SHORT-WAVE SECTION

Canadian Experimental Station VE9GW

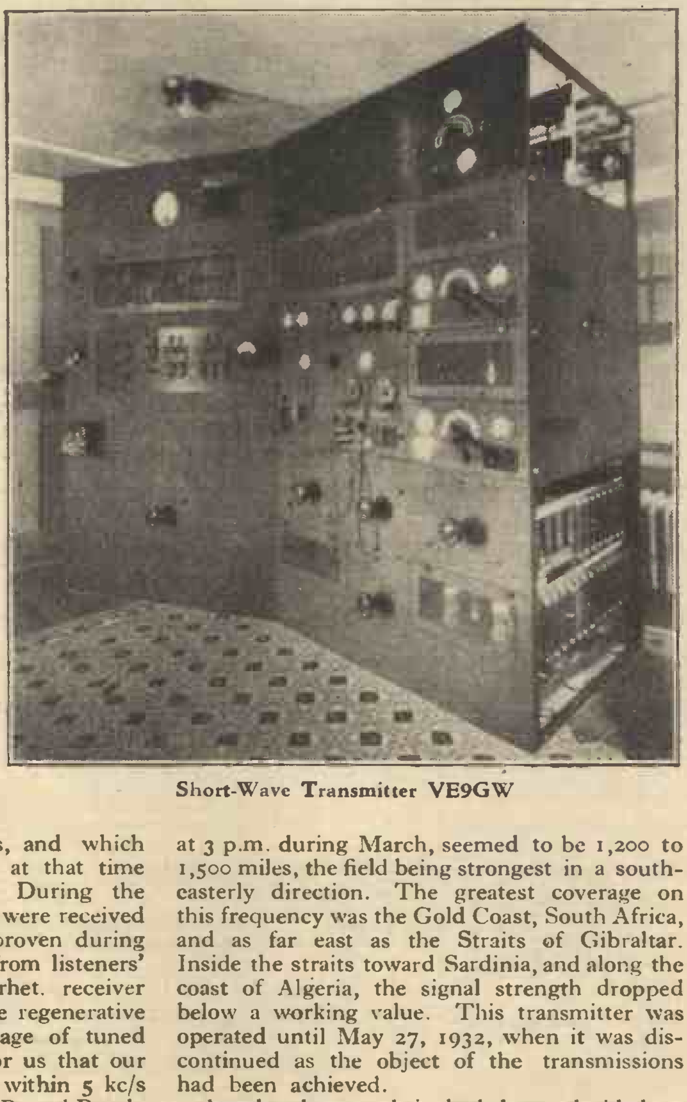
THE transmitter operating under the call VE9GW, was first put in service on a regular schedule in April, 1930. The use of a high-frequency transmitter, in conjunction with our other broadcast services, was conceived necessary in order to give service towards the north, taking in those sparsely populated regions in Northern Ontario, Northern Manitoba, and on toward the northernmost portions of Canada, wherein lie outposts held by members of the Royal Canadian Mounted Police. It was first decided that the equipment would be of low power and purely of an experimental nature, and that experiments were to be concentrated on the development of three main lines: (1) A highly efficient, non-directional, antenna; (2) precision frequency control and (3) high quality, high percentage, modulation. One of the rules of the game was to develop something entirely different; in other words, to develop something that was not an imitation of equipment already developed by someone else. In some respects the apparatus had to follow the general trend.

The initial transmitter had a power output of 10 watts, being capable of complete modulation and producing peaks of the order of 40 watts. In acknowledging reports this transmitter was always rated at 25 watts, which of course, was slightly more than the R.M.S. power when modulated. The reason for this high rating was that, at first, observers of our signals, in various parts of the country, quite candidly stated their opinion of our veracity. The transmitter operated on a regular schedule during 1930, until September 18, on which date it ceased operating on 6,095 kc/s at 8.03 a.m., not to resume operations on this frequency again until May 8, 1932. This particular transmitter was then rebuilt and started operating on 11,810 kc/s on October 8, at 6.05 p.m., the object on this frequency being to obtain data: (1) as to the number of listeners operating short-wave receivers; (2) as to what distances could be covered consistently with the same power as on the lower frequency.

It was quite easy to design the transmitter to meet the three requirements as laid down at the beginning. At first there were very few listeners on this frequency, and our signals were at times overwhelmed by powerful transmitters on neighbouring channels, and which the very simple receivers in use at that time were incapable of tuning out. During the summer of 1930, five to six letters were received per week. If nothing else was proven during that time and the early autumn, from listeners' letters it was clear that the superhet. receiver gave far better selectivity than the regenerative detector, sometimes with one stage of tuned H.F. It was very unfortunate for us that our frequency assignment was placed within 5 kc/s of the high-powered transmitter at Bound Brook, N.J.

Range of the New Transmitter

During the winter of 1930-31 the number of listeners began to increase, until by January the acknowledgment department was nearly swamped. The records show a tremendous listener increase during that autumn and winter: reports were received from listeners in New Zealand, Great Britain, Norway, Johannesburg, S.A., South America, and dozens of out-of-the-way places. After making as thorough an analysis as possible of the reports received, it was decided to increase the power of this channel to 200 watts. It was decided, too, that, during the construction of the high-powered transmitter, transmissions would be made on the higher frequency of 11,810 kc/s. The results of observations made over about 1400 hours of operation on 11,810 kc/s showed that a greater knowledge is required with regard to the speed with which the zone of reception shifts along the earth's surface in relation to the sun's position and the distance from the transmitter. This frequency seems to be very badly affected by disturbances which do not have such tremendous affect at 6,000 kc/s. For instance, the disturbance which causes the most brilliant auroral displays would completely obliterate radiation on this channel for days on end with the power used. Daylight reception zone limit for this frequency,



Short-Wave Transmitter VE9GW

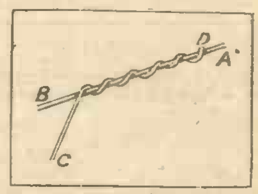
at 3 p.m. during March, seemed to be 1,200 to 1,500 miles, the field being strongest in a south-easterly direction. The greatest coverage on this frequency was the Gold Coast, South Africa, and as far east as the Straits of Gibraltar. Inside the straits toward Sardinia, and along the coast of Algeria, the signal strength dropped below a working value. This transmitter was operated until May 27, 1932, when it was discontinued as the object of the transmissions had been achieved.

As already stated it had been decided to increase the power on the 6,095 kc/s channel. One of the reasons for this was to increase the reliability of reception at far greater distances from the transmitter. By increasing the power the field intensity would be raised to such a value that, when fading took place, *i.e.* fading of the carrier and side bands in phase, the field intensity at its minimum would probably be two or three microvolts per meter, whereas with the lower power it would drop below a useful value. Increasing the power would also give a better signal-to-noise ratio. With the increase in power, larger valves could be used with advantage, because in some of the amplifier stages of a high-frequency transmitter the efficiency is very poor, sometimes not more than 40 or 50 per cent., the loss showing up as heat in the valves. When small valves are used in these amplifiers, there is very little power available to drive the following stages, and anything approaching practical operating economy, or transmitter free from frequency creep, is difficult to attain.

The power of 200 watts was chosen for three reasons: (1) cost; (2) availability of valves; (3) it represented a power ratio, as compared with the low-power transmitter, of 20 to 1. The new transmitter was completed over a period of fifteen months, and was first tested out on the air on May 5, 1932. Sunday, May 15, 1932, was the first time that the transmitter operated until 10 p.m., and on this night it was reported from England and Ireland. It has been reported since from Great Britain, Germany, France, the island of Madeira, California, North West Canada, Newfoundland, and British West Indies. Taking into account the time of year and the power used, the results must be considered as fairly satisfactory. W. A. S.

Two Programmes—One Aerial

THE scheme described below offers at least one advantage to the listener, viz.: the impressing of friends with his knowledge of the science of radio. To receive two programmes from one aerial suggests an unselective receiver, but receiving two good programmes entirely free from interaction is a simple matter if you possess a short-wave receiver. Only one aerial is generally available for reception, and the broadcast set is frequently required by the family, whereas the reader may wish to listen around the short waveband. All that he requires is a short length of single flex. Wind it around the lead-in wire, as shown in the illustration: AB is the main aerial lead-in wire connected to the broadcast receiver, and CD is the twisted flex. C is connected to the short-wave receiver. If the lead-in wire is bare, take care that the end D of the flex does not touch AB.



If the winding is spaced as illustrated, it may extend for a length of about 10 or 12 inches, but the extent and closeness may be a matter for experiment. The short-wave receiver could also be coupled to the aerial lead *viâ* a neutralising condenser, set near its minimum position. No interaction nor interference has been experienced by the writer although even the same battery eliminator has been used for both receivers simultaneously. When two separate out-door aerials were employed the broadcast programmes were also received on the short-waver. The reader will readily understand that the twisting of the insulated flex around the aerial lead forms a miniature condenser of the order of a few micro-microfarads connecting the short-wave receiver in series with the main aerial. The loading effect of this combination is not sufficient to affect reception of medium and long wave signals W. H. M.