

Radio Theory And Practice

(By J. J. Stencil, Radio Technician, Member Radio Association of America, Member Co-Operative Radio Doctors, Inc., Custom Set Builder, Graduate National Radio Institute, Graduate Radio Training Institute and allied courses.)

Push Pull Power Amplification
(By J. J. Stencil, Radio Technician, Member Radio Association of America, Member Co-Operative Radio Doctors, Inc., Custom Set Builder, Graduate National Radio Institute, Graduate Radio Training Institute and Allied Courses)

In the modern radio of the present time, practically all use push-pull audio amplification with some of the higher powered power tubes hooked up in a kind of semi-parallel manner. The claims for this kind of audio hook-up are great and varied, most of which is merited. I find it rather hard to explain some of the techniques of radio so that those who have never made a very extensive study of radio may understand the theory and principles involved and at times I find it necessary to vary a little the true schematic arrangements to be able to present the matter in a little clearer light. In radio there are harmonics, those that are desirable. In audio amplification these harmonics play a vital part in the quality of the reception which emanates from the speaker. In push pull audio the hook-up is such that these harmonics are taken care of in the correct manner and the resultant output is of the very best. The action of tubes in push pull arrangement is in this manner: There is introduced into the audio tubes two harmonics—or kinds of harmonics, even harmonics and odd harmonics. In the old conventional type of audio amplification, both these harmonics passed on through the entire audio system and often a blurred or distorted signal emanated from the speaker. In push pull audio these harmonics do not all go galloping all the way through the audio system but all the even harmonics are acted upon in such a manner that they are neutralized—balanced out. This action is caused because in each tube these even harmonics are present and they being even in nature, these even harmonics in each tube act upon each other and being of equal strength—even, they balance each other out but with the odd harmonics the action is different, these harmonics being odd—in variance with each other, their action is different in that being odd in respect to each other, they will not balance against each other and hence they pass on through the tube and we get the one kind of harmonic, not a combination of harmonics and hence the output is smooth and clear. In a. c. sets where push pull audio is used, there is another distinct advantage in that any stray noise that may be introduced into the signal by the audio (push pull) tubes is also balanced out by these tubes in a similar manner to that in handling the harmonics. A. c. hum is lessened by the use of push audio amplification. With the use of power detection as used in most present day receivers, the push system has a large power handling capacity and this makes for smoother and quieter operation. Now for some of the types of power tubes that are desirable for use in the audio system. In most later models of receivers the use is made of the 245 power tube and justly so because two of these tubes will handle nearly as much power as one 250 power tube which is the largest and most powerful of all audio tubes. The 250 power tube requires 450 volts plate pressure which means that a powerful step-up transformer must be used to convert the 110 volts from the electric light lines to the necessary 450 volts for the plate of this tube. These high voltages are a little dangerous in the hands of the novice in as much as they act upon a very delicate and intricate electrical and mechanical system. The 245 tube only requires 250 volts maximum upon its plate and may be worked satisfactorily quite a bit below this point and hence the need for such a powerful step-up transformer is necessary. The 210 power tube is a step in-between the 250 and the 245 power tubes but requires practically the same voltages as does the 250 tube. Next below the 245 is the 171 power tube which gives very good results with a maximum plate voltage of 180 volts and its close competitor, the 112A is not quite as powerful but gives a better quality of output with practically the same voltage on its plate as those used for the 171.

RADIO SERVICE AFFECTED BY SOIL AROUND STATION

Placing a radio station seems utterly different from planting corn or cotton, but the two have one point in common. The right kind of soil is important to the corn or cotton crop, and the right kind of soils is important to the most effective operation of the radio station. This fact came out when a representative of a large concern manufacturing radio transmitting apparatus visited the United States Department of Agriculture and asked to examine soil-survey reports and maps as a guide to the placement of radio stations in the middle West and Southwest. This use of the soil-survey records was new to the soil specialists of the department.

The radio expert explained that engineers have found that radio transmission is better over soils which are retentive of moisture than over drier soils. They believe this is because the drier soils absorb the radio waves to a greater degree than do the moist soils. He said that the soil maps and the detailed descriptions of the structure, the texture, and the arrangement of the layers of soils which are included in the department's soil-survey reports have already proved useful in locating stations.

Soil-survey reports are in demand by settlers in search of productive lands, by farmers seeking to make the best use of their fields, by engineers in building roads, by bank and mortgage concerns in estimating the loan value of farms. These uses are familiar, but it will be news to most soil surveyors that their work also locates the spots on the earth which provide the best sounding board for radio transmission.

Last year 1,876,000 persons moved from farms to cities, and 1,257,000 moved from cities to farms, a movement away from farms of 619,000, according to U. S. Bureau of Agricultural Economics figures. The population is now the smallest in 30 years.

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are mostly in favor of push pull audio amplification, there is some points against its use which might be incorporated in this article. Any tube of the power tube family, when properly wired in to a circuit, will give APPARENTLY the same results as when used in push pull arrangement. I mean by this, that it will give ample volume, distinct and readable signals and only those who have a good ear for distinction can readily appreciate a very great difference between the quality of the two signal outputs. Another feature that might be called favorable to the straight audio system is, it requires less expensive units and is easily a cheaper system to build and saves the price of one tube. I have built now for my personal use, a super heterodyne receiver which uses one 250 power tube in the last stage and is an eight tube receiver. While I get very nice and sweet music from this receiver, it incorporates certain features which would not lend it so admirably to the average person. I use a loop for an aerial and get more distant stations than many of the high priced receivers will pull in. To do this, I built in to this receiver certain features not found in any other receiver at this time. I used two 122 shield plate (screen grid) tubes and I doubt if any receiver near here uses exactly this type of screen grid tube. It will be well for any one who has push audio in their receivers to look well after their tubes when the signal fails to be clear and a faithful reproduction of the original broadcast. The fact that the tubes light and seem normal is not absolute proof that they are functioning properly. A splendid means of trying out the tubes is to pull out one audio tube at a time while the signal is coming in, first one and then the other. In either of these two trials of letting one tube amplify at a time, the signal should sound with the same clearness and volume for each tube. Of course in this arrangement, the volume will fall off greatly but it should still be audible. Those desiring information relative to their radio receivers may have a free treatise as to possible cause of trouble if they will address their communication in care of The Johnstonian-Sun, Selma, N. C., inclosing self-addressed envelope and 2c stamp, giving kind and model of receiver, length of aerial, kind of ground connection used and a general description of symptoms etc., as to how the receiver functions.

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KENLY

(By MELBA WATSON)

The Junior Sunday School class of the F. W. B. Church enjoyed a picnic at Holt Lake Thursday. They motored there in the afternoon, leaving Kenly about 3:00 o'clock. In various ways they amused themselves while there, bathing, boat-riding and otherwise; until about dark when they spread and ate the appetizing lunches which they had prepared. Later in the evening they returned home.

Mrs. Ad Mitchell, of Live Oak section, was buried in the Kirby burying ground near Kenly, Saturday, amidst the presence of many friends and relatives.

Messrs. P. D. Grady, L. C. Wilkinson, J. F. Crumpler, and W. T. Kirby made a business trip to Nashville, Tennessee last week, leaving Kenly Sunday and returning Tuesday.

Mrs. L. A. Johnston and daughter, Pearl, of Rocky Mount, spent last week with Mrs. J. R. Johnston.

Misses Eva Pittman and Melba Watson spent Thursday night and Friday in Princeton, guests of Miss Beulah Worley.

Mrs. Cecil Davis of Smithfield visited his cousin, Mr. Vonnie Pittman, Saturday night and Sunday.

Rev. Kirby, of South Carolina, was the week-end guests of Mr. and Mrs. W. T. Kirby.

An announcement party was given at Mr. P. D. Grady's, announcing the marriage of his daughter, Eloise. The couple had been married since last September.

Miss Hazel Phillips visited relatives in Smithfield the past week.

Mr. Thad Harris, of Enfield, visited in Kenly Wednesday afternoon and night.

Miss Beaulah Worley, of Princeton, was the week-end guest of Miss Melba Watson.

Messrs. E. J. High, Jr., and Ronald Griffin, of Bailey, visited in Kenly Sunday night.

Mr. Joe Pittman, of Enfield, spent Sunday in Kenly with his parents, Mr. and Mrs. R. L. Pittman.

Mr. and Mrs. Luther Pittman, of Micro visited Mr. and Mrs. E. G. Pittman Friday night.

Messrs. William Godwin, Lester Watson and Velma Atkinson, who have been in Atlanta, Ga., quite a while, returned to their respective home in Kenly last week.

Misses Lois Barnes and Clarence Pittman visited Mr. and Mrs. P. A. Talton and family, of near Princeton, Thursday night and Friday.

Mary, the baby daughter of Mr. and Mrs. James Bunn, of near Kenly, died Friday. She was buried in the Bunn burying ground Saturday.

Mr. Larry Raper spent Saturday night with his brother, Robert, of the Hickory Cross section.

Misses Grace Watson and Leora Cooke made a business trip to Princeton Friday.

Mr. and Mrs. H. R. Renfrow and family visited Mr. J. R. Hinnant, of Raleigh, Sunday.

Mr. and Mrs. P. D. Grady and Mr. and Mrs. L. C. Wilkinson left Monday for Canada.

Miss Maud Edwards, of Princeton, visited Miss Eva Pittman the past week-end.

Mr. Justice Hardison, of New York, is spending some time in Kenly with his parents.

Mr. and Mrs. Jack Ballance and Messrs. Cecil Davis, Vonnie Pittman, and R. L. Pittman carried Mr. and Mrs. Ballance's son, Wallace, to the State Sanatorium at Aberdeen Monday for examination.

The announcement of the marriage of Miss Eloise Grady, of Kenly, to Elbert Stanford Eskridge, of Shelby, which was made public at a party given at the home of the bride's parents last Thursday evening, came as a complete surprise to friends and relatives. The couple had been married since September 13th, 1929. They will be at home in Winston-Salem after July 15th.

Miss Eva Pittman shopped in Smithfield Tuesday.

Messrs. Walter and Hoyle Stinson, of Raleigh, visited their brother, Bernice, Sunday.

Mr. Bernard Ferrell spent Monday night and Tuesday with Mr. Nathan Talton, of Princeton.

The severity of cutting or length of the cutting season and the treatment of asparagus after the cutting season determine to a great extent the quality and quantity of the next year's crop. Cutting too late exhausts the plants. After ridges have been leveled and the beds have been cultivated thoroughly, broadcast and work in a good high-grade complete fertilizer at the rate of 1,000 to 1,500 pounds per acre. Give the bed flat culture for the remainder of the growing season.

FOUR OAKS

(By MRS. ALTON MASSENGILL)

Mr. Jesse Keene, of McColl, S. C., is spending some time here with relatives.

Miss Mildred Lassiter spent last week in Benson with friends.

Mr. and Mrs. Bert Lassiter and little daughter spent Thursday and Friday in Oxford with relatives.

Mr. and Mrs. R. B. Strickland spent Wednesday in Fayetteville.

Miss Luma Lewis and Mr. C. G. Grady visited friends in Raleigh Sunday.

Mrs. Reid Adams spent last week in Knightdale as the guest of her sister Mrs. Robert Wilder.

The Granny Creech Circle met on Tuesday evening at the home of Mrs. R. C. Cannaday. The meeting was opened with prayer by Mrs. B. B. Creech, after which the roll was called and minutes of last meeting read. After a brief business session, the Circle continued the study of the mission book, "Ann of Ava." During the social hour the hostess served a frozen fruit salad course with iced tea.

Mr. and Mrs. L. M. Eldridge, of Benson, visited Mr. and Mrs. W. P. Massengill Sunday.

Mr. Herman Berkshot, of Richmond, is spending several days here as the guest of Mr. and Mrs. N. H. Keene.

Dr. and Mrs. W. T. Witte, of Richmond, are the guests of Mr. and Mrs. S. E. Sherrill.

Mrs. Jack Stallings and son, of Charlotte, spent Friday and Saturday here as the guests of her sister Mrs. Carl Lewis.

Miss Katie Allen, member of the Micro school faculty, has returned home. She will leave next week for Greenville, where she will attend summer school.

Rev. Ordell E. Bryant and Mrs. Bryant, of Clinton, visited Mrs. B. A. Rich Thursday.

Mrs. J. E. Lassiter and Mrs. Martha Lassiter shopped in Smithfield Thursday morning.

Mrs. Garland Adams, of Greensboro, is spending sometime here with her parents Mr. and Mrs. B. B. Adams.

Mrs. Katherine Adams and son Billy left Thursday afternoon for Greenville, where they will spend the summer.

Mr. Herman Creech and family, of Tarboro, spent Sunday here with Mr. and Mrs. J. B. Creech.

Mr. Charles Lee, Jr., spent Monday in Smithfield with relatives.

Mr. and Mrs. Dalma Upchurch, Mr. and Mrs. Elton Strickland, Mrs. Evelyn Strickland and Miss Margaret Strickland spent Sunday in Coats, the guests of Mr. and Mrs. W. M. Keene.

Mr. and Mrs. Ham Johnson and Mrs. Alton Massengill spent Friday in Raleigh.

Miss Rose Worley, of Selma, spent a short time in town Friday.

Mr. and Mrs. C. H. Gibson, of Rocky Mount, spent Friday night here with their parents Mr. and Mrs. J. B. Creech.

Mr. and Mrs. John Massengill, and Mrs. Thomas Speare, of Goldsboro, were here for a short time Sunday evening.

Miss Lucile Strickland spent the week-end near Smithfield with Mrs. H. G. Johnson.

Mr. and Mrs. Horace Smith and children, of Newport News, Va., are spending some time here with their parents Mr. and Mrs. Jas. A. Creech.

Mr. Hubert Allen, of Wilson, spent the week-end here with relatives.

Mr. Hoyt Massengill, of Richmond, Va., is home for awhile, recuperating from an attack of influenza.

Mrs. W. M. Keene and children, of Coats, visited friends in town Thursday afternoon.

Mr. and Mrs. Jesse Coats, of Smithfield, visited their brother Mr. J. D. Upchurch Friday.

Mrs. Alderman, of Raleigh, visited Mrs. C. H. Wellons Sunday afternoon.

Many dairymen believe that cows should always be milked regularly, but tests at the U. S. Bureau of Dairy Industry Experiment Farm at Beltsville, Md., show that an average to good cows can be milked at irregular hours without any material effect on milk production. Apparently cows are more sensitive to changes in feeding routine than to variation in the hours of milking.

Pick mushrooms when they are "buttons"—that is, before the membrane or veil extending from the margin of the cap to the stem has broken. At this stage they command a better price than when larger. Mushrooms may be picked by twisting the base of the stem. Take care to press the soil over any holes made in picking.

Currituck potato growers are interested in a plan whereby hogs will be used to glean the fields after the sweet potatoes are harvested. Some tests will be made to determine the value of these gleanings both alone and in combination with other feed.

SUNNYSIDE

(By ALICE HINNANT)

Mrs. Bud Evans and daughter Mildred spent Sunday with Mr. and Mrs. Eddie West, of Brodgen.

Mrs. Atsy Peel and children and father Mr. George Durham, of near Kenly, spent the week-end with Mr. and Mrs. W. A. Crumpler.

Miss Alice Hinnant spent the week-end with her sister Mrs. L. M. Barnes of Batten's X Roads.

Miss Hazel Crumpler, spent Thursday with her aunt Mrs. Wiley Wiggs of Fitzgerald section.

Miss Esther Braswell spent the week-end with Miss Ethel Batten, of near Micro.

Mr. and Mrs. L. M. Barnes and children, of Batten's X Roads, spent Sunday with Mr. and Mrs. Theo Hinnant.

Mieses Daisy and Allie Evans spent Sunday with Mr. and Mrs. J. R. Evans, of Batten's X Roads.

Mrs. Will Martin and children and Mr. Oscar Evans and children and Mrs. Eatmon spent Sunday afternoon with Mrs. Jack Martin, of Pleasant Plain.

Mr. and Mrs. Gernie Price and children, of Pine Level, spent Sunday afternoon with Mr. and Mrs. Fletcher House.

Mr. and Mrs. Eddie West and children, of Brodgen, spent Wednesday night with Mr. and Mrs. Bud Evans.

Mr. and Mrs. C. V. Evans and children, of Goldsboro, spent Wednesday night with Mr. and Mrs. Tom Evans.

Mr. and Mrs. Monroe Braswell and children spent Sunday afternoon with Mr. Braswell's mother Mrs. Braswell, of Royal section.

Mr. and Mrs. Raymond Sutton and Miss Myrtle Barnes went to White Lake Sunday.

Mr. and Mrs. W. M. Pace and children visited Mr. and Mrs. Barnie Brown Sunday afternoon.

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WATCHING THE WEATHER MAN WITH UNCLE SAM

(The sixth in a series of ten talks by Welby R. Stevens, assistant forecaster, U. S. Weather Bureau, delivered through WRC and 32 other stations associated with the National Broadcasting Company, at 1:10 p. m., Eastern Standard Time, Thursday, January 16, 1930.)

Last week we said that the most important feature on the weather chart was the isobars. These lines located the high and low pressure areas, which are roughly elliptical in form. It is absolutely necessary for the forecaster to know where the HIGHS and LOWS are located, because the ceaseless changes in our weather are due almost entirely to their approach and passage and the winds which attend them.

The meteorologist used a variety of terms to designate a low pressure area, such as LOW, depression, disturbance, or cyclone. Contrary to popular public opinion "cyclone" is not the proper name for a severe wind storm and is often used to indicate a tornado. Only rarely are the winds in a cyclone destructive, while in a tornado they are always destructive.

A cyclone or LOW is of wide extent. On the average they have diameters between 600 and 1000 miles, but sometimes they may be as large as 2000 miles in diameter. They usually move from some westerly to some easterly point. Except in a certain portion of the disturbance, the wind does not blow in the same direction that the LOW is moving. This is due to the fact that the surface winds circulate around the LOW. The circulation is counterclockwise in the Northern Hemisphere and clockwise in the Southern, with the winds blowing spirally inward toward the center. In the Northern Hemisphere the temperature to the south and east of the LOW is comparatively high because in those portions the winds are from some southerly quarter. On the west side the temperature is comparatively low for the wind is from some northerly direction.

Clouds are almost entirely lacking on the west side but generally extend far out to the east. Rain is usually associated with LOWS; most of it occurs in the eastern half. Just as two valleys are an impossibility without a hill or ridge of land between them, in the same way two areas of low pressure cannot exist without a region of higher pressure between. These regions of high pressure in many ways stand in sharp contrast with the LOWS and have many characteristics which are exactly opposite.

The wind circulation around a HIGH is clockwise in the Northern Hemisphere and just the reverse in the Southern, with the winds blowing spirally outward. In them but few clouds are to be seen and precipitation is usually lacking. With the advance of a HIGH there is a decided drop in temperature in the eastern portion where, in the Northern Hemisphere, the winds are from the north. After the center of the HIGH has passed there is a decided rise in temperature on the western side where the winds are southerly.

There is a very definite relation between pressure and wind direction, which was formulated into a law almost a century ago. This law proved to be very valuable to mariners in avoiding dangerous storms. It states: If you stand with your back to the wind, the region of low pressure will be to the left in the Northern Hemisphere and to the right in the Southern.

It must be remembered that the statements we have made in connection with HIGHS and LOWS apply only in a general way. Each individual HIGH and LOW has its own peculiar characteristics and it is a problem for the forecaster to decide how each one is going to behave.

Next week we shall tell you more about the characteristics and importance of HIGHS and LOWS.

When the mosquitoes come around to torment us again, it may be well to have a copy of Farmers' Bulletin 1570-F, Mosquito Remedies and Preventives. This bulletin can be secured free from the U. S. Department of Agriculture, Washington, D. C.

"The Rats Around My Place Were Wise," Says John Tuthill.

"Tried everything to kill them. Mixed poison with meal, meat, cheese, etc. Wouldn't touch it. Tried RAT-SNAP. Inside of ten days got rid of all rats." You don't have to mix RAT-SNAP with food. Saves fussing, bother. Break a cake of RAT-SNAP, lay it where rats scamper. You will see no more. Three sizes, 35c, 65c, \$1.25. Sold and guaranteed by E. V. Woodard, Druggist, Selma, N. C.; Godwin Drug Co.; Pine Level, N. C.; A. F. Holt & Sons, Princeton, N. C. Adv.