

THE RADIO SET OF 1950

Within the next fifteen years, great changes are in store for the radio receiver. Just what these changes will be is predicted here by one who has been successful in foreseeing many outstanding inventions.

HUGO GERNSBACK

I HAVE in the past twenty-five years predicted a great many radio improvements, many of which have come true and which had been adopted universally. Thus, for instance, in the December 1921 issue of my former publication RADIO NEWS, long before we had any complete radio sets, and when radio apparatus still was screwed to an open breadboard, I predicted the radio console—I called it "Radiotrola"—which is now in constant use. It is interesting to note that the radio console was not produced commercially till about 1926. I do not take any special pride in these predictions because, after all, technical developments can be prophesied with certainty. It is usually only a matter of time before the predicted development catches up with the prophecy.

In predicting coming developments, I always had in mind certain evolutionary features, which seemed most reasonable to me; and, if they have as yet not been adopted, it is simply because the art has not developed sufficiently.

Therefore, if I make some predictions as to the radio set of 1950, I believe I do not have to exaggerate much; and, as a matter of fact, the developments which I describe here will, probably, come about much earlier than 1950.

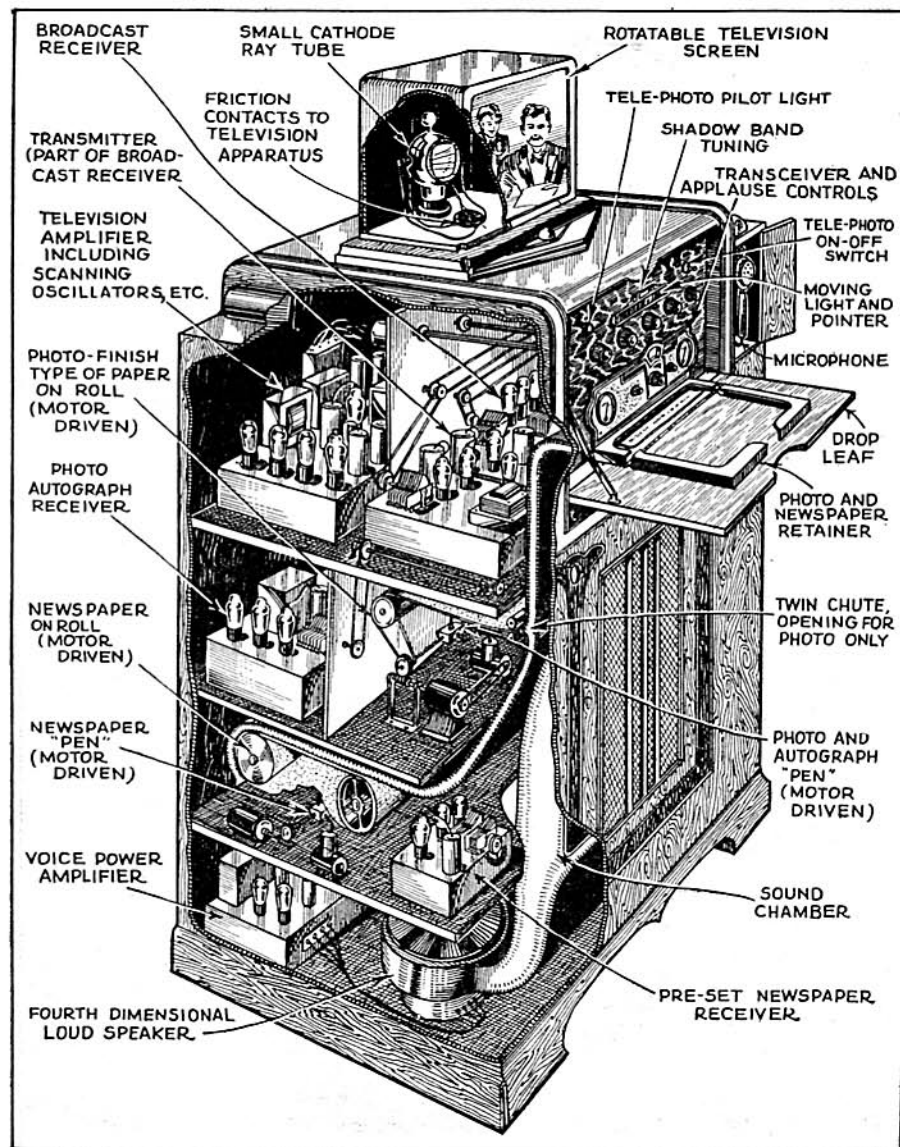
It may seem like a platitude to reiterate that the radio set of 1950 will be equipped with television. I, in common with many radio engineers, have predicted television for so many years that it has almost become a hackneyed idea. As I have also pointed out before in my various articles, there is still a "missing link" in connection with television; because so far the real solution of the television problem (that is, an unmechanical scanner) is still to be invented. While the cathode ray tube today presents the best possibility, I still believe that it is not the final word, and that some other means of *instantaneous, non-scanning* method is in the offing. What we require is something that works like the animal eye, which is still the best television instrument ever devised; and which does not scan but transmits the image *instantaneously AS A WHOLE*, rather than by fragmentary impulses which afterwards have to be all assembled.

Anyway, I am pretty certain that a satisfactory solution of television will have come about by 1950. Let us start then, from these premises, with our radio set of 1950. One of the elements that most designers have disregarded, when it comes to television in the home, is that they insist on fixing the television screen rigidly into the set, which is plain foolishness. When you sit in a room and listen to a radio program, every one in the room can hear it, because the waves travel in all directions. With the radio set in which television is incorporated, we have an entirely different technical problem, which is as follows:

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Have you ever wondered how the radio receiver would change in the next few years? Is television just around the corner—or will it be some time before we shall see as well as hear over the air waves? Hugo Gernsback, for the past twenty-five years, has made a hobby of predicting developments in the radio and scientific fields and he has attained a reputation from the numerous times in which he was able to see a little further and a little clearer than other people.

Once again, he has turned his hand to making a prediction—the radio set of 1950. In this article, he points out some startling possibilities for this radio set—and even more startling is the fact that these predictions are all based on scientific facts. Scientifically, the radio set of 1950 is possible today, with a few exceptions. It is, however, not as yet economically practical.



RADIO SET OF 1950

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If the radio set stands against the center of a wall for instance, then the person who sits in a chair near the same wall cannot possibly see the television image, and he has to move around in order to see the image. For that reason, the television-equipped radio set of 1950 will have the television screen in a compact box or case which can be swiveled on top of the set, in such a manner that the screen can be made to face anyone anywhere in the room. To obtain this result, the television apparatus proper must be on top of a cabinet where it can rotate freely through 360 degrees. When the radio set is not in use, means can be provided to disguise the television screen as a decorative picture or what not to harmonize with the decorations of the room.

As I pointed out in a previous article (see RADIO-CRAFT for April, 1934) it is already possible today to receive by means of radio, not only facsimile transmissions, but even a complete tabloid newspaper, which can be printed while you sleep by the radio receiver. By the time you wake up in the morning, the tabloid newspaper is already printed for you. The full instrumentality how this is done, with all the apparatus described, was shown in the above issue of RADIO-CRAFT.

The radio set of 1950 will have such a facsimile printing arrangement built right into it. But in addition to this, I wish to speak of another feature which, as far as I know, has not been described so far. When television finally comes about, it will be done (in this country at least) only through commercial means; that is through sponsored programs, which will have to bear the tremendous cost in bringing television into your home. Great artists will perform in the studio and their images will appear on your television screen; so that you will, in addition to hearing their voices, also see their features. And, when a great artist appears, it would be an added value if you could get almost instantly, his autographed photograph, without stepping out of your own room. This will be effected as follows:

While you are looking at the artist on your television screen, the announcer will hand him a photograph, which he will autograph before your eyes. This photograph is then taken into the adjoining control room, where it is automatically transmitted on the same wavelength as that used by the broadcast station; and, in a few minutes, it will appear in front of your radio set in a slide provided for that purpose. The technical difficulties of doing this are but slight. It has already been demonstrated by several stations that television images can be sent out simultaneously with the sound impulses, over the same wavelength, without interfering with each other. The idea, therefore, of sending autographed photographs or other similar documents from the radio station to your own home and over your own set is, therefore, realizable even today. With certain refinements, the radio set of 1950, therefore, will not only be enabled to furnish you with your morning tabloid newspaper, giving you "spot" news information, but also autographed photographs and other memorable pictures that the enterprising station will wish to send out to its radio public.

Of course, it is understood that all the radio station will do is send out impulses; the radio set must do the rest. The upkeep of the radio set of the future will be exactly as it is today, and it will be up to the owner. At the present time you have to worry only about tubes and other replacements. In 1950, you will have to provide, in addition, rolls of paper in two varieties; one, a cheap newsprint roll for the nightly tabloid newspaper; the other, sheets of photographic paper for the facsimile photographs, etc.

As to the quality of sound received, the radio set of 1950 should be improved upon, with the same progress noted during the past ten years, which will continue. The future radio set will sound as different from the one we hear today as today's radio set compares with those of 1924 or 1925. Just as you are wondering today how you could ever have listened to the abominable sounds from the 1924 radio set, so in 1950 you will wonder how you could stand the kind of sounds which you received from your 1935 set. We are only now entering on the so-called High-Fidelity cycle. This will culminate by 1950 into, what I may term COMPLETE FIDELITY; where it will not be possible for a human ear to notice any difference between a well-known

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voice spoken in the same room and that transmitted by radio.

It is quite probable that the radio set of 1950 will no longer have two amplifiers (as some receivers now have, one giving the low notes and the other the high notes) but it will probably have an entirely new type of amplifier, which will pass all the audio frequencies in a manner undreamed of today. It is quite possible that we will have a combination loudspeaker, built into a single unit, to transmit faithfully the lowest as well as the highest frequencies. This will come about by having a single speaker (of a design not yet realized) with a multiplicity of vibrating diaphragms, screens, or cones; all built into a single unit, yet making it possible to do what the human voice does—that is, automatically provide a wide range of frequency without having recourse to a number of loud-speaker units.

A good soprano, for instance, is enabled to sound fundamental notes between the frequencies of 195 straight up to 1,150 cycles; but of course there also are produced, without the conscious effort of the singer, harmonic frequencies, without which it would be impossible to distinguish one singer from another!—and these harmonic frequencies extend the effective "soprano" range to at least 8,000 cycles (or more than twice the range of fundamental frequencies produced by an 88-note piano; it is the still higher frequency harmonics of these fundamentals that enable us to identify an individual piano!) This is a considerable range, and the soprano does all this by means of one throat (and larynx). She does not need several throats to do it. Certain trick tenors, as well as sopranos, can even exceed the range indicated above; proving that a single instrumentality can give a wide range of audio frequency. This is what I have in mind when I say that the loud-speaker of the future will give complete fidelity in a single unit, instead of a number working in unison as we do in high fidelity today.

But the radio set of 1950, besides having reached a high development in both visual and aural radio has not, by any means, exhausted its possibilities. Those who think that the radio set of the future will be used only for sound and vision are mistaken. As a matter of fact,

the complete possibilities of the radio set are not, as yet, apparent. As the art progresses new uses, new inventions will be made, all of which can sooner or later be incorporated in your home radio set.

In the first book that was ever published on radio telephony (long before the radio telephone and broadcasting were invented), entitled "The Wireless Telephone" and written by myself in 1910, I made the following prediction:

"The wireless telephone of the future must be as flexible as the wire telephone of today. Every farmer will be able to operate his wireless telephone, where the sending and receiving instruments will be housed in a box a foot square."

We are only now catching up with that idea. Since 1910, the wireless telephone has come about through the means of broadcasting to our own homes; but today's set, as yet, can be used only for one-way communication. Your radio set is enabled to talk to you, but you can't talk back to it; at least, not as yet. Slowly this condition is changing. Through using ultra short waves (that is, frequencies less than 6 meters) for instance, it is possible to accommodate several hundred thousand radio telephones for communication purposes.

Most people are not aware of the fact that the radio set in their own home is also an excellent transmitter. By making a very slight change, it is possible to send out into space, over the same aerial, voice impulses. Merely by throwing a switch on your own set it becomes possible, even today, to speak into a microphone using your own receiving set as a transmitter (a type already called Transceiver) and communicate with your friends, etc.

Why is it not done today? The reason is that, up to now, it has been necessary to obtain an amateur license or radio operator's license before you can transmit voice or sound by radio. This means that you must know the code, you must know how to send dots and dashes. Slowly, the Federal Communication Commission is coming to realize that this is an archaic condition and, if we had a small radio wave band below 6 meters opened up for private communication, it would be possible for your wife sitting in your own home to pull out a microphone from a

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space provided in her radio set and, within a few minutes, be in communication with her husband who may be sitting in his automobile 20 miles away from home.

I know that a lot of people will throw up their hands and howl at this suggestion. The cry will go up that the ether lanes are already so crowded and cluttered up with transmitters that even if we wanted, communication of this type would be useless; because no one would be able to understand anything. This is not true at all. I have had this idea in work for the past two years in RADIO-CRAFT's sister publication SHORT WAVE CRAFT, where the pros and cons of this idea of mine have figured in a discussion, hot and heavy. After all the smoke is clearing, the fact remains that below 6 meters, fortunately, you cannot transmit further than about 20 miles. In general, that means that you cannot go much beyond the horizon. Thus, for a certain area, there will be far less congestion even than there is today; because on a few dozen frequencies, assigned for each district, with an automatic frequency lock on your radio set, there could not be too much congestion. It will, therefore, become a rather simple thing to converse by means of your own set with your friends a few miles distant. This will be especially useful for communication in outlying districts; such as on farms, between houses, automobiles, motorboats, yachts, and many other applications, not to forget private airplanes, of which there will be many in 1950. In case of accident, for instance, on the road, automobile, by means of transceivers, can quickly summon aid. The same is true of motor boats and airplanes.

But the idea of the transceiver does not stop here by any means. I still have in mind another idea one which has constantly bothered radio engineers, and for which no solution has been offered so far—and that is the item of *applause by the unseen radio audience*. I believe the transceiver is the solution for this problem. It is well known that a radio station has, up to now, never had an accurate means whereby it could check up how many listeners there were. I visualize the radio applause idea somewhat as follows:

On the radio of 1950 there will be a special button or switch. You are listening to a radio program, at the end of which the announcer asks for an expression from you. If you like the artist or the program, you merely throw a switch; this immediately transforms your radio receiver into a transmitter. A certain note, let us say a whistle of 500 cycles, is automatically transmitted, by means well known today. Somewhere in your district there is an elaborate radio set maintained by the radio station or network to which you are listening. This special radio set receives your 500-cycle note, which is sent out in lieu of applause. By means of a special resonance meter, a needle will fluctuate, showing a certain intensity received. Suppose that there are a thousand individuals sending out at the same instant a note on the same frequency. All will superimpose, one on the other, and the effect will be as if a powerful transmitter were radiating that note. The more powerful the note, the higher the meter at the receiving set will indicate. In other words, the more people applaud, the stronger the indication of the special receiving set belonging to the broadcast station. If the applause lasts for, perhaps, five seconds, the meter will have vibrated up to a certain figure on the dial—let us say 68. By means of a slide rule, the engineer in charge immediately calculates that, in order to get this much gain, there must have been 3,850 transceivers sending the applause impulse. In other localities, scattered all over the country, we have the same instrumentality and, within a few seconds, the key station will have been informed exactly how many people applauded. This result may vary a few per cent; but the difference will not be very important, and a pretty accurate estimate of the total number who applaud can thus be made. Expensive you say? Yes, it is expensive for the radio stations; but when you figure how tremendously great the incomes of the radio stations are, you will also understand that they will gladly go to this expense so that they can get accurate information as to the listening audience.

There may be a few slight objections to the scheme; for instance, there are two programs on the air, on two networks. Which applause goes to which station, or which applause goes to which program, on what network? The answer is the *time element*. The competing stations can readily split their time, in such a way

that no two programs will end at the exact time. At the present time, most of the important programs start and stop on the hour or the half-hour. This could be changed so that one network would run on the hour or half-hour; the other fifteen minutes later. These are simple details that could be worked out in such a manner that there would be no occasion for clashing as far as applause is concerned. Sooner or later, this idea will be used, and the transceiver is the solution of the problem.

Yes, the 1950 radio receiver will be complex. If you compare the 1935 receiver with the crystal set of 1920, you will also say that the 1935 radio is complex, even as compared with the receiver of 1922. Progress always means more complexities, and the radio set is no exception to this rule. The 1950 radio set will be ever so much more complex than the one of 1935, but it will be vastly more enjoyable than the present-day set and vastly more efficient.

INTERFERENCE ELIMINATION

(Continued from page 475)

appliances he found that the washing machine was producing an exceptionally large amount of man-made static. This fact was reported to the woman, with the recommendation that she arrange for "filtering" the motor so that she herself would not be responsible for the same type of disturbance, inflicted on her neighbors, that she had found sufficiently annoying to cause her to complain to every possible authority. Did she approve of this suggestion? Indeed she did not. In fact she said "When everyone else in this neighborhood has quieted his appliances, I will take care of my washing machine. Until then, I will do nothing."

That the cost of eliminating interference is not a major factor contributing to the unwillingness of many individuals to silence the noise-makers on their premises is proved by another incident which occurred during the survey just mentioned. A particularly vicious interference was traced to an oil burner in the home of one of the wealthiest men in the community. He had been much interested in having the noise survey conducted, so when the engineer reported where interference had been found, the chairman of the survey committee said, "I know he will take care of that trouble." On being asked, however, the owner of the oil burner stated that he planned to purchase a new burner within a few months and would insist on a "filtered" burner at that time. He did not feel that it would be worth while to spend any money to eliminate interference from the old burner.

Since such action would leave a major interference making reception impossible for many listeners, the survey committee offered to repurchase the "filtering" equipment at its full price when the new burner should be installed, if only the noise might be eliminated at once. Even this proposal, which insured the appliance owner against any chance of loss, was refused—and the noise is probably still blasting the best programs in that community.

What Can Be Done?

In the two examples cited, there was no technical difficulty involved in eliminating the interference. A filter costing less than five dollars would have kept the washing machine from affecting even the radio in the same building, while a filter costing less than ten dollars, plus a little shielding of ignition spark wiring, would have made the oil burner absolutely silent as far as radio is concerned. Technical knowledge could not, however, surmount the obstacles interposed by individuals who felt that their convenience was of greater importance than was the successful completion of a noise elimination campaign.

From this brief discussion it should be evident that the elimination of man-made static, which must be accomplished if short-wave reception, television, and high fidelity transmission are to be satisfactorily conducted, is no longer dependent on the development of new engineering methods but awaits only a means of making the fruits of present technical progress available to the majority of radio listeners. The engineer has done his work—now let us learn how to utilize it.

(Additional and more detailed information on the subject of radio noises will appear in a subsequent issue of RADIO-CRAFT.—Ed.)

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