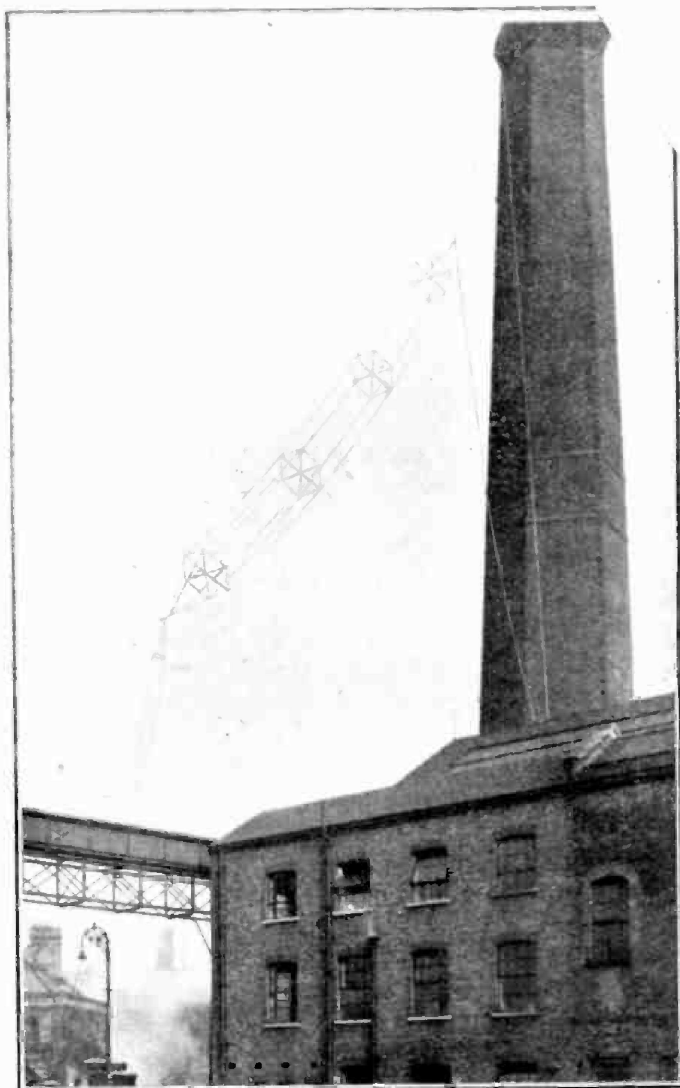


The Erection of **5WS**—The Radio Society's Special Station at Wandsworth.

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The aerial attached to the chimney stack at the Wandsworth Generating Station. Part of the earthing system is attached to the iron framework seen on the left.

AS all readers of this journal are probably aware, the Transatlantic Radio Tests took place during the last month of 1922. In 1921 tests of the same nature were made from America, when signals were received by several amateurs on this side of the water, but this time tests were conducted in both directions. It could, of course, hardly be expected that the amateur stations complying with the ordinary Post Office regulations would be able to reach through to America from Great Britain, but for the period of the tests, viz., December 22nd to 31st, several special licenses were issued permitting the holders to use increased power, and to erect larger aerials. Amongst those so favoured was the Radio Society of Great Britain, which was represented by a specially appointed sub-committee, including Messrs. G. G. Blake, P. R. Coursey, N. Hamilton, N. Lee and C. F. Phillips, and these members were later joined by Mr. M. Child. Having no club rooms or regular transmitting station of any kind the first matter to be considered was a suitable location for the special station to which the call letters 5WS were to be assigned. Several proposals were tentatively examined, but all proved impracticable, until Mr. Blake approached the Engineer of the Generating Station at Richmond, with a view to the possible use of a site at their station. Some such situation was desirable, since the provision of a suitable power supply was essential. While the Richmond engineers were themselves unable to help, they suggested that application should be made to the County of London



Electric Supply Company. Mr. Bacon, the Chief Engineer, was therefore approached, and proved very sympathetic. Through his kindness the matter was put before the directors of the company and their consent to the use of a site quickly obtained. Permission was given for the use of a chimney stack of their Wandsworth Generating Station, to support the aerial. Mr. Bacon was also good enough to put the Committee in touch with the Metropolitan Water Board, who own property adjoining the generating station, a very conveniently situated small brick building belonging to the Board being discovered

at the foot of the chimney. This had been disused for some time, and though somewhat small, proved very suitable for the purpose of a transmitting station. The Metropolitan Water Board readily allowed its use by the Radio Society for the purpose of housing the apparatus, and as it was situated but a few yards from the base of the chimney stack of the generating station, and separated from it only by a narrow lane known as the Causeway, the erection of an almost vertical aerial was comparatively easy.

The next step was to obtain transmitting apparatus, and this might have proved a serious stumbling-block but for the generosity of manufacturers in lending parts. As the power licensed to American amateurs does not exceed 1 kilowatt, and as the special station put up in America during the tests in December, 1921, to send signals to Mr. Godley, used approximately this amount of power, it was desired to install an equipment of about the same output. To deal with this amount of energy large transmitting valves were necessary, and the M.O. Valve Company, Hammersmith, kindly consented to loan to the Society two T4 A power valves and two U2 rectifying valves, the presence of an A.C. supply rendering the use of rectifying valves preferable to the installation of a special H.T. D.C. generator.

Although as mentioned above, an A.C. supply of 220 volts, 50 cycles, was available from the generating station, the task of securing step-up transformers suitable for this supply did not prove easy, and a solution was eventually found in the use of a motor-driven generator delivering current at 350 cycles to two separate step-up transformers so that double-wave rectification could be employed. The step-up transformers for this frequency were each of 1½ kilowatt output and were loaned by Messrs. R. M. Radio, Ltd. This firm also lent a 350 cycle rotary converter suitable for feeding the transformers. This machine, while primarily designed for a D.C. supply at 100 volts, was not directly suitable for use on the supply available and was therefore fitted with a pulley in lieu of the customary rotary spark (the machine being one of a type normally used for ships' spark radio installations) and was belt-driven from an induction motor run off the 50 cycle A.C. supply. This latter machine, together with its starter, switches and fuses for the circuit associated with it, was loaned by the Dubilier Condenser Company, Ltd.

Various inductances for use in the aerial and other circuits associated with the transmitting apparatus were loaned by the Radio Communication Company, Ltd., Leslie McMichael, Ltd., and Dubilier Condenser Company, Ltd. This last firm also supplied a number of condensers for use with the rectifying valves for smoothing out the rectified currents for the grid circuits of the oscillator valves and for the oscillation and aerial circuits, several of these being specially made up for the purpose.

Low tension supply for lighting the valve filaments was obtained partly from special transformers loaned by Mr. L. F. Fogarty, of the Zenith Manufacturing Company, Ltd., Willesden (who also supplied four adjustable filament resistances for the valves), and partly from an 18-volt accumulator battery, loaned by Messrs. Leslie McMichael, Ltd. Grid leak resistances of assorted values suitable for use with the oscillating valves were loaned by Messrs. Gambrell Brothers, Ltd. and by the Zenith Manufacturing Company, Ltd. Wire for the aerial was supplied by Leslie McMichael, Ltd., and the transmitting key and receiving set by Mr. M. Child.

Apart from the fitting of the pulley block at the top of the chimney stack and the fitting of a suitable halyard thereto, which was carried out by Messrs. Beaumont and Son, a firm of steeplejacks, the labour entailed in the erection of the station was entirely voluntary.

The aerial was a six-wire cage, having an overall length, including the lead-in wires, of approximately 160 feet. It was constructed by Messrs. Child, Manning and Hathaway, members of the Radio Society of Great Britain, E. Pickering, assistant to Mr. G. G. Blake, E. Trehearne, lent from the staff of the Dubilier Condenser Co., a rigger from the staff of Messrs. Burndept, Ltd., and a representative from Leslie McMichael, Ltd., who shared the labour on different days. The weather was fine during the erection of the aerial, but later turned very wet and stormy, and grave fears were entertained that the shrinkage of the ropes supporting the aerial might cause a catastrophe. Fortune favoured 5 WS, however, and even the terrific winds which blew from time to time during the tests left the aerial unharmed.

The apparatus was collected in the research laboratories of the Dubilier Condenser Co., Hammersmith, and on Saturday, December 16th, only five days before the tests were to

begin, the assembling of the various parts was commenced. This part of the work was carried out by Messrs. Blake, Coursey and Trehearne during Saturday, Sunday and Monday, during which time a rough wooden framework was made to support the valves, filament resistances and transformers, with a switch controlling the latter. Difficulties in the insulation from earth of the filament circuits of the rectifying valves necessitated the temporary use of an accumulator battery supported on a wooden framework separated from the floor by four stoneware pots. After these arrangements had been made considerable time was devoted to adjusting the constants of the circuits so as to obtain as large an oscillatory current as possible at a wavelength approximating 1000 metres in a dummy aerial circuit, having a resistance of 5 to 6 ohms.

The apparatus was transported to the Wandsworth station by means of a motor van lent by Dubilier Condenser Co. on the afternoon of Tuesday, December 19th, and the evening was spent there by Messrs. Blake, Child, Coursey and Trehearne in getting the motors running, and so on. Late that night (or early next morning) the aerial circuit was joined up and some current obtained in that circuit. The current was not very large, but it was left to a subsequent time to increase it by readjustment of the various parts, the workers by this time feeling that they deserved a rest for what remained of the night.

No work was done at the station on Wednesday, December 20th, as there was a meeting of the Radio Society, but as the first transmissions were to take place at 2.45-3 a.m. on Friday morning, the 22nd, it was essential that all final arrangements should be made on Thursday evening. Accordingly the same four enthusiasts, together with Major Hamilton, assembled once more at Wandsworth on Thursday and after much persuasion the aerial current was increased to 3 amperes, which was thought sufficiently satisfactory for a start. During the period of the tests, however, various modifications and improvements were made from time to time with the result that the maximum current obtained was 4.3 amperes, representing nearly three-quarters of a kilowatt of high frequency energy in the aerial.

The British transmissions were arranged to take place between midnight and 3 a.m., and 3 a.m. and 6 a.m., on alternate nights. Owing to the extreme lateness of the times, it was, of

course, necessary for the operators to be taken to the station by car, and Messrs. Klein, McMichael and Woodhams very kindly lent cars on different nights for this purpose. As the apparatus was put together rather roughly, owing to the shortage of time, it was necessary for one of the four who had been responsible for its arrangement to be present each night, in order to see that all was in order. They therefore took it in turns to attend, and on some nights were accompanied by Messrs. Maitland and White, members of the Radio Society, who were anxious to have a share in trying to "raise" America. On one or two occasions the key of the hut was not forthcoming at the proper moment, but fortunately such a trivial matter was not allowed to stand in the way of progress, as the intrepid scientists gained an entrance through a very small window. This minor discomfort, however, was eliminated on Christmas night. Through the kindness of the caretaker of the premises, a fire was laid each day in the cabin, so that those in charge each night were able to keep themselves warm.

The weather throughout the tests was very rough and wet, and fears were entertained for the safety of the aerial. Fortunately, however, no accidents occurred, and all the scheduled transmissions were duly accomplished. On the nights before and including Christmas, additional transmissions were made from 5 WS during the times allocated to 2 ON, which station was not used on those nights, owing to the absence of Major Parker. The Marconigram from Mr. Schnell the Traffic Manager of the American Radio Relay League, was anxiously awaited each day by the Committee, but sad to relate, the first two or three reports were most discouraging. However, the signals from 5 WS were reported as received on the other side of the Atlantic on the mornings of the 24th, 25th and 26th.

As a matter of interest, it may be stated that the aerial energy from 5 WS was greater than that put out by 1 BCG, the special station erected in America, during the 1921 tests, which was received by so many listeners over here. Although, on the whole, the results of reception on the American side are rather disappointing, yet it is gratifying to know that the station was received. A more detailed account of the number of Americans who heard 5 WS, with a description of the apparatus, etc., used, will be given when it has been received from America.