Westinghouse Radio and Television Production

***"You can be sure* . . . if it's Westinghouse!"** This was the familiar advertising slogan used by the Westinghouse Electric Corporation for many years. Today, if it's a Westinghouse, even an experienced collector may have many questions about his or her radio or television. When was it made? Where was it made? Why are the ID tags on two radios so different? Surprisingly, the collector may have to ask, who really manufactured it? Read on, and we will puzzle through some of the mysteries. Successful companies must respond to changes in business conditions and changes in the marketplace. They also must incorporate new technologies into their business. By adhering to these principles, the Westinghouse Electric Corporation was able to endure as a successful company for nearly a century. For over fifty years they were leaders in the radio, television, and consumer electronics business. The changes Westinghouse made over this period, when studied today, make it difficult for us to make sense of their decisions. By understanding the business decisions they made over time, it may be possible to understand the effect they had on the artifacts found today. Locations, licensing issues, contractual issues, legal issues, new technologies, the Great Depression, three wars and more, have combined to make following the Westinghouse story an interesting journey.

The Beginning

George Westinghouse (1846–1914), inventor and industrialist, organized the first of many Westinghouse companies, the Westinghouse Air Brake Co., in July 1869 to manufacture his own inventions as well as to utilize other inventions and the new technologies of his time. He started the Westinghouse Electric Company in 1886, changing the name to Westinghouse Electric and Manufacturing Co. in 1889. This company utilized the inventions of Nikola Tesla and others to wage the battle for alternating current (AC) over direct current (DC) as America was beginning the process of making electricity a household utility. Sadly, George Westinghouse would lose control of this part of his company to financiers during the financial panic of 1907, and he passed away in 1914. The Westinghouse Electric and Manufacturing Company went on to win the "battle of the currents" and installed the AC power generation facility at Niagara Falls. As the company grew, it also went on to become a major player in the radio industry, enduring for most of the 20th century. But George Westinghouse himself

never played a part in the radio and electronics business.

In 1915, the management of the company first took an interest in radio by forming the Radio Engineering Section in Pittsburgh. In 1917, under contracts to supply radios for the Signal Corps, Westinghouse built 75 model SCR69 transmitters and 150 model SCR70 receivers. In 1918, to fill a contract for the Navy Bureau of Steam Engineering, Westinghouse built the Navy-designed Model SE1012A and SE1414 receivers at the Westinghouse Newark Works in New Jersey (see Fig. 1). In 1920 at this location, they also manufactured the Model RB long-range receiver for use in commercial shipping.[1] After the contracts for these radios were completed, Westinghouse moved to gain a stronger foothold in this field. It was also in the company's interest to keep their business rival, General Electric (GE), from gaining control of radio technology. Their first move was to obtain an option to purchase the International Radio Company, which they later bought. International controlled the National Electric Signaling *Company* (NESCO), which in turn controlled the heterodyne and other patents of Reginald Fessenden. They also purchased options on, and later the full rights to, the patents of inventors Michael Pupin and Major E. Howard Armstrong.[2]

Frank Conrad, KDKA, and Pittsburgh

Westinghouse engineer Frank Conrad developed radio receivers to fill the government orders for radios needed during World War I. To test these receivers, he transmitted music to the nearby Westinghouse factory from a transmitter in his garage at home using a phonograph and borrowed records. Before long, a curious community discovered that free evening concerts were being broadcast through the air on a

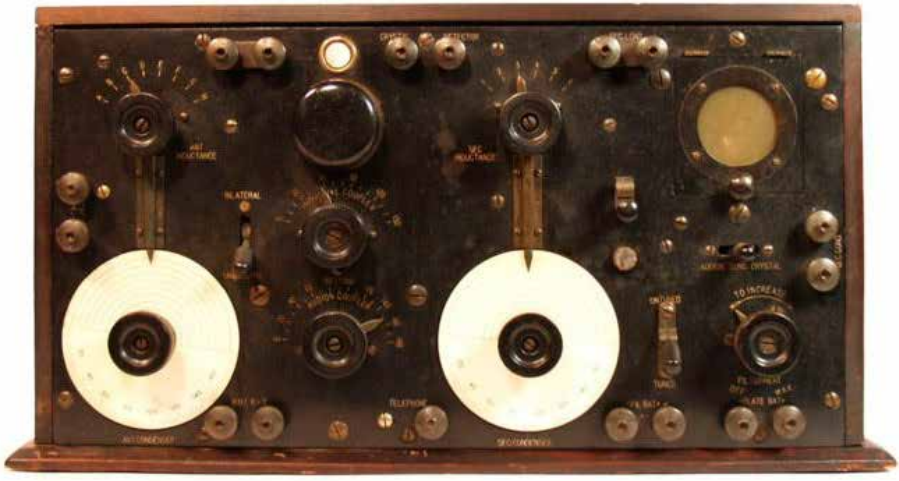

Fig. 1. SE 1012A receiver made at Westinghouse Newark Works (Courtesy of Radiomuseum.org)

Fig. 1. is 138 ppi.

station with call letters 8XK, a Special land station license belonging to Conrad. When the war was over, the income from government contracts ended, and Westinghouse cast about for new applications to support their fledgling radio business. Westinghouse saw little chance for commercial radio business because GE and the new company it had formed, the Radio Corporation of America (RCA), had locked in long-term contracts with many foreign countries for worldwide radiogram service. Vice President H. P. Davis found out how popular Conrad's music broadcasts were when he learned that the Horne Department store was selling radios to hear his concerts.[3] Thus, the idea of creating a broadcast station to sell radios was born. Westinghouse began to construct a broadcast station on the rooftop of its factory in East Pittsburgh at the end of September 1920, and station KDKA was inaugurated with the broadcast of presidential elections on November 2, 1920.

Fortunately, the public interest to "listen in" on radios after this broadcast created a new business model for Westinghouse, although it took more than a year for the business to materialize. Westinghouse made broadcasts daily, generated interesting programming, erected three more broadcast stations in 1921, and more to the point, began to manufacture and sell a line of radios to satisfy the needs of the average person who was not interested in building his own radio set.

Westinghouse manufactured a complete receiver that would allow an average family to "tune in" their programs. The agreement to purchase the patent rights of Howard Armstrong became very important. His regenerative patent and later his Superheterodyne patent were perfect for the home radios of the 1920s. Dr. Conrad had previously designed a regenerative receiver for use by Westinghouse in communicating with other Westinghouse factory locations within its range. He and his staff modified this radio to make it suitable for use by the general public as a broadcast receiver, and it went on sale in December 1920. This receiver consisted of two units: the Model RA tuner and the DA detector/amplifier, which when sold together in one cabinet was designated the Model RC receiver. Manufacturing was initially set up at the Shadyside Works in East Pittsburgh and later moved to East Springfield.[4]

Although a combined total of 1,700 RA tuners and DA amplifier/detectors were produced in East Pittsburgh,[5] it is important to recognize that these broadcast radios were an insignificant part of the business of a company the size of the Westinghouse Electric and Manufacturing Company in 1921 (see Fig. 2). At that time, Westinghouse controlled 104 companies and was working full speed to electrify America. This effort required manufacturing everything from dynamos and power stations to light bulbs and small appliances. Much of this equipment, which was constructed in East Pittsburgh, was huge, and the demands of production must have put a strain on the facility

Fig. 2. is 117 ppi.

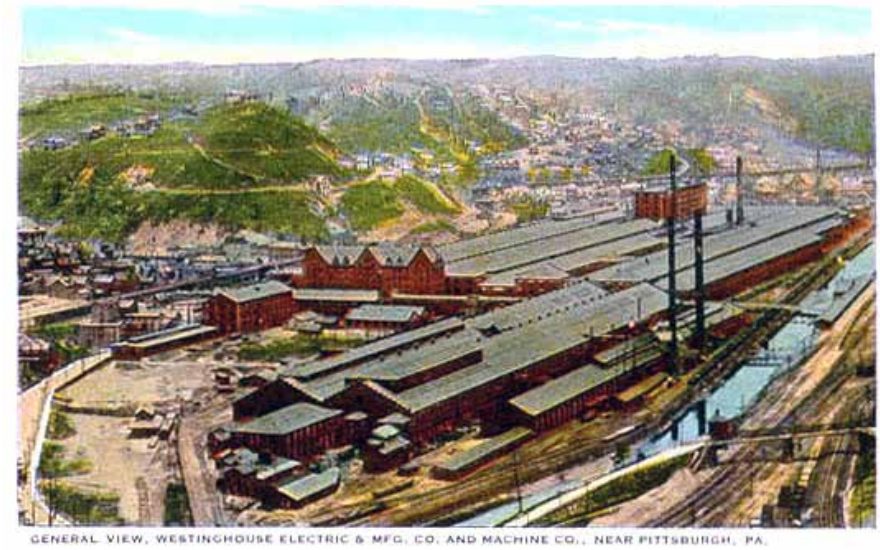

Fig. 2. Postcard depicting a general view of the Westinghouse Electric & Manufacturing Co. and Machine Co. in East Pittsburgh. (Author's collection)

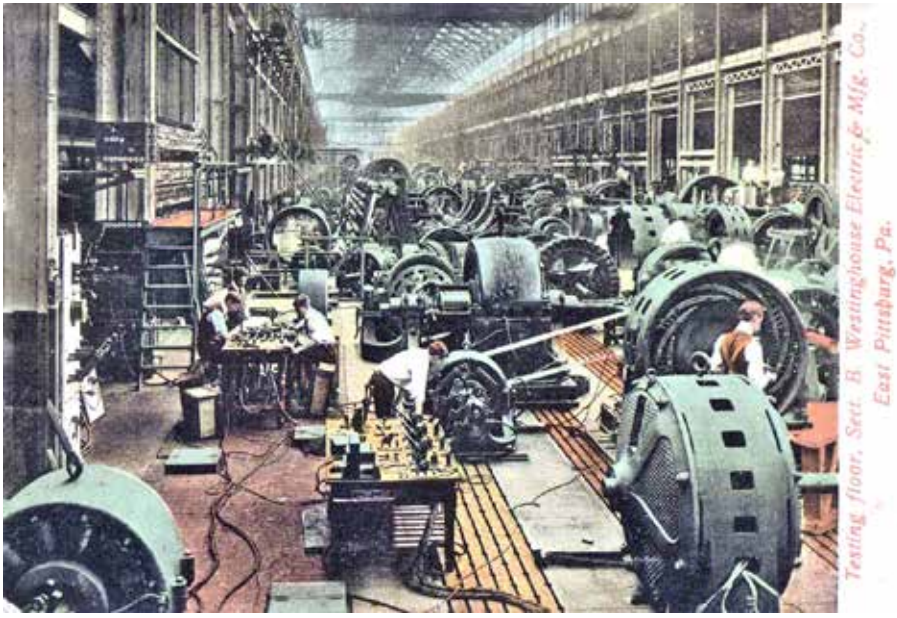

Fig. 3. Postcard depicting Testing Floor in the East Pittsburgh Westinghouse facility where dynamos were tested. (Author's collection)

Fig. 3. is 256 ppi.

as well as the available labor force (see Fig. 3). This complex covered 75 acres and had over nine miles of railroad track within the buildings.[6] Therefore, it is not too surprising that Westinghouse needed a new location for the radio portion of its business.

The Move to East Springfield, MA

During World War I, the various divisions of Westinghouse had been awarded many contracts to fill war-related orders. One such contract called for manufacturing components for over one million rifles for the Russian Army. To execute this contract, Westinghouse bought buildings in Massachusetts formerly occupied by an automobile manufacturer, the Stevens-Duryea Company.[7] After war-related contracts ended, Westinghouse redesigned these buildings for other purposes. The site in East Springfield, MA, became home to the Electric Home Appliance Division. The newly created Home Radio Products Division soon left East Pittsburgh, PA, for East Springfield (see Fig. 4). The type of machined parts used for the rifles and the skilled labor that had manufactured them was a good fit for radio work. Westinghouse also produced small motors for automobile starters and sewing machines at the East Springfield facility,[8] and they selected another property for manufacturing small appliances in Chicopee, MA.

To continue the business model calling for the construction of several radio stations in addition to KDKA, the company constructed a second radio station atop the factory in East Springfield. This station was licensed with the call letters WBZ on September 15, 1921. Not all radio work left East Pittsburgh, however. Frank Conrad and the Radio Engineering Department remained there, as did the division that produced small transmitters and radios for government sales.[9] During

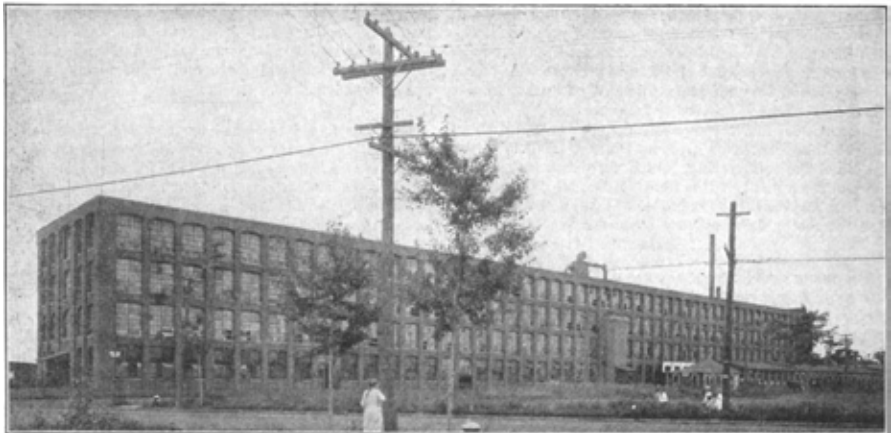

Fig. 4. The Westinghouse facility in East Springfield where most of its consumer radios were manufactured in the 1920s. (*Elect. World*, Vol. 74, p. 620)

this period, Frank Conrad also experimented with short waves. This work included a demonstration in a London hotel room, where his shortwave receiver with a short antenna received a transmission from East Pittsburgh. Attending the demonstration were both Marconi and David Sarnoff.

Production in East Springfield began with the same RA and DA models that were made in Pittsburgh, but in much greater quantities. Westinghouse combined the RA and DA into a single cabinet and designated it Model RC. They rounded out the offerings the first year by adding two inexpensive models, the Aeriola Junior crystal set and the Aeriola Senior one-tube regenerative receiver.

With the public interest in radio receivers that Westinghouse had kindled in 1921, RCA and GE could no longer ignore the broadcast radio market. It would have been risky for a large corporation to invest substantial resources in radio manufacturing without having a solid patent position. To obtain the licenses for the patents needed to produce competitive receivers, RCA and GE invited Westinghouse Electric, owners of the regenerative patent and others, to join what became known as the "the radio group." RCA, GE and Westinghouse negotiated a deal in which 60% of the broadcast radios sold by RCA would be manufactured by GE and 40% by Westinghouse. A small number of radios made for sale by RCA were actually made by the Wireless Specialty Company; that portion came from GE's 60% share. Under this agreement, neither GE nor Westinghouse would sell broadcast radios directly to the public.

The agreement was signed in June of 1921, but it did not become effective until January 1, 1922,[10] at which time RCA began to advertise the sets. The models produced and marketed by Westinghouse before this agreement became effective are listed in Table 1, while the models made exclusively by Westinghouse and sold by RCA after the agreement became effective are shown in Table 2.[11] Beginning in 1922, RCA also began to sell the models listed in Table 1 that Westinghouse had been selling in 1921. Note that RCA began to market the RC as the Radiola RC beginning in April 1923, but all RC sets were manufactured by Westinghouse before 1923, and as a result, no model RC sets have the Radiola name on the nameplates. The dates in these tables are those when each model first appeared on the market.

Table 1. Broadcast radio models produced and marketed exclusively by Westinghouse before January 1, 1922.

Westinghouse Model Number	Date Introduced
Model RA Tuner*	Dec. 1920
Model DA Det./Amp.*	Dec. 1920
Model RC Receiver	Dec. 1920
Aeriola Junior	July 1921
DB Crystal Detector*	Aug. 1921
Aeriola Senior	Dec. 1921

*An RA tuner when combined with either a DB or DA model formed a complete receiver.

Table 2. Broadcast radio models produced by Westinghouse and marketed exclusively by RCA beginning in 1922 (in addition to holdover sets listed in Table 1).

Westinghouse Model	Date	Westinghouse Model	Date
Aeriola Sr. Amp	Sept. 1922	Radiola Sr. Amp AC	Feb. 1923
Aeriola Grand	Mar. 1922	Radiola III	Feb. 1924
Radiola Grand	Dec. 1922	Balanced Amp.	Mar. 1924
Radiola AR *	Jan. 1923	Radiola III-A	Mar. 1924
Radiola RT *	Jan. 1923	Radiola RC	Apr. 1923
Radiola RS	Jan. 1923	Radiola Regenoflex	Apr. 1924
Radiola Jr.	Feb. 1923	Radiola X	Mar. 1924
Radiola Senior	Feb. 1923	Radiola 26	June 1925

*Used with RA and DA sets in various combinations

Standardization of Receiver Manufacturing

While the 60%–40% agreement between GE and Westinghouse for manufacturing sets had been in place since 1922, the actual ratios depended on consumer demand, and demand greatly favored Westinghouse receivers in the first few years. The agreement was informally modified to make the percentage cumulative over several years, and GE finally evened it up in 1924 with the sale of the first mass-produced superheterodyne receiver. In 1925, it was decided that each model would be manufactured to the exactly same specifications by both companies in the ratio of 60%–40%. The first standardized model manufactured by both companies was the Radiola 28 released in August 1925. Models manufactured to the same standard between August 1925 and the end of 1929 are listed in Table 3.[12]

Unification and Production in Camden, New Jersey

As the size of radio transmitters grew and government orders for receivers increased, more space was needed than was available in East Pittsburgh. In 1925, production of radios for the government was relocated to Chicopee Falls, MA, and the Radio Research and Engineering Department moved there later in 1927. The evolution of the technology during this period was more than impressive. Home receivers progressed from simple crystal sets to regenerative sets, all of which were soon replaced by superheterodyne and tuned-radio frequency (TRF) sets. Sets with headphones, multiple dials, a number of batteries, and long outdoor antennas were soon replaced by single dial tuning sets that only needed to be plugged into a wall outlet. While the radios from East Springfield were produced in larger and larger quantities, that

Table 3. Each model produced to the same standard for RCA by both General Electric (Schenectady) and Westinghouse (E. Springfield) in the ratio of 60% to 40%.

Model	Date	Model	Date
Radiola 16	Aug-1927	Radiola 33 DC	July-1929
Radiola 17	Sept-1927	Radiola 41	Dec-1928
Radiola 18	Apr-1928	Radiola 41 DC	Mar-1929
Radiola 18 DC	Dec-1928	Radiola 44	May-1929
Radiola 20	Nov-1925	Radiola 46	May-1929
Radiola 21	Oct-1929	Radiola 46 DC	Nov-1929
Radiola 22	Nov-1929	Radiola 47	Oct-1929
Radiola 25	Sept-1925	Radiola 50	Mar-1928
Radiola 28	Aug-1925	Radiola 51	Jun-1928
Radiola 28 AC	Sept-1925	Radiola 51 DC	Dec-1928
Radiola 30	Nov-1925	Radiola 60	Aug-1928
Radiola 30A	Aug-1927	Radiola 62	Sept-1928
Radiola 30A DC	Sept-1927	Radiola 64	Oct-1928
Radiola 32	July-1927	Radiola 66	July-1929
Radiola 32 DC	Sept-1927	Radiola 67	Sept-1929
Radiola 33	Mar-1929		

would come to a sudden stop in 1929. Production was not stopped by product issues, lack of demand, or labor problems, but by management decisions involving a change in direction for RCA and the radio group.

David Sarnoff had long recognized the problems of manufacturing and marketing radios under the 60%–40% agreement. In October 1927, he headed a committee at RCA charged with investigating unification of radio manufacturing. Managing this agreement was cumbersome at best because requiring that sets be designed and manufactured in a fixed ratio by two different suppliers made RCA slow to respond to changes in the marketplace. Engineering and research was not coordinated between the two entities, and production had to be adjusted up or down to stay within the 60%–40% production ratio. These difficulties allowed independent manufacturers to take the lead in radio production and sales.

Sarnoff worked methodically to change this situation. In April 1928, the committee recommended to proceed with unification. RCA had an ongoing relationship with the Victor Talking Machine Company whereby RCA provided radio chassis and amplification

hardware for installation in Victor phonographs. Sarnoff developed a plan for the Victor manufacturing facilities in Camden, NJ, to become the manufacturing center for RCA radio products. In a July 1928 meeting with Victor, Sarnoff proposed an RCA plan to purchase the Victor Talking Machine Company.[13]

In addition to manufacturing phonographs and cabinets, Victor also had an extensive marketing network and produced phonograph records using a stable of recording artists under contract—the latter being a new business for RCA. The stockholders of RCA approved the plan on February 27, 1929, and the acquisition of Victor by RCA was completed on March 15, 1929. A new company was soon formed to take over the manufacturing responsibility. On April 29, 1929, the Audio Vision Appliance (AVA) Company was incorporated, and the assets and manufacturing operations of the Victor Company were transferred to this new company. Ownership of the AVA Company was accorded to GE and Westinghouse in the same 60%–40% ratio as the previous manufacturing agreement.

David Sarnoff soon found that this arrangement, combined with a clumsy marketing arrangement, was a step backwards. Within months he was lobbying at the highest levels of RCA for complete unification. To implement this plan, the RCA Victor Company, Inc. was formed on December 26, 1929. The new AVA Company was dissolved and radio research, manufacturing, and marketing operations were then placed under the control of this new company. Many assets and personnel were transferred to Camden, and GE and Westinghouse became major shareholders of RCA. The radio business for Westinghouse was now upside down. In the 1920s, Westinghouse manufactured radios marketed by RCA, but beginning in 1930, Westinghouse and GE began to market radios made by RCA.[14]

Westinghouse and GE Divest Themselves of RCA

The unification period did not last long. As 1930 started, David Sarnoff was named president of RCA, and his unification plans were put into action. Before unification, many viewed the "Radio Group" as the "radio trust," and to many, the new RCA looked like a stronger trust than before. Also, the 1930s brought on stronger antitrust actions against monopolies as the U.S. Justice Department investigated big business in the United States. At this time, the federal government was prosecuting a case against Standard Oil, and it was winning the case to break up this monopoly. So by May of 1930, the Justice Department became bullish about prosecuting monopolies at just at the time David Sarnoff was waving the red cape with his new company. Preliminary talks were being held between the principal members of the radio group and the Justice Department before any actions had been taken, and these talks dragged on for some time. Again, Sarnoff took the lead for RCA. Finally, as trial dates approached, talks continued at an accelerated pace, and trials were

repeatedly postponed. Shortly before yet another trial date, all parties in the radio group reached a settlement with the Justice Department.

The agreement was signed on November 21, 1932. Westinghouse and General Electric agreed to completely divest themselves of all connections with RCA, and management officials from GE and Westinghouse were removed from the RCA board of directors. As part of this settlement, Westinghouse and GE agreed not to compete with RCA in radio production or sales for a two-and-a-half year period. This would allow RCA time to firmly establish production of consumer radios in Camden and gain a market foothold without GE or Westinghouse manufacturing competing broadcast radio receiver lines.[15] The non-compete agreement would end in May of 1935, at which time both Westinghouse and GE were free to manufacture competing consumer radio products.

RCA Victor Manufactures Westinghouse Home Receivers (1930–1935)

From 1930 to 1935, Westinghouse marketed radios manufactured by RCA Victor Co. in Camden, NJ. These Westinghouse radios had equivalent RCA models, which are listed in Table 4. The model years for radios marketed during this decade were from mid-year to mid-year, so that most of the sets first manufactured in 1930 were generally sold through mid-1931, and likewise, most of the sets manufactured in 1934 were sold though midyear 1935, at which time the RCA agreement to make radios for Westinghouse ended. The model number equivalents in Table 4 were taken from the *RCA Victor Service Data* book published in 1944,[16] and the year that each model was first manufactured were taken from the *RCA Victor Service Notes* for the year 1935, which contains a cumulative list of sets made each model year beginning in the model year 1930–1931.[17]

One of the first ads announcing the new line of radios for sale by Westinghouse was a four-page ad that appeared in the July 1930 issue of *Radio Retailing*. The ad featured the WR-5 lowboy, WR-6 screen-grid superheterodyne, and WR-7 combination phonograph-radio.[18] The ad was circumspect about who manufactured the radios: "Westinghouse Radio . . . the product of the finest radio engineering and manufacturing talent ever assembled . . . made in modern factories on a mass-production basis." They certainly told the truth, but they avoided naming any manufacturer at all.

When RCA began manufacturing radios for Westinghouse in mid-1930, the nametags on Westinghouse radios stated, "Manufactured for Westinghouse Electric & Mfg. Company by RCA Victor Company, Inc." One such tag from a WR-10-A receiver that was first manufactured in 1931 is shown in Fig. 5. However, by 1932 the company name appearing on the tags had changed to "Westinghouse Electric Supply Co., Inc. New York, N. Y." The only reference to RCA was as a licensor (see Fig. 6). While the tag in this figure is from a Model WR-28 made in 1933,

Table 4. Westinghouse WR series radios made between 1930 and mid-1935 by RCA Victor Co. in Camden, NJ, with equivalent RCA models (dates are years first marketed).

Westinghouse Model No.	Equivalent RCA Victor Model	First Year Mfd.	Westinghouse Model No.	Equivalent RCA Victor Model	First Year Mfd.
WR-4	Radiola 48	1930	WR-25	RE-80-SW	1933
WR-5	Radiola 80	1930	WR-26	R-27	1933
WR-6	Radiola 82	1930	WR-26-M	R-17-M	1933
WR-6-R	Radiola 82-R	1930	WR-27	R-28-B	1933
WR-7	Radiola 86	1930	WR-27-P	R-28-PB	1933
WR-7-R	Radiola 86-R	1930	WR-28	R-37-P	1933
WR-8	WR-6 chassis	1931	WR-29	RE-40-P	1933
WR-8-R	WR-6R ch	1931	WR-30	140, 141	1933
WR-9	T-5	1931	WR-31	140-E, 141-E	1933
WR-10 (DC)	R-7	1931	WR-32	100	1933
WR-10A	R-7-A	1931	WR-33	M-34	1933
WR-12	R-9	1931	WR-34	112	1933
WR-12 (DC)	R-9 (DC)	1931	WR-35	111	1933
WR-13	RE-16	1931	WR-36	120	1933
WR-13-A	RE-16-A	1931	WR-37	121	1933
WR-14	R-5	1931	WR-38	340	1934
WR-14 (CR)	R-5-X	1931	WR-39	340-E	1934
WR-14 (DC)	R-5 (DC)	1931	WR-41	M-105	1934
WR-15	R-11	1931	WR-42	M-116	1934
WR-15-A	R-10	1931	WR-45	143	1934
WR-16	RO-23	1932	WR-45-A	143 (Mod)	1934
WR-17	R-4	1932	WR-46	128	1934
WR-18	R-8	1932	WR-46-A	128 (Mod)	1934
WR-18 (DC)	R-8 (DC)	1932	WR-47	135-B	1934
WR-19	R-70	1932	WR-48	118	1934
WR-20	R-74	1932	WR-48-A	118 (Mod)	1934
WR-21	R-70, R-70-N	1932	WR-50	128-E	1934
WR-22	R-73	1932	WR-53	125	1934
WR-23	RE-80	1933	WR-93	R-93	1934
WR-24	R-24-A	1933			

the tag on a Model WR-24 made in 1932 has been observed to be virtually identical to the tag on the WR-28 (except for the model number). The Westinghouse Electric Supply Company (WESCO) had been established as a wholly owned subsidiary company of the Westinghouse Electric & Mfg. Company in 1922 for the purpose of distributing electrical products through jobbers, distributors, and eventually retail stores. A WESCO catalog prepared by WESCO for its wholesale distributors clearly stated that it was "A National Distributing Organization" with many branches—clearly, not a manufacturer (see Fig. 7).

It would appear that by 1932, Westinghouse decided it did not want the consumer to know that RCA made their sets. The status quo persisted until mid-1935 when the manufacturing agreement between Westinghouse and RCA expired—and without any mention of the agreement or its expiration in the press. What happened next is something of a mystery. Read on.

Fig. 5. is 100 ppi.

Fig. 5. A Model WR-10A radio with nametag indicating it was manufactured by RCA. (Author's collection)

Fig. 6. A nametag from a Westinghouse Model WR-28 made in 1933 no longer reveals that is was manufactured by RCA.

Fig. 6. is 187 ppi.

Fig. 7. is 197 ppi.

Fig. 7. A Westinghouse Supply Company (WESCO) sales catalog clearly indicates that it was a national distributing organization, not a manufacturer. (Author's collection)

Westinghouse Home Radios Mid-1935 to mid-1937 or *"The Mystery of the Manufacturer"*

The radio business had changed dramatically during the period from mid-1930 through mid-1935 when Westinghouse marketed radios made by RCA. The United States was well into the Great Depression, and radio buyers had less cash in their pockets. The radio industry had answered with new technology. The many individual components of 1920s radios, often placed in separate cabinets, were replaced with self-contained AC tabletop sets shaped like cathedrals and tombstones. These radios cost less to produce, sold for much less, and as a result, generated much less revenue per sale. Westinghouse radio sales fell from $800,000 per year to $235,000 for 1934, and during this same period other competing companies such as Atwater Kent, Majestic, and Philco became dominant in the marketplace.

In order for Westinghouse to continue selling radios in the post-RCA manufacturing era (beginning in mid-1935), they had two choices—manufacture their own sets or outsource them. In order to design and manufacture their own sets, Westinghouse would have to gamble a huge investment in start-up costs associated with designing new radios and setting up a new manufacturing line. Alternatively, with little risk they could continue to outsource radios using manufacturers of their own choice.

Westinghouse clearly made the decision to continue selling radios under their own brand, because an ad appeared in the August 1935 issue of *Radio Retailing* (once again) announcing the new Westinghouse models for the 1935–36 model year, but this time with little fanfare.[19] The ad was a single page and unassuming with small images of fourteen sets, including the model WR-100—an inexpensive AC/DC receiver. This receiver had the lowest "WR" model number of any set made after the RCA Victor agreement with Westinghouse expired. The WR-100 is a key model number because all radios with a WR number less than 100 were manufactured by RCA under the earlier Westinghouse–RCA agreement, while all radios with WR numbers of 100 and greater were manufactured under other arrangements.

The distribution of Westinghouse radios sold between mid-1935 and 1942 (when the sales of all consumer radios stopped because of World War II) were handled once again by WESCO. Westinghouse radios sold in this time frame had nametags labeled with "Westinghouse Electric Supply Company," many of which were followed by a street address—either 150 Varick St. in New York or 1101 Race St. in Philadelphia, PA. One such nametag found on a WR-272 has the Varick street address (see Fig. 8).

The addresses on these tags were of sales offices that were responsible for marketing the radios, not those of a factory. So, do we know where these radios were manufactured? Do we know if Westinghouse was really the manufacturer? Very few obvious clues

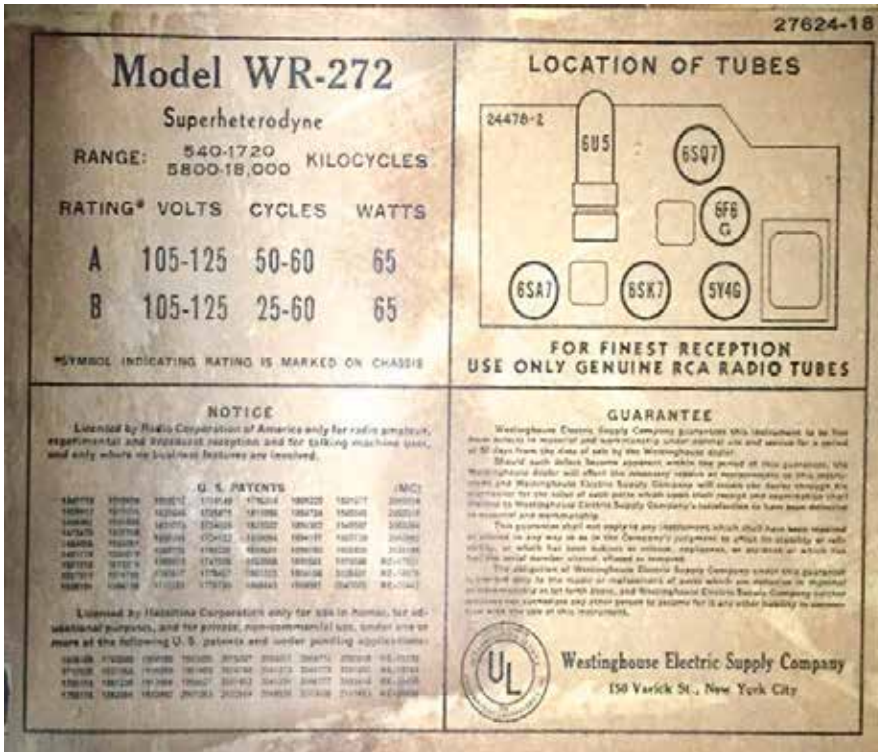

Fig. 8. A Westinghouse WR-28 nametag indicates is was distributed by a WESCO office on 150 Varick St. in New York City.

have been found. It is likely that Westinghouse, knowing that their name had great appeal to radio buyers, decided to stay in the market by outsourcing the manufacturing. It also appears that considerable effort was made to hide the fact that radio production was subcontracted to other manufacturers. All service information, including tags, schematic diagrams, ads and such, was supplied under the WESCO name.

One of the first clues that manufacturing was outsourced is an ID tag for a Westinghouse Model WR-262, Chassis Model 232E (see Fig. 9), which stated that it was manufactured for Westinghouse by "D. Company, Detroit Michigan." This company was almost certainly the Detrola Corporation of Detroit, Michigan. A search of many model tags did not uncover any other clues to actual manufacturers, although collectors have reported WR series radios that were likely made by companies other than Westinghouse.

Another line of investigation began with the fact that all the WR numbers assigned after mid-1935 had an initial digit between 1 and 6. It was first postulated that the first number represented one of six different manufacturers, but investigations of buyers' guides

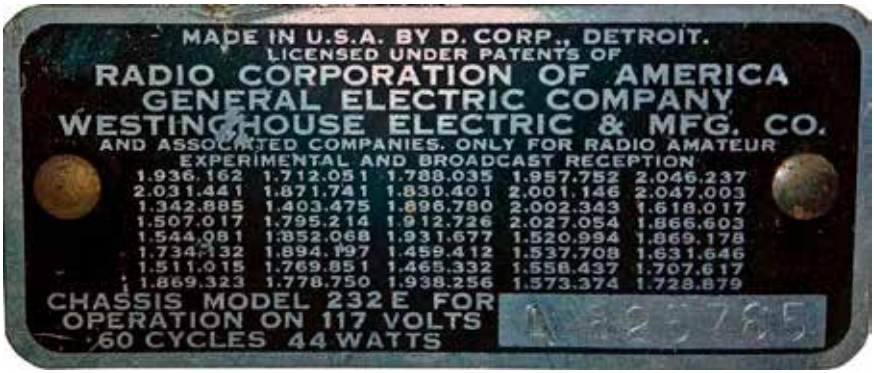

Fig. 9. A license tag found on a Westinghouse WR-262 indicates it was manufactured by Detrola Corp. of Detroit. (Courtesy of eBay advertisements)

and advertisements in radio magazines pointed to a different meaning. *Radio Today* in particular listed the complete Westinghouse line by year for 1935 to 1939, characterizing each radio by type.[20] The six types are shown in Table 5 for each of the six different series of numbers. The numbers actually indicate sets with different features. For example, the 100 series designates AC/DC table radios, while the 200 series designates AC table radios—that is, radios with power transformers using tubes of equal voltage ratings wired in parallel. (AC/DC radios used tubes with different voltage ratings wired in series to add up to the power line voltage.) The 100 series sets were the least expensive radios of the lineup. It appeared that the search to identify individual manufacturers would not be easy.

Table 5. Westinghouse WR Model Numbering Scheme.

Series	Model Types
WR-100 to199	AC/DC Table Radios
WR-200 to 200	AC Table Radios
WR-300 to 399	Console Radios
WR-400 to 499	Radio /Phono Combos
WR-500 to 599	Auto Radios
WR-600to 699	Portable/Farms Radios

A third line of investigation was to search the 23 volumes of the Rider Manuals to determine if there were any manufacturers with models whose chassis layouts or schematic diagrams were identical to those of Westinghouse Models. A great deal of detective work is needed to find matching schematics or chassis layouts in the six or so volumes of Rider's covering 1935 to 1940, each with about 1500 to 1600 pages. Unfortunately, the 23 volumes of the Rider's manual are not research-friendly. In all fairness, it was never Rider's intention to provide accurate material for a researcher some eighty years later.

To begin the search, it was logical to assume that a manufacturer supplying radios for sale by Westinghouse would provide a radio with a circuit diagram and chassis identical to one of its own

models—and in the same year. However, the year of manufacture in Rider's does not generally correspond to the year the manual published. The different indexes are inaccurate or incomplete, the diagrams in each volume are not in numerical order, and bits and pieces of information for the same model may appear in different volumes. Also, the amount of information provided for each radio model varies, and often the major component layout is not included. This makes the search reminiscent of finding the proverbial needle in a haystack, or the challenge of putting together a jigsaw puzzle where you don't know what to expect as the final picture. Thankfully, a hardworking, strong-willed radio historian achieved success for the years 1935 and 1936 and provided the information appearing in the next two tables.

The first step was to accurately date the Westinghouse models to the first year manufactured and then focus on the Westinghouse models manufactured by unknown manufacturers in the first two years beginning with the 100 series. The model years were accurately dated by finding the first year each model appeared in the magazine *Radio Today*. The results of this effort are summarized in Table 6.[21] This table is not entirely complete—but then

Table 6. Westinghouse WR Radio Models by Year Introduced (1935–1942).

1935	1936	1937	1938	1939	1940	1941-42
WR-100	WR-102	WR-116	WR-150	WR-165M	WR-168/B	WR-12X3
WR-101	WR-103	WR-120	WR-150W	WR-165I	WR-173	WR-12X4
WR-201	WR-116	WR-217	WR-152	WR-165W	WR-175/I	WR-12X8
WR-203	WR-207	WR-222	WR-154	WR-166A	WR-177	WR-12X10
WR-204	WR-208	WR-224	WR-158	WR-168	WR-179	WR-12X12
WR-205	WR-209	WR-226	WR-256	WR-169	WR-182	WR-12X14
WR-303*	WR-210	WR-228	WR-258	WR-170	WR-184	WR-12X15
WR-304*	WR-211	WR-326	WR-260	WR-172	WR-186	WR-12X16
WR-305*	WR-212	WR-328	WR-262	WR-270	WR-272L	WR-42X1
WR-306	WR-214	WR-330	WR-264	WR-272	WR-288	WR-42X3
WR-500	WR-310	WR-332	WR-366	WR-274	WR-290	WR-42X4
WR-501	WR-311	WR-334	WR-368	WR-372	WR-375	WR-42X7
WR-601	WR-312	WR-336	WR-370	WR-373	WR-388	WR-62K1
WR-602	WR-314	WR-338	WR-472	WR-373Y	WR-475	WR-62K2
-	WR-315	WR-610	-	WR-374	WR-476	WR-62K3
-	WR-316	-	-	WR-468	WR-478	-
-	WR-502	-	-	WR-470	WR-480	-
-	WR-503	-	-	WR-473	WR-482	-
-	WR-603	-	-	WR-474	WR-484	-
-	WR-604	-	-	WR-675/A	WR-486	-
-	WR-605	-	-	WR-676	WR-678	-
-	WR-606	-	-	WR-677	WR-679	-
-	WR-607	-	-	-	WR-680	-
-	WR-608	-	-	-	WR-682	-

*Models in the table that do not appear in Rider's manuals are highlighted in gray. Models with asterisks are in Rider's manuals but do not appear in the Riders index.

neither are the Rider's manuals. There are a small number of models listed here, highlighted in gray in the table, that do not appear in Rider's manuals. There are also models listed here with an asterisk that do not appear in the Rider's indexes but can be found in the manuals anyway.

Finally, there are a small number of models listed in Rider's that do not appear in the table. However, most of those sets can be accurately dated using this table by recognizing that the WR model number for each of the six series of models in Table 5 monotonically increases over time. Therefore, it is only necessary to determine where the missing model numbers fit in the appropriate six numerical sequences in the table. For example, WR-176 appears in the Rider's index but not in this table. Model WR-176 fits into the 100-series sequence in the year 1940 column between WR-173 and WR-175I, and so it would have been first manufactured in 1940. Note that for some reason, the Westinghouse model numbering system changed for the Westinghouse models beginning with the model year 1940–1941.

The next step was to make a copy of all the Westinghouse models in the Rider's manuals for 1935, 1936 and 1937 and go through all three Rider's volumes for those years trying to match schematics or chassis. After an extended period of time, all the Westinghouse models in the Rider's manuals for the first two years were matched to either Emerson or United American Bosch models (see Table 7). The Emerson and Bosch models in bold were found to have schematic diagrams that exactly duplicate the corresponding Westinghouse models. The schematics for models not in bold were close enough to those of the Westinghouse models to confirm a match, although the diagrams were not exact duplicates.

Table 7. Manufacturers of Westinghouse WR Radio Models (1935–1936).

Yr.	Model	Emerson	Bosch
1935	WR-100	**108,110**	-
	WR-101	**107,111**	-
	WR-201	**36**	-
	WR-203	**340, 101**	-
	WR-204	-	**575F, 575Q**
	WR-205	-	**585Y, 585Z**
	WR-303*	**340, 101**	-
	WR-304*	-	**575F, 575Q**
	WR-305*	-	**585Y, 585Z**
	WR-306	-	**595M, 595P**
	WR-500	-	634A
	WR-501	**E128**	-
	WR-601	**103**	-
	WR-602	Not in Rider's	
1936	WR-102	-	**604**
	WR-103	-	**610**
	WR-116	-	620,625
	WR-207	Not in Rider's	
	WR-208	**117**	-
	WR-209	-	**515**
	WR-210	-	**605, 605C**
	WR-211	-	640,650
	WR-212	Not in Rider's	
	WR-214	-	207A
	WR-310	-	**605, 605C**
	WR-311	-	**650**
	WR-312	Not in Rider's	
	WR-314	Not in Rider's	
	WR-315	-	680
	WR-316	-	620,625
	WR-603	-	**600**
	WR-604	-	**601**
	WR-605	-	**602**
	WR-606	-	**600**
	WR-607	-	**601**
	WR-608	-	**602**

It is of interest to see how the radios made by Emerson for sale to the public compared to the equivalent models they made for Westinghouse. A Westinghouse WR-201 is compared with an Emerson Model 36 in Fig. 10, and a Westinghouse WR-101 is compared with Emerson Model 107 in Fig. 11. While the cabinets are slightly different, all the shapes are the same, and the controls and speakers are in the same locations.

Emerson all but stopped making sets for Westinghouse after the first year. They made only one in the second year, and no others matches have been found. It appears that Bosch became the favorite supplier for Westinghouse in 1936. Then in 1937, Bosch suddenly stopped making domestic radios for

Fig. 10. Emerson Model 36 matches the shape of the WR-201 as well as and the location of the controls and speakers. (Courtesy of Radiomuseum.org)

Fig. 11. Emerson Model 107 matches the shape of the WR-101 as well as and the location of the controls and speakers. (Courtesy of Radiomuseum.org)

sale in the in the United States,[22] and no more Bosch radios appeared in Rider's. The trail of suppliers went cold.

Westinghouse Home Radios 1937 to 1942, or *"Unsolved Mysteries"*

Searching for identical chassis becomes more difficult beginning in 1937. The model WR-262 tag that refers only to the D. Company may be telling us something (see Fig. 8). Was there a new effort to hide the subcontracting scheme? Was this subcontracting information being used by other manufacturers to sour buyers against Westinghouse? Was this all done under orders from Westinghouse? There is only a reference on this tag to a chassis 232E. No picture or schematic could be found of an identical set. In the case of the WR-262, a search of the Rider's manuals revealed that many of the three- and four-digit part numbers for parts used on the Westinghouse WR-262 match the part numbers used on the Detrola Model Series 175, 190, and 193. The only difference is that the Westinghouse four-digit part numbers are preceded by the letter "D," while the Detrola part numbers have no initial letter. For example, the part number for a .02 mfd. capacitor used on the Westinghouse Model WR-262 is D576,[23] while the number for the same part type used on the Detrola series is 576.[24] This duplication is repeated many times with many different parts. Obviously, the D refers to Detrola, and Detrola manufactured the WR-262 for Westinghouse using Detrola parts. While the schematics and chassis of the Detrola sets were close to those of the WR-262, they were not nearly as close as the Emerson and Bosch models had been to corresponding Westinghouse models as in earlier years.

Another possibility is that Bosch continued manufacturing some radios for Westinghouse based on sets produced outside the United States. Under those circumstances, no additional Bosch diagrams would have appeared in the Rider's manuals after Volume 9, published in 1938. But did Bosch continue its subcontracting activities? Perhaps that is why the number of identical diagrams has dropped off. Did they keep a contract with Westinghouse for most of the models until World War II stopped all production? So far, no evidence has been found to prove or disprove this theory. Now the jigsaw puzzle box is also filled with a pile of blank pieces.

The frustrations involved in finding additional subcontracted sets became evident when the search of Rider's Manuals produced another possible subcontractor. The schematic diagram for a DeWald Model 408R matched the schematic diagram for Westinghouse WR-677 almost exactly, except for the output tube. Also, the schematic diagrams were both drawn in a very unusual print style. The Westinghouse set used a 1Q5, whereas the DeWald model used a 1C5. By 1937, radio technology had developed to a point where very similar complements of tubes were used in many radios, and the design for many sets had nearly the same schematic diagram. But a check of the

408R and the WR-677 for matching component layouts or physical appearance bore no positive results. Therefore, it is only likely, but not proven, that the WR-677 was made by DeWald. It is possible that additional searching through the Rider's Manuals might find an even more direct link to Westinghouse sets made by DeWald.

Westinghouse in Baltimore during World War II

In 1938, Westinghouse transferred 250 radio research employees working at plants in Chicopee, MA, and Pittsburgh, PA, to a radio division at a Westinghouse facility in Baltimore. This site, not too far from Washington D.C., was chosen so that Westinghouse could pursue its business with the federal government and the military more effectively. It was staffed with personnel who not only could design and build radio communications equipment, but also secretly begin work on the earliest radar systems. In that location, Westinghouse built the first mobile radar system to be deployed, the SCR 270, which used the Westinghouse radar tube WL 530. It was placed on duty near Pearl Harbor, HI, just prior to the attack on the fleet there. On December 7, 1941, this installation reported the incoming Japanese planes that commanders unfortunately decided were friendly aircraft. Throughout the 1930s, the workload of filling government orders kept growing. Westinghouse management stated that during this period they produced a greater number of radios for the war effort than were produced in the entire time the company built broadcast radios in Springfield.[25]

Early Television at Westinghouse Electric and Manufacturing

The Westinghouse Electric and Manufacturing Co. was a leader in early television research. It can be said that television research at Westinghouse began in 1920 when they hired Vladimir Zworykin, who left his then-current job, took a pay cut, and relocated his family to East Pittsburgh. Although his first projects at Westinghouse included developing the WD-11 triode tube for radio, the seed for developing electronic television was germinating. Born to an upper-class family in Russia in 1889, Zworykin was educated in science and engineering and studied under Boris Rosing, who is credited in Russian histories as the inventor of television. At this time in 1911, with Zworykin as his lab assistant, Rosing worked to develop his idea for an electronic system using both a pickup tube and a cold-cathode display tube. Soon the Russian Revolution and World War I caused Zworykin to leave Russia and begin the long path that would take him to East Pittsburgh.[26]

At Westinghouse, Zworykin convinced management to allow him to begin research on television. Zworykin started this arrangement in 1923, a time when broadcast radio was just beginning. While Westinghouse engineer Frank Conrad experimented with mechanical television, Zworykin focused on electronic television. As the 1920s progressed, Zworykin produced

crude experiments, first showing a line on a screen and soon sending more geometric shapes. By 1928, Zworykin had built and demonstrated several test receivers using a cathode ray tube (see Fig. 12). As part of the Westinghouse association with RCA, David Sarnoff was one of the RCA officials attending the demonstration. When Westinghouse consolidated its radio manufacturing with RCA, the interest to fund this television research had diminished. By April 1930, Sarnoff would have Zworykin and his team fully transferred to RCA in Camden.

As the depression years continued, Westinghouse did not want to miss out the sales boom from the predicted shift in the consumer electronics market from inexpensive radios and low-margin to expensive and profitable television sets. As the 1930s ended, regular television broadcasting was beginning. With the inauguration of scheduled television broadcasting at the 1939 World's Fair, it was expected that TV receiver sales would quickly follow. For Westinghouse, with no television research staff or a manufacturing establishment, gearing up to offer television sets would be slow and expensive. Instead, they decided to make use of the same approach that had been successful for them with radio. Arrangements were made with RCA to supply Westinghouse with four TV models similar to the models offered by RCA and produced in Camden, NJ (see Fig. 13). The Westinghouse model numbers and RCA equivalent model

Fig. 12. Zworykin demonstrates a television receiver with a cathode-ray tube in 1928. (http://www.earlytelevision.org/zworykin_receiver.html)

Fig. 12. is 130 ppi.

numbers are listed in Table 8. And similar they were, right down to the RCA decal on the cabinets. A few subtle differences can be identified by experienced collectors—for example, the three console TVs used a built in radio chassis to receive the TV audio portion and AM radio. The radio chassis used by Westinghouse is different from the chassis in the corresponding RCA models. Small cabinet changes can also be noted. However, the oncoming war

Fig. 13. Four televisions appeared in a Westinghouse appliance catalog for 1939. ("Electrical Household Appliance," catalog, 1939, p. 28)

Table 8. Westinghouse TV models produced by RCA in Camden, NJ, and RCA equivalents.

Description	Westinghouse	RCA
5" Tabletop (no audio)	WRT-700	TT-5
5" Console (direct view)	WRT-701	TRK-5
9" Console (direct view)	WRT-702	TRK-9
12" Console (mirror in lid)	WRT-703	TRK-12

effort would soon put an end to all TV broadcasting, and television production was stopped.[27]

After the war, as television broadcasting had started in major cities, Westinghouse experimented with a system to bring television to more rural areas; this was called Stratovision. In the period before broadcasters could send signals long distances by coaxial cables or microwave relays, there was no way to send programming out from the big metropolitan areas where the programs originated. Stratovision was a plan to have aircraft in the air with receivers to pick up the signal and transmitters to rebroadcast down to rural areas. As other transmission technology improved, the plan for Stratovision was dropped.

Westinghouse in Sunbury, PA

By 1942, war-related orders had overloaded the Baltimore facility. It was urgent that Westinghouse search for available space that could quickly be converted to help with the national war effort. They found a suitable vacant plant in Sunbury, PA, a town with adequate transportation facilities that was centrally located in the foothills near the Susquehanna River (see Fig. 14).

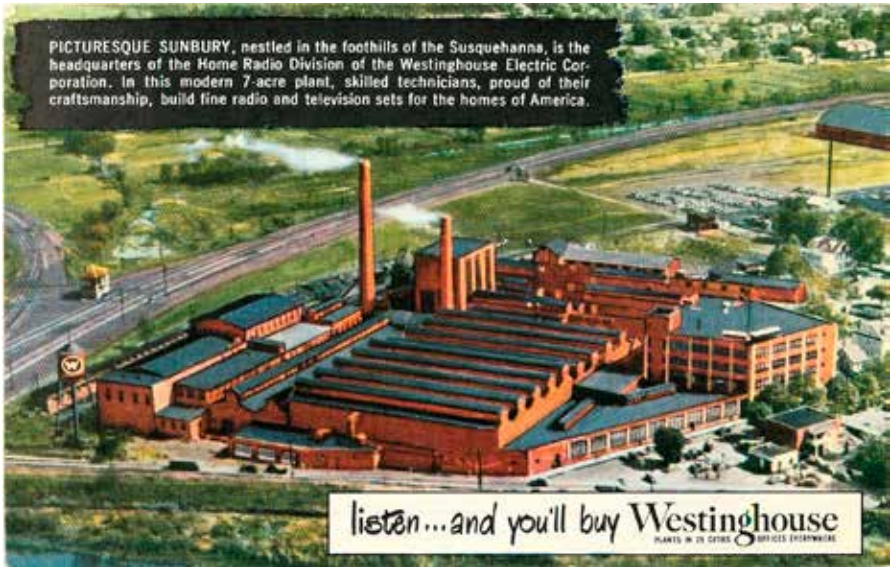

Fig. 14. Postcard of the Westinghouse Sunbury, PA plant. (Author's collection)

There was also a capable local workforce that could outfit the plant in a few weeks, and so Westinghouse was able to staff the plant with an initial workforce of 400. As Walter Evans, Westinghouse Electric and Mfg. Co. General Manager, stated at the time, the plant would turn out "bulkier types of communication equipment."[28] This was deliberately misleading, because the Sunbury Plant was secretly producing radar equipment. Over the wartime period the Baltimore and Sunbury plants produced a combined total of 104,000 radar units.[29]

This plant became the location for the Receiver Division, and during the war, workers in Sunbury continued filling defense orders. In an interview in 1944, General Manager Evans stated that Westinghouse Electric and Mfg. Company was preparing for a conversion to postwar domestic sales. He announced that the company had taken out a Hazeltine license, which was needed in addition to an RCA license, to produce quality radios during this period.[30] He also announced that Westinghouse Company planned to construct three television stations and produce television receivers. In the same announcement, he acknowledged that Westinghouse would manufacture its own line of home radios for the first time since 1928. They predicted a huge demand, as some 50 million home radios were outdated and ready for replacement.[31]

As Westinghouse management continued to position itself for the expected postwar boom, they announced on February 22, 1945, that the Receiver Division would be renamed the Home Radio Division. The Sunbury plant would soon phase out the production of military devices and re-tool for the manufacture of home radios. After the war ended, new Westinghouse radios were on the market for the many new households popping up around the country. These models can be recognized by their serial numbers that started with H. Models H-103 and H-104 were the first. The Sunbury plant also produced the company's first FM radio, and Westinghouse announced that the first orders for the model H-161 were leaving the factory in early 1948. This introduction was in line with the Westinghouse radio station KDKA beginning early tests of FM broadcasting.

As radio production grew and television receivers were added to the product line, Westinghouse made more moves. A supply line was created to produce some of their own components to feed the Sunbury production line. From the early days of television production, Corning Glass Works, situated along the southern tier of New York in the city of Corning, produced the glass used in TV picture tubes and receiving tubes. Corning became the source at the beginning of a supply chain. In 1952, Westinghouse opened a receiving tube factory in Bath, NY, and a factory for picture tube production in Elmira, NY (see Fig. 15). At these locations, the Westinghouse Electronic Tube Division produced the Reliatron brand of receiving tubes and television

picture tubes as well as transmitting and special purpose tubes. These facilities would ship components about 100 miles down to Sunbury, PA on U.S. Highway 15. In comparison to other companies producing radios and televisions at that time, the Westinghouse Company products contained a very

Fig. 15. Advertisement for the Westinghouse Electronic Tube Division. (*Radio and Television News*, Nov. 1952, p. 11)

Fig. 15. is 156 ppi.

high percentage of components manufactured "in house."

When the United States became involved in the Korean War in 1950, critical materials were directed to this effort, which caused supply problems for most domestic manufacturers. Other divisions of Westinghouse that were producing products for the military effort would have priority over consumer electronic products. By 1952, supplies began to increase, so production was also increased to meet the demand for television. Westinghouse introduced their first postwar TV, the model H-196 in 1948, but management had already recognized that when demand increased, the Sunbury plant would not able to produce enough sets. This old factory had been quickly adapted for electronic production during the war, and the decision was made to move to a modern electronics manufacturing facility to provide sets in the 1950s. It was also decided that Sunbury would not be the location for this facility.

As Westinghouse began to phase out the factory in Sunbury, they faced a problem. They had no further plans for this location, and that would mean laying off a workforce that had grown to well over a thousand. To solve this problem, Westinghouse contracted with an industrial realty firm to find a company to take over the factory. Westinghouse offered to pay the rent for over two years if a company could be found to move into the old facility and employ the workforce of one thousand.[32]

Television and Radio Division moves to Metuchen, NJ

The search for a location to build a modern TV and Radio factory led the Westinghouse Electric Company east to Metuchen, NJ. A large 50-acre lot was purchased in Raritan Township, later renamed Edison Township. Since the area was not well developed, the mailing address was Metuchen, and this new factory became known as the Metuchen plant. This small town, only a short 22 miles to New York City, with a railroad station for commuters, was established in 1900, when Thomas Edison's Menlo Park Laboratory was just a few miles down the road. Construction of the new Westinghouse building was begun in September of 1950. It was the start of a huge $1.5 million dollar project with the main building covering 10 acres (see Fig. 16).[33] A modern straight-line TV production line was

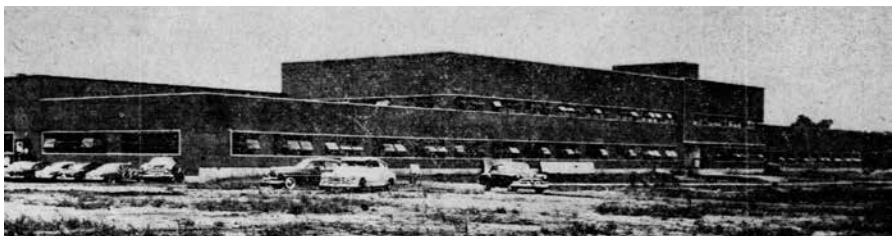

Fig. 16. The new Metuchen plant. (Courier News, Aug. 27, 1951, p. 4)

built to take advantage of a 450,000 sq. ft. production area.

In his announcement, division manager F. M. Sloan listed a number of the factors that made this site a smart choice. A rail line passed through the lot, and there was easy access to major highways, including the recently completed New Jersey Turnpike. He stated that the talented labor force available locally was capable of staffing the completed facility with 3,000 employees. He noted that other leading research facilities were in the area. Metuchen was not far from RCA in Camden and Princeton, Hazeltine Labs in New York, and Philco in Philadelphia, and other companies. The potential to recruit talent from these facilities must have been a consideration. He also noted that the location was suitable for reception of color TV test broadcasts from New York. Westinghouse needed to be prepared for this next advance in television.[34]

Construction of this new modern factory proceeded quickly. Opening was set for September 1, 1951, just one year after breaking ground. With just a few management personnel transferred from Sunbury, work began to fulfill ongoing defense contracts with 200 employees. The restrictions that directed certain materials to the Korean War effort slowed the company's transition to television production in Metuchen. By 1952, as materials became available again, the new Westinghouse Electronic Tube Division in Elmira, NY, was able to begin shipping receiving tubes and picture tubes to Metuchen, and the new assembly line went into production. By 1953, about 2,500 people were employed using what was now being called "The Miracle Mile Assembly Line" (see Fig. 17), and they were shipping Westinghouse radios and TVs to a network of 123 franchised distributors.[35]

While Westinghouse was organizing a modern assembly line to produce black and white TVs, they also had to prepare for color TV. Not long after black and white TV production started, Westinghouse engineers began to make good use of the New York test signals broadcast by RCA. In 1953, they produced some early prototype models. Then in March of 1954, Westinghouse was the first company to place a color TV set, Model H840CK15, on sale in 60 stores (see Fig. 18). Unfortunately for Westinghouse, potential customers were aware that color programming in 1954 averaged only about an hour per week. Also, due to the high initial price of $ 1,295 and the small 15" screen, sales were disappointing. Only 30 sets were sold in the first month, and a price reduction in April to $1,100 did not help. RCA kept the price of its CT 100 color set under $1,000, and with its larger production and distribution of televisions, RCA is most often credited as having sold the first color TVs. In all, Westinghouse produced about 500 of these color sets and it is believed many went unsold. Fewer than 20 of these TVs are known to survive today.[36] The company stopped color TV production until the market was ready, but monochrome TV sales were

booming. As the 1950s progressed, TV prices dropped and a second wave of sales came in as portable TVs were introduced (see Fig. 19), and families began buy a second set. When color TV prices dropped and programming

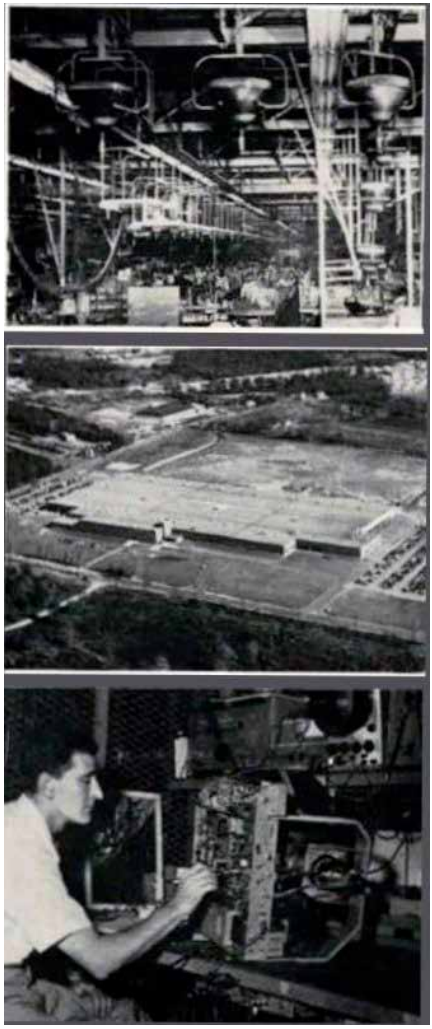

Fig. 17. The "Miracle Mile" Assembly Line at the Westinghouse Metuchen plant (top), Westinghouse plant at Metuchen (middle), and final inspection station (bottom). (*Music Trade Review*, Nov. 1953, p. 22)

Fig. 17. is 151 ppi.

Fig. 18. Westinghouse was the first to place a color TV on the market, namely this Model H840CK15. (Author's collection)

Fig. 19. Westinghouse Portable TV model H14T172. (Author's collection)

increased, Westinghouse restarted color TV production.

The announcement of the 1966 television models included another innovation from Westinghouse—the introduction of "instant-on" television. Vacuum tube warm up time was reduced to a few seconds by applying a small heater current whenever the TV was plugged into power line. Other industry-wide color TV improvements were announced, including 40% brighter pictures. Production was strong enough that on January 28, 1954, the new division manager, T. J. Newcomb, announced that Westinghouse would start a one-million dollar expansion, including a 150,000 sq. ft. warehouse.[37]

Westinghouse was also an early leader in the production of transistor radios. Their first transistor models were introduced in 1957 with model numbers starting with H-587 and extending up to the H-900s. The earliest models, like the H-622 made in 1957, exhibited the characteristics of many early transistor sets (see Fig. 20). A large case was required to house many of the components that were only minimally modified from those used in portable tube model design. Early hand-populated and soldered printed circuit boards are common in these models. One unusual characteristic in Westinghouse sets was the use of their own brand of transistors (see Fig. 21). As time passed, other related products were introduced, including walkie-talkies, small phonographs, and tape recorders. While the transistors were labeled with the Metuchen tag, construction techniques made domestic production seem unlikely. Later, when the tags were labeled Portable Product Division, the products were clearly imported.

Fig. 20. Westinghouse Transistor Radio model H622P6. (Author's collection)

Fig. 21. Westinghouse transistor mounted on a chassis. (Author's collection)

Westinghouse: The Final Chapter

In a 1912 speech, George Westinghouse stated: "Unquestionably, the history of Westinghouse Electric is one of tremendous achievement. Even in so brief a time, there is abundant evidence of the breadth and depth of contributions made by the company to the nation and the world. All of us in the Westinghouse family—no matter what our span of service—can be proud of these achievements."[38] Indeed, by the 1970s, Westinghouse was a big company with a multitude of products. During the 1970s, the Westinghouse Corporation was represented at an International Exposition in Saudi Arabia where they displayed over 1,000 products from 100 divisions. By 1984 Westinghouse had 150,000 employees and an annual income of over $10.2 billion. At that time, the Westinghouse Radio and Television Division was a small part of a big conglomerate. The Radio and Television Division reported to corporate headquarters through three separate major organizations (see Fig. 22).[39] The future of this division would be driven more by the fortunes of the company at large rather than by the performance of the division itself.[40]

Many different Westinghouse divisions were world leaders that pioneering in many fields with manufacturing products as diverse as radar and defense systems, U.S. land-based nuclear power

Fig. 22. Assorted Westinghouse ID tags. (Author's collection)

plants, and the first nuclear power plant for submarines. They also built the radar systems that helped the Gemini 6 and Gemini 7 spacecraft dock in orbit and the TV cameras that Apollo astronauts used on the Moon. There were still more divisions with products as diverse as office furniture to power plants and light bulbs to financial services. Unfortunately, some of these divisions proved to be a huge financial drain. The first big loss came when company contracts to supply fuel to Westinghouse-built nuclear power stations sustained huge cost overruns as the price of uranium skyrocketed. Many lawsuits were filed when Westinghouse could not deliver fuel at the contract price, which ultimately resulted in a two billion dollar loss. A second big loss came several years later when a dip in the economy caused the Financial Services Division to sustain three billion dollars in bad loans.

Neither was the Westinghouse Television and Radio Division itself

immune to price competition from foreign companies. During the late 1960s and early 1970s, the "Made in Japan" tag would appear more and more on Westinghouse products as the manufacturing of those goods in the United States was being phased out. An examination of TV listings by Sam's Photofact Service shows that the last TV diagram was published in the late 1960s. Curiously, in the 1970s many TV dealers had showrooms filled with televisions owned by Westinghouse but not made by Westinghouse. As the company had moved into financial services, they provided "floor plan financing" so that the TV dealer did not pay up front for the inventory. Instead, distributors were paid by Westinghouse Credit Corporation, and the TV dealer was paid by Westinghouse Credit Corp. for the products, plus interest, after they were sold from the store's stock.

Overall, the company had many manufacturing divisions. But in the 1990s, management made a major change in direction. This new management brought in to rescue the company systematically sold off manufacturing concerns and bought up media companies. An article in the November 27, 1997 issue of the *Economist* entitled "Westinghouse RIP" posed the question, "Why would a company that enjoyed a century of success in manufacturing make a complete change to media and broadcasting?" There was no clear answer, but it was noted that Group W, the Westinghouse broadcasting division, had the company's highest profit margin of 40%. From 1994 to 1997, Westinghouse Corporation would sell $9.52 billion in manufacturing companies and spend $15.75 billion to buy media companies. Ultimately, Westinghouse would buy the Columbia Broadcasting System (CBS) and, on completion of the deal, change the company name from Westinghouse to CBS. As a result the 111-year-old Westinghouse Corporation and its WX stock symbol disappeared.[41]

Afterword

While the Westinghouse Corporation was a huge concern, the radio part of this business was actually a small fraction of the business. Over the years it was shuffled between divisions at various locations around the country (see Tables 10 and 11). Westinghouse nametags, many of which are shown in Fig. 23, bear witness to a number of divisions and companies of Westinghouse listed in Table 9 that manufactured radios and television in many different locations over the years.

The management at large, which was outside the purview of the radio divisions, made decisions that affected the profitability and performance of the consumer radio divisions. For example, they decided who manufactured what type of radios and televisions and how the business was financed. In the end, foreign competition and a management philosophy that focused on businesses with a higher return would end the radio and TV business at Westinghouse forever.

Today, a company with the Westinghouse name is either a company that

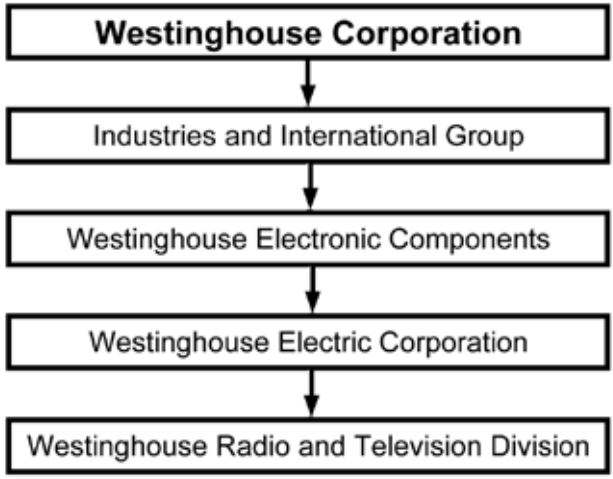

Fig. 23. Position of the Radio and Television Division in the corporate ladder in the 1970s.

Table 9. Product divisions that manufactured radios and televisions.

Dates	Divisions and Locations of Radio and Television Manufacturing
1920 to 1921	Westinghouse Electric & Manufacturing Co., E. Pittsburgh, PA
1921 to 1929	Westinghouse Home Radio Products Dept., E. Springfield, MA
1930 to 1935	Production outsourced: RCA Victor Company, Camden, NJ
1935 to 1942	Production outsourced: Emerson, Bosch, Detrola, RCA, et al.
1942 to 1945	No production of consumer products during WWII
1945	Parent becomes Westinghouse Electric Corp.
1946 to 1952	Home Radio Products Division, Sunbury, PA
1953 to 1954	Television and Radio Products Division, Sunbury, PA
1954 to 1974	Television and Radio Division, Metuchen, NJ Name change in July 1967: Portable Products Division, Edison, NJ
1975	Sold to White Consolidated Industries, becomes White-Westinghouse

Table 10. Commercial and government radio divisions. (Complied from Barron's)

Dates	Commercial and Government Radio Divisions
1912 to 1915	Experimental Radio Section (no production)
1915 to 1918	Westinghouse Radio Engineering Section, Pittsburgh, PA
1918 to 1920	Westinghouse Newark Works, Newark, NJ
1920 to 1927	Radio Engineering Dept., East Pittsburgh, PA
1920 to 1925	Government and Commercial Radio Products Division, East Pittsburgh, PA
1925 to 1938	Government and Commercial Radio Products Division, Chicopee Falls, MA
1927 to 1938	Radio Division (formerly Radio Engineering Dept.), Chicopee Falls, MA
1938 to 1945	Radio Division, Baltimore, MD
1945 to 1946	Radio Division, Sunbury, PA, becomes Home Radio Products
1946	Radio Division, Baltimore, MD, becomes Industrial Electronics Division

was bought from the original Westinghouse or a name licensed from CBS to exploit the name recognition of Westinghouse. Even that name recognition is fading over time. For example, while I was researching this article, a call to the library in Sunbury, PA, required an explanation of who and what Westinghouse was and a request to spell the name.

The brick and mortar part of Westinghouse is also disappearing. Buildings that constituted the Metuchen plant, the last Westinghouse consumer electronics manufacturing facility, were used by other companies for many years, and in 2016 the facility was torn down to construct a huge warehouse complex. The bricks making up the buildings were actually ground up on site to create a fill material around the foundation. With the help of a friend, I was able to rescue two bricks, now the last surviving fossils of this last facility for consumer electronics produced by the Westinghouse Electric Corporation.

Endnotes

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About the Author

Mike Molnar started Diagnostic Services Inc. in 1983, and it still keeps him busy building nuclear medicine gamma cameras for veterinary clinics. Thanks to Pam, his understanding wife, Mike also finds time for the care and feeding of a 40-year collection of electronic fossils. This year, with the help of his assistant Lila, two bricks from the last Westinghouse consumer electronics plant joined the other fossils.

Mike Molnar