IN THE WORLD OF RADIO

Two Features in Radio Program

Use of Short Waves and Wire Interconnction of Importance.

By JUDGE S. B. DAVIS

In radio development during the last year two factors are outstanding—the use of the short waves and wire interconnection of stations. Both are of great importance. The short wave has found its place in commercial and amateur transoceanic communication and in transmission for rebroadcasting both at home and to places across the seas. In domestic use it is a rival of wire interconnection, both being a means to the same end, the furnishing of simultaneous programs to several stations.

I consider interconnection, in whichever mode effected, almost essential to the future of broadcasting, if we are to look at radio as a means of service to all our people all the time. It ultimately means national programs, nation-wide utterances, more valuable subject matter and that great happenings in which our people have so vital an interest will be made available to everybody. To give them an immediate touch with national and world happenings must result in better citizenship.

We have already seen examples of nation-wide communication in the simultaneous broadcasting on several occasions by stations from the Atlantic to the Pacific, and it is now a nightly practice within extensive areas. All this has happened in the last year. It is transforming broadcasting from a local to a national service, and this not by way of detriment to the local stations, which are the backbone of the system, but as an advantage to them.

Interconnection, with its corrallary of national service, is only just beginning. It will go much further. Its development, together with some general rise in the power level of stations for the overcoming of static and interference, giving us really useful reception, will I believe be the principal improvements in the immediate future.

I look for remarkable development along these lines for the good of broadcasting, which means for the benefit of the listener, during the coming year.

Radio Consumes Leisure Hours

Modern Inventions Have Given Man More Time for Diversions.

What shall we do with our leisure time?

To many busy men and to large numbers of women engrossed in the cares of home or of social interests this question may not at first appeal.

Yet the busiest men and women have more leisure than they realize. Labor-saving machinery, shorter hours of labor, quicker means of transportation, the increased number of holidays, and the growth of the annual vacation habit have helped increase the number of hours left over from the job of making a living.

Survey Planned.

The whole question of utilization of leisure has again been brought to widespread discussion by the recent announcement of the Carnegie corporation that it will make a thorough survey, in order to determine how the public can best use its leisure. In making the study they will enlist organizations, educators, artists and scientists in an effort to point the way to cultural improvement.

Without anticipating the conclusions of these spare time researchers, it is safe to say that radio as one solution of the problem will be offered. Radio, even in the short period of popularity which it has had, has done more to provide pleasant, profitable and sane use of leisure than any other utility that has appeared in many generations.

Radio Popularity Gains.

"Absence of occupation is not rest: a mind quite vacant is a mind distressed," is still true. Radio as a new agency for the employment of leisure has much to commend it, both for real enjoyment and for its permanent contributions to personal growth and happiness.

"Its popularity is indicated by the fact that the number of radio sets in use in this country today numbers between 2,000,000 and 3,000,000, and is increasing constantly.

Furthermore, radio has proved a double-barreled time killer, since they not only enjoy listening to radio broadcasting but have had an equal amount of pleasure in building their own receiving sets. For example, approximately 100,000 persons have made for themselves sets of the well-known Acme Reflex type. A popular booklet, "Amplification Without Distortion," has led thousands of men and boys, and not a few women, to construct their own sets.

The possibilities of radio in providing popular entertainment, mental and spiritual refreshment and in broadening the outlook of the average man and woman on life, are only beginning to be realized.

The new art is so wholesome, so democratic and universal in its appeal, and so susceptible of further development as a resource of culture, education and diversion, that it may well receive the thoughtful attention of those who are trying to help humanity enjoy and improve itself.

Year's Progress in Reflex Circuits

By VICTOR GREIF, E. E., I. R. E.

Of one development during the year there is no doubt—reflex circuits have come to stay. For a time it seemed that this interesting class of circuits was just a playground for experimenters and amateurs, but the past year's developments, seasoned by a summer in the laboratory, indoor and out, have proven up to all the demands.

Since many amateurs have had good, results with reflex circuits, and some have had just the reverse, so that "some swear by them and others at them," as the saying goes, it will be necessary to describe the classes of "reflexes" and show how the best in them has gradually been developed.

A reflex circuit, as is well known, is one in which one or more of the tubes are used for both radio frequency and audio frequency amplification, thus giving greater power for each tube used.

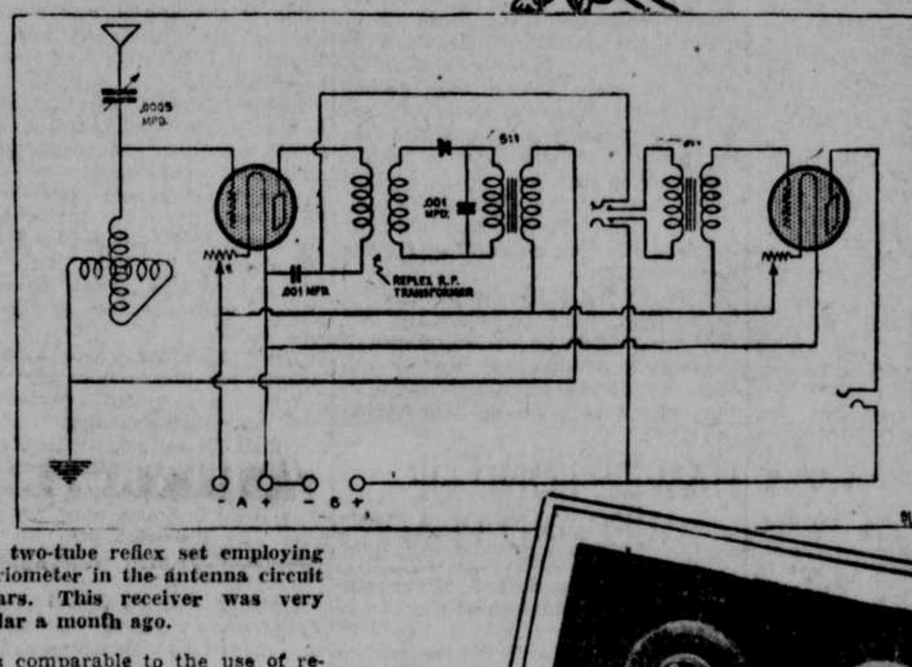
In crystal reflexes the signal after radio amplification is put through a transformer into a crystal rectifier and becomes an audio or sound current, and is further amplified.

The use of a crystal has very important advantages:

1. It avoids the use of a detector tube with grid leak and condenser, the most uncertain factor in radio, which is usually the seat of tone distortion, and replaces it by an element which in its nature must give perfect tone. Every one who has used a crystal set knows it does this in practice as well as theory.

Reflex Circuits, Step by Step.

2. The tube which would be needed as detector can be used twice, as R. F. and audio amplifier and act far more efficiently. This gain in efficiency is comparable to the use of regeneration.



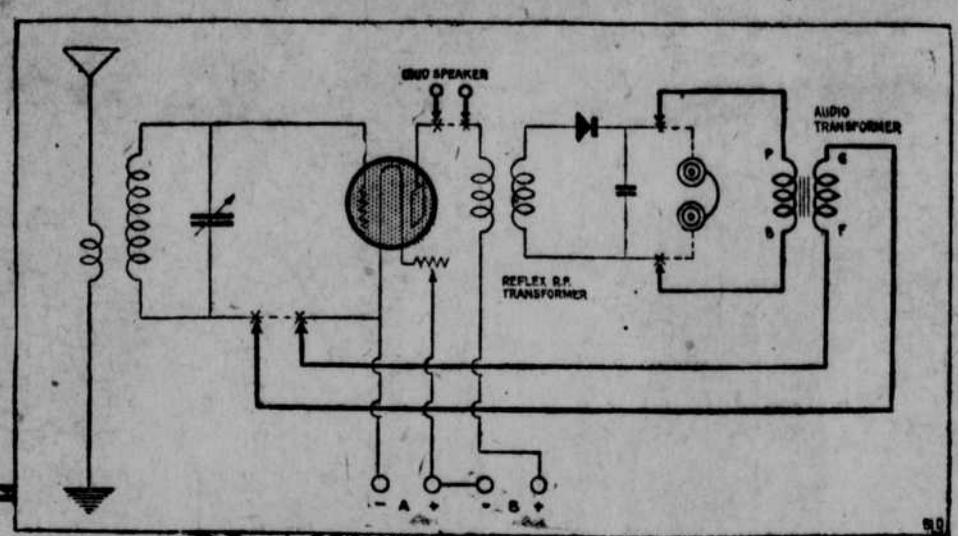
How a two-tube reflex set employing a variometer in the antenna circuit appears. This receiver was very popular a month ago.

The diagrams of reflex circuits are very difficult to trace and to read until one gets the "hang" of them. This may be accomplished very quickly by breaking them up by the step-by-step method.

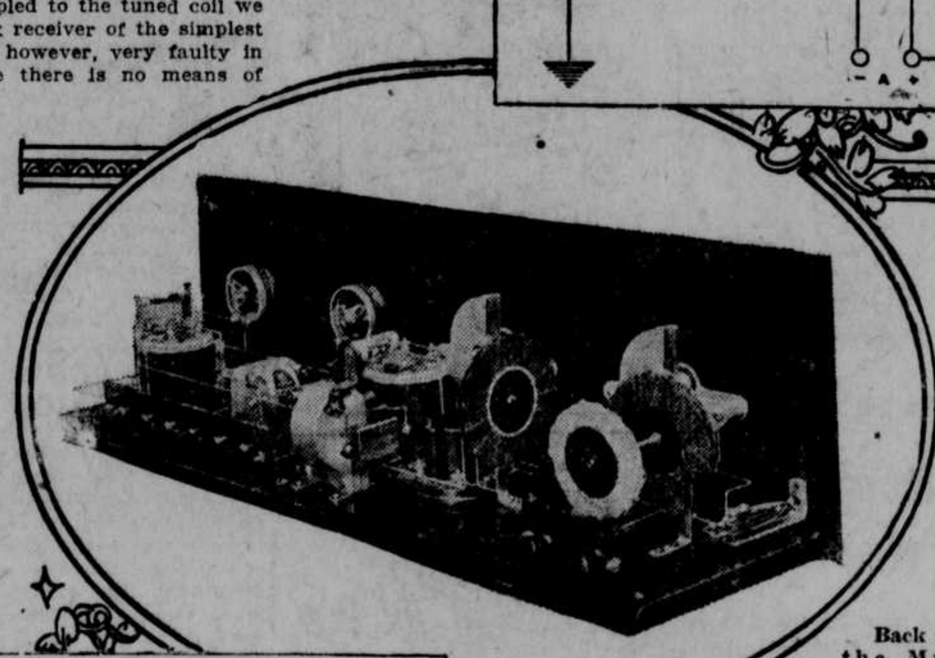
It will be seen by figure 1 that a standard reflexed tube is developed from one stage of radio frequency amplification and a crystal detector. This is shown with a headset to receive the audio signal. It will be seen that this headset has no connection with the tube circuits except through the coupling in the reflex transformer. There is no difficulty therefore in substituting the primary of an audio transformer for the headset at M and cutting the grid return wire at N and introducing the audio secondary.

Following this operation will make it plain how the signal after conversion to sound in the crystal is stepped up in the audio transformer and again amplified in the tube, coming out finally at O.

This diagram shows the basic principle of the reflex circuit. If an antenna is coupled to the tuned coil we have a reflex receiver of the simplest type. It is, however, very faulty in design, since there is no means of control, and while many such receivers have been built by amateur, it is a matter of luck whether they work or not. If the crystal happens to match the circuit it will work, if not the efficiency is low.



A standard single tube reflex circuit, using the tube for one stage of audio and radio frequency combined with the crystal serving as a detector.



Back panel view of the Multiflex, a commercial application of the four-tube reflex, which is equivalent in output to a six or seven-tube receiver.

A circuit which is typical of the reflexes of a year ago is shown below. This uses a variometer and a condenser in a single circuit hookup. There is one reflex tube and one straight audio. While rather difficult to control, when built with proper parts this circuit has proven a good distance getter and operates a loud speaker well.

It will be remembered that on the first evening of the transatlantic tests a delighted fan telephoned WGBS from Lakewood, N. J., and proudly reported his log of the Aberdeen broadcast received on one of these two-tube sets. Those who know him say he is still quite puffed up about having his achievement broadcast to the world.

More than mere distance getting is expected of a set these days, however, and the real progress of the year in reflex circuits has been from these "two tubes" that were quite remarkable in their way, to a more highly finished set, one which will give a maximum of entertainment value. For this it is necessary to have:

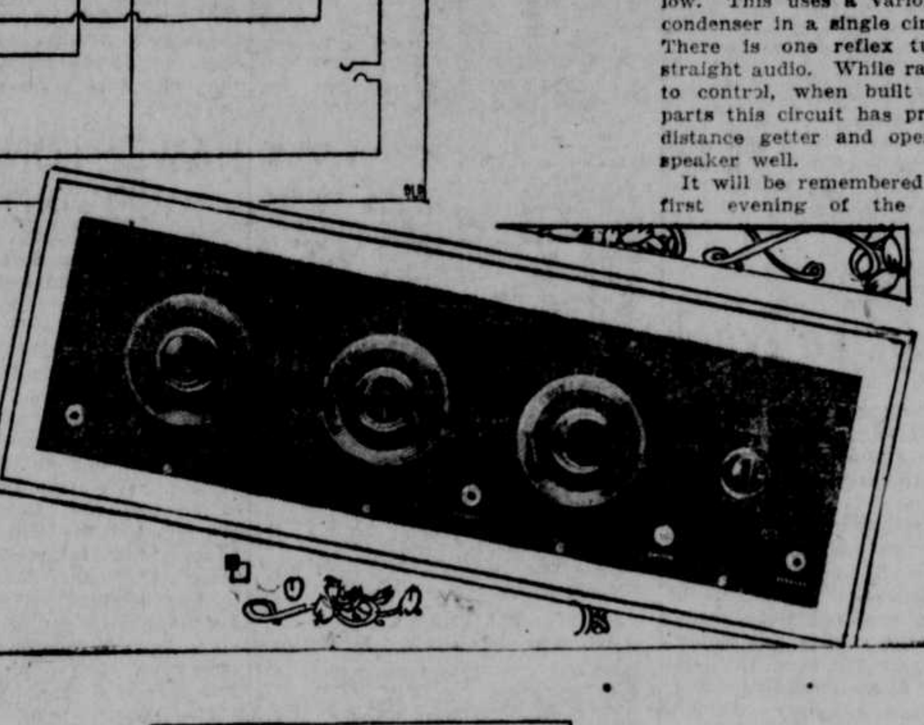
1. Ease of tuning, fixed reading and not too many dials.
2. An absolutely "foolproof" reliable crystal.
3. An energy control to use the crystal to best advantage.
4. High selectivity.
5. Certainty and uniformity of results.
6. Sufficient sensitivity for loop operation and sure fine loud speaker volume under perfect control.

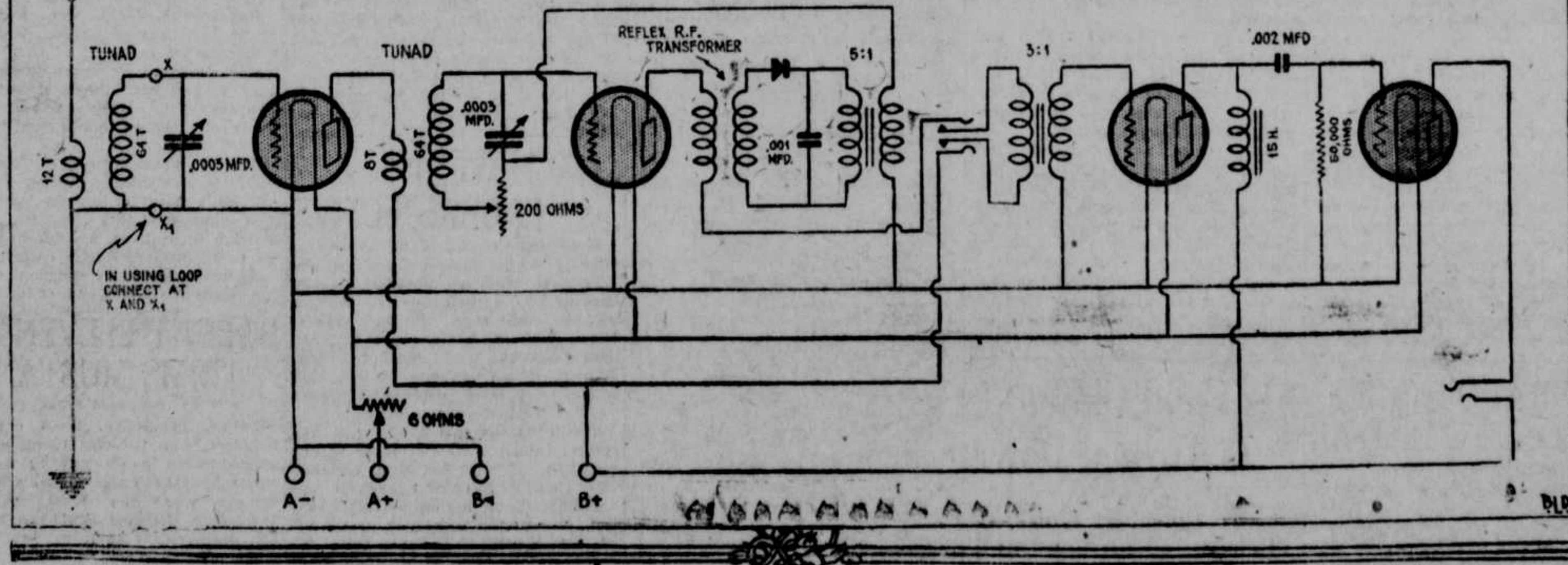
The first attempts to increase the number of tubes in the reflex were not very successful. It was difficult to get the circuits to work, as the principle of crystal control was not developed.

Finally a circuit was developed using the highly efficient, special reflex transformer used in previous work in combination with the type of highly efficient low-loss coils used in filter tuners and superheterodyne couplers.

This circuit was named the double selector multiflex, and had the following specifications:

1. As the name indicates, double selector tuning.
2. Two radio stages, crystal rectifier and three audio, the equivalent of six tubes, using four.
3. A special control of energy in the reflexed tube.
4. A last stage of very true toned, stable, reactance coupled audio amplification, giving the effect of a power amplifier. This is shown in the circuit diagram shown.





The latest development in reflexing, making four tubes do the duty of from six to seven, is shown schematically, for costructive purposes, directly above. A panel view of this set, completed, appears at the top of the diagram.

MIAMI HOTEL TO BROADCAST

A new broadcasting station, operating under the call letters WMBF, will be opened this winter by the Fleetwood hotel, Miami Beach, Fla., according to an announcement made by Jesse H. Jay, engineer in charge of installation and operation. The wave length will be 830 meters and the two-unit antenna, supported on needle towers, will have a capacity of 500 watts. The work of construction is now under way.

Tuning Is Vital for Harmony

Radio Novice Must Understand Why He Moves Dials.

To understand what he is doing when he moves the dials of his set to certain positions, the novice in the radio art must learn a little bit of the theory of tuning. To receive a desired station the receiver must be in "harmony" with the sending station. This function may be explained in a simple manner by considering the action of two violin strings exactly alike in key, length and tension, and strung side by side. If a bow is drawn across one of the strings, causing it to vibrate, the string which was not touched by the bow also begins to vibrate and send out sound waves. This happens because both strings are in "harmony" with each other, or are said to be "in tune" with each other.

Must Be in Tune.

Similarly in radio, a receiver must be in tune with the sending stations one desires to receive. The wave length, or vibration period, must be identical for both stations. For the most part the vibration period is governed by the effective length of the antenna. In the sending station the wave length is always the same—having a fixed value. But in the receiving set certain variable units are used which add to or deduct from the wave length of the antenna.

The dials of the set are attached to these variable units, and by moving the dials one way or the other the period of vibration or frequency of the set is changed at will.

The degree marks on the dials show the degree of variation in the units inside the set. They do not necessarily represent the wave lengths of broadcasting stations. The position of the dials for a certain station depends more or less on the antenna attached to the receiving set. With two different antennas, that is, of different lengths, the positions of the dials for a certain wave length will be different. It is because of this that it is impossible to know beforehand at what positions the dials are to be set for a certain station. It all depends on the antennas.

No Two Alike.

No two sets are alike. The dials on one set will have entirely different positions for a certain broadcasting station than those of another set even with the same antenna, because the values of the variable units are different for every set.

At the present stage of radio with any receiver there is only one method of tuning. After the set has been installed the owner must begin to hunt for the desired stations. Once he has located them he should "log" the positions of the dials for each station. After a week or two he will then be able to set his dial at the degree numbers which he has found will bring in the station he desires. But if he makes a change in the length of his antenna he will find that the positions of the dial for each station also will have changed.

With receivers that use a loop antenna, and thus may be carried around to different locations without a change of conditions, the listener even may mark down the different stations' call letters opposite the degree marks on which they are brought in. But until he learns by the "pick and hunt" method where the different stations are found, the receiver cannot be marked for the stations. Nobody several hundred miles away can tell him where to set his dials for any station. He must find the stations himself by searching for them.

Appreciation of Radio Is Growing

Change in Attitude of Public Is Noted by Secretary Hoover.

By HERBERT HOOVER.

The greatest development in broadcasting during the last year has not been in the application of new methods of transmission or reception, important as improvements in these lines have been. It is rather in the change in public attitude. Listeners are becoming more and more appreciative of the real service of radio and increasingly critical both as to the character of the matter furnished them and as to the efficiency with which it reaches them.

The whole broadcasting structure is built up on service to the listeners. They are beginning to realize their importance, to assert their interest and to voice their wishes. Broadcasting must be conducted to meet their demands and this necessarily means higher character in what is transmitted and better quality in its reproduction to the ears of the listener.

There is a growing realization on their part of the public responsibilities they assume in conducting an agency so greatly affecting the cultural progress of our people. The innovations of which we hear so much—national programs, wire interconnections, short wave rebroadcasting, increased power and wired radio, which are already playing so important a part and are destined to have still greater influence for good —are based entirely upon the necessity for meeting the growing popular requirment of better service. The demand will continue to increase, and new methods of efficiency will continue to be found to meet it. But beyond all, radio has begun to enrich American life by a real contribution to the home. It yet has far greater service to perform in this way and I believe the next year will see great and more definite advance in this direction.

Tuning Fork as Signal Measure

Errors Under This Method Are Between 5 and 10 Per Cent.

It is frequently important to measure the strength of received radio signals. Since the early days of radio rough measurements have been made by shunting the telephones with a resistance just large enough to leave the signal barely audible. A more accurate method of measuring the telephone current has now been developed at the bureau of standards, which is especially applicable to continuous wave signals with beat reception. In this the telephones are switched quickly from the receiving circuit to a local circuit in which a known alternating current from a 1,000-cycle tuning fork oscillator flows.

The amount of this current which passes through the telephones is regulated by a potentiometer. When the beat note of the signal is adjusted to 1,000 cycles and the strength of the local current adjusted so that the sound intensity in the telephones is the same in the two positions of the switch the known local current in the telephones is equal to that due to the signal.

The errors in this method of measurement are under favorable circumstances not greater than 5 per cent and do not exceed 10 per cent under ordinary conditions of continuous wave reception. In cases where the tone of the signal cannot be made to match the tuning fork oscillator, as in the measurement of spark signals or atmospheric disturbances, the errors are greater.

Check on Broadcasters.

Australian amateurs have organized a radio institute, which meets periodically in a federal convention, and boasts of an official organ, The Experimental Radio and Broadcast News, the first number of which was published last August. This magazine declares that the Australian Radio institute will examine all transmitting stations, and will cancel the licenses of all those whose work is unsatisfactory as to production and technical means, and are, therefore, nuisances to the radio world.

Owing to illness of the author, the third article in the series on the new radio principle of augmentation is missing on today's radio page. The article will be printed next week.

Radio Programs

Program for January 3.
(Courtesy of Radio Digest.)
By Associated Press

WGR, Buffalo (319): 6-6:30, music.
KYW, Chicago (536): 6:35, Uncle Bob; 7, concert; 8, musical; 9:05, Youth's Companion; 9:35, Congress classic; 12-2, carnival, Nighthawks.
WGN, Chicago (370): 6, organ; 6:30, concert; 8, classical; 10, dance.
WLS, Chicago (345): 7, lullaby time; 7:15, entertainers.
WMAQ, Chicago (447.5): 6, orchestra; 6:30, radio photologue; 9, Chicago theater revue.
WQJ, Chicago (448): 7, concert, soprano, pianist, tenor; 10-2, Skylark, melodians, entertainers.
WBAV, Columbus (423): 8, dance.
WFAA, Dallas News (476): 8:30, Serenaders; 11, orchestra.
WOC, Davenport (484): 7:30, religious; 8, orchestra, songs.
KTHS, Hot Springs (375): 8:30, concert; 10:30, dance.
WDAF, Kansas City Star (411): 6-7, School of the Air; 11:45-1, Nighthawk frolic.
WHAS, Louisville Times (400): 7:30, concert.
WMC, Memphis (501): 8, story; 8:30, concert.
WCCO, Minneapolis-St. Paul (417): 8, philosophies; 8:30, announced; 10, orchestra.
CAC, Montreal (425): 6, stories; 6:30, concert; 7:30, studio; 9:30, dance.
WNJ, Newark (233): 9:30, revue.
WOR, Newark (405): 8, "How to Live 150 years."
WBBR, New York (273): 7-7:50, trio, soprano, Bible.
WEAF, New York (492): 6:30, boys' period; 7, singers; 8, orchestra; 10, dance.
WHN, New York (360): orchestra; 7:30, entertainers; 9, orchestra; 10:30, dance.
WJZ, New York (455): 6, orchestra; 9:30, dance.
WNYC, New York (526): 6:35, Chateau Four; 7:40, police quartet; 8:30, instrumental novelties.
WCAL, Northfield (360): 12, musical.
KGO, Oakland (312): 6, concert; 10, drama; 12, dance.
WTAY, Oak Park (283): 6:45, artists.
WFI, Philadelphia (395): 6, talk; 7, recital; 8, concert.
WDAR, Philadelphia (395): 6:30, talk.
KDKA, Pittsburgh (326): 6:30, story; 7:30, concert.
WCAE, Pittsburgh (462): 6:30, Uncle Kaybee; 7:30, piano recital.
KGW, Portland Oregonian (492): 12, orchestra.
KPO, San Francisco (423): 10, orchestra.
KFOA, Seattle (455): 10:30, concert; 12:05, jazz.
KFQX, Seattle (238): 9:15, story; 10, orchestra; 11, concert; 12, dance.
KFNF, Shenandoah (266): 6:30, program.
WBZ, Springfield (337): 6:30, trio; 7:15, orchestra; violinist, soprano, baritone; 8:15, songs, piano, reader; 8:45, orchestra.
KSD, St. Louis Post Dispatch (546): 11:30, orchestra.
WRC, Washington (469): 6:15, music; 7:15, Bible talk; 7:30, concert; 9:30, orchestra; 10:15, organ.
WAHG, Richmond Hill (316): 11 serenaders.

WOAW Program.

Saturday, January 3.

6:00 P. M.—Dramatic hour, Davis Studio of Expression. Selected readings and regular weekly lesson in voice improvement by J. Simmons Davis.

6:30 P. M.—Sunshine Twins of Lincoln, Neb. (Eleanor Ackerman and Esther Kahn.)

6:45 P. M.—Ray Muzzy's Cinderella entertainers.

9:00 P. M.—Program from the studios of J. Edward Carnal (voice) and Stanley Jan Letovsky (piano), arranged by Mr. Carnal. Edna Carnal, accompanist.

Contralto solos:
(a) "Where My Caravan Hast Rested" ... Lohr
(b) "A Gift of Roses" ... Openshaw
Jeanette Warren.

Piano solos:
(a) "Old Vienna" ... Godowsky
(b) "March of the Dwarfs" ... Grieg
Margaret Kolberg.

Bass solos:
(a) "The Armour Song" ... De Koven
(b) "Out in the Deep" ... Lohr
Howard McMasters.

Piano solos:
(a) "Polonaise" ... Chopin
(b) "Hungarian Dance" ... Brahms
Gretchen Sanders.

Soprano solos:
(a) "I Would Weave a Song for You" ... O'Hara
(b) "Le Laran Rose" ... Arditi
Linda Lindquist.

Piano solo, "Whispering Winds" ... Wollenhaupt
Katherine Pugner.

Soprano solos:
(a) "Love and Music" ... Puccini
(b) "I Dreamt That I Dwelt in Marble Halls" ... Balfe
Mrs. W. L. Pier.

Violin Solo—Selected.
Ely Rasmussen.

Baritone Solo—Selected.
Vernon C. Horne.

Vocal duet, "Hark, Hark, My Soul" .. Nevin
Mrs. W. L. Pier and Mrs. Mary Danneel.

Piano solos:
(a) "Cradle Song" ... Brahms
(b) "Molly on the Shore" ... Grainger
Margaret Carmichael.

Contralto Solo—Selected.
Mrs. Mary Danneel.

Violin Solos—Selected.
Ely Rasmussen.

Baritone solo:
Frank Warren.

Piano solos:
(a) "Polonaise" ... Chopin
(b) "Juba Dance" ... Dett
Jennie Catherine Gillespie.

Soprano solos:
(a) "Il Baccio" ... Arditi
(b) "Absent" ... Metcalf
Horatia Powell (dramatic soprano).

11:00 P. M.—Frank Hodek's orchestra at Roseland Gardens.

11:30 P. M.—Organ music, transmitted from World theater, Arthur Hays, organist.

LOW WAVE LENGTH RECEIVERS SOUGHT

Washington, D. C.—Radio manufacturers are urged to develop receivers which will enable their owners to tune in stations as low as 200 meters. Unless this is done, it is said, these low wave lengths will be practically valueless for broadcasting purposes, since they cannot be tuned in on the ordinary set. There are very few sets on the market today that will go below 235 meters, while most of them will not go below 250 or 275 meters. Several class A stations have already been assigned wave lengths as low as 209 meters.

Radio Mobilizer.

Radio was used successfully in Chicago to mobilize 148 members of the 131st infantry in less than half an hour, and the entire regiment answered roll call two hours after an assembly call had been radiocast.

When in need of help try Bee Want

New Merger in Wireless.

A new merger in the radio industry was consummated recently when the Inter-Ocean Radio corporation completed the purchase of the American Radio Phone and Manufacturing company. The Inter-Ocean corporation will henceforth carry on the business of both companies, operating three plants, two in Jersey City and one in Newark, according to the announcement of W. P. Hurn, its president.