

Carrier-Current equipment is employed in connection with regular talk at the same time over the same wires. In the illustration telephone line; over which the four conversations are sent interfere with each other. They are received through separate telephone

"Wired Radio" and

By M. L.

"Wired-Radio" or Carrier-Current-Telephony the present time and have reached a point of quite possible that these systems will be used



DURING the last few years communication engineers have made considerable headway in the development of "carrier-current telephony systems," better known under the more popular name of "wired radio." Very little information relative to these systems has been published in radio and electrical periodicals catered to by the radio fan; probably for the reason that no great interest has been shown. Evidently the whole matter sounds too commonplace to the average person and offers no more novelty than the house telephone.

Had the first strains of music been broadcast to the general public over electric-light wires, instead of "through the air," the reaction might not have been great enough to put in motion a wave of popularity such as "space radio" has been favored with.

Homo sapiens invariably finds romance in mystery; it is one of those psychological manifestations which has remained within us from the time in the not-so-remote past when little was known of natural effects.

And what smacks more of the unknown than radio? Music and voices speeding through space at an unbelievable rate, to be caught by wire nets on house-tops and released again through a horn. Yes; it appeals very much to one's imagination. But "wired radio" does not seem at all unusual. We are so used to things operated by electricity, fed to them by wires, that "wired radio" appears too much like the matter-of-fact manner in which water is piped to a house.

Yet, have you known that something quite marvelous takes place in wired radio systems, something far more interesting and unusual than the mere flow of water through a pipe or electric light current through wires? Imagine, if you can, two wires supplying electric light current to your house and at the same time carrying three different musical programs without the slightest mixing or interference of the four currents. Yet all four travel in the same two wires. Let us see just how this is accomplished.

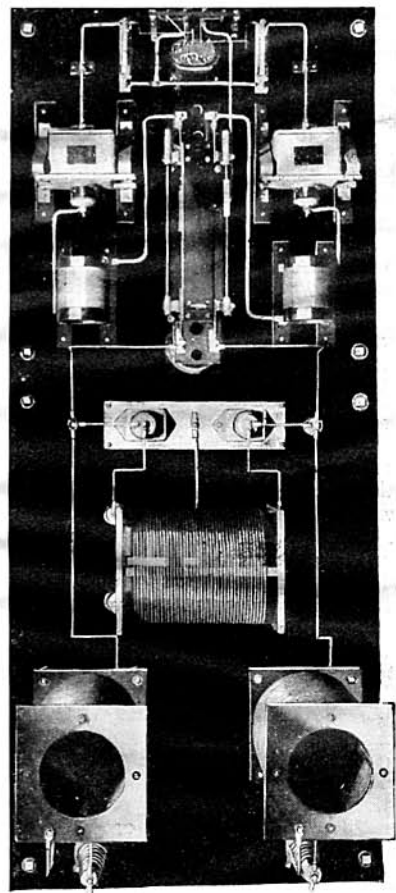


Fig. 3. A coupling and protection panel, which connects the carrier equipment with the power transmission lines.

WHAT WIRED RADIO IS

"Wired radio" refers to the use of radio-frequency currents, just the same as employed in radio broadcasting, in telegraph, telephone, electric light or power lines. The workability of the system depends on the fact that electric currents having dissimilar periods of vibration or frequency do not intermingle or interfere with each other. Consequently it is possible to superimpose a great number of currents of differing frequency on the same set of wires, without the possibility of any difficulties arising from "mixing." This being the line of practicability, we can go a step further and superimpose music or voice vibrations on ("modulate") each distinct radio-frequency current, and let them all go their way along the electric light, telegraph or telephone wires without any cause for worry. It is just as if we

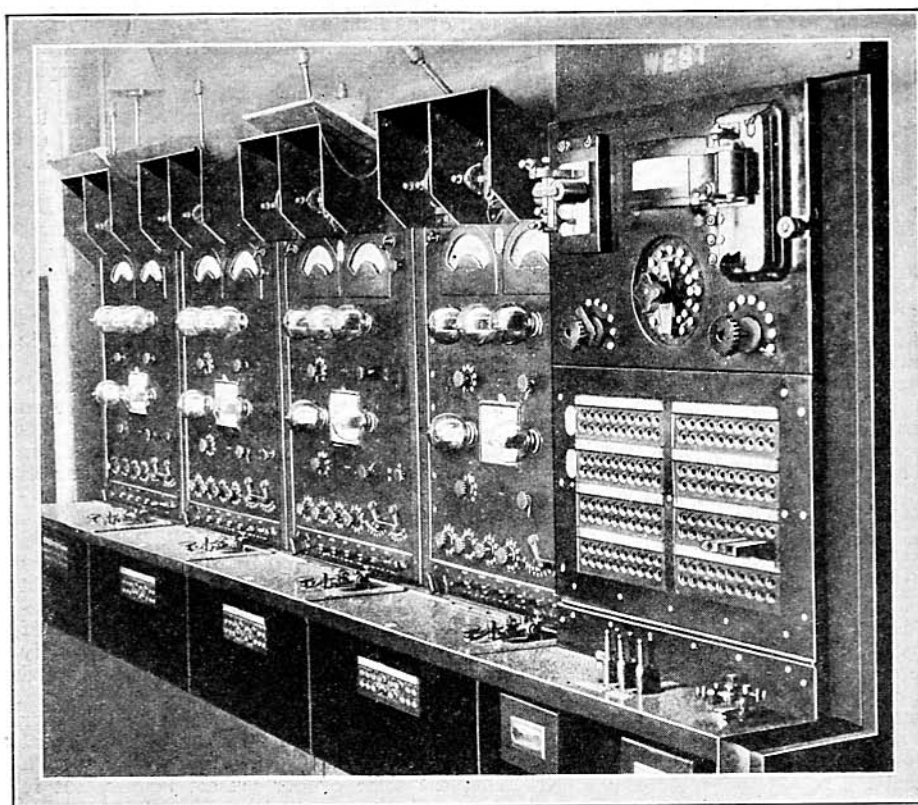
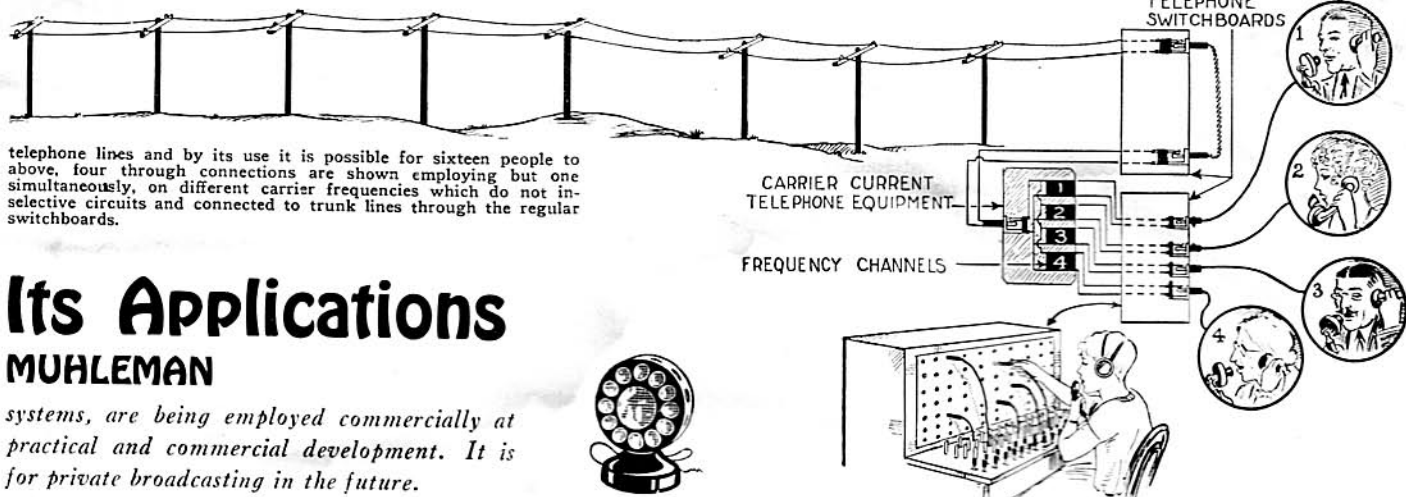


Fig. 5. A Carrier-Current Telegraph installation, including a test panel, and four panels for both sending and receiving.

(Photos courtesy of Western Electric Company)



Its Applications MUHLEMAN

systems, are being employed commercially at practical and commercial development. It is for private broadcasting in the future.



Fig. 4 A Carrier-Current Telephone panel unit, for use in connection with high-voltage power-transmission lines.

collected the transmissions from say three broadcast stations operating on different wavelengths and bid them go by way of wire instead of spreading out in space.

WIRED RADIO BROADCASTING

Though the use of carrier-current telephony for long-distance communication over light power lines and telephone wires dates back many years, the use of the system for broadcasting entertainment was instituted for the first time but four years ago in and about Washington, D. C., and Cleveland, Ohio. In the early part of 1923 experimental operations were transferred to Staten Island, New York, where it was possible to serve some 25,000 people through the feeder lines of a single central power station. Though this unique service was discontinued a short time thereafter, it was reported that the public's reaction to the service was con-

sidered favorable. The idea, as instituted, called for the rental of special receiving sets which could be plugged directly into any electric light socket. The power company's customers were to be charged from two to four dollars a month and, in turn, they were to be provided with the best of programs from the studios located at the central power station.

Though there has been a great deal of skepticism aired whenever one has been so rash as to suggest that some day wired radio would supplant space radio, the question remains speculative. However, carrier-current telephony and telegraphy is being employed at the present time, on a commercial basis, and has met with complete success. It is through this commercial application that the system may, in the future be employed with equal success from all standpoints, to furnish entertainment to the public. When one considers the fact that the nature of carrier-current telephony systems is such that they are no more susceptible to interference and

distortion than are space radio systems, it can be assumed that it may be favored by the public in the future when the time is more ripe for its introduction.

THE "WIRED RADIO" RECEIVER

The developed system heretofore mentioned, which was put into operation on Staten Island, allowed for the simultaneous transmission of three programs over the electric light wires; although only two programs were transmitted when the station was first opened. The receiver provided the subscribers allowed them to select either program at will. It essentially consisted of a cord and plug to attach it to the 110-volt light socket, coupling coils similar in design to present-day tuned-radio-frequency transformers, a variable condenser for selecting the desired program, a crystal detector for rectifying the modulated radio-frequency currents, and a two-stage vacuum-tube audio-frequency-amplifier to provide sufficient

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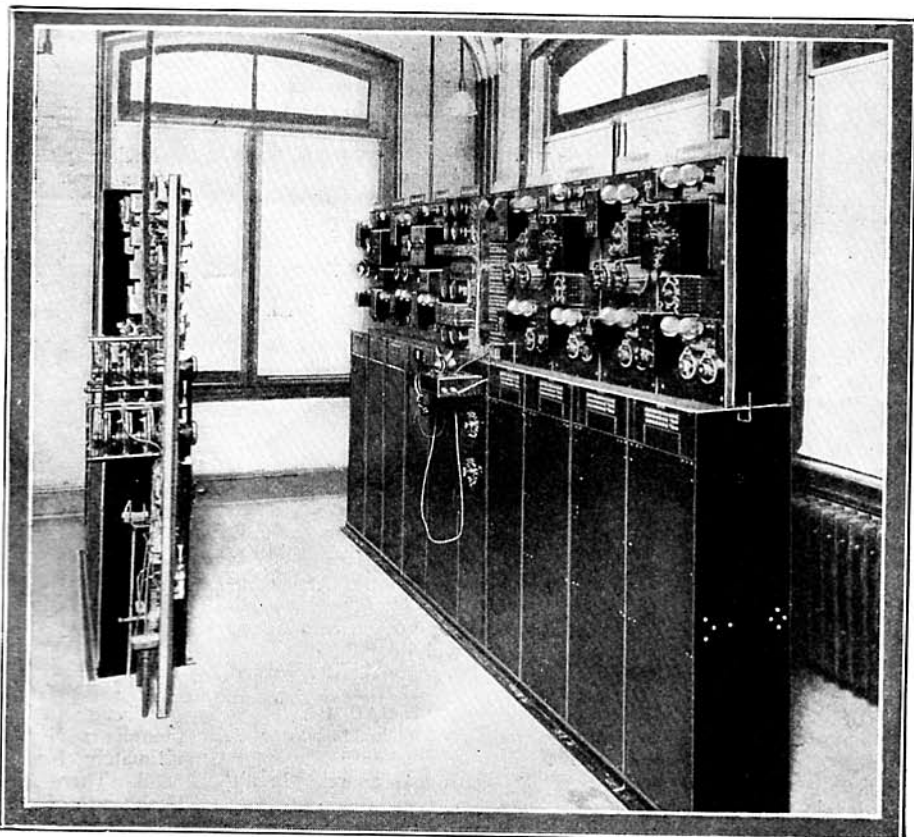


Fig. 6. A Carrier-Current Telephone installation with four sending and four receiving panels, one testing panel, and a voice-frequency panel.

PLEASE NOTE: THE MAGAZINE FROM WHICH THIS WAS SCANNED CONTAINED NO PAGE
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BALLOONED UNIT SENDS REPORTS FOUR MILES UP

Washington.

Radio meteorographs are the newest devices for bringing down to earth information on atmospheric conditions high above the clouds. Several of these instruments have just been calibrated by the United States Weather Bureau and sent to Alaska for use in obtaining facts for the Second International Polar Year, which started August 1st.

A radio meteorograph consists of an automatic temperature and pressure recording device and a compact radio sending apparatus. It is attached to a balloon for release at any desired point.

Signals Transmitted

As the balloon rises the changes in barometric pressure and in temperature cause a metal finger to move across various contact points, thus transmitting radio signals. The observer on the ground below picks up these signals with a receiving set and, from calibrations of the instrument previously made, determines the corresponding temperatures and heights.

In thickly settled areas instruments that automatically record atmospheric changes on tracing paper are often sent up in balloons. Attached to a parachute and bearing a tag asking that they be returned to the nearest Weather Bureau station, they stand a good chance of being recovered.

In the uninhabited polar regions, however, they are not likely to be seen again. The radio meteorograph was, therefore, designed for use there.

Used Up to 4 Miles

Atmospheric records at all levels up to about 4 miles can be obtained by pilots in airplanes. To get records at higher levels, however, balloons are necessary. They go 10 miles or more up into the stratosphere before they burst.

Radio meteorographs are designed to promote that part of the polar year program which calls for a determination of the relationship between weather conditions in the polar regions and those in the lower latitudes. They will also help toward a better understanding of the general circulation of the atmosphere over the earth.

J. D. Rockefeller, Jr.,

Lauded for Radio City

"The people of the United States are better off than the people of any other country on earth," said M. H. Aylesworth, president of NBC, addressing two electrical associations in New York City. "We will recover from the depression; in fact, we are now on the way out, but I tell you there is nothing in existence as capable as the electrical industry to lead the world back to prosperity."

"Thank God for men like John D. Rockefeller, Jr., who in times of stress and want have the vision and courage to build things like Radio City. He believes this country is not ruined and that this industry is not ruined, so let us all announce to the world we have reached and passed the bottom of the depression and we will accomplish our objective all the sooner."

Patterson is Named NBC Vice-President

The appointment of Richard C. Patterson as executive vice-president of the National Broadcasting Company was announced by M. H. Aylesworth, president. Mr. Patterson resigned as Commissioner of Correction of New York City to accept the new post.

Mr. Aylesworth said:

"I have invited Commissioner Patterson to assume charge of the operation of the company."

"While I shall retain the active presidency my new duties as president of the Radio-Keith-Orpheum Corporation make it necessary for me to divide my time between the two organizations, and I have asked Vice-President McClelland of the National Broadcasting Company to become Assistant to the President of the National Broadcasting Company. Mr. McClelland has accepted his new responsibilities and will immediately assume his duties."

Mr. Patterson was appointed Commissioner of Correction of New York City, August 15th, 1927.

Mr. Patterson was administrative officer of the American Commission to Negotiate Peace at Paris in 1919. He is a Colonel of the Officers Reserve Corps, and has been president of the New York Military Intelligence Reserve Society.

NEW STATION SOON IN MEXICO

Washington.

XENT, Mexico, is about to take the air with 150,000 watts power, on 1,115 kc. It is a new station.

As the time approaches for the station to operate under Norman Baker, who operated KTMT, Muscatine, Iowa, before its removal from the air, broadcasters are hopeful that the impending chaos in the Southwest anticipated because of this high-powered station will be averted through an adjustment at the meeting of delegates at Madrid.

American broadcasters attending the international radio conference at Madrid are hopeful that the difficulties may be ironed out.

Agreement Sought

It is hoped that an agreement may be worked out so that stations in Mexico, Cuba and Canada will not interfere with American stations. The United States has no treaty agreement with Mexico to cover the interference expected from this new station which will operate on an unlimited schedule day and night.

The permit for construction was the largest ever issued by the Mexican Government. Built at a cost of \$225,000, construction is nearly finished. The 300-foot steel towers will withstand 75,000 pounds pressure.

Between WPG and WRVA

The towers have been completed at a cost of \$100,000. Its frequency of 1,115 kilocycles is in between WPG, Atlantic City, N. J., which operates on 1,100 kilocycles, and WRVA, Richmond, Va., on 1,100 kilocycles. It is believed that the broadcasts will interfere with both channels.

WICC JOINS COLUMBIA

WICC, Bridgeport, Conn., is the latest link to be added to the 90-station network of the Columbia Broadcasting System. The Bridgeport outlet, operating on a wavelength of 600 kilocycles, or 499.7 meters, was established in 1926. The station is licensed at 500 watts.

"WIRED RADIO" SEEKING NEW FOOTHOLD NOW

Washington.

Reports that "wired radio" will soon be introduced in America are becoming more persistent. The basic idea of the system was conceived by Major-General George O. Squier while he was chief of the United States Signal Corps, about the time that radio broadcasting was new. However, there has been little progress of the system as a service in this country for various reasons. Lack of capital of the sponsors, lack of interest on the part of the public in the face of space broadcasting, and patent and copyright difficulties, all have had an effect in preventing its commercial development.

In Europe the principle has been applied commercially with more success. About a year ago a British company started a service with an initial list of subscribers of 1,500, each paying 35 cents a week for service in addition to the regular government broadcast receiving fee of \$2.50. In Ghent, Belgium, is a system having 3,000 subscribers, and in Switzerland one of 2,000 subscribers.

170,000 in Holland

The largest number of subscribers of "wire radio" is in Holland, with a list containing 170,000 names.

In Europe the public telephone lines are usually employed as the carriers and the systems are frequently tied in with the space broadcasting programs. That is, the "wire radio" stations pick up the broadcast programs and relay them over the wires to the subscribers.

In the United States it is proposed to use the power lines as carriers and the system will be worked in competition with space broadcasters. In order to provide adequate service it is necessary for the sponsoring company first to acquire patent rights for devices used and then to obtain dependable sources of broadcast material. It is reported that Wired Radio, Inc., a subsidiary of the North American Company, has been acquiring patents and copyrights during the past years.

Question of Cost

The claimed advantages for "wired radio" is that it will be free of static and man-made electrical noise, as well as the nuisance of advertising. The handicap, which space radio officials point out, is that most homes now are equipped with radio receivers with which they can receive programs without cost, so that it is not likely that many will pay from \$2 to \$5 monthly for the new service even if it is free of advertising.

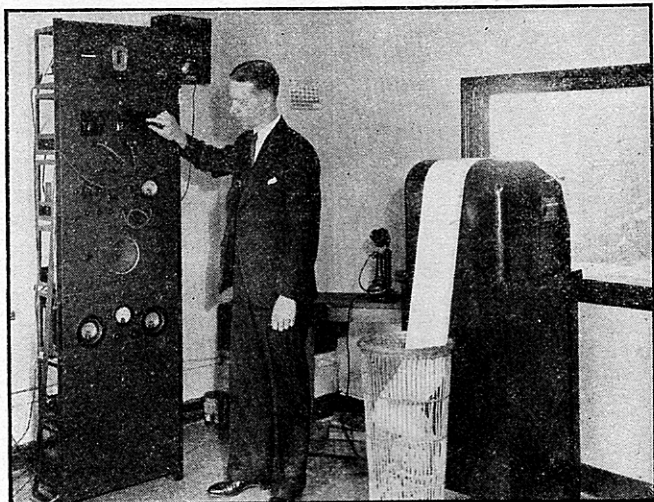
Experiments with "wired radio" over power lines have been conducted quietly in Cleveland since 1929 and already considerable money has been expended in its development.

Inexpensive Set Analyzer

This device, using the Accessor and a meter switch besides, also including oscillator and a-c measurements, will be described next week, issue of October 22d.

SHORT-WAVE CLUB

Wilbert L. Clark, 833 West Greenfield Ave., Milwaukee, Wis.



SPORTS AND NEWS EVENTS BROADCAST OVER THE LAND WIRES

News services for use by commercial clients only are now transmitted from a small studio over the telephone wires by means of the set-up shown above by a number of systems. The studio at the left is that of Ticker News which furnishes such programs to restaurants and hotels through the telephone wires, by means of the amplifying and switching panel shown on the right. Music is by electrical transcription.

The Growing Use of WIRED RADIO for Restaurants, Hotels and Night Clubs

WIRED program services have been coming into the limelight during the past few months. But despite the apparent strides made by the wired audio or wired radio companies, the respective services are either highly specialized or still experimental so that no direct competition to established radio broadcasting and receiving has been noticed in those sections of the country where such methods of "directed" programs are offered.

AT the time of this writing, New York City is witnessing the enlarged activities of three wired services. One of these—*Wired Music*—has been functioning since 1931, while the remaining two—*Ticker News Service* and *Teleflash*—are new in the field. It is interesting to note that all three of the New York services are offered solely to commercial subscribers, chiefly hotels and restaurants.

Utilize Telephone Lines

The three wired program services utilize leased lines of the New York Telephone Company to route the programs to subscribers. These, it was pointed out, are not ordinary voice wires, but are special cables with booster equipment to accommodate the wider ranges of musical renditions—instrumental and vocal.

Ticker News Service and *Teleflash* are, primarily, news services, offering speedy bulletins of sports results. Although the programs do not travel via the air waves, the radio influence is prominently applied to technique and

By Merle Cummings

to the pick-up and amplifiers employed.

The *Ticker News Service*, according to a representative, was originally designed to supply stock-market quotations via the familiar old telegraphic tape printers. Now, the tickers have

"WIRED" SPORTS NEWS

Scene on the opening night of the Teleflash sport news service in Jack Dempsey's Restaurant in New York City. That the service is proving popular is evidenced by the nightly crowds frequenting the bar which is equipped with loudspeakers

been replaced with loudspeakers—small units with an "on-off" switch and volume control. An obvious advantage of loudspeakers to tickers for spots where large crowds assemble is that the messages can be heard by the entire group while just a few can crowd around reading distance of ticker tape. This firm, according to its spokesman, considers itself an "audible newspaper." It is on the air twelve consecutive hours each day, supplying such things as major league baseball scores, racing results from tracks, blow-by-blow accounts of important boxing matches, etc. General news items and stock quotations also have their place in the day's program schedule. The firm, (Turn to page 432)





These are the tubes that service men can recommend, sell and guarantee with confidence.

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WESTON

Radio Instruments

Wired Radio

(Continued from page 394)

the writer was informed, receives complete international and Universal press dispatches and, in addition, uses its own reporters at some events.

Studios of *Ticker News* are located atop a New York office building. A monk's cloth draped room serves as the main studio. Its chief furnishings are a crystal microphone, a desk to accommodate an announcer and telegrapher, and some chairs. There's no piano because all the music used at intervals comes from electrical transcriptions played on turntables in the adjoining control room.

The control room, visible from the studio through the broadcasting type of double-plate glass window, includes a panel for volume adjustment, as well as switching equipment linking the studio with the various subscribers, via the telephone company's facilities.

Teleflash, an associated company of the New York *Morning Telegraph*, functions in quite a similar manner. The *Teleflash* headquarters are on Fifth Avenue, while studios are on West Twenty-sixth Street. Sport news is the chief program subject and music is used as fill-in material. While the system is available chiefly to commercial spots such as hotels, restaurants, etc., we were told that no definite limiting of its scope was decided on. *Teleflash* has a 14-hour program day, starting operations at 10 a.m., continuing until midnight. An executive stated that the program content averages 80 percent of sports material, and he termed his service a "talking newspaper."

As mentioned in a prior paragraph, *Ticker News Service* used the term "audible newspaper." These two designations indicate that the two firms intend adhering to the news field—rather than a general entertainment sphere.

Wired services are already branching out to other cities. *Ticker News* has established similar set-ups in the Boston and Philadelphia areas while *Teleflash* is branching out in the Baltimore and Chicago areas, the writer was informed. *Teleflash* expects about eight or nine more cities to be included in its wired program area. In both firms' instances, it is believed that, while some single circuits linking the cities may be employed, local cut-ins will have to be provided for sport news of strictly locality importance.

Teleflash, according to an executive, uses Western Electric equipment "generally" in transmission and reception. *Ticker News* informed the writer that its own equipment is used in the New York area, Bell apparatus in Boston, and Philco in Philadelphia.

Wired Music is usually accredited with being the pioneer New York wired program service. It has its studios and transmission equipment in a West Forty-second Street hotel. As its name implies, its service is strictly musical, no vocal announcements of any kind being given. The firm was organized to provide sound entertainment over loudspeakers as a substitute for individual talent at each subscriber's establishment. Live talent, we were told, is used while transcriptions are added as occasional filler.

The latter firm, according to a representative, endeavors to supply "all the properties of an orchestra, except physical ones" to subscribers. Inasmuch as hotels and restaurants form the bulk of trade, the music is timed for dining hours. The day starts with luncheon music, resumes with cocktail hour selections and continues through the evening with dinner and dance music, all compositions being selected ac-

cording to the clock. After ten o'clock, the programs are solidly dance music.

A novel part of the *Wired Music* service is that the timing of selections is almost identical to that of average metropolitan restaurant entertainment. For example, after a few selections, there is a period of silence. This program gap simulates the intervals in the dining spots when the players leave the bandstand for a smoke and rest. Such gaps are controlled at the *Wired Music* studios, the loudspeaker units being left turned on continuously at subscribers' outlets.

A representative of the firm said that the equipment used in transmission and reception was entirely of its own design.

Out in Cleveland, the *Wired Radio*—"Muzak"—subsidiary of the North American Company, has been functioning experimentally over a long period. It was understood that, after a long test in the Lakewood area, sets—supposedly of Philco manufacture—were being commercially installed and regular program service begun. However, at the New York office of the North American Company, its representative asserted that everything was still in the experimental stage and that the firm, not desirous of publicity at the time of the writer's query could neither confirm nor deny anything.

It is understood, though, that a choice of three simultaneous programs is offered in the Cleveland set-up. The *Wired Radio* service differs from the other "directed" program methods mentioned in this article in the fact that the entertainment is conveyed by radio frequency over power lines. Transcriptions are reported to be used virtually exclusive to live talent. Also, it is said that the special transcriptions made by this firm are now being offered to some standard broadcast stations. The absence of commercial announcements on the Muzak programs in Cleveland is apparently the only chief change from radio program formula.

The "directed" program services, while opening up new fields for experienced radio talent and technicians, has not yet directly duplicated the offerings of the broadcasting world. It is probable that the "directed" sound transmissions will continue as an entirely distinct group, related to radio only in matters of talent and equipment.

The Masterpiece IV

(Continued from page 395)

means of the treble and bass tone controls, both of which are highly effective.

Tuning the receiver is extremely simple on all ranges. As an example a check-up showed that tuning through the 25 meter broadcast band caused the "second" hand to move over 42 divisions on the dial. This band is only 290 kilocycles wide which means that the "second" hand moved approximately 1½ dial divisions for each 10 kilocycles. This "second" hand can be accurately logged and any short-wave station will come in again at the same setting. On the 30 meter band the spreading effect is almost identical and on the 49 meter band it increases to approximately 2 divisions per 10 kilocycles. For the 16 and 19 meter bands the spread is exactly 10 kilocycles per division. In the 20 meter band the spread is a little better and in the 75 meter ham phone band it is almost 4 divisions for each 10 kilocycles.

To add to the ease of control the "main hand" moves over accurately calibrated frequency scales—so accurate that the receiver can be visually tuned to any of the short-wave or amateur bands—simply depending upon the dial calibration.

The tuning meter is an extremely useful tuning and DX accessory. It is provided with a 30 division scale and deflection noted for a few stations at various distances from New York are as follows: KFI, 2; KOA, 7; WWL, 7; WBAP, 8; WCCO, 9; WHAS, 10; KDKA, 12; WBBM, 13; WLW, 15; WFAF, 15; and WABC, 18. Because of the excellent operation of this meter it serves not only the usual purpose of indicating resonance, but also as a dependable signal-strength meter which can be used to check the relative strength of distant stations.