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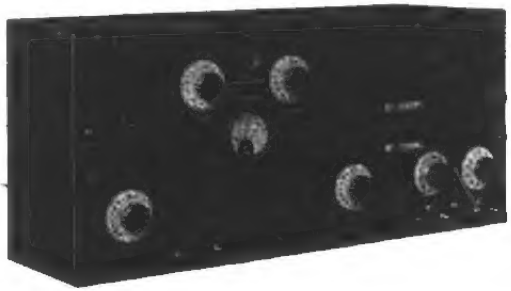

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WIRELESS & AVIATION NEWS

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Some Features for Amateur Stations

By F. K. D'ALTON, B.A. Sc,

Like most other amateurs, the writer commenced receiving operations with a crystal, and transmission with a spark coil; but having a desire to investigate the principles of radio communication, has been adding to his equipment and subtracting therefrom ever since. Every amateur starts work on his wireless set with a great deal of enthusiasm and finds a large number of problems to solve as to a method of mounting coils, "B" batteries, switches and the set in general. These and many more technical problems occupy a great deal of time, and frequently, for mechanical or electrical reasons, the products of thought and work do not prove satisfactory. It is for this reason that the writer wishes to put before you for your comment, and adoption if you see fit, a number of the features which from time to time have been put into his transmitting and receiving sets.

Mounting Honey-Comb Coils

A loose coupler, of course, was first tried, but very soon discarded in favor of honey-comb coils and variable condensers. The different coils were set up on wooden blocks, and so adjusted that they were co-axial, or nearly so, and at suitable distances, i.e., close together for intensity on short waves, but about an inch apart for Arlington or larger waves.

The coils, however, did not balance themselves very well, and a new scheme was tried. This consisted of a piece of a hard wood curtain pole, supported at one end only, and having its axis horizontal. There was a clearance of three inches all around this bar. As its diameter was slightly less than the internal diameter of the coils, the latter would slip onto it and could easily be moved back and forth along it. The coils were each provided with flexible leads, then slipped into their proper positions and each connected to its respective pair of binding posts, a short distance away. This proved satisfactory, permitting of easy adjustments, but the scheme had one rather serious fault, namely—the time required to change coils was rather too long, frequently resulting in the missing of time signals when it was not realized that ten o'clock, p.m. was so near. Later, when a soft valve was installed there was the fifty per cent. possibility of getting reversed connections on either secondary or tickler coil.

This led to the design of a coil mounting as shown in Figs. Ia, Ib and Ic. To each coil is bound a wooden block, Fig. Ia, of the same width as the coil, and having a tapered tongue about one-quarter inch narrower than the upper part of the block. These blocks are so designed that the distance from the shoulder of the block to the

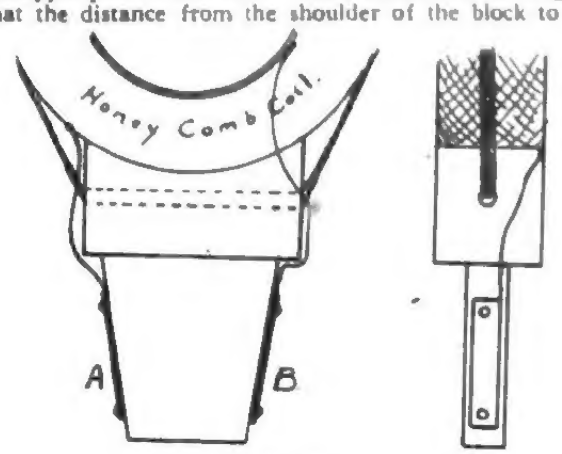


Fig. Ia

centre of the coil is the same in each case.

On each edge of the tongues is a metal strip, A and B, to which the leads from the coils are soldered.

The receptacle for such a plug then consists of a hollow

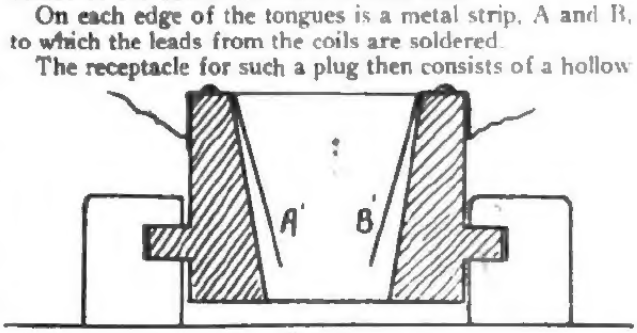


Fig. Ib

wooden block (cross section given in Fig. Ib), having phosphor bronze springs, A' and B', against which the metal strips A and B, or the brass tacks which hold them in place, bear and make connection when the plug is inserted. On each end of the receptacle is a projection which fits a groove in a stationary strip of wood. The

receptacle may then be moved back and forth in the grooves, to make adjustment of the coils.

Three of these receptacles are provided, Fig. Ic, the centre one of which holds the secondary coil and is not moveable. The primary and tickler receptacles may be moved to and from the secondary receptacle. Fibre handles are provided on the moveable receptacles to facilitate adjustment.

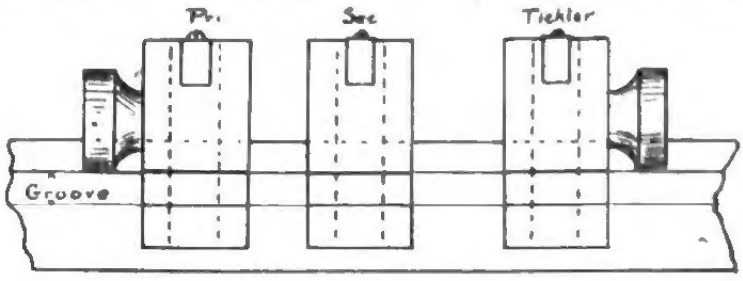


Fig. 1c

It should be noted that with the coils properly connected to the plugs a reversal of polarity of secondary or tickler is impossible. By removing a coil, turning it through 180 degrees and replacing it we have reversed

Fig. 2. Photograph of described set.

connections, but polarity is the same as before. The coils are directly above the receptacles as shown in Fig. 2, and are held in place by gravity. Thus there is no tendency for a heavy coil to fall out of position, and as the taper on the tongues is sufficient to prevent the coils being tight, the three coils may easily be removed by one finger.

In Fig. 2 it will be noted that a short-circuiting plug is inserted in the tickler receptacle, this being the custom when the valve is to operate as a relay, and not be regenerative.

The Rotary Change-over Switch

After securing some fairly good results with a one-step amplifier, the writer decided to install a low-powered radiophone transmitter. It was desirable to use the amplifying valve as the modulator-oscillator of the radiophone, and to do this a connection, Fig. 3, was adapted. While both receiving and transmitting circuits were as simple as possible, it was necessary to have some sort of change-over switch which could be conveniently operated with one hand without any jarring of equipment. The switch designed for this purpose is similar to a drum controller for street railway operation, Fig. 4.

A string, "S," is attached at one end of the horizontal rod "C," the knots being at the other end. This string once encircles a cylindrical drum and is again fastened to the rod. By moving the rod "C" back and forth horizontally the drum oscillates from the position of making contact with left side fingers to that where it makes connection on the right side. As shown in Fig. 3, this is all that is necessary to change connections of the hard valve, so that in one position it is a first stage amplifier, and in the other a modulator-oscillator of the radiophone.

The parts of the radiophone were mounted in the upper compartment, Fig. 2, the coupling coils being above and the ammeter as shown. The microphone was portable and connected by plug at the far side of the box. The lower compartment contains the receiving set, including the rotary switch, the tuning coils being seen in front of the box.

Hence, the set was made very compact, although giving transmission by spark coil, continuous wave, buzzer modulated C. W. and radiophone and reception by crystal, non-oscillating valve, oscillating single valve, and one-step amplifier.

It was an excellent set for low-power experimentation.

The Hard Valve Detector

It seems to be an unwritten law that the amateur, when graduating from the crystal, must necessarily adopt the soft valve. The writer obeyed the law in this respect, but when the filament of this valve burned out, the hard, amplifying valve was tried in its place, and found to be more satisfactory in many respects.

It is not so partial to spark stations, and gives them a great deal of discouragement, the radiophone stations are just as loud and free from the unpleasant whistling when any part of the operator's body comes near the set. In addition music is much more pure.

The hard valve is very definite in its operation, and though somewhat critical in respect to plate voltage, is

not nearly as objectionable in this feature as the soft valve.

The writer believes that the liability of a burn-out is not so great on a hard valve while acting as detector in regenerative circuit as on the soft valve giving the same intensity in any type of circuit.

Being inclined to reduce the intensity of spark signals in relation to radiophone, the general interference is much less and tube noises are practically nil.

Since adopting hard valves for detection, several opportunities have arisen for comparison of these with different types of soft valves, with the invariable conclusion that the hard type is much the better

The receiving set has been rebuilt and two additional steps of amplification added

The Loud Speaker

Some experiments were then made with a pair of Baldwin phones to find out if reproduction was true and sufficiently loud to allow their use as a loud speaker

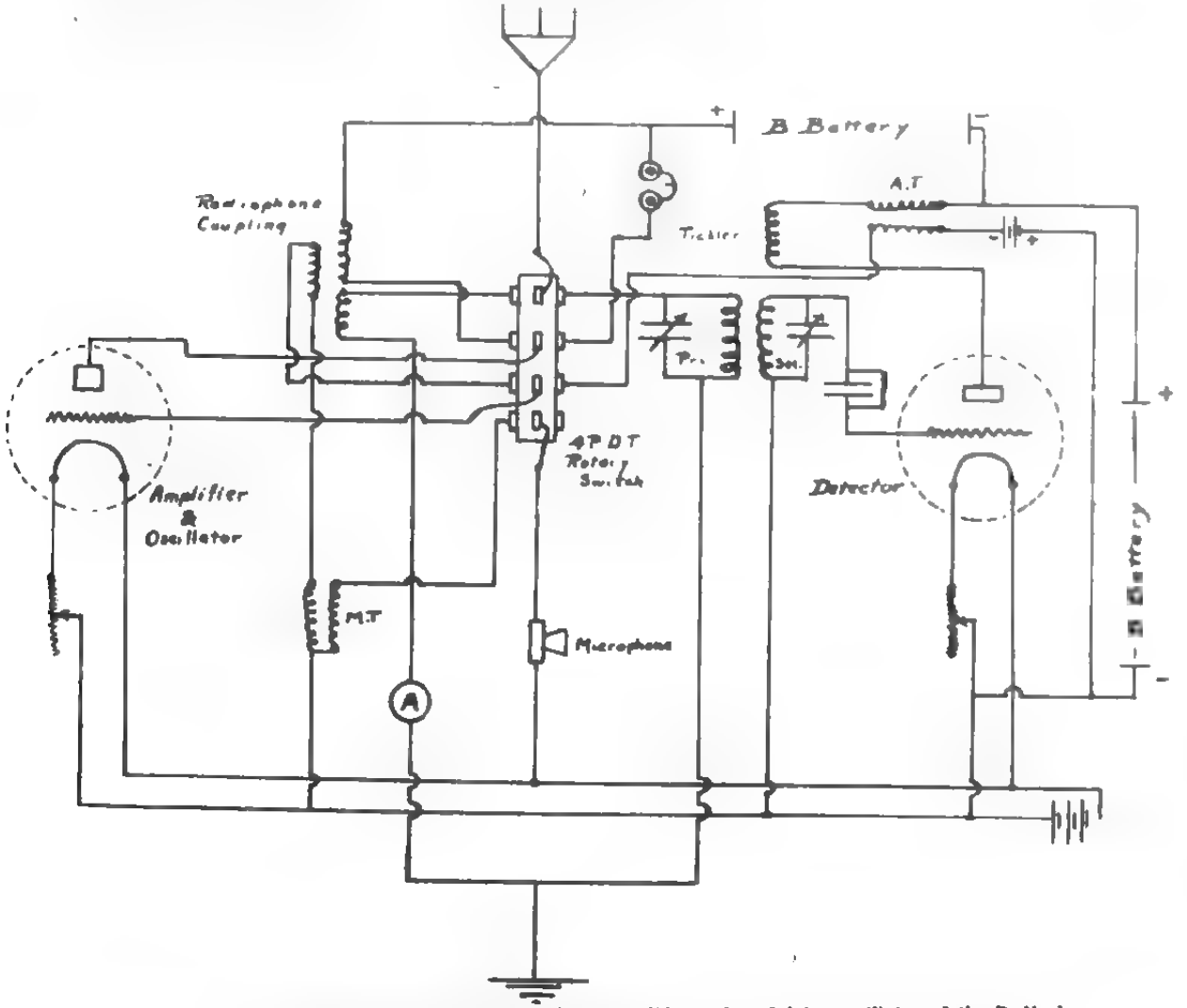
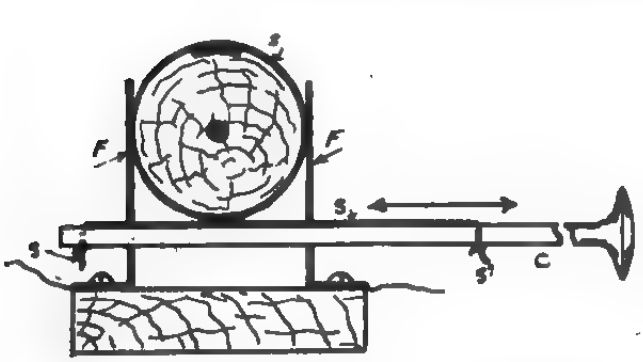


Fig. 3. Connections—Using hard valve alternately as amplifier and modulator oscillator of the Radiophone.



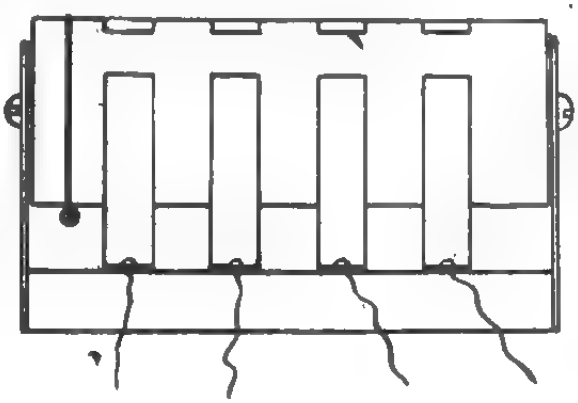


Fig. 4. Rotary Switch 4-pole Double Throw.

With a metal horn the results were not satisfactory, and a gramophone having a wooden horn was called into service.

By means of a specially designed wood block, Fig 5, both phones were fitted to the tone arm of the gramophone.

In designing this block it was necessary to provide a tubular passage for a distance of several inches from each phone and have these two passages of precisely the same length to the point of interception. The passages meet just before entering the tone arm

In connecting the phones electrically in series, care must be taken to see that the sound waves emitted are in phase, not in apposition

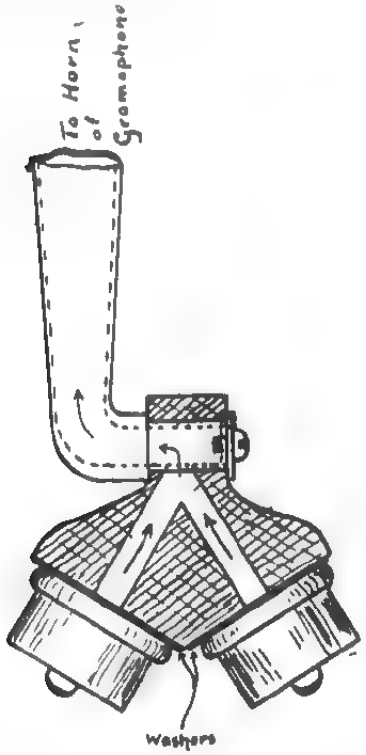


Fig. 5. The Gramophone Loud Speaker Attachment.

The manner in which this attachment fits onto the tone arm is shown in the photograph, Fig. 6. Only a few seconds' time is required to remove this sound box and attach the wooden block with the Baldwin phones.

Fig. 6. Gramophone Showing Loud Speaker Attachment.

The Plate Battery

High voltage batteries for use in the plate circuits of receiving valves are manufactured by several companies and put up in various forms, some being completely enclosed in sealing wax and having taps brought out for different voltages, others being just the individual cells, which one may mount as he wishes.

These separate cells have a distinct advantage over the made-up battery, for the failure of one cell does not impair the usefulness of the others, this worn out cell being short circuited or removed quite easily.

Every amateur, however, has not the opportunity of soldering his connections, and as an alternative, the following satisfactory method is suggested:

Buy the unit cells and make paper tubes, each of which holds six cells. Then, on a suitable wide board, or light frame, mount some metal fingers, two for each tube of cells, a plain finger for the negative and one with a set-

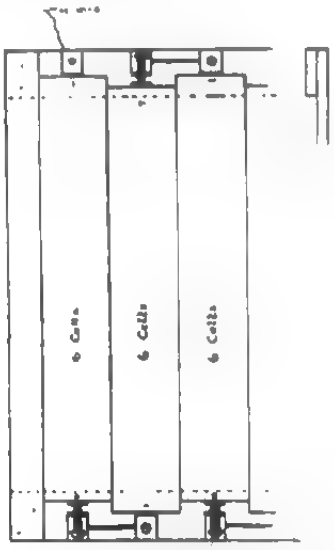


Fig. 7. The mounting of Plate Batteries.

screw for the positive end, Fig. 7. The six cells are then clamped between the fingers. Several tubes of cells may be mounted side by side with the group positive terminal alternately at top and bottom to facilitate connections.

With this method of mounting, the cells are certain of making good connections without dependence on solder, and faulty cells may be pushed out of the tubes and replaced by new ones very easily and quickly.

Pins may be put through the tubes to touch the zinc casings of the cells for the purpose of tapping.

Barbs on the Aerial

The first aerial which the writer erected was made up of short pieces of copper wire connected by mere twisted joints. Another aerial of approximately the same height and length but without joints did not prove nearly as satisfactory.

From a scientific viewpoint barbs placed at certain distances on the aerial should add to the signal strength. The writer would be pleased to hear of any satisfaction which has been found by the uses of such points on aerials, or which may be gained by amateurs who follow this suggestion.

The Handwriting on the Wall

Is the recent order of the Naval Department of Canada authorizing, as an interim measure the use of 200 metres for C.W. transmission by amateurs, and holding spark stations down to the wavelengths specified in the present regulations, a forecast of the tenor of the new regulations? If so, we think it is a step in the right direction, and that while the differentiation may not be relished by the owners of spark equipments, it will, in the end, work for the future good of the amateurs.

A Revolution in Amateur Radio

How many amateurs appreciate that a bloodless revolution in amateur radio activities has, so to speak, taken place over night. We refer, of course, to the advent of radio telephone broadcasting stations and the sudden and enormous interest which the public is taking in this form of entertainment.

Every person who installs a receiving equipment is an amateur, and as such he has distinct and positive rights, and since in this democracy of ours the majority rules, the amateur transmitting station must not delay in taking proper cognizance of the new state of affairs and regulate his actions accordingly, otherwise he will find himself ruled out in just the same way as the automobilist who used to make our lives precarious by dashing past standing street cars.

Has the Amateur Failed to Regulate Himself?

Until a year ago amateur activities were confined to a few people in the main centres of Canada, and the Canadian Government was prepared to allow the amateurs to regulate themselves so long as their transmission did not interfere with commercial and Government services.

Except in isolated cases, there has been no interference with commercial stations, but the increasing number of complaints from amateurs would appear to have demonstrated that no longer are the amateurs disposed to regulate themselves, and as a result we have the circular letter which the Naval Department recently sent to all associations.

The Policy of the Naval Department

The Department is going about this matter in a proper and far-sighted manner. It appears to appreciate that no one can regulate the amateur as well as the amateur can regulate himself, if he will only do so, and it seems to us that the solution of the question may prove to be the establishment of a real live Canadian radio association, which will embrace in its executive representatives of every local amateur association in Canada. Rules to govern the working of amateur stations could be drafted by such a body, and would, with the prestige of such a body behind them, be carefully considered by the Naval Department, which is anxious to have the amateur fraternity work with as few hard and fast Government regulations as possible.

Lieut. Commander C. P. Edwards, Director of Radio, in addressing the W.A.O.O. in January last, stated that the Department was of the opinion that the only person who can properly regulate the amateur is the amateur himself, and that the function of the Government in regard to amateurs is to establish a few broad regulations for the proper protection of the commercial services and not the establishment of a multitude of minor regulations saying what time relay work shall be carried on, etc.

The New Regulations

Whatever regulations the Government may see fit to issue, we feel that they must provide that there shall be no interference by amateur transmitting stations whilst radio telephone broadcasting programmes are being transmitted, and that if to secure this end it is found necessary to forbid every amateur transmitter to work during these hours, then such working ought to be forbidden. Further we think that the regulations should tend to encourage the adoption of C.W. and the ultimate abandonment of the spark, otherwise public opinion, as voiced by the thousands of people who have already installed or are going to install receiving sets, will rise and compel the Government to so restrict the activities of the amateur transmitting stations as to practically put them out of business altogether.

A Canadian Wide Association

Let us accordingly get together and boost for a Canadian wide association which will embody in its membership not only transmitting licensees, but also everyone with a receiving set, and in this way co-ordinate the different points of view and secure the support of the Naval Department in obtaining proper and adequate protection for every class of amateur.

ORDER REFERRED TO ABOVE

Ottawa, March 3, 1922.

Sir,—I would inform you that as a temporary measure pending issue of the New Regulations governing Amateur Radio Stations, the Department of Naval Service has authorized the use of the wavelength of 200 metres for continuous wave and radio telephone transmission by all Licensed Amateur Stations throughout Canada. Spark transmission will continue to be limited to the wavelength prescribed in the licenses. This order is effective from February 22nd, 1922.

I am, Sir,
Your obedient servant,
G. J. DESBARATS,
Deputy Minister.

Editor, Aviation & Wireless News,
Toronto, Ont.

Wife—"Why, Henry Smith, where did you get that dirty face?"
Hubby—"Listening to Pittsburg, my dear!"

BROADCASTING NEWS

WESTINGHOUSE ELECTRIC ESTABLISHES RADIO BROADCASTING NEWSPAPER.

"Radio Broadcasting News," a weekly newspaper, has been established to mark the first anniversary of KDKA, the radio telephone broadcasting station of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa.

The newspaper is believed to be the first of its kind in the United States and the only one devoted solely to the publication of news concerning the activities at one broadcasting station.

About one year ago, the Westinghouse Electric & Manufacturing Company broadcasted its first programme from KDKA, which was the first station in the world to give nightly broadcasting programmes. Interest in the programmes became so great that, in the latter months of 1921, there came to the company an insistent demand on the part of "listeners in" that they be informed "in advance" of the programmes to be broadcasted from KDKA.

With this demand—good-naturedly given, yet insistent—"Radio Broacasting News" was born. To-day, with only a few issues off the press, it is a fixture. It has come to stay because public opinion has demanded it. The birth of this newspaper marks one of the many great forward steps in the marvellous history of the advancement of radio broadcasting.

Radio developments are the chief items published in "Radio Broadcasting News," which derived its first circulation list from those friends of radio broadcasting who, after "listening in" on the KDKA programmes, wrote to the Westinghouse Company expressing appreciation of the broadcasting service.

The publication gives in word and picture news concerning various broadcasting programmes and pictures of artists who entertained radio enthusiasts. A feature of each is the programme to be broadcasted nightly during the week following the date of issue of the newspaper.

It is estimated that more than 60,000,000 persons are within the range of the four Westinghouse broadcasting stations, the calls wave lengths and locations of which are as follows:—KDKA, 360 meters, East Pittsburgh, Pa.; KYW, 360 meters, Chicago, Ill.; WJZ, 360 meters, Newark, N.J.; and WBZ, 360 meters, Springfield, Mass.

The programme broadcasted nightly by the Westinghouse broadcasting stations include concerts, church services, results of various games of sport, market reports, stories for children, and new bulletins.

Copies of "Radio Broadcasting News" will be sent to all persons desiring to receive the newspaper who send their names and addresses to the Editor, "Radio Broadcasting News," Department of Publicity, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

NEW CANADIAN BROADCASTING REGULATION

Commencing April 1st next, all stations undertaking broadcasting will be classified as "Public Commercial," and will require a "Public Commercial" license, for which the fee is $50.00 per annum. Holders of "Experimental Licenses" were formerly allowed to broadcast in Canada.

NEW BROADCASTING STATION, W G Y

A radio broadcasting station, more powerful than any now sending out programmes, has been installed by the General Electric Company at its plant in Schenectady, N.Y. From the roof of a five-story factory building two towers 183 feet high and spaced 350 feet apart support an antenna at such height as to give the wireless waves unobstructed freedom to travel equally well at a speed of 186,000 miles per second in all directions.

This station has not been regularly operated nor has advanced announcemnts been made of the impromptu or test programmes sent out, which would cause amateurs to be listening, yet, letters have been received from such distant points as Cedar Rapids, Iowa; Minneapolis, and Santa Clara, Cuba, the latter place 1,450 miles distant, announcing that programmes have been heard.

The General Electric station has been licensed to operate on a 360-metre wave length under the cell letters of WGY. It is equipped with the most modern of radio apparatus, including the multiple tuned antenna, which, because of its many advantages, has been installed in Radio Central, the world's most powerful commercial station, at Port Jefferson, L.I., and other trans-oceanic stations of the Radio Corporation of America.

RADIO RAMBLINGS

"The melancholy days have come—
The saddest of the year,"
So sang our friend the poet once,
But now he's wrong, I fear.

The summer statics over and
The air is clear and bright;
There's always something doing, though—
I listen every night.

On Saturdays a football game
Will find me full of "pep."
Tho' far away from scenes of strife,
It seems but just a step.

When winter comes and piles of snow
Are heaped about my door,
On Sunday morn, why freeze my toes?
I'll venture out no more.

For in my humble cottage is
A simple wireless set;
I'll hear the choir singing and
Perhaps a sermonette.

It has one great advantage: if
The sermon fails to suit
I'll cut the preacher off real short
And practise on my flute.

Now, after all is said and done,
There's just this much about it:
Take my advice and get a set;
No home's complete without it.

—Peter Deets.

ROCHESTER NOW HAS BROADCASTING STATION

With the establishment of a radio broadcasting station, WHQ, The Times-Union is taking a step forward in the wheel of progress and has firmly established Rochester on the radio map.

The broadcasting service was successfully launched March 1st, when Raymond Fagan and a distinguished company of artists gave a programme of instrumental and vocal numbers in an improvised studio in The Times-Union Building.

A temporary antenna was used, and this did not give the best of service, with the result that broadcasting is temporarily suspended pending the completion of the permanent antenna on the roof of The Times-Union Building.

Two steel poles, seventy-five feet in height, tower above the building, supporting the antenna, which is of the cage type and made of copper wire.

The Times-Union has already spent several thousand dollars in the radio enterprise, but the progressive Rochester publishers are prepared to go the limit in serving the people of Rochester and vicinity.

Merrill R. Mitchell, of Detroit, a former officer in the Royal Flying Corps, is operator in charge, and already he is a popular figure in and about the city. Hundreds of people have consulted with him to date.

With the resumption of its service The Times-Union plans to broadcast weather forecasts, market news, news and more entertaining programmes.

At least one theatre and one church in the city will be connected with The Times-Union studio, and plans are made to send out religious addresses and sacred music from The Times-Union radio chapel Sunday afternoons.

CANADIAN INDEPENDENT TO ESTABLISH LARGE BROADCASTING STATION

The Canadian Independent Telephone Company, Limited, have for some time been carrying on broadcasting at Toronto. It is now reported that they are about to tear down their old station and establish one which will be on a par with some of the largest. This will mean that they will undertake broadcasting on a much larger scale than they have in the past, and will make Toronto a very important broadcasting centre.

UNITED STATES WEATHER BUREAU REPORTS

Owing to demands from our readers, we are preparing and hope to publish in next issue full particulars regarding code used by the U. S. Weather Bureau.

WOMEN INTERESTED IN RADIOPHONE

A series of radiophone talks of direct interest to the housewife will be introduced when Miss D. H. Goodwin, of the Massachusetts Division of Markets, speaks March 22 from the Amrad Broadcasting Station at Medford Hillside.

"Marketing for the Home" will be the subject of Miss Goodwin's first talk, which is under the direction of the Massachusetts Division of the Department of Agriculture. Her talk will be supplemented by weekly market reports furnished by the Division, of interest not only to those who buy for the table, but for those who sell perishable merchandise including the storekeeper and roadside vendor.

Another feature arranged to meet the demand for programmes of interest to women are the series of clothing talks given on Saturday evenings by Miss Harriet E. Ainsworth, Manager Clothing Information Bureau, William Filene's Sons Co., Boston. On Saturday, March 25, Miss Ainsworth will discuss "The Spring Clothing Budget."

WIRELESS TELEPHONE CONCERTS IN AUSTRALIA

For six months past the Amalgamated Wireless Company has provided regular Monday night concerts from its Melbourne headquarters to a select audience distributed all over the States of Victoria, South Australia and Tasmania.

The Company has installed one of the latest types of wireless telephone transmitters in its building known as Wireless House in Little Collins Street, and from eight to half-past eight o'clock every Monday night ether wave concerts are given for the benefit of all those within range who have suitable receiving apparatus.

This unique entertainment is regularly received at no less than three hundred houses which are equipped with suitable wireless receiving instruments. It is also known that they are regularly received as far distant as Hobart in Tasmania, Adelaide in South Australia, and by ships at sea up to a distance of over eight hundred miles.

The first successful demonstration of wireless telephony between the mainland and Tasmania was made in October, 1920, when the apparatus now used by the company was first installed at Brighton, near Melbourne. As soon as the plant was erected both vocal and instrumental selections were received clearly in Hobart.—*Sea, Land and Air.*

THE NEW SIDE OF WIRELESS

The war brought us many trials and tribulations. It is true, however, that however great an evil may come upon the world's people, some good always comes forth as a result. One of the big things the war gave to us is the Radio Telephone. The art of transmitting the human voice and other harmonic sounds has progressed more rapidly during the past decade than has perhaps any other effort of science. In fact, Radio Telephony has advanced with such tremendous strides, even during the past year, that it is, to the busy man of every-day life, as though this new science had dropped down upon us out of a clear sky.

At any rate, the public has suddenly become aware that radio telephony has arrived with a "bang" and is here to stay. Wireless, in its varied forms, has always been the hobby of a small group of scientifically-inclined people. But now what is it? Briefly, it is a coming necessity of our everyday life. The automobile took possession of us slowly—first a novelty, then a fad; then, quite suddenly, a regular family necessity. The phonograph came next, and phonographs are now in almost every modern home. Now comes the radiophone receiver, and it can give to us what the phonograph can never hope to do. With a well made radio receiver on our living room table we can sit of an evening and listen to the finest music, not necessarily of the "canned" variety, but real live music. Turn the dials on the receiver to a certain point and we hear a famous artist singing to us from a studio in Pittsburgh. The Westinghouse Electric Company in East Pittsburgh, who operate the now famous "KDKA" broadcasting station, send weekly, to all who ask, a little magazine called "Radio Broadcasting News." In this are found photos of the artists who sing and play and talk, so that with our "News" spread out before us, we can "see" the artist who is singing to us from the far-off city. Turn the dials again, and we hear another artist performing in Newark; with another adjustment, we bring in Chicago. The large Westinghouse station in Chicago recently gave a series of nightly concerts covering a period of 19 weeks, broadcasting the entire performances of a grand opera company playing in a large Chicago theatre. Radio listeners in Toronto and other Canadian centres could distinctly hear even the applause of the huge audiences in the theatre.

Nor are we confined to music only. Many stations send nightly reports on the stock and produce markets, weather probabilities and last-minute news of world events, baseball scores, block-checking time signals, etc.

Through these new broadcasting stations, we have Radio giving to the whole country, pleasures and profit that were before only within the reach of a favored few.

Unfortunately, perhaps, there are conditions governing radio reception, over which we have no control. Sometimes the signals from a certain distant station are very fine—at others, reception is nil. We have not as yet come to know why the signals vary in this way; but they do, and it rather lends a sporting touch to the game of "listening in."

Recently, on a Sunday evening in Toronto, we heard a splendid sermon being preached in a large Pittsburgh church by William Jennings Bryan. So clear was the reception on this night that not one syllable of the famous statesman's words was missed. On the next evening, reception of KDKA was so poor as to be not worth the effort, and we listened to Newark instead.

There is always "someone going." If the distant stations cannot be heard, we can listen to those nearer home. The Canadian Independent Telephone Company, of Toronto, will have in operation shortly a powerful broadcasting station, giving entertainments of the same high quality as we hear from Westinghouse stations. Arrangements are bing made, both by this company and by the Marconi Wireless Telegraph Company of Canada, whereby the best in music, opera, and religious services can be enjoyed by all who have the key to this store of culture.

The key is the radiophone receiver in the home. "Everyone is getting them," apparently. Radio manufacturers the continent over are swamped with orders that will require months to fill. So popular has this new thing become, that "Wireless & Aviation" will devote, henceforth, a whole section to this particular phase of radio communication.

Next month, we will discuss the problem of legislation to regulate this new kind of traffic and also go on to discuss the problems of reception that the novice will encounter when he first tries to "drive this new kind of automobile."

CANDIDATES SUCCESSFUL IN EXAMINATIONS

The Department of the Naval Service announce that eleven candidates were examined during the month of February, 1922, of which the following were successful and obtained Certificate of Proficiency in Radiotelegraphy:

1st Class (Commercial)—Akins, C. R., Halifax, N.S.; McDonald, A. B., Halifax, N.S.; McFeters, D. C., Vancouver, B.C.; Picton, H. H., Montreal, P.Q.

2nd Class (Commercial)—Mawhinney, L. F., Victoria, B.C.

Amateur—Black, P. T. A., Prince Rupert, B.C.; Bulger, G. C., Prince Rupert, B.C.

Drawn by Staff Artist. With apologies to Geo. McManus.

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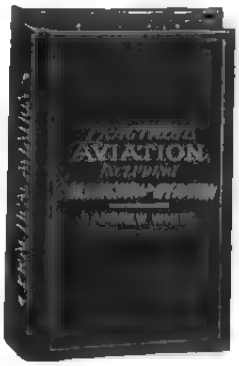

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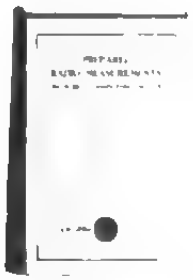

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Postage 25c extra with each order.

With order for any of the above books and one year's subscription to Wireless and Aviation News add $1.00 (Regular Subscription Price $1.50). This amount will include postage above mentioned.

Every Radio Dealer should stock these books. Write for Dealers prices.

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RADIO TRADE REVIEW

CONDENSITE CELERON

The Diamond State Fibre Company of Canada, Ltd., have been quite active in meeting the requirements of the Radio trade and in making Condensite-Celeron as popular with the Radio enthusiasts in Canada as the parent company has done in the United States. The Diamond State Fibre Co. of Bridgeport, Pa., have established at their plant a radio station and laboratory for the purpose of making all kinds of tests upon their products. The station consists of a 1 K.W. spark transmitter, as well as a 300 watt C.W. and phone transmitter consisting of six 50-watt Radiotrons. The company is also endeavoring to co-operate with the radio amateur by assisting in working out his experimental problems for him, and furnishing him with such technical information as he may desire.

Similar information is available upon application to the Canadian company.

Condensite-Celeron may be described as vulcanized fibre thoroughly impregnated with Condensite and then hardened by heating. Condensite-Celeron, which is especially adapted for radio panel work, is supplied in three grades and in two colors. It is furnished in full sheets, or panels, cut to size, or machined, to customers' specifications. Catalogue No. 20, which has just come to hand, should be of interest to every one interested in Radio, as special sections are devoted to Radio panels. We understand this booklet may be obtained on request to the Diamond State Fibre Co. of Canada, Ltd., 245 Carlaw Ave., Toronto, Ont.

EDISWAN TUBES

Advice has just been received by the editor from The Edison Swan Electric Co., Ltd., of Ponders End, Middlesex, England, that they have suspended, for the present, at least, the manufacture of wireless apparatus.

BRITISH VACUUM TUBES

Our British friends have evidently made up their mind not to fall behind in the matter of vacuum tubes. Thus their vacuum tube offerings range all the way from small receiving tubes to large tubes of 500-watt capacity. The latest tube, or valve, as they call them in England, is the Mullard ORA. The plate voltage of this tube is given as 30, and the filament voltage as 3.6 to 4 volts. The base of this tube is of the four-prong type. This tube is said to combine efficiently the qualities of a rectifier and an amplifier. Thus it becomes possible to carry only one tube in stock for all purposes.—*Scientific American.*

NOTICE BOARD USED BY RADIO DEALERS

A good idea being put into practice by many live Radio dealers is that of erecting in their stores an announcement board. This is in the form of the notice boards to be found in clubs and colleges. A convenient size is three or four feet by about five feet long. It should be covered with ordinary green baize. On this board may be pinned items of local interest, including the weekly broadcasting programmes which are regularly heard in that particular vicinity, and also any local Radio club announcements.

ELECTROPLAX COMPANY, LIMITED

It will be of interest to Canadian Radio dealers and enthusiasts to know that the famous Redmanol products are now being manufactured in Canada on a large scale. Dr. L. V. Redman of Chicago is well known to many as the founder of the Redmanol Chemical Products Co. and the inventor of the products named after him. For some time past in the United States there have been a series of lawsuits and counter-suits between Dr. Redman's company and various competitive companies. Matters, however, were recently adjusted by a large merger being formed between—we understand—Dr. Redman's company, the Condensite Company and the Bakelite Company.

The Canadian end of the company will be known as the Electroplax Companl, Limited. Mr. Harry E. Corey, formerly of the Mechanical Expert Department of the Standard Oil Co., is president, Dr. L. V. Redman is vice-president, Mr. P. A. Thomson, of Nesbitt, Thomson & Co., Ltd., investment brokers, is 2nd vice-president, and Mr. C. H. Taylor, formerly chief accountant at the head office of the Bank of Toronto, is secretary-treasurer.

A factory has been taken over at Mt. Dennis, Ont., just outside of the City of Toronto, and advance orders are already pouring in. The Chicago facory devotes a large section to the production of panels, insulation, etc., for the Radio trade, and the same will be done in the Canadian plant. Their comparative cheapness and high dielectric strength, together with the low power and hysteresis losses with high frequency currents should make these products very popular. In addition, a choice of colors may be made.

The company also manufacture synthetic amber, moulding compounds, acid and heat-proof varnishes and lacquers, telephone receivers, etc.

LOUD SPEAKERS

It is interesting to note how many devices are being introduced for service as loud-speakers in connection with the receiving of broadcasted music. One of the new devices is a simple horn provided with two arms that terminate in soft rubber caps. The ordinary pair of telephone receivers clamps right over the two arms, so that the sound must then pass up through and be amplified by the horn. Another device takes a single receiver, which is placed in the base. Several receivers are provided with special coupling members so that they may be fastened to the usual phonograph tone arm, for amplifying the sound. There can be no doubt that broadcasted music is at its best when it is heard through some form of loud-speaker.

LARGE BATTERY MANUFACTURERS ALIVE TO RADIO BUSINESS

The last few weeks have brought more actively into the Radio "game" the large manufacturers of storage batteries. There has always been a demand for a cheaper storage battery for Radio work. Many of the large battery manufacturers have now awakened to the large volume of Radio business, and are now putting out special Radio storage batteries at attractive prices.

Effects of Impurities in a Storage Battery

The effects of impurities in the electrolyte are, generally, to corrode and eventually disintegrate the plates, to fill up the pores and decrease their capacity, or to cause local action by deposition on the plates and producing, with the active material on which it may be deposited, a couple which causes local action.

If the impurities are lead-attacking acids, or their salts, the rapidity of shedding of the positive active material is increased, and in Plante plates the underlying base lead is more rapidly attacked.

Metallic impurities act as oxygen carriers from anode to cathode and thus cause a transfer of charge, which results in gradual internal discharge of both electrodes.

Platinum.—The smallest trace will cause discharge of its negative electrodes.

Hydro Chloric Acid.—Acts on the positive electrodes to form lead chloride from the peroxide. This latter changes into lead sulphate which is accompanied by an internal discharge of the positive electrode. The H.Cl is again released and the local action continues. Such action does not usually last for more than a month, since the evolution of chlorine gas due to electrolytic action gradually weakens the H.Cl.

Arsenic.—This non-metal discharges the negative electrodes of the battery, but its action in a cell is short, however, as it gradually disappears, partly as an arsenate of hydrogen and partly in its elementary state falling to the bottom of the cell.

Nitric Acid.—This is harmful to both electrodes. It will corrode and disintegrate the positive electrode though not discharging it. It forms nitrate of lead with the negative electrode, this latter being converted into lead sulphate, which change is accompanied by the release of nitric acid. This released acid will again attack the sponge lead. The presence of nitric acid and metallic impurities causes the electrolyte to become much warmer on change than normally. This increase has been known to become so great as to crack glass containing jars.

Ammonia.—Reduces the capacity of the electrodes. It also causes "creeping" of the electrolyte over the edges of cells by forming crystals of ammonium sulphate around the edges of the cell, and the electrolyte by capillary attraction is led over the tops of the cells. Batteries should not be installed near stables, ammonia refrigeration plants, or chemical works.

Iron.—Most injurious of all substances which are likely to appear in a cell. It discharges both electrodes and, unlike other imprities, is not eliminated with time, but is permanent. It acts as an oxygen carrier. It is estimated that 0.5 per cent. of iron in electrolyte will completely discharge a cell in 20 days

Manganese.—Salts of this element act in the same manner as iron salts, carrying oxygen. Permangaine acid and manganic sulphate are formed. A red or reddish violet coloration of the electrolyte indicates the presence of manganese.

Antimony.—Causes local action which discharges the negative electrode on which this deposit of antimony collects. This element is particularly deleterious in the case of cells which stand idle

Two metals of nearly any kind produce local action and have an injurious effect.

RADIO CLUB REPORTS

On this section the Editor will be pleased to publish reports of any of the various Radio Clubs. Such reports should be submitted in the exact form in which they are to appear, the Editor, however, reserving the right to edit and curtail the reports if necessary. Papers of special interest read before such Clubs will be also acceptable for publication.

RADIO RESEARCH CLUB OF CANADA

Through the courtesy of the Toronto section of the American Institute of Electrical Engineers, members of the club were enabled to attend on March 10th a very interesting lecture by Mr. Chas. A. Culver, Ph.D., on the subject of "Wireless and Carrier Telephony." The meeting, which was an "open" one, was attended by some five hundred persons, to many of whom "Radio" was still an "uncanny" subject. To meet the needs of this class, Dr. Culver largely shaped his address, and explained by simple analogies just how voice waves are caused to modulate the "carrier waves" for transmission either along metallic currents or directly across space, and how these waves are later "sifted out" and rendered audible.

W. A. O. O.

Reported by Clarence Smith, Publicity Manager.

"Mr. W. Y. Sloan, old 3CA, has been granted a special license, and in future he will be known as 9BJ."

A regular meeting of the W.A.O.O. was held in Room 25, Dept. of Agriculture, U. of T., on March 2nd, 1922. The meeting was called to order at 8 p.m., 64 members being then present. The president occupied the chair. Messrs. Russell, Bowers and Galbraith were elected a committee to act as judges in the Lecture Contest.

Mr. H. H. Moor, a contestant in the Battery Charger Contest, gave his lecture on "Electrolytic Rectifiers as Applied to Radio Communication." The highly instructive technical data given by Mr. Moor were avidly consumed by the many budding CW enthusiasts present.

A convention committee was formed, namely: Messrs. Russell, Lowry, Bowers and Duncan, to act and investigate the possibilities of organising and holding a "Canadian National Amateur Radio Convention," to be held on the last two days of the Toronto Exhibition. Details of this will be given later.

The desirability of having a club pin was again brought up, but was again shelved on motion of Mr. Burgess, who remarked that the price of the pin would buy a filament rheostat, which is more useful.

Meeting adjourned at 10.40 p.m.

DISCOUNT TO MEMBERS OF W. A. O. O.

The Gray Battery Service, 77 Roncesvalles Ave., Toronto, Ont., are offering a discount of 10% off on all sales to members of the W.A.O.O. or other Toronto clubs.

ELECTROLYTHIC RECTIFIERS

In the April issue there will appear a very interesting article by Mr. H. H. Moor. This will be entitled "Electrolythic Rectifiers for Radio Use, Their Construction, Care and Operating Characteristics."

THE QUEBEC RADIO RESEARCH CLUB

The development of Radio in Quebec has taken a big step forward when, at a meeting of the Radio amateurs of this city, held on the 14th of January last, the Quebec Radio Research Club was organized. The purpose and aims of this club being for the advancement and development of the Radio art in this city and to interchange Radio knowledge and promote research work among its members.

Many of the foremost Radio amateurs are included in its membership, and, incidentally, it is the first Radio club to be formed in this city. A club room has been secured for the use of the members, and it is the intention of the club to give a series of lectures on Radio Telegraphy and Telephony. These lectures will start on the elementary principles of Radio for those who are new to the game and more advanced lectures for the more proficient members. These lectures will be given by qualified members of the club.

In conjunction with these lectures an up-to-date receiving and sending set, which will include a Radiophone, will be built by the members at their club room, and many experiments will be carried out.

The following officers were elected by the members at its first meeting: President, Henry Shehyn; vice-president, M. O'C. Harris; secretary-treasurer, W. R. Caron; committee, R. Gravel and A. J. Macnamara. The rules and regulations were drawn up and submitted at a subsequent meeting and it was decided to commence the lectures at the following meeting.

This Radio club is desirous of being in communication with other Radio organizations in Canada, and any information regarding this club may be obtained from the president, Henry Shehyn, 139 Grande Allee, Quebec, Que.

Address all communications to the president or secretary: H. Shehyn, 139 Grande Allee, Quebec; W. R. Caron, 77 Cromazie, Quebec.

Quebec, Feb. 4th, 1922.

Mr. C. E. Williams,
Editor, Aviation & Wireless News,
Toronto.

Dear Sir,—I am enclosing a report of the starting of our local Radio club for publication in the Radio Clubs report section of your interesting magazine.

Speaking about your magazine, I should say that it is very good and that we like it very much here; but we would like to see that Radio map of Canada of which you spoke about in your October number; it would be very handy for all the amateurs in the country.

Hoping that you will find this report interesting enough for publication.

I remain,
Yours truly,
W. SHEHYN,
President.

WIRE TABLE FOR USE OF AMATEURS

Gauge No. B. & S.	Diameter Inches Bare	ENAMEL Turns per Inch	ENAMEL Ohms per 1,000 ft.	ENAMEL Pounds per 1,000 ft.	DOUBLE COTTON Turns per Inch.	DOUBLE COTTON Ohms per 1,000 ft.	DOUBLE COTTON Pounds per 1,000 ft
10	.102	.....	.....	.....	8.8	.9972	32.4
12	.081	.....	.....	.....	10.7	1.586	20.4
14	.064	.....	.....	.....	13.2	2.521	12.9
16	.051	.....	.....	.....	16.1	4.009	8.20
18	.040	23.9	6.374	4.95	19.6	6.374	5.21
20	.032	30.1	10.14	3.14			
22	.025	30.2	16.12	1.98			
24	.020	47.2	25.63	1.24			
26	.016	59.5	40.75	.782			
28	.013	74.6	64.79	.492			
30	.010	93.5	103.0	.311			
32	.0079	116	163.8	.796			
34	.0063	145	260.5	.124			
36	.0050	178	414.2	.078			
38	.0031	222	.....	.049			

Wireless and Aviation News

¶ It is safer to buy advertised goods. The advertising in this magazine is a safe index to reliable business

HOW UNITED STATES WILL GOVERN RADIO

The allocation of radio wave lengths and recommendations made in the tentative report of the conference on radio telephony called by the department of commerce have assured the widespread use of radio for the broadcasting of public information and other matters of general interest.

The experts recommend in brief, the following action:

Amend present radio laws to give the secretary of commerce effective and practically complete control of all transmitting stations. Receiving stations are not to be regulated except where they produce radiations that interfere with other stations. Radio communication is a public utility and as such should be regulated and controlled by the federal government in the public interest.

The conference has laid out an ambitious programme of research to be undertaken by the bureau of standards of the department of commerce with a view to reducing interference between stations.

The findings of the conference look forward to the day when one person will be able to simultaneously address by radio the majority of people in this country. Under the tentative recommendations official federal government broadcasting has first rights on the ether, and next educational and public broadcasting by states, universities and public institutions will have the most privileges. Third in order of priority comes private broadcasting of entertainment news and other such features and then the broadcasting by public service companies that rent apparatus and furnish a broadcasting service will be allowed.

There is no chance for the counterpart of the newspaper and magazine advertisement, the car card, and the billboard in the ether. The conference recommended that "direct advertising in radio broadcasting service be not permitted" and concerns broadcasting will only be allowed to state their name and call letter.

Twenty bands of radio wave lengths have been set aside for various uses and five of these are devoted to broadcasting.

Government departments and public institutions will use wave lengths between 1,050 and 1,500 metres, and government broadcasting will also be allowed between 1,850 and 2,050 metres. Private and toll broadcasting will have rights on wave lengths from 310 to 435 metres. Cities and states will be able to spread information relating to public safety on wave lengths 275 to 285 metres. Seven hundred miles inland, government and public broadcasting will be permitted within the band 700 to 750 metres.

Ships at sea, whose only telephonic link with land is through the ether are treated generously in the new allocations, as they are under the old regulations. "Mobile radio telephoney" is given rights to the following bands of wave lengths: 525 to 650, 650 to 750, and 2,500 to 2,650 metres.

Radio telephony and telegraphy for aircraft use have been given the exclusive use of the wave length bands: 500 to 525, 850 to 950, 1,500 to 1,550 metres.

AMERICAN AVIATION IN 1922

Statistics issued by the Aeronautical Chamber of Commerce show civil aircraft carried 275,000 passengers, covering 6,500,000 miles, in the United States during the year 1921.

THE RADIO DIRECTION FINDER AND ITS APPLICATION TO NAVIGATION

The Department of Commerce has developed a system of radio direction finding to be applied to navigation, in which the direction finder is located on board ship and receives signals transmitted from a radio station on shore. This development has been carried on by the Bureau of Standards and the Bureau of Lighthouses in co-operation. Three radio transmitting stations have been established on lightvessels and lighthouses at the approaches to New York Harbor, and a fourth is in process of installation on San Francisco Lightvessel. The three stations in commission have been giving very satisfactory service.

The location of the direction finder on board ship instead of on shore has a number of advantages, of which some of the more important are: The navigator of the ship can himself take the radio bearings, position can be determined promptly, and bearings taken as often as desired.

The radio direction finder is particularly useful in times of fog or poor visibility, and in cases of shipwreck may be the means of saving many lives.

The Bureau of Standards has made studies of radio direction finding apparatus, extending over the past nine years. One important consideration which has received careful attention is the distortion effects which may result from the presence of adjacent objects, such as a ship, and methods of eliminating errors which such distortions may cause in observed radio bearings. The radio direction finder on board ship may be calibrated, just as the ship's magnetic compass is.

A common type of direction finder for installation on shipboard consists of a coil of 10 turns of insulated copper wire wound on a wooden frame 4 feet square, mounted so that it may be rotated about a vertical axis. The radio direction finder as used by the Department of Commerce involves a number of unique features. It is designed to be installed over the ship's binnacle carrying the magnetic compass card, on which the radio bearings are read directly. An additional scale is attached to the top of the binnacle and marked with the corrections obtained by calibrating the radio direction finder. By these means the radio bearings are obtained in a simple and direct manner, the only operations necessary being the adjustment in the radio receiving set and the rotating of the direction finder coil.

The Bureau of Standards has recently issued a publication describing this system of direction finding. Photographs are given of a radio direction finder of the type mentioned above installed on the pilot house of a lighthouse tender. Actual courses are shown which were run by means of radio bearings taken by the ship's navigator, on the three beacons at the approaches to New York Harbor. The paper deals briefly with the principles of the operation of the direction finder, but it is primarily concerned with its practical application and the development which has made possible a device sufficiently simple and accurate for use as an aid to navigation. Every person connected with radio or with navigation will find this paper of considerable interest.

It is known as Bureau of Standards Scientific Paper No. 428 "The Radio Direction Finder and Its Application to Navigation" and may be purchased for 15 cents from the Superintendent of Documents, Government Printing Office, Washington, D.C.

AVIATION NOTES FROM ABROAD

AFRICA

The Upper Congo Service is now available.—The rapid transmission of correspondence from Great Britain by the aeroplane service which has linked up with the European steamship arrangements is now operating between Kinshaba and Stanleyville. The air service is scheduled to take three days, as compared with fourteen days by river boats.

ARGENTINE

A mail service over the Andes from Buenos Aires to Santiago, Chile, is contemplated. Test flights have been successful in both directions.

Argentine-Uruguay semi-weekly service has been inaugurated between Buenos Aires and Montevideo, 120 miles.

BRAZIL

A Committee of the Brazilian Senate has reported favorably upon a bill proposing the establishment of two aviation lines between Rio de Janeiro and Porto Alegre, which are to be started before September, 1922.

CHILE

The Government has under consideration a 15-year exclusive concession for commercial aviation rights. An advantage claimed for the proposed service is that the trip from Santiago, the capital, to Antofagasta—a distance of 1,552 kilometres by rail and requiring a two-days' journey—could be accomplished by airplane in something over five hours.

CHINA

General Pan Chu Ying, the newly appointed Director of the Aeronautical Department, assumed his official position. Mr. T. H. Chang, a returned Chinese student from the United States, has been engaged by the Aeronautical Department as pilot instructor in the Nanyuan Flying School.

COLUMBIA

Air Service Cuts Mail Time Delivery in Half.—An aerial mail service has been established between Bogota, Capital of Columbia, and the Atlantic seaport of Santa Marta which will make possible the delivery of mail between Bogota and Colon in three days. This will make the mail time between New York and Bogota about ten days, as compared with previous time of about three weeks.

DENMARK

Denmark is engaged in completing a system of conventions regulating air traffic. An agreement with Norway was recently signed, and a conference between Danish and German delegates will begin at Copenhagen for the conclusion of a convention similar to that between Great Britain and Denmark.

ECUADOR

Ecuador will receive aid in advancing aviation from France and Italy with the object of organizing and developing that country's military, maritime, postal and commercial aviation. The agreement provides for the establishment of aviation missions in Ecuador.

HONDURAS

Honduras Government will send Honduranians to the United States to study aviation. An aviation school is in course of construction and will soon be opened. The Minister of War and Navy, believe that aviation should be introduced into Honduras for official and commercial purposes.

ITALY

Government franchises have already been granted by Italy to twenty aerial navigation companies which are now in actual operation, while several other franchises have been granted to companies that must begin operating within three months.

The Italian Government will shortly add its own network of dirigible commercial lines. This latter will have for special object quick passenger, post and express communication between the big Italian commercial centres on the Continent with those of the Italian islands of Sardinia and Sicily and the Italian northern Africa colonies of Tripoli and Cyrenaica.

JAPAN

Japan is sparing no efforts or expense to building up a great military and civil air force. Some of the leading British designers and engineers have been enrolled. Shipbuilding firms have acquired foreign licenses for the manufacture of naval aircraft and aeronautical engines, and several European firms have established branches in Japan.

MEXICO

Commercial aviation in Mexico is rapidly expanding. The Secretary of Communications has made arrangements with a foreign company with a view to establishing an aerial transportation service for passengers and cargo between Mexico City and Tampico.

SIAM

Siam is taking considerable interest in aviation.—Recently, it is reported, airdromes have been opened in various provinces, and machines are being or are to be imported from France and England to Bangkok. As the roads are not of the best, aeroplane services should have the effect of speeding-up considerably the inter-communication between the various provinces.

SWEDEN

The Army Air Service of Sweden successfully laid a six mile section of cable in six minutes using a seaplane.

COMING AERONAUTICAL EVENTS

Apr. 30.—Spring Show and Opening Meet, Curtiss Field, Mineola, L. I.
May .—U. S. National Balloon Race.
Aug. 1 (about).—Coupe Jacques Schneider. (Seaplane speed race). Italy, probably Venice.
Aug. 6.—Gordon Bennett Balloon Race, Geneva, Switzerland.
Sept. 4 (about).—Detroit Aerial Water Derby, Detroit. (Curtiss Marine Flying Trophy Competition).
Sept. 15 (about).—Detroit Aerial Derby, Detroit. (Pulitzer Trophy Race).
Sept. 30.—First Annual Interservice Championship Meet. (In preparation).
Oct. 1.—Coupe Henri Deutsch de la Meurthe. (Aeroplane speed race). France. American elimination trials, if required, to be held about Aug. 15, at Mitchel Field, L. I.

RADIO EQUIPMENT OF HUGE AIRPLANE

There has been installed on one of the huge Goliath biplanes engaged in the Paris-London aerial service a combined radio telephone and telegraph equipment of 35 watts antenna output, with a sending range of about 180 miles at 900 meters' wave length. The complete radio equipment, acocrding to Radioelectricite, weighs only 125 pounds. An air-propeller-driven generator for six volts and 700 volts and a 6-volt storage battery supply the necessary current. A 3-bulb amplifier is used for receiving on all wave lengths between 300 metres and 1,000 metres.

GREAT BRITAIN ABANDONS AIRSHIPS

Great Britain definitely has abandoned airships. The Air Ministry has announced that what is left of the great war fleet of aerial monsters is now for sale, which means that the plants, materials on hand, the latest ideas in mooring masts and hydrogen generating works must go, too. The celebrated stations at Pulham and Norfolk already are awaiting dismantlement.

This decision has been taken, it is stated officially, partly as a result of the failure of the plan for formation of an imperial airship service and partly on grounds of economy. The decision comes as a surprise, because a recent official statement said the airship fleet would be kept intact for some time to give an opportunity for the Dominions to take action to link up the empire aerially. At the imperial conference last summer such pressure was brought to bear by the Dominions, particularly by Australia and Canada, that the airship scrapping programme was delayed and there was hope that the service might be saved.

Then came the disaster of the ZR-2, with the great loss of British and American lives, which caused widespread discouragement of any development of the plans. The ultimate decision still was under discussion when the Roma was wrecked, and then even the stanchest friends of airships in this country gave up hope.

Sponsors for airships say that the official disinclination to carry on means that America and Germany will blaze the trail for airships. There is still a determined opinion here that the airship will succeed if given a chance.

The Pall Mall Gazette says: "Great Britain now will have to take a back seat definitely as regards long distance air transport. There is one hope. An American is now hastening to this country to try to get airships at scrap prices, and fly them across the Atlantic. Good luck to him!"

CAMP BORDEN

The undermentioned officers have completed a Tour of Duty at Camp Borden during the month of January, 1922:

Rank	Name	Address
P. O.	Hallick, W. Gordon	332 Frank St., Ottawa, Ont.
F. O.	Braithwaite-Wood, Jack	326 Main St. S., Moose Jaw, Sask.
F. L.	Duncan, Richard	109 May Ave., Windsor, Ont.
F. O.	Feather, Herbert Victor	616 Cranbrook, B.C.
P. O.	Kilts, Frank Douglas	Welland, Ont., Box 1662.
F. O.	Ruggles, Jack Algernon	Bridgetown, N.S.
F. L.	McEwen, Clifford	521 9th St., Saskatoon, Sask.
F. O.	Creery, Kenneth Andrew	1389 Jarvis St., Vancouver, B.C.
F. O.	Knowles, Charles	54 Scarborough Rd., Toronto, Ont.
P. O.	Rankine, Andrew	14-39th Ave., Lachine, P.Q.
P. O.	Graham, Ray Tupper	2532 Balaclava St., Vancouver, B.C.
P. O.	Lovell, Charles Alfred	Box 66, Alton, Ont.
P. O.	McCulloch, Frederick Fisher	Ryan Motors, Ltd., Regina, Sask.
F. L.	Fury, N. W.	38 Nanton Ave., Toronto, Ont.

The undermentioned officers have completed a Tour of Duty at Camp Borden during the month of February, 1922:

Rank	Name	Address
Flt. Lt.	H. S. Quigley	c/o Price Bros. & Co., Chicoutimi, Que.
F. O.	A. K. Charlesworth	Harriston, Ont.
F. O.	F. J. Whigham	Selkirk, Man.
P. O.	H. E. Foster	225 Sherbourne St., Toronto, Ont.
P. O.	K. W. Mayhew	700 Bruce Ave., Windsor, Ont.
P. O.	A. C. Symon	Craik, Sask.
F. O.	P. J. Molonely	Air Station, Dartmouth, N.S.
F. O.	A. Tapping	Revelstoke, B.C.
F. O.	J. I. Morgan	202 Montrose Ave., Toronto, Ont.
P. O.	Calder, P. B.	Edmonton South, Edmonton, Alta.
P. O.	J. M. Calnek	923 Caribou St. W., Moose Jaw, Sask.
P. O.	H. S. McClelland	747 Ave. "H," South, Saskatoon, Sask.
P. O.	W. V. Tomlinson	801 1st St. W., Calgary, Alta.
P. O.	F. G. Robins	528 Wiseman Ave., Outrement, P.Q.
P. O.	M. R. Jordan	202 Spadina Crescent W., Saskatoon, Sask.
P. O.	W. T. Broome	c/o J. Harris, Marsden Road, Bedford, N.S.

STUNT FLYING ENEMY TO AVIATION

Captain Eddie Rickenbacker, vice-president of the $5,000,000 Rickenbacker Motor Co., former racing driver and America's Ace of Aces, recently submitted to one of those three-minute interviews being featured by a New York evening paper. The Captain said that three minutes was harder than bringing down a German plane at the front or getting under way in the automobile manufacturing business, or anything else that might be mentioned, but he lived through the ordeal and came out with flying colors. He pronounced airplanes in their infancy, and said that stunt flying was aviation's worst enemy.

AIRPLANE MAP OF THE WORLD

An Airplane Map of the World has been published by the Geographic Magazine, Washington, D.C.

THE TYPICAL AIRPLANE MOTOR OF TO-DAY

If the heart of a man is an imperfect organ, refusing to do its work of properly pumping the blood through the body when unusual conditions prevail, such as are met in stunt flying, that particular man can not be an aviator. So it is with the engine of an airplane. The engine, cooled by water jackets, and kept in running order by the flow of lubricating oil pumped into its operating mechanism, is somewhat like the human heart. If the flow of this oil is interrupted by an abnormal position of the machine, then that particular engine is not suitable for work in the air.

The Motor's "Circulation"

Here is an airplane engine with a pump at each end of the crankcase to aid perfect running during stunt flying. Oil is thus kept in circulation intact in abnormal positions. No "rush of blood to the head" is possible with this mechanical imitation of the animal mechanism, for the two pumps keep an even circulation of the vital lubrication fluid.

The pilot's winged chariot is driven through the air by "horsepower." It is curious to consider how the modern airplane motor repeats history. The inventors of the automobile considered four to eight horsepower more than sufficient for the first automobiles. They argued that if two horses could draw a carriage, the power of from four to eight would be ample for an automobile. But to-day a whole stableful of horsepower is used for pleasure vehicles, while racing machines use considerably over a hundred horsepower. Similarly, the power for the typical airplane has risen from twenty to more than one hundred and fifty.

The V-6 type of the Italian Isotta-Fraschini engine develops at normal speed from 250 to 260 horsepower. It is a two-stroke vertical six-cylinder water-cooled engine, which at normal speed gives the propeller 1,650 revolutions a minute, and is capable of 1,850 revolutions a minute at 275 horsepower. Rated at 260 horsepower, the engine weighs only two and one-half pounds to the horsepower. Like other modern motors, this engine has its valve-operating mechanism next to the valves themselves, the camshaft being right on top of the cylinders, because this gives always the same action in spite of vibration and is amost free from wearing influences.

The Perfection of Engine Detail

Those who are familiar with gasoline engines will recognize a noteworthy feature in the design of the cylinders of the V-6. These are composed of matched pairs from a steel ingot, and are complete with their combustion chamber and valve seats. Each pair of cylinders has a head from a single aluminum casting bolted on to the cylinder itself. The valve guides are contained in the cylinder heads, as are also the induction and exhaust ports, the camshaft, as indicated, resting upon the cylinder tops. Steel water jackets surround each pair of cylinders, being screwed on the base and head of the cylinders. Cavities for the cooling water surround the valves' bodies, including nearly the whole stem of each valve. Since the exhaust valves are the most taxed, this system shows a decided gain in reliability, and it could be combined eventually with a one-piece all-aluminum design (except the lining of rubbing surfaces and valve seats). It will be noted that the valve springs are also thus positively shielded from heat.

Typical also is the long stroke, which gives more power through permitting higher piston speed than it proportionally increases weight by longer cylinders. There is a certain best cylinder bore for the light-weight gasoline engine at which loss of heat to the cylinder walls is lowest, which means greater power for little fuel, while the cylinder can still bear up under the ever-increasing relative quantity of heat developed in cylinders of increasing size.—*By C. Dienstbach, Popular Science.*

DIRIGIBLE FRAME METAL

It is stated that scientists in a Pittsburg steel mill have discovered a formula, long sought by British and American naval authorities, which the Germans used in the construction of frame-works of Zeppelin dirigibles. Hitherto nothing has been known of the composition of the aluminum alloy used in the framework of Zeppelins save that it was lighter than steel and of great tensile strength. It was determined that the strength of the metal lay in its treatment by heat, and scores of attempts were made to determine the proper temperature. The scientists, however, have discovered something else, essentially American, which will go into the new alloy.

ALTITUDE COCKPITS

When considering altitude flights for commercial purposes, writers often lay considerable stress on the difficulties to be met in designing passenger cabins. Oxygen tanks, air-tight walls and temperature and pressure regulators are stipulated among others, states "Aviation and Aircraft Journal," and great difficulties are foreseen in developing this equipment. Vane-driven air compressors, continues this authority, would probably obviate the use of oxygen tanks and a simple system of intake, exhaust and relief valves might take care of ventilation in the passenger cabin, which would have to be constructed with perhaps greater care to details than is usual. Exhaust gas heating, or electrical heating, comparatively easy to construct, would maintain a comfortable temperature in the cabin. Taken altogether, we are told, the difficulties to be met in providing for altitude flying appear to have been somewhat exaggerated.

FRENCH AIRMAN CLIMBS 34,768 FEET

The airplane height record made at Dayton, Ohio, on February 27, 1920, by Major Schroeder, was beaten in France recently by a French airman, Leutenant Georges Kirsch. Unfortunately, however, the Frenchman's record cannot be accepted officially, as he was forced to make a landing at another point than the one from which he started. His barometric register, when he landed, showed that he had risen to a height of 10,600 meters (about 34,768 feet), which is 500 meters above Major Schroeder's record, which still stands as official.

The attempt was the ninth which Lieut. Kirsch has made, but on former occasions he has never been able to get much beyond 9,000 metres. To-day he profited by previous lessons, and when he reached the 7,000-meter mark he took the climb more slowly than in earlier flights, and got safely through the change of temperature zone into rarefied air without mishap.

When he decided to descend, his 300 horse-power motor was still working well, but on the descent a stoppage in his carburetor occurred which compelled him to volplane to the nearest airdrome instead of landing, as required by the rules, at the airdrome from which he started.

The initial calculation of the height attained by Major Schroeder in his flight at McCook Field on February 27, 1920, was 36,020 feet; but after a careful homologation of his records the Bureau of Standards reduced this to 33,000 feet.