RADIO LORE FOR NOVICE AND EXPERIENCED FAN

"Seeing by Radio" Attachments to Be on Market Soon, Belief

Expert Declares Television for Everyone Imminent Possibility .- Principles Involved Not Exceed-

ingly Complicated .- Tells "How It Works."

ments will actually be on the market bottom corner is for use separately or in connection; process is repeated. with our regular radio sets. In fact the Baird Company of London has al-ready sent experts to this country, and it is claimed that a special television broadcasting station will be set up in westchester county. New York, and sets will be on sale at about \$100

If you were to tune in on a sta-

broadcasting radio pictures, you regular, that would mean nothing as heard on your phones or loud-speaker. Yet, with the proper equipment, the unintelligible noises are translated into s clear view of the person or object whose picture is being sent out.

The "picture" is sent out as a series of electrical impulses, one after the Some of the impulses are strong, others weak In place of the customary loud-speaker, a "neon" lamp is employed. This lamp is remarkably is employed. This lamp is remarkably sensitive to fluctuations in energy applied to it and is able to vary its brightness with extreme rapidity and to radiate bright or faint rays of light.

The control of the strong or

At the transmitting end, the electri-

TIME TO THWART LIGHTNING BOLTS

Antenna Should Be Protected **During Summer Months**

portant then than at any other time
Your telephone is provided with a

Regulations of fire insurance companies everywhere demand that the your vision screen.

The best way to find out about these and ask for a copy of the rules regarding radio antennae. They usually are put out in pamphlet form and state definitely how the particular insurance company wants the arrester installed. In many cities especially in apart. you are a city dweller, that the regu-

is far as possible, and the ground ture. terminal of the arrester must be con- | The energy of a wave is so weak in plug | pecially large electric los |

nected with a ground clamp on this | actual practice that even picked up a | Radio tends to work with constantly | "Compared vith this, wooden musts" pected with a ground clamp on this actual practice that even picked up a plug the provided to be much more adverted by the provided of the current as being the frequence electric to a plug the provided of the current as being the provided of the current as being the frequence electric to a plug the provided of the current as being the provided of the current as the provided of the p The arrester is in reality only an in-

pass directly to the ground instead of process of amplification or heterodynfirst passing through the antenna coil ing

The passing through the antenna coil ing

The passing through the antenna coil ing

The passing through the antenna coil ing

of the arrester and dis- ether

The outside of the lightning arrester will cause leakage, weakening the reteption of far-distant stations. Every six months or so it is well to test the done by tuning in a distant station and then disconnecting and reconnecting the ground wire of the ar-

BY BRAINARD FOOTE. cal "eye" which controls the impulses "Seeing by radio" seemed pretty far sent from the station is a light-sensioff a few years ago; yet today seeing tive cell Such a cell passes more elec-by radio has been accomplished and is tricity when a strong light is played tricity when a strong light is played being done right along. Station WGY on it than when it is in darkness, and is broadcasting radio "pictures" experitive strength of the current through the s broadcasting radio pictures experi-mentally, and radio fans equipped with the proper apparatus are receiving them and seeing small-sized "views" of per-to "scan" sweep over a certain area and seeing small-sized "views" of performers before the microphone.

The principles involved in transmitting radio "movies" or "pictures" are not exceedingly complicated and are intensely interesting. It won't be very long before television sets or attachments will actually be on the market bottom corner is reached—then the process is repeated.

> Certain parts of the area will reflect a good deal of light—a man's face, his collar, etc—while other parts like the clothes, necktie, etc., reflect less light In this way the light-sensitive cell In this way the light-sensitive cell causes the electrical energy to fluctu-ate. A disc is rotated very fast be-tween the cell and the object being "photographed" and this disc has a spiral of tiny holes in it. As the holes in the disc pass before the cell various parts of the picture are allowed to reflect light into the cell. There-fore, only a very tiny portion of the picture is sent out at each impulse.

> The receiving apparatus is quite simthe receiving apparatus is quite simple. The "neon" lamp above-mentioned, is connected in circuit as a loud-speaker ordinarily is. A small square of ground glass is set up between the observer and the lamp. A disc of paper or cardboard with a spiral of timy boles purched in it is received.

When the speed of the motor—ad-justed by a rheostat—is just right and matching the speed of the motor at the sending station, a clear-cut view flashes out on your ground glass screen When the motor is out of adjustment, at the wrong speed, the ground glass shows a myriad of tiny flashes of light which mean nothing.

Of course, the ground glass is very small, only about an inch square or so at the present stage of development, but improvements will no doubt be made right along as they always have been in radio By means of using a good sized reading glass, the picture is made to appear very much larger without losing its definition.

So just close your eyes a moment and picture the radio outfit of the future—the near future, too. You will have This Can Be Done by Installing an extra tuning dial on your set or else Good Arrester in Lead-In.—Fire a small extra cabinet which will really be a radio set by itself. It will have Insurance Regulations Demand its cwn tubes, but will use the same The of Safety Device with Out- teries or eliminators—that you already possess

The broadcasting of the present kind Everybody is more or less afraid of will be sent out on one wave length lightning, but, of course, the actual and will be received in the usual mandanger to life and health is more or less slight. During the warmer months particularly, lightning is quite frequent and, as a result, any protective measures that we are to take are more imthe "picture" on a diffirent wave length Your telephone is provided with a and as you adjust a different control lightning arrester, usually located in to get your small electric motor, which the basement. Electric lighting wires tuns silently within the cabinet holding any trouble, unless he happens to be length. Also the capacity of the steel are so protected, especially when they run for long distances on high poles. Your radio aerial should be equipped. So the capacity of the steel internals. But this is not always the by reasons of the transformer station orchestra playing, of the championship case where the owner of an older set built under the western tower. orchestra playing, of the championship case where the owner of an older set being broadcast, of the Sunday Y. M., brings it up-to-date by adding power C. A. conference will flash brightly into stages.

HERE'S NEW THEORY

The theory that a radio wave never completely exterminates itself ought to found, and the "B" current is switched lighting because of the large steel be cheering news to the dial twister on previously, he is certain to get a nished by officials at Munich to the structures, which absorb its energy who ever is on the lockout for stray using a plug with the connection con
"It is true that the radiation of the Hence, you may find, if bits of DX. The idea that a dying cealed or by insulating the metal Munich sender, after buying replaced to decader that the regular lations allow you to place the arrester | wave, reduced to infinitesimal strength, hinge. inside the house, probably near the can come back to the point of origin. The latter can be accomplished by from about 20 per cent to more than window, running the ground wire to a and kick up a rumpus is a little too- running tape the length of the hinge 60 per cent. This is urincipally due to far-fetched even for the extremely im- Thus, if the operator happens to put the fact that the steel mast, could be In country sections, a little more againstive, but we cannot afford to overhis hand over the back of the set that the steel mast cound be against the force of inserting the fact that the steel mast cound be the same that the steel mast cound be against the force of inserting the fact that the steel mast cound be against the force of inserting the fact that the steel mast cound be steel mast cound be against the force of inserting the fact that the steel mast cound be against the force of inserting the fact that the steel mast cound be against the force of inserting the fact that the steel mast cound be against the force of inserting the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the steel mast cound be against the fact that the fac

to be amplified and doctored until it is, to think of its current as being the faceous electrically, as the loss due to r is in reality only an inuseable. We utilize a considerable weak energy of the early battery gendeflection is small, although there is
amount of locally applied electrical enerated receivers.

al, with the points very pleces of metal, with the points very close together, but not touching. Of this means we achieve the remarkable course, if the points should touch, the feat of reproducing the original. It is energy picked up by the aerial would life might be recreated through the

spate the energy. The tendency, therefore is to prevent the accumulation of indestand how powerful currents cussion of radio in his new book. a large charge above the aerial and to reduce the chance for a sufficient which bridge the gap between the "Marchina Alama" that the chance to collect over the chance the chance to collect over the chance t reduce the chance for a sufficient source of potential accumulation and cause a stroke of lightning. However, if the lightning should directly strike he arrester would help to the arrester would help to the arrester would help to though the set.

The arrester has only two terminals.

The arrester has only two terminals.

magnetic waves. The steel portions of am sure that the progress of any stubuldings near by actually became dent depends larrely upon the urge he ald be kept clean as dust and dirt warm with absorption of the broad-feels within him cast energy. As more and more power highest and finest degree radio will is put into the air and as the theory never take the place of the personal of the indestructibility of the radio performance by the artist. arrester to note whether it leaks or whether it is short-circuited internally of a conductor than originally was

SHORT CIRCUITS



Weekly Radio Test

1. What is the best way to combine an outside antenna with a loop aerial?

How much does it cost to talk to London by radio? Why do some of the set manufacturers continue to

use voltmetres mounted on the panel? How many broadcasting stations are there in Mexico? Is the top of a high building in the city a suitable place

tenna? (Answers to these questions ill be found elsewhere in the Radio Section) (Copyright, 1928.)

to erect a broadcasting an-

CHANCE FOR SHOCK

Operator of Power-Receiver Should La- ergy by the steel ercise Care.

With the extremely high voltages used in the newer sets, provision is metal towers was a very serious one made to guard the operator against pos- A further influence to loss of power sible shock. Everything is exception- was the circumstance that the natally well insulated and there is no reading wave length of the tower- lay in son why the radio owner should have the neighborhood of the station's wave

In some of the sets of the convenpanies everywhere demand that the pool panies developed the projection against lighting all possible projection against lighting and have found it is described "feding and have found it is described "feding and have found the metal to be due to a rundows B battery when the set in the special possible projection against lighting and have found it is described "feding and have found it i

> If, for instance, the connections at Vir Far More of a Conductor Than the plug are exposed and the operator or conductor the plug are exposed and the operator of the included holds these and at the same time puts the increased efficiency of the his hand around to the back where

to be driven into the ground new source. This changes the pic- by spared a shock. Another plan is 10 masts was in close proximity to the as possible, and the ground ture.

This changes the pic- by spared a shock. Another plan is 10 masts was in close proximity to the insulate the exposed tips feeding to the Munich wate which resulted in an es-

SOUSA EXPLAINS

When the air becomes electrically when the aerial, tiny sparks lap the gap between the points or "electrodes" of the arrester and dis-

by the insurance rules. The other is cannot tell casting stations was traced to etherial whether this influence extends to the aerial lead-in, with-cut changing its ordinary connection to the antenna post of the set.

Self up to the enarms of music with pipe and foot-stool at hand than in the crowded concert hall. I cannot tell whether this influence extends to the conduction of the powerful electrostudent of music in his practice, for I magnetic waves. The steel portions of the conduction of the set.

WOODEN TOWERS TRIED IN EUROPE

Entirely Successful

Useful Radiation of Antenna In-

attract world-wide attention is the replacing of the steel antenna towers at the Munich-Stadelheim station in Germany with wooden towers, in an en-deaver to eliminate the loss of power due to the absorption of the radio en-

them, according to advices reaching the

The new wood towers have met requirements successfull, it is said, and tests made by the Munich Division of

ers who have adopted a power stage of the wooden to els being reduced to where the voltages may run around 75 metres (246 feet) to allow for the greater surface exposed to wind pressure, whereas the old towers had stood 100 metres for about 328 feet; blob the increased efficiency of the station was said to have been noted.

The following interesting details with

no special insulation to ground. Further, electrical reflection was not dis-

"In general we may say that wooden life are about the same for both kinds "The Munich masts are about 75 metres high Detached wooden masts may be made about 100 metres high. The

ma to I catisfactory in every way The mast wa made of pine wood, C wish the exception of the Ladders, where the rungs are made of a h. Tie.

Two Loud-Speakers

But even at its spective of whether it is the horn or prove your tone quality by using at ferent pitch. Thus if you are now andience is invaluable and can be fully mellow cone u e a high-pitched charp rolf balls clubs and cards, lumished than 17,000, attained only through actual vision. I born in addition. You will be sur- by the Hawaii Transportation Company electricity have refrained from broadcasting for pried to what extent you can round for a nominal sum to supply the de- Since their

Radio Questions and Answers

Radio Editor, Sunday Journal:

German Station's Experiment Do you advise 6 to 1 or 3 to 1 transformers. Do high-priced transformers usually have more windings cheaper ones? Pawtucket

The best thing to do is to select two transformers made by a rollable com-pany to work together. A good deal Steel Masts Caused Serious Loss planning to use a power tube. Usually the 3 to 1 transformer will give less of Electrical Energy. Say En- distortion. Very often a very cheep for a transformer is made by skimp-ing the number of turns on the pri-A departure which will very likely transformer is 6 to 1. In such a case, a better make of 3 to 1 would give more amplification and better quality. High-priced transformers, as a rule, do have more turns of wire on both windings and also have a much larger from pencils and paper, core. In addition, they use selected. Other subjects grades of iron for the core--an importtant factor in transfermer design -Ed)

Radio Editor, Sunday Journal

Providence

Please let me know whether fading answered. an be caused by run-down B batteries ing, principally during evenings

distance radio that has not set been explained, although there are reveral plausible theories as to the subject. At ant rate fading has nothing to do with batteries as we oldinarily understand fading Sometimes questioners have

to outside stations, you will probably experience more or less fading. If you have no trouble with interference among stations, you might try and cerest a higher aerial. Then the fading of the stations can be somewhat controlled by cutting down on the volume control when the station comes in loudly and turning it up as the station becomes fainter. Ed i

Endia Editor, Sunday Journal

I have a vibrating type of charger profitably take out the vibrator part stead. Would there have to be many changes in wiring?

ther, electrical reflection was not discernible. On the strength of these onservations, other radio senders will be is only 5 to 15 cents. If you are not complete with wooden masts.

"In general we may say that modes the change a battery from home sockets.

"In general we may say that modes the change is only 5 to 15 cents. If you are not bettery units and additional "B" battery eliminator is not the great a radio man to do it. There will have to be a recistance inserted used

Am I right in understanding that a be made about 100 metres high. The milliametre in my set should not vary produce will not be experience we have had with wooden while stations are being received unless. comething is group with the tubes or battery voltages

Crat. ton

provide a path for transmission of the self up to the charms of music with sedium fluoride, after the pieces had originally impressed signals

| Pipe and foot-stool at hand than in the been framed | Pipe and below if a normal sedium fluoride in the piece shad | Pipe and below if a normal sedium fluoride in the pieces and been framed | Pipe and below if a normal sedium fluoride in the pieces and below if a normal sedium fluoride in table, so that the effect is to hold the would have to forego the advantages of metre pointer still. As the grid is sets that operate from house current of the above or below the correct fig- and that it would be better if the in-

your milliametre will "jieple

exception is any louder with the arinster off If so, a new arrester, or the
old one taken apart and cleansed and
disted, will solve the problem.

A FOLTIC HINT

have refrained from broadcasting for pried to what extent you can round for a neminal sum to supply the destinate out your tone quality by using at least mends of candidates to drive a golf with radio receivers, there probably and cleansed and leansed and solve the problem.

A FOLTIC HINT

have refrained from broadcasting for pried to what extent you can round for a neminal sum to supply the destinate out your tone quality by using at least mends of candidates to drive a golf with radio receivers, there probably and leansed and leansed and leansed and leansed, will solve the problem.

A FOLTIC HINT

have refrained from broadcasting for pried to what extent you can round for a neminal sum to supply the destinate out your tone quality by using at least mends of candidates to drive a golf with radio receivers, there probably and observe cornected in paral-ball become certified members of the increasing popularity of receivers that rangement works best

A FOLTIC HINT

have refrained from broadcasting for pried to what extent you can round for a neminal sum to supply the destination.

Since there are but 7500,000 homes this term reason. I em reluctant to out your tone quality by using at least mends of candidates to drive a golf with radio receivers, there probably and parallel of the problem.

Since there are but 7500,000 homes the first pried to what extent you can round for a neminal sum to supply the destination.

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Since the reason. I em relieves, and the first pried to what extent

Within a week 89 aspirants had achieved membership. The one es-cential condition is that the feat must be performed before witnesses.

CODE CLASS PLANNED

Brown Radio Club Will Teach Meaning of Dots, Dashes.

The Brown University Radio Club is planning the formation of a special code class, for the benefit of Providence radio fans who desire to become skilled in interpreting the meaning of the dots and dashes which come in over the low wave lengths. At the next regular meeting of the

club, which will be held Tuesday night at 745 o'clock in the Engineering Building of the University, the subject of a code class will be taken up, according to C. Newton Kraus, president. Radio enthusiasts interested in learning the code are invited to attend. Mr Kraus will conduct the classes

"assisted by other members of the club who are versed in the code. Those who attend the meetings are asked to bring Other subjects which will be dis-cussed are amateur transmitting sets and Government requirements for sta-

NEW TYPE "MIKE"

tion and operators' licenses. All ques-tions regarding these subjects will be

Device Makes Possible Better Control of

Crowd Noises.
Worthy of the attention of those who will broadcast the national political contentions, exciting baseball games prizefights and so on are the "insensitive' microphones being tried out in England which enable crowd effects to

the Grand National Steeplechase at Aintree recently. They were much smaller than the ordinary microphone. measuring only two inches by inches and could be accommodated comfortably in the palm of the hand.

These diminutive."mikes" are not as centitive as the normal types, but the quality is reported by the British Broadthat has hitherto been obtainable by

MODERNIZES SET

Power Tube Adapter Brings Neutrodyne

Up to Date.

Owners of five-tube rete made in 1925 and 1926, particularly of the neutro-Providence J. S. dyne type, may be interested to know (Yee, the change can be made, but that it now is possible to buy a special the disadvantage is that the transform- power tube adapter which fits into the er of the charger has been built to socket of the last stage of audio amer of the charger has been built to socket of the last stage of audio amstand more power transfer than the dry rectifier will be some wastage of energy and the consumption of current will be more than it would be with a properly designed transformer to match the dry rectifier. Of course, the actual difference will be small, as the usual cost to charge a battery from home sockets.

Before making the change, if than steel marks of the same height to keep the current within the limits a "B" eliminator is being relied upon as but that the costs of upkeen and the "hitable to the dry rectifier Ed") a course of "B" power, he sure that this actise is equipped to produce at least 135 tells of more. Otherwise there will be not point in adding a power since the device will not be able to

MOST HOMES WIRED

No matter how good your present either above or below the correct figure, the changes in the B battery cursulation of this development of whether it is the horn or spective of whether it is the horn or lent are not uniform and the needle or lent are not uniform and the needle or lent are not uniform. In the meantime, however, the fact-

finders were checking the situation and "Hole-in-One" Club.
On the very case of one of Hawall's Just recently they came forth with the "It fulfills its purpose, just as the using a high-pitched, sharp horn try. On the very cage of one of Hawaii's Just recently they came forth with the wiveles do, but its scope is limited and secure a low-pitched, dull came steaming craters a regulation tecine announcement that of the 27,000,000 cr. The rapport between performancer and vice versa, if you now have a soft, ground has been made with a supply of so homes in the United States more rolf balls clubs and cards, furnished than 17,000,000 of them are wired for

RADIO PROGRAMS

WEAN starts broadcasting at 11:00 m, with the service from All Saints Memorial Church. At 2 00 p. m. will be heard the Dudley radio carollers. who will also broadcast from Arcadia at 8.01 p. m The Columbia Chain programs will be on the air at 3 00 p. m. 4.00 p. m., 9 p m., 9:30 p. m., 10:00 p m and 10:15 p. m. At 6:30 p. m. will be broadcast an organ recital and at 7.00 p. m the Asia Seren-aders. The daily golf lesson will be broadcast from the station tomorrow at 7.55 p m. At 6.05 p. m. on Tues-day will be heard the Army recruiting realities. Wcygand's orchestra will be broadcast from Arcadia on Thursday at 9 30 p. m Uncle Red will be on the air on Friday at 6:05 p. m. The baseball game broadcast from Aldrich Field at 3 00 p. m. on Saturday will be the Brown University vs. Providence College game,

WJAR commences its week at 3:00 p. m. with the Young People's Conference. The Weymouth band will be on the air at 6:00 p. m., the Capitol Theatre program at 7:30 p. m. and a talk by David Lawrence entitled "Our Government," at 9 p. m. Tomorrow at 8 30 p. m. the A. and P. Gypsles will be on the air. A safety talk spon-sored by the Providence Safety Council will be heard at 8.00 p. m. on Tues-day. At 3.00 p. m on Wednesday will broadcast the Memorial Day exercises direct from the National Cemetery, Gettysburg. Elsie Miller and Helen C. Place will be on the air Thursday at 9.05 p. m. with a musical program. Palmolive hour will be broad-cast at 10.00 p. m. on Friday. Satur-day at 1 35 p. m. will be heard Al Wil-liams and his orchestra

liams and his orchestra.

WLSI starts broadcasting at 5:30 p.m. with the International Bible Students program. The service from the Church of the Seventh Day Adventist will be heard at 8 00 p.m. Tomorrow at 8:30 p.m. will be broadcast the Providence chapter choir Order of the Providence chapter choir Order of the De Molay, which is under the direc-tion of C. Fred Nicholas and is composed of 20 voices. William T. Cavanagh, special studio announcer, will officiate. Tuesday the usual program will be heard. Wednesday at 5.00 p. m. will be broadcast the Providence College orchestra. Al Blakely, the nov-

p. m. on Thursday. The customary programs will be heard the remaining days of the week. WFCI starts broadcasting at 10:45 a m, with the service from the Centra Falls Congregational Church. Tomor-row at 6.45 p. ny will be heard a talk by Mrs. Robert Johnston, chairman of the Motion Picture Committee, Pawtucket Wcman's Club. The family hour will be heard at 6 p. m. on Tuesday. Ernie and his danceland orchestra will be on the air Wednesday at 6 p. m. program by the Exide Battery boys

elty man, will be on the air at 9:00

will be given at 7.05 p. m. on Thurs-The usual programs will broadcast the remaining days of the week.
WCOT starts its week of broadcasts at 1:30 p. m. with the Wallana Ha-wallans. Jacob Conn will talk on current events at 2.00 p. m. A studio program will be heard at 2:30 p. m. to-

morrow. Tuesday Ernest Reddy, baritone soloist, will be on the air. Another talk on current events will be on Current events will be given by Jacob Conn at 200 p. m. on Wednesday. Thursday and Friday the usual programs will be observed. Saturday at 2:30 p. m. will be broadcast a studio program.

WEAN-THE SHEPARD STORLS-275

Today

Today

11 00 a. m —Service from All Saints Memorial Church.

2 00 p m.—Dudley Radio Carollers
3 00 p m.—Symphonic hour. Columbia Chain program: Overture to "The Water Carrier." Cherubini, United Symphony Orchestra: Concerto in D for four solo violins, Vivaldi, violas, 'cellos, basses and cembalo, Messrs Bestedny, Karman, Bay, Edelstein and the United Symphony Orchestra. Inthe United Symphony Orchestra. Intermezzo from "L'Amore Medico."
Wolf Ferrari, Intermezzo from the "Jewels of the Madonna," Wolf Ferrari, United Symphony Orchestra "Angelus in the Mountains." / Alberto Bimboni, United Symphony Orchestra Ballet music from the opera "Aida, Verdi, United Symphony Orchestra Op m — Cathedral hour, Columbia Chain program. Processional, "God of Our Fathers," Roberts: Adagietto from "L'Arlesienne Suite." Bizel, orchestra. Tr Deum in F." Lemare, quartet and ensemble. "Magnificat in F." Tours, solo voices, cherus and orchestra. Andenie for the strategy of the strategy of the Madonna, "Wolf Ferrari, United Symphony Orchestra Store chorus."

8.30 a. m.—Morning sing by The Shepard Store chorus.

9.32 m.—Morning sing by The Shepard Store chorus.

9.33 a. m.—Morning sing by The Shepard Store chorus.

9.34 m.—Women's Institute program conducted by June Abbott.

10.05 a. m.—The Providence Journal and Evening Bulletin news flashes.

10.05 a. m.—Morning sing by The Shepard Store chorus.

9.35 a. m.—Morning sing by The Shepard Store chorus.

9.36 a. m.—Morning sing by The Shepard Store chorus.

9.37 a. m.—Morning sing by The Shepard Store chorus.

9.38 a. m.—Morning sing by The Shepard Store chorus.

9.39 a. m.—Morning sing by The Shepard Store chorus.

9.30 a. m.—Morning sing by The Shepard Store chorus.

9.31 m.—Morning sing by The Shepard Store chorus.

9.32 m.—Morning sing by The Shepard Store chorus.

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9.37 m.—Morning sing by The Shepard Store chorus.

9.38 m.—Morning sing by The Shepard Store chorus.

9.39 m.—Morning sing by The Shepard Store chorus.

9.30 a. m.—Morning sing by The Shepard Store chorus.

9.31 m.—Morning sing by The Shepard Store chorus.

9.32 m.—Morning sing by The Shepard Store chorus.

9.35 m.—Morning sing by The Shepard Store chorus.

9.36 m.—Morning sing by The

quartet and ensemble. "Magnificat in F." Tours, solo voices, chorus and orchestra. Andante from "Fifth Symphony." Beethoven, orchestra: "The Lord is My Strength, 'Smart, solo voices, chorus and orchestra. "Pecessional," De Koven, bass solo, chorus and orchestra. "He Shall Feed His Fiock, The Messlah," Handel, control to the control of Flock, The Messiah," Handel, con-traite sole, anthem, "Send Out Thy Light," Gounod, full ensemble, "Ario-Bach, orchestra. "Trust in Handel full ensemble

Lord, "Handel, full ensemble. "The Messiah," Handel, full ensemble: Postlude, First Movement from "L'Arlessenne Suite." Bizet, orchestra.

1) p. m.—Organ reclial

2) p. m.—Organ reclial

3) p. m.—Dudley Radio Carollers, broadcast from the Arcadia

4) p. m.—Dud Voorhees Concert Ofchestra, Columbia Chain program "Prellude in G-minor." Rachmaninoff "Serenade," Drigo "Song of the Mala, Fisherman," Niemann, "Chinese Dance," Ewing, "Erolis," Grieg, "Jdillo," Lack, "From the Land of the Sky Blue Water," Cadman, "Mah Lindy Lou." Strickland, "The Bam-9 00 f

Lindy Lou," Strickland, "The Bam-noula," Coleridge-Taylor, Don Voor-hees Concert Orchestra, p.m.—La Palina hour, Columbia onula." Coleridge-Taylor, Don Voorhees Concert Orchestra.

9 30 p. m.—La Palina hour, Columbia Chain program. American Singers "On the Banks of Allan Water," arr. by Button. "Kathleen Mavourneen." Crouch. "On the Sea. Dudley Buck 'Oft in the Stilly Night." Moore. "We Gather Together," Old Netherland hymn.

10.15 p. m.—United Military Band, Columbia Chain program Overture to "If I Were King," Adam march, "National Emblem." Bagley Salut d'Amour Elgar The American Patrol, "Meacham waltz, "Tales of Hoffman," "Twenty-second Regiment," Victor Herbert Love in Hilmess," Macbeth, Fantesy, "Dream Pictures," Lumbye, march, "On Jersey Shore," Pryor Characteristic Internezzo "Wedding of the Rose" Jessel "Stars and Stripes Forever," Sousa, United Military Band.

Monday

Club, report by Chester H. Miller.

Program.

10 00 p. m.—Columbia broadcasting system program.

10 00 p. m.—Columbia broadcasting system program.

10 00 p. m.—Potwidence Journal and Evening Bulletin news flashes.

9 45 a. m.—Women's institute program of the Rose "Jessel "Stars and Stripes Forever," Sousa, United Military Band.

10 00 p. m.—Potwidence Journal and Evening Bulletin news flashes.

11 00 p. m.—Providence Journal and Evening Bulletin news flashes.

12 00 p. m.—Tournella broadcasting system program.

13 00 p. m.—Providence Journal and Evening Bulletin news flashes.

14 00 p. m.—Potwidence Journal and Evening Bulletin news flashes.

15 0 p. m.—Tournella broadcasting system program.

16 00 p. m.—Potwidence Journal and Evening Bulletin news flashes.

18 00 p. m.—Tournella broadcasting system program.

19 00 p. m.—Potwidence Journal and Evening Bulletin news flashes.

19 01 p. m.—Tournella broadcasting system program.

19 02 p. m.—Potwidence Journal and Evening Bulletin news flashes.

19 03 p. m.—Collumbia broadcasting system program.

19 05 p. m.—Collumbia broadcasting system program.

19 00 p. m.—Columbia broadcasting system program.

10 05 p. m.—Women's institute program of m.—Wowen's institute program.

10 05 p. m.—The providence Journal and Evenin

a m—Women's institute program conducted by June Abbott a m—The Providence Journal and Evening Bulletin news flashes

a. m --- Women's institute or a. m --- "Good Groceries," Sawyer a m—The Shepard Stores concert 11 00 B

11 00 a m—The Shepard Stores concert ensemble
11 30 a m.—Mustcal program
11 55 a. m—Time signals
12 00 m—Asia Serenaders
12 30 p m.—Weather report
10 0 p m—The Providence Journal and Evening Bulletin news flashes
10 5 p m—Official market report for Providence Market Earenu of Markets of Rhode Island State Depuriment of Agriculture
11 0 p m—Daily fire hezard report.
115 p. m—Good gardening talk
400 p m—Mustcal program.
430 p. m—Weather report.
600 p m—The Providence Journal and Evening Bulletin news flashes.

p m - the constant. Evening Bulletin news flashes.

6 05 p. m.—Port Arthur orchestra.
7.00 p. m.—Code instructions by radio through the courtesy of the American Radio Relay League, Inc.
7.30 p. m.—Information service.
7.50 p. m.—Sportograms
7.55 p. m.—Daily golf lesson.
8 00 p. m.—Honoluiu quintet.
8 30 p. m.—Globson's program.
9 30 p. m.—Columbia broadcasting system program.

program.

10.00 p. m.—Columbia broadcasting system program

10.30 p. m.—Columbia broadcasting system program

11.00 p m.—Providence Journal and Evening Bulletin news flashes.

ning Bulletin news flashes.

Tuesday

30 a. m.—Women's institute program conducted by June Abbott.

9 45 a m.—"Swiss Maid.

10 00 a m.—The Providence Journal and Evening Bulletin news flashes.

11 00 a.m.—Shepard Stores concert ensemble.

12 00 m.—Westher report.

12 00 m.—Westher report.

13 00 p. m.—Westher report.

15 0p. m.—The Providence Journal and Evening Bulletin news flashes.

15 0p. m.—Official market report for Providence Market Bureau of Markets of Rhode Island State Department of Agriculture

11 0p. m.—Good gardening talk.

11 3p. m.—Daily fire hazard report.

4 00 p. m.—Organ recital

4 00 p. m.—Organ recital

4 00 p. m.—Weather report.

6 00 p. m.—The Providence Journal and Evening Bulletin news flashes.

6.55 p. m.—Army recruiting realities revealed.

6.15 p. m.—Peature.

6 00 p. m.—Smith grante program.

7 15 p. m.—Sportograms.

7 50 p. m.—Sportograms.

7 50 p. m.—Sportograms.

8 00 p. m.—Kalua Hawalian troupe.

8 30 p. m.—Opry house tonight.

9 15 p. m.—Will Hopkins and his dance or-crestra. Tuesday

crestra.

10:15 p m — Biltmore Hotel orchestra.

11:00 p m.—Providence Journal and Evening Bulletin news flashes. Wednesday

9:45 a. m —Women's Institute program
conducted by June Abbott.

10 00 a m —The Providence Journal and
Evening Bulletin news fiashes.

10 30 a. m —Women's Institute orchestra.

11.00 a. m —Shepard Stores concert ensemble.

11.00 a. m.—Women's Institute orcinestra.

11.00 a. m.—Shepard Stores concert ensemble.

11.30 a. m.—Musical program.

11.55 a. m.—Time signals.

12.00 m.—Gibson's program.

10.00 p. m.—Providence Journal and Evening Bulletin news flashes.

10.50 p. m.—Official market report for Providence Market Bureau of Markets of Rhode Island State Department of Agriculture.

10.00 p. m.—Good gardening.

11.50 p. m.—Daily fire hazard report.

4.00 p. m.—Weather report.

4.00 p. m.—Weather report.

6.00 p. m.—Providence Journal and Evening Bulletin news flashes.

6.05 p. m.—Asia Serenaders.

7.00 p. m.—Narragansett Hotel concert ensemble.

semble.
7 30 p. m.—Information service.

7 30 p. m.—Information service.
7:50 p. m.—Sportograms.
7:55 p. m.—Daily golf lesson.
8 01 p. m.—Nicholson Thickray Home Sweet Home.
8 30 p. m.—Columbia broadcasting system Program.
9 00 p. m.—Columbia broadcasting system Program.
10:00 p. m.—Columbia broadcasting system Program.
11:00 p. m.—Columbia broadcasting system Program.
11:00 p. m.—Providence Journal and Evaning Bulletin news flashes.

Thursday.

9 45 a. m.—Women's Institute program conducted by June Abbott.

10.00 a m.—The Providence Journal and Evening Bulletin news flashes.

10 05 a. m.—Home Service radio chat.

10 35 a. m.—Shepard Stores concert ensemble. Thursday.

11.00 a. m.—Shepard Stores concert ensemble.

11.30 a. m.—Musical program.

11.55 a m.—Time signals.

12.00 m.—Musical program.

12.35 p. m.—Organ recital.

10.00 p. m.—The Providence Journal and Evening Bulletin news flashes.

10.50 p. m.—Official market, report for Providence Market Bureau of Markets of Rhode Island State Department of Agriculture

110 p. m.—Good gardening

115 p. m.—Dairy fire hazard report.

4.00 p. m.—Musical program.

4.30 p. m.—Weather report.

5.00 p. m.—The Providence Journal and Evening Bulletin news flashes.

6.55 p. m.—Short story pericd.

6.50 p. m.—Code instructions by radio through the courtesy of the American Radio Relay League, Inc.

7.00 p. m.—Food Peppers Oichestra.

7.30 p. m.—Sportograms.

7.55 p. m.—Sportograms.

7.55 p. m.—Sportograms.

7.55 p. m.—Daily golf lesson.

8.00 p. m.—To be announced.

8.00 p. m.—To be announced.

8.01 p. m.—To be announced.

8.02 p. m.—To be announced.

8.03 p. m.—To be senounced.

yer. a m.—Shepard Stores concert ensem-11.00 8

11 30 a m.—"Microphone gets suggestions

hle.

11 30 a m.—'Microphone gets suggestions from Dorothy Dow.'

11 55 a m.—Time signals.

12 00 m.—Glison's program.

1:00 p m.—The Providence Journal and Evening Bulletin nervs fleshes.

1.05 p m.—Official market report for Providence Market Bureau of Markets of Rhode Island State Department of Aericulture.

1:10 p. m.—Good gardening

1:15 p. m.—Dairy fire hasard report.

4:00 p. m.—Weather report.

6:00 p. m.—Weather report.

6:00 p. m.—The Providence Journal and Evening Bulletin news fleshes.

6:05 p. m.—Uncle Red.'' auspices Providence Safety Council.

2:25 p. m.—Radio talk by courtesy of Rhode Island Society of Optometry transport.

6:30 p. m.—Jimmy Walsh and his orchestra. 7 30 p. m —Information service.
7 50 p m.—Sportograms

50 p m.—Sportograms
55 p m.—Daily golf lesson.
60 p m.—Amateur boxing bouts from Arcadia, auspices Providence Athletic Club, report by Chester H. Miller.
60 p m.—Columbia broadcasting system

Continued on Page Eight.

11.05 p

Ariculture.

1 10 p m — Good gardening.

1 15 p, m — Daily fire hazerd report.

3 00 p m — Baseball game broadcast from Aldrich Field—Brown University verocidence College.

6 00 p m — Providence Journal and Evening Bulletin news flashes.

6 05 p m — Code instructions by Radio through the courtesy of the America.

Radio Relay League, Inc.

6 30 p in.—Biltmore Hotel orchestra.

7 30 p m — Sportograms.

7 50 p m — Sportograms.

7 50 p m — Sportograms.

8 00 p m — Shepard radio minstrels.

9 00 p m — Rhodes orchestra.

10 00 p m.—Biltmore Hotel orchestra.

10 00 p m.—Biltmore Hotel orchestra.

p m—Providence Journal and Evening Bulletin news flashes, p m—Jimmy Walsh and his orches-

RADIO PROGRAMS

Continued from Page Seven. WJAR-THE OUTLET COMPANY-184

Today

To 6.00 p. m.—Weymouth Post No. 79 Ameri-

6.00 p. m.—Weymouth Post No. 79 American Legion band.
7:25 p. m.—Weather report.
7:30 p. m.—Capitol Theatre program.
9:00 p. m.—"Our Government," by David
Lawrence.
9:15 p. m.—Robert W Powers' or hestra
10:15 p. m.—News flashes from the Editorial
Rooms of the Providence Journal and
Evening Bulletin.

Nonday.

Monday.

Monday.

10 40 a. m.—News flashes from the Editorial Rooms of the Providence Journal and Evening Bulletin.

10 45 a m.—Musical program.

11:15 a m.—Radio Mousehold Institute.

1:05 p. m.—Providence Journal and Evening Bulletin news flashes.

1 10 p. m.—Studio program

1:35 p m.—Weather report.

1:35 p m.—Continuation of studio program

1:35 p m—Continuation of scales program
6 40 p. m.—Providence Journal and Evening Bulletin news flashes.
6:45 p. m.—Earl Shean and his orchestra, assisted by William I. Carrigan,

assisted by William I. Carrigan, tenor.

7.00 p. m.—James G. McDonald, topic, "Young China."

7.15 p. m.—Earl Shean and his orchestra.

7.30 p. m.—Baseball scores.

7.35 p. m.—Weather report.

7:40 p. m.—Harold Strong, tenor, accompanied by Violette Marks.

7:50 p. m.—'The Rhode Island Historian"

8:00 p. m.—O'Cedar shining hour.

8:30 p. m.—General Motors Family Party.

10:30 p. m.—General Motors Family Party.

10:30 p. m.—Correct time.

11:00 p. m.—Correct time.

11:00 p. m.—Providence Journal and Evening Bulletin news flashes.

11:05 p. m.—Baseball scores.

Tuesday.

Tuesday.

10.40 a. m.—Providence Journal and Evening Bulletin news flashes.

10.45 a. m.—Musical program.

11:15 a. m.—Radio household institute.

1:05 p. m.—Providence Journal and Evening Bulletin news flashes.

1:10 p. m.—Studio program.

1:30 p. m.—Weather report.

1:35 p. m.—Continuation of studio program.

1:35 p. m.—Continuation of studio program.

6:45 p. m.—Providence Journal and Evening Bulletin news flashes.
6:50 p. m.—Weather report.
6:55 p. m.—Baseball scores.
7:30 p. m.—Sconyland sketches
8:00 p. m.—Safety talk sponsored by the Providence Safety Council.
8:05 p. m.—Edward Keenan, tenor, accompanied by Violette Marks.
8:30 p. m.—Eetherling singers.
9:00 p. m.—Eveready hour.
10:00 p. m.—Correct time.
10:30 p. m.—Correct time.
10:30 p. m.—Providence Journal and Evening Bulletin news flashes.
10:35 p. m.—Baseball scores.

Wednesday

Wednesday 3:00 p. m.—Memorial Day exercises direct from the National Cemetery, Gettysburg, Pa.
4.00 p. m.—Graham McNamee will describe the international 500-mile race direct from Indianapolis Motor Speed-

way.
7:45 p. m.—Providence Journal and Evening Bulletin news flashes.
7:50 p. m.—Baseball scores,
7:55 p. m.—Weather report.
3:00 p. m.—American Magazine and Women's Home Companion hour.
9 00 p. m.—Ipana Troubadors.
9:30 p. m.—Goodrich quartet and orchestra.

10.30 p. m.—Correct time.
10.30 p. m.—Providence Journal and Evening
Bulletin news flashes.
Bulletin flashes. 10:35 p. m.—Baseball scores. Thursday

10:00 a m.—Providence Journal and Evening
Bulletin news flashes.
10:05 a. m.—Housewives Radio Exchange, a
department conducted by Mrs. Wood
on matters of household interest
Questions submitted will be answered
by radio.

Questions submitted will be answered by radio.

11.00 a, m—Rhode Island Tuberculosis Association talk.

11.05 a. m.—Musical program.

11.15 a. m.—Radio Household Institute.

1.05 p. m.—Providence Journal and Evening Bulletin news flashes.

1.10 p. m.—Studio program.

1.30 p. m.—Weather report.

1.35 p. m.—Continuation of studio program.

7.20 p. m.—Providence Journal and Evening
Bulletin news flashes
7 25 p. m.—Baseball scores
7 30 p. m.—Coward Comfort hour.
8 30 p. m.—Oward Comfort hour.
8 30 p. m.—Weather report.
7 30 p. m.—National religious.
8 30 p. m.—Weather report.
8 30 p. m.—Concert Jorchestra.

8 30 p. m.—Weather report.
8.35 p. m.—James F. McKenney, tenor;
Herbert A. Medbury, baritone.
9:00 p. m.—Rhode Island State Board of
Public Roads talk.
9:05 p. m.—Musical program by Helen C.
Place and Elsie Miller.
10 00 p. m.—Correct time.
10 30 p. m.—Correct time.
10.30 p. m.—Providence Journal and Evening
Bulletin news flashes.
10:35 p. m.—Basphall scores.

10:35 p. m.—Baseball scores. Friday 10 00 a. m.—Providence Journal and Evening Bulletin news flashes.

10 00 a. m.—Providence Journal and Evening Bulletin news flashes.

20 05 a. m.—Housewives Radio exchange, a department conducted by Mrs. Wood on matters of household interest Questions submitted will be answered by radio

11 00 a. m.—Musical program.

11:15 a. m.—Radio household institute.

11.30 a. m.—Black Jacksons

1 05 p m.—Providence Journal and Evening Bulletin news flashes.

1 10 p. m.—Studio program.

1 30 p. m.—Weather report

1 35 p. m.—Pollyanna.

5 55 p. m.—Pollyanna.

5 50 p. m.—Providence Journal and Evening Bulletin news flashes.

6 00 p. m.—Mutual Savings Banks hour.

7 00 p. m.—Baseball scores.

7 05 p. m.—Weather report

8 00 p. m.—Weather report

8 00 p. m.—Weather report

8 00 p. m.—Weather report

8 01 p. m.—Weather report

9 02 p. m.—Weather report

9 03 p. m.—Weather report

9 05 p. m.—Weather report

10 p. m.—Major Alonzo Williams, general manager of the United Electric Rallways, in a five-minute chat with the people of Rhode Island

8 35 p. m.—Roy Partington, tenor, accompanied by Violette Marks.

9 00 p. m.—The Cabin Door,

9 30 p. m.—Automobile Club of Rhode Island.

9 35 p. m.—William I Carrigan, tenor.

10 00 p. m.—Palmolive hour.

11 00 p. m.—Correct time

11 00 p. m.—Correct time

11 00 p. m.—Providence Journal and Evening Bulletin news flashes.

Saturday

10 40 a m.—Providence Journal and Evening Bulletin news flashes.

Saturday

Saturday

10 40 a m.—Providence Journal and Evening Bulletin news flashes.

10.45 a. m.—Musical program

11 00 a m.—Congressional Club talk.

11 15 a. m.—Radio household institute.

1:05 p. m.—Providence Journal and Evening Bulletin news flashes

1:10 p. m.—Walliams and his orchestra.

1:30 p. m.—Walliams and his orchestra.

1:35 p. m.—Al Williams and his orchestra.

1:35 p. m.—Providence Journal and Evening Bulletin news flashes

8:15 p. m.—Providence Journal and Evening Bulletin news flashes

8:20 p. m.—Thomas Cross, tenor.

8:45 p. m.—Baseball scores

8:50 p. m.—Robed Islander Humane Education Society

9:00 p. m.—Correct time.

9:00 p. m.—Correct time.

10:00 p. m.—Providence Journal and Evening Bulletin rews flashes

10:05 p. m.—Baseball scores

WEST-LINCOLN STUDIOS, INC-218 5 50 p m —International Bude Students' 10 45 a m 8.00 p. m — Service from the Church of the Seventh Day Adventist.

Monday. 8:00 p. m—Harold Eddy and his orchestra 8:30 p. m—DeMoley chair under the direc-tion of C. Fred Michelas 9:00 p. m.—Talk by Charles M. Hall of the Oaldand Manachum

6:20 p m .- Providence College orchestra

7 15 p. m.—Organ resital 8.03 p. m.—Rhode Island Welders' pro-gram. 9.00 p. m.—Prof Franklin N. Strickland.

m .- Mrs. Marian Tetreau, astrol-8 00 p. m.—Mis. Marini. 2005. 8.15 p. m.—Movie Club with the Twilight Hawalian quintet and the Movie Club tenor. 9.00 p. m.—Al Blakeley, the novelty man. Friday.

7.00 p. m.—International Bible Students

Thursday.

program. 8 00 p. m.—Steinert Duo-Art program. Saturday. WFCI-FRANK CROOK, INC.-242

Today. *
10.45 a. m.—Service of the Central Falls
Congregational Church. Monday.

2 00 p. m.—Musical program.
6 00 p. m.—Family hour.
6 45 p. m.—Talk by Mrs. Rebert Johnston,
chairman motion picture committee,
Pawtucket Woman's Club.
7:00 p. m.—Baseball acores. 7:05 p m -To be announced Tuesday.

2 00 p. m.—Studio program. 6 00 p. m.—Family hour 7,00 p. m.—Baseball scores. Wednesday. 2 00 p. m.—Musical program
6 00 p. m.—Ernic and his Danceland orchestra
7 00 p. m.—Baseball scores.
7:05 p. m.—Musical program.

Thursday. 2 00 p. m.—Studio program. 6 00 p. m.—Highland four. 7:00 p. m.—Baseball scores 7 05 p. m .- Exide Battery boys. Friday.

2:00 p. m.—Musical program.
6:00 p. m.—Family hour.
7:00 p. m.—Baseball scores.
7:05 p. m.—Musical program.
7.00 p. m.—Ivo Wolverines.
8 00 p. m.—Pawtucket Boys' Club harmonica band. Saturday. 2:00 p. m.—Virginia troubadours. 6:00 p. m.—Family hour. 7:00 p. m.—Baseball scores

WCOT-CONN'S OLYMPIA-225 Today. 1.30 p. m.—Wailana Hawaiians. 2.00 p. m.—Jacob Conn on current events.

2:30 p m.—Studio program. 7:50 p. m.—Blanchard's better be protected hour. 2 30 p. m.—Studio program.
7 30 p. m.—Musical program.
8 00 p. m.—Ernest Reddy, baritone soloist.

Wednesday. 1:30 p. m.—Musical program. 2 00 p m.—Jacob Conn on current events. Thursday. 2 30 p. m.—Studio program. 7:30 p. m.—Olympic radio service hour.

Friday. 2.30 p. m—Ideal Battery entertainers.
7 30 p. m—Organ recital.
8.00 p. m—Musical presentation by Wesleyan Church of the Nazarene. Saturday.

2 30 p. m.—Studio program. 7.30 p. m.—Rooney's pioneer entertainers

OUT OF TOWN STATIONS

To-Day

KDKA-PITTSBURGH-316. 10:45 a. m.—Correct time. 11:00 a. m.—Church service 2 00 p. m.—Same as WJZ.
4 00 p. m.—Correct time.
4 00 p. m.—Organ recital.
4 15 p. m.—Service from Shadyside Presbyterian Church.
6 08 p. m.—Baseball scores
6 15 p. m.—Symphony orchestra.
6 00 p. m.—Same as WJAR
7:00 p. m.—Same as WJAR
7:00 p. m.—Same as WJZ.
9 15 p. m.—Same as WJZ.
9 15 p. m.—Same as WJZ.
10:00 p. m.—Same as WJZ. m.-Same as WJZ

WAAM—NEW ARK—349.

11:00 a. m.—Service from Second Presbyterian Church,

3:30 p. m.—William Mendel, piano novelties. 4.00 p. m -- Myron Tymkevica, concert vio-linist.

WBAL-BALTIMORE-286. 7:00 p. m.—Concert orchestra. 8:15 p. m.—Collier's radio hour. WBSO—BABSON PARK—286.

WBZ—SPRINGF(ELD—333,
10 45 n. — Unity Church service,
2 00 p. m.—Same as WJZ.
3 00 p. m.—Joe Mitch-Il Chapple,
4 00 p. m.—Merican Legion hour,
5 30 p. m.—Mational religions service,
6 30 p. m.—Musical program
7 00 p. m.—Gorrect time and baseball,
7 06 p. m.—Blue and gold hour,
8 00 p. m.—Ensemble,
8 15 p. m.—Sume as WJZ
9 15 p. m.—Utica jublice singers,
9 45 p. m.—Phantom and Shacow.

9 15 p. m.—Utica Jubilee singers. 9 45 p. m.—Phantoin and Shacow. 1943 p. m.—ranzom and Shacow.
10.00 p. m.—Correct time.
10.11 p. m.—Contnuttion of program.
10.15 p. m.—Baseball.
10.20 p. m.—Musical program
11.00 p. m.—Correct time and weather reports.

WEAF—NEW YORK—192.

100 p m—Hour of chamber music with Katherins Palmer, soprano.

200 p m.—Interdenominational Church services under the direction of the Greater New Yook Federation of Churches.

3 00 p m.—Same as WAAR.

4.00 p. m.—Genia Zie'ingki, seprano, with Windred Cornish, pirnist.

4:20 p. m.—National sping orchestra with Marie Montana, soprano.

5 30 p. m.—Forty Chorus of Elks of Pitts-ville. WEAF-NEW YORK-192.

5 30 p. m.-ville. 6 00 p. m.—Same as WJAR.
7 00 p. m.—Haus Barth, concert planist.
7 25 p. m.—Baseball scores
7 30 p. m.—Same as WJAR.
9 00 p. m.—Same as WJAR.
9 15 p. m.—Atwater 'Cent heur.
9 45 p. m.—Correct time
9 45 p. m.—Biblical drama

WEEL-BOSTON-118

WELI—BOSTON—118

10 44 a. m.—Westmünster chimes
10 13 a. m.—Service from the First Church
of Christ Scientist
5 20 p. m.—Same as WJAR.
7 13 p. m.—Westminster chimes.
7 20 p. m.—Westminster chimes.
7 20 p. m.—Musical grogram.
6 03 p. m.—Sager hour of hespitality.
9 00 p. m.—Sager hour of hespitality.
9 15 p. m.—Same as WEAF.
9 45 p. m.—Correct time
9 45 p. m.—News disortens. WFI-PHILADELPHIA-405

a. m -Service from Arch Street Meth-odist Episcopal Church. odist Episcopal Church.

4 30 p m.—Service under the auspices of the Church Federation of Philadelphia.

6:00 p m.—Seme as WJAR.

9 15 p m.—Organ rectial

9 45 p m.—Same as WEAF

9 15 p. m -Radio ministrels. WGR-BUFFALO-303

WGR—BUFFALO—303

10 45 a m—Service from Westminster Presberlan Church
12 00 m.—Weather report
6 00 p. m—Same as WJAR
7 00 p m—Baseball scores.
7 30 p m—Service from Central Presbyterlan Church
9 00 p m—Same as WJAR
9 15 p m—Same as WEAF. 5.00 p. m.—Service from Wash edrel.
600 p m.—Same 28 WJAR
7.30 p m.—Sime as WJAR,
9.00 p. m.—Same as WJAR,
9.15 p m.—Correct time
9.15 p m.—Came as WEAF
10.15 p m.—Same as WEAF
10.15 p m.—Same as WEAF
10.15 p m.—Same as WEAF the Oakland Metaoleum
Tucsday.

p m.—New Victor releases
p m.—Taik by Carries M. Hall of the
Oakland Mausoleum
WGY—SCHENECTADY—380
Church
5 00 p m.—String orchectra, soloist.
6 00 p m.—String orchectra, soloist.
6 00 p m.—String orchectra, soloist.
7 00 p m.—String orchectra, soloist.
7 00 p m.—Same as WJAR
7 00 p m.—Same as WJAR
7 00 p m.—Same as WJAR.

Today's Programs in Brief

For the convenience of radio fan-the following hourly schedule of broadcasting today is given in brief form. Figures following station de-note wave length. The hours are based on Eastern Daylight Saving Time. 4:15-Music, WPG, 273. LOCAL STATIONS

10.45—Church, WFCI, 242. 11.00—Church, WEAN, 275. 1.30—Concert, WCOT, 225. 2:00—Music, WEAN, 275. Talk, WCOT, 225. 3.00-Music, WEAN, 275. Conference, WJAR, 484. 4:00-Music, WEAN, 275. 5:30-Lecture, WLSI, 248. 6.00-Band, WJAR, 484. 6 30—Organ, WEAN. 275. 7 00—Music, WEAN, 275.

7.25-Weather, WJAR, 484. 7 30-Music, WJAR, 484. 8.00—Correct time. WEAN, 275, Church, WLSI, 248. 8.01—Music, WEAN, 275. 9.00—Music, WEAN, 275. Talk, WJAR, 484. 9 15—Music, WJAR, 484.

9 30-Music, WEAN, 275. 10 00-Music, WEAN, 275. 10.15-Music, WEAN, 275. News, WJAR, 484 EASTERN STATIONS 9:00—Children's hour, WJZ, 454; WPAP, 353. 9:30-Church, WKBW, 217.

10.20—Church, WFI, 405. 10:30—Church, WGY, 380; 280. 10 44-Chimes, WEEI, 448. 10.45—Church, WGR, 303; WKBW, 217, WBZ, 333; WEEI, 448. 11:00—Church, KDKA, 316: WQAO, 395, WAAM, 349.

395, WAAM, 349.
12:00—Church, WRC, 469.
12:30—Organ, WHN, 393.
1.00—Peature, WJZ, 754: WHN, 326.
Music, WEAF, 402. WRC, 469.
Organ, WKBW, 217.
2.00—Church, WEAF, 492.
Orchestra, WHN, 396.
Feature, WICC, 265.
Music, WHAM, 280.
Roxy and his gang, KDKA, 316: WBZ, 333. WJZ, 434.
WRC, 469.
2:30—Sunday school, WOO, 349. 316: WBZ, 333, WJZ, 434, WRC, 469.
2:30—Sunday school, WOO, 349.
Special, WNYC, 526, Music, WKBW, 217.
3:00—Feature, WQAO, 395, Music, WBZ, 333. WOR, 422.
Ensemble, WJZ, 454.
Conference, WEAF, 492, WTIC, 535; WICC, 265.
Church, WRC, 469.
3:15—Organ, WPG, 273
3:25—Music, WHAM, 280
3:30—Music, WAAM, 349, WJZ, 454.
3:55—Vespers, WJZ, 454.

9:15 p. m.—Same as WEAF. 9:45 p. m.—Correct time. 9:45 p. in.—Same as WEAF.

WHAM—ROCHESTER—280

10.30 a. m.—Morning church service.
2.00 p. m.—Down Melody Lane.
3.25 p. m.—Popular concert
4.00 p. m.—Musical milestones, Marjoric
T. MacKown.
4.30 p. m.—National religious servise.
5.30 p. m.—Studio program.
6.30 p. m.—Studio program.

4.30 p. m.—National religious service.
5 30 p. m.—Studio program.
6 30 p. m.—Dinner concert.
7 00 p. m.—Tommy Weir, tenor, and Frank
Nanna, pianist.
7 25 p. m.—Theatre party.
8 45 p. m.—Studio program.
9 00 p. m.—Organ recital.
10.00 p. m.—Weather forecast.

WHAP-NEW YORK-200.

WHN-NEW YORK-396.

WIIN-NEW YORK-306.

1 30 p. m.—Organ recital
1.00 p. m.—Three Little Sachs.
2 00 p. m.—Orchestra.
4.30 p. m.—Alexander Light, eminent
Shakespearean actor and scholar.
5 00 p. m.—Dance orchestra.
6:30 p. m.—Eldridge and Bentum European circus from Iceland.
7:00 p. m.—Orchestra.
10.00 p. m.—Organ recital.
11:30 p. m.—Orchestra.
12:00 p. m.—Orchestra.

WICC-BRIDGEPORT-265.

WIP-PHILADELPHIA-319.

10:45 a m-Service from Holy Trinity
Church.

10:15 a. m.—Symphony orchestra.

9:00 a, m.—NEW YORK—154, 9:00 a, m.—Children's hour, 1:00 p. m.—National concert orchestra, 2:00 p. m.—Ensemble

m.—Bisemole
m.—Music of the masters,
m.—St. George's Church

5:30 p. m.—St. George's Church vesper services
5:30 p. m.—National religious service.
6:30 p. m.—Cook's travelogue.
7:00 p. m.—Correct time.
7:00 p. m.—Oragan music assisted by a mixed quartet
8:00 p. m.—Classical trio.
8:15 p. m.—Collier's radio hour.
9:15 p. m.—Ulica jublice singers.
9:45 p. m.—High spots of melody.
10:00 p. m.—Correct time.
10:00 p. m.—High roots of melody.

10:00 p. m.—Correct time. 10:00 p. m.—High spots of melody. 10:15 p. m.—Don Amaizo, the wizard.

WKBW-BUFFALO-217.

9.30 a. m.—Episcopal service
10:45 a. m.—Public worship.
1.00 p. m—Organ recital
2.30 p m—Polish program.
7.00 p. m.—Evangelistic service.
10:15 p. m.—Back home Gospel melody hour.

WLWI-NEW YORK-370.

8.00 p. m .- Service from Paulist Church.

WNYC-NEW YORK-526. 2 30 p m.—Annual memorial service of th American Legion at Prospect Park.

WOO-PHILADELPHIA-319.

2:30 p. m.—Sunday school.
6:00 p. m.—Organ recital.
7:00 p. m.—Concert trio.
7:30 p. m.—Service from Bethany Presbyterian Church.

WOR-NEWARK-122.

WOR-NEWARK-127.

3 00 p. m.—Same as WEAN.

4.00 p. m.—Same as WEAN.

7:45 p. m.—Vesper organ

8:45 p. m.—Randall Hargreaves, song discourse.

9:00 p. m.—Same as WEAN.

10 00 p. m.—Same as WEAN.

10 01 p. m.—Same as WEAN.

WPAP-PALISADES-305.

WPG-ATLANTIC CITY-273.

3.15 p. m.—Organ recital.

4.15 p. m.—Community vocal and instrumental recital

5:15 p. m.—Religious service.

9:00 p. m.—News flashes and baseball secres.

9:10 p. m.—Concert orchestra.

10:00 p. m.—Correct time.

10:00 p. m.—Sunday evening musicale.

WQAQ-NEW YORK-195

WRC-WASHINGTON-169.

3 00 p. m.—Same as WJAR. 4:00 p. m.—Same as WJAR 5:00 p. m.—Service from Washington Cath

WTAG-WORCESTER-517

2 00 m.—Church service 1:00 p. m—Chamber music 2:00 p. m.—Bame as WJZ

6.00 p ri -Same as WJAR.

m—Caltery morning service m—Inspiration hour m—Calvary evening service.

9.00 a. m.-Children's hour.

S--- 151.

2 00 p. m.—Popular orchestra program. 3:00 p. m.—Studio program. 4:00 p. m.—American Legion program.

p. m —Sacred choral music. p. m.—Augusta E. Stetson, C. S. D., Christian Science reading from the writings of Mary Baker Eddy and re-

marks.

o. m.—Sibyl Marvin Huse, religious

WHAM-ROCHESTER-280

4:00-Organ, KDKA, 316. WHAM, Conference, WEAF, 493, WRC, 463. Music, WOR, 422, WAAM, 349; WICC, 265 Band, WBZ, 333.

4.30—Feature, WHN, 396; WAAM, 349, WEAF, 492, Church, WF1, 405; WHAM, 280

Church, WFI, 405: WHAM, 280

4 45 — Vespers, KDKA, 316.
3.00 — Church, WRC, 469.
Orchestra, WHN, 336.
Music, WAAM, 349.
5:15 — Church, WPG, 273.
5:30 — Church, WBAL, 286: WJZ, 454: WBZ, 333. WHAM, 280.
Music, WEAF, 492. WGY, 380; WEEI, 448. WAAM, 349.
6.00 — Band, WEAF, 492. WGR, 303; KDKA, 316. WTAG, 517. WFI, 403. WTIC, 535. WEEI, 448. Music, WGY, 380, WRC, 469. Organ, WOO, 349.
6.08 — Basbail scores, KDKA, 316.
6:15 — Orchestra, KDKA, 316.
6:30 — Feature, WHN, 396.
Music, WJZ, 454. WBZ, 333.
FORUM, WHAM, 280.
7 00 — Music, WGY, 380. WBAL, 286; WOO, 349. WTIC, 535. WHAM, 280. WHN, 366.
Raseball scores, WEAF, 492; WTAG, 517; WGR, 303. Church, KDKA, 316. WKBW, 217.
Organ, WJZ, 454.

Church, KDKA, 316. WKBW, 217.

Organ, WJZ, 454.

7 05 - Music, WJZ, 454.

7 10 - Chimes, WEZ, 333.

7 10 - Chimes, WEZ, 335.

7 20 - Music, WIAM, 280.

Baseball scores, WEAF, 492.

7 30 - Music, WEEI, 448.
Church, WOR, 303. WOO, 349.
WQAO, 395.
Capitol Theatre program,
WEAF, 492. WRC, 460. WTAG, 517. WTIC, 535. WGY, 380.

7.45 - Feature, WOR, 422.

8 20 - Music, WEEI, 448. WJZ, 454.
WBZ, 333. WHAP, 236.

8 15 - Music, KDKA, 316. WBZ, 333:
WBAL, 286. WJZ, 454.

8 30 - Reading, WHAP, 236.

8 45 - Music, KDKA, 316. WBZ, 333:
WBAL, 286. WJZ, 454.

8 30 - Reading, WHAP, 236.

8 45 - Music, WGR, 422. WHAM, 280, 517. WTIC, 535.
Feature, WOR, 422
Music, WHAM, 280.
News, WPG, 273. WEEI, 448.

9 10 - Music, WG, 273. WEEI, 448.

9 10 - Music, WG, 273. WEEI, 448.

9 11 - Organ, WFI, 405.
Atwater Kent hour, WEAF, 402. WGP, 330, WEEI, 448.
Biseball scores, WTIC, 535.
Music, WGP, 380. WBC, 333:
KDKA, 316. WJZ, 454: WTAG, 517.

9 30 - Reader, WHAP, 236.

517.
9.30—Render, WHAP, 236.
Music, WOR, 422.
9.45—Music, KDKA, 316: WJZ, 454;
WEEI, 448. WBZ, 333.
Drama, WEAF, 492. WFI, 405;
WGY, 380.

WTIC-HARTFORD-535.

The Dial's Diary

By the Trouble-Shooter

Since the radio world turned to con-

speakers and the various types of re-

producers which accentuate the low irequencies, there has been no end to

complaints about crackling noises. In majority of cases these are static, but there is just enough man-made static

in the vicinity of the average set to suggest the value of making certain

First of all, there are the electrical

appliances used in the home. For-

tunately, the average electric refrigeta-tor installation is at the opposite one

of the house under or in the kitchen, whereas the radio is in the living room. Only when the motors of these refrig-

equipped with an open fireplace they

thus close to the radio set. Here, now-ever, proper servicing of the motor usu-

ally eliminates any interference with

the radio set. Where burners are ignited electrically there will be an unavoid-

able period of intense crackling during

Heating pads are a source of much

chances are that when one is using

such a pad one isn't particularly in-

somewhat by by-passing at the base-board plug. Use a double outlet plug

and plug the set to one side. To the other side connect a condenser. This should be one capable of an AC operat-

ing voltage of 200 and should be of the two to four mfd, type.

ANSWERS TO RADIO TEST.

1. Couple them by induction rather than by actual connection. Let the

outside aerial be wired in series with a

wave trap near the loop and let the

latter pick up the wave energy by in

2. Forty-five dollars for the first

5. No. Out in the open country is better. Many stations have been erected

to the innovation. The advertising value

COAST GUARD CLASS

Five Chief Radiomen to Study Radio

Englueering,

rather advanced nature of the studies.

sary for a comprehension and under-standing of radio principles,

pulls like a Missouri mule.

three minutes and \$10 a minute there-

a 10 per cent, overload.

4. Twenty,

These disturbances can be reduced

which it is best to switch off the jet.
This period lasts for about a minute.

rouble in this connection; but

terested in a radio set.

duction.

erators are in bad condition. sparking excessively, are they trouble-

changes to minimize it.

the living room.

3.03 p. m.—Same as WJAR.
6 00 p. m.—Same as WJAR.
7 00 p. m.—Old world cathedrals.
7 20 p. m.—Edward Rochan, tenor.
7 30 p. m.—Same as WEAP.
9.00 p m.—Same as WEAP.
9.15 p. m.—Baseball scores.

7.00 p. m.-Baseball scores.
7.05 p. in.-Organ recital.
7.30 p m.-Same as WJAR.
9.00 p. m.-Same as WJAR.
9.15 p m.-Correct time.
9.15 p. m.-Correct program.
10.00 p. m.-News bulletin.

10.00-Music, WOR, 422. KDKA, 316, WHN, 396, WPG, 273, WJZ, 454.

10.01-Music, WBZ, 333. 10.01—Music, WBZ, 33.3.

10.15—Band, WOR, 422.
Music, WJZ, 454, KDKA, 316;
WKBW, 217.
Drama, WRC, 469
Baseball, WBZ, 333.

10 20—Music, WBZ, 333.

11 00-Organ, WHN, 296. 11:30-Orchestra, WHN, 296. 12.00-Orchestra, WHN, 206. Church, WBSO, 384. DISTANT STATIONS

12 45--Feature, WGHP, 277. 2 00—Roxy and his gang, KYW, 526; WOC, 294. Music, WMAQ, 448. 3 00-Conference, WOC, 353
Music, WGHP, 294, WMAG, 448, KGO, 384. 30-Band, WLW, 428; WIBO, 304.

3.45-Baseball, WMAQ, 448. 4 00-Conference, KOA, 326. WSAI, 4 45-Band, WLW, 448.

5 00-Music, KNX, 336. 5 30—Music, WMAQ, 448, WLW, 428; KYW, 526, WIBO, 304, 6 00--Music, KFI, 469 6.15-MIIAIC, WMAQ, 418.

6.15 — Music, WMAQ, 448.
6.30 — Music, KGO, 384, WJR, 441;
WLW, 448.
7.00 — Music, WMAQ, 448, KYW, 526;
KNX, 336, WLW, 448.
7.30 — Capitol Theatre program, W3B,
478, KOA, 326, WSM, 337,
Music, KFI, 469
7.45 — Music, WLW, 428
7.50 — Orchestra, WMAQ, 448.
8.00 — Music, KFI, 469
Talk, WMAQ, 448.
8.10 — Trio, WIBO, 304
8.15 — Collier's radio hour, KOA, 326;
KYW, 526, WJR, 441, WLW,
428.

KYW, 526, WJR, 441, WLW, 428, Music, \$VIBO, 304, 9.00-Talk, WSB, 476, KNX, 326; WCG, 353, Music, WGHP, 277; KFI, 469, 9.15-Talk, KFI, 469, Music, KOA, 326, WIBO, 304, Atwater Kent hour, KGO, 384; WCG, 575, 9.17-Talk, KYW, 526, 9.30-Music, KI, 469, 9.37-Music, KYW, 526, 9.45-Music, WCK, 375, 10.15-Music, WOA, 375, 10.15-Music, WMAQ, 448; KOA, 326;

9:45—Muric, WOC, 375

10:15—Muric, WMAQ, 448; KOA, 326; WLW, 448, frature, KYW, 526, 10:36—Muric, KPI, 469

10:36—Muric, KPI, 469, KNX, 336; WIFO, 204, WMAQ, 448, WGIP, 277

11:15—Muric, WOC, 375, 11:45—Muric, WOC, 375, 11:45—Muric, WOC, 375, 11:45—Muric, WTMJ, 294, 12:30—Muric, KPI, 469, KNX, 336, 12:30—Muric, KPI, 469, KNX, 336, 10:30—Orchestra, KPI, 469,

Receiver Construction Not as Those in the Last Two Years Should

Fan Should Be Certain All Parts Are at Hand Before He Starts Work .- Mustering Basic Circults lissential to Thorough sire first to make ture that they really are worn out or antiquated. Knowledge of Radio.

Building that first radio set appears formidable and folbidding until you have actually tried it. Yet if you tackle your first radio set or amplifier or power unit, you are almost certain to tackle others in the future not only for the fascination of the thing when once confidence has been gained, but also for the results that may be obtained from

The first essential in building a radic set or amplifier or power unit is to obtain the necessary parts. Nothing is more irritating or disappointing than to launch upon the constructional work. enly to find that this, that or the other component is missing. And quite aside from components or parts, there are the Oil burners usually are placed nearer he living room. Where homes are solder, screws, nuts, baseboard and fully. other non-radio yet nevertheless quite cesential things that go into a radi assembly,

are very likely to have the oil butner directly under the living room and With the parts on hand, the next step s to decide on how the components are o be arranged on the baseboard, panel or whatnot. The parts should be ar-langed with the mechanical, electrical, radio and symmetrical factors in mind. with special preference given to the mechanical and radio considerations. there are sockets, the tubes should be temporarily inserted so as to make sure they clear the other parts by a suffi-cient margin. There should be some thought to the subsequent wiring, such as keeping it short and simple, as well as accessible for the soldering fron.

There is nothing difficult oldering, especially with a good grade of rosin-core solder. The main thing wire are clean so as to take the flux and the solder. In the case of nickel-plated terminals, these should be scraped clean with a file or emery cloth, shows through. Otherwise it is the devil's own job to make the solder take

in the city, some to attract attention are only a handful of really basic radio circuits. These basic circuits are used of the city antenna, however, has been more than offset by poor broadcasting results.

Over and over again in various forms. Hence, if the reader is familiar with these basic circuits, he is familiar with the entire radio art until such time as a really new circuit makes its appearance. Our basic circuits today are: 1. The simple vacuum tube detector. which is in general use today,

The next Coast Guard class in the employed alone or in combination with sidered from radiomen having the nec-essary qualifications. Owing to the self-amplification. 4. Audio-frequency amplification, which serves to build up the audio out-

it is desirable that the radiomen as-signed to take this course be well put of the detector to such proportions grounded in the mathematics neces- as may be required for operating headphones of loud-speaker. 5 Tuned radio-frequency amplifica A Journal and Bulletin Classified Ad energy from one stage to the next.

ON BUILDING SET

Difficult as It Seems

many home-made jobs.

wave trap which, in turn, should be connected to the ground. Place the The diagram should be religiously followed, unless the builder feels safe in deviating from the very letter of instructions. To avoid confusion, it is well to cross off each wire as it is con-nected in place, so that the builder knows precisely what has so far been cone and what remains shead of him. Once the assembly is complete, the 3. As a service to buyers. A tube's life may be cut in half by so little as tubes should first be inserted withou plate voltage, if possible. If they light it is a safe indication that the plate

circuits may next be tried.

Despite the constant appearance of new circuits in the radio press, there 2. The simple crystal detector, either

Naval Radio Material School at Belle-vue, D. C., will commence on or about July 1. Five Coast Guard chief radio-tent in vacuum tube reflex circuits, 3. The regenerative detector, in men will be assigned to this class for 3. The regenerative detector, in a six months course in radio engineer- which the plate current or output of the detector tube is returned to the Applications for detail will be con-defered from radiomen having the nee-

tion, in which each stage is tuned so as

6. Untuned radio-frequency ampli-

USEFUL POINTERS

So many claims are made for loud-speakers that the average radioist seek-ing to better his reception is tempted to scrap his old equipment instead of sending it to a radio expert for serv-icing. If speakers cost a little more than they do there wou'd be less will-ingness to discard them and more de-sire first to make the thet there were

The average speaker of good quality, in service for the last two years, can profit by a little attention and can be made to last for some time to the owner's satisfaction. It isn't necessary to consider it worn out or out of date just because newer and better speak ers have been developed and marketed Some very simple things can happen to speakers to render them inefficient.
Usually they are loosened and dis-

turbed through hard usage and through being forced to carry heavy loads of current, especially where they are not protected by filters,

Being so portable, speakers suffer many falls during their lives and not infrequently are victims of the curi-osity of owners who desire to experi-ment with the driving mechanism, but

fication making use of transformers of resistance coupling, which requires no adjustments although at some sacrific

in efficiency.
7. The reflex circuit, whereby one or more tubes are made to do double duty first as radio-frequency amplifiers and then as audio-frequency amplifiers.

8. The super-heterodyne circuit, whereby the incoming radio carrier wave is delivered to a first detector and set into interference with a locally produced frequency, so that the difference between the two or "beat" effect is of ultable frequency to be handled efficiently by a fixed intermediate frequency amplifier and passed on to a second detector for conversion into judio frequency energy for operating the loud-speaker.
It should be noted that the foregoing

basic circuits are often grouped into a single receiver. Thus we find regenera-tion combined with radio-frequency amplification in a large number of present-day circuits. We find tuned radio-frequency amplification in the vast majority of latest circuits, the main claim to novelty usually being the stabilizing method employed. The superheterodyne versions are numerous, yet all make use of the general principle of setting up a heterodyne interference or third frequency which can be passed through a fixed amplifier known as the intermediate frequency amplifier,

WHEN YOU lose anything, the Classified Section becomes a necessity.

Marshall & Co. Authorized Radiola Service re They KNOW The Neutrodyne R-A-D-I-O Exclusively 94 DORRANCE STREET Opp. Narragansett Hotel

DISTANCE! Can You Get Distance?

Is You Set Operating Poorly? Have you some special radio engi-neering problem? CALL

> "OF BROADCAST FAME" **DEXTER 7274** TRAINED EXPERTS
> IN ATTENDANCE

EFFECT OF AERIAL Average Maximum Range for These ON SET RECEPTION A great many questions have been recently by rural fans, with re-

CRYSTAL SETS

About 30 Miles.

cities wehre there are a number of

different broadcasters.
When it comes to distances often claimed for crystal sets—500 miles or even more—such statements should be

taken with a grain of salt. At times, it

is perfectly true, phenomenal distances can be covered with a crystal detector

On the average, however, even a dis

tance of 50 miles at night can be considered very nearly a maximum, except under very favorable conditions. This means a very sensitive pair of 'phones, a good high aerial, and an open and

two near-by stations. The tonal quali-

X-RAY IN NEW ROLE

Trouble-Shooter. George Clissold, London radio expert,

SERVICING SPEAKERS

Have Attention.

high location.

radio set.

cuit is 200 metres or less and so does not interfere with reception of the sta-tions from about 250 or 300 metres and

up.

However, we find that reception of stations on the higher wave lengths is rather poor, except for locals. This is considerably caused by the fact that the set itself is less efficient on the longer waves, but is partly caused also by the fact that the transfer of energy from the aerial to the set is not great another. This can be increased in two

In the latter method there must be

On this account some sets which aim for very fine results for distant and

faint stations provide an extra attach.

faint stations provide an extra attachment for changing the aerial coupling. Sometimes there are extra binding posts, labelled "short antenna," "long antenna," "medium antenna," etc. Other sets just have a switch labelled "antenna adjustment," and the user can change this to suit.

Where the aerial is so large that on the corter wave stations are pretty.

the shorter wave stations are pretty well jumbled up and if it is impossible

or difficult to tune low enough, a use-

ful suggestion is to insert between the

of about .0005 mfds, capacity. In extreme cases one of .00025 mfds, will be

A very good method for one who finds difficulty in covering the entire wave band successfully can be pointed

out, and the suggestion involves he changes in the set itself. Obtain a fixed

condenser of .00025 size and one of .0005 size. Obtain also a small spring clip for making connections. Disconnect the aerial wire from the set and attach it to one terminal of both con-

densers. Next fasten a short length of wire to the aerial binding post and to the spring clip. Fasten the clip to the spring the set operations of the set of the set

metres.
Inserting such a condenser is a goo; way to reduce interference for the

stronger local stations that come if

RADIO IN AFRICA

"Jo'burg," Durban,

If you have been working all day in

a cave on a Hottentot reservation in southwest Africa the radio evidently

helps a lot to while away the long eve

Fred Greeley, one of the American solar observers of the National Geo

graphic Society's expedition at Mi Brukkaros, southwest Africa, write

"We heard Bach's 'Air for G String-

over the radio tonight, played by one of the artists of the Cape Town Jym

phony Orchestra. It was well done

The radio has given us a lot of pleasure. There is static sometimes. Jo';

burg (Johannesburg) and Durban and

easily within our reach, but the statio

from the Cape oomes in best ar strongest."

The Hottentots call the solar radia

tion observers the "guardians of the sun" They are taking sun observations in the effort to evolve a method clong range weather forecasting. The

apparatus ir housed in a cave.

home:

Explorers Enjoy Broadcasts

louder than required anyway.

aerial and the set a fixed condens

best.

of the antenna circuit.

gard to the possibilities of long-distance work with a crystal receiving set. Ordinarily the crystal set has a useful and reliable range of 25 to 30 miles in daylight. It is necessary to have a Size Has Important Bearing On Selectivity and Range good aerial even then. Since the crystal act is not very selective, a good deal of trouble is had with one near large

enough. This can be increased in two days—either by making the aerial longer, so as to pick up more energy, or by increasing the coupling between the aerial and the set. High Antenna Means Low Capacity, Necessary for Best Remore turns of wire wound on the an-tenna coil. Any method that is used for such an increase in energy transsults .- Ideal Method Is to Erect Vertical Wire,-Blow to Solve for also raises the natural wave length Problems Explained.

BY BRAINARD FOOTE Sometimes your aerial may be of uch an unfortunate size that your radio results are seriously affected with-out your being aware of the fact. Generally speaking, and within limits, it may be said that the bigger the aerial the stronger the reception.

Crystal sets have many worth-while uses. As a plaything for an interested child they are unequalled, for they are However, the aerial has a number of effects upon the reception, altering the tuning control, the selectivity, the collow-priced, have no upkeep cost, are not easily damaged, and are simple to ume, ctc. No aerial can be said to be "Just the right size or shape," as the operate. For the entertainment of an invalid who can use headphones right along they can be well recommended. same aerial would act differently when connected to different receiving sets.

Accordingly, it is only possible to such person is apt to be satisfied with consistent entertainment from one or

make the aerial approximately right to suit the average set or the set conties are, of course, very fine, and the headphone wearer hears a great deal templated, and if desired to make any alterations later on. Now the aerial circuit, which includes the earth unn a musical selection that is usually lost on the speaker.

But don't count on crystal sets to derneath the acrial as well as the aerial cover hundreds of miles, except erratically and occasionally, and don't expect a high degree of selectivity. itself, and also the lead-in wire from the set, the ground wire from the set and the aerial coil inside the set, has a definite "frequency" or wave length

of its own. Perhaps you understand the meaning of the term "capacity" as applied in electricity. At any rate, consider two metal discs, held a certain distance metal discs, held a certain distance apart. These discs can be electrically charged with energy, and this energy will remain on the discs for a period denser and the tuning will be sharpe. London Expert Uses Device as Radio uses an X-ray to discover breaks in his A perfect "condenser" like this would on the shorter waves, and clip to the retain the charge forever unless dis- 0.0025 condenser for best results at 200 He owns a receiver guaranteed for a charged, but there are leakage and certain length of time so long as the panel seal is not broken. His instruother factors involved. Anyway, the "capacity" of this condenser to take ment developed a fault. Although up the charge of electricity is increased if the area of the plates or discs is increased and if the distance between quite sure that the receiver was at fault, he was loth to investigate further

because of the seal,
A friend is an X-ray photographer, A friend is an X-ray photographer, and he decided to have an X-ray photograph of the receiver taken. The picture disclosed that one wire was picture disclosed that one wire was picture disclosed that one wire was tions. Others are fixed and sealed up for permanency. The arrial circuit is the plates is reduced. pleture disclosed that one wire had loose, being just held by the insulation. for permanency. The acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation. For permanency, the acrial energy loose, being just held by the insulation in the acrial energy loose, and the acrial energy loose energy loose, and the acrial energy loose ener broke the seal they would find a certain been mentioning. The size of the aerial southwise disconnected, but he omitted to thus affects the capacity. If the aerial helps of mention how he knew. His reputation is lowered the capacity increases, and in the relief the capacity is described to the capacity is described. s a radio expert went up when reas it is raised the capacity is de-

pairers found that his diagnosis was The ideal radio receiving aerial does not have any more capacity than it can help, so for this reason the ideal radio aerial is a vertical wire-straight up in aerial is a vertical wire—straight up in the air. Attach a wire to a balloon that somehow will remain directly overhead and you've got an aerial that is truly remarkable in results. The idea is to have plenty of wire—so as to collect all the possible energy—but to keep the capacity low. This means, of course, altitude.

By viriue of the fact that the serial So many claims are made for loud-

By virtue of the fact that the aerial is composed of wire, like a coil (only inwound), and because it has capacity (aerial as one plate of a condenser and ground as another) it forms a tuned circuit just lik a coil of wire and a variable condenser in the receiving set. If the frequency of this aerial circuit should be somewhere in the broadcast band it will have a bad effect upon the operation of the set. Generally the "natural wave length" of the aerial cir-

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