RADIO

A Weekly Feature of The Guide-Advocate to give our readers a clear explanation of this new popular science.
By Chas. M. Fitzgerald, Watford

The wireless telephone or the radiophone, as it is more commonly called, is generally thought to be the most mysterious and wonderful achievement of the age.

To be able to hear voices, music, etc., clearly from distant points without wires conveying the energy from the speaker to the listener is uncanny to the average individual. However, this latest stunt of science should not be considered more unusual than light which is more commonplace and for which we have the sense of sight to perceive its presence and operation. In the case of the radiophone we must have suitable apparatus to make audible the passing presence of the wireless energy which is radiated in the form of wave motion as is also light.

The purpose of this article is to explain the operation and mysteries of wireless telephone and telegraph, especially the former, and to deal particularly with points of interest generally overlooked.

In the first place let us consider the medium used to convey the energy from the speaker or sender to the distant listener or receiver in wireless communication. In the case of the ordinary telpehone we have the medium of a wire connecting the two points to convey the electric energy from the sender to the listener. In wireless, however, we have no wires as a means by which we transmit the energy so we must expect to use some other medium, and an energy capable of travelling through this medium. The medium used is called "ether." Now what is the "ether". It is merely a filler-in that is presumed to occupy the spaces between the real solid particles or atoms composing a material or substance. To illustrate this we could fill a glass jar with marbles. The marbles would represent the real material or atoms while the spaces between would be representative of the ether. Now every material or substance whether it is a gas (air is a gas) or a more tangible material such as stone wood earth or liquids contain the solid atoms or particles with the "ether" filling in and since the ether occupies such a place we can expect that it provides the medium for the radio energy or waves to travel through these things. On account of this we can be entirely enclosed in our house and by having a suitable receiving set we can receive and make audible the music, etc., that is conveyed on these radio waves. Then again if we were to seclude ourselves in a vault entirely underground we could also receive wireless or if we were to go under the water in a submarine these radio waves would be heard by the use of suitable apparatus.

In the ordinary wire telephone we utilize a fluctuating electric current produced at the sending end to convey intelligence to the listener. In radio practice we make use of an undulating radio wave which is termed Hertzian wave or electromagnetic wave. These waves were first made known, transmitted and detected, by a scientist named Hertz. Marconi later utilized them on a practical basis to make wireless communication possible. When a transmitting radio apparatus is put into operation these electro-magnetic waves of a definite length are radiated outward in a similar mannr as a pebble would cause waves to travel when dropped on a still pool of water.

Let us now learn what is the nature of the Hertzian wave as used in wireless. A popular question generally puzzling to most individuals is that if there are different transmtting stations in operation in a given area, why they do not interfere with each other producing a unintelligible jumble to the listener operating the distant receiver. The answer is, that the transmitting stations can be each individually tuned to radiate a wave of a definite length. Thence each could be so adjusted to provide a wave length longer or shorter than an adjacent transmitter. For a receiving apparatus to hear a particular transmitting station it must be tuned in resonance or harmony to the wave length radiated by the transmitter. In other words there must be the same lengthy of wire in use, electrically, as the transmitting station utilizes. In order to better understand this phenomena we will look into a parallel example of which most ofu s are more familiar. Take sound for instance, which is also propogated by wave motion, through a different medium than Hertzian waves, must utilize strings etc. of a definite length to produce a given note. The length of the string determines the wave length along with the rate, or frequency that this string will vibrate, which is in adverse arrangement to the wave length. There would be a method which could be used to cause a certain string, say on your piano, to vibrate producing its particular note without mechanical contact with. This can be done by plucking another string similiar to it or by whistling a similiar note. This can be demonstrated to your own satisfaction on the piano in the following manner. Depress the "loud" pedal to give the strings free play. Now give a short sharp whistle. You will hear a response of a similar note from the particular string that is tuned to this wave length in the piano. Note that no other strings respond. This is because they are tuned to same wave length or frequency as that produced by the whistle, therefore in order to produce sympathetic action we must either bring the wavelength produced by the whistle to that of the string which we might term as the receptor or cause the string to be brought into tune with he whistle or transmitting member. In radio practice it is more customary and convenient to set the transmitting station adjustments to radiate a given wave length and generally leave it at such while the receptor is brought into tune with it. By the foregoing illustration, which is better understood by trying the experiment mentioned, anyone can understand how interference is prevented in radio communication. However, because sound is taken as an example it should not be confounded with radio which is entirely different in more than one respect. Sound also produces wave length or in visa versa frequency of vibration which are low enough to be heard by the human ear while Hertzian wave frequency may run at over the million per second and also being of a different nature, or more so inaudible to the unaided senses. It is sometimes believed that the wind effects interferes with Hertzian waves. However as wind is a rush of air and air being a natural substance in a sense, it could not be expected to impede an unlike or the radio wave energy.

In the foregoing part we learned, that, one reason for using different wavelength, was to avoid interference. It also has been found that long wave lengths having a small vibrating frequency penetrate farther with less absorption. Take an example of a large wave produced by a big steamer will travel farther than a short wave produced by dropping a pebble on water. Similiarly it takes a large bulk or surface and a greater power to produce a big wave on water, as in radio. Therefore a radio station using a large aerial, excited by a great amount of power, co-ordinating with the long wave it will naturally produce will cover a longer distance most effectively. We would therefore expect that these long waves would be assigned to long distant transatlantic stations. Such station uses wave lengths up to 25,000 meters in length (a meter being the standard measurement used in radio practice and equals over three feet). Ordinary commercial, ship and shore station use wave length of 600 meters and over. Amateur traffic in Canada and U.S. are permitted to utilize wave lengths from 150 to 275 meters. Radio telephone Broadcasting is carried on approximately 360 for music, news and reports while the weather is radiophoned on 485 meters. It will be assumed that it would be natural for amateur traffic to be carried on the shorter wave lengths due to the more convenience in erecting smaller aerials or antenna systems. The aerial or the antenna is merely a wire or wires so arranged to provide a means of radiating or collecting radio energy. At the transmtting end this aerial is excited by a suitable current of a given frequency thereby producing a wave motion in the ether. At the receiving end these waves cause a similiar current to be set up in the receiving antenna which are made manifest by the use of a suitable receiving apparatus providing of course that the receiving antenna system is tuned to that partcuiar wave length corresponding to that which is radiated by the transmitter. A problem now presents itself to the reader. What if the transmitting station uses a wave length of such a length as to be too long to be in resonance with the antenna system of the receiving station? It would not be convenient to change the length of the antenna to receive each transmitting station but as it is necessary to use a sufficient length of wire in order to tune-in and hear the transmitting station radiations, therefore we must have some means of making the addition of wire. This is accomplished by having a length of wire wound around a tube or form and so arranged that more or less wire can be added by the operator listening at the receiving station. The same end is also accomplished by the additon of this and other means as well. Thus by turning a switch or dial or a plurality of these the listener can pick out the wave length radiated from any particular station within the range or distance that his receiving apparatus may be able to reach and bring them to his hearing.

What determines the distance that a deceiving station may be able to hear a distant transmitter? There are numerous factors and we well consider the chief ones. As will be expected the power of the transmitter as well as the character of the wave radiated and the proportion of the antenna or aerial system is important. The terrain intervening and the locality of the sending station in regard to the receiving station is another factor. Over water the range is greatly increased to that obtained over land. In daylight the range is about one half as great as it is after nightfall. The season of the year also determines the range. The summer season bringing with it a decrease compared with the other seasons. At the receiver the proportion and height of the antenna determines how far the signals can be heard from. The greater height producing a increase in range while it is well expected that the antenna wire outside or inside must have a sufficient length to provide an ample surface to the incoming waves. And lastly but possibly the most important is the ability of the receiving set to make use of, to the greatest extent, the infinitesimal amount of energy htat flows down the antenna wire to the apparatus and of course the skill in handling the apparatus helps as well. This last mentioned factor is largely overcome by the present day radio apparatus which have the entire control reduced to four or even two adjustments with excllent efficiency.

RESULTS OF LOWER SCHOOL EXAMINATIONS

The results of the candidate's examination is indicated by papers as follows:

First class proficiency (75-100) 1st
Second class proficiency (66-74) 2nd
Third class proficiency (60-66) 3rd
Credit without proficiency (50-59) C

Form II

All candidates were granted credit in History and Geography from last year's work. They wrote on six papers this year. A subject omitted means a failure. Grammar and Latin were alternative subjects.

	Physiog.	Arith.	Art	Botany	Zoology	Latin or Grammar
Gordon Adams	1	1	C	1	1	1
Beatrice Cooke	1	1	1	1	1	1
Frank Edwards	1	1	C	2	2	1
Kenneth Fulcher	C	2	C	C	C	G3
Amy Hair	C	1	3	3	1	L2
Wilson Howden	1	1	C	1	1	1
Alice Johnson	2	1	1	2	1	G2
James Kinnell	–	1	–	–	2	L2
Olive Leach	1	1	2	1	1	1
Reginald Logan	1	1	C	3	1	2
Florence Lovell	C	1	C	2	1	1
George McCormick	C	1	3	C	2	1
Annie McElroy	3	1	3	2	2	2
John McGillicuddy	–	3	–	–	C	–
Gordon McKenzie	2	1	3	C	1	–
Esher McKercher	1	C	2	C	1	L2
Teresa McManus	C	C	C	–	3	1
Clayton Moorhouse	2	1	C	C	3	3
Hilda Morris	3	2	C	C	3	G2
Jean Rapson	–	2	C	C	3	G3
Frank Roberts	2	1	C	C	2	LC
Beulah Saunders	3	2	2	C	2	C
Donald Vail	C	1	C	C	3	3
Ethel Watson	3	1	2	C	2	G2
Verlie Williamson	C	2	–	C	C	L1
Minnie Wright	2	1	2	3	1	C
William Fitzgerald	C	2	–	–	C	–

Form I

Form I pupils wrote on four papers only.

	Gram.	Hist.	Geog.	Bot.
Ruby Atcheson	C	1	1	1
Loretta Bryce	C	2	2	2
Mary Connolly	1	1	1	1
Roy Cooke	–	C	1	C
Dorothy Delmage	1	1	1	2
Reta Dodds	–	–	2	2
Carman Harper	–	–	2	C
Sadie Harper	C	1	1	C
Lena Healey	1	C	1	3
Allen Heaton	2	3	1	C
Calvin Hodgins	C	C	1	3
Doris Kelly	1	2	1	1
Gordon Kelly	C	2	1	3
Gladys Kersey	C	2	1	2
George King	2	2	1	C
Jack Kinnell	C	C	1	C
Bert Langford	2	3	1	1
Margaret McLean	2	2	1	3
Eleanor McIntosh	C	1	1	C
Charles Miller	2	1	1	C
Maxine Rogers	2	2	1	3
Orville Shugg	–	3	1	C
Reta Stephenson	–	C	1	C
Alice Sutton	C	C	2	2

Mabel Jackson—Gram. C, Geog. C.
Alma Johnson—Gram. C, Geog. 3
Donald McKercher—Hist. 3, Geog. 1
Lorenzo McLean—Geog. 2
Fred O'Neill—Gram. C, Geog. 1.
Muriel Parker—Geog. 3
Melvin Williamson—Geog. 3.
Gladys Zavitz—Geog. 2.

If one be troubled with corns, he will find in Holloway's Corn Remover an application that will entirely relieve suffering. m

EAST LAMBTON ENTRANCE RESULTS

Two Hundred and Ninety-two candidates wrote at the various examination centres. About the usual percentage were successful. The standard required for "pass" is 40 per cent in each subject and a total of 60 per cent. Those who obtained a total of 75 per cent. or over have passed with Honors. The candidate who obtained the highest standing in East Lambton Inspectorate was Gordon Richardson of the Petrolea Public School. He made 82 per cent. of the total marks, while Vera Doreen Millar of Watford Pubilc School stood second with 81 per cent. Certificates are being sent to the successful candidates and a statement of their marks to the unsuccessful candidates.

The names are arranged in alphabetical order.

WATFORD

Barnes, Harold; Barron, Mary A.; Carroll, Josephine; Fisher, Malcolm; Fulcher, Mildred; Hair, Harold; Higgins, Annie; Howden, Harold S. (honors); Hume, Winnifred; Kelly, Grant; King, Audrey; Lester, Enid; Lovell, Frances; Lovell, Olive; McIntosh, Fred; McKenzie, Mary; McLean, Nelson; McNally, Edwin; MacGregor, Bert; MacKenzie, Dorothy; McGillicuddy, Lloyd; Mahon, Aleta Pearl; Millar, Vera Doreen (honors); Minielly, Gordon C.; Minielly, Elsie; Mitchell, Mary; Pearce, Alice; Powell, Pearl; Prentis, Donald (honors); Prentis, Marjorie; Rapson, Alexander; Rayner, DeCourcy (honors); Rogers, Richard; Smith, Marguerite; Steadman, Eloise; Stephenson, Marjorie; Styles, Edith; Thomson, Elsie M.; Walsh, Mary B.; Thompson, Clare.

ALVINSTON

Benstead, Kenneth; Binder, Wilfred; Binder, Mary; Brownlee, Leda; Campbell, Bernice; Campbell, Irene; Dolbear, Edna; Downing, Anna; Douglas, Archie; Downie, Jean; Forman, Florence; Goldrick, Hazel; Jones, Helen; Johnson, Tena; Johnson, Cecil; McDonald, Margaret; McIntyre, Florence; McKellar, Duncan; McLachlan, J. D.; McLean, Mildred; McLean, Edna; McKellar, Donald; Maddock, Mona; Moore, Zack; Morrison, F. B.; McLachlan, Hugene; Munro, Beatrice; Oke, Ella; Osborne, Julia; Patterson, Vera; Pitz, Howard; Pollock, Janet; Reader, James; Steele, David; Tucker, Gordon; Wallis, Irene; Wallis, Mabel; Ward, Ruby; Wray, Clarence.

ARKONA

Baldwin, Willie; Cundick, Edwin; Cable, Roy Gordon; Donaldson, Elva Jean; Dunham, Cecil H.; Dunlop, Harold; Eastman, Wilbert M.; Grogan, Ruby E.; Holmes, George; Jackson, J. D. Harold; Lucas, Arnold Everett; Marsh, Sherman; McPherson, Neil; McPherson, Donald; Murray, Ivy Mabel; Wilson, Jean Winnifred; White Florence; Herrington, Myra G.

PETROLEA

Arnold, Martha; Artiss, Charles; Bradley, Charles; Braybrook, John; Brown, Blanche; Brown, Helen; Cann, Cecil; Clifford, Eva; Craig, Gertrude (honors); Currah, Agnes; Donald, Charles; Douglas, Mabel; Drope, George; Fraser, Gordon; Henderson, Raymond T.; Hendy, Edith; Holmes, Marion; Hunter, Edna Grace; Isber, Annie (honors); Jackson, David; Kirkpatrick, Alice; Madery, Vaughn; McDonald, Lucy; McDonald, Myrna; McLean, Lester; McLean, Ruby; McPhail, Lula; McPhedran, Margaret; Morrison, Elfreda; Maw, Ida; Hyatt, Merle; O'Hara, Laura (honors); Parsons, Annie; Porter, Harold (honors); Porter, Ruth; Rainsberry, Nicholas; Rawson, Muriel; Redick, Norman; Regan, Geraldine (honors); Richardson, Gordon (honors); Stapleton, Martin; Steadman, Marjorie; Stothers ,Aline; Strangway, Gladys; Taylor, Marjorie; Taylor, Ruth; Thompson, Arnold; Thompson, Sheldon; Thompson, Dorothy; Tithcott, Alta; Tobias, Orval; Trowbridge, Rheta; Wilkinson, Thelma; Wilson, Laurel; Wilson, Louise.

OIL SPRINGS

Belton, Stanley; Bateman, Elizabeth; Bradley, Carrie; Bateman, Ada; Carr, Lloyd; Evoy, Tom; Ellis, George; Graham, Alice; Hodgins, Beth; Jewell, Evelynia; Lawrence, William; Mackesy, Dorothy; Morley, George; Nurse, Clarence J.; McCatty, Dorothy E.; McKinnon, Annie; Stephenson, Alfred; Ryan, Patrick D.; Rupert ,Marvel; Sanderson, Frank N.; Saunders, Earl; Stinson, Ralph; Tiffin, William A. (honors); Trott, Jean; Nusworth, Garnet; Stevenson, Gladys; Willis, Wilma; Woodward, Roscoe; Winnett, Jean; Winnett, Marion.

FLORENCE

Bilton, Ila; Bodkin, Bert; Cox, Ivan; Elliott, Florence; Kelly, Charles; McAuslin, Milton; McDonald, Weston; McRobert, Edna; McRobert, George; Waters, Lyle; Rolston, Grant; Webster, Edna; Willmore, Mary; Smith, Edwin.

EAST LAMBTON JUNIOR PUBLIC SCHOOL GRADUATION RESULTS

Twenty-three candidates tried the Junior Public School Graduation examination and of these fifteen were successful. The names of the successful candidates are given in order of merit.

Milton Powell, Gilbert R. Miller, Pearle Jacques, Alice Hannay, Stella Law and Grace Sinclair equal, Annie Grose, Charles Hebden, Harold Spearman, Amelia Unsworth, Hazel Wray and Edna Vansickle equal, Edress Smith, Blanche Morningstar, and Phyllis Eden equal.

SUMMER HEAT HARD ON BABY

No season of the year is so dangerous to the life of little ones as is the summer.The excessive heat throws the little stomach out of order so quickly that unless prompt aid is at hand the baby may be beyond all human help before the mother realizes he is ill. Summer is the season when diarrhoea, cholera infantum, dysentry and colic are most prevalent. Any one of these troubles may prove deadly if not promptly treated. During the summer the mothers best friend is Baby's Own Tablets. They regulate the bowels, sweeten the stomach and keep baby healthy. The Tablets are sold by medicine dealers or by mail at 25 cents a box from The Dr. Williams' Medicine Co., Brockville, Ont.

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