BIRTH AND GROWTH OF WIRELESS

BROADCASTING

MERITS OF THE SHORT WAVE-LENGTH

No. IV.

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THE Great War had a tremendous influence on wireless, for necessity brought the best brains of all nations to the task of perfecting the new science. After the war fresh means of utilising the inventions had to be found, and broadcasting developed.

THE HISTORY of wireless, on its nical side at least, since 1914, is largely the history of the development and improvement of the thermionic valve and the circuits and accessories which are employed in conjunction with it for the purpose of transmitting or receiving wireless signals or speech. The extraordinary rapidity of these developments has been due in the first place to the advent of the Great European War. Efforts to improve the range, the reliability, and the secrecy of signalling by this means for purposes of naval and military communication were prosecuted by both sides with great vigor.

Intensive research on the part of the manufacturers—and notably by the research laboratories maintained by the great electrical companies of the United States—resulted in great improvements in the details of the construction of valves, and in the development of methods of manufacture suitable for mass production of cheap, standardised, efficient types of valves. Chief among these improvements in the valve itself must be mentioned the attainment of a much higher degree of evacuation.

FIFTY YEARS AGO

FROM "THE ADVERTISER" OF AUGUST 6, 1880

The Australian Eleven won their match against Gloucestershire by 71 runs.

General Roberts, with 10,000 men, is marching from Kabul to the relief of Kandahar.

The Russian Government has given orders for the construction of ten ironclad ships of war.

To-day, being the anniversary of the Duke of Edinburgh's birthday, will be observed as a public holiday. There will be racing on the Old Adelaide Racecourse, and military sports on the Adelaide Oval. Retail drapers' assistants will journey by train to Morgan, and the steamer Jane Eliza will make an excursion on the Murray.

Colonel Downes has promised to give a prize of £5 to the volunteer who makes the fewest misses during class-firing.

Two dogs last night jumped a fence at the Melbourne Zoological Gardens and destroyed a number of animals, valued at over £100.

A severe shock of earthquake, lasting fully a second, is reported from Orroroo. Doors and crockery were shaken severely.

This, although it does not necessarily increase the sensitivity of a valve for reception, permits of the employment of far higher voltages than can be used with valves in which, as in earlier types, the amount of residual air is still sufficient appreciably to affect the nature of the discharge through the valve.

A later improvement consisted in the employment of a wire coated with a film of certain metallic oxides, which —as shown by the German physicist, Wehnelt, many years previously—has the effect of enormously increasing the electron emission from the heated wire. In fact, with filaments coated with a film of barium, caesium, or thorium oxide, it is sufficient to heat the wire to a dull red heat to secure the required emission of electrons. Such "dull-emitter" valves have now largely superseded the original type, in which a pure metal wire had to be heated to bright incandescence.

Broadcasting Marks an Epoch

On the termination of the war the large manufactories in America—faced with the loss of a new and profitable line of business—sought to create and cultivate a demand for valves and accessory equipment for radio-telephony by establishing "broadcasting" stations. How fully these achieved their purpose is perhaps best illustrated by the statement that in the first nine months of 1923—only two years after the inception of broadcasting—the Radio Corporation of America received orders for 2,931,262 valves.

A recent writer states that the sales of receiving sets by a single firm in U.S.A. reached the colossal total of six thousand per day!

Among more recent improvements may be mentioned the use of a fourth, or even a fifth, electrode. This "screened-grid" type of valve has come rapidly into favor in the last year or two, particularly in connection with the reception of shorter waves in transmission.

Short Wave Length

As already stated, the wave length employed in the early years of "wireless" varied from a few hundred to, in some cases, more than twenty thousand metres. To avoid confusion, private experimenters were debarred from the use of these longer wave lengths and restricted to wave lengths of 200 metres or less. This apparent disability proved fortunate, for it led to the discovery that these shorter wave lengths were equally or even more suitable for long distance transmission than the longer. In 1921 American amateur wireless enthusiasts arranged with their English brethren a series of tests which conclusively demonstrated the possibility of trans-Atlantic radio-telephony on a 200-metre wave length, and a power of less than one kilowatt.

The Beam

The possibility of utilising still shorter waves of the order of 20 metres appears to have been in the mind of Marconi as early as the year 1896, but it was not until 1923 that experiments carried out by him in conjunction with C. S. Franklin, an engineer of the Marconi Company, conclusively demonstrated the feasibility, not merely of using such short waves, but also of concentrating a "beam" in any desired direction.

The first "beam" service—for telegraphy only—was established between England and Canada. It has been followed by many others until, at the present date, most civilised countries possess "beam," or at least short wave transmitting stations, both for the purpose of distant telephony to other countries and for local broadcasting. A very large economy of power is effected in these beam radio stations Thus, whereas the great station at Rugby, on a wave length of 18,000 metres, uses 1,000 kilo-watts, a beam station recently erected for trans-Atlantic telephony by the American Telegraph and Telephone Company, uses only 15 k.w. Partly this economy is due to the possibility of more effectively directing the shorter waves in a desired direction, even more perhaps to the fact that the short-wave receiver is very much less affected by atmospheric electrical disturbances.

The fifth and concluding article of this series will appear to-morrow.