

FIFTEEN MINUTES OF RADIO EACH DAY

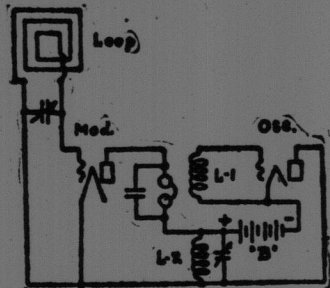
By Edward N. Davis

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Lesson No. 150.

MODULATION APPLIED TO RECEPTION.

In the reception of continuous wave signals it is common practice to employ the heterodyne principle in some form or other, such as the popular regenerative circuit. Most of these circuits require the use of a tube which acts as a detector at some point in the system, in the case of the single tube regenerative set the same tube acts as an amplifier and as a detector. The method described here consists of an application of the modulation principles, employed in transmitting circuits, to receiving circuits.



In the accompanying diagram, the incoming signals are impressed upon the grid of the modulator tube which in turn modulates the output of the oscillator tube. The circuit of the heterodyne tube must of course be adjusted so as to give beats when continuous wave signals are being received. It has been found experimentally that this circuit functions well without the use of a plate battery in the modulator tube plate circuit, although separate filament batteries may be employed. Filament battery connections are omitted for simplicity.

The operation of the circuit is such that the plate circuit of the modulator tube receives energy from the oscillating circuit of the second tube only when incoming oscillations are being impressed upon the grid of the first tube. It will be noted in the diagram that the first tube is connected in a way similar to the standard detector circuit except that there is no grid leak or grid condenser connected, while the second tube circuit contains plate and grid coils in the usual way for coupling these circuits together so as to produce oscillations. The oscillations, thus produced, cause beats (audible in the telephone) when combined with oscillations of the incoming signal.

The telephone is inserted in the plate circuit of the modulator tube and is shunted by a condenser having a capacity of about .008 microfarads in order to bypass the radio frequency current from the oscillator circuit. The circuit shown above may be operated satisfactorily in connection with a loop aerial or may be used in connection with several stages of radio frequency amplification.

The inductance coils (L1) and (L2) in the diagram may be honeycomb or other similar coils so placed that they are in inductive relation to each other, (L2) being shunted with a variable condenser of the proper size to give the desired frequency.

The circuit illustrated functions very satisfactorily for the reception of continuous waves in many cases where very weak signals are to be received, better results will be obtained by its use than by employing the usual form of regenerative receiver where the detector tube does not rectify very weak signals efficiently. The circuit shown is simple to operate, having only two controls, the variable condenser in shunt to inductance coil (L2) which adjusts the frequency of the locally generated oscillations. (All Rights Reserved by United Feature Syndicate. Reproduction Prohibited.)

Lesson No. 151. RADIO DICTIONARY.

Carrier Wave.

The wave which provides the means for transmitting or carrying the audio-frequency wave, but which does not determine the nature of the sound heard at the receiving station when simple detection reception is used.

Coated Filament.

In some types of vacuum tubes the filament or hot electrode has been coated with a thin coating of oxides. Filaments having this coating give off electrons freely at much lower temperatures than those employing pure metal and require considerably less power to evaporate the same number of electrons in a given time than filaments of pure metals.

Magnetic Amplifier.

A device for controlling signalling in high powered stations, employing large currents, to avoid having to break the full current. When used with a high frequency alternator, it consists of a variable impedance connected in shunt with the external circuit of the alternator. Through the use of a control current of a few amperes, large antenna currents of several hundred amperes are effectively controlled.

Dielectric Constant.

The dielectric constant of any substance is the ratio of the capacity of a condenser using this substance as the dielectric, to the capacity of an air condenser using air as the dielectric. If the capacity of an air condenser is multiplied by this ratio, the capacity of the same condenser employing the new substance may be determined.

Substation.

A condition which exists in lead cells due to over-discharge or to allowing the cell to remain discharged for a considerable period. The production of an excess of lead sulphate causes the plates of the cells to buckle, which either short-circuits the cells or reduces their capacity through the falling off of the active material from the plates.

Arc Transmitter.

A system for generating continuous waves by combining an electric arc with inductance and capacity of suitable values and supplying the arc with direct current having a potential of approximately 500 volts. Copper is used for the positive electrode of the arc and carbon for the negative. The oscillations produced in the circuit composed of the arc, the inductance and the condenser are transferred to the aerial circuit and radiated in the form of continuous waves.

Push-Pull Circuit.

A circuit in which two vacuum tubes having similar characteristics are connected in the same manner as a single-stage amplifier. Owing to the fact that the input voltage is divided equally between the two tubes, variations in this input voltage may be used which are twice as large as variations impressed upon a single tube. The resultant outputs are correspondingly increased due to the summation of the outputs of the separate tubes. (All Rights Reserved by United Feature Syndicate. Reproduction Prohibited.)

Lesson No. 152.

FUNCTIONS OF THE THREE-ELECTRODE.

In radio-receiving circuits there are four distinct functions which the three-electrode vacuum tube is capable of performing, namely, rectification, direct amplification, regenerative amplification and oscillation. Through the first of these functions, rectification, it converts the received radio oscillations into uni-directional pulsation which produces audible signals in the telephone receivers. In this respect it resembles the crystal detector but in addition to its rectifying properties it simultaneously performs the function of direct amplification, due to the fact that the small amount of energy received in the grid circuit is used to control the larger amount of local energy provided by the battery in the plate circuit of the tube. In other words, the alternating voltage of the received oscillation, when impressed between the grid and filament causes the plate current to follow the variation of the voltage impressed upon the grid.

This relation is brought out in the simple receiving circuit of Figure 1 which shows the physical relations existing between the plate and grid circuits. When no signal is being received and the circuit is in proper adjustment, a steady current flows from the positive terminal of the plate battery, through the telephone receivers, from plate to filament inside the tube and returns to the negative terminal of the plate battery.

It has previously been explained that the property of amplification possessed by the tube may be utilized previous to rectification of the received oscillation, that is, radio-frequency amplification or it may be used after rectification to magnify the oscillation of audible frequency, this method being known as audio-frequency amplification.

The third function of the tube, namely, regenerative amplification, is realized when a portion of the energy of the plate circuit is "fed back" to the grid circuit. This is accomplished, as shown in Figure 2, by connecting a "tickler coil" in the plate circuit and placing this coil in inductive relation to the secondary coil so that the radio-frequency current of the plate circuit will flow through the "tickler coil" and induce a radio-frequency voltage in the secondary coil. The voltage induced in the secondary coil reinforces the radio-oscillation and the resultant increased radio-frequency current in the plate circuit flows through the "tickler coil" and by virtue of its coupling to the secondary coil it increases the oscillation in the grid circuit. Due to this regenerative action the audibility of the signals in the receiving telephone is considerably increased.

The remaining function of the tube—oscillation—takes place when the coupling between the "tickler coil" and the secondary coil is increased up to a certain point. Regeneration may be considered as a means of "balancing

out" the resistance of the circuit due to the fact that it supplies energy to compensate for the energy consumed by the resistance. As the coupling between the "tickler coil" and secondary coil is gradually tightened the resistance is gradually "balanced out" with resultant increase in the strength of the received radio oscillation. This regenerative effect increases up to a certain point where the tube automatically starts oscillating and a further tightening of the coupling results in increased strength of the tube oscillation. It may thus be seen that the three-electrode vacuum tube possesses the ability to perform four distinct functions simultaneously, namely, rectification, direct amplification, regenerative amplification, and oscillation, and through the utilization of these functions is able to produce a considerable increase in the audibility of radio signals. (All Rights Reserved by United Feature Syndicate. Reproduction Prohibited.)

RECENT DEATHS

Mrs. Jennie A. Waring.

Many friends will regret to learn of the death of Jennie A., widow of George H. Waring, which occurred last evening at the residence of her son-in-law, George R. McKean, 88 Mecklenburg street, after a short illness. She is survived by one son, Russell F. Waring, of Braintree (Mass.); and two daughters, Mrs. George R. McKean and Miss Grace H. Waring, both of this city.

BILL SENTENCING EDITOR TO JAIL PASSES ASSEMBLY

(Canadian Press Despatch.)

Quebec, Nov. 9.—The bill providing for one year's imprisonment for John H. Roberts, of Montreal, editor of the *Star*, was given final reading in the legislative assembly this afternoon. Before the sentence takes effect, however, the bill will have to pass the legislative council and receive the sanction of the lieutenant-governor-in-council. Premier Taschereau announced this afternoon that the government would open an inquiry by royal commission in the charges which have been made in connection with the *Blanche Garsneau* murder and that Arthur Sauve, Armand Lavergne, John H. Roberts and others would be heard before the two judges who will be appointed.

ITALIAN ARTIST IN NEW YORK

Lulo Bias Says He Intends to Paint American Beauties.

New York, Nov. 10.—Among the first cabin passengers who arrived from Italy on the liner *Colombo* of the Italian Navigation Company was Lulo Bias, an Italian portrait painter, who said he had come here to spend six months, painting the pictures of noted American beauties. He is the son of Count G. de Biasi di Lesse, whose Venetian paintings are hung in the Metropolitan Museum of Art.

Mr. Bias said that he was the sixth painter in his family, to the credit of his father, grandfather, great-grandfather, an uncle and a cousin. He has painted the late Pope Benedict, Lady Irene Curzon, Marquis Casati, Princess Potengiani and many other persons prominent in European society.

Can You Wear

Size 2 1-2, 3 or 3 1-2?

If So

You can get a lace or button boot of extra fine quality—values up to \$10.00 at a special reduced cash price.

Remember

The sizes are 2 1/2, 3 and 3 1/2 only, and the reduced price is

\$2.75

Have us show you these styles made by the best manufacturers of Canada and the United States.

McROBBIE
Foot St. John 50 King
Fitters Street

RETURNED GOODS COST \$25,000,000 IN N. Y. STORES

\$100,000,000 of Sales Fail to Stick, Executives' Survey Shows—Association Seeks Cure for the Evil.

In some stores, he declares, the proportion of returned goods amounts to 25 per cent. \$25,000,000 annually is the extra cost which the large retailers alone must exact from the public for the privilege of buying thoughtlessly and then changing his mind. "Estimating the overhead of retail stores at about 25 per cent," Gould declared, "a rather low figure, this tremendous cost must be passed along in the form of higher prices, and the consequence is a rise in the business costs that hamper business."

More than \$100,000,000 worth of merchandise is annually returned to the larger stores of New York alone, according to an estimate made by Thomas V. Gould, of Oppenheim, Collins & Company, following a statistical investigation. Gould is president of the association.

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Taking the assumed costs of doing business at 25 per cent, and considering months, painting the pictures of noted American beauties. He is the son of Count G. de Biasi di Lesse, whose Venetian paintings are hung in the Metropolitan Museum of Art.

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Another hope expressed was that the campaign might be taken up by the National Retail Dry Goods Association.

MAYORALTY ELECTIONS IN OLD COUNTRY

London, Nov. 10.—(Canadian Press)—The mayoralty elections in twenty-eight London boroughs returned sixteen Conservatives, eleven Liberals, sixteen Labourites, eighteen Independents, while in twenty-seven cases the politics of the winners are not stated.

Returns from 323 contests in the provinces saw 152 Conservative elects, ninety-nine Liberals, eleven Unionists, sixteen Labourites, eighteen Independents, while in twenty-seven cases the politics of the winners are not stated.

GETS THREE YEARS IN PENITENTIARY

Montreal, Nov. 10.—"It is men like you who spread stories that justice is venal—that judges can be bought. You have attempted to soil the reputations of men on the bench for your own profit. I shall give you the maximum sentence imposed by the law—three years in the penitentiary."

In these words, Judge Gustav Perreault here yesterday afternoon ended the trial of Henri Duperron, found guilty of attempting to obtain \$75 from Mrs. Emile Brassard. She testified that Duperron had told her he could settle a charge against her brother for \$55.

Stores open 8.30 a.m., Close 6 p.m., Saturday 10 p.m. Phone Main 2400.



November Clearance of Women's Heavy Winter Coats

Be Sure and See These on Saturday. Prices have been greatly lowered on these coats. Some of the season's best liked styles are among them. Materials represent some of those most in demand this season.

Four Bargain Price Lots.
\$13.75, \$16.75, \$17.75, \$19.75
(Costume Dept., 2nd floor.)

Manchester Robertson Allison Limited
KING STREET - GERMAIN STREET - MARKET SQUARE

Tomorrow---

Armistice Day

It brings back some vivid recollections. For one thing you will remember how eager you were to get back into "civies." To a degree you will experience something of the same satisfaction in getting into one of the new fall and winter Overcoats we have for you here.

We Have Just Received Some Fine New Top Coats

Appreciating that a man's Overcoat plays the leading part in his outdoor dress, we have secured an unusually nice selection of fine coats—enough variety in style, color and fabric to meet individual needs and tastes. Every man who intends buying a new Winter Ulster should be interested in these. In spite of their fine quality you'll not find the prices too high—

\$22.50 to \$45.00

Special November Clearance of All Broken Lines of Overcoats Now Going On.

Some wonderful bargains among them.

\$15.75 to \$31.50

(Men's clothing, 2nd floor.)

"HATCHWAY" No Button Underwear

For Men

These practical and comfortable garments are gaining more and more in popularity. They are in combination style, designed to fit snugly without sagging open in the front or slipping from the shoulders.

"Hatchway" garments are made from soft fine materials and are unshrinkable.

Showing in three seasonable weights. Sizes 34 to 44 in.

White Union, very soft finish . . . \$2.60 gar.
Dark Natural Wool . . . \$5.25 gar.
Light Natural Wool . . . \$6.25 gar.

(Men's furnishings, main floor.)

See Special Advertisement

ON PAGE 20

\$20,000 November Drive

Dry Goods, Women's and Children's Wearing Apparel and All Seasonable Accessories

SEE PAGE 9

LONDON HOUSE

F. W. DANIEL & CO. Head of King St.

the change in the provincial administration, so it was learned yesterday.

NOT DECIDED YET WHAT TO GIVE TO THE EXHIBITION

Ottawa, Nov. 10.—(Canadian Press)—The amount which Canada will contribute toward the British Empire exhibition has yet to be determined. This was announced by Premier King last evening. He said that the federal government had been awaiting word

from the provinces as the amounts which they were prepared to spend on the exhibition before deciding on the expenditure of the federal government. He said that Major Belcher, head of the British Empire exhibition mission, which toured Canada, is expected in the capital again about the 20th of this month.

Purity Frost Kist bars, 5 cents at all Purity Ice Cream dealers. 11-16

Use the Want Ad. Way

ODD LOTS SALE

Women's Shoes

Beginning FRIDAY MORNING we are offering about 800 pairs of Ladies' Boots and Low Shoes at the REMARKABLY LOW PRICES quoted below. They are being SHOWN AT ALL OF OUR THREE STORES

437 Pairs of
\$3.95 BOOTS \$3.95
ALL STYLES—ALL LEATHERS
ALL ONE PRICE
BOOTS ARE NOW BECOMING MORE POPULAR

368 Pairs of
\$2.95 OXFORDS and PUMPS \$2.95
ALL GOOD STYLES—ALL LEATHERS
ALL ONE PRICE
Colonials are Considered the Last Thing in Pumps

These shoes, in the very same quality, were selling two years ago at \$9 to \$12. THE GREATEST VALUE IN FOOTWEAR EVER OFFERED THE LADIES OF ST. JOHN. MAKE YOUR SELECTIONS EARLY.

SOLD FOR CASH ONLY. NOT SENT ON APPROVAL. RELIABLE FOOTWEAR AT FAIR PRICES.

WATERBURY & RISING, LIMITED

AMDUR'S BARGAIN BULLETIN, No. 29

Saturday Only---For the Whole Day

Millinery

Jaeger Sport Hats—In Grey, Mauve and Black and White . . . \$1.50
Brush Felt Hats—In Grey, Mauve and Black and White . . . \$1.50
Semi-dress Hats—In Nigger-Brown, Delphian Blue and Black \$2.00

Ladies' Coats

Ladies' Velour Coats, with Fur Collar and Cuffs . . . \$12.95
These coats are beautifully embroidered.

Sweater Yarn

Sweater Yarn—Latest wanted shades, all wool . . . 2 oz. ball, 25c
1 oz. ball, 13c

Heather Hose

Ladies' Heather Hose—Full fashioned, high grade . . . 59c pair
This line is offered in all the popular shades.

Men's Leather Work Gloves and Mitts . . . 49c pair

AMDUR'S, LTD., No. 1 King Square