EXPERIMENTAL WIRELESS

A JOURNAL OF RADIO RESEARCH & PROGRESS

Vol. II. MARCH - JUNE 1924

Principal Contents.

Published by PERCIVAL MARSHALL & CO., LONDON, E.C.4.

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Principal Contents.

AMATEUR TRANSATLANTIC

MIGUEL MOYA, EAR-1 / EA4AA COLLECTION

Published by PERCIVAL MARSHALL & CO., LONDON, E.C.4.

EXPERIMENTAL WIRELESS

A Journal of Radio Research and Progress

Vol. 1. MARCH, 1924. No. 6.

Subjects dealt with in this issue include:

"HOWLING" IN RESISTANCE AMPLIFIERS.

THE EFFECT OF SELF-CAPACITY.

IMPROVING THE SENSITIVITY OF TELEPHONES.

CONSTRUCTION OF A PORTABLE DIRECTION-FINDER.

AMATEUR TRANSATLANTIC RADIO-TELEPHONY.

And other Articles of practical value.

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The Month's "DX."

Recorded by HUGH N. RYAN (5BV).

The increasing efficiency of amateur transmitters and receivers is resulting in the creation of many new long-distance records which are undoubtedly worthy of mention. It is proposed to record month by month work in this direction, and the Editor will be pleased to receive details for inclusion in these pages.

AT the time of writing last month's notes we were still sufficiently in the thick of the first trans-Atlantic rush not to have had time completely to collect all the results which had been obtained, or to realise fully the extent of the good work which had been accomplished.

This being so, and conditions being now more settled, it may not be out of place here to give a *resumé* of trans-Atlantic work up to date.

Before the end of 1923 2KF, 2SH, 2OD, and 5BV had established two-way communication with the United States and Canada. Since then the same result has been achieved by the following : 2SZ, 2NM, 2FU, 5NN, 5KO, 2KW, 2WJ.

The list of stations heard in the States during the official tests remains as given last month, since for some reason the R.S.G.B. appears to have dropped the subject and no further reports have been issued.

The results would, no doubt, have been even better but for the fact that from about January 26 until February 8 we had a spell of very bad conditions, during which trans-Atlantic work was practically impossible on any scale, though 2OD managed to keep up communication with Canadian 1BQ most of the time.

A number of additional American stations have entered the field of two-way working. Our old friend 1CMP, famous for his countless CQ calls on 200 metres, has now come down to the lower wave lengths. His programme at first consisted of further CQ calls, which many of our stations answered, without success. His reception has now greatly improved, however, and he now receives 2KF, 2OD, 2KW, and 5BV, having often effected two-way working. One wonders how many thousands of times 1CMP was called by British stations during the latter months of 1923 when his calls were such a familiar feature of the night watches! It is with a particular satisfaction that we connect with him after so many months of calling.

The distinction of being the American station heard best in England has kept changing from one to another. In the early days of two-way working 2AGB probably held the position. It then became the turn of 1XW. At present by far the strongest station I receive myself is 1XAM (Reinartz's Station), but 2KF finds 1BDI the best.

Many of us remember 1BDI as one of the star stations in the 1922 tests, and are glad to hear him again, especially as he can now hear our signals and reply!

In last month's notes I mentioned the large number of Americans worked by 2KF. He has not only maintained his lead, but

greatly increased it. Here is his list to date: 1XW, 1XAM, 1XAQ, 1CMP, 1BDI, 2AGB, 2AWS, 2CFB, 3XAO, 3OT, 8XAP, 9AZX, Canadians 1BQ and 3BP.

And the North used to say London couldn't work DX! 2KF's telephony has been received weakly by 1CMP, and strongly and clearly by 1BDI.

Dutch PCII is still working Americans regularly nearly every night. I am not sure how many he has worked, but the number is fairly high.

Another well-known Dutchman, PCTT, whom some of us had the pleasure of meeting in London recently, is now going again, and should get over soon. During the tests PCII and PCTT combined their apparatus to make one station at PCII.

Of the French stations, 8AB is still working, but is not heard so much as he was a month ago. 8CT, of Arcachon, who was heard in America during the tests, on 200 metres, has now reduced his wave-length, and is very strong indeed. The last time I heard him he was trying to connect with 1XAR, but I do not yet know whether he has been successful.

Some listeners on this side have been confused by the fact that some American stations on the short waves are apparently operated by men from different stations on 200 metres. The reason is that all American stations licensed for 100 metres are given a special call-sign for that wave-length, beginning with the letter "X."

Thus 1XW on 100 metres is the same station as 1MO on 200 metres. 1XAM is 1QP of 200 metres, and 1XAR is 1BDT of 200 metres.

Much more could be written about American work, which has become so absorbingly interesting to us all, but I think I have occupied enough space with it already.

In spite of the great interest in American work, much that is interesting is happening in European DX.

After becoming used to working the States, our stations have become so expert that European stations, which we worked with some difficulty two months ago, now seem quite "local."

It is interesting to look back, say, less than two years. In those days we were quite excited at working a French or Dutch station.

An envied few could connect with 8AB, but most of us considered ourselves lucky if we were in the reports from Denmark, which were then just beginning to arrive. Our "testing" was usually carried out with a station a few miles away at most, and not until we had our sets tuned up to their very best did we venture to call a Frenchman. We now carry on most of our testing with Dutch or French stations, who are read with ease, and who can be "raised" with a single short call. Our only concern with the local stations with whom we used to do all our testing is now to tune them "out" instead of "in."

Italy, the latest country to possess amateur transmitting stations, is already doing very well. IMT (Venice) has worked a number of our stations. ACD, mentioned as an unknown station in last month's notes, is also in Italy (Bologna).

I believe he has, so far, only worked with two British stations (2KF, 5BV) and one Dane (7ZM), but he has received signals from a large number of British and French stations. He has also received telephony from 2KF.

One station (1JW) has started up in Luxembourg, and he has worked a number of British stations. I have received an enormous number of letters from British stations, saying that he was a new Italian station whom they had received! His signals are very strong everywhere in England.

The number of French stations has greatly increased recently. One of them, 8OH, is run by some soldiers in the French Army of Occupation at Wiesbaden. It is a useful station for testing the transmissions of those of our men who want to get further than Holland, but cannot reach Italy.

Now for what our own stations are doing. 5KO has been doing very well in trans-Atlantic work. He started a bit late, and is apparently trying to make up for it, with interest. He has, as far as I know, only worked one American (1XAR), but he has been received by a large number of them, including 3APV, Washington, and Canadian 9AL, Toronto.

5DN has worked XY (Geneva) again several times.

Mr. Niell, of Belfast, is still doing very well in reception. In addition to those mentioned last month, he has now received telephony from 2KT, 5DT, 2PX, 5IC, 5TR, 6NH, and 5BV.

5QV has worked French 8CJ on telephony, which 8CJ reported as being very clear.

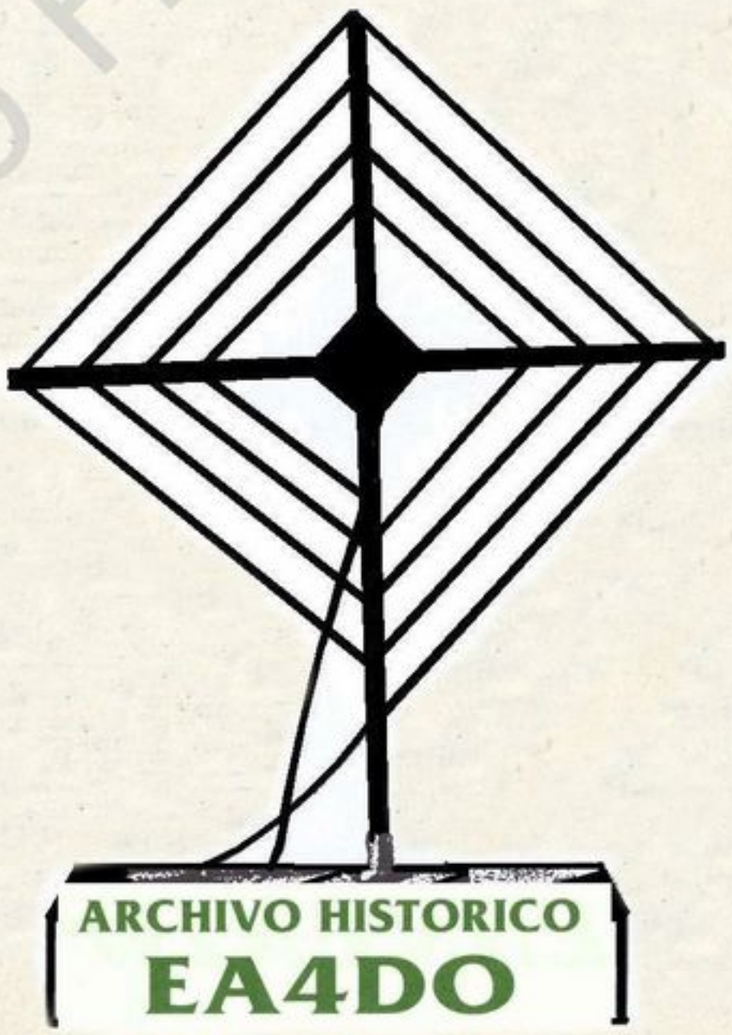
M. Alphonse Boutié, of Ain Tedèles, Algiers, has received signals from a number of British stations. I have not the full list at present, but it includes 2JF, 5KO, 6RY, 2NM, and 5BV.

Now, just at the end, so that the shock you get on reading it won't matter, I will mention the ambition which is forming in the minds of several of our men, and that is direct transmission to Australia. It sounds pretty hopeless at first, but consider the facts. When we first started up on 200 metres it took us about a year to realise its possibilities, and nearly two years to do any useful DX. Yet within a month or so of "discovering" the shorter wave-lengths we are working regularly with Americans and Canadians, at ranges up to 5,000 miles. Then why, as we get more knowledge of the short waves, which we are rapidly doing, should we not increase the 5,000 miles to 12,000? 2KF and I have now met two of the Australian transmitters, and from their accounts it appears that they are blessed with splendid conditions. The foremost of their transmitters, Mr. McClurken, has worked with New Zealand, 1,100 miles, on 250 metres, with an input of ·004 of a watt!

If they can do that, then I prophecy that they will hear us within two years. But if European amateurs do get through to the Antipodes, let us see to it that the British stations do it first.

Apart from direct work, we are fixing up a relay to Australia through the United States and Honolulu. All the individual links in the chain are working, that between Honolulu and Australia being the weakest, and it is only a question of whether we can connect up before the season this side gets too late. We do not yet know whether we shall be able to keep up communication with America during the summer, but we hope for the best. After all, we first connected with France and Holland during winter months, but kept it up ever since, so why not America?

It is, at any rate, sure that we who are concerned with DX are having the most interesting time we have ever had before, or are likely to have again.



Dutch Amateur Transatlantic Tests.

By a Dutch Correspondent.

An examination of Dutch methods shows that the circuits employed, both for reception and transmission, vary considerably from our own. Below one of our Dutch correspondents summarises their work in the recent Transatlantic Tests.

DURING these trans-Atlantic tests, too, transmitting had not yet been permitted to the Dutch amateurs, and most of us were only allowed to listen for our English and French colleagues. Only to the Dutch station PA9 was an official licence awarded. This station belonged to the Technical High School at Delft, and had an input of 500 watts.

The amateurs who possessed a transmitter, however, did not mind this prohibition, and all risked trying to bridge over the ocean, except station oMX, who had a call after some days of testing of an official of the telegraph service and a detective. He was compelled to give up his A.R.R.L. testing, and only to listen for his colleagues, a very grievous thing for a thorough amateur.

Of the Dutch amateurs the stations PCII, PA9, PAR14, oDV, oAR and oYS were the principal transmitters, of which PCII, PA9, PAR14 and oDV had good results, while till this moment it is not yet known whether the stations oYS, oMX, oFN and oAR bridged the ocean or not.

We will give now some descriptions of

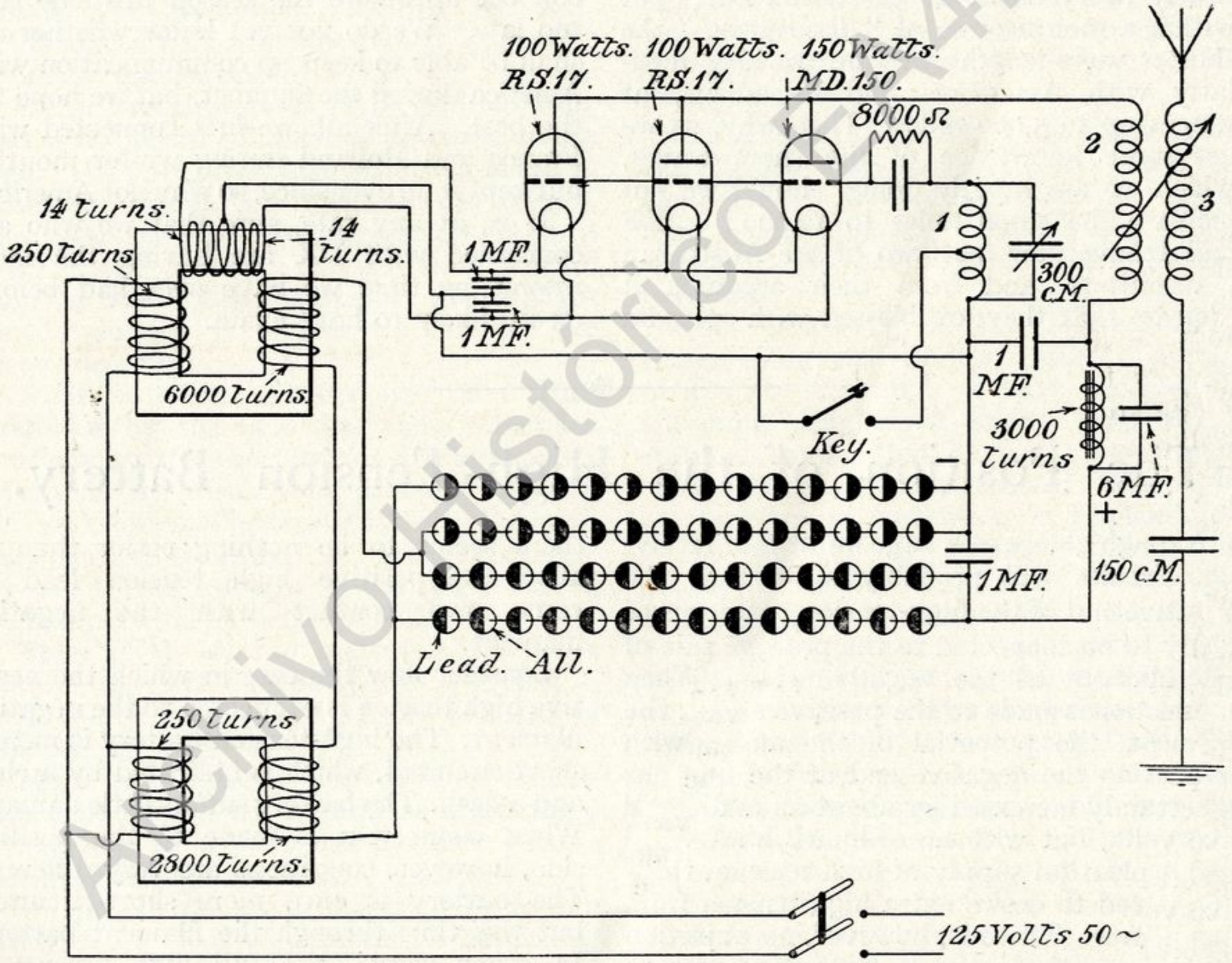


Fig. 1a.—The transmission circuit employed by PCII.

some Dutch transmitting stations which got success, especially on a wave-length of 100–130 metres. Their attention having been drawn to results of French 8AB, which worked very successfully with American 1MO and 1XAM on 135 metres, and, after this, the success of English 2KF, the Dutch amateurs also lowered their wave-length from 200 metres to 100–130 metres, with the result that the most of them had less antenna current, but with the advantage that the well-known fading effect almost disappeared and that their radiation was better.

Station PCII was the first Dutch station on 112 metres, and succeeded in working with American 2AGB for two hours in the morning of December 28. In the beginning PCII worked on 200 metres with one 150-watt "Mullard" transmitting valve, with 3·5 amps. in aerial. After lowering his wave to 112 metres, the aerial current was only 1·6 amps. For all that, he was reported with this antenna energy. After this result PCII increased his transmitter by a second 1,500-volt transformer, and raised the solution of his electrolytic rectifier (ammon. phosph.) from 7 to 12 per cent. Parallel with the "Mullard" of 150 watts two 100-watt valves ("Telefunken") were placed so that the total input was about 350 watts, with 2,100 volts on the plate and 2·75 amps. in

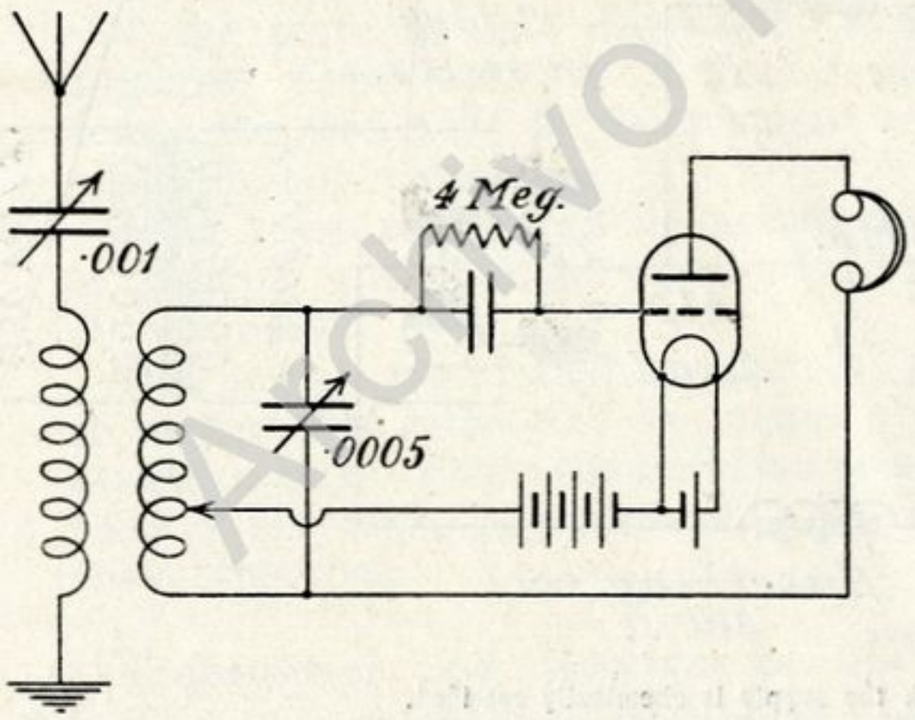


Fig. 1b.—Receiving circuit used by oAR.

aerial. The plate circuit is inductively coupled with the aerial; this was done to prevent variations of wave-length by swinging the antenna (Fig. 1a).

The aerial of PCII consists of four wires, 21 metres long, one end attached to a pole 21 metres high, the other end to the roof of his house. Below the aerial is a counterpoise of five fan-shaped spread wires, 4 metres above the ground.

On December 28, 0400 G.M.T., PCII got the first connection with 2AGB, who had

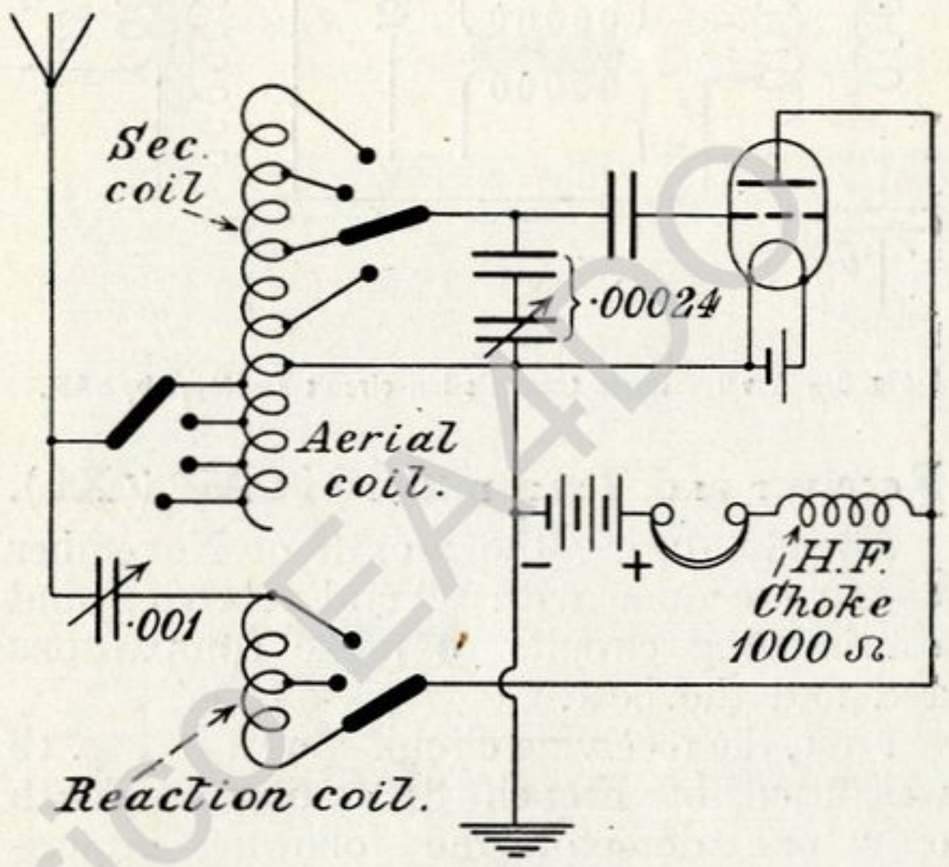


Fig. 2.—A modified form of Reinartz receiver.

900 watts input and 4 amps. aerial current. After some testing PCII delivered a message from the Dutch Radio Society, containing greetings to the A.R.R.L. The signals of 2AGB were strength 6 on one detector and a two-valve low-frequency amplifier. On December 29, 0450 G.M.T., 2AGB called PCII and gave qsa, but qrm qsu half hour cu half hour, 0533 G.M.T.; 2AGB gave still qrm, pse qsu few minutes more vy sri om. At 0550 G.M.T. 2AGB gave, after calling: qrm very bad, will come back to-morrow. At 0637 G.M.T. 2AGB called PCII: This is all right nw, qst fb. k. After this they had connection till 0715 G.M.T. On December 30 tests with C1BQ, but strength of signals too weak at break of day

Fig. 1a shows the transmitting circuit of PCII. Coil 1 is the grid coil, consisting of ten turns on a coil of 20 cm. size. It is not necessary to couple this grid-coil with the plate-coil.

Coil 2 is the plate-coil, nineteen turns on a coil of 18 cm. size, and coupled with the antenna-coil 1, of $3\frac{1}{2}$ turns, wound on a coil of 13 cm. size. Keying is accomplished by shorting some of the grid-coil.

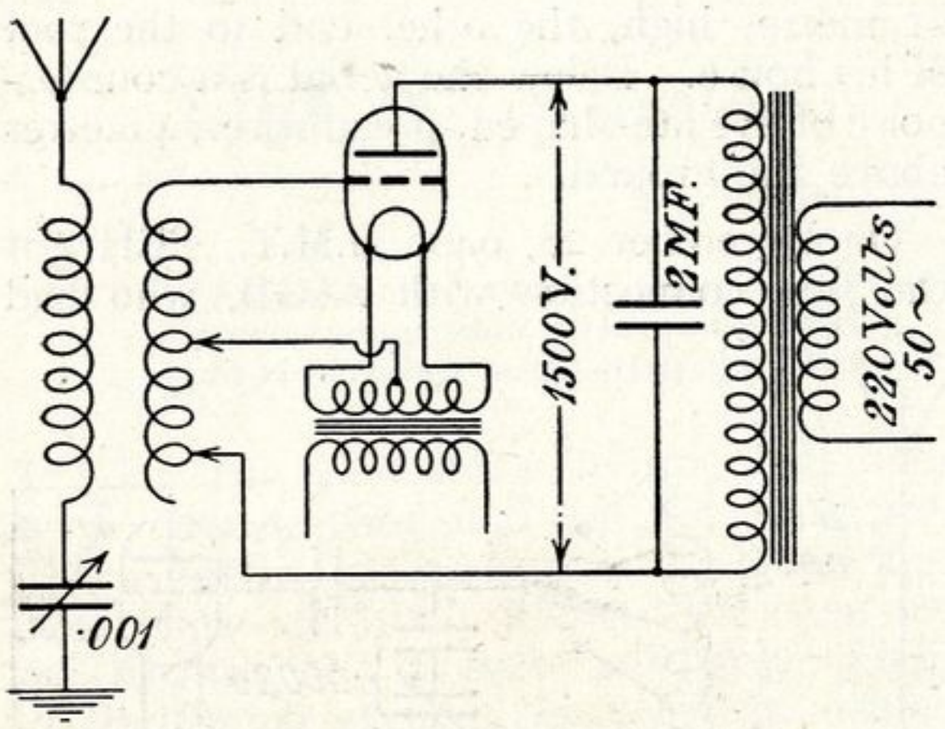


Fig. 3.—A very simple transmission circuit employed by 0AR.

Receiver and Transmitter of 0AR (0XL).

Already during the month of November tests were done with several receiving and transmitting circuits to make comparisons and find the best.

First, the receiving circuit shown in Fig. 1b was used of French 8BV origin :—With only one detector the following American amateurs were heard : 1ANA, 1CDU, 1AW, 2BD (very qsa), 1BWJ, 2BSC, 1BCF, 8SZ, 1BLN, 1WL, 8CDC, 2BQH (qsa), 2WA, 8CKO, 3MO and 2CXL.

Generally, a counterpoise was used some metres above the roof. This slightly corrected the reception, because the local qrn decreased and at the same time a sharp aerial tuning was obtained. During the transatlantic tests a Reinartz receiver was mounted, with this difference—that the inductance was not a basket coil, but a common cylindrical coil (Fig. 2). The size and length of this coil is about 8 cm. The coil is vertically mounted in the set, and is wound with 3×15 turns for the plate circuit, 5×1 turns for the aerial, and 65 turns for the grid circuit, tapped at 16, 24, 34, 46 and 65 turns. The plate- and grid-coil are wound in two layers, the so-called "bank-wound." The wire used was litz wire, about 0·8 mm. size.

Maximum wave can be lowered by bridging the non-used part of the grid-coil, and as long as the bridged coil is not tuned on the wave on which one wishes to receive one will not be troubled by it.

The smoothing-coil is made of copper wire, 0·07 mm. size, and to a total resistance of about 1,000 ohms.

In series with the secondary condenser of 600 cm. a condenser of 400 cm. is placed, by which the maximum capacity of the secondary condenser is about 240 cm. This is of great importance for receiving very short wave-lengths.

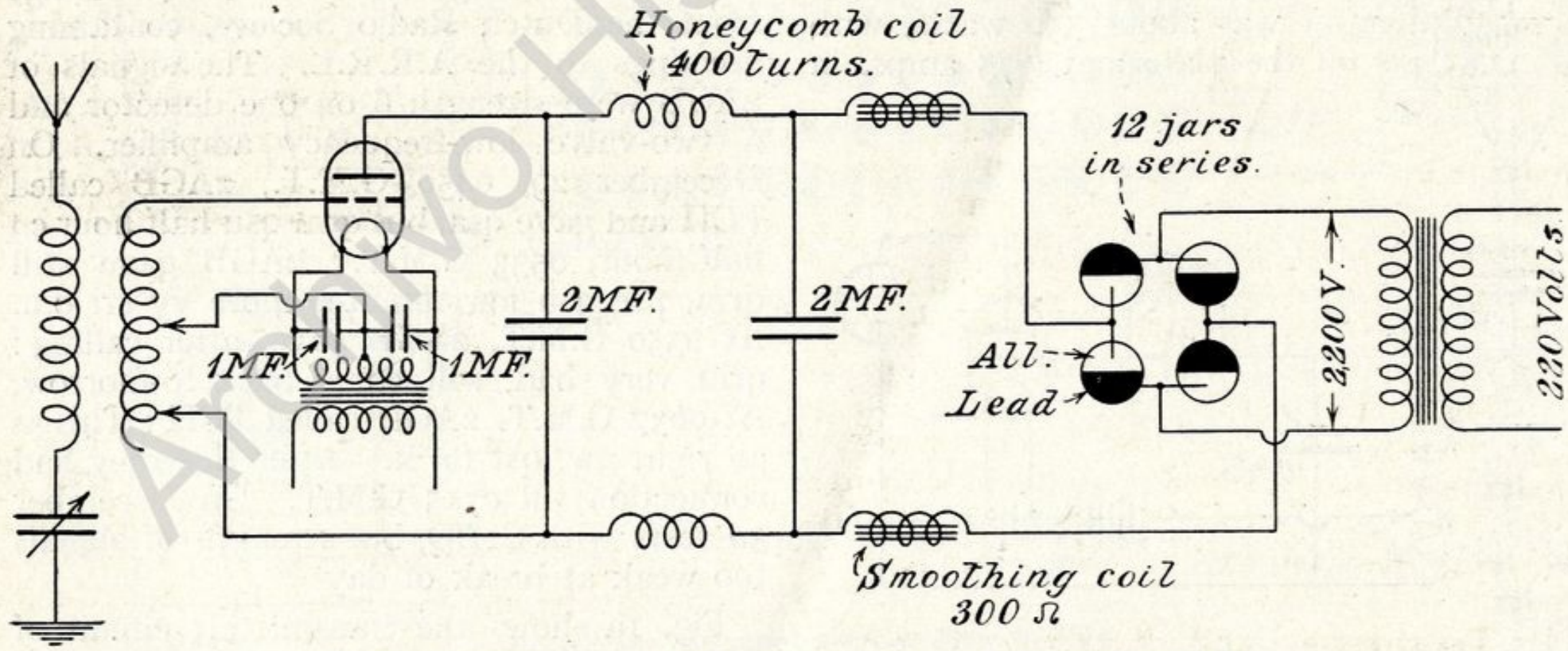


Fig. 4.—A modified form of Fig. 2 in which the supply is chemically rectified.

The primary coil of this circuit had twenty-four turns, while the secondary coil had forty turns litz wire wound on a coil of 8 cm. size. The strength of the signals with this circuit was very good, but tuning was difficult, as the aerial coupling had an influence on the oscillation of the valve.

With this receiver and one detector 0AR heard the following American amateurs on the morning of December 2 :—1BEP, 1XAM (on 100 metres very qsa), 2AWF, 8NB,

8CKN, 8CEI, 1CMP (calling French 8AB), 2RK (qsa), 1XM (on 100 metres very qsa), 2BD, 9VM and 9AN.

For transmission 0AR (a combination of three amateurs) used the following circuit (Fig. 3). The primary coil had 25 turns, wound on a coil of 12 cm. size. The grid-coil had 25 turns, wound on the same coil of 12 cm. size. The high tension used for the plate was full alternating current, without any rectifying. With three 10–20-watt valves ("Telefunken") an aerial current was obtained of 2·5 amps. on a wave of 210 metres.

The note was very bad because of the terrible "hum" of the alternating current, so that 0AR looked for a rectifying method. Some days before the trans-Atlantic tests the following corrections were made (Fig. 4): The primary coil and the grid-coil were changed into ebonite crosses, round which concentric hoop copper was wound. The two coils were fixed on hinges so that the exact coupling was easily found. The high tension of 1,500 volts was changed into 2,200 volts and rectified by an electrolytic rectifier (ammon. phosph. 10 per cent. solution), making use of the so-called "Grætsche circuit," to rectify the two phases of the alternative current.

Two high-frequency chokes were placed in the high-tension leads. The chokes were common honeycomb coils of 400 turns. By this the plate current decreased 50 milli-amperes. Condensers of 1 mfd., placed across the two halfs of the filament turns, made the note clearer.

After these corrections an aerial current of 2 amps. was obtained on a wave-length of 130 metres.

The aerial used was 20 metres long, 16 metres above the roof by means of two wooden masts. Below the aerial is a counter-poise of six wires, 25 metres long, 2 metres above the roof.

Transmitter and Receiver of oDV.

Fig. 5 shows the old transmitter of 5 watts, with which the first results were obtained. The high-tension transformer is on the table in a tin-lined iron box, filled with oil. Against the wall we see the unmounted 5-watt valve, the transmitting spider-web coils, and fila-ment-plate and aerial-current ammeter. Near the transformer is the high-tension con-denser of 2 mfd. The transmitter is visible mounted, as shown in the photo. All parts were made by himself, except the valves and ammeters. . The antenna was a cage-aerial, 30 metres long and 16 metres high. A counterpoise was used of five wires and 50 metres long, which was used together with the common water-pipe earth.

Some days before the beginning of the tests the transmitter was fitted out with

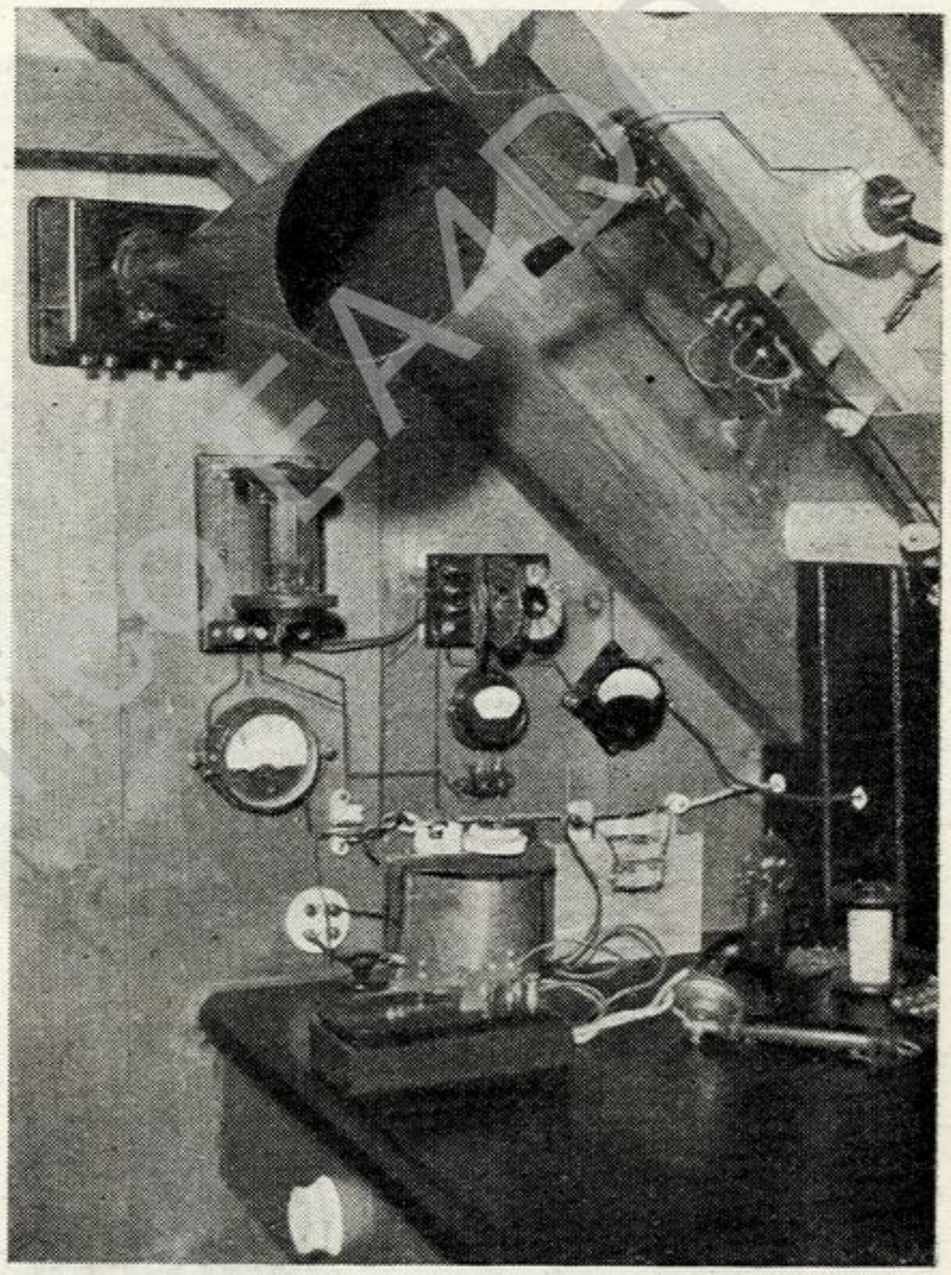


Fig. 5.—The original transmitter at oDV.

two 10–20-watt valves, and a new high-tension transformer was built.

To get a shorter way of his aerial to his transmitter the whole transmitter was re-moved to another corner of the room and was mounted there in haste, because it was one day before the tests (Fig. 6). To get the 100-metre wave the aerial must be shortened to a length of 12 metres and the counterpoise kept at a length of 50 metres. Especially the shortening of the aerial was accompanied with great trouble, in a very severe frost and snowstorm, during the A.R.R.L. days.

Fig. 6 shows the transmitter with which oDV bridged the ocean. To the right of

the photo, mounted against a chimney, is a ring-transformer, primary 220 volts, secondary 12 volts 10 amps. for filament of the transmitting valves and 2 volts 15 amps. for filament of a neon gas-rectifier valve. This valve is visible below the ring-transformer, and can be used for two-way rectifying, maximum 3,000 volts and 300 milliamps. Owing to this valve being so very short-lived (25 hours), oDV only used this neon valve for long-distance work.

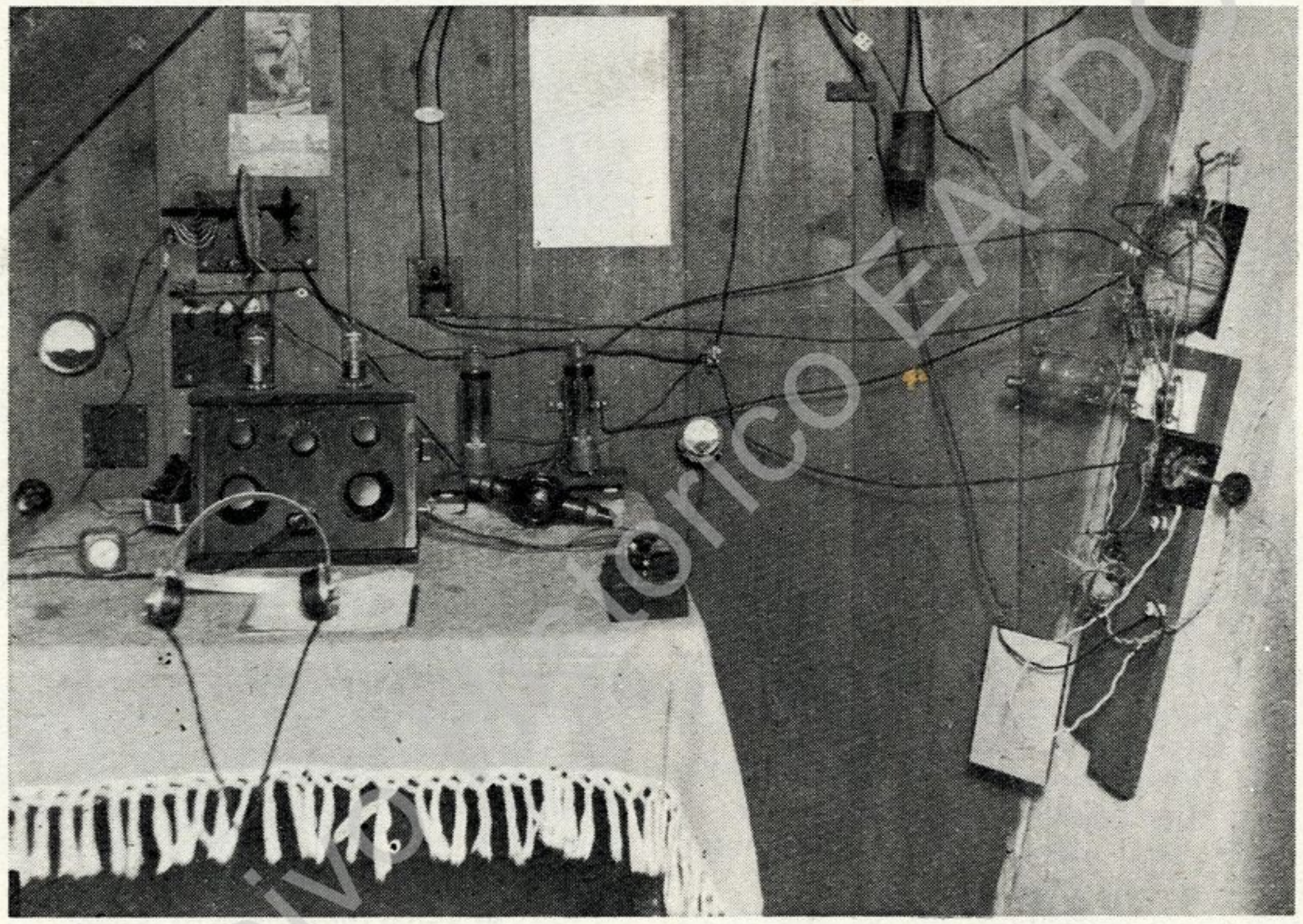


Fig. 6.—The rearranged transmitter at oDV which resulted in a much shorter aerial lead.

Below the neon valve is the "power switch," which varied the number of turns of the filament transformer in series with the high-tension transformer. This high-tension transformer is not visible in this photo, and is hung up in a wardrobe to deaden the buzzing of the transformer when it works with its full power. This transformer gives 2×2,300 volts, and is wound in segments, with wire of 0·3 mm. size. Below the "power switch" is a smoothing coil with a 2 mfd. high-tension condenser. Look at the other smoothing-coil, mounted in an old chocolate box and hanging up free above the floor!

Above the table we see the transmission coils and the filament ammeter, and on the table the two transmitting valves and a "Philips" rectifier valve of 100 milliamps.

Fig. 7 gives the transmitting circuit of oDV. The coils have been wound concentrically. Coil 1 has six turns and coil 2 has eight turns, both of 2·5 mm. wire size; coil 3 has twelve turns, wire size 1 mm. The capacity across coil 2 is about 0·0002 mfd. During the tests a radiation was obtained of 1·5–2 amps. on 110–130 metres, with an input of 200 watts. After some nights of testing oDV had the good fortune to be reported by 1KW.

In the beginning oDV had some hard luck with his high-tension condensers, and lost three of them. Being afraid that he would also lose his last one he decreased his high tension to 1,800 volts. Antenna current was then 1·4 amps. Also with this decreased power oDV was reported on other nights.

For receiving the circuit shown in Fig. 8 was used, with a reaction circuit like the "Reinartz."

The primary, secondary and reaction coils

are wound like spider-web coils, and are built in the set. The regulating of these coils is done at the side of the set. The primary coil has seven turns, secondary coil ten turns, and reaction coil has fifteen turns for reception of 80–250 metre waves. A two-grid valve, "Siemens-Schottky," with 12-volt plate tension, was used. Most American amateurs and American broadcasting stations were very good on one valve.

Finally, some news about station oYS. The same transmission circuit was used as described already in the November issue of EXPERIMENTAL WIRELESS, Fig. 8.

With two 10–20-watt valves and a common water-pipe earth he had an aerial current of 1·4 amps., while using a counterpoise and the same transmitter an aerial current of 2·5 amps. was obtained.

The aerial of 24 metres was too long—the lowest wave was 140 metres—but there was no time before the tests to shorten his aerial. Till this moment there has been no report as to whether oYS had any results with his testing.

For receiving a kind of "Reinartz" receiver was used (Fig. 9). The inductance is wound in one piece, with one tap about in the middle. No special manner was used to wind this inductance. The turns are laid in a small hollow wooden plank, 60 × 65 mm. The hollow is covered by means of a second little plank.

For waves of 100–250 metres the best result was obtained when about eight turns were used for the part *a* and about fifteen turns for the part *b*.

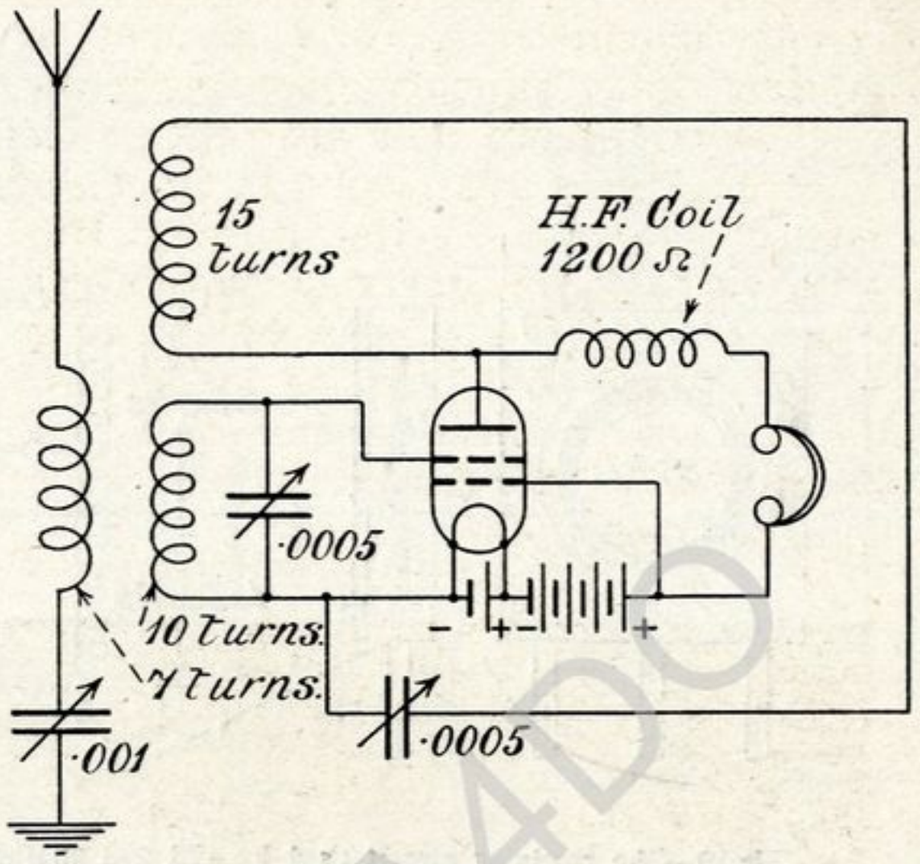


Fig. 8—A four electrode valve receiving set.

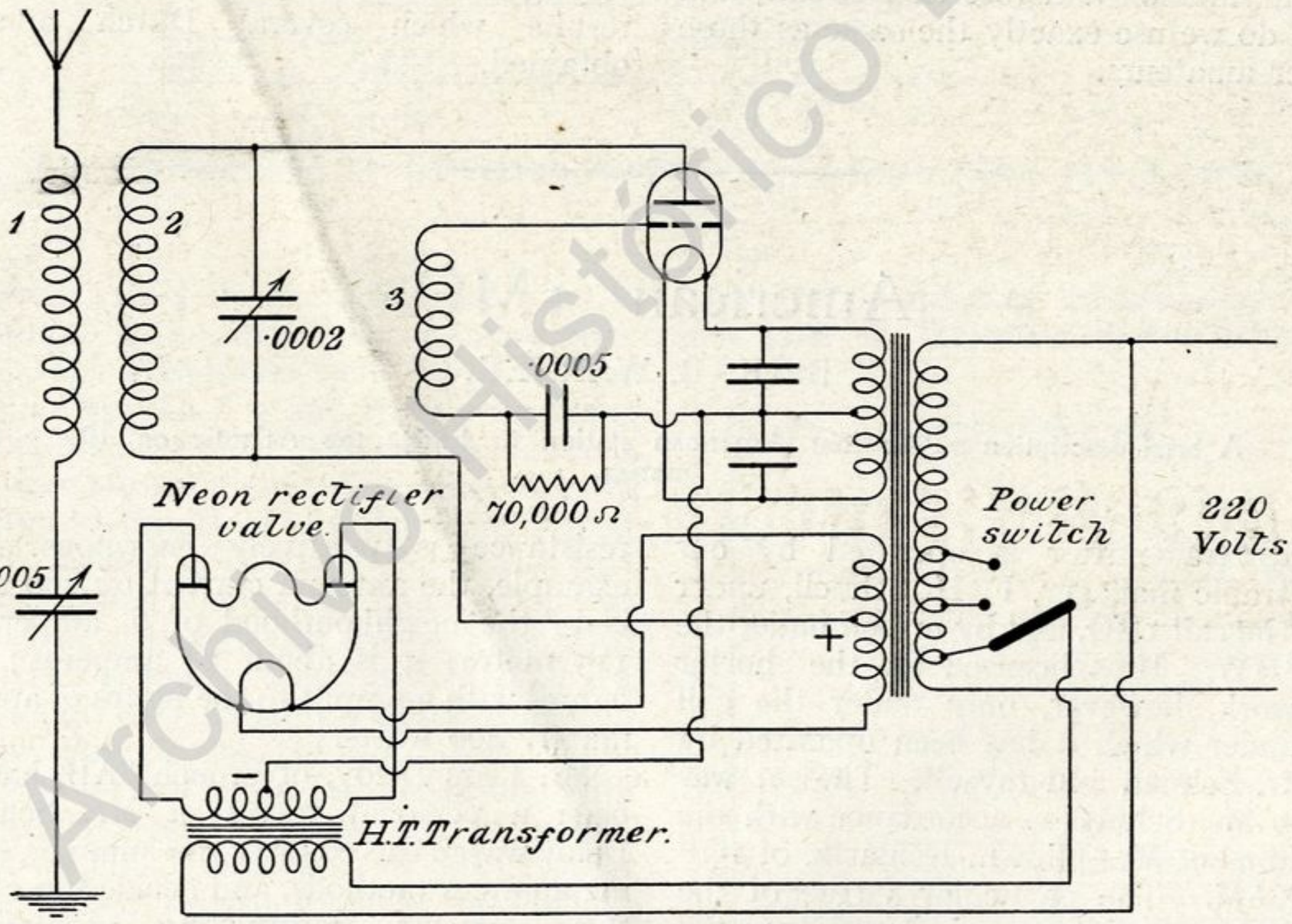


Fig. 7.—The supply to the anode at oDV was rectified by a special neon tube as shown above.

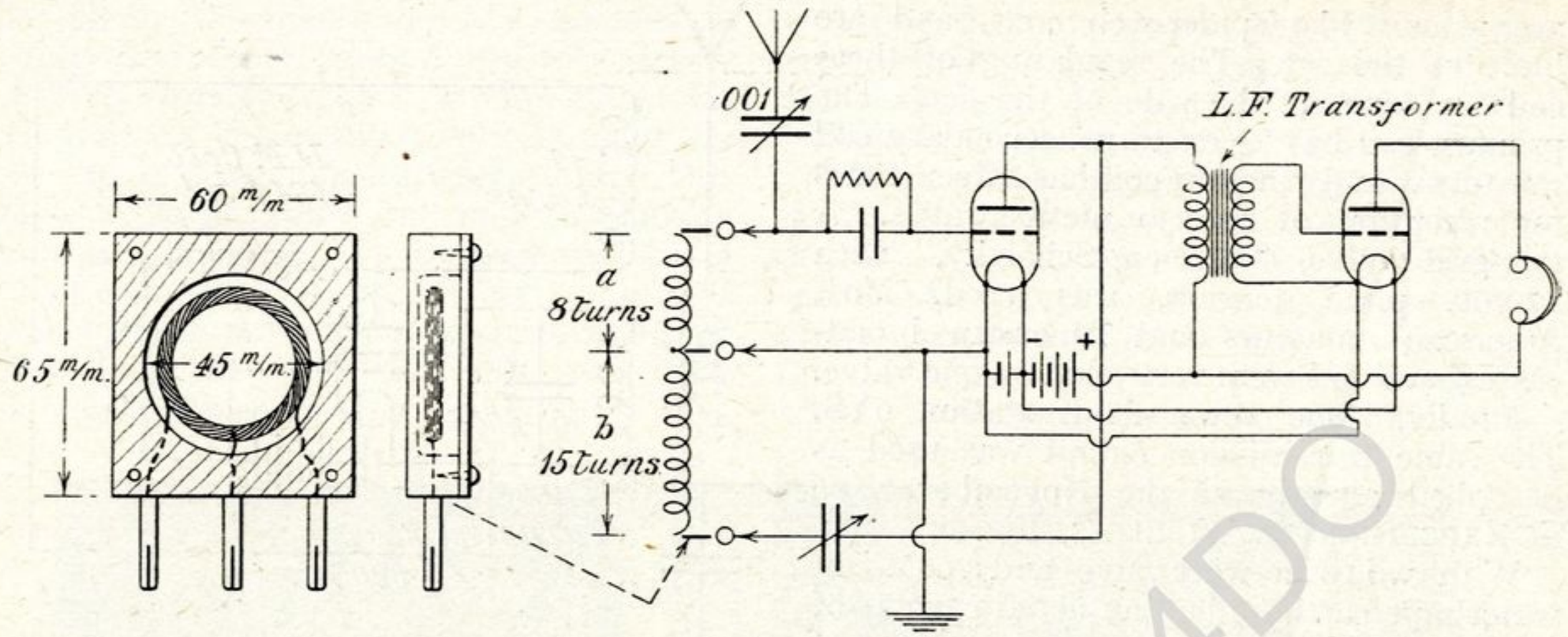


Fig. 9—The receiving circuit used by oYS was another modified form of Reinartz receiver with one stage of low frequency amplification.

As we see, most Dutch amateurs use their own transmission and receiving circuit, and seldom do we use exactly the same as those of other amateurs.

When we look back to the past days of testing we may be very content with the results which several Dutch amateurs obtained.

American 1MO.

BY K. B. WARNER.

A brief description of the first American station to bridge the Atlantic on 100 metres.

THIS transmitter is operated by our traffic manager, F. H. Schnell, under the call 1MO, and by myself under the call 1BHW. It is licensed for the shorter wave work, however, only under the call 1MO, under which it has been operated by both Mr. Schnell and myself. The set was built by Mr. Schnell in accordance with the suggestions of Mr. John L. Reinartz, of 1QP and 1XAM. The particular virtue of the circuit lies in its ability to shift rapidly wave-lengths, and yet maintain the node in a fixed position.

Briefly described, the circuit is a full-wave self-rectifying circuit, with two UV203A tubes on each half of the cycle. Whatever unusual merit it may possess as a transmitting arrangement probably lies in its ability to work well below the fundamental of the antenna, in the region where the radiation resistance is relatively enormous. For example, the antenna current on 200 metres is in the neighbourhood of 6 amperes, at 115 metres it is about $2\frac{1}{4}$ amperes; these figures with an input to the plates of approximately 400 watts.

Mr. Leon Deloy, of French 8AB, has long been a personal friend of Mr. Schnell's. Deloy was in this country this summer, studying amateur methods, and decided to employ this Reinartz transmitting arrangement. Returning home, he installed it, and upon completion wired the traffic manager that he would start transmitting on the Sunday night before Thanksgiving. Schnell hurriedly wound a few coils for a crudely made short wave receiver of the tickler feedback type, and was listening on 100 metres at the appointed time. Deloy was received quite splendidly—with two-step audio amplifier

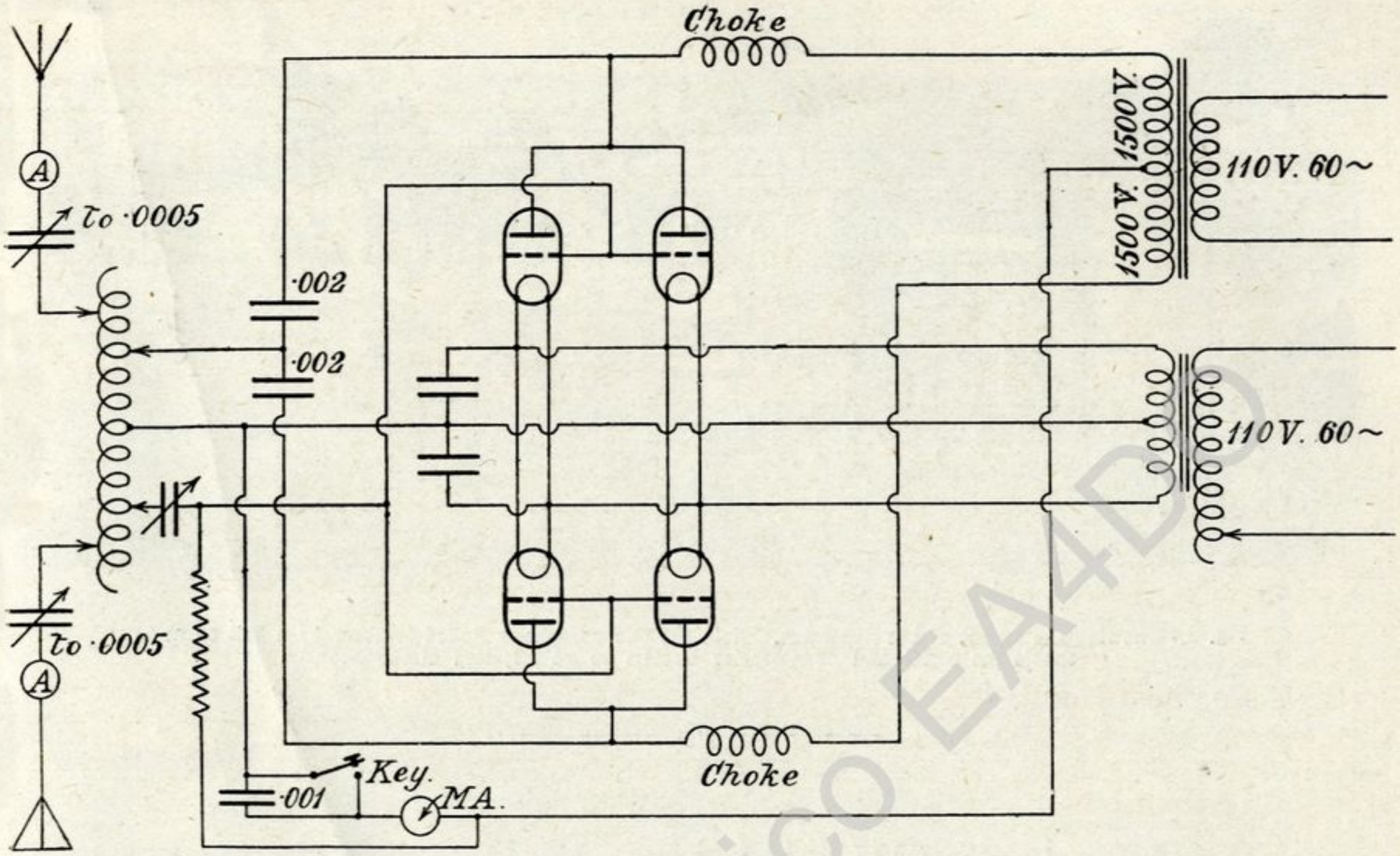


Fig. 1.—The circuit used at 1MO is a full-wave self-rectifying circuit employing UV203A valves in parallel.

his signals could be heard 25 feet from a phonograph horn carrying an ordinary telephone. His broadcasts were copied on the nights of November 25 and 26. By the night of November 27 Mr. Schnell had secured permission from the Radio Supervisor to use the wave-length of 115 metres, and upon the conclusion of Deloy's broadcast that night he called him and communication was established. Since then it has been accepted as a matter of course. Deloy is worked almost every night, and probably a dozen American stations have connected with him. His signals have been heard far inland, and with very good audibility. On the night of December 7, at the conclusion of our regular schedule with French 8AB, he assisted in connecting me with British 2KF, of London, whom I worked for a matter of several hours, stopping only at 8.40 British time when the signals of 2KF finally faded out here. I have worked 2KF a total of five times. On the night of December 11, at the conclusion of correspondence with him, he asked me to listen for British 2SH, our mutual friend Hogg, and I am happy to say that I connected up with him, too, for a period of about two hours and ten minutes. I had a schedule with him later in the week, but unfortunately

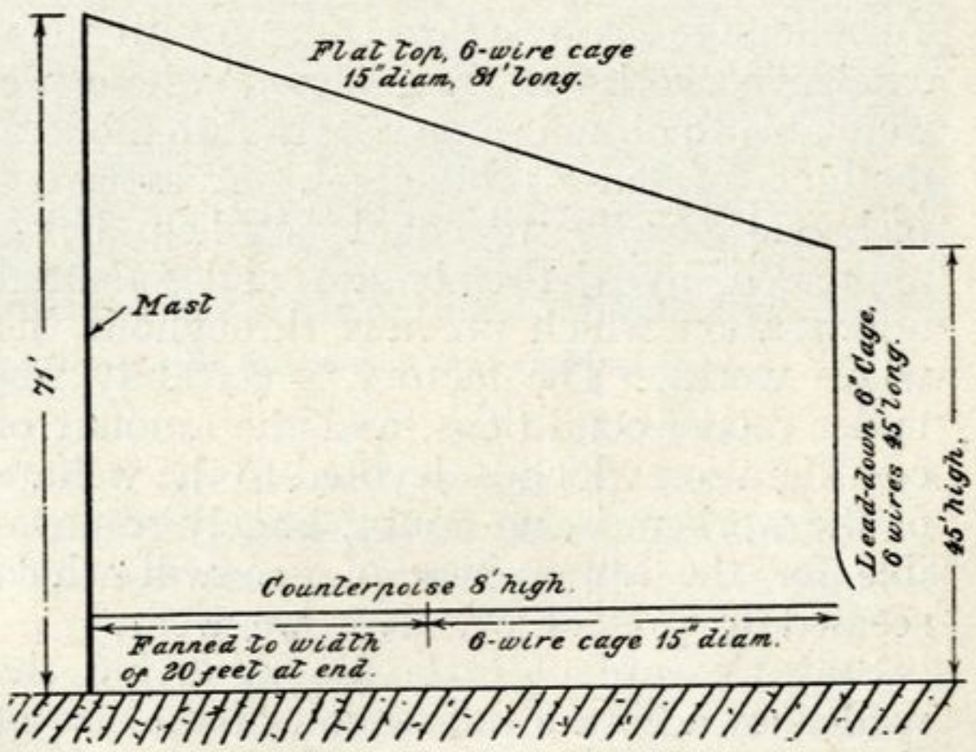


Fig. 2.—The aerial and counterpoise system at 1MO.

could not hear him. On the night of December 15, at the conclusion of correspondence with French 8AB, he connected me up with French 8BF, our fourth European correspondent, with whom I talked for over half an hour.

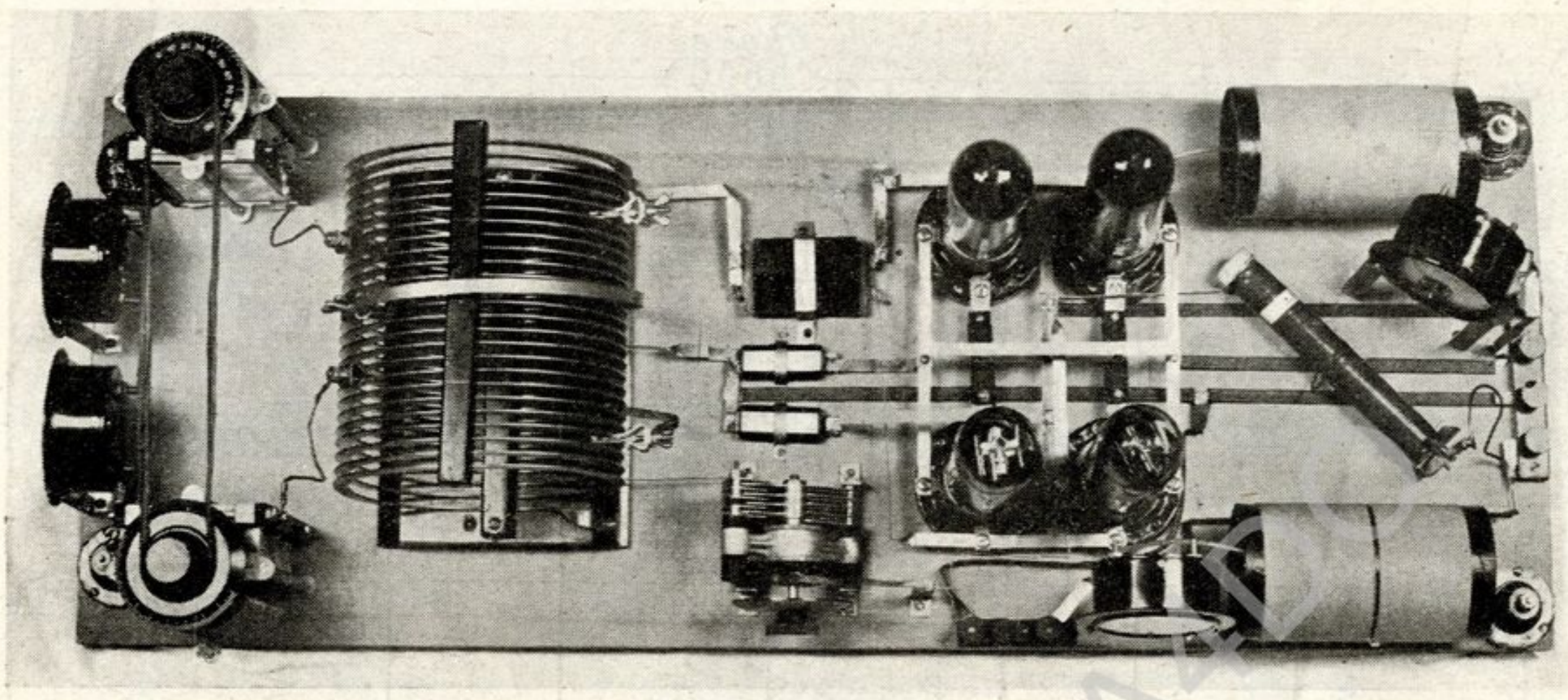
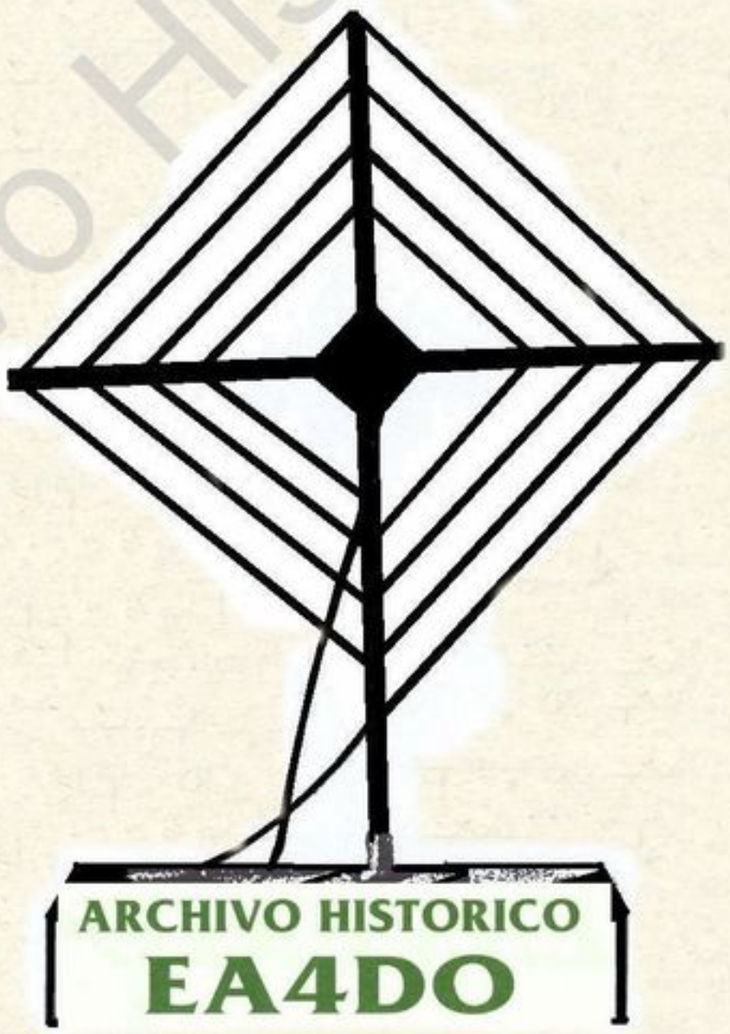


Fig. 3.—Showing the layout of the apparatus. Note the two condensers linked together by a belt so as to enable the aerial and counterpoise circuits to be adjusted simultaneously.



The Transatlantic "PA9."

By K. C. VAN RYN.

We give below some details of the Dutch Station PA9, which was specially licensed for the recent transatlantic tests.

BRITISH experimenters will have noticed the appearance of the Dutch short-wave station PA9 since the commencement of the transatlantic amateur tests.

As you are aware, transmission is not yet permitted in Holland. Nevertheless, steps have been taken by the writer since May, 1923, to obtain permission from the Government for a transmitter for the object of testing on very small wave-lengths. After much trouble, permission has been granted to use the licence of the Technical University of Delft (Holland) from October, 1923, to May, 1924. At the end of November last the writer, in co-operation with Mr. G. T. Eschauzier, planned to erect the station, both being students of the University.

The time for preparation was short, as the necessary components were not available until December 15. On December 17 we commenced assembling them, and on the 19th the first radiation took place. On December 22 at 1 G.M.T. (prompt) we started the automatic code relay, radiating 75 watts (2·5 amps.) on a wave-length of 195 metres.

At that time the set was comprised of nothing in particular. The "tickler coil" circuit was used fed at the filament side of the plate circuit. After a few days it rendered about 60 per cent. The plate current supply was 50 periods single rectified alternating current. The generator valve was a Phillips' 25, and the rectifiers (two in parallel) Phillips ZG5 tubes. On the fourth day of the tests a telegram was received stating that PA9 had been heard on the first three nights.

Noticing the success in using very short wave-lengths, and the fact that many American amateurs were heard on them, we decided to turn to a shorter wave-length. Therefore, on December 31 we changed to 108 metres, using an entirely different circuit. Two days later we succeeded in communicat-

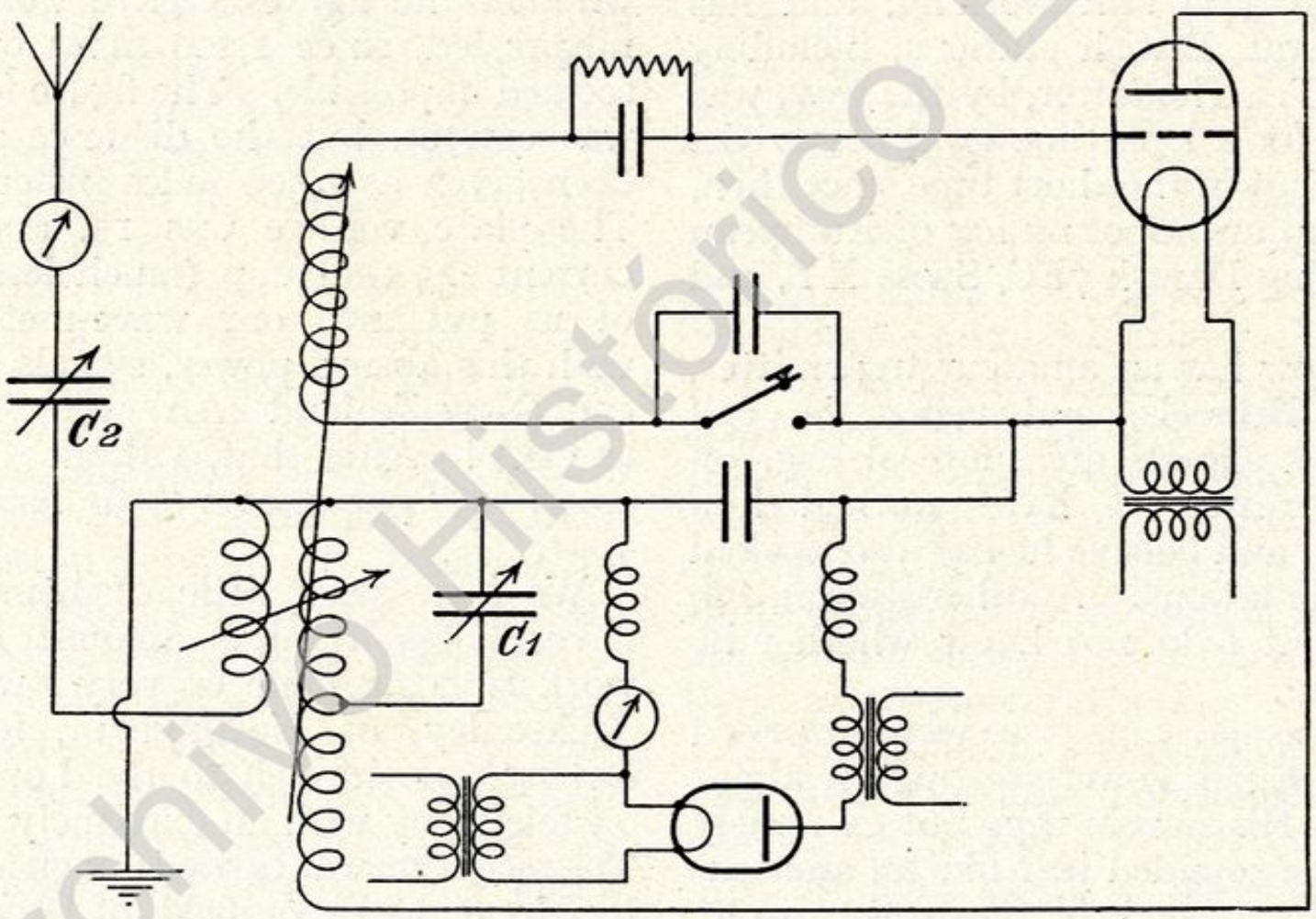


Fig. 1.—Showing the arrangement of the circuit employed, which, no doubt, is quite familiar.

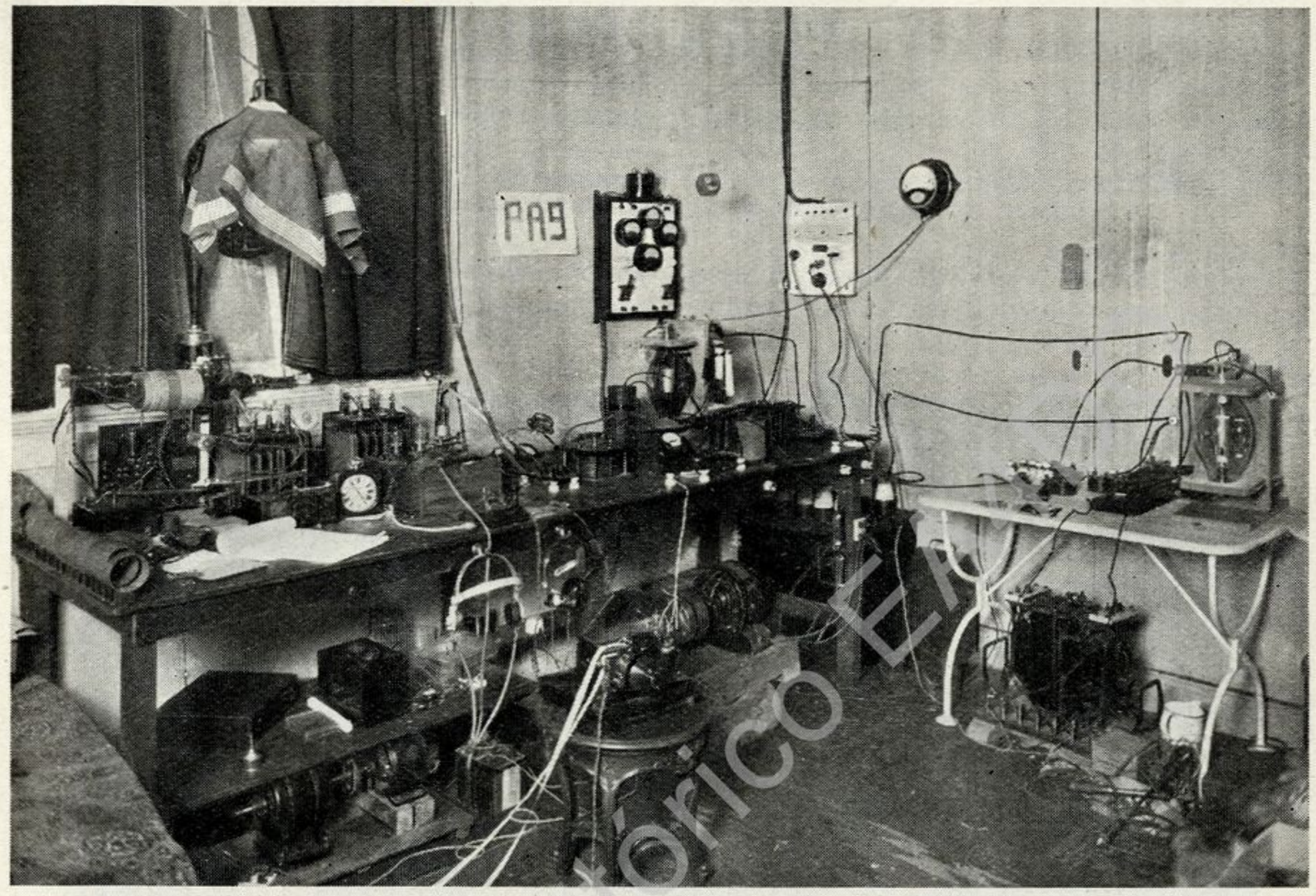


Fig. 2.—A general view of the apparatus which was rapidly arranged for the tests.

ing with U2AGC and U1XW, and since then we have maintained an almost daily communication, the total aerial energy being about 350 watts.

Primarily we started to tune the same circuit down to 100 watts, taking away each dead end which proved absolutely necessary, but the adjustments became too critical, and could not be relied upon. Changes were constantly taking place, the origin of which could not be overlooked. It should be remembered here that the Phillips valve works in the lower bend of its curve, so as to increase the efficiency, and this also made adjustment more difficult. We decided, therefore, to turn our attention to the circuit recommended in the October number of *Q.S.T.* by Messrs. Brown, Darne and Basim (3BNT), and found it much more flexible in operation. Here is the circuit changed in detail for the particular power supply. The condenser C is the only component that fixes the wave-length and the capacity should not be taken very small. In this particular case the capacity of C2 became rather small. The fundamental wave-length of the aerial being 207, it had a value of 60—70.

At the time of writing the first part of the transatlantic tests have been concluded, and we are looking forward to the communication tests. As already stated, we had the opportunity of working a number of stations of the first and second districts, and signals were always reported QSA (time mostly 0600-0820). Fading was scarcely noticed, and never as bad as on 200 metres. It will be interesting to note the results when a larger stretch of land is interposed.

It is intended to diminish the wave-length still more, and we expect to change to about 60 metres very soon.

Finally, I wish to state that we are quite prepared and willing to conduct serious tests in this direction, with any experimenters, especially those at long distances from Holland, and should be glad if they would communicate for this purpose with the writer at the address given.

The Month's "DX."

GENERAL REPORT, BY HUGH N. RYAN (5BV).

SINCE writing last month's notes the inevitable has, of course, happened. The annual curiosity which passes in this country for spring has come upon us, to the usual accompaniment of loss of signal strength. Transatlantic work has become increasingly difficult, and for long periods American signals disappeared altogether, and those of us who had prophesied "Yank signals right through the summer" on the short waves began to feel a bit doubtful. But, bad as things have been at times, a somewhat spasmodic touch with the "other side" has been maintained. We have just passed through such a period of extraordinary advance in British "DX," consequent upon the "discovery" of the virtues of the waves around 100 metres, that we have all become somewhat blasé. But consider for a moment to-day's doings in the light of last year's experience. What should we have said last year to the idea of working two-way with America, on low power, half way through May? We never expected even to receive American signals later than February or March, and two-way working in May is really a great achievement. I firmly believe, as does our "Northern Manager," 5JX, that we can keep up some sort of touch across the "Pond" right through the summer, if we try.

Of course the summer provides many counter-attractions to Radio, but "please, gang," as the Yanks say, give a little time to it occasionally and try to keep the work going right through the summer. It will be a great achievement if we can do it, so it's worth working for.

No very startling work has been done during the past month by the higher-powered stations. All of them have added to their "bag" of Americans during their work, but their maximum range has not increased. The less powerful stations, on the other hand, have been doing some very good work, many of them "getting over" on very low powers. Just too late for last month's notes I heard that 2GO (London) had been logged by 3CJY (Washington), input power being under 10 watts. Though London had every other district "beat hollow" in the pioneer work with America and Canada, and in the subsequent high-power working, the later low-power work has been almost

monopolised by the North. 5OT, 2PC, 2NO and 5JX have all been heard in America on powers below 20 watts.

Apart from Transatlantic work, very little of interest has happened. The Italians have been doing good work, 1MT having now bridged the Atlantic, and 1MT, 1ER and ACD having worked a number of very low-power British stations. 1ER is now heard regularly and very strongly in Britain.

Of the Danes, 7ZM is leaving Radio alone for a while owing to examinations. 7QF has packed up for the summer (though I doubt if he can keep off it that long ! !) and so the whole of the work falls on 7EC, whose signal strength seems to have risen to the occasion. His signals are very strong both on 200 and 120 metres, and he should soon reach America on the latter wave. By the way, I succeeded in relaying what was, I think, the first message from Denmark to America with the co-operation of 7EC. He suggested the attempt on May 9, and I told him that transatlantic conditions were very bad, but he gave me a test message and I was fortunately able to pass it on to American 1XAH within twenty-four hours. Danish experimental messages have been passed to America before, but they have come to England by post, and this was, I think, the first to go all the way by Amateur Radio.

At Easter the R.S.G.B. organised a four-day test to determine the range of members' transmitters. The tests were run like the transatlantic tests on a small scale, arrangements being made for listeners in France, Italy, Denmark and other European countries, as well as America and Canada. The tests were primarily for the lower-power stations, and at the end of each night's work a number of the higher-power stations (2KW, 5KO, 5BV, 2WJ, 5JX and others) who could be sure of reaching the various countries collected the reports. These, when published, should be interesting. Last month I suggested that a pure D.C. C.W. note was a very great help in long-distance work, and cited 2KF and 2NM as the only high-power D.C. stations in London. I forgot to mention 5LF, who, though not as powerful as the other two, is one of our higher-powered stations. I mention him now as his results bear out my last month's statement, 4th district American stations being able to receive him and 2KF through QRM and QRN, which blot out our A.C. stations.

We must use D.C. for Australia next winter. Speaking of Australia, in the March notes I spoke of the possibilities of our signals reaching that country, and, in view of the advances we had recently made, I prophesied that we should be working Australian amateurs within two years. I see that the American Radio Relay League Journal *Q.S.T.* has published my prophecy, and the reasons for it. This means that all the American amateurs, and, in fact, "hams" all over the world, since *Q.S.T.* and EXPERIMENTAL WIRELESS are read everywhere, will be expecting us to fulfil this prophecy. So it's up to us British amateurs. Let's do it next winter and make sure.

The MacMillan Arctic Expedition, with its amateur wave-length transmitter (WNP), provided an unusually fine opportunity for "DX," but our hopes have been sadly disappointed. I think many of us felt secretly sure that we should work him, but not only has nobody worked him from this country, but he has only been heard, and that very weakly, once by 5NN, once by 6XG and twice by 6LJ. There is still just a chance, but a very slender one, that someone may be lucky and connect with him, but even in America his signals have been almost inaudible since the beginning of February. I for one must confess to being very disappointed at not connecting with him. There used to be quite a rivalry between 5KO and me, as to which would work him first ! Well, 5KO has at any rate been heard by WNP around Christmas, so I suppose he wins on points !

The American Bureau of Standards, which is in close co-operation with the A.R.R.L, sends out very useful calibration signals for American amateurs, and these signals should be very useful to our men.

The call-sign of the "Bustans," as the Yanks call it, is WWV, and his signals have been heard by 2WJ and Italian ACD.

I cannot conclude without reference to a wonderful world's record, confirmed officially in America. 7ZU (Montana) has been received by 7ZU (Montana), the distance (round the world !) being 25,000 miles. Can any British station beat this ?

eight Americans and Canadians. On one occasion he worked Canadian 1BQ, the latter using telephony most of the time. He has often heard 1BQ working other Canadians on 'phone. 2WJ also uses low power (3 to 10 watts) sometimes, and with this he has worked Danish 7EC and 7QF, and Italian ACD and 1ER. 2GO has reached America once on 8 watts. 5LF, in addition to excellent American work on about 50 watts, has worked all the possible European countries on 4 watts. Italy on 4 watts is, I should think, a record.

2ZT's last power valve has now given up the vacuum, so he is temporarily out of action.

5BT has worked most of the French and Dutch stations on a few watts.

2OD has sent the following summary of his transatlantic work, which is certainly a remarkable achievement :—

RADIO G2OD.
(Up to April 30th).

AMERICAN STATIONS WORKED.

1BBO	2AWF	3XAO	4BY	8AOL	9AZX
1XAK	2AWS	3OT	4XC	8ZAE	
1XJ	2BSC	3YO	4OA	8AVL	
1BDI	2AGB	3CKJ			
1BCF		3BVN			
1XAR		3BG			
1XW		3MB			
1CMP		3BJ			
1IV		3PZ			
1AJA		3ME			
1BSD		3ADB			
1JD					
1AUR					
1BLB					
1BCR	*Total American*				40
1CAK					
1BVL					
1DZ					

CANADIAN STATIONS WORKED.

1BQ	2BN	3BQ	9BL
1DQ	2BE		
1DD			
1AR			
1BV			
1DT	*Total Canadian*		13
1DJ			
1EB			
1EF			

Grand Total of Transatlantic Stations Worked 53

Input.—1,200 volts and 75 milli-amperes=90 watts.

Radiation on 115 *Metres.*—2 amps. (Weston thermo-couple).

Effective Resistance of Aerial at 115 λ.—15 ohms.

Radiation Resistance.—12 ohms.

Transmitter Efficiency.—60 watts in aerial=66 per cent.

Total Efficiency from Input to Energy Radiated.—Useful power radiated=48 watts.

Therefore, total overall efficiency=53 per cent.

One hundred and seventy cards reporting reception of signals from 2OD have been received from America and Canada, including one from 6AJU of California.

That is all the London news to hand. Not a very good show this month, but I'm sure a lot more good work must have been done. Will all London stations please make a point of reporting any "DX" work to 5BV at once, before they forget, and will those regularly engaged in "DX" please send 5BV a report of their month's activities by about the 10th of each month. We must keep up touch with America and Canada through the summer, and London is the district to do it.

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