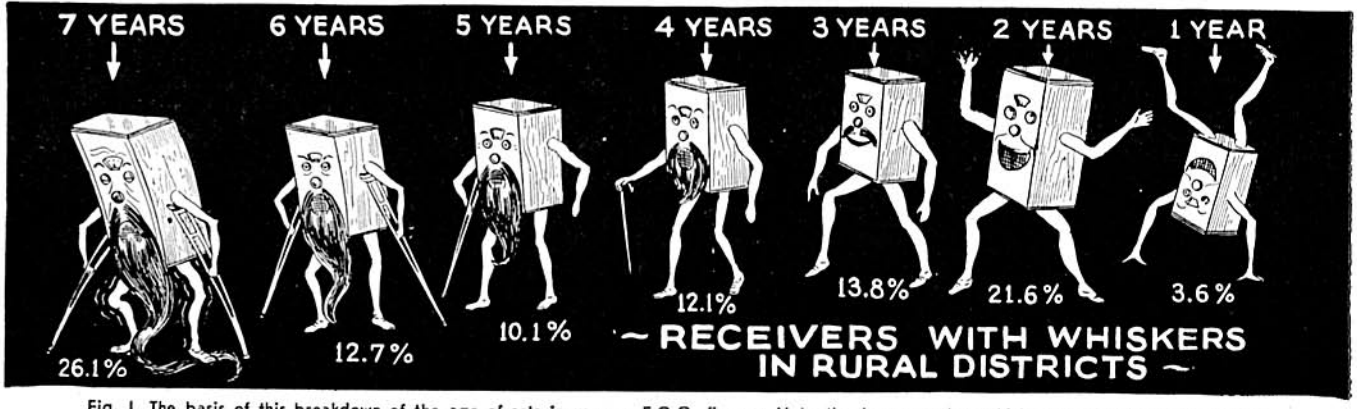

Fig. 1. The basis of this breakdown of the age of sets in use are F.C.C. figures. Note the large number which must shortly be replaced!

INSIDE FACTS ABOUT AMERICAN BROADCASTING

An up-to-the-minute compilation of useful and interesting facts about the ever-changing condition of broadcasting in the U. S.

It is interesting to compare these statistical facts with "Milestones in Broadcasting" in the February 1936 issue, and "A Modern Picture of Broadcasting" in the February 1935 issue.

WILHELM E. SHRAGE

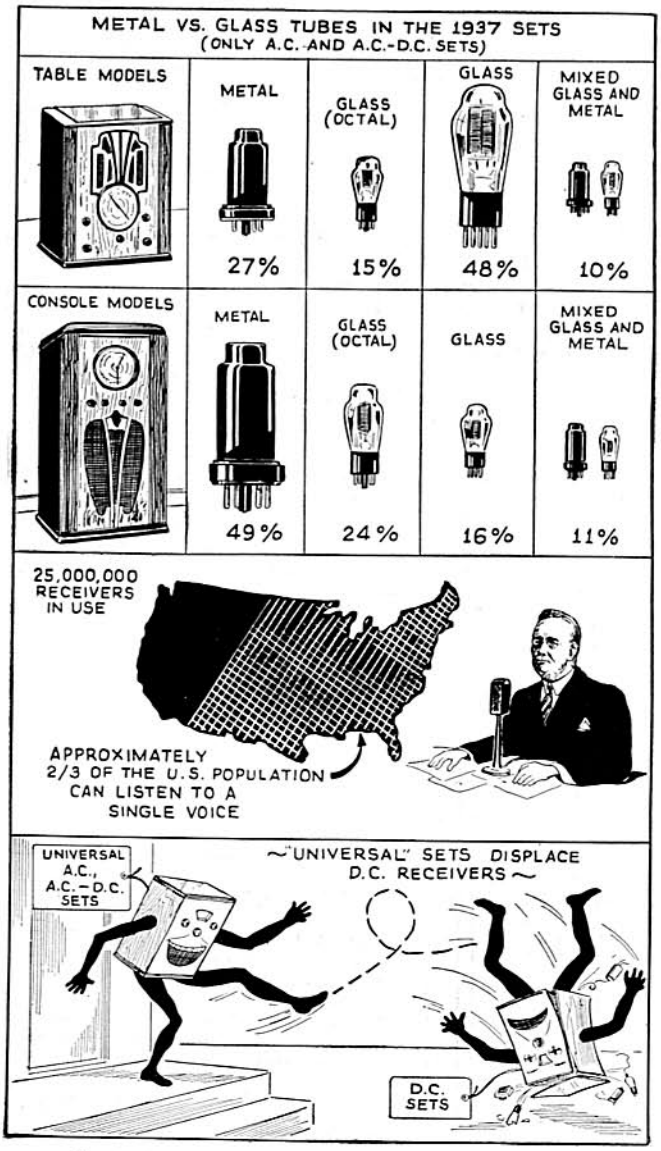

Fig. 2. The "metal-tube" situation can be seen at a glance.

EXACTLY 40 years ago (in 1896) a young technician, Guglielmo Marconi, surprised the world with the first practical method of communication by means of radio waves, or, as contemporary scientists termed them, "Hertzian Waves." Considering the important role radio plays today, it sounds worse than a bad joke, that Heinrich Hertz's discovery was considered before Marconi's time as "just one of these impractical aims of the physicists"!

Professor Hertz's electromagnetic waves were of as much importance to the average man during his life as Einstein's Relativity Theory is today. But the most tragic note about Heinrich Hertz is the fact that he died long before Marconi converted his theoretical ideas into "something practical."

Einstein, at least, had the privilege of witnessing how his theory provided science with valuable information in developing a means of controlling cancer. His "brilliant uselessness," as some ignorant persons called his life work a few months ago, is today the cornerstone of our understanding of the atomic nuclei, and these nuclei (which are the origin of a number of extremely hard radiations) have opened up new possibilities in combatting the worst disease ever to confront mankind. But this is not all that has been derived from his theory. New types of radio and electronic tubes—at present under research—utilize in the final analysis, Einstein's theory, and in a few years every one of us may have this great scientist's brainchild "installed" in his own radio set.

BROADCASTING AN OLD I. O. U.

Old Europe, without doubt, has given us radio. But America paid this gift back with 1,000 per cent interest in the form of radio broadcasting. Without America's daring engineering, radio would probably still be "Wireless Telegraphy"! But radio broadcasting as it is today serves everyone—everywhere. It is the one universal means of communication. It comes into our home, whether we live in the lonesome woods, or in a city apartment. It connects us with the far-flung corners of the globe. It brings us entertainment, information, and education!

Broadcasting was born on November 2, 1920, in Pittsburgh, Pa., when Dr. Frank Conrad broadcast the returns of the Harding-Knox election to a handful of excited amateurs. It was a simple beginning. A small garage, housing transmitter, studio, and what not, and a large amount of optimism were the initial investments. But broadcasting,

and its idea, has grown since then to gigantic dimensions. It is not necessary to search the globe to realize this fact. An excellent proof is found in the past presidential election, which marked the 16th birthday of broadcasting progress. This election has shown better than many thick books the tremendous power of radio, today. Let us look only at one figure which explains everything: we have approximately 25 million radio receivers in use, and because of this vast distribution approximately 75,000,000 persons (or about two-thirds of our population) could listen to a single voice.

600,000,000 "LISTENING HOURS" WEEKLY

But this example demonstrates only the tremendous size of the radio audience on certain occasions. Of much more importance is the regular or average radio audience. Since American broadcasting is an important advertising medium, the larger the audience the better the programs. According to Professor Allport of Harvard we spend weekly a billion hours listening to the radio. We do not know how Professor Allport obtained this figure, and even if we consider only 60 per cent of his estimate as correct there are still left 600,000,000 hours to be reckoned with. Since figures of this vast size are far above our horizon of conception, let us convert them into something more digestible. We remember that recently a New York reporter traveled around the world in 18 days and 11 hours. For the sake of simplicity let us assume that the average citizen provided with the necessary amount of money would need at least 20 days, or 480 hours for the same trip. Well, the time spent weekly by the American radio audience would be sufficient to send 10,000 reporters around the globe—125 times over.

RADIO AN EXTENSIVE EMPLOYMENT FACTOR

However, this is only one side of the story. American radio broadcasting created a completely new industry which provides about 150,000 persons with jobs. There are at present approximately 25,000,000 radio receivers in use in the U.S. with a value of about 1.5 billion dollars, though the initial investment of the American public in radio will probably amount to more than 3 billion dollars. These 3 billions are, according to David Sarnoff, President of RCA, more than 10 times the investment in broadcasting stations and manufacturing plants.

The "oil" which greases this vast machine is provided by the radio sponsors who spent during 1936 approximately $100,000,000 to buy "time" from the radio stations, and $40,000,000 for talent to put their advertising over.

INCREASE IN RADIO PRODUCTION AND QUALITY

Despite the fact that American radio production increased steadily during the past few years, conditions within the industry were far from ideal. However, this year's balance sheet indicates that the radio industry made real money in 1936, and this for the first time since the great boom of 1929. Approximately 7.5 million receivers were produced (and sold for decent prices) in 1936. Even if we consider the respectable number which went abroad, there remains still an all-time record of domestic radio business.

About 75 per cent of all retail sales went to listeners who already had a receiver (an old-fashioned one, of course). The increase in purchasing power, and the education of the listeners to appreciate high-class radio performance induced the American public to buy larger and better sets. This trend towards high-quality receivers cut a considerable slice from the cake of the "cheap set" manufacturers. The year 1937 will probably bring us receivers even a little more expensive but with a performance which will overcompensate for the increase in price by its superb quality.

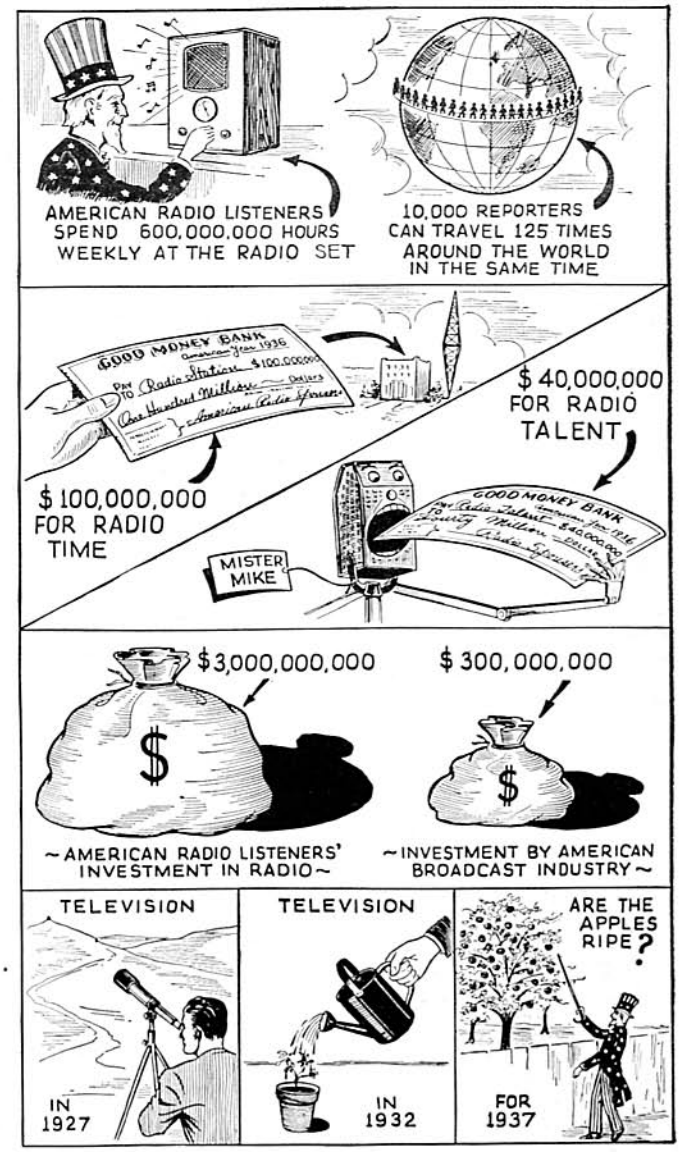

Fig. 4. A few figures and forecasts on broadcasting.

RECEIVERS WITH WHISKERS

The improving economic conditions of the country, and an

(Continued on page 488)

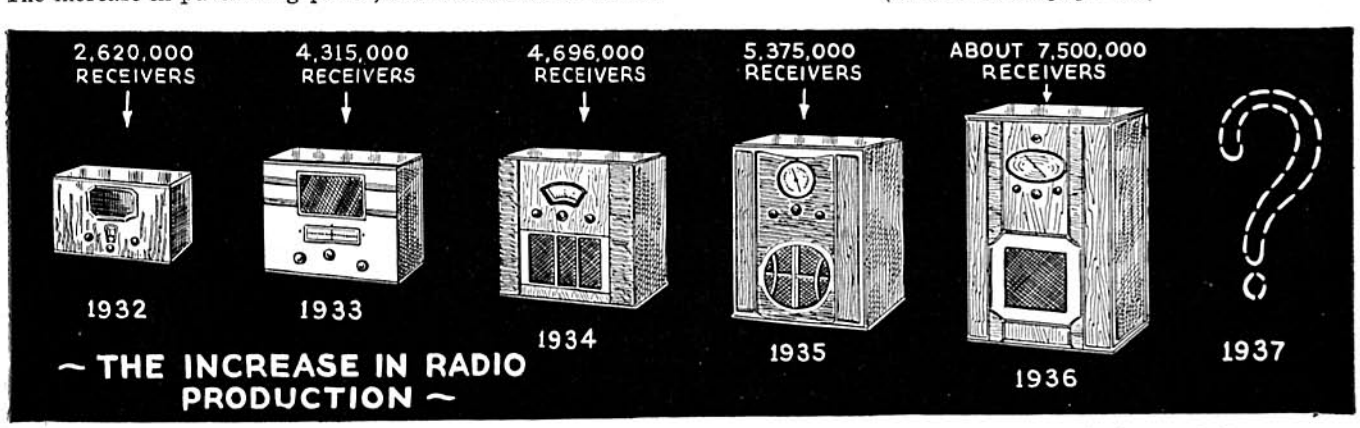

Fig. 3. What will be the sales figure for 1937? Every estimate made shows a record year ahead for manufacturers and sales organizations.

INSIDE FACTS ABOUT AMERICAN BROADCASTING

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interesting report called "Allocation Survey" compiled by the Federal Communications Commission, Washington, is the basis for a very optimistic forecast of the American radio industry in 1937. This interesting survey, compiled from 32,674 returns (concerning rural districts, exclusively), is presented in the form of a diagram in Fig. 1!

Despite the fact that this F.C.C. survey was executed in 1935, but not released in Washington until the fall of 1936, nobody will doubt the value of this report, because the receivers have not grown younger in the meantime. Even considering the large percentage of replacement sales in 1936 there remain to be replaced plenty of sets with long whiskers. These "must-replacements" and the considerable increase of cash money, due to the improving purchasing power, gives us a good indication of what we may expect in the year 1937. (See Fig. 3.)

WHERE ARE THE METAL TUBES?

Considering the great selling power of metal-tube-equipped receivers, it is disappointing to comb the price lists and sales ammunition concerning the new receivers of the 1937 line. The disappointment is due to the small gain metal tubes have made after 2 years of intensive sales propaganda.

Before going deep into the matter, some short explanations are necessary. Statistics of this kind cannot be made by simply comparing the sale figure of sets equipped with glass tubes against the number of metal-tube-equipped receivers. The reason is quite simple. Philco, which still sells about 40 per cent of the entire production of receivers, offers only glass-tube-equipped receivers to the public.

A more correct method is to add sets with metal or glass tubes separately, and to present the figures obtained in a percentage relation. The percentages obtained by this method are given in Fig. 2. To avoid misunderstandings, and to make the trend in American radio engineering towards metal-tube applications more obvious, only A.C. and A.C.-D.C. sets are included in this compilation. Battery and automobile receivers are omitted, since these types of sets are mainly offered glass-tube-equipped. And last, but not least, rectifier tubes and tuning indicators are also kept out of our tabulation.

Figure 2 indicates clearly that glass tubes are still favored by American designers, especially, for table models. This is of great interest considering the fact that the type of customers who buy these small sets usually "fall" for novelties like metal tubes, etc. The reason for this trend in radio engineering is probably the problem of the heat dissipation vs. electrolytic-condenser life, and the ventilation puzzle in general, which obviously can be solved much more easily by the use of glass tubes. This does not speak entirely against metal tubes, and in favor of glass tubes, but nobody can close his eyes to the facts.

Nevertheless, metal tubes have a much better chance to survive than glass tubes, but the present "design principles" for radio sets (especially, for the midget type) need a thorough revision. This revision will come, and pretty soon, too. The public does not ask at present for low price as it did during the depression. We have a complete "new deal" in radio retailing. The times are past when a "combination" of an electric stove and radio receiver could be sold to the public, and it is to be hoped that a certain class of radio sets, produced only for "price-appeal," will disappear from the market.

"UNIVERSALS" DISPLACE D.C. SETS

Another design trend of great interest is the decreasing number of 110 V. D.C. sets. There was never any special reason for manufacturing these sets, and the surplus stocks of some factories speak for themselves. But the number of 2-, 4-, 6- and 32-V. D.C. receivers showed a considerable increase; a fact which does not surprise those who know that about 80 per cent of all farms are still without radio sets, and 5,000,000 farms without electricity.

The 6-V. D.C. receivers, operated in connection with wind-driven battery chargers, is

one of the new fields which will make the radio year 1937 as profitable as was the one of 1936.

WHAT ABOUT TELEVISION?

On June 29, 1936 television experiments on a large scale were started from the television station atop the Empire State Building in New York City. A number of receivers had previously been installed in the homes of a number of RCA engineers and NBC officials. Motion pictures as well as talent have been successfully transmitted and received. Due to the unusual height of the New York television station, the transmissions have been received as far as 45 miles from the Empire State Building. In these experiments an image definition of 343 lines has been used. But since the adoption of the 441-line definition has been recommended by the R.M.A. to the F.C.C. it will be necessary to change the New York transmitter in 1937 to conform to recommended standards, and a great number of new experimental transmissions will be made in the next two years.

Just *when* television will enter our homes depends on the outcome of these field tests and, last but not least, on the results achieved in trying to reduce the price of the receivers. The present price of about $750.00 is prohibitive. As long as an image-sound receiver cannot be sold for about $150.00 television is still "around the corner."

A TUBE TESTER THAT TALKS

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form the "plate" of a 2-element tube.

During normal use of a tube it's control-grid is at negative or zero potential which restricts or prevents electron flow from the cathode areas directly back of grid wires, while allowing flow from areas in-between. In emission testing the control-grid is highly positive, drawing most electron flow from previously protected cathode areas. Areas used in normal operation may be worn out, yet if emission-tested the tube will test "good" due to portions practically unused in actual service!

When testing with this new meter it will be noted that shorts or leakages will show simultaneously on (a) the meter, (b) the neon indicator and (c), be audible in the headphones (if used). For example, changes in the position of the test switch will cause the meter pointer to move from zero into the red area of the scale on any short of 5 megohms or less resistance. The greater the resistance the higher the meter reading.

The neon indicator glows only if the short is 1 megohm or less in resistance. Thus on a short of more than 1 megohm the neon bulb does not light but the meter pointer will rise. This adjustment of the neon sensitivity gets rid of false flashes on "short" tests while using a hot cathode. A headphone connected to the Noise Test jack will buzz if there is a permanent short of resistance low enough to light the neon tube.

All leakages, however small, are shown by the meter and the amount of leakage is proportional to the meter reading. No short, however great, will cause a Good reading. All leakages will cause the meter to read Bad. All intermittent shorts, leakages and intermittent contacts can be listened-to by the customer; and, last but not least, all shorts in all tubes are checked with just one switch.

While every variety of tube which has appeared can be tested by this unit ample provisions have been made to give complete protection against changes caused by future developments in tubes.

A polarized test voltage furnished through panel jacks may be used for checking leakage in electrolytic, paper and mica condensers, and for making continuity or point-to-point tests. Current flow is indicated by the meter and by the neon tube at the same time.

This tester is available in two models both of which are extremely modern in appearance. They are finished in ivory, red and chrome. In the portable tester tools, tubes and repair parts can be conveniently carried in the two large compartments having 320 cubic ins. of storage space. The overall size of the portable case is 5 by 12 by 17½ ins. The counter-type tester (illustrated) has a base 14½ by 16½ ins. and with its glass display top stands 15¾ ins. high.

This article has been prepared from data supplied by courtesy of Radiotechnic Laboratory.