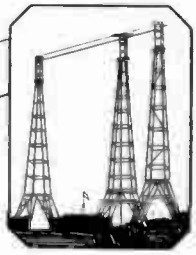
NATIONAL RADIO NEWS



FROM N.R.I. TRAINING HEADQUARTERS

Vol. 1—No. 5 WASHINGTON, D. C. SEPT., 1928

We're Going On the Air

Be sure and Listen in — tell all your friends to "tune in". Radio-Trician Program of interesting talks and good music.

On These Dates

Oct.2, Oct.9, Oct.16, Oct.23

From 8 to 8:30 P. M. Eastern Standard Time

Over these National Broadcasting Company Stations

WEAF	New York	**WGY**	Schenectady	**KYW**	Chicago
WTIC	Hartford	**WGR**	Buffalo	**KSD**	St. Louis
WJAR	Providence	**WCAE**	Pittsburgh	**WOC**	Davenport
WTAG	Worcester, Mass.	**WTAM**	Cleveland	**WHO**	Des Moines
WCSH	Portland, Maine	**WWJ**	Detroit	**WOW**	Omaha
WFI	Philadelphia	**WSAI**	Cincinnati	**WDAF**	Kansas City
		WRC	Washington, D. C.		

Read Full Details Inside

HERE are those snappy, peppy Radio-Tricians who are going to broadcast a "bang-up" program of music over the National Broadcasting Company's chain of stations listed on the outside page. These programs will consist of both old-time and modern pieces. Westell Gordon of Capitol Theatre (New York) fame will entertain you with your favorite songs.

And here's another treat for you—right along with these interesting musical programs will be short, helpful talks by prominent men on subjects that interest you. The names of these speakers, their subjects and the dates on which they will speak are printed at the bottom of this page.

These interesting, helpful talks and good music are being broadcast for your benefit. They will advertise you and help you build up your leadership in Radio in your community. Indeed, this is something that N. R. I. students, graduates and the many friends of the Institute will want to listen in on. So keep your own set in working order and get those of your friends straightened out so that we can all get in on these programs.

At the same time just send in the names and addresses of your friends who are interested and want to learn more about the Radio course.

Remember the dates. All programs are from 8:00 to 8:30 p. m. Eastern Standard time. Here are the speakers and their subjects:

OCTOBER 2

S. L. "ROXY" ROTHAFEL

well known to Radio audiences

THE FUTURE OF RADIO BROADCASTING

OCTOBER 16

J. E. SMITH

President, N. R. I.

THE MAN-POWER AND MECHANISM BACK OF RADIO

OCTOBER 9

DR. J. H. DELLINGER

Chief Engineer, Federal Radio Commission

WHAT THE U. S. GOVERNMENT IS DOING TO ADVANCE RADIO

OCTOBER 23

DR. C. FRANCIS JENKINS

Inventor of Jenkins system of Television

MODERN DEVELOPMENTS IN TELEVISION AND RADIO-VISION

National Radio News

Published in the interest of
N. R. I. students and graduates, by the
NATIONAL RADIO INSTITUTE,
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J. E. SMITH, Publisher; E. R. HAAS, Editor
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NATIONAL RADIO INSTITUTE

Washington, D. C. September, 1928

Students, graduates — this is your magazine. The National Radio News is published for your benefit. You can help make it interesting by sending in contributions of interest to other students. Tell others thru the "News" how you make spare-time money, etc. Send in Newspaper clippings from your local paper about your own achievements in Radio. Let's make the "News" the most interesting, helpful student paper in the U. S. A.

—Editor.

Just Between You and Me—

THIS is one of Radio's big years. The comparatively short, yet colorful history of Radio has never experienced a year with such promising outlook as this one gives. Convincing and satisfactory reports of progress and opportunity for trained Radio-Tricians come from every section of the country.

In the early summer Radio got off to a running start at the Radio Manufacturers' Association Convention in Chicago. Twenty thousand Radio manufacturers, dealers, jobbers and enthusiasts were there. New ideas for new apparatus, ways and means of cooperation and plans for the development and promotion of Radio were exchanged at the convention. It is significant that the little giant of industry—Radio—should make the world sit up and take notice by staging the biggest convention in the history of Trade Associations.

Another sign of progress has been the remarkable developments made in the field of Short-Wave Beam Transmission, and its adoption by the leading communication companies. The Beam system now belts the world and carries a heavy volume of traffic at rates much lower than the usual cable prices. Thousands of trained Radio men will find this a rich field of opportunity as it further develops and expands.

Right along with these big strides comes the announcement that the United States Government needs Radio operators in their Light House units, and Radio beacon operators to handle the Aircraft Beacons throughout the country. Here, again, a new and promising field of opportunity is opening to trained Radio men, for experts who know say the future development of Aviation depends upon Radio.

But the most outstanding development of the year in Radio has been in the field of Television—instantaneous sight. Its development has been carried forward by a number of famous engineers and scientists and in the laboratories of big corporations. Successful demonstrations in this new art have been conducted by a number of different systems, and marvelous progress has been made.

But Television is no longer a dream—a fancy idea of scientists—it is a reality. Three or four stations have made infrequent broadcasts of moving images in the past few months, and on August 16, 1928, Station WRNY made its first regular daily broadcasting program of Television. These daily programs are conducted in very much the same manner that sound programs are being broadcast.

Hugo Gernsback, Editor of Radio News, in a letter to Director Haas under date of August 14, 1928, says, "During the next few months there will be a boom similar to the first Radio boom when Radio Broadcasting came on, and we are doing our share to promote this by being the first station in the Metropolitan district to broadcast regular Television programs. There will be a good demand for opefators practically by every Radio station which is going on the air with Television."

It is quite clear, then, that this new field will make a severe demand upon the profession for men with the thorough knowledge of the principles underlying all Radio.

And thus it is in this new giant industry—Radio. I am glad to join with my students in looking forward to the bigger and brighter future that is yours in the Radio profession. The trained Radio man feels a keen sense of pride in marching onward with Radio and has a deep feeling of security and success in a profession where opportunity abounds on every side. So make the most of your chances—there is room at the top for you in Radio.

J. E. SMITH.

Moving pictures were transmitted through the air on Radio waves for the first time in history on August 8, 1928. They were picked up and reproduced by a receiver in Westinghouse Television laboratory. Officials of Westinghouse announce that regular broadcast programs of motion pictures from KDKA will begin in a few months. The possibilities are said to be unlimited.

The first broadcast program in British Guiana was sent over a 47-meter wavelength from the Georgetown Wireless Station on June 28.

The Baird Television Corporation of Delaware has organized with a capital stock of 1,000,000 shares of no par value.

According to recent news items the Radio Corporation of America has placed orders for equipment to link the principle cities of the country together through the use of a Beam operated wireless telephone and telegraph service. The system will permit operation of 1000 circuits on one wave length and is said to be an invention of Senator Marconi. Sending and receiving sets are said to approximate in size an ordinary telephone switchboard. The service is understood to be cheaper and more efficient. This will make the United States the first country in the world to have such communication between its cities.

A recent article in the New York Times points out that there are 12,000,000 sets in use in America now serving an audience of 40,000,000 people.

Regular commercial Beam wireless service between Australia and America was inaugurated on June 16, 1928. The transmitters operated in Melbourne can maintain a speed of 250 words a minute. The completion of this new link makes a chain of Beam wireless around the world.

Plans are being rushed for the construction of a new Radio broadcasting station at Horby, Sweden. The cost will be about $61,000.

A wireless station is being completed at Horta, Azores Islands, by the Portuguese Government for the purpose of radiating detailed weather reports four times daily. It will give special service to Trans-Atlantic Aircraft.

$858,302 worth of Radio apparatus was exported during March, 1928. This is an increase of $199,830 over the same month last year. Argentina and Canada were the best customers.

2,500,000 radio sets will be sold in 1928-29 season according to Mr. Irwin, General Manager of the Radio World's fair which is being held in Madison Square Garden this month. He says "Contemplation of the Radio market in the United States based on present day knowledge of the field presents a picture that is truly an inspiration to any man in the Radio business."

Fourteen new Radio stations in the Philippine Islands are being installed by the Bureau of Posts. All stations will have facilities for communication with ships at sea.

A wireless station has been erected at Tumbes, Peru.

Twenty-one carloads of Majestic Radios were sold in 6 weeks' time in Southern California recently. The sales volume reached $500,000.00. Dealers claim this is a new record.

The new station at Point Barrow, Alaska, is the northernmost Radio station in the world.

45,000 miles of circuits were used in the hook-up to broadcast the Republican convention recently and 1500 men were used to operate the hook-up.

Over 2000 Neon Lamps for building Television receivers were sold in one week in Boston recently. These first figures from just one city indicate the keen interest being taken in Television.

American radio manufacturers and dealers anticipate a 1928 sale of more than $600,000,000, a record. The demand for radio receivers and equipment has been greater so far this year than at any time since broadcasting became general. Sales were given a great boost by the Republican and Democratic national conventions and will get further stimulation by the world baseball series in October and the broadcasting of election returns in November.

A New Field for Radio—Geophysical Prospecting

By C. M. Jansky, Jr.

TO MANY people, the term Radio means Radio broadcasting. The spectacular development of this phase of Radio communication has drawn the spotlight of public attention to this field to the exclusion of many other branches of the Radio art, which from an economic standpoint, are just as important. It is the purpose of this article to briefly touch upon one of the newer Radio fields which already promises to be of tremendous economic importance. This field involves the use of Radio phenomenae in connection with geophysical exploration having as its object the location of valuable mineral deposits. It will be impossible within the limitations of this article to touch upon more than a few of the problems involved in work of this kind. Specifically, therefore, attention is directed to the use of Radio in connection with exploration, having as its object the location of petroleum bearing geological structures.

Editor's Note.—Professor C. M. Jansky, Jr., has charge of instruction in Radio Engineering in the Electrical Department of the University of Minnesota. He has bene spending the summer in Washington at the N. R. I. assisting in the preparation of new instruction material for the course covering such subjects as "Types of Radio Waves," "Heterodyne Receivers," "Heterodyne Interferences," "Radio Measurements," "Speech and Music," "Conversion of Sound to Electric Energy" and "Input and Control Apparatus in Modern Broadcasting Stations."

The haphazard and spectacular manner in which oil was discovered in various localities in the early days of the petroleum industry is well known to all. Who has not dreamed of discovering oil in his own back-yard and who has not built air castles involving the expenditure of the vast wealth so acquired? This characteristic of the petroleum industry which has had such a romantic place in the industrial history of the United States is, however, rapidly becoming a thing of the past and in its place we now see the systematic exploration and study of the earth's structure to determine the exact nature of its composition and to locate those mineral deposits which man has found so essential to modern civilization. The geologist and the engineer are rapidly replacing the man with the divining rod.

Radio phenomenae are utilized in several ways in connection with geophysical exploration. More specifically, the uses might be classified under two distinct heads: (1) the use of Radio to transmit timing signals in connection with seismic waves, (2) the transmission of Radio waves through rock structures and the study of the effect of these rock structures upon the direction in which the waves travel, their attenuation, etc. The first of these methods is in extensive use today and already literally millions of dollars' worth of petroleum deposits have been discovered. The second method, while it holds great promise, is still in the experimental stage.

Petroleum is very frequently found adjacent to certain geological structures known as "salt domes." A salt dome consists of material of a given geological structure protruding upward and, as the name implies, has the general conformity of a dome. Fig. 1 illustrates how a salt dome may be located in the earth's crust. The top of the dome may protrude beyond the surface of the earth or, as is more usually the case, it may be down several hundred or even thousands of feet. If the dome protrudes beyond the surface of the earth, then its location is comparatively easy, but on the other hand if it does not, then its exact location and the determination of its dimensions becomes a problem of considerable magnitude.

The method by which geologists and engineers locate and measure these salt domes even though they may be three thousand feet below the surface of the earth is based upon the fact that the velocity with which a sound wave or a shock (compressional wave) travels through the earth. Sounds travel about 1,080 feet per second through air, about 6,000 feet per second through ordinary

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"My spare-time work in Radio has netted me $900.00 clear money in the past seven months." G. P. Vearrindy, 710 N. 19th St., Philadelphia, Pa.

"I want you to know that the first ten lessons were worth more to me than what the whole course cost me. I spent hundreds of dollars back in 1923 trying to accomplish what I had in mind, finally I HAPPENED TO FALL upon the right method, but all this money would have been saved had I been fortunate enough to have had those priceless first ten lessons of yours." W. L. Morgan, 430 Winchester St., Newton Highlands, Mass.

"I have just completed several Radio repair jobs. My first job netted me $11.75 clear profit for only a few hours work." John Helton, DeSoto, Missouri.

"Your Work Sheets are a valuable help and I prize them greatly." C. W. Rippeteau, 17 So. National Ave., Ft. Scott, Kan.

"When I received my Diploma I was very happy and had it framed immediately. This Diploma cannot be bought for any amount of money. I value same too highly." David Salzman, 137 Barrett St., Brooklyn, N. Y.

"In my opinion your system of teaching is the best and I really do believe that your course is worth all that it costs and more." Fred Nelson, Box 3068, W. Monroe, La.

"I have circulated quite a few of my cards and my first job fetched me $50. Since then I have built up a few 5-tube Sets, also some short-wave receivers, repaired Atwater Kents and other sets." Noel G. Clark, 19 Moore St., Woodford Park, Cross Roads P. O., Jamica, B. W. I.

"When I enrolled my knowledge of Radio went no farther than the dials that control it, but now I can repair any set from the crystal set to the latest type of socket power radios without the least bit of hesitation simply because this course fits one to know not just guess at a repair job. I believe that Radio is in its infancy now and I heartily advise any man, old or young, to get into this interesting branch of study." G. M. Pattinson, 349 17th St., W., Owen Sound, Ontario, Canada.

"My best week this past season was $107.00 for servicing and repairing for one week. Not so bad. I have only one regret regarding the course and that is I should have taken it long ago." Hoyt Moore, 3301 South Lyndhurst Drive, Indianapolis, Ind.

"Since starting your course I have sold and installed 3 complete sets. The profit on these amounts to $338. That's not so bad for a beginner." H. R. Roberts, Gen. Manager, The Radio Broadcasting Co. of N. Z., Ltd., Christchurch, New Zealand.

"I was just figuring up the other day how much I had earned in the last four months in Radio and it amounted to $745. Had I not filled in a coupon of yours taken from "Radio News" just two years last April, I would probably be just driving a truck or taxi for twenty dollars a week." J. T. Mawson, Jr., c/o Spencer Rooms, Nanaimo, B. C., Canada.

"I have repaired a few sets in the last week, and made enough money to pay up my hospital bill. I am sure learning a lot of things I never thought I would ever know." Lawrence C. Ritter, 565 Durango Drive, Toledo, Ohio.

"Mr. Dowie, is there another N. R. I. student in Fort Wayne? If so, give me his address as I think it won't be long until I'll need a good partner and I prefer one that has the N. R. I. knowledge." Earl Smyers, 418 Harrison St., Fort Wayne, Ind.

"I have secured several orders to build all-electric sets. Your lessons and service sheets have given me confidence besides the knowledge necessary." Hyman C. Ferber, 2177 E. 21st St., Brooklyn, N. Y.

"After reading an article in the September issue (1927) of Popular Radio, written by Mr. Armstrong Perry, I decided to try Radio by mail. I want to say right here that I have made no mistake by taking a course in the N. R. I. It teaches the how and why of radio in all of its forms. I have made twice the cost of this training course already, and have one hundred dollars worth of work on hand to do." John W. Sullivan, 1204 College Ave., Spokane, Washington.

"I have made at least $200 just in my spare time since I started this course. I think anyone that wishes to learn about Radio from the ground up can't go wrong on taking this course." S. McCalley, 3678 Jackdaw St., San Diego, Calif.

"Anyone who has a hobby for Radio, or who wishes to enter the science for engineering purposes or profit, can benefit enormously from the course you offer, and I thank the lucky day that I read your advertisement and answered it." Charles Russell, Coffeyville, Kansas.

"Your school has worked wonders for me on all the work I have done. Haven't found anything yet I couldn't whip and am not afraid to tackle anything. Chas. H. Stouder, 1232 Myrtle Ave., Eureka, Calif.

"If some one would offer me $10,000 for what I know in Radio, I would not take it." Edward Gump, 255 Second Ave., Gallipolis, Ohio.

N.R.I. Staff Gets Inside "Dope" on Television

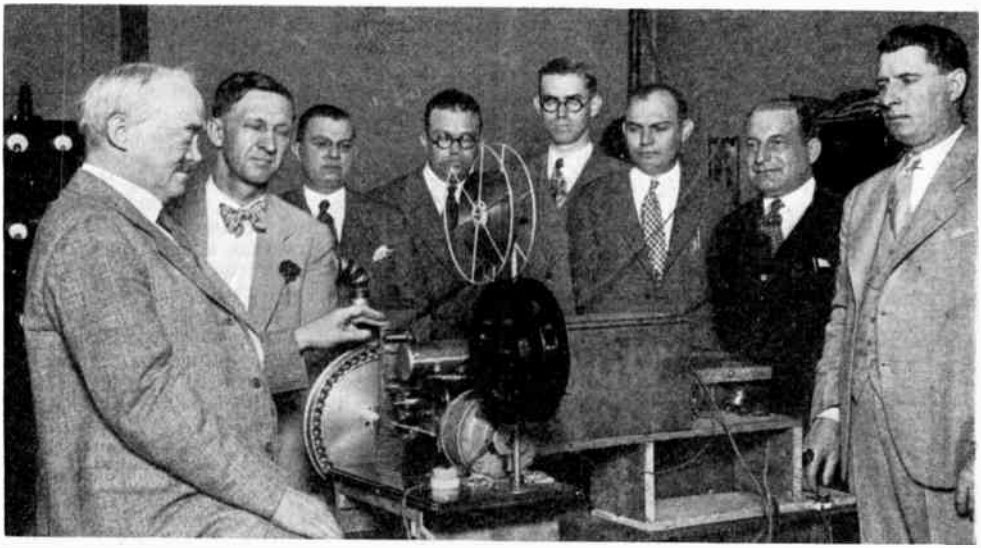
Inspection of Apparatus in Private Laboratory of Inventor Reveals Secrets of Remarkable Invention. The Latest Principles of This and Other Systems of Television Are Being Incorporated in Our Course of Training.

STUDENTS and friends of the Institute will be interested in learning of a recent personal inspection of the Jenkins Television apparatus by several members of the N. R. I. Staff.

The private demonstration was conducted in the inventor's laboratory which is only a few short blocks from the N. R. I. building. Valuable first-hand information was obtained which will be used in the preparation of new instruction material for the course.

Dr. Jenkins has made remarkable progress in the development of his system of Television. He broadcasts a program three nights a week on 46.72 meters (6.420 kilocycles frequency) in order to perfect his system and for the benefit of amateurs and scientists who are building Television receivers. These pictures which he has broadcast have been picked up and clearly recognized as far away as Montreal and Chicago. The intense interest that is being shown in this and other Television experiments indicates that the Radio amateur will have a big hand in the final development and perfection of the newest member of Radio's family.

Mr. Jenkins has indicated his willingness to advise any inquiring amateur as to the necessary Television receiving equipment. The station call letters are 3XK.



Dr. C. Francis Jenkins demonstrating his Television apparatus to members of the N. R. I. Staff. Left to right: Dr. Jenkins, the Inventor; J. E. Smith, President of National Radio Institute; James A. Dowie, Chief Instructor, N. R. I.; George Sutton, Employment Manager; G. Birrel, Head of Department of Merchandise and Sales Counsel; E. L. Degener, Office Manager; A. L. Haas, head Student Service Dept.; Walter C. Hinton, an authority on Aviation's Radio needs and one of the members of the NC-4, the first plane to cross the Atlantic, who has been in conference with the N. R. I. Staff recently pertaining to the demand for Radio Operators in Aviation Circles.

A New Field For Radio— Geophysical Prospecting

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rock near the surface of the earth, but through a salt dome the velocity is sometimes as high as 16,000 feet per second. The fact that the velocity of sound through salt is so much greater than through ordinary rock forms the basis for a method of geophysical exploration which has already located millions of dollars' worth of oil bearing structures and promises to locate many millions more.

Referring to Fig. 1, let us assume that a charge of dynamite is exploded at the point S. This will cause a compression wave to travel through the earth's surface outwardly from the point S in all directions. Let us assume that at point O, as shown in Fig. 1, we have a device known as a seismograph. This is an instrument such as is used to record earthquake shocks. When the wave from point S reaches the observing point O, a record will be made showing the intensity of the shock as it reaches O. If the distance between S and O is known, the time of the explosion at S is known, and the time the compression wave arrives at O is known, then it is possible to compute the velocity with which the wave has traveled from S to O. If this velocity proves to be about 6000 feet per second, then it is safe to assume that the wave has been traveling through ordinary rock. If, however, this velocity proves to be considerably greater than 6000 ft. per second, then the natural assumption is, that during a part of its course at least, the wave has passed through a salt dome formation. Subsequent observation made by exploding dynamite at various locations and observing the velocity in the wave as received at additional locations permits an accurate determination of the exact location of the salt dome and also of its dimensions.

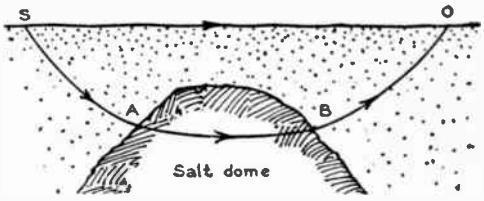

Fig. 1

As has been stated above, it is necessary to know the exact time at which the charge of dynamite is exploded and also the exact time at which the compression wave reaches the point O. The difference between these two times gives the interval of time necessary for the wave to travel from S to O. It is here that Radio communication provides information without which exploration of this type could not be conducted.

Near the point where the explosion takes place is located a small Radio transmitting station. This station is so connected to the circuits which explode the charge that just previous to the explosion a long dash is sent by the Radio transmitter. At the instant the explosion occurs, this dash is interrupted and the transmitter turned off. The equipment at the receiving location O includes in addition to the seismograph a Radio receiving set and apparatus which will record on a moving photographic film signals from the Radio receiving set together with a record of the compression wave as received by the seismograph. Since Radio waves travel with a velocity of 186,000 miles per second, the instant at which the transmitter at S is stopped and consequently the instant at which the explosion occurs is marked immediately upon the moving film at the receiving location O. A few seconds later the compression wave will arrive at the receiving location, actuate the seismograph and make its record upon the same moving film. Knowing the speed of motion of the film and the distance between S and O, it is then easy to compute the velocity with which the sound waves travel through the earth's surface from the record on the film.

In actual practice, an exploring party will consist of three or more groups. Each group will be equipped with a seismograph, a Radio transmitting and a receiving set, a means for recording signals on a moving film, and apparatus for exploding dynamite charges. These groups will then be located at points in a given territory separated by one or more miles and while one group explodes a charge of dynamite the others will make records. A second group may then explode a charge of dynamite and the remaining groups will again make records. This process may be repeated, the groups from time to time changing their location until a given area has been thoroughly surveyed. Even though a salt dome may be located as far as 3000 feet below the earth's surface, it stands very little chance of escaping detection by the thorough method in which

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Servicing the One Dial Receiver

By Don B. Looney
Member of N. R. I. Instruction Staff

THERE is nothing nicer to operate than a single dial receiver—as long as it operates. Likewise, there is nothing harder to service when it refuses to bring in the stations. There seems to be a tendency among service men to avoid such receivers, saying, "it can't be done." Servicing the one control receiver is rather a "mystery" to many. To the N. R. I. service man with the right kind of equipment, it is clear and easy. The equipment is not elaborate and can be made and operated quite easily.

Several different things may cause a receiver to lose its selectivity. In the neutralized type of the radio frequency receivers, the most common cause is the unneutralized condition of the Radio frequency stages. This will not only cause the receiver to tune broad, but it will cause the receiver to lose its sensitivity as well. The first step then is to correctly neutralize the receiver.

To do this, it is first necessary to tune in accurately a loud broadcasting station operating on a wavelength of 300 meters or slightly less. Next, prevent the filament current from flowing in the filament of the first radio frequency tube. This can be easily done where the receiver has a rheostat. However, few receivers have a rheostat for each radio frequency tube and so some other means must be used. In the case of the old style sockets, this can be easily accomplished by placing a small piece of paper on the filament prong of the tube so that it will not make contact with its corresponding spring in the tube socket. When the tube is placed in the socket the filament should not light up. In the case of the newer type of receiver where the UX base is used and there is no separate rheostat for the Radio frequency tubes, a different procedure must be followed. In this case, the filament may be cut out by carefully extracting one of the large filament prongs from the base of a good tube. A tube with a burned out filament will not suffice, as the slight difference in the internal capacity caused by the incomplete filament wire will throw everything out of balance and defeat the whole purpose of the adjustment.

Having extinguished the filament of the first Radio frequency tube, if there is no decrease in volume it is an indication that that stage is not correctly neutralized. In such a case, take a screwdriver made of some insulating material such as wood, hard rubber or bakelite, and adjust the small neutralizing condenser until the signal has reached its weakest point or entirely disappeared, using a pair of headphones in place of the loud-speaker if necessary.

When the signal is reduced to its lowest possible intensity, then that particular stage is neutralized. If the tube is now removed from its socket, the signal volume will increase because only the capacity of the neutralizing condenser remains and it is not compensated for by the capacity of the tube which has been removed from the circuit. If a different tube is substituted for the one removed, the signal may again reappear because of the capacity in the new tube.

The foregoing procedure of neutralizing should be carried out first on a high frequency or low wavelength station, then on a low frequency or high wavelength station. If it requires a considerable change of capacity in the neutralizing condenser to make the two adjustments at different frequencies, the adjustment should be left about mid-way between the two points or slightly nearer the point used for the high frequency station.

If there is a small balancing vernier condenser across the main tuning condenser of the stage which is being adjusted, these adjustments should be made with the small rotary plates half exposed. The Radio frequency tube which is to be used in the stage which has just been neutralized is then placed in its socket and the next stage is neutralized in the same manner always working from the antenna towards the detector.

Balancing the Tuning Condensers

The paragraphs above apply equally to the old or new type of receiver, while the following paragraphs apply only to those receivers which have one, two or three condensers ganged together such as the one or two dial receivers. In such receivers the tuning condensers will often get out of adjustment causing broad tuning and loss of sensitivity with

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Chief Instructor Dowie gives you some good hints on a question many set owners are thinking over. There's good money for you in converting D C to A C sets.

—Editor's Note.

Hints on Electrifying a Radio Receiver

By J. A. Dowie, Chief Instructor

IF YOU have a receiving set originally designed for battery operation and if that set is functioning properly, it naturally is wise to hold on to it. However, in keeping up with the times, you may wish for the convenience and economy of socket power operation, in which case the following suggestions are in order.

The first step in socket power operation is the "B" eliminator. There are many types of "B" eliminators or "B" power units on the market which give satisfactory service.

As likely as not you already have a "B" eliminator, in which event you have solved at least half the problem of the electrified receiver. Fortunately, aside from the rectifier tube, which should be replaced at the end of a thousand hours' use or a year of typical Radio application, there is little to wear out in the properly designed and constructed "B" eliminator. With the "B" power requirements taken care of, the next is the C potential or grid biasing source. It is possible to obtain grid biasing effects by means of voltage drop through resistances in the different B circuits. In choosing a resistance for any particular purpose, it is necessary to determine the value required. For example, a resistance is to be used to supply C bias to a 171-A type tube. The plate current of the tube (which must flow through the resistance) is 20 milliamperes. The required C bias voltage is 40 volts. To calculate the required value of the resistance, Ohms Law must be used.

$$\text{Resistance} = \frac{\text{voltage}}{\text{current (in amperes)}}$$

$$\text{which equals } \frac{40}{0.020} = 2000 \text{ ohms.}$$

If you do not wish to use a resistance to give the correct "C" bias, you can by means of a "C" battery obtain the correct bias for the tube. Often the latter method is preferable especially when the battery type receiver is being converted over into socket power operation.

Four Methods Available

Next and last we come to the operation of the tube filaments. Here we have four sources available each with its own particular advantages.

First, there is the regular storage battery with a trickle charge with an automatic relay. This arrangement takes care of your "B" eliminator or trickle charger or both. When you turn your set on the trickle charger is off, the "B" eliminator is on. When you turn the set off the trickle charger is automatically turned on and the "B" eliminator off.

Secondly, there is the "A" eliminator, which converts the usual alternating current of the house lighting circuit into low voltage direct current for lighting the usual tube filaments. There are several "A" power units on the market. In conjunction with the "B" eliminator, use of the "A" eliminator in place of the storage battery provides the simplest electrification job.

Thirdly, there is the series filament method, in which all the tube filaments with the exception of the power tube are connected in series. This means rewiring the filament circuits of the receiver, and a skilled radio man should be capable of rewiring the usual receiver in a very short time. However, the series filament method calls for an extra large "B" power unit, employing a 350 milliampere rectifying tube in the case of the ¼-ampere filament tubes. If the low current 99-type tubes are employed, the 125 mill. tube may be employed for supplying the increased current drain for the filaments. In rewiring for series filaments, there are just two main points to be observed, namely, the application

of the proper voltages on filaments, plates and grids, and confining the radio frequency currents to their power circuits.

Fourthly, there is the A. C. tube which may be applied either by rewiring the receiver, or what is far simpler and usually preferable, substituting A. C. tubes for the usual battery tubes, without rewiring, by means of the harness or ready-made wiring cabled together with a suitable step-down transformer. The harness method provides excellent results and there is a harness available for practically any type of battery operated receiver.

B Unit Always Essential

It should be noted that irrespective of the method of conversion, a "B" power unit is essential. Therefore, the investment made in the "B" power unit is a lasting one. The only change to the "B" eliminator or "B" power unit is to plug it into the same source of lighting current as the filament supply and to provide a common switch which will turn the entire set on and off. It should be clearly understood that a receiving set operated with A. C. tubes does not do away with the "B" power unit. While A. C. tubes can and do operate on raw alternating current, stepped down to the required voltage, a source of plate current is still necessary, whether it is supplied by batteries or a B power unit. The self-contained electrified receiver must include a "B" power unit.

Therefore, don't throw away your old "B" power unit. If it lacks sufficient voltage to operate the 171 power tube, try a more recent type of rectifier tube, which generally increases the output voltage. And if you do not own a "B" power unit as yet, but wish to go on to socket power operation for your old set, don't hesitate to secure such a unit as the first step towards the electrified receiver as it will remain a sound radio investment.

How A C Tubes Obtain Their "C" Bias

A C tubes obtain their "C" bias by using the voltage drop across a resistance placed in series with the negative line of the filament transformer, which goes to the negative side of the "B" supply line. For example, suppose a resistor is to be used to supply "C" bias to a 171 tube, which is generally used in an A. C. receiver in the last stage of audio frequency amplification. The plate current of the tube which must flow through the resistor is 20 milliammeters. The required "C" voltage is 40 volts. To calculate required value of resistance we use ohms law which is: resistance equals voltage divided by current and amperage—therefore, 40 devided by .020 equals 2000 ohms, so 2000 ohms inserted in series with the grid lead will give a negative "C" bias of 40 volts, due to the voltage drop in the resistance.

Concerts Broadcast For School Children

THE value of Radio as a means of giving instruction to large numbers of school children will be tested this fall when 24 weekly musical concerts will be broadcasted over a large hook-up of 28 stations and received in the school rooms of thousands of schools throughout the country.

Walter Damrosch, noted musical leader, will conduct these weekly concerts which will be broadcast at 11 a. m. and the first one will go on the air on October 26th. The success of this new departure will have far reaching consequences. It will develop appreciation of the best music among young Americans and mark the beginning of a new era in instruction methods.

Salesman (pet shop): "Madam—may I show you our line of Pedigreed Poodles?"

Madam: "No, I wish to see one of those DX HOUNDS I've been reading about."

Utilizing The Squeal

A number of young lads were seen standing in a row performing various stunts. First, they all sang a verse together; then one recited a piece, followed by yet another playing on an old mouth organ.

"What are you youngsters doing?" inquired a passerby.

"We're playing Radio," explained the leader.

Just then a lad who had taken no part doubled over with a series of groans and cries.

"What is the matter with him?" asked the man.

"Oh, he's got the stomach ache and we're using him for static," was the reply.

Servicing The One Dial Receiver

(Continued from page 9)

the result that only the loud local stations will be received. Many service men attempt to make satisfactory adjustments of the condensers by using a loud broadcast signal, but this method will give poor results. The only efficient method of accurately ganging the condensers is by the use of a modulated oscillator located near the set to be balanced. When properly constructed, this will give a very sharp signal, adequately suited for such work.

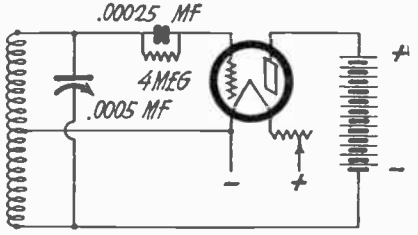


Fig. 1

Fig. 1 gives a wiring diagram of a modulated oscillator which is easily and cheaply constructed. The size of the coil and variable condenser should be such that the entire broadcast wavelength band will be covered by the oscillator. If a .0005 mfd. condenser is used, then the coil should consist of 50 turns of No. 22 DCC wire wound on a 3-inch form and tapped in the center. The Radio frequency feed line which is mentioned in the following paragraphs may be connected from one of the terminals of the variable condenser.

An incorrectly balanced receiver is usually denoted by one of the small balancing condensers (often called trimmers, compensating or vernier condensers) showing a resonance point at the extreme end of the scale or else having no effect at all on the tuning. If the former condition exists, loosen the coupling mechanism of the particular condenser to be adjusted and slip in whatever direction necessary. A definite position will be noted where the coupling mechanism should be again tightened. This should all be done with the rotary plates of the balancing condenser half out. By using this plan, a leeway is provided on each side of the point of resonance, which will take care of the tuning characteristics of the coil. In many receivers no balancing or trimmer condensers are used, in which case it will be necessary to adjust each individual tuning condenser, after loosening the coupling mechanism, to resonance and then tightening the coupling apparatus.

In tuning the individual Radio frequency amplifier stages, the oscillator should be set at any desired frequency and placed ten to twenty feet from the receiver. Loop the Radio frequency feed line from the oscillator once around the tuning coil in the last Radio stage, that is, the one preceding the detector. Tune in the signal with the regeneration control, if there is any, set a minimum. Mark the dial or make a notation of the exact position in which the sound is the loudest.

Next, loop the wire around the Radio frequency transformer in the stage preceding the detector and again tune in the signal. It may be weak, but upon adjusting the condenser of this stage back and forth maximum loudness may be secured. The coupling mechanism of this unit should then be tightened. It is important that the balancing condenser be turned half way out.

The above is then repeated for as many stages as the set may have. The point of resonance for each stage should coincide with the first dial setting. In other words, the signal should be received loudest when all the condensers are in exact resonance, at which time the balancing condensers should also show a resonance peak at approximately the same point on their scales. To get the set finally balanced accurately, the balancing condensers may need to be varied slightly one way or the other.

If the signal from a loud broadcast station is used, it is quite probable that the first balancing condenser will tune way off from where it should, due to the broad wave being received. In such a case, the operator will find that the set will have no sensitivity when he tries to tune in distant stations.

After balancing the receiver, the set should be again checked to see if it is correctly neutralized as balancing the set may destroy the neutralization.

IT SOUNDED LIKE DX

Doctor: "Have you ever had Corysa?"
Radio Ham: "No, but I've worked Australia lots of times."

HE TUNED IN CUBA INSTEAD

Teacher (to geography class): "What was Columbus trying to find in 1492?"
Bright Pupil: "A short wave hook-up to get India."

731 Charles St.,
St. Paul, Minnesota.

Dear Mr. Smith:

When you learn all that I have been doing lately with the money earned in Radio you will see how I have put my spare time to good use in Radio work.

Radio earnings have paid one-half the balance and interest on our home, bought a good high-grade piano and music lessons for three of the children. I also have a good saving account started and over one thousand dollars out on loan at interest. I also have over $350 out on monthly payments on Radio service, repairs on sets, and am making 25% commission on several commercial sets that I sell for a Department store. More than that—I have just recently bought a new Buick and paid cash for it.

Mr. Smith, my knowledge of this subject gained through your course could not be bought, providing that were possible, for one hundred times the price that I paid for the course. Besides the good money Radio has enabled me to make, I get considerable amusement during some of the service calls I make in meeting many different people and listening to some of their conversations about this and that fellow or company or service man "who was here and fixed our Radio last time" and what they were charged later only to find on inspection that very little work was done, etc., etc. It surely is interesting to say the least.

So I certainly want to thank you for the fine help and cooperation you have given me.

Sincerely yours,

GEORGE C. MEDVED.

Are You Practicing Them?

What qualities do big Radio executives look for when picking Radio men? Do you have them? Every serious-minded Radio man considers these questions at some time in his Radio career. It is well to stop and take stock like this—to have the clear understanding of what one must be and be able to do to succeed.

For many years I have been in contact with big Radio executives who employ Radio men and these are some of the qualities they say a man must have to succeed in Radio.

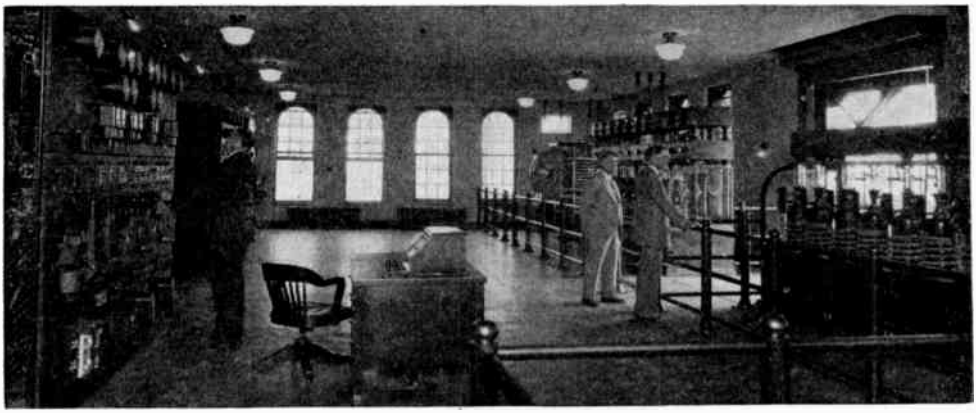
First, one must have personal integrity and character. No man reaches the big jobs without these qualities. There is a high standard of ethics in the Radio profession and the man who does not measure up to it—the man who has no personal responsibility or reliability cannot expect to reach the top in Radio or any other profession. Character commands the respect and confidence of others.

Next, one must exercise extreme care in doing any kind of Radio work. If a job is worth doing at all it is worth doing right, and one cannot be too careful and exact in giving attention to every detail—these little things lead on to the bigger jobs ahead.

Next, in order to succeed, one must have a well planned, organized program to follow. A "hit and miss" slipshod method of doing things gets one nowhere, but steady, consistent and regular methods will help you reach your goal. I am glad that most N. R. I. men have this quality. They know where they are going in Radio, and in studying a well organized course of training they are following a plan that will take them to the kind of jobs they want in the Radio profession. After all, when one knows where he is going and what it takes to get there, and has the determination and stick-to-it-iveness to forge right ahead—that kind of fellow is going to succeed in Radio.

So there is nothing magical or mysterious about success—it comes easily and naturally when a man is willing to dig right in and see what it takes to get it and then refuses to "let up" until he wins. That spirit and determination has carried hundreds of N. R. I to big jobs in Radio and it will do the same for you. The true N. R. I. man keeps going until he wins.

E. R. HAAS, Director.



View of Main Operating Room, WENR, Chicago. Along the right wall are the high-power Radio frequency amplifiers, and the modulators, equipped with 20-kilowatt water-cooled tubes. On the left are the power supply panel, and the intermediate Radio frequency amplifier.

Some Facts About WENR — Largest Broadcasting Station in West

By E. H. Gager
Chief Engineer of the Great Lakes Broadcasting Co.

WITH the completion of a new 50-kilowatt transmitting station near Chicago, radio station WENR-WBCN of the Great Lakes Broadcasting Company now ranks as the most modern and one of the most powerful radio broadcasting stations in the world.

The new equipment is now in daily operation at reduced power, and it is hoped that negotiations with the Government will soon be completed, allowing use of the full 50-kilowatt capacity. Experimental work with the high-power equipment, conducted during the early morning hours under a special license, indicates that WENR will be heard over the entire country and in many neighboring foreign countries with unusual volume.

The new station is located on a 40-acre plot of land four miles south of Downers Grove, Illinois. The geographical location is such, that signals from this station will reach the north and south sides of Chicago with approximately equal intensities, so that satisfactory reception may be had by all receivers in Chicago day and night, both summer and winter.

In order to determine the best location, a 1000-watt portable transmitter was installed in a test location. A set of instruments was mounted in a truck and moved about from point to point in the city in order to determine which location of the transmitter produced the most uniform reception throughout the city.

The transmitter building, erected in the center of the property, facing Downers Grove-Lemont road, is a two-story brick structure of attractive design, 65 feet in width, and 55 feet in depth. The main part of the building consists of a power room, 35 feet by 65 feet, on the main floor and an operating room of the same size on the second floor. Rooms are provided on the second floor for an Engineer's office, control room, dormitory, dinette, locker room, and toilet facilities. On the main floor are the battery room, shop, pump room, tube vault and boiler room.

The antenna towers are each 300 feet high and are located 700 feet apart. These towers, which can be seen for several miles around, will be provided with beacon lights as a warning to aviators. The counterpoise or ground system consists of a series of bare copper wires buried in the ground and extending radially out from the station for 300 feet.

Power for the station will be supplied by two outdoor substations located at the southwest and southeast corners of the property. These substations are connected with the Public Service Com-

pany system by 33,000 volt transmission lines. Each substation consists of a bank of 450 kv-a transformers, which transform the energy from 33,000 volts to 2300 volts. Underground cables conduct this 2300-volt energy to the transmitter building, a distance of about 900 feet.

Four pairs of wires connect the studios in the Straus Building to the transmitter station. These are special high-grade lines supplied by the Illinois Bell Telephone Company. Two of them will follow the Ogden avenue route to Downers Grove, thence south on Main Street to the transmitter building. The other two pair will follow what is known as the Chicago-Omaha route, along Joliet road. This provision of two pairs of wires by two different routes will provide a dependable connection with the studio under practically all conditions.

The studios are located in the Straus Building where the entire 23rd floor has been remodeled for their use. A new control room is being installed and complete new amplifying equipment will be provided. A new type of microphone known as the condenser microphone will be used in all the studios. This type is far superior to the carbon microphone, which is in general use in broadcasting stations at the present time.

Below: The new power room which furnishes power for Station WENR.

Wide Publicity Given "Radio-Trician" Is Valuable To N. R. I. Men

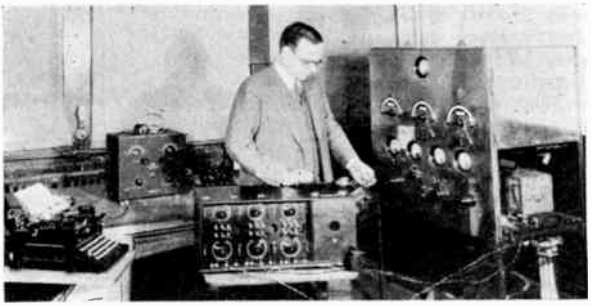
SOME very valuable publicity has been given to the name "Radio-Trician" recently by articles appearing in a number of magazines and newspapers throughout the country.

N. R. I. students and graduates and many friends of the National Radio Institute are aware of the fact that the word "Radio-Trician" was coined and copyrighted by the National Radio Institute some years ago and can properly be applied to N. R. I. students and graduates only. This fact has also been brought before the attention of the public in a number of ways, and the most recent publicity has again brought the name of the N. R. I. Radio man before the public in a most favorable manner.

The N. R. I. Staff has been extremely gratified by this publicity and the value it has for every student and graduate, for it will serve to introduce the N. R. I. man to the Radio public and stamp him as one properly trained and qualified to do high grade radio work.

Mr. Ding: I haven't seen your wife lately.

Mr. Dong: No, she's looking for an apartment to match our new radio outfit.



This is the new transmitting apparatus at the Firestone Plant in Akron used to keep the Plant in close touch with the company's huge rubber plantations in Africa. It was specially designed and made in the Firestone Laboratories.

Akron to Africa Service a Success

Recent Firestone Achievement Points Way to Big Developments—New Field For Trained Radio Men Opened By Adoption of Beam System By Industry

By C. M. Young

A JET of escaping steam near at hand may cause more trouble in transmitting a radio message across far seas than all the complications of the ether. That fact has been well demonstrated after three months' operation of the new radio station erected on the roof of the Firestone Tire & Rubber Company in Akron, Ohio, connecting with another station on the company's rubber plantations in the republic of Liberia, 4,600 miles away.

The two stations operate on short waves. Both transmitting and receiving equipment was developed and built in the company's own laboratories under the direction of R. W. Brown, who used to be a radio amateur before he became an engineer. This equipment is unique in many ways and undergoing constant changes to meet the conditions that develop daily. Before the two stations introduced regular service across the Atlantic there were few standards available to Firestone engineers by which they could judge equipment and operation. It was an uncharted field; one that has slowly yielded knowledge of its special requirements.

Early in his experiments Mr. Brown discovered that power leaks, escaping steam and similar disturbances, inside the plant or nearby, could cause about as much trouble as an African hurricane. The plant stands alongside a railroad yard and the noises of moving trains were not the least source of difficulty. But, worst of all, was the tooting switch engine that came about the time Liberia had the "line" in working order.

Within the plant a complicated mechanical system is in operation many hours a day. And every piece of machinery sends forth its own peculiar vibrations to complicate the radio man's task of "keeping the line open" to the rubber plantations far overseas. But in three months of operation communication has been maintained practically all the time.

Liberia lies in tropical Africa, four to eight degrees above the equator, subject to intensive atmospheric disturbances that interfere greatly with radio reception. It was necessary in the beginning to try out a large number of wave lengths, and making these tests and collecting this information was a slow, laborious job.

After a period of experiment covering several months the transmitters were completed and assembled. This experimental work was conducted entirely in the Akron laboratories as there were no facilities on the rubber plantations. Then the laboratory staff enclosed one of the transmitters in a water-tight, sheet-metal case, put this into a packing case, and shipped the whole to Liberia.

There it was necessary to provide equipment and power for operation and maintenance of the transmitter, a somewhat difficult matter, considering that the plantations were jungle land a little more than a year ago, and Liberia itself is a primitive country. The transmitting station stands near the Du River and part of the company's development program includes a modern power plant, recently installed, supplying light, power and refrigeration in the midst of the primitive. Current from this plant is used to charge a bank of batteries that furnish power to operate the transmitter.

When the "station" reached Africa, in

a big assemblage of packing cases, it was landed at Monrovia, the capital city, named for our own President Monroe. River craft propelled by the arms of natives transported it up the Du River to the largest of the Firestone plantations. Today the land that was jungle a little while ago is a vast clearing, free of trees, and partly planted with rubber seedlings that will bear the precious latex for tires five years from the day they were planted.

Fifteen thousand natives are employed in clearing the jungle, preparing the ground and planting the trees. For 1927 the record was 15,000 acres, or three million trees, and this year the number will be larger. When Mr. and Mrs. Harvey S. Firestone, Jr., arrived in Liberia recently on an inspection trip they traveled in a modern American motor car over excellent roads, traversing a stretch of country without any better means of travel than a native trail when the plantation was laid out. Another plantation, slightly smaller, is being developed on the Cavalla River, 250 miles distant, and this soon will be in communication with the Du plantation by means of the radio telephone, bringing both centers into direct contact with each other and general headquarters in Akron.

Such is the country where radio has brought its civilizing touch. Never has this magical means of communication met a severer trial. To establish communication from the equator to a northern city like Akron was an undertaking of the first order. The Akron transmitter operates at present on a wavelength of 43.5 meters and the Liberian transmitter on 29.6 meters. Because of high humidity and temperature on the African end, the usual receiving equipment has been largely altered to meet the unusual conditions. For instance, receiver parts are enclosed in glass jars and the jars filled with sealing compound. Static and other atmospheric conditions cause serious interference on frequencies as high as 10,000 k.c. Yet these many variations have been met for the most part by means of available short wave receiving instruments.

It was found that a single-wire vertical aerial, seventy-one feet long, with a horizontal counterpoise of equal length, proved to be the best antenna equipment. Then the type of transmitter became a matter for extensive investigation. Satisfactory results had been obtained by

(Continued on page 18)

Government Needs Radio Operators for Airways and Light House Units

MUCH interest in Radio circles followed the Civil Service Commission's recent announcement of examinations for Radio Operators to man the beacons along the various airways of the country.

The light house unit also offers work to Radio operators in one of the oldest and most romantic of all Government services. The duties of the Radio operator in this service are similar to those of ship operator—interesting work that will keep him on his toes. Food and quarters are provided in this service and the nice salary that the operator draws is velvet—he can save practically the entire amount.

In addition to these advantages the light ship Radio Operator is allowed from 108 to 120 days annual shore leave every year at full salary.

The need of trained Radio operators for the Airway beacons is right in line with the development of Government and Commercial Aviation and the demand made upon the Radio Industry for trained men to fill these new positions that are being opened up.

While the strict field of private and commercial aviation offers positions to radio trained and experienced men in a number of capacities, the demand by the Governmental service is also making itself felt, and it is generally predicted that this next year will find a larger number of trained Radio men enjoying the privileges, permanency and good pay on Uncle Sam's payroll. Any student interested in Civil Service positions may send for detailed information regarding examinations, qualifications, etc., from the U. S. Civil Service Commission, Washington, D. C.

Radio Plays Big Part in Presidential Campaign

THE important place that Radio will play in the coming Presidential campaign is indicated by the big Radio hookups that have already been made to carry important political events.

Millions of people all over the country got their first intimate glimpse of a political convention when more than 68 stations broadcast the Republican Convention proceedings at Kansas City and

(Continued on page 18)

Akron to Africa Service a Success

(Continued from page 17)

amateurs with every known type of circuit, having as low as one watt of power. But early experiments eliminated the common types of simply circuits as unreliable. In the end it was decided that a circuit using a recently developed tube as a master oscillator, and two of the same tubes as a power amplifier, would give the best average service. This combination has proved workable and dependable.

Other important considerations included complete shielding of each stage and proper neutralization of the amplifier. Extreme care has been necessary to keep losses down to the minimum. By close attention to these matters the laboratories gradually produced a sharp, narrow wave, imposing the smallest tax on the radio spectrum. The type of transmitter decided upon is suitable for crystal control, to be applied as soon as the wavelength has been definitely fixed. Crystal control and thermostatic temperature control offer further possibilities in improving frequency stability.

This latest development of the short-wave service that is now belting the world may be attributed in large part to amateur experimenters, in the opinion of Mr. Brown.

"We must give credit to the radio experimenter, working in his wood shed, or bending over his task in an attic," he said. "Without that experimenter short wave radio would not have reached its present stage of development. The radio amateur has led in supplementing the big stations operating on high waves.

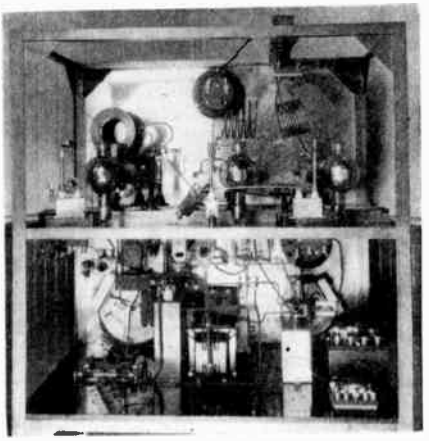
"I believe that our Liberian service will be the equal of any in a short time. We are having difficulties, but no greater than those of the ordinary station, I imagine. And I am particularly pleased with the way we have found solutions for each new problem. Our tests certainly show the possibilities of short wave transmission; something but little understood in its full importance."

It is planned to carry on further experimental work to perfect the apparatus now in service, the principal reason for this experimental work being the perfection of the transmitters in such manner that the minimum of interference will result. To accomplish this, the transmitters must be made to maintain their frequency to a very high order of accurcay. Developments under way offer great promise in this respect and it is quite probable that the benefits of radio will be extended along broad lines within the next few years.

E. F. Rigby is at the Akron key of the Firestone service and J. C. Harrower and W. E. Kennedy operate from the Du River. All are experienced men.

Such is the modern way of American business in conducting a tropical development thousands of miles away—running a rubber empire across the world as easily as a department on the next floor.

Rear view of the short-wave beam transmitter used in the Akron to Africa service.



Radio Plays Big Part in Presidential Campaign

(Continued from page 17)

about the same number broadcast the Democratic proceedings at Houston.

Then followed the giant hook-ups to carry the notification ceremonies of the candidates. Over 100 broadcast stations including two short-wave transmitters carried Mr. Hoover's acceptance speech around the world, and it is estimated that it was heard by more than 30,000,000 people in the United States alone. Another giant "hook-up" carried the acceptance speech of Gov. Smith to an incredibly large number of Radio listeners.

Both presidential nominees are "at home" before the microphone and during the next two months they will use the Radio to a large extent in making their appeals to the American voter.

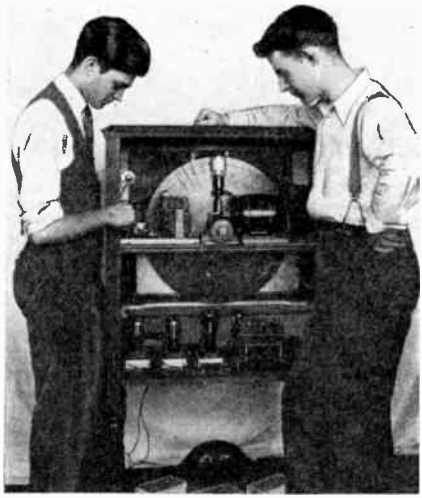
A New Field For Radio— Geophysical Prospecting

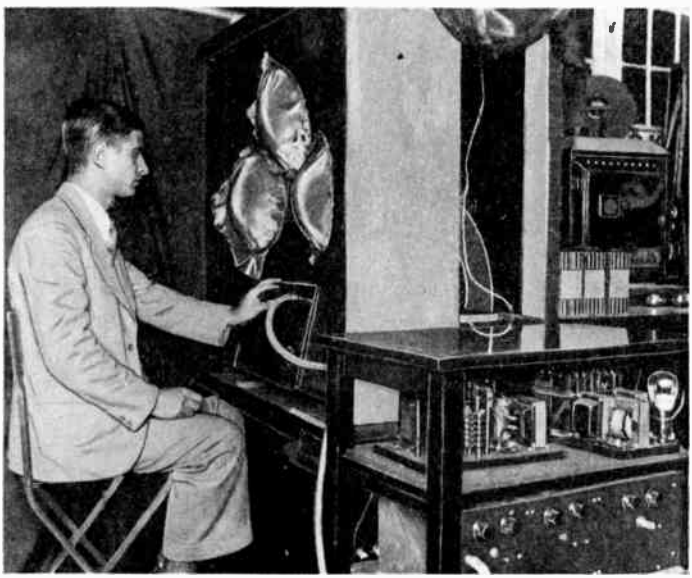
(Continued from page 8)

these exploring parties survey the area in which the dome may be hiding.

Not all salt domes have oil located around them in sufficient quantities to warrant production. However, a fairly large percentage of domes do. This percentage is so high that the owner of leases in the territory occupied by a salt dome usually considers that these leases possess a potential value of at least a million dollars. Should the first well sunk indicate the presence of oil in producable quantities, then the valuation of these same leases is likely to rise to anywheres from fifteen to twenty-five million dollars. Some idea of the potential value of geophysical exploration of this type may be gained from a statement made by a man closely associated with this work to the effect that oil producing fields worth at least one hundred million dollars have been located by the method just described during the past few years.

As has been stated above, there are other methods under study which show promise of proving of great value as means for locating petroleum bearing geological structures. These methods also hold great promise as means for locating other mineral substances such as iron, copper, etc. However, most of them are still in the experimental state and but little information concerning the details is as yet available. It is exceedingly interesting to note the very important part which Radio is playing in connection with all of these methods. In fact, Radio is so essential that without its aid geophysical exploration as it exists today would be impossible. The Radio engineer may well take pride in the part which his science is playing in this industrial activity so essential to modern civilized life.



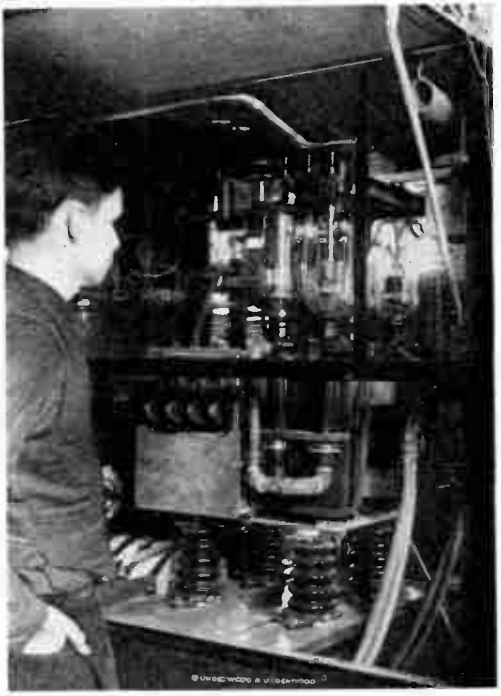


Above: View of a receiver to catch broadcast sight waves. The receiving disk, motor and neon lamp are easily recognized above. It will probably be a matter of only a short time until Television receivers will be as easily obtained as sound receivers are now.

Below: Here's the new Television Transmitter recently installed in Station WRNY now broadcasting daily programs. WRNY is the first station to broadcast regular Television programs and keen interest is being aroused by them. Here's a big field for trained men.

NEW RAYS IN RADIO

Above: Patrons of this line of Chicago Taxicabs will no longer have to watch the fare-meter for entertainment. This cab is equipped with Radio and loud speaker so that patrons can be entertained with music and news items enroute to the office or hotel.



Right: One of the new R. C. A. projectors at Radio Central at Rocky Point. It is the many new Radio installations as this one that make Rocky Point (N. Y.) the key of a gigantic system of National and International Wireless communication.

"Number, please."

The wireless operator of "S. S. Avalon" is calling a business firm in St. Louis by wireless telephone while the ship is in mid-Pacific. This telephone system has been installed on the ships of the Wilmington line and passengers are paged from the deck to answer phone calls the same as in the lobby of a hotel.