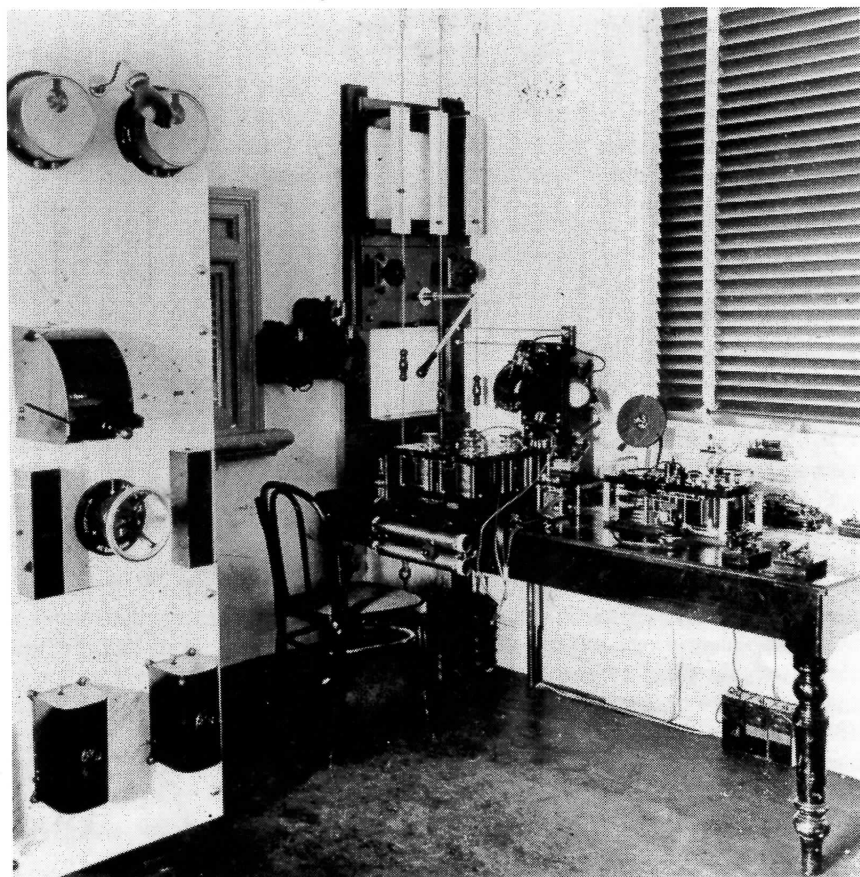




NEW ZEALAND VINTAGE RADIO SOCIETY INC.

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WHEN SPARK WAS KING

FROM THE EDITOR

In a previous issue I mentioned that, at the age of 91, George Askey was "hanging up his hat" and retiring from active participation in radio collecting after more than 30 years in the game. In November last year his splendid collection of the "old and rare" was auctioned by RG Bell, auctioneers in Christchurch, and it attracted a great deal of attention from collectors within New Zealand and around the world, with even personal attendance from Australia. Our President attended and three of his photographs of the set-up at the auction are shown on page 12. Meanwhile George has now sold his residence in North Avon Road and moved to St Albans Retirement Village. We all wish him a pleasant time in his retirement.

As the older valves become more difficult to obtain the possibility of restoring weak specimens attracts a lot of attention. This issue contains two interesting and informative articles on the subject. George Newlands has responded to a little arm twisting and has provided us with a revised version of an article of his originally published in Radio Bygones. This article described the establishment and operation of the early high power spark stations which supplemented New Zealand communication with the outside world and established communication with ships at sea in the 1910/30 period. Then, for good measure, George has given us his views on the vexed question of what to do with that lovingly restored radio collection of ours. As a retired curator from the Telecom Museum George's views are an important contribution to this subject.

Following on last years popular experiment, our Annual General Meeting will be held on Saturday, 30th March at 1pm, with a car boot sale in the morning at 10am, an auction following the AGM and a social dinner in the evening at 7pm for those who wish to stay. See the enclosed flyer for further details. Let the Treasurer know in advance if you wish to attend the dinner.

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FRONTISPIECE The operating position of the Telefunken spark station at Pennants Hill, Sydney (Awarua and Awanui stations in New Zealand were similar). The receiver can be seen in front of the operators chair with the wavemeter to the right. The transmit/receive crank lever can be seen to the left together with three vertical cords, with handles and vertical scales above, counterweighted below the table. These would have controlled various functions in the high tension room which would have been no place to be while the station was operating

A Short History of the New Zealand High Powered Spark Wireless Stations.

George Newlands

The establishment of a wireless link between Australia and New Zealand was first proposed by the Marconi Company in 1902 but it was not until December 15th, 1909 that an Imperial conference was convened in Melbourne to discuss the matter in detail. On behalf of New Zealand the conference was attended by J.K. Logan, the chief technical officer of the New Zealand Post and Telegraph Department. One of the recommendations to come from this conference was for wireless communication to be established across the continent of Australia, between Australia and New Zealand and between New Zealand and Fiji. Australia undertook to build two stations, one at Applecross, near Freemantle and another at Pennant Hills, near Sydney. New Zealand undertook to build two similar stations, one at Doubtless Bay, near Kaitia, to communicate with a Marconi station being built at Suva, Fiji, and another near Bluff to communicate with a Telefunken station at Pennant Hills.

By 1909 the operating principles of the two principal systems, Marconi and Telefunken, had stabilised and tenders were called the following year for two New Zealand high powered stations, with a reliable working range of 1,250 miles, to be installed at Doubtless Bay and Bluff. The tenders also called for three low powered stations, with a range of 500 miles, to be located at Cape Farewell, Gisborne and Sumner. Three companies, Lepel, Marconi (UK) and Telefunken submitted tenders.

The successful tenderer was the Telefunken Company of Germany through their Australian agent Australasian Wireless Ltd of Sydney, and it may seem surprising that they were able to sell their equipment to Australia and New Zealand, both British Dominions, ahead of the rival British Marconi Company. Details of the Lepel tender are no longer available and the Marconi tender was considered prohibitive at 30,000 pounds against 23,730 pounds for the Telefunken system. System efficiency was considered also. The Marconi system required generator power of 200 h.p. against 70 h.p. for the Telefunken system. Also the British Government was at loggerheads with the Marconi Company at the time, over patents and royalties, and the Dominion Governments had been instructed not to deal with Marconi.

The acceptance of the German tender may seem all the more surprising, given the lamentable state of world affairs at the time and the powder keg that Europe was becoming. Any feelings concerning the Anglo-German naval armaments race and the growing hostility between the Kaiser and the so-called Triple Entente of France, Russia and Britain were over-ridden by practicalities. The German system was recognised as world class in all respects. The English speaking world held German science, technology and education in high regard and German expertise and education in the new technologies was unsurpassed as were the construction techniques and reliability. Even at this stage German electrical firms such as Siemens & Halske and Telefunken had ready markets well beyond Continental Europe.

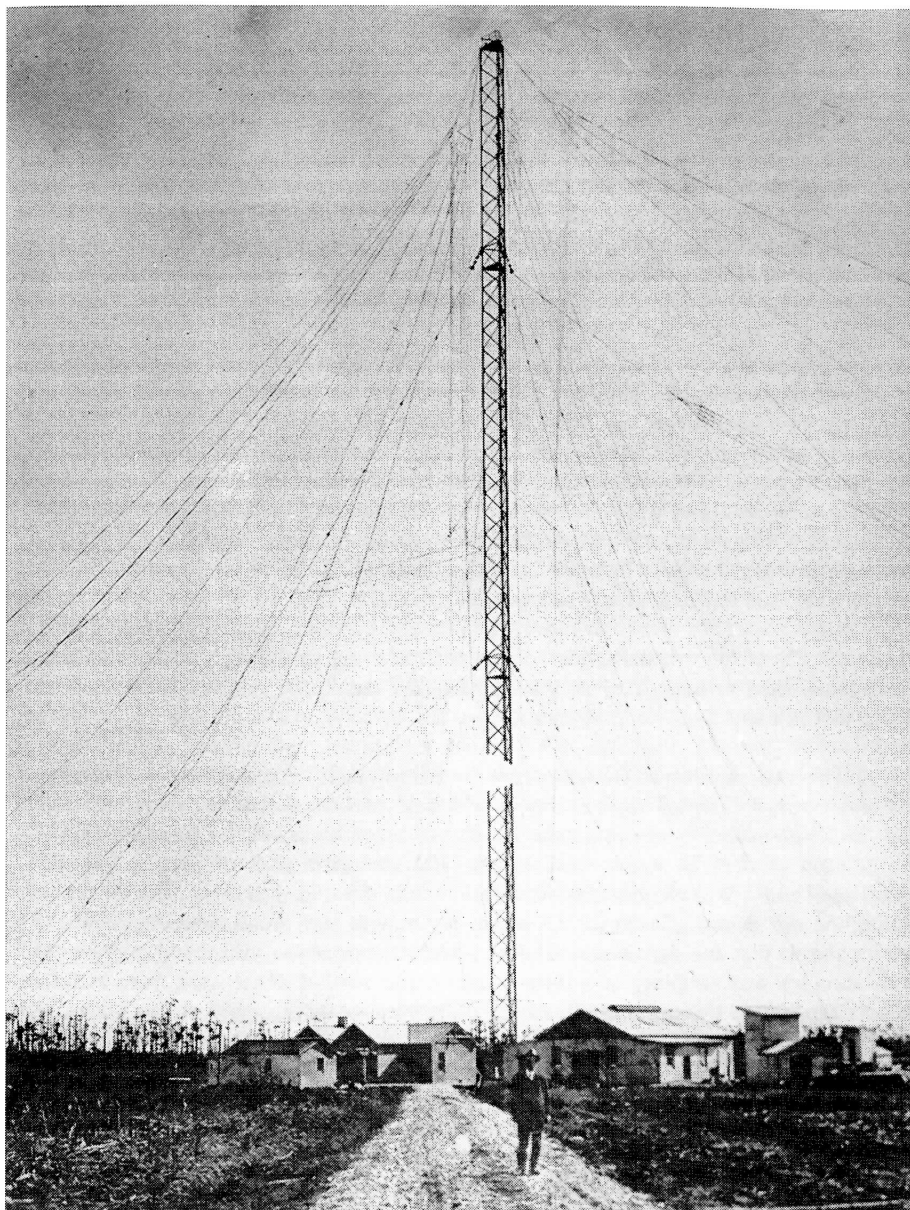
The tender document, couched in the wordy legalese of the time and exquisitely detailed, makes interesting reading. The proposal, dated November 30th, 1910, is addressed to the New Zealand High Commissioner in London (Mr Hall Jones) from the Telefunken Company in Berlin. It comprehensively details major components, general conditions and a guarantee of service. It is interesting to note also that the company required the station sites to be selected by one of their own engineers. Only then would they give a guarantee of service. The document is signed by his Excellency John Poynder Dixon-Poynder, Baron Islington, the Governor of the Dominion of New Zealand, and by W. McLeod and Walther Straeker, two of the directors of the Australian agents of the Telefunken Company. The tender was then concluded between Australasian Wireless of Sydney and the Minister of Telegraphs in Wellington on December 9th, 1910 and a tender deposit of 300 pounds paid.

Some technical detail is in order here. The terms "High Power" and "Low Power" must be viewed in perspective. The high powered stations worked with a 30kW. input and were specified to provide an "oscillating energy of 15kW. in the aerial". The low powered stations required 5kW. input for an aerial energy of 2.5kW. and were actually Telefunken type D shipboard stations adapted for landbased installation. The order for three low power stations was later increased to five and they were installed at Auckland, Wellington, Chatham Islands and on the Government steamship "Tutanekai". As far as is known nothing was ever installed at Cape Farewell, Gisborne or Sumner. The fifth set was a standby and spare parts source.

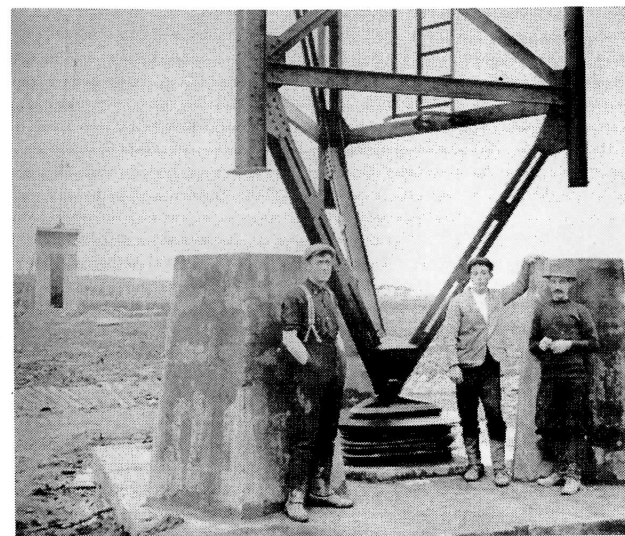
Paragraph 25 of the original tender document, referring to the high power stations, is reproduced here verbatim and gives an idea of the detail and language used. It will be noted that it is one single long sentence.

25. The said stations at Doubtless Bay and Bluff shall be capable of maintaining a minimum range of signalling seawards as aforesaid of One thousand two hundred and fifty (1,250) nautical miles at a rate per day of seven thousand five hundred (7,500) words each of five (5) letters during Ten (10) successive days of Twenty four (24) hours each and under all normal atmospheric conditions and shall be capable of sending during the day or night Twenty (20) words per minute each word consisting of five (5) letters and so that the signals sent from the said stations at the said speed may be read with accuracy and certainty at a distant station and so that signals sent from a distant station capable of transmitting signals for such distance as aforesaid at the said speed may be received and read with accuracy and certainty at the said stations at Doubtless Bay and Bluff.

The actual sites chosen for the stations were at Awanui in the north (Doubtless Bay) and Awarua in the South (Bluff) and thus the stations came to be named. The original callsigns for the stations were VLA for Awanui and VLB for Awarua. The sites, 100 acres each, were similar in aspect, being flat with good ground conductivity and no surrounding hills or forests. The construction of the stations was similar also. The dominant feature of the stations was the aerial mast. This was a massive triangular steel lattice structure, 9 feet across each side, 394 feet high and built to withstand a wind pressure of 25 lbs per square foot. It cost 1600 pounds and the base weight, with the



The Aerial Mast at Awanui



Mast Base Under Construction - Herr Reinhardt at right

The concrete plinths below the mast upright members allowed insertion of bottle jacks to raise the mast if the base insulator required replacement. Note massive guy anchor block at left rear.

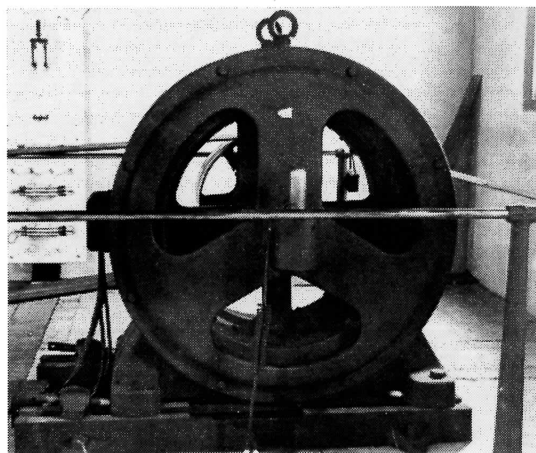
aerial rigged, was in the order of 120 tons.

The mast stood on a three layer insulator consisting of iron plates and glass insulators. It was supported by two sets of three guy wires, actually iron rods broken up with insulators, attached at the 150ft and at the 300ft levels. The bottom ends of these terminated in three massive concrete anchor blocks, 42 tons each with a tensioning shed at

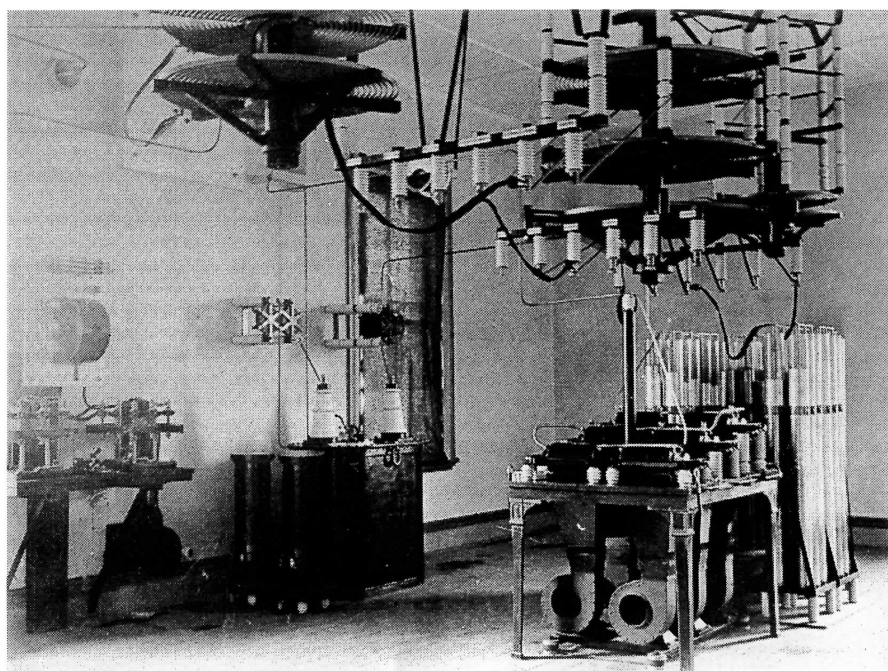
the rear. These anchor blocks are still in position today and are likely to remain so. An interesting stipulation regarding the guy wires was that they had to leave the anchor blocks at a height in excess of that of a man standing in the stirrups of a horse, presumably to protect any horseman riding among the guy wires. The construction of both masts was overseen by a Telefunken engineer by the name of Reinhardt. The company undertook to provide expert supervision during the construction of high powered stations and Herr Reinhardt gained eminence in erecting stations throughout the world. He died in February 1959, aged 82.

The aerial itself was a high capacity umbrella type favoured by Telefunken. A large number of phosphor-bronze wires, (The spec. states "phosphorous bronze") terminated in six groups at the top of the mast, spread out radially for about 1200 feet from the mast base to where they terminated on short wooden poles. The top 600 feet of these wires was the active part and the mast was part of the system. Beneath this was a counterpoise, a radial earth mat of more phosphor-bronze wires ploughed into the ground, radiating out from the mast base to the limit of the aerial system. One can wonder at the necessity of this. The ground at both stations is swampy and conductivity good. Probably installation of a counterpoise was a standard procedure for Telefunken.

The station buildings were the same at both stations and consisted of a powerhouse, a high tension room and an operating room. A superintendent's house and staff quarters were also provided. Such was the similarity of the buildings at the two stations that photographs of the internal fittings and apparatus are often difficult to localise.



Alternator at Awanui



High Tension Room at Awanui

At left are the keying relays with the step-up power transformer at centre. The cylindrical objects beside the transformer are probably RF choke coils. At right is the bank of quenched spark gaps with their blowers. Behind them is a bank of Leyden jars. Tuning inductors are suspended from the ceiling.

The powerhouse contained the main alternator and its driving engine. The specification called for a 70 h.p. "petrol-oil" engine and the machines were actually Gardner semi-diesels, started on petrol and switched to light oil or power kerosene when up to running temperature. They were started by compressed air. The engine was belt coupled to a 30kW. alternator which produced 220 volts at 500 cycles when running at 1000 r.p.m. This gave the transmitter a spark rate of 1000 per second and produced the high pitched "singing spark" note that was a characteristic of the Telefunken system. The use of a British engine is strange as Telefunken was part of AEG and would have had access to very good German engines. Probably a political decision.

No attempt will be made here to describe the finer points of the technical apparatus. There is no reason to believe that the equipment was anything other than standard Telefunken and the system is well described in published literature. It is worth noting however that most of the equipment was made in Sydney and a brief description of the transmitter operation is in order. The 220 volts 500 cycles power from the alternator was fed via massive keying relays to a step-up transformer producing 30,000 volts. These relays, equipped with air blast over their contacts, were an impressive and very noisy feature of the stations. The oscillatory circuit consisted of silver plated copper pancake inductors in series with a bank of Leyden jars and banks of quenched spark gaps. Like the keying relays, the spark gap banks were also equipped with air blast. Coupling to the aerial was inductive with shortening condensers and inductors for tuning. The aerial was fed through an RF ammeter scaled for 250 amperes and generally reading about 50. All this produced the required 15kW of RF on wavelengths between 600 and 2000 metres.

The receiving system was entirely conventional for the time and used the standard Telefunken "acoustic receiver" type GAH. These impressive machines are prominent in photographs of the operating positions (see frontispiece), as are wavemeters type EGW. The receiver is little more than an elaborate crystal set with provision for different detector types and tuning arrangements and the wavemeter is a multiple indicator absorption type. Again, such equipment is well described in published literature. All instrumentation and equipment in the stations was of superlative quality and finish.

Both stations were opened for business on December 18th 1913. Information on exactly what services the stations eventually provided is now both sparse and scarce but it is obvious that Awanui was the busier of the two. The intended purpose of Awarua, a service in conjunction with Pennant Hills, obviously never eventuated although it can be assumed that tests would have been made. The station seems to have served chiefly as a marine communication and distress watch facility but restrictions imposed by wartime regulations, with ships required to keep radio silence, must have left the station with little to do.

The war with Germany started in 1914 and quite early in the piece a force was sent to Western Samoa to take over the German colony there. The operation was successful but the high power Telefunken station at Apia was damaged by the German staff in an attempt to deny its use to the New Zealanders. Stories vary as to what actually happened but it seems that the engine governor was sabotaged and the flywheel disintegrated when it was started. A consignment of parts, including an engine flywheel,

was sent from Awarua to get the Apia station operational.

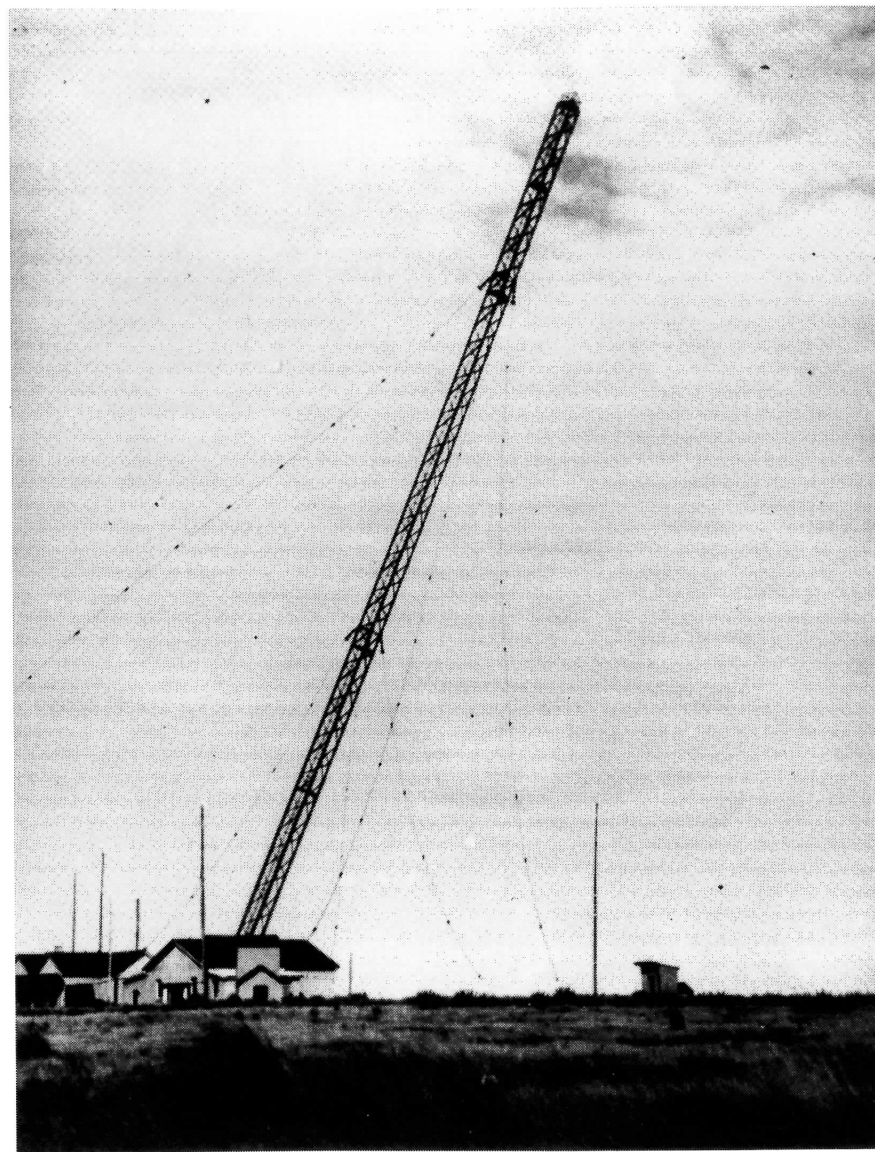
Records of what services Awarua provided are now few and sparsely detailed. On March 8th 1922 attendance at the station was curtailed to 6 a.m. to 8 p.m. other than for a distress watch and the transmission of marine navigation messages but the station was handling commercial traffic again on June 24th 1925. A twice daily service (9.15 a.m. and 4.15 p.m.) to the lighthouse station at Puyseger Point was commenced on August 1st 1925.

A shortwave service, using thermionic valve transmitters, was commenced from Awarua in 1924 and it can be assumed that the spark transmitter, or whatever still remained of it, would have fallen into disuse at that time. (Valve receivers, De Forest 1Bs, had been introduced about 1916.) At this time radio broadcasting was becoming common and with domestic receivers of the day being designed for sensitivity rather than selectivity the powerful spark signals must have been less than popular with the general public. Shortwave services were taking over long distance communication and the longwave stations were having ever less to do. By 1930 spark wireless had had its day and maintenance of the mast, always a substantial on-going expense, ceased. By 1938 it had deteriorated irreparably and it was felled on March 24th of that year.

Not much more is now known about the services operated by Awanui but it obviously had a rather less passive role than Awarua. As with Awarua and Pennant Hills, there is no record of Awanui ever working a regular service to Suva, the service for which it was built, although it did so for a short period in 1920 when the Norfolk Island-Suva cable broke. Apart from assisting Auckland Radio with shipping traffic it operated a regular telegraph service with Apia between 1917 and 1927. On January 12th 1925 the station commenced to broadcast press messages on a wavelength of 2000 metres. These contained New Zealand news and were free to all ships and coast stations within range. This service ceased on November 1st 1927 (taken over by Auckland Radio) although a weather report was still provided at 10.10 p.m. daily on 600 metres.

From February 1st 1929 the Awanui listening service was curtailed to 9 a.m. to 1 p.m. and 2 p.m. to 5 p.m. The station was closed Wednesdays at 1 p.m. and all day Sundays and statutory holidays. With ever less to do complete closure was inevitable and this finally happened on February 10th 1930. The station was dismantled, the land sold off and Radio Awanui passed into history. In retrospect this was an error because at the outset of World War II a completely new station had to be established at a place called Waipapakauri, not very far north of Awanui.

Radio Awarua became Awarua Radio and remained an active station for another 61 years, providing a particularly valuable monitoring service through the World War II years. Awarua is roughly the same distance from Rabaul (New Britain) as is Tokyo and radio traffic from the Japanese base at Rabaul was monitored constantly at Awarua. The station also provided an invaluable High Frequency Direction Finding service over this period. With the closure of Awarua Radio, on August 30th 1991, a significant period of radio communication in New Zealand came to an end.



The Awarua aerial mast being felled - March 24th 1938.

Acknowledgements.

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