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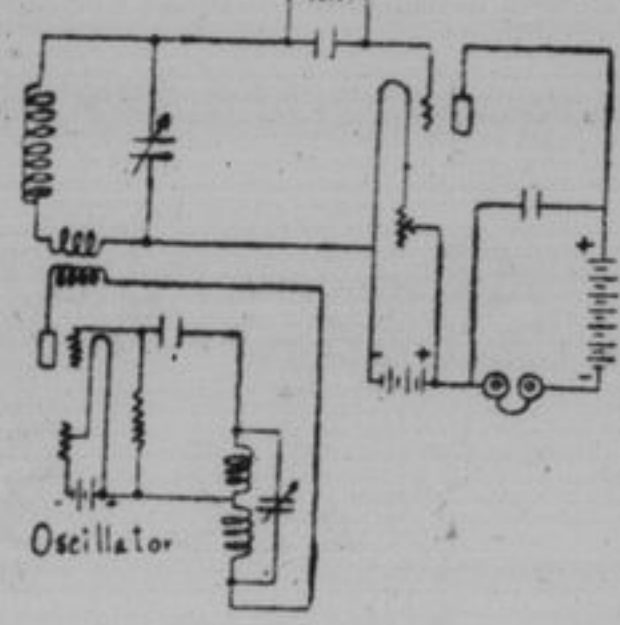
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RADIO EXPLAINED
By E. H. LEWIS
INSTRUCTOR NEW YORK Y.M.C.A. RADIO SCHOOL

PRODUCTION OF BEATS WITH SEPARATE HETERODYNE

The circuit diagram shows the secondary circuit of a receiver connected to a vacuum tube detector and, in addition, a vacuum tube oscillation generating circuit coupled to the closed oscillator, or secondary, circuit of the receiver. The frequency of the oscillations is controlled by the variable condenser shown



connected across the grid and plate coils of the oscillator. Oscillations will of course be induced in the secondary circuit by the oscillator and will be of maximum strength when the secondary is in resonance, other things being equal. The coupling between the oscillator and the secondary circuit will also of course affect the strength of the induced oscillations. Imagine that a signal is picked up when the antenna circuit is in resonance with a distant sending station at a wave length of 3,000 meters and suppose that the oscillator is not being operated. If the sending station is transmitting with undamped or continuous waves no signal is heard in the head telephones because the plate current variations are smoothed out and are of too high frequency at any rate to produce an audible sound. This would happen even though the secondary were accurately tuned to resonance with

the incoming oscillations whose frequency in the case of a 3,000 meter wave would be 100,000 cycles. The undamped oscillations would not produce audible sound in the head telephones whatever their frequency might be.

But now let us tune the oscillator circuit and start the generation of continuous oscillations at a frequency of say 99,000 cycles. The tuned secondary circuit connected to the grid and filament is not in resonance with the oscillator, but the latter will nevertheless induce oscillations of 99,000 cycle frequency in it. They will be forced oscillations. There are then oscillations of two frequencies—100,000 and 99,000 cycles—which add together to produce a third frequency of 1,000 cycles, the difference between the other two. The oscillations act upon the grid and therefore the plate current variations have a frequency of 1,000 cycles, which is called a beat frequency. This frequency is within the audible limits and when rectified or apparently rectified by the tube results in audible sound in the head telephones. The telephone diaphragms vibrate at a rate of 1,000 times per second and the sound heard has a musical tone. If the oscillator frequency were made 100,000 cycles no beats would be produced and no sound would be heard in the telephones. The beat frequency would be zero. But if the oscillator frequency were increased to 101,000 cycles the beat frequency would again be 1,000 cycles and produce the same audible sound as before. The beat frequency is always the numerical difference between that of the received oscillations and those locally generated in the oscillator. If the beat frequency is varied within audible limits by varying the oscillator frequency slightly, the tone of the signals may be varied.

APPARATUS AND DEVICES
By RALPH BROWN, RADIO ENGINEER

A TELEPHONIC LOUD SPEAKER

A careful study of acoustics has resulted in the production of



this loud speaker. Material consists of spun fiber brass. Telephones are inserted on sound

Will readers interested in these radio articles kindly communicate with the editor by mail?

chambers and clamped there by an ingenious device allowing no escape of sound vibrations. Tone arm runs at right angle and fits into horn. Latter consists of overlapping sections, each one an acoustic chamber, the diameter increasing until the bell is reached. Latter is so designed that overtones are done away with. The main acoustic features are a perfected sound chamber with a graduated series of ten others, each increasing the resonance of tone. In addition there are two sound projectors on the bell, one augmenting the one behind. They are made according to sound curves and this type is patented. The instrument is finished either in nickel or brass. The base is also of the same material and is large enough to furnish a firm stand. The results claimed for this instrument by the manufacturer are surprising. Not only does the tiny sound disappear but all tones are given their natural resonance. The price is very reasonable and compares very favorably with other loud speakers. Telephones are not included.

AT CHAFFEY'S LOCKS.

The Farmers Report a Good Yield of Hay in This District. Chaffey's Locks, July 25.—The farmers are engaged harvesting their hay, and report a good yield, the past week being ideal weather for the work. Dr. T. F. Chamberlain's ideal cottage is nearing completion. Mr. and Mrs. Harry Fleming, St. Louis, Mo., and Mr. and Mrs. M. H. Kieran, Mrs. J. E. O'Brien and Miss Frances, of Montreal are guests of W. H. Fleming, A. W. Thompson and Party of New York, on the yacht Summertime, are spending the summer here. A. Jones and family Smith's Falls, are occupying their house boat here. D. F. Anderson, Youngstown, is spending a few weeks in his beautiful cottage here. He was fortunate in catching a six-pound bass last Saturday while W. G. Smith, of Youngstown, caught a six and a half pound bass, the day previous. Some of the late guests at the Opinions Club are: Mr. and Mrs. R. Buchanan, J. A. Trawick and nephew, W. G. Smith; Dr. and Mrs. Sherbondy, D. A. Trawick, Youngstown, Ohio; Mr. and Mrs. C. Sample, J. A. Richards and sister, Chicago, Ill. W. Sample, Judge Kennedy, Youngstown, Dr. Conboy and party, Rochester, New York. A very enjoyable evening was spent on Friday last, when Mrs. W. H. Fleming entertained a number of the young people. Dancing and cards were enjoyed, also a number of selections from Chaffey's Locks orchestra. W. H. Buffman, Detroit, is the guest of George L. Simmons, Mr. and Mrs. J. Rowswell and family, Winnipeg, are visiting Mrs. Wellington Kerr, Sr. W. F. Noonan, Napanee, spent the week-end here.

W. N. Stevenson, Organist and Choirmaster of Almonte Presbyterian Church, was the recipient of a handsome wrist watch, presented by the members of his choir. The tax rate this year for Pembroke is forty-six mills.

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They have what the doctors call "malnutrition." They are underfed. They eat the wrong foods. Their appetites need coaxing. "Lots of good milk" is the remedy. Milk is easily digested. It is the perfect food. It contains everything the body needs and supplies it in the right proportion.

Folks with appetites jaded with too much rich, highly spiced food should try Price's Pasteurized Milk.

PRICE'S DAIRY



J. M. Quinn, Perth, sold the 300 Hiram Green, Lansdowne, Ont. The acre farm owned by John McRae, crop, live-stock and farm implements one mile from Ashton Station to go with the farm.

Many Shoe Bargains on \$ Day \$ DAY \$ VALUE

- Ladies' White Canvas Lace Boots with Rubber Soles and heels \$1.00
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- Aug. 5—Empress of France Cherbourg, Southampton, Hamburg.
- Aug. 11—Montreal Liverpool
- Aug. 12—Tunislan Glasgow
- Aug. 15—Empress of Britain Liverpool
- Aug. 16—Melita Southampton, Antwerp.
- Aug. 18—Victorian Liverpool
- Aug. 22—Empress of Scotland Cherbourg, Southampton, Hamburg.
- Aug. 26—Montreal Liverpool
- Aug. 26—Montreal Glasgow
- Aug. 26—Minneapolis Southampton, Antwerp.
- Sept. 1—Empress of India, Cherbourg, Southampton.
- Sept. 1—Montclair Liverpool
- Sept. 2—Empress of France, Cherbourg, Southampton, Hamburg.
- Sept. 4—Scottian Southampton, Antwerp.
- Sept. 5—Montross Liverpool
- Sept. 9—Tunislan Glasgow
- Sept. 12—Empress of Britain Liverpool
- Sept. 13—Melita Southampton, Antwerp.
- Sept. 15—Victorian Liverpool

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From Montreal, down the St. Lawrence River, out through the Gulf to the Atlantic, passing the picturesque Gaspé Coast, then to Prince Edward Island, where we stop at Charlottetown—across to St. John's where the ship docks for two days, allowing you to visit points of interest in the neighborhood.

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Every Saturday Steamer de luxe "Cape Eternity" leaves Montreal at 7 p.m. for an extended cruise to Quebec, Lower St. Lawrence River resorts, Tadoussac and the Saguenay River, arriving back at Montreal the following Friday.

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