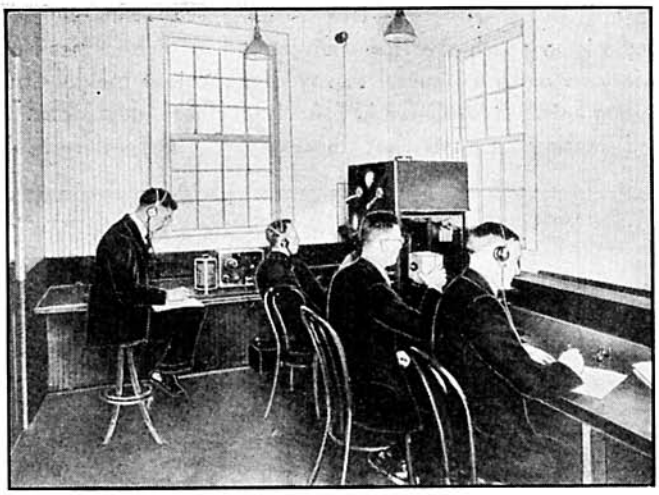


Dr. Conrad and associates starting the American broadcast industry on Nov. 2, 1920! KDKA sent Harding-cox election returns.

MILESTONES

In this article the author presents a cross-section of radio broadcasting from 1919 to date. The 25 million radio receivers now in use are analyzed from all angles, and conclusions drawn concerning the probable trend of the industry. Everyone interested in radio should read this valuable article. (Other references are given at right.)

WE ARE now in the 16th year of American Broadcasting. The daring idea of youthful David Sarnoff in 1919 when he predicted the future of broadcasting has grown into a vast industry with many millions of dollars invested and providing thousands of workers with jobs which did not exist before broadcasting started.

No one knows what the directors of RCA thought of this prediction which was included in a report from David Sarnoff—who had just been appointed commercial manager of the company—but it is not hard to guess that they did not consider it seriously or with much confidence.

However, despite this fact, only one year later, on Nov. 2, 1920, Dr. Frank Conrad and his staff of Westinghouse engineers broadcast over KDKA returns of the Harding-Cox presidential election—and thus staged what was perhaps the birth of American broadcasting.

Since that time broadcasting has continued to grow by leaps and bounds and is at present an important factor in the progress of all civilized nations.

David Sarnoff has also grown. This former telegraph boy who had a weekly income of $5.50 at the age of 15 became, in 1930, when only 39 years old, the president of RCA. Now, however, after having so much experience with radio and broadcasting, he is quite tight-lipped with regard to the future of radio, and recently—during an interview with Mr. Orrin E. Dunlap of the *New York Times*, said the very meaningful words: ". . . Those of today cannot foresee the radio of a generation hence!" And no one can blame him for his attitude, because of tremendous strides made in the first 15 years of American broadcasting.

Fig. 3. Radio sets in public reduce sales resistance.

OVER 25 MILLION SETS IN USE

To give a simple picture of broadcasting today we may start with the plain fact that on the first of January of this year (1935)* there were about 22,000,000 home radio receivers in use, and about 2,400,000 auto sets in use in the U. S. (*See page 454.—*Editor.*)

What the figure of 22,000,000 home radio receivers involves may be seen from the fact that it was 50 years before 10 million telephones were in use in America. Let's take these 22 million home sets and pile them up.

But this trick of statisticians involves difficulties where radio sets are concerned, because within the last 15 years about 10,000 different receiver models have been put on the market. There are large consoles and tiny midgets, and table models of medium and large size. Although it is difficult to agree on an average size, by careful estimations the average size has been found to be about 24x16x9 ins.

With these figures as average dimensions, all 22 million radio receivers piled one on top of the other will give a pillar towering about 8,000 miles!

If this colossal number of radio receivers now operating in American homes is pictorially represented, as in Fig. 1A, by dividing the 44,000,000 ft. pillar into 500 single ones having base dimensions of 24x16x9 ins., each pillar would be about three times as high as Mount Everest (highest mountain in the world, which towers about 30,000 ft. into the air.

Now let us group these 500 single pillars to form a tower having base dimensions of about 30x16 ft. deep. Then, taking $50 as an average value per set, this tower would represent $1,100,000,000. Since the president of the U. S. receives a yearly salary of $75,000, the value represented by these radio sets would be sufficient to pay the salaries of all American presidents for the next 14,666 years!

LISTENERS ARE THE FINANCIAL POWER OF BROADCASTING

That the main part of American broadcasting has been financed by the radio listener is shown impressively by Fig. 1B. The value of all American broadcast stations including equipment and goodwill is only $60,000,000. The value of all commercial stations including radio investment on American ships is estimated at about $40,000,000. Radio factories are valued at about $80,000,000, and the value of American radio retail and wholesale houses may be quoted as being about $50,000,000.

These 4 branches of radio represent a total investment of about $230,000,000 which is a little more than ⅕ the value of all radio receivers in use at present in American homes.

There are, as Fig. 1D shows, about 581 broadcast stations in operation in America. More than 31 of them have a power output at the antenna of about 50 kw. One station, WLW, Cincinnati, *the world's largest broadcast station*, has an antenna power of 500 kw.! But these 581 stations representing a value of about $60,000,000 produce an annual gross revenue of about $90,000,000 which is certainly a worthwhile business for the owners of these stations.

Very interesting also are the relations between the estimated value of the American radio factories and their yearly turnover. In the year 1934, American radio manufacturers sold approximately 4,696,000 radio receivers (this figure includes the export sales of about 612,000 sets), having a total retail value of about $250,390,000. The figures for 1935 amounted to 5,500,000 units (including export) representing a retail sales value of about $300,000,000. This increase is due to a greater demand for consoles in 1935, and also to the higher average prices for these different types of receivers. (See also Fig. 1C.)

As Fig. 1E indicates, the radio listeners spend yearly for operating expense about 2.2 times as much as the payroll figure for the manufacturing and distributing side of the broadcast industry. That is, the yearly bill for the 800,000,000 "kilowatt-hours" used to operate radio receivers amounts to a sum which easily surpasses the yearly payroll of all American broadcast stations. Also, the total kw.-hour energy used by radio receivers is greater than the total of kw.-hours used by each of the domestic home appliances represented in Table I.

IN BROADCASTING

Radio-Craft, in presenting this comprehensive review of the latest facts and figures concerning the radio "business," supplements the valuable data contained in the following, previously-published industrial reviews.

"The Broadcast Industry," and "A Modern Picture of Broadcasting," Feb. '35; "A Modern Picture of Television," April and May '35; "The Growth of Public Address," May '35; "The Present Status of Automotive Radio," June '35; "The Radio Service Industry," and "The Radio Service Business," July '35; "World-Wide Television," Aug. '35; "Some Facts About Radio As a Career," and "New Opportunities in Radio," Nov. '35; "Television in the Theatre," Nov. and Dec. '35; and, "Television and Ultra-Short Waves," Jan. 36. (Radio Month in Review items contain additional data.)

WILHELM E. SCHRAGE

TABLE I

Estimated total amount of energy used by domestic electrical appliances

Appliance	*Kilowatt-hours*
Radio Receivers	800,000,000
Flatirons	673,000,000
Vacuum Cleaners	235,600,000
Washing Machines	131,000,000
Toasters	152,000,000
Percolators	106,000,000
Heaters	48,000,000

LISTENER INFLUENCE ON PROGRAMS

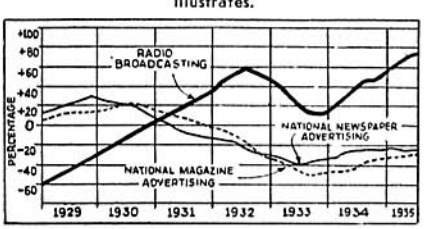
Because of these important financial relations it would be usual to expect that the radio listener has a tremendous, direct influence upon the program planning. However, this is not the case! Despite the fact that the American broadcast stations receive yearly about 5,000,000 letters (which are carefully filed, as far as the networks are concerned), the direct influence of individual listeners upon the program planning is about ZERO! There are, of course, some women's organizations in America which have quite a bit of influence on the kind of programs presented, but even their power is restricted, since program sponsors have the last word in this respect!

However the *indirect* influence of the radio listeners as a whole on the kind of radiated programs (which are about equally proportioned, as shown by Fig. 2A) is about 100 per cent. A survey made by The Psychological Corporation, New York, by order of the NBC, unveiled many interesting facts as to just how the public is influenced by radio. By means of a very interesting method (which is described with all details in a booklet—prepared by Dr. Henry C. Link—entitled, "A Study of the Relative Effectiveness of Major Advertising Media) a great many retail dealers have been asked how far they believe radio broadcasting is a fitting vehicle for advertising messages. This was done because it is realized that the radio broadcasting lacks the great impor explain the advertising forces which influence his preferences. Since the dealer is actually the clearing house of customers' reactions, this survey (the results of which are shown in Fig. 3) is highly interesting.

It shows that the public *en masse* has about 100 per cent control of the programs presented, because only programs which suit the public taste will find listeners. Since there are only a few program sponsors who would dare to present to prospective customers a performance which did not produce popular satisfaction, the broad mass of radio listeners really has a very effective control of American broadcasting.

Inversely, the great influence of radio broadcasting has had a great effect upon listeners; this buying public (see Fig. 3) has greatly effected the amount of advertising appearing in national newspapers. According to *Radio Today* (which compiled the diagram shown in Fig. 4), many newspapers and magazines had a decrease in advertising because of radio broadcasting. According to the above-mentioned magazine a quarrel is going on between the newspapers and broadcast stations, and as always in such cases, both sides are fighting for the patronage of the manufacturers of nationally advertised brands.

Fig. 4. Increased revenue by "commercials" may be attributed to more effective use of radio as an advertising and publicity medium, as this figure illustrates.



METAL CONTRA GLASS TUBES

But this quarrel in the evolution of radio broadcasting lacks the great importance of another combat which has its battlefields directly among the American radio manufacturers. This fight which is drawing much attention in the broadcast industry, is the one of *metal* versus *glass* tubes.

According to the defenders of the metal tube, 47 manufacturers are using metal tubes in their sets. This fact published as full-page advertisements in many daily newspapers proves nothing, because there are other facts which enter the picture. (*Continued on page* 489)

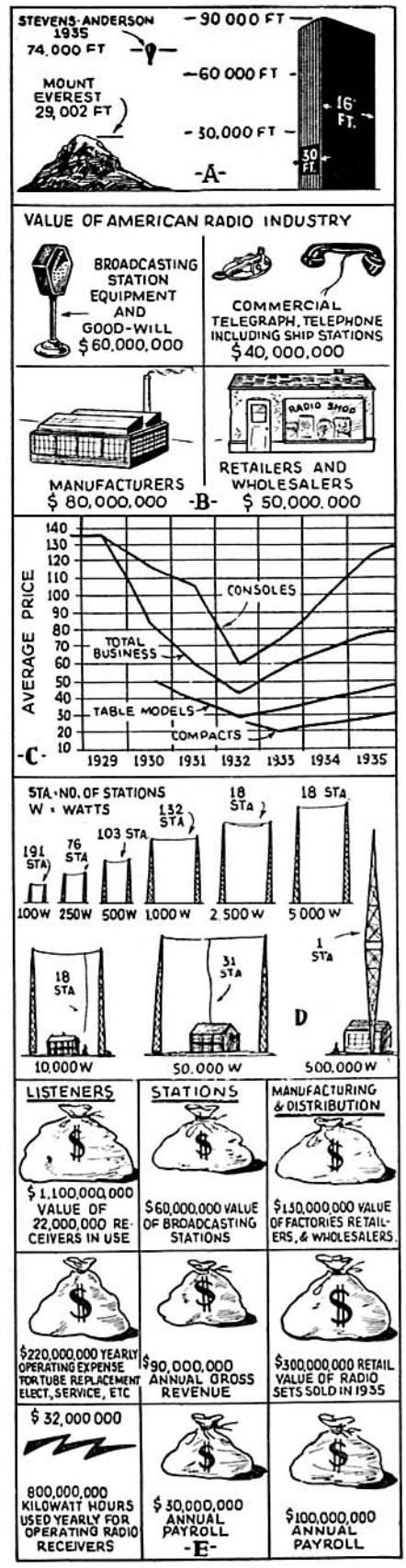
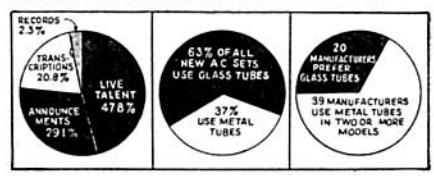


Fig. 1, above, and Fig. 2, below. These illustrations visualize some modern facts concerning radio.



MILESTONES IN BROADCASTING

(*Continued from page* 457)

According to *Radio Retailing*, however, 57 per cent of all receivers now offered use regular glass tubes. About 16 per cent of all sets at present on the market are equipped with glass tubes, but having a metal-tube socket, another 16 per cent use both metal and glass tubes in the same chassis, and 11 per cent exclusively use metal tubes.

Since the public quite definitely is "sold" on metal tubes these statistics may change tremendously; after all, public opinion is a powerful force that no manufacturer dare ignore if he wants to stay in business. Although many radio dealers interviewed by the author report a heavy demand for metal tubes, some of these dealers—and, especially, those who had sold metal-tube sets equipped with early models of the new tube—because of the trouble with their customers concerning radio receivers which did not work satisfactorily, are quite biased against metal tubes. But this by no means indicates a permanent antagonism toward metal tubes.

METAL TUBES MUST GET OLDER

It took about 20 years to develop the glass tube into the precise operating devices we know today, and the metal tubes, even if we include the two or three years of experimenting before they were introduced, still are quite young products, and have plenty of time to be improved before reaching the age of glass tubes. Then again, 90 per cent more types of tubes are now available in glass than in metal; and of all those most instable yet economical and highly-perfected of tubes—the "multi-purpose" type, only one model, the new 6Q7, is so far available in metal. However, the tube situation changes daily in favor of the metal tubes, as may be seen from another diagram published recently by *Radio Retailing* (see Figs. 2B and C).

In the diagram Figs. 2B and C, only 39 radio set manufacturers are mentioned as users of metal tubes against 47 claimed in the advertising described above; this is due to selection of only the more important concerns among the 115 American radio set manufacturers. A still better view of the actual situation is given by the following, Table II, published recently by the magazine *Fortune*, which indicates how the leading manufacturers ranked in 1934 with respect to set sales.

TABLE II

Proportion of units produced by manufacturers.

Philco	1,250,000
RCA	500,000
Crosley	300,000
General Household Utilities (mostly automobile radio sets)	300.000
Colonial (mostly for Sears, Roebuck)	300,000
Wells-Gardner (mostly for Montgomery Ward)	200,000
Emerson (mostly midget)	200,000
G.E. (made by RCA)	200,000
Atwater Kent	100,000
Zenith	100,000
Bosch	100.000
Total accounted for	3,550,000

During the year 1934 there have been produced and sold (including 612,000 radio receivers exported),—4,696,000 radio sets. Since the percentage of sales made by the different manufacturers during 1935 probably is about equal to their percentage of sales during 1934, the advertisement which printed the names of 47 different manufacturers, and disregards their yearly output appears in quite a different light.

READERS' DEPARTMENT

(*Continued from page* 465)

playing their outfits and hoping the Association will not catch up with them. Even these would pay if the fee were more reasonable.

I hope you will print this so that other Service Men will send in their views.

W. R. LUSTIN.

Thanks very much for your comment, Mr. Lustin, a little publicity regarding this situation may help.

INTERNATIONAL RADIO REVIEW

(*Continued from page* 466)

waveform distortion introduced by the shielding cage. This aerial offers possibilities for the experimentally-inclined fans.

A NEW TABLE-MODEL SET

THE EXPRESSION *table model* has become firmly associated with small sets designed to rest on a table, but in the true sense of the word a table-model set would be one with the set mounted in a table!

Such a set was described in an issue of *Wireless World* (London) a short time ago. As shown in Fig. B, the set (a superheterodyne) is housed within a drawer of the table, with the speaker (mounted behind the chassis) facing forward and downward in such a way that closing the drawer does not affect the sound. The piece resembles a serving table with two wings which fold down flat against the sides.

THE TELEPHONE-DIAL SET

A NEW German set which made its appearance at the Berlin Radio Show is equipped with a novel type of tuning dial, in the form of a revolving dial disc similar to the dials used in automatic telephone systems. Tuning in this set (Fig. C) which was described in *Radio-Handler* (Berlin) is accomplished by dialing to a predetermined number. For example, London —74, Berlin—42, Rome—29, etc. Thus, to tune in London the listener turns the dial first to 7, then to 4.

A BOOK-CASE SET

ANOTHER novelty in set design is made to imitate a group of books which can be set on a table between bookends. This set, shown in Fig. D, is of French origin.

A glance at the photo shows that the speaker "horn" is located below the tuning controls. When the set is opened for use, the front drop-panel forms a horn-type projector for the small-size speaker.

A HIGH-FIDELITY PHONO.-RADIO

A NEW German receiver of odd appearance was introduced recently and is shown in the photo here (see Fig. E).

The receiver is a 5-tube superheterodyne which has a variable band-width adjustment for fidelity control. The set uses 2 dynamic speakers, one for the bass and middle register and the other, a tweeter, for high-frequency response.

A phonograph pickup and turntable are mounted just below the tuning controls, within the "control compartment" at the back of the desk.

(This set sells for about $280.)

AN UNUSUAL FRENCH SET

A RECENT issue of *La T.S.F. Pour Tous* (Paris) contained a photo of a peculiarly-shaped cabinet which will interest many American radio enthusiasts.

As shown in Fig. F, the cabinet has an irregular, hexagonal shape with the tuning dial on the front facet. On this side also are mounted a tuning indicator, a volume control and tone control. On the adjacent facets, to left and right, are 2 speaker grilles, behind which are mounted the 2 speakers. The other three sides complete the cabinet structure.

A shallow lid covers the phonograph equipment when not in use.

A NOVEL RADIO-PHONOGRAPH

THE magazine *L'Antenne* (Paris) recently contained several views of the novel radio-phonograph unit shown in Fig. G. The cabinet is cylindrical in shape, with the radio set at the top and the automatic record changer and record storage cabinet in the bottom. Two doors in the front provide access to the phonograph unit. Receivers are available both in A.C. and A.C.-D.C. types.

(Unusual cabinet styles are featured much more in Europe than in this country, as shown by this issue, and other examples in past issues of *Radio-Craft*.)