following the 6K7G tube in the first audio stage is a 6J5G tube functioning as an exact balancing Phase Inverter. Following this, a 6F8G tube acts as a push pull driver and operates into the primary of a special transformer having absolute minimum leakage reactance and using two identical secondary windings which apply the signal to the 6V6G beam power output tubes. An important advantage of the Phase Inverter circuit used in the SCOTT PHANTOM is that it is not susceptible to unbalance, due to change in tube characteristics.

Phase Inverter systems used in most radio receivers employ a regular amplifier output stage, the action of which is applied to the grid of a second audio tube where the signal phase is reversed to supply the other side of the push pull system. If the auxiliary tube is either weaker or stronger than the amplifier tube with which it operates, the signals



The Scott Heavy Duty High Fidelity Speaker With Dual Speaker Cones to Secure Perfect Diffusion of High Frequencies.

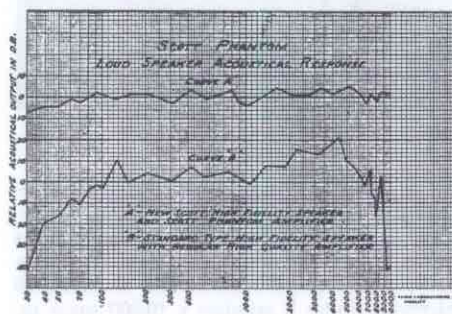


Fig. 4

on one side of the push pull system will be weaker or stronger than those on the other side, and this lack of balance results in annoying distortion. This common defect is overcome in the SCOTT PHANTOM by the use of the 6J5G tube in a circuit practically independent of the resistor values used and which is inherently self-balancing.

An examination of the acoustical curves of

even the best of loudspeakers will show many "peaks" and "dips" in the loudspeaker response at various frequencies. This means that the tones coming in at the "peaks" of the speaker are accentuated or made louder than they should be, while the tones coming in at the "dips" are not heard with sufficient volume. The result is that reproduction is impaired in proportion to the range of these variations in "peaks" and "dips" of the speaker.

The Improved Inverse Feed-Back System incorporated in the SCOTT PHANTOM Audio Amplifier automatically cuts down these "peaks" and brings up the "dips" which gives finer and more natural reproduction, flattening out the acoustical response of the speaker by a factor of approximately 2 to 1. In addition, it extends the frequency range both at the low and high frequency ends. Thus, the objectionable "hangover" so often noticeable in loud bass reproduction caused by the speaker cone vibrating after the note has actually ceased is entirely eliminated.

The improvement in the loudspeaker acoustical response is illustrated graphically in the two loudspeaker curves shown in Fig. 4. The first curve shows the acoustical response of the speaker connected to the SCOTT PHANTOM amplifier. Note the tremendous improvement over that obtained from a standard high fidelity speaker connected to the regular type of high quality amplifier. A study of the Fidelity curve will show the very excellent frequency response over the entire range and the very firm round bass response our highly developed Inverse Feed-Back System makes possible.

Sensitivity

One of the outstanding features of the new SCOTT PHANTOM is the high degree of Useable Sensitivity on all wave bands. The Overall Sensitivity curves shown for each of the four wave bands in Fig. 2, are measured at the new I.R.E. standard one-half watt output using an I.R.E. universal dummy antenna. These curves indicate only the Useable Sensitivity available for signal reception after tube and circuit noises (which have generally been included in Sensitivity curves published up to this time) have been deducted.

The curves show that the Sensitivity is remarkably flat on all bands and that the degree of Sensitivity is extremely uniform on all wave bands. We believe they represent the highest degree of Useable Sensitivity that has, up to this time, ever been attained in any receiver available to the general public.

Two Separate Automatic Volume Control Systems

To counteract the effects of fading, most radio receivers available today have only a single Automatic Volume Control System operating from the I.F. System. While a single system is adequate for those who confine their listening to local stations, it is NOT satisfactory for those who listen to distant stations. In the SCOTT PHANTOM we have incorporated two distinct and separate Automatic Volume



Control Systems to keep the signal at a constant level irrespective of wide variations in signal strength.

When a receiver using only a single Automatic Volume Control System is tuned to a weak distant station which is near in frequency to a powerful local, there is practically no Automatic Volume Control action on the weak signal you wish to hear, because the grid of the first R.F. tube is supplied with Automatic Volume Control voltage only from the I.F. Automatic Volume Control System, and therefore receives practically no bias voltage. On such receivers a powerful local station—even if it is 30 Kilocycles or more removed from the desired weak station—will practically obliterate the weak station you want to bring in, and in addition will distort the signal because the signal voltage from the strong station may exceed the small R.F. grid bias.

In the ordinary Automatic Volume Control System the R.F. and I.F. are controlled by a single diode stage. In the SCOTT PHANTOM two diode stages are used, one to control the I.F. Amplifier the other a newly developed double-tuned diode stage to control the R.F. Amplifier. The curve showing the characteristic of this extra diode stage is shown in Fig. 5. It will be noted that the use of this double tuned transformer, which develops control voltage on either side of the resonance at a band width as wide as 100 Kc., assures rejection of strong undesired signals on adjacent channels when desiring to listen to weak distant stations.

This practically eliminates cross-modulation—the effect caused by a strong undesired signal modulating the station signal you are trying to receive. When you get this cross-modulation, you hear both signals at the same time and often blame the interference on poor Selectivity. Another form of cross-talk or cross-modulation is produced by heterodyne detection where the frequency difference of the signals is in the broadcast band. For example, if one station is at 1400 Kc. and another at 600 Kc. then heterodyne detection of the two carrier waves will result in producing an 800 Kc. signal or the difference between 1400 and 600 Kc. This will allow the programs from either the stations on 1400 or 600 Kc. to be heard in the background when the set is tuned to 800 Kc. This type of cross-talk occurs when both interfering signals are allowed to reach the 1st R.F. grid, and is further affected greatly by the curvature of the characteristic curve of this tube at its operating point. The New Advanced design of the R.F. circuit, together with the use of the new double tuned R.F. A.V.C. diode reduces the effects of both types of cross-modulation mentioned above to a minimum.

The importance of having a separate R.F. Automatic Volume Control System designed to operate in the presence of strong signals either above or below the frequency at which the receiver is tuned cannot be overemphasized. By its use it is possible to operate the R.F. Amplifier tube at maximum gain under

all conditions. This increases the signal strength applied to the Converter System, greatly reducing the usual tube hiss on weak signals, in addition to protecting the first tube from overloading and distorting the program when the receiver is tuned to a weak station near in frequency to a powerful local.

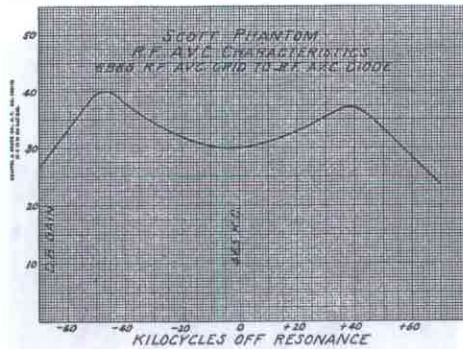


Fig. 5

The major part of the work of keeping the volume at a practically constant level in the reception of signals from the weakest to the strongest stations is done by a special I.F. Automatic Volume Control System recently perfected by the Scott Research Laboratories. This part of the Automatic Volume Control System is adjusted at the Laboratories so that its action extends completely down to the noise level of the quietest possible location, thus assuring maximum Automatic Volume Control action at all times.

The effectiveness with which the Automatic Volume Control System in the SCOTT PHANTOM is able to hold the output constant for signals of different amplitude is shown in curve Fig. 6.

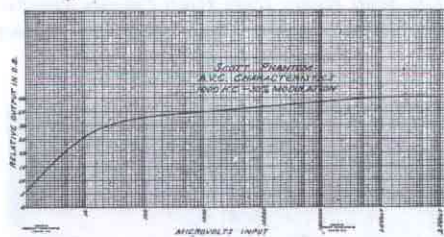


Fig. 6

The curve illustrates the typical AVC characteristic of the SCOTT PHANTOM for average output conditions, and demonstrates its ability to hold the output constant. The curve shows that from 100 microvolts to 1,000,000 microvolts input it requires a 10,000 times increase in signal strength to produce a 30% change in the audio output.

The Audio Amplifier

To secure perfect reproduction on all types of programs, the Audio Amplifier must have sufficient reserve power and the speaker must be capable of reproducing all degrees of volume without distortion. The reason you hear distorted or blurred tone in some of the louder passages on the ordinary type of radio receiver is because it does not have enough

reserve power to handle the "peaks" that occur frequently on every program. When programs of wide dynamic volume range are tuned in, that is, programs with a number of very soft as well as very loud passages, and the controls are set for sufficient volume on normal passages there is often not sufficient reserve power in either the amplifier or speaker to reproduce the loud passages without distortion. The SCOTT PHANTOM has ample reserve power to reproduce all programs perfectly without distortion, for it is designed to give a "peak" output of 16 watts, or over 13 watts with less than 2% harmonic distortion—over 300% more than the average radio receiver. The Laboratory Power Output curve is shown in Fig. 7.

High Fidelity Record Reproduction

One of the features that will appeal particularly to all music lovers is the very fine reproduction of phonograph records thru the Audio System of the SCOTT PHANTOM. Symphonies, Operas, and Chamber Music performed by the great artists of the world are reproduced with a new beauty and clearness, for the separate Bass and High Fidelity controls can be used to secure the finest possible reproduction from phonograph records as well as programs received over the air. In fact, when you hear a High Fidelity record reproduced by the SCOTT PHANTOM you will agree the reproduction is equal in every way to the finest High Fidelity broadcast.

Automatic Needle Scratch Suppressor

The constant background of needle scratch or surface noise has always detracted considerably from the full enjoyment of phonograph records. A development of the Scott Research Laboratories (Scott Patents Applied For) at last makes possible the full enjoyment of phonograph record reproduction, for it automatically eliminates the needle scratch on the records without affecting the full reproduction of the higher frequencies at normal volumes.

The first time you hear your favorite records through the SCOTT PHANTOM you will have a thrilling experience, for you will hear tones and overtones you never before realized were on the record—but with one thing missing—surface noise or needle scratch.

Remote Control

The SCOTT PHANTOM can be equipped with a perfected Remote Control mechanism and a small compact Control Keyboard at an extra cost of \$49.75 which enables the receiver to be operated from any part of the room. By merely touching a key, the receiver can be switched on or off, and any one of your twelve favorite stations tuned in from your favorite easy chair. If there is not enough volume, touch another key and instantly it becomes louder. If there is too much volume touch another key, and instantly it is reduced. It is never necessary to move from your chair.



The new Scott Automatic Record Changer can also be fitted at a small extra charge to operate the phonograph from the remote point.

If desired, extra speakers and additional Control Key Boards can be installed in various rooms, all operated by Remote Control. If you will send us a rough sketch of your rooms, we shall be glad to send full particulars of a Remote Control installation engineered for your own particular requirements.

Program Selector

When equipped with Remote Control, the SCOTT PHANTOM can also be equipped with an Automatic Program Selector which will automatically tune in any one of eight different stations every 15 minutes of the 24 hours of the day. Simply select the radio programs you desire to listen to during the day and evening, set them up on the Program Selector—then without any further attention on your part—the Program Selector will switch on the receiver and tune in each station you have selected at the exact time the program comes on the air.

The Power Supply

In order to secure maximum efficiency and performance in the SCOTT PHANTOM, the Power Supply chassis is separate from the Tuning Chassis. While it is much less expensive to build these two units on a common chassis base (standard practice among mass-production manufacturers) there are a number of very good reasons why the Tuner and Power Supply of the SCOTT PHANTOM are mounted on two separate chassis.

For example, if the bass response of a receiver is good down to as low as 30 cycles, hum picked up from the Power Transformer is practically unavoidable if this unit is an integral part of the tuning chassis, and the bass response must be limited at the factory in order to avoid the hum picked up from the Power Transformer. This is the reason why the bass tones on many receivers often sound weak, and without the rich full timbre associated with good bass reproduction.

Economical Operation

The SCOTT PHANTOM is extremely economical to operate, for it consumes less current than most of the common electrical appliances used in the home, requiring only 135 watts of electricity.

Custom Built

The SCOTT PHANTOM is Custom Built to Order in limited numbers under my personal supervision in our own modern and completely equipped Chicago Laboratories by skilled technicians trained for many years in precision work. However, it is only when you actually see the high quality parts, the precision workmanship, careful checking and testing of every receiver that you are able to realize the tremendous difference in quality between a production-type receiver and a Custom Built Scott. For this reason, we are always glad to welcome visitors to the Laboratories and show them exactly how Scott receivers are built and tested.

Protected Against Extreme Climatic Conditions

All coils, chokes, transformers, etc. are specially impregnated, and metal parts of the chassis and amplifier are chromium plated to prevent breakdown of these parts in humid climates, or in locations near the sea coast where salt air and dampness break down the ordinary type of transformers, or rust and corrode metal parts which are not protected. This assures practically indefinite life of these parts in locations where the ordinary receiver often breaks down after only a few months of service.

30 Day Trial

So certain are we that the SCOTT PHANTOM will completely satisfy you in every way, that it is sold to you with the distinct understanding that you are to be allowed a full 30 days (in U.S.A. only) after delivery to test it in your home. If it does not outperform any other make of receiver, regardless of price, regardless of circuit, or regardless of the number of tubes used—and you are to be the sole judge—you are at liberty to return it any time within the 30 day period and we will promptly refund the purchase price you paid for it.

The Convenient Scott Monthly Budget Plan

Buying out of income has enabled the American standard of living to be raised, until today it is the highest in the world. It is a dignified

way of acquiring things that one otherwise might go without. By selling Scott receivers direct to you without the intermediary of the usual radio dealer or distributor, I am able to set a price far below what it would be possible to sell the SCOTT PHANTOM at if a dealer's profit had to be added.

Now, in addition to the saving you realize in eliminating the dealer's discount, you can own a Scott receiver and pay for it out of income. The SCOTT PHANTOM and the beautiful ACOUSTICRAFT console only requires a small down payment with the balance in ten monthly payments.

To remove any possible hesitancy on your part about using this plan, I might say I carry my own time-payment accounts. You deal direct with me—and not a finance company. You get the same 30-day trial period—the same service—when you buy on the Budget Plan as you would if you paid cash. The order blank gives you full details.

Where to See and Hear the New Scott Phantom

In order that you may hear the marvellous new SCOTT PHANTOM under actual home receiving conditions, we have several "Living Room" studios in the cities listed below. If you are in any of these localities, I urge you to pay them a visit.

The technicians in charge have been associated with me for many years, and will be glad to demonstrate the new SCOTT PHANTOM, survey your location, and send me all the necessary details with your order so that I may build the finest and most efficient instrument for your own particular requirements.

If you are unable to visit these studios, place your order direct with me by mail on the enclosed order blank subject to the regular 30 day trial in your own home and money-back guarantee as explained elsewhere on these pages.

NEW YORK CITY. The Scott studio is located in the International Building, Rockefeller Center, at 630 Fifth Avenue on the 33rd floor, Suite 3362. Telephone Circle 7-0574.

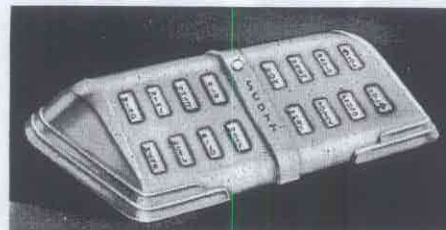
LOS ANGELES. This Beautiful Scott Salon is located at 155 North Robertson Boulevard (1½ blocks north of Third Street and ½ block south of Beverly Boulevard). Telephone Crestview 19158 or Bradshaw 23448.

DETROIT. This demonstration studio, typical of the average home, is conveniently accessible from downtown Detroit. It is located at 825 Webb Avenue, and the telephone number is Townsend 8-0471.

BUFFALO. The comfortably furnished Buffalo studio is at 41 Leonard Street, and the telephone number is Parkside 1489.

CHICAGO. There are four fully equipped studios here at our main Laboratories. The address is 4450 North Ravenswood Avenue (1800 West) and the telephone number is Longbeach 5172.

All studios are open every day until 9 in the evening except Sunday. Your visit will not place you under the slightest obligation whatsoever.



The Scott Remote Control Keyboard.

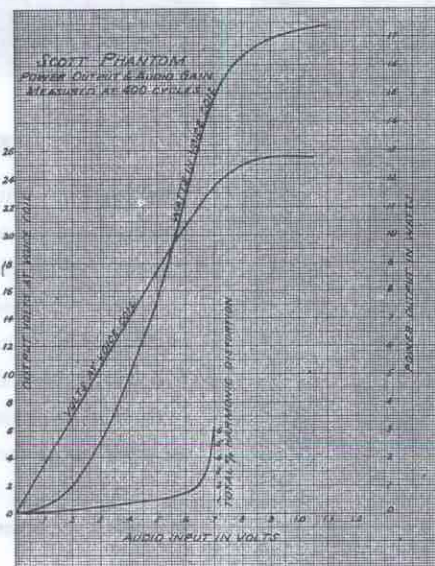


Fig. 7

Why Scott Consoles Are Superior in Design and Craftsmanship

It has always been a problem in many homes to find a radio console that was equally as fine as the rest of the furniture in the room *from both a design standpoint as well as quality*. This fact was recognized when I started my business nearly 15 years ago, and standards were then established for the quality and design of Scott Custom Consoles that have made them just as superior to ordinary radio consoles as Scott receivers are superior to ordinary radios.

Scott Custom Consoles have been engineered to secure the most perfect acoustical response as well as beauty of line. By this I mean they are not only beautiful pieces of furniture, *but also have acoustically correct sound chambers* that make it possible for the Scott receiver to deliver brilliant, clear and natural tone. It was no small problem to achieve these ends because it was necessary to keep in mind at all times, *that the console had to harmonize with the other room furnishings as well as be capable of contributing its important*

part toward the performance of the instrument housed in it.

The designs are exclusive, and have been worked out by famous designers prominent in the home arts decorative field in cooperation with our Acoustical Laboratory. They are built to order by craftsmen who have spent their lives at the job of hand working fine woods.

Each one is followed through the various steps of its construction by a master craftsman who sees that the proper stains, varnishes and lacquers are used to bring out the greatest possibilities of the delicate grain in the woods and achieve just the right coloring.

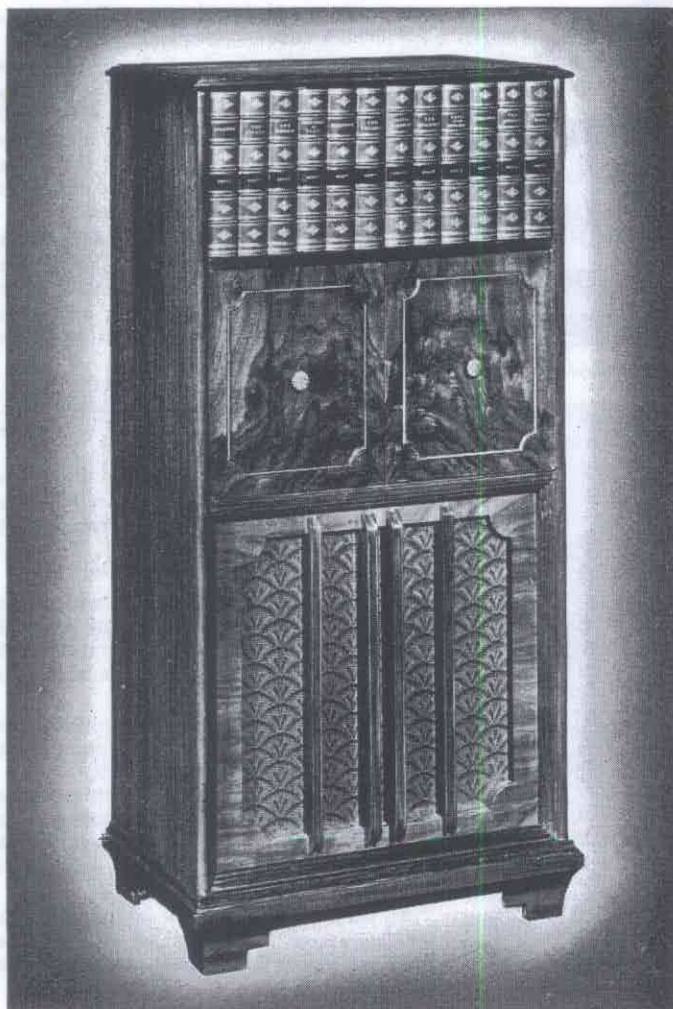
We are also equipped to submit special designs in Sheraton, Hepplewhite, Adam, Regency, 18th Century English, French Provincial, or special designs using false book covers, doors, or grilles for concealed built-in installations in library, living or music room.

Scott Phono-Radio Combinations

The Stratford, Gothic and Linden consoles, illustrated on these pages, will

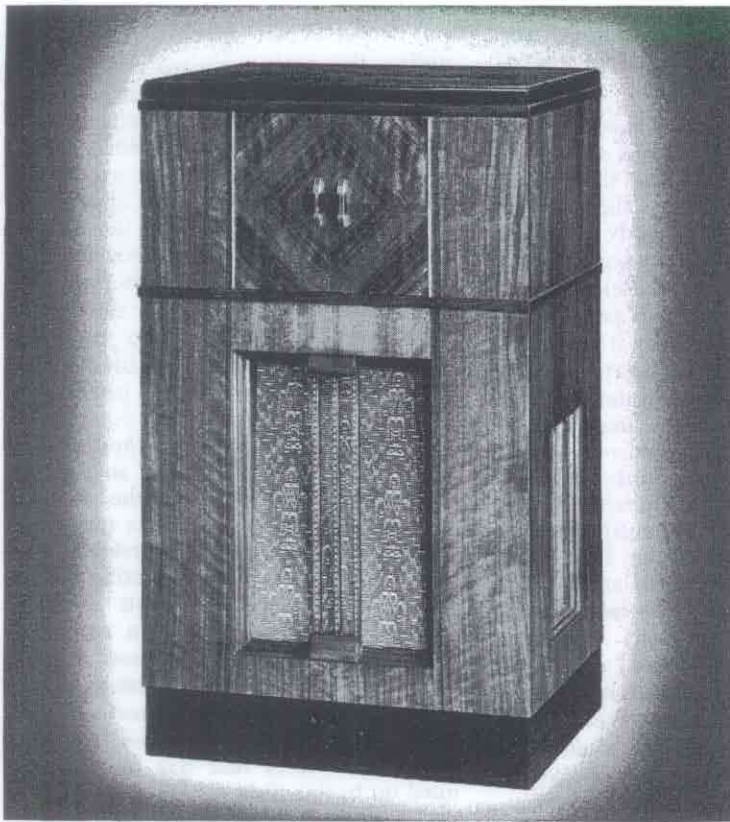
house both the Scott Phantom radio chassis and the Scott Automatic Record Changer. In the Stratford illustrated below, you can see the record changer which is located behind the doors in the center compartment. In the Gothic the changer is in the top part of the cabinet and in the Linden it is alongside the radio chassis.

Phonograph records played on the Scott Automatic Record Changer and reproduced through the Scott Phantom amplifier and speaker, will bring into your home, a great variety of fine music, with the same beauty and tonal purity that you hear on radio programs. There is a total absence of the feeling that you are listening to recorded music, so perfect and free from the usual needle scratch is the rendition. Not only is the music as different from the old time phonograph as night is from day, but you will also notice that records played on the Scott Changer and Scott Phantom are far superior in tone quality to the recorded programs that are broadcast.



THE STRATFORD

Eighteenth Century Pier Book Cabinet Custom made of selected walnut veneers, beautifully hand rubbed to a semi-luster. Radio controls concealed behind genuine leather hand tooled false book fronts on upper shelf. Phonograph located behind middle doors. A cabinet that will enhance the charm and decorative scheme of any room and blend with other furniture of any period. Answers the problem of how to place a radio in your library or living room without adding another piece of furniture that looks as though it was merely an afterthought.



The Acousticraft

A strikingly beautiful Moderne console in fiddle-back American walnut veneers, with catelin door handles.



The Gothic Grande

Subdued richness characterizes the classic Gothic in selected American Walnut with Linen-Fold panels.

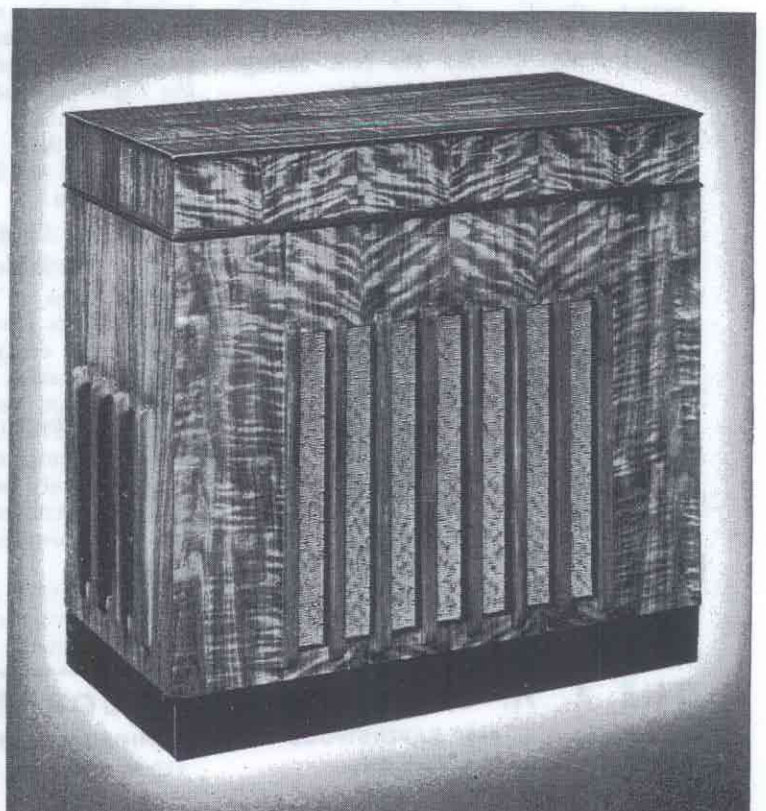
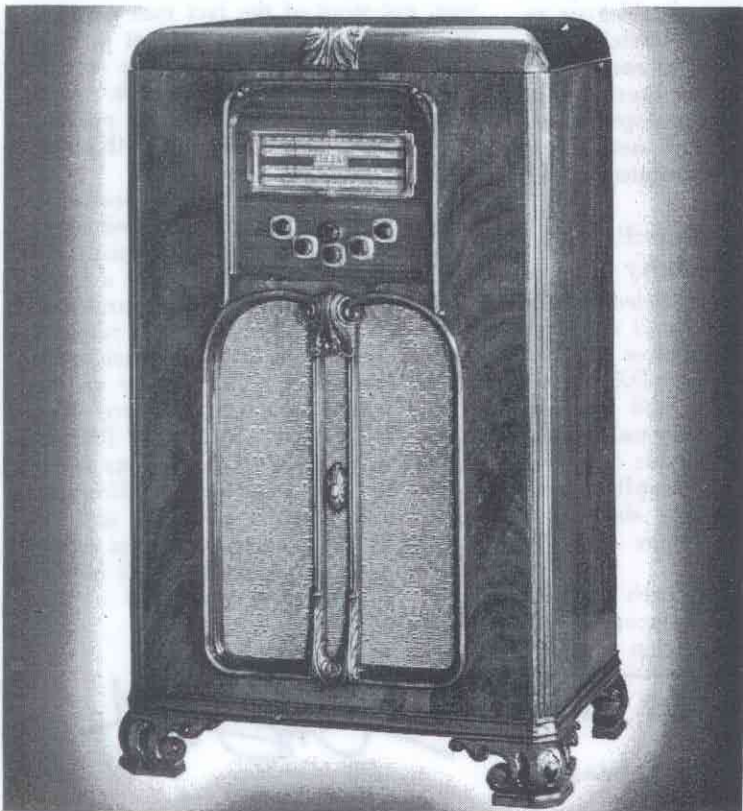
The Chippendale

A distinctive creation of the Chippendale period in Swirl Mahogany with hand carved legs and grille.



The Linden

A Console designed to add distinction to the finest home—built in Figured American Walnut with base of Ebonized Birch.



The Scott News

Published Frequently at Chicago by
E. H. SCOTT RADIO LABORATORIES
4450 Ravenswood Avenue
Chicago

E. H. SCOTT, Editor

First Announcement of Remarkable New Scott

For some time the public has come to expect the announcement of a "new model" by most manufacturers in the radio and automobile industries at least once a year, but the fact that a "new model" radio or automobile is announced, does not necessarily mean that it incorporates features that are radically different from the previous year's model. In automobiles a "new model" very often means that a skilled designer has worked out some striking new lines for the radiator or body, while in radio it has meant, more often than not, simply a new console or dial design with little difference in the actual instrument itself.

The question is, when should either a radio manufacturer or an automobile manufacturer bring out a new model? *I believe the only logical answer to that question is when some new discovery is made or design developed that makes the performance and efficiency very much superior to that incorporated in the model the manufacturer is currently selling.* Then, and then only, I believe should a new model be introduced, and not at some particular period of the year to stimulate sales.

Scott Laboratories Do Not Bring Out Yearly Models

For many years, Scott radio receivers have been recognized as having very advanced design, and the principle reason for this is that when new discoveries are made in our Research Laboratory, or ways are found for improving the performance or efficiency of my current receiver, *they are immediately incorporated in its design,* for I do not believe in waiting and holding them back so that they can be introduced at a certain time of the year as a "new model".

However, when a new circuit is developed that increases the performance and efficiency, and also requires more tubes, coils and condensers, so that the model I am building must be entirely redesigned to incorporate these new developments, *then, and then only, do I bring out a new model.*

Why New Model Is Being Introduced Now

A number of new features have recently been perfected which require additional tubes and parts to perform their functions, and in order to use them it has been necessary to completely redesign the layout, increase the number of tubes to eighteen, and enlarge the chassis.

In locations where the antenna is erected in a position where it is within 400' of the street or highway, foreign shortwave reception on ordinary receivers is always marred to a considerable extent by noise or interference when an automobile with a strong ignition system passes by. The New Automatic Noise Limiter, while it does not entirely eliminate noise or interference from this source, reduces its effect to such a remarkable extent that programs from foreign shortwave stations can be brought in and enjoyed, and does this without reducing the sensitivity or affecting the fidelity. This development requires an extra tube and a number of new parts for its operation, so could not be incorporated in the Scott Sixteen.

Scratch Suppressor Incorporated In New Model

In the past, the only way to reduce the "scratch" or surface noise on phonograph records has been to use a pick-up that did not reproduce the higher frequencies, or use a tone control which would enable the higher tones or overtones to be reduced. This, however, destroyed the beauty and life of the music. A development of our Research Laboratories (which up to this time has only been incorporated in our highest priced 30 tube model), enables us to practically eliminate "scratch" on phonograph records *without sacrifice of the higher frequencies or overtones at normal volumes.* This development required another tube and new parts which could not be incorporated in our Scott Sixteen.

New I. F. Amplifier Now Provides Variable Selectivity

A wide range of Variable Selectivity is a tremendous advantage for it makes it possible to design a receiver that is really two radios in one—a DX set for long distance reception, and a wide range High Fidelity set for tonal perfection. To incorporate Variable Selectivity, an entirely new I.F. Amplifier and switching arrangement were developed and is incorporated in the SCOTT PHANTOM.

Further proof is given each year of the very advanced design incorporated in Scott receivers. In addition to pion-

neering the now universally used "all-wave" receiver, which was brought out in 1928 by the Scott Laboratories—approximately four years before it was made available by mass-production manufacturers—the Scott Laboratories in 1930 designed and was the first to introduce an efficient transmission line Noise Reducing Antenna, that was again universally adopted later in some form or another by other radio manufacturers. The new Scott Double-Doublet Antenna System not only provides a high degree of noise reduction on all wave bands, but does it *without losing any appreciable part of the signal.* In fact, it actually *increases* the antenna response on all wave bands as compared to conventional antenna systems.

I believe I am simply stating a fact when I say the new Scott Double-Doublet Antenna System, in combination with the improved Scott Super-shield Antenna Coupling System, is by a very wide margin, the most efficient Noise Reducing Antenna and Antenna Coupling System that has been developed up to this time.

The SCOTT PHANTOM Is a Completely New Radio

A study of the many technical features given in these pages will prove that the SCOTT PHANTOM is a new model in every sense of the word, and I sincerely believe that its design is far advanced over anything in the radio world today.

I have heard of a means of communication called the "grape vine", and have had a practical demonstration of it during the past week. Apparently a number of people have, in some mysterious way, got wind of the fact that we were bringing out a new model at a very modest price, and have come to the Laboratories to see and hear it. As a consequence I now have a large number of orders on hand, even before this new model is officially announced.

As you probably know, Scott receivers are built in very limited numbers only, and undoubtedly this issue of the "Scott News" will bring a large number of orders to the Laboratories which will be filled strictly in rotation of their receipt. *If you are considering the purchase of a radio receiver at this time, I would urge you to place your order NOW, before the SCOTT PHANTOM is announced in the various radio magazines and national publications next month. In this way, you will be assured of being among the first to receive one of the most remarkable instruments that has ever come out of my Laboratories.*

THE E. H. SCOTT RADIO LABORATORIES, INC.

4450 RAVENSWOOD AVENUE, CHICAGO, ILLINOIS

630 Fifth Avenue, New York City

115 N. Robertson Boulevard, Los Angeles