

MEDDELELSER OM GRØNLAND

UDGIVNE AF

KOMMISSIONEN FOR VIDENSKABELIGE UNDERSØGELSER I GRØNLAND

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DANSK NORDØSTGRØNLANDS EKSPEDITION 1938–39

UDSENDT AF: ALF TROLLE, EBBE MUNCK OG EIGIL KNUTH TIL MINDE OM
DANMARK-EKSPEDITIONEN

LEADERS: EBBE MUNCK AND EIGIL KNUTH

RADIO-TECHNICAL OBSERVATIONS

IN LAT. $76^{\circ}56'1''$ N. AND LONG. $20^{\circ}18'2''$ W.

BY

KURT BÆK

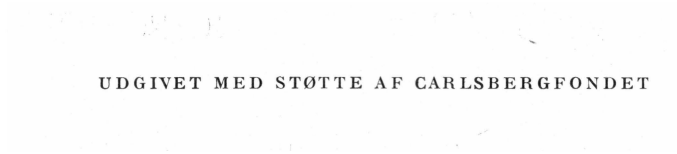
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KØBENHAVN

C. A. REITZELS FORLAG

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1943



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PREFACE

The experience recorded in the following brief paper on the maintenance of wireless communication from Northeast Greenland to stations in other parts of Greenland, Denmark, Norway and Iceland, as well as the waters lying between these countries, was gained in the course of my participation as wireless telegraphist in the "Dansk Nordøstgrønlands Expedition 1938—39", partly on the voyage up to Greenland and especially while at the expedition's winter station in Mørkefjord.

Conditions for both sending and receiving wireless waves seemed to me so interesting and unique that they deserved a description. It is my hope that future expeditions will be able to derive some advantage from my experience and expand it. I feel sure that in the not too distant future a permanent meteorological station will be established in Northeast Greenland, and here again it will be of some value to have a basis of experience to build upon.

I have much pleasure in expressing my warm thanks to the leaders of the Dansk Nordøstgrønlands Expedition, Count EIGIL KNUTH and Mr. EBBE MUNCK, for extending to me the opportunity to be a member of the expedition and thus to be the richer for an unforgettable experience. I would also thank Captain ALF TROLLE who, together with Mr. MUNK and Count KNUTH, launched the expedition by means of a grant from the fund established by him together with his wife Mrs. BERGLIOT TROLLE.

It may be thought that time passes slowly during a winter spent in the inhospitable regions of Northeast Greenland. I did not find it so, partly because everything was so well arranged, and mostly because of the splendid comradeship of the wintering party.

For many pleasant hours at the station and on walks in its vicinity, and for good-fellowship both during and after our sojourn in Greenland I am grateful to the leader of the wintering party, Count EIGIL KNUTH, Dr. PAUL GELTING, Dr. EIGIL NIELSEN, SVEN SØLVER, B. Sc. and the Greenlanders OVE ROSBACK, ELI CHRISTIANSEN and ZAKÆUS SANDGREEN.

I thank Colonel FØRSLEV, Commander in Chief of the Royal Danish Army Air Force, for his accommodating attitude to my request for permission to take part in the expedition, an attitude which made it possible for me to obtain War Office sanction for the necessary leave of absence.

To Mr. POUL WINTHER I am particularly indebted for the care and great skill he exerted when planning and purchasing the expedition's wireless and lighting material. It is due not least to his insight and recognition of what was required for the work that this material came through the test with flying colours.

For their valuable collaboration in Greenland I thank the telegraphists at the stations Eskimonæs and Ellaø, the superintendent at Angmagssalik Radio Station, and the telegraphists SIGBJØRN ÅMODT and JESS TILLIER of the "Norsk-Fransk Polarekspedisjon 1938". My special thanks to Superintendent THORKILD HANSEN at the Scoresbysound Radio Station, through which all our telegram traffic passed, and to the telegraphist and hunter at Hvalrosodden Station, CHRISTIAN JENSEN.

Last, but not least, I am pleased to be able to express my thanks to the men on board the Danish fishing vessels in the Iceland fisheries with whom I had telephone communication evening after evening.

With their frank voices they brought a refreshing change into our lives during the dark period, and by means of their reports on the audibility of my station they helped me to make telephone communication with Blaavandsradio. And finally, let me tender my hearty thanks to the superintendent and telegraphists of Blaavandsradio for the interest and patience they displayed when picking up our distant and faint transmitter in Mørkefjord.

INTRODUCTION

Without doubt the wireless has dispelled much of the romance and the gleam of adventure that once surrounded the arctic expeditions of former days. In those times people at home were long kept without news of the fate and results of expeditions, often for years, and at the same time the members of these expeditions were cut off from all knowledge of developments in the rest of the world.

The advent of the wireless on arctic expeditions has meant a complete upheaval in this respect. No matter how solitary and remote from inhabited parts an expedition may be when in the field, the wireless enables it to receive the latest news from all the countries in the world and to send communications home as to conditions at the winter station and the results it has achieved.

On a large expedition, where many of the accessories of modern science are taken into use, the importance of wireless is particularly outstanding. It is employed for the purpose of keeping touch between the base and the various parties working on land, in motor-boats and in aircraft.

By means of his wireless the leader can direct the work in the field, and he can ensure the rational utilization of time and materials.

Mention must also be made of the great importance of the wireless as a safeguard; a distressed party will quickly be able to summon assistance or secure the necessary instructions.

The value of wireless to meteorology is an entire chapter to itself. Daily weather observations are now transmitted from some of the world's most inaccessible regions to the meteorological institutions that need them.

Nevertheless, there is romance in modern science too. When in the middle of a dark period of several months duration, in a hut amid the wastes of snow and ice, one can telephone to one's home land several thousands of kilometres away and be connected up with any telephone subscriber there, it sounds after all like a passage from a fairytale.

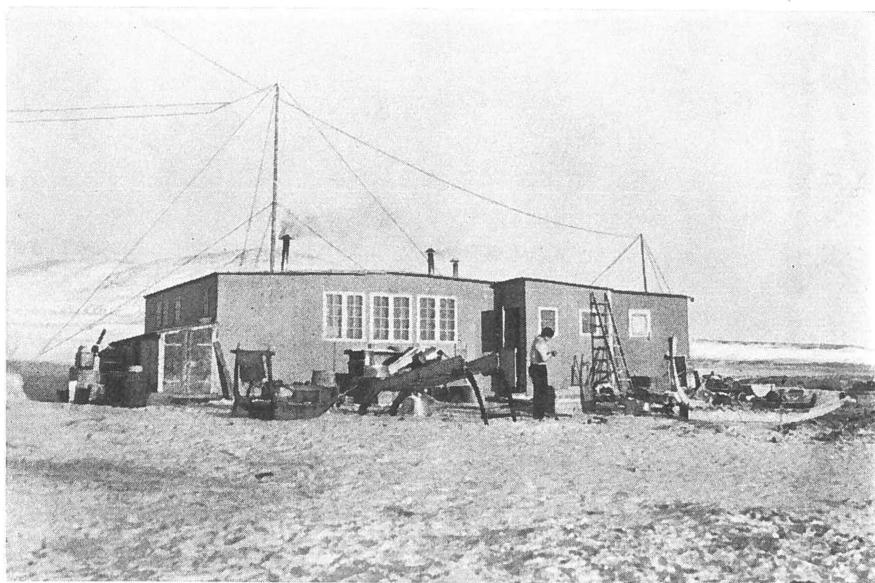


Fig. 1. The expedition's winter quarters in Mørkefjord (Egil Nielsen, phot.).

To expedition people of the time before the coming of wireless, this modern romance may be small consolation; but there is no doubt that wireless will continue its triumphant march; indeed, it has become indispensable to large expeditions on which many of the technical accessories of our day are to be used.

In the following a description will be given of the wireless material with which the "Dansk Nordøstgrønlands Expedition 1938—39" was equipped on its way out to Northeast Greenland and during its stay there.

The expedition left Copenhagen in the middle of July on its own ship, the schooner "Gamma", and sailed via Akureyri in Iceland to Northeast Greenland, arriving at Danmarkshavn in lat. 77° N. at the beginning of August.

The winter base was built at the mouth of Mørkefjord, about 45 km west of Danmarkshavn in lat. $76^{\circ}56'1''$ N., long. $20^{\circ}18'2''$ W. The station was given the name of Mørkefjord, the wireless station being allotted the call-signal O Y Y.

The conditions to be observed when purchasing the material, and my experiences with it in practice will be explained in the course of its description.

It should be stated here that the arrangements and service of the wireless station in the course of the expedition were planned with no thought of publishing the results. I am quite conscious that my records

of reception at Mørkefjord are somewhat desultory and devoid of system; but I feel that they will give some idea as to what is required of wireless material on such an expedition, and that as already stated, my experience may be useful in the planning of material for future expeditions.

I have elected first to give a fairly complete description of the expedition's wireless material, then of the wireless and lighting installation at the winter station Mørkefjord, and finally a summarized account of working conditions at the station, followed by an abstract of the station log.

SURVEY OF WIRELESS MATERIAL

The following were used on the expedition ship "Gamma":

- 1 short-wave transmitter Type A 95.
- 1 long-wave transmitter Type A 78.
- 1 receiver Type B 114.
- 1 Marconi aircraft telegraph/telephone set Type AD.63 B/64B.

At the winter station we had:

- 1 short-wave transmitter A 95.
- 1 long-wave sender Type A 78.
- 1 receiver Type B 114.
- 1 medium-wave telephony transmitter Type A 45.
as well as a special sledge-receiver built into a teak box.
- 1 accumulator battery 32 volts 145 amp. hrs.
- 2 4-volt accumulators for receiver.
- 1 6-volt accumulator for telephony transmitter.
- A number of anode batteries (Hellesen, Type Kover).

With the exception of the Marconi station all the wireless material was supplied by the firm of M. P. PEDERSEN, Copenhagen, the accumulator by A/S Akkumulatorfabrikken, Lyngby. A Delco-light set with an output effect of 850 watts was used for charging the accumulator.

DESCRIPTION OF THE MATERIAL

Short-Wave Transmitter A 95.

The short-wave transmitter was the expedition's principal transmitting equipment. Communication with Denmark was to be maintained with it. Prior to the expedition's departure it was arranged with the Meteorological Institute in Copenhagen that meteorological reports should be sent home several times daily from the winter base. For this purpose the aerial effect of this transmitter was put at 150 watts.

As a result of the ice conditions in 1938 the winter station was not placed so far north and so near the outer coast as was hoped and reckoned with.

Owing to the changed locality of the station it was decided to omit the daily transmission of meteorological observations, as under the circumstances it was not thought that they would be of much importance to the weather forecasts in Europe.

This meant that the required performance of the short-wave transmitter was considerably reduced, especially as the normal telegram traffic was not to be routed direct via Lyngby Radio in Denmark like the meteorotelegrams, but via Scoresbysund Radio and Angmagssalik Radio on the East Coast, ending at Lyngby via Julianehaab Radio.

My experience with short-wave communication direct to Denmark shows that the aerial energy certainly cannot be lower than the 150 watts originally decided upon if it is desired to maintain anything like constant communication at regular hours. Naturally one is much more favourably placed if one is free to choose the hour for establishing the connection, but this cannot be done in meteorology.

For maintaining local connections with the nearest stations, in our case Scoresbysund Radio in particular, a transmitter with an aerial effect of about 50 watts would be quite satisfactory.

As the diagram shows, the short-wave transmitter was master controlled. The master oscillator consisted of a 25 watt triode with a circuit, tuned by a variable condenser, between anode and grid. The inductance was variable in two stages.

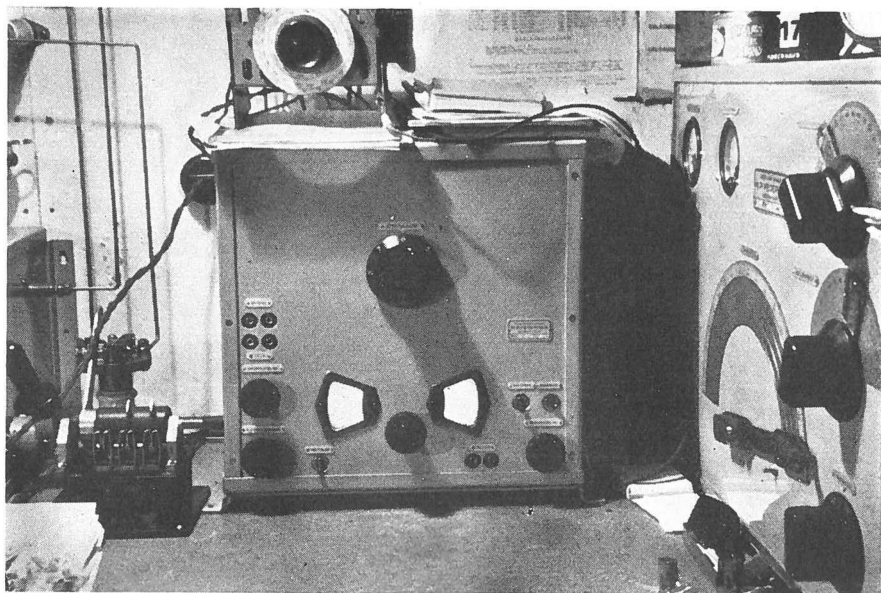


Fig. 2. In the middle the station receiver, on the right the short-wave transmitter (Solver, phot.).

The amplifier circuit consisted of a 100 watt penthode with a tuned anode circuit, to which the aerial was connected through a variable condenser.

The transmitter had a continuous wave range of from 16 to 56 m., and the effect supplied to the aerial circuit was from 100 to 150 watts according to the frequency used.

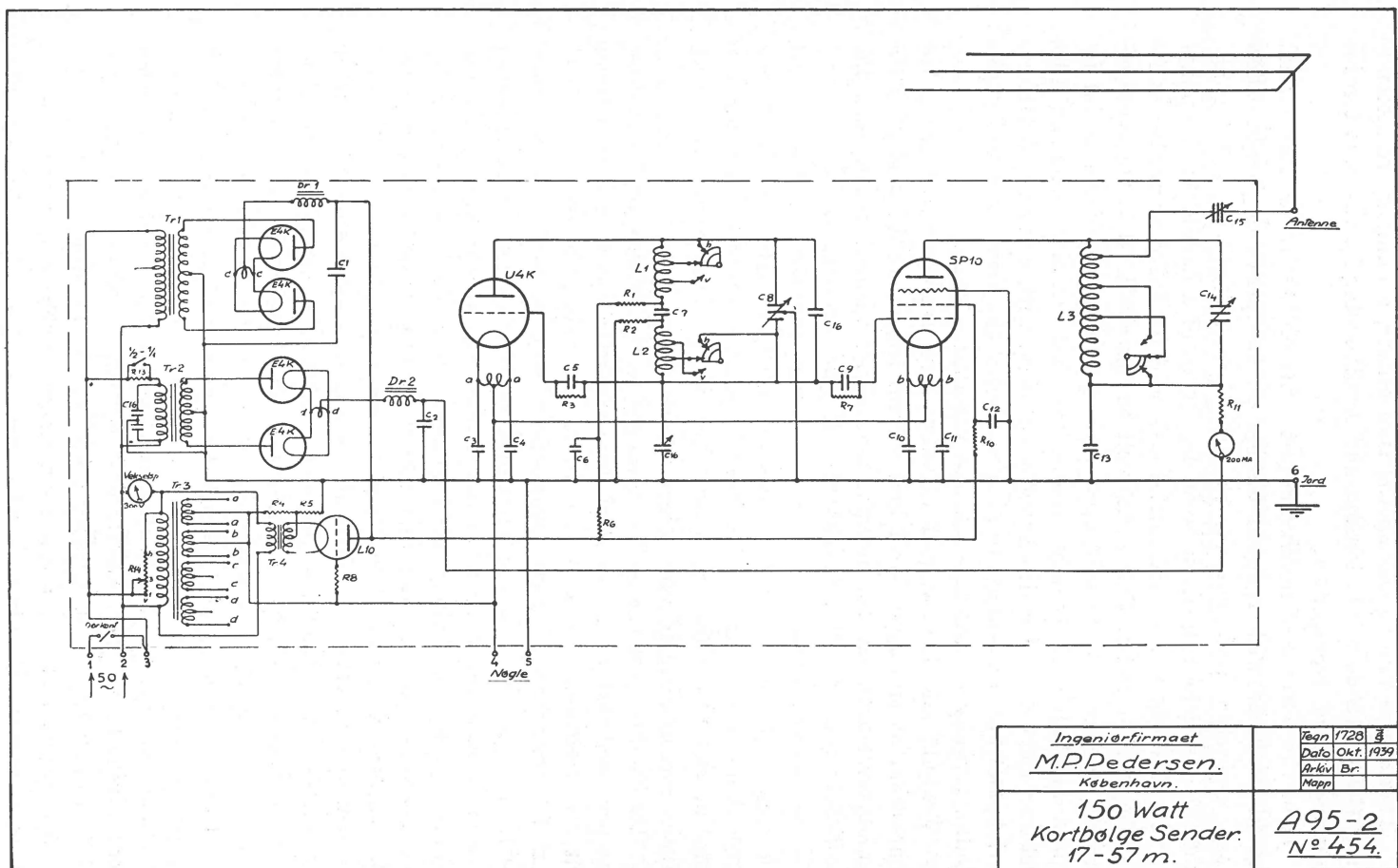
High tension to the master oscillator and screen-grid tension to the penthode were taken from a rectifier supplying 450—500 volts at 150 m/a.

Anode tension for the penthode was taken from another rectifier supplying about 1500 volts at 125 m/a.

The transmitter received 220 volts a. c. 50 periods from a motor alternator driven from the local mains. At the winter station we had 32 volts main tension, and on the outward voyage on board ship, where the same transmitter was used, the tension was 110 volts.

The load from the battery was 700—800 watts. The transmitter was keyed in the oscillator circuit in such a manner that the transmitter was "dead" in the signal intervals, i. e. one could break in on the same transmitting and receiving wave.

The transmitter was provided with a time relay to prevent the rectifier valves from receiving anode current before the filaments were heated.



Ingeniørfirmaet M.P. Pedersen. København.	Regn 1728 Dato Okt. 1939 Ar-kv Br. Happ
150 Watt Kortbølge Sender. 17-57 m.	A95-2 N^o 454.

Fig. 3. The 150 watt short-wave transmitter.

There were two gauges on the transmitter, a milliampere-meter to show the penthode anode tension and a volt-meter for the a. c. tension supplied to the transmitter.

For the purpose of making adjustments on the transmitter—which should be made with reduced tension on the penthode anode—there was a reduction resistance for the transformer supplying the tension, and this could be turned on or off by means of a handle on the panel.

In Mørkefjord the same aerial was used for this transmitter as for the long-wave sender. This aerial will be described later. On some occasions, however, I experimented with a separate directive aerial for communication with Lyngby Radio, the first occasion being on 10th October 1938 when I called Lyngby on 54 m. with a current-fed Hertz aerial placed at right-angles to the direction of the great circle to Lyngby Radio. Lyngby replied at once and reported *q s a 4*.

I would add here that I was not very confident of making the connection at the time, for I had several times called Lyngby on the same wavelength on the normal long aerial without result, and immediately prior to the experiment with the directive aerial.

As already stated, this transmitter was also used on the ship on the way out to Greenland. Communication with Lyngby was maintained throughout the voyage, and without difficulty even after the ship had come in under the Greenland coast, right up to the day when the transmitter was dismantled and taken ashore.

As conditions developed with regard to the locality of the station, the principal task of the short-wave transmitter was to maintain touch with Scoresbysund Radio in lat. $70^{\circ}29'$ N., long. $21^{\circ}57'$ W.

The expedition's base, Mørkefjord, was in lat. $76^{\circ}56'$ N., long. $20^{\circ}18'$ W., as stated in the Introduction. For wireless communication this is no great distance to Scoresbysund, but all the same there was some difficulty, especially at the beginning, when the station at Scoresbysund, which was an older and rather unstable transmitter, was not quite in order. However, the local telegraphist THORKILD HANSEN got it functioning to the best of its ability and communication between the two stations was maintained without trouble as a rule. All our telegram correspondence to Europe and West Greenland passed through Scoresbysund, so actually there was no great reason for testing the range of the transmitter in respect of other stations. Still, I spoke on several occasions to Godhavn (lat. $53^{\circ}31'$ N., long. $69^{\circ}14'$ W.) on the west coast of Greenland. On the whole that station was heard much better than Scoresbysund, and the connections I had with Godhavn were first rate.

I also tried to get Lyngby Radio OXZ, as already stated. That station was almost always audible throughout the twenty-four hours on at least one of its three wave-lengths, ca. 24 m., ca. 36 m., ca. 54 m.

In June 1939 with the short-wave transmitter on the 40 meter band I had a Polish amateur station S.P. 2 L.M. His report was R.S.T. 558.

Our transmitter was normally in function twice daily at 12.20 G. M. T. and about 17.30 G. M. T., the times for communicating with Scoresbysund. For all other connections I used chiefly one of the other transmitters, as these required a much lower load from the battery and therefore could be driven by the accumulator alone, without needing the power unit.

This short-wave transmitter came up to expectations in every way; there was never anything wrong with it, on board the ship or after being set up in Mørkefjord.

The spares for this transmitter consisted of two complete sets of extra valves.

The Long-Wave Transmitter.

This sender had a wave-range of 600 to 800 m. and an aerial-circuit effect of about 135 watts.

On the diagram it will be seen that the transmitter had a master oscillator circuit with a triode in a tuned circuit between anode and grid (Colpitt) with fixed condenser and variometer tuning. The oscillator circuit drove an amplifier circuit with two triodes in parallel with the tuned anode circuit, like the oscillator circuit with fixed condenser and variometer tuning.

Connection with the aerial circuit passed through a condenser of 10,000 cm. which was common to both the anode circuit of the amplifier circuit and the aerial circuit.

Aerial tuning proceeded by means of a variometer in connection with an aerial coil, which was adjusted once and for all, so that the entire range of 600—800 m. was covered simply by turning the variometer.

The drive and buffer circuits were mechanically coupled, partly in order to simplify manipulation, partly to prevent destruction of the valves in the event of detuning the buffer stage. There were thus only two handles to turn when changing wave lengths.

The transmitter was driven by an alternator, of which the motor and generator had a common shaft. The motor, which was driven from the mains (32 volts) was tapped from a point on the armature to provide 20 volts 60 periods a. c. for supplying the filaments. The generator supplied 500 periods a. c. 110 volts, which was transformed and rectified for anode tension.

The transmitter was keyed on the primary side of the transformer for the anode tension. As the transmitter was thus "dead" in the inter-

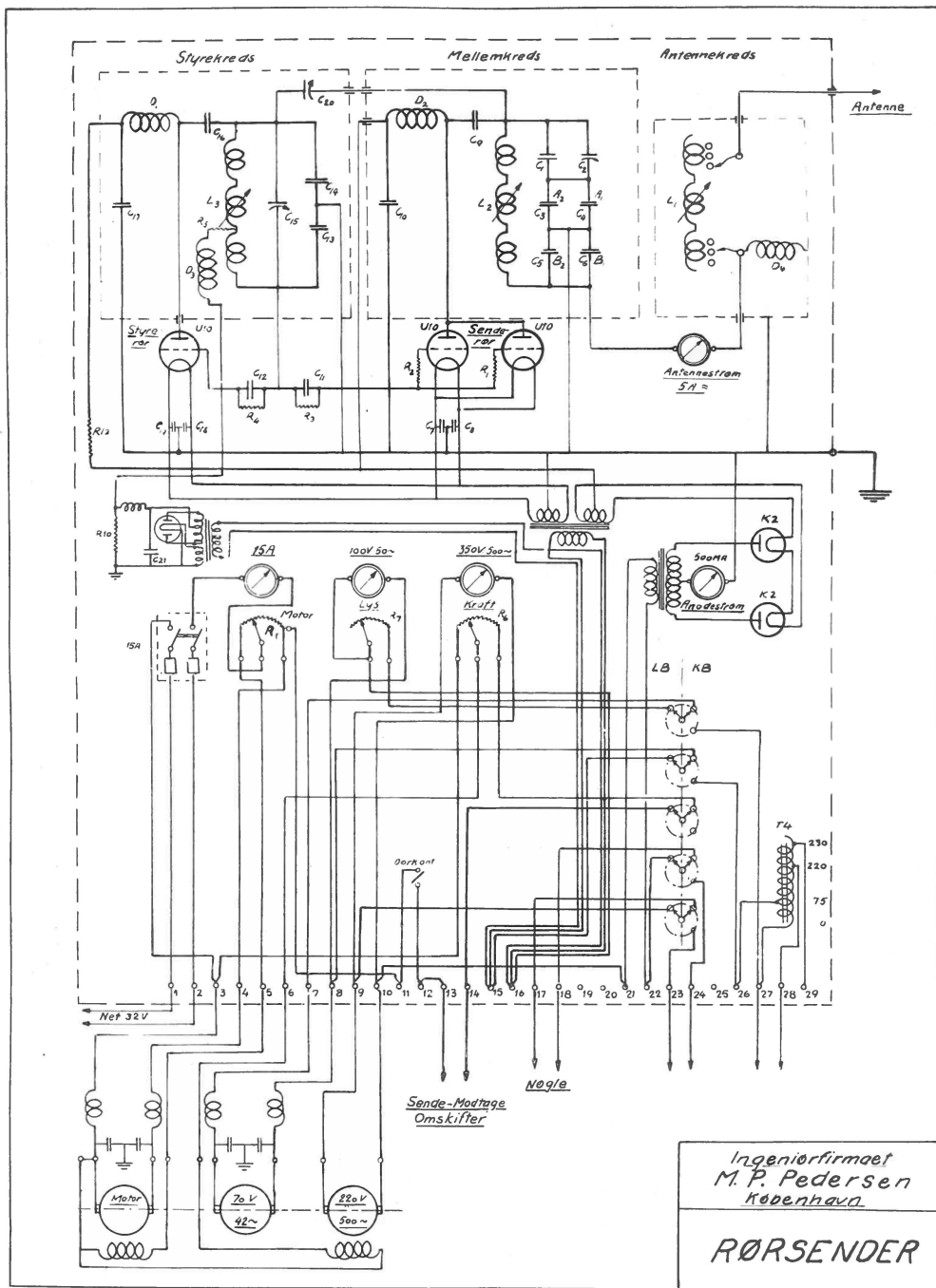


Fig. 4. The long-wave transmitter.

vals between signals one could "break in" on the same transmitting and receiving wave.

The alternator had a primary load from the mains of 17—20 amps.

A long-wave transmitter might perhaps seem superfluous for a station like ours when there already was a fairly powerful short-wave set. For several reasons, however, this was not the case.

As will be described later, there were occasional periods when the short-wave region was quite dead, and communication even with the nearest stations was impossible. In such periods it was usually possible to maintain communication in the 600—800 m. band.

Furthermore, in the event of injury to the short-wave transmitter it would unquestionably be an advantage to keep touch by means of the long-wave transmitter.

In this connection I would say that I consider it best to have separate transmitters instead of a combined set for both wave regions. When the two are separate units, each with its own generator, they can be worked independently, which of course is not the case with the combined transmitter.

The long-wave transmitter was intended as a reserve for the short-wave set in the event of the latter getting out of order. We hoped to be able to reach the nearest Greenland stations and perhaps the Norwegian coastal stations. Furthermore, it was to get into contact with the ship coming to fetch the expedition during the following year.

With this transmitter we made contact with the Danish stations on the east coast of Greenland: Eskimonæs (lat. 74° N.), Ellaø (lat. 72°54' N.) and Scoresbysund.

Connection with Eskimonæs was excellent under all conditions, whereas with Ellaø, and especially with Scoresbysund now and then, it was impossible under bad conditions.

Occasionally we had contact with Isfjord Radio (lat. 78° N., long. 13° E.) on Spitzbergen, and the signal strength was always extraordinarily great at both places.

I also tried the Norwegian coastal stations of Ingøi, Vardø, Aalesund and Bergen on 600 m. Contact with the first two was obtained without trouble, whereas Aalesund and Bergen could only be maintained under good conditions.

None of the Danish stations on the west coast of Greenland answered our call on 600 m., nor did we succeed in connecting with Reykjavik Radio on the long waves.

In our case it would have been of definite advantage if the long-wave sender had been so powerful that it could always have maintained connection with Scoresbysund when the short-wave region was dead.

The fact was, however, that in such periods the 600—800 wave lengths were also somewhat weaker, though nothing like so much as with the short waves, where work was quite impossible.

As a general rule we could establish connections on 600 m., but contact was not entirely certain, and neither of us heard the other party particularly well.

There is no doubt but that the aerial effect of the long-wave transmitter should have been somewhat greater. In that case it would have been better able to replace the short-wave transmitter when conditions for the latter were unfavourable.

Medium-Wave Telephony Transmitter.

Type A 45.

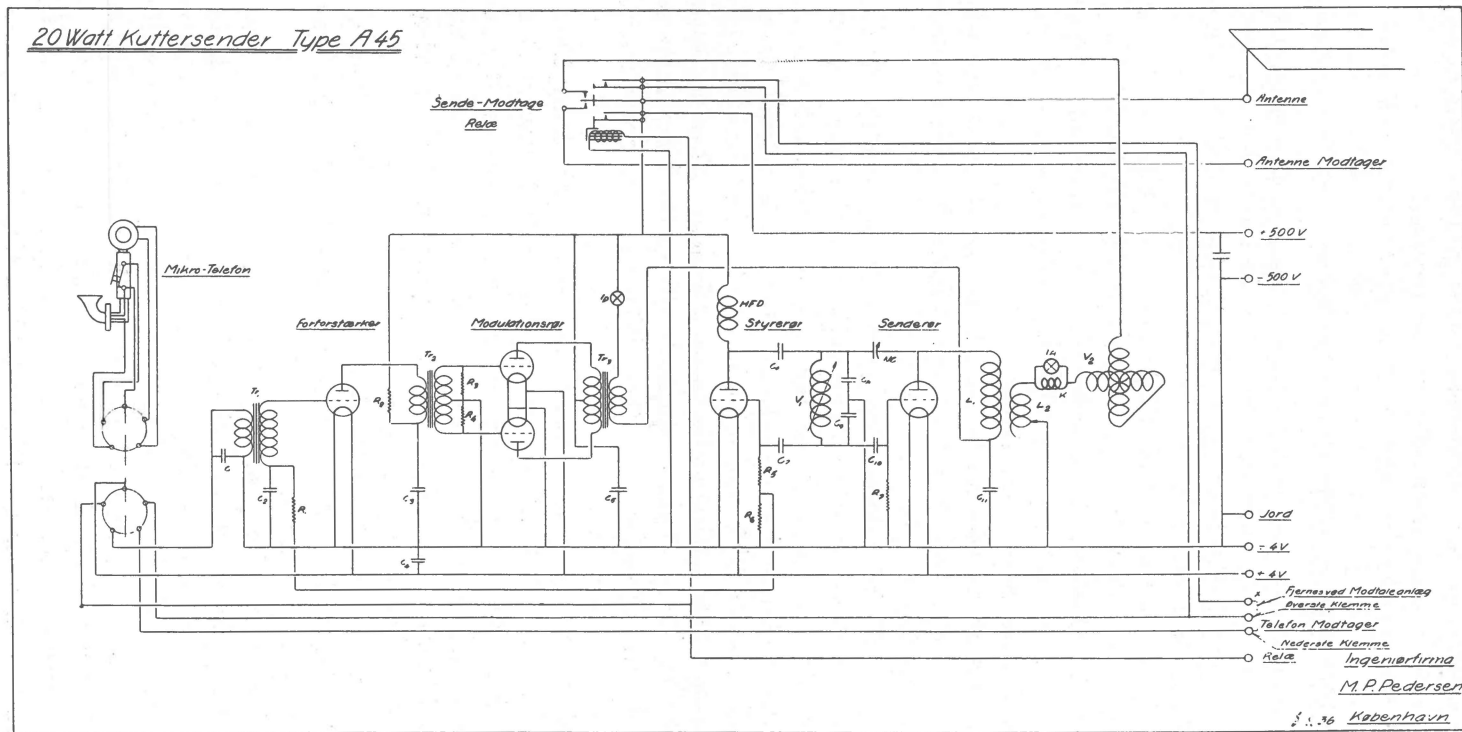
The telephony transmitter, which had a wave-length range of from 85 to 200 m. and an aerial-circuit energy of 20 watts, was intended for use in conjunction with a sledge receiver. This receiver, taken along by a sledge party, would make it possible for the party to receive messages from the winter station, and also time signals from the various stations sending such signals at fixed hours and according to certain systems.

With the rather low input to the aerial circuit—20 watts—we had not expected reception at distances much beyond 200—400 km., which indeed would be sufficient for the purpose. It turned out, however, that the range of this transmitter was surprisingly great, about 3000 km., for we were repeatedly successful in obtaining direct telephonic communication on 156.5 m. with Blaavand Radio (lat. 55°33' N., long. 8° E.).

What is more, the quality of our signals was so good that Blaavand was able to connect us with the telephone system in Denmark. From our isolated existence in the arctic night we were thus able, when conditions were favourable, to make telephone calls to any telephone subscriber in our distant homeland.

Beyond the purely practical importance of these calls, it was no small experience for us up there to get into such personal contact with family and friends at home.

Having regard to the low aerial effect and the wave-length employed, these connections may also be said to be of some interest from a purely wireless point of view. Concurrent experiments carried out from Angmagssalik Radio with a ca. 800 watt telephony transmitter, tuned like ours to 156.5 m., gave no positive result. Angmagssalik was unable to connect with Blaavand despite the greater aerial effect and shorter distance to Blaavand. This would seem to suggest that Mørkefjord's situation



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Fig. 5. The medium-wave telephony transmitter.

was favourable for that connection. Angmagssalik's medium-wave telephony came through splendidly on our receiver.

All the connections made over long distances took place in the dark period from the close of October till the middle of February, as a rule from 02.00 G. M. T. to 06.00 G. M. T.

Sometimes our small transmitter was heard at loud-speaker strength in Denmark, and I have recently been informed that on several occasions Lyngby Radio heard us on the loud-speaker, even when contact with Blaavand Radio failed.

According to the superintendant at Blaavand Radio his station in 1938—39 was troubled by much atmospheric disturbance, as well as frequent disturbance from English amateur stations and ships in the North Sea. These disturbances spoil a good deal of our contacts which otherwise might have got through.

This telephony transmitter, which as stated had a wave-band of from 85 to 200 m., was of a type that is normally used by small craft, especially fishing vessels.

It was fully modulated. The primary load from the feed current was about 200 watts. It had five valves: one master oscillator, one transmitter valve, one amplifier and two modulation valves in Class B. The filament current for the valves, 7 amps., was taken from a 4-volt accumulator which at the same time supplied current for a relay governed by a spring on the handle of the micro-telephone. When the spring was depressed the aerial changed automatically to the transmitter and the anode current was connected with it. When the spring was released the set went back to receiving.

The station was thus arranged for one-way telephony, but experiments were also made in two-way working with Blaavand Radio, the receiver being fitted with a wave-trap tuned to our own transmitting wave, and with a separate receiving aerial. The experiment was very successful, through the wave-trap was very primitive, having to be constructed of what material was available.

The anode current for the transmitter was taken from a motor alternator driven by the 32-volt mains current and giving about 530 volts to the anode circuits.

A small control lamp with red glass was inserted above a few windings in the aerial circuit, and a similar lamp with white glass in the anode lead of the transmitting valve. Correct tuning of the transmitter was announced by the red lamp giving the maximum glow, the white lamp showing no light. By means of attaching the receiver's telephone lead to the transmitter terminals marked "Send" and "Rec." the signals could be heard in the ear muscle of the micro-telephone, which was automatically short-circuited when transmitting.

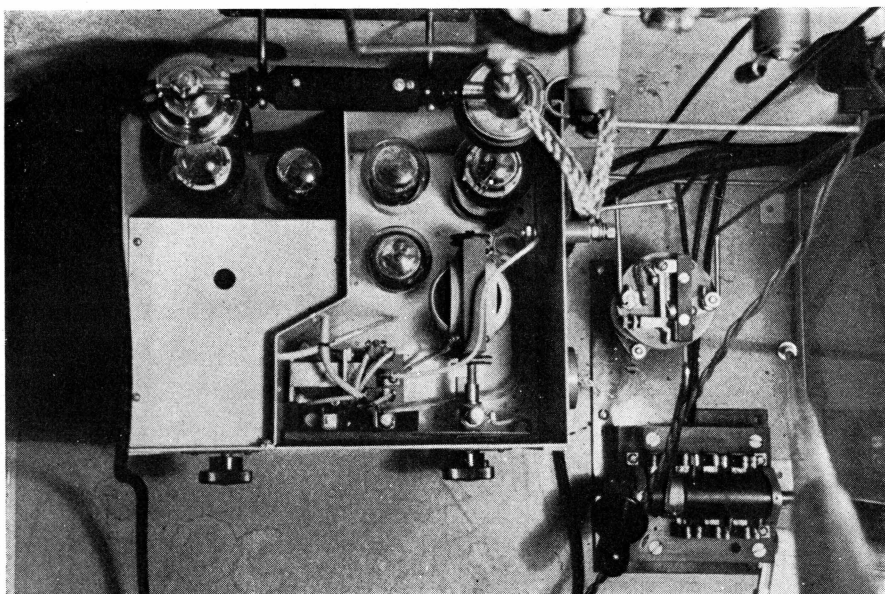


Fig. 6. The telephony transmitter, seen from above (Sølver, phot.).

I originally intended to use part of the large, divided aerial for this transmitter, but the idea proved to be less satisfactory, as the down lead alone from the big aerial was so long that it was impossible to tune the oscillator and aerial circuits without artificially shortening the aerial.

Instead I suspended a separate aerial from a flagstaff about 12 m. high to the westernmost of the two 16 m. aerial masts. The direction of this aerial was nearly South-North. Various kinds of aeriels and different lengths were tried, the final result being a 12 m. single-wired T aerial. In the course of these experiments I was greatly assisted by the Danish fishing vessels lying off Iceland, who reported to me on the reception of my station every evening.

As with the other two transmitters I had to use a counterpoise instead of an earth; this will be described together with the big aerial. When the telephony transmitter was in function the principal aerial was connected with the counterpoise. Experiments were also made with lowering the big aerial down to the ground while the telephony set was in use, but this did not seem to make any perceptible difference.

For several reasons I consider this type of transmitter to be particularly suitable for expedition purposes: It is extremely easy to work, so that anybody can learn to use it in a short time. Thus it will be possible to establish wireless communication with the surrounding world

even during the absence of the telegraphist. Furthermore, its primary consumption is very moderate—a matter of no small importance to an expedition. For expeditions on a large scale, with several independent parties in motor-boats, aircraft, sub-stations, etc. such a transmitter would be ideal for keeping touch with the various groups. For this purpose an aerial effect of 5—10 watts should suffice for ranges up to 200—300 km. Size and weight should be capable of being greatly reduced, and high tension current could be supplied by a pedal-generator.

The first contacts obtained with the telephony transmitter from Mørkefjord were with Danish fishing vessels lying in the waters north and east of Iceland. The cutters were fitted with transmitters of the same type or very similar types to our own. Their receivers were more sensitive than ours as a whole. These contacts, which commenced in October 1938, were remarkably strong; as a rule we heard one another in the loud-speaker. The distance was about 1200 km.

The skippers of the fishing vessels told me that when conditions were particularly good they were sometimes able to talk with Blaavand Radio OXB from positions between the Faeroes and Iceland. Thereafter I listened regularly for Blaavand when he broadcast his traffic list on 172.5 m. at five minutes past the hour G.M.T. After about 18.00 G.M.T. he was usually heard well in the loud-speaker.

Blaavand Radio, whose position as stated is lat. $55^{\circ}33'$ N., long. 8° E., had just started operating with a new telephony transmitter. This set, a crystal controlled valve transmitter with a aerial power of 500 watts, was built by the same firm as our own, M. P. PEDERSEN, Copenhagen.

Arrangements were made with the skipper of the fishing-vessel "England" of Esbjerg, that when he left for Grimsby with his catch at the end of October he was to endeavour to get a telephone call via Blaavand Radio through to EBBE MUNCK, one of the leaders of our expedition, who at that time was in Copenhagen. In Mørkefjord we were to try to listen in to the conversation, which was to take place at a time in the evening when we could expect to hear Blaavand well. At the same time we were to keep in touch with the "England" as long as possible.

On October 26th at 22.00 G.M.T. we were called by the "England", then off the Faeroes at a distance of 1700 km. from Mørkefjord. Reception was 100 per cent.

On October 27th at 22.00 G.M.T. we were again in touch with the "England", who now stated his position to be lat. 60° N., long. 3° W., which makes a distance of 2100 km. We heard the "England" well, but his reception was poor owing to his anode battery being worn out.

The agreed conversation between the "England" and EBBE MUNCK took place on October 28th at 22.05 G.M.T., when the "England" was

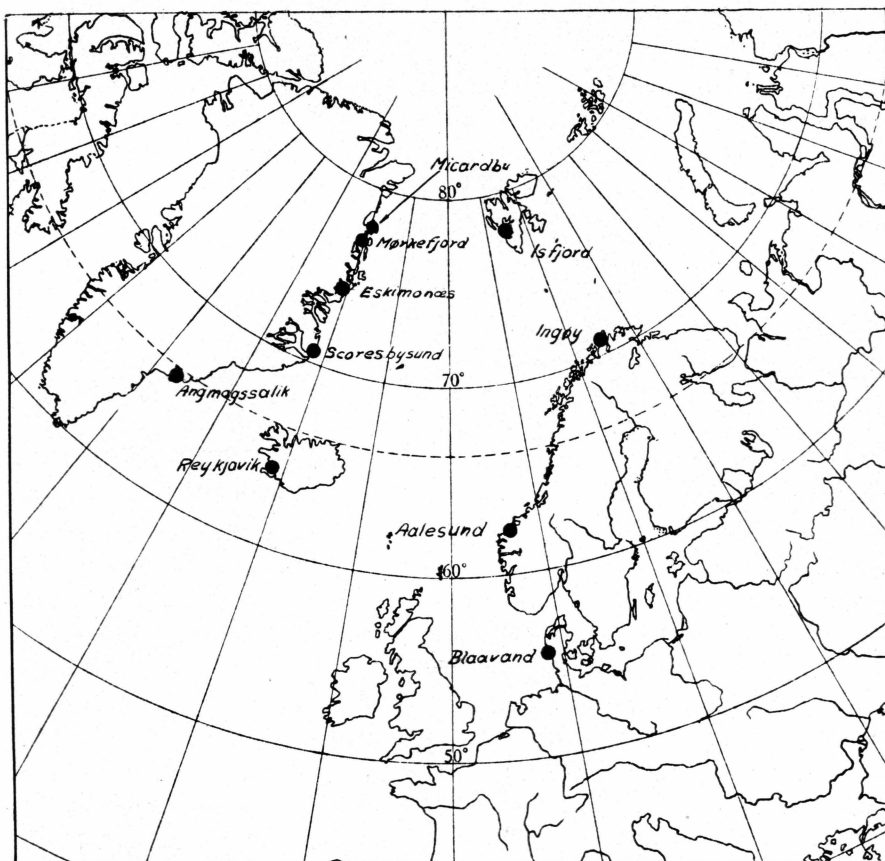


Fig. 7. Position of the regular stations communicated with by telephony 1:40,000,000.

in the North Sea and so close to Blaavand that under normal conditions the connection should be possible. Unfortunately, that evening the atmospheric conditions were anything but favourable and the two parties had difficulty in understanding each other. At Mørkefjord we received Blaavand fairly well and heard EBBE MUNCK send us greetings. On October 29th at 22.00 we were briefly in touch with the "England" when she was about to go into Grimsby. Conditions were bad and reception on both sides only about 50 per cent. These long-distance connections suggested that we might get into direct telephonic communication with Denmark ourselves, and in fact we succeeded on the first attempt on November 3rd.

The skipper of the fishing-vessel "Mackenzie" of Esbjerg had informed us that on that morning at 05.05 G.M.T. he intended to try to contact with Blaavand for a telephone call to his home from a position between Iceland and the Faeroes. I asked him to inform Blaavand, if

he made contact, to tell the station that I would call when the "MacKenzie" was finished. The vessel got through, and when he was finished I began calling Blaavand on 156.5 m. After calling for a few minutes I changed over to receiving on 172.5 m. and Blaavand answered at once that he heard us well and understood everything. I asked him to put a telephone call through to EBBE MUNCK. The call was put through by the State telephone to MUNCK's private telephone at his house in Klampenborg.

In the meantime I had awakened the other expedition leader, Count EIGIL KNUTH, and these two leaders then had half an hour's conversation. It went through faultlessly but from our side in the form of one-way telephony, as at that time I had not yet made a wave-trap for two-way operation.

To us up there it was naturally a great event; Blaavand Radio was also greatly interested and promised to listen for us from then on.

The very next morning we had the second telephone conversation with Denmark, and during the four months of the dark period we had several talks with relatives and friends at home. These telephone conversations were rumoured along the coast and before long we were visited by some Norwegians of the Norwegian-French Micardbu Expedition, who wanted to get through to Oslo. The conversations were routed via the Norwegian coastal station Aalesund Radio (Lat. $68^{\circ}28' N.$, $6^{\circ} E.$), but were scarcely so successful as those to Blaavand, our reception of Aalesund being rather poor. On the other hand we made excellent connections with the Norwegian coastal station Ingøy Radio (lat. $71^{\circ} N.$, long. $24^{\circ} E.$), but the telephone connection from Ingøy to Oslo was not so good that the calls could be put through that way.

We had very good telephonic communication with Angmagssalik Radio too, a station which we heard very clearly over a distance of about 1300—1400 km. with very mountainous country between.

We spoke a few times with Reykjavik Radio in Iceland, but this connection was very unstable and could only rarely be established.

I tried Thorshavn Radio in the Faeroes on several occasions, but never succeeded in making contact. A few times I heard its telephony transmitter on 182 m., but not particularly well.

The telephony transmitter was never used for its original purpose, that of keeping touch with the sledges, as the absolutely necessary gear for the long outward sledge trips weighed so much that the load could not be further increased with the rather heavy sledge receiver.

The telephony transmitter, like the other transmitters, gave no trouble whatever, though it was very much in use.

The Receiver.

Type B 114.

The station receiver was an ordinary ship receiving set with a wave range of from 15 to 20,000 m.

As the diagram shows, this receiver had three tuned circuits and five valves: two H.F., detector and two L.F. As will be seen, this was not a particularly modern lay-out; nevertheless the receiver did splendid work and it was astonishing how much could be heard on it.

The receiver was battery-driven. Filament current was supplied by a four-volt accumulator and the anode current by three Hellesen's dry batteries, type "Kover".

This set was employed for the radio service proper and for receiving radiophony broadcasting. For the latter purpose especially it gave every satisfaction; we heard practically all European and American broadcasting stations excellently.

The Aircraft Station.

Type: Marconi AD 63 B/64 B.

The idea of taking an aeroplane was realized only at a very advanced phase in the history of the genesis of the expedition. The machine, a Tiger Moth D.H. 82 with a 130 h. p. Gipsy Major engine, was lent by the Army Flying Corps.

It being an absolute necessity that the aircraft should be fitted with wireless, which was not already the case and never had been, we had to procure a suitable set in haste and have it installed.

Fortunately, the Flying Corps had just received a number of Marconi aircraft equipments for building into fighter-planes. One of these was placed at our disposal and built into the aircraft's baggage room, which, as it turned out, was a very good place for it.

The equipment, known as Type AD 63B/64B, consisted of transmitter, receiver and rotary transformer mounted on one platform. The primary source of power was a 12 volts accumulator. As the aircraft, which was normally employed for training purposes, was not provided with a loading generator, we had to use an accumulator of fairly high capacity in order to ensure reasonable operating time. We used two 12 volt Nife accumulators with a total capacity of 90 ampere hours. The current consumption was about 15 amps. Under load the terminal tension on the battery fell to about 11 volts, but this was sufficient to ensure satisfactory radiation.

For correspondance with the aircraft we used the ship's shortwave transmitter, which had a wave range of 16 to 56 metres. For both

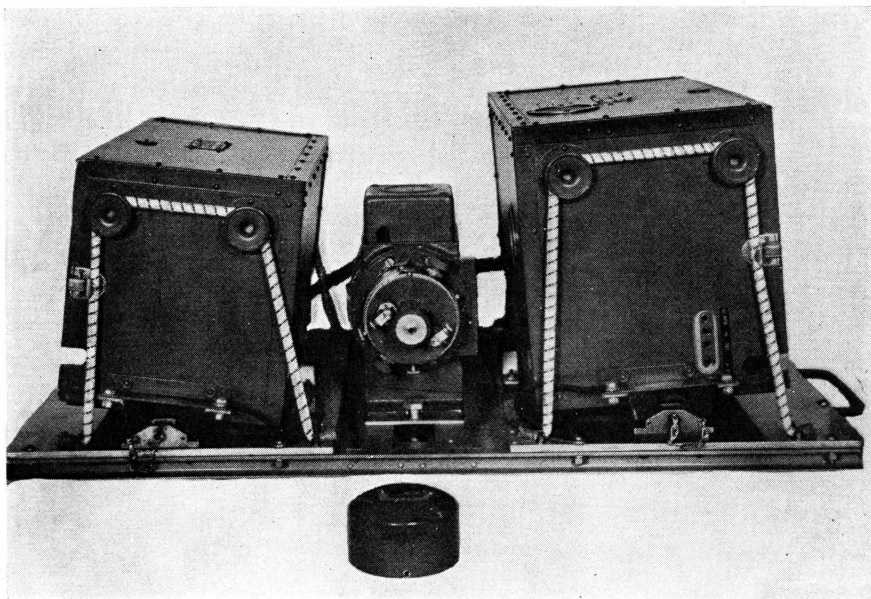


Fig. 9. The aircraft station (Copyright by Danish Army Flying Corps).

transmitter and receiver the aircraft station's wave range was from 75 to 110 metres, so it was necessary to change the receiver's tuning circuit to take a wave band of 50—75 metres.

The transmitter, which was very simple, had a master oscillator valve, a transmitting valve and a modulator with corresponding circuits. It was capable of transmitting telephony and modulated continuous wave (M.C.W.). For telephony the aerial effect was about 8 watts.

On the panel of the transmitter were the following controls:

- 1) Master oscillator condenser control,
- 2) Amplifier circuit condenser control,
- 3) the send/receive switch

as well as a milliammeter showing the anode feed to the amplifier stage.

The set being out of reach of the pilot, all controls were arranged for remote control by means of Bowden wires, but in our case only the Bowden lever for the send/receive switch was taken to the pilot's panel. The other adjustments were made before starting and were left there, as there was no reason for changing wave-lengths while in the air.

Besides this lever the pilot had within reach

- 1) M. C. W.—telephony control unit,
- 2) Plug for microtelephone,
- 3) Plug for key
and the Morse key.

The receiver was a super-heterodyne with four valves, consisting of: an H.F. pentode with exponential characteristics of an H.F. amplifier, followed by a triode-hexode frequency changer, then a duodiode pentode as an intermediate frequency amplifier and rectifier for signal and tension to the automatic volume control (A.V.C.), and finally a duodiode for volume.

After the A.V.C. there was a manually operated volume control adjustable to suit the volume to the noise in the aircraft type.

The receiver's tuning condenser could be fitted with a Bowden lever for remote control; this however was not fitted, as for each flight the receiver was pre-set to the ship's short-wave transmitter. On the other hand the vernier tuning condenser was prolonged to the pilot's reach by means of a Bowden lever. This condenser permitted of corrections to the tuning in case of slight frequency changes when flying. The receiver valve filaments, which were connected parallel, got their current direct from the accumulators. By means of a switch on the panel the receiver could be set for receiving C.W. telegraphy, or telephony and M.C.W. telegraphy.

The rotary transformer belonging to this equipment had an input of about 12 amps. from the accumulator and delivered 550 volts 0.1 amp. to the transmitter. For receiving this tension was reduced via a potentiometer to 200 volts.

The aerial was suspended from the two extreme ends of the upper plane to the tail fin in the form of a V. The lead in was from the point of the V to the station in the luggage space behind the pilot's seat.

By means of tests made in Denmark before departure satisfactory telephony communication was obtained over a distance of about 80 km.

On the outward voyage the aircraft was used several times for reconnaissance to assist the ship through the belt of drift-ice. Contact was made with the aircraft from the ship's short-wave station every ten minutes. Telephony from the aircraft was received exceptionally well all the time, whereas reception in the aircraft was not always so good, as its receiver was encumbered with a periodical fault which could not be remedied with the means available; nevertheless this wireless communication was of great value, as we were constantly kept informed of the movements and observations of the aircraft.

The aircraft was very useful, both while the ship was navigating the ice-belt and after arriving at the winter quarters for reconnaissance of the terrain to the north. Flying under such conditions, with starts made from channels in the ice, is very risky, as the channel may close up very quickly while the machine is in the air. The wireless contact serves to keep the pilot informed of the movement of the ice while he is in the air.

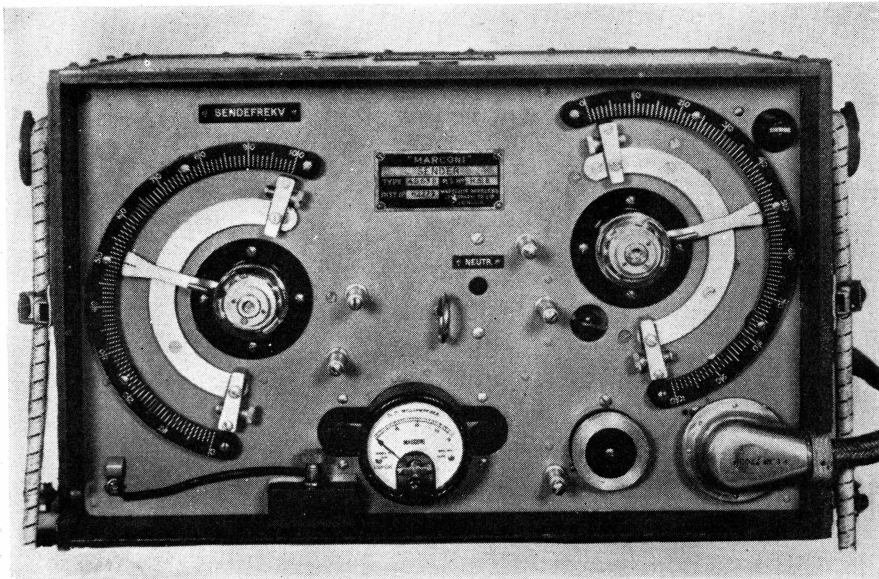


Fig. 10. The aircraft station, the transmitter (Copyright by Danish Army Flying Corps).

All in all the equipment was eminently suitable for the purpose, and the range was enough for the distances likely to be flown. The ship's short-wave transmitter, which as stated was used for correspondence with the aircraft, should have been adapted for telephony with this in view. We had to resort to telegraphy, which was practicable because the pilot, Capt. MICHAEL HANSEN, was a particularly able telegraphist.

The Accumulator.

Type J 4 f. 1.

The accumulator, which was supplied by A/S Accumulatorfabriken, Lyngby, consisted of 17 elements. These were placed in a rack built into a separate accumulator room in the winter house. This room lay between the kitchen and the wireless room. Leading into the wireless room were two doors, through which the entire battery could be inspected. As the various cells consisted of glass jars, it was very easy to ascertain the condition of the battery at any time.

There were two ventilators in the outer wall of the accumulator room, the upper one to the open air, the lower one to the shed running along the outer wall.

The accumulator is such an important part of the power plant that it pays to give it the best possible placing. It must not get

too cold; even at -5° the capacity of a lead accumulator falls 25 per cent.

The position we gave it was good, as it received warmth from two sides, one from the kitchen, where the fire in the range burned almost continuously, and on the other side from the wireless room, which in the coldest period was heated by a stove.

Our accumulator had a capacity of 145 amp. hours at 14.5 amps. output. It proved unnecessary to make any arrangements for compensating for the difference between the tension when it was fully charged and when partly discharged. Transmitters and the lamps used for lighting were quite capable of tolerating the over-tension of the newly charged battery.

Now and then, when the motor failed the accumulator had to supply the current for the short-wave transmitter, though of course these periods were limited as far as possible.

The accumulator worked excellently, and after the first year it was in very fine shape. I may state that the distilled water for refilling the cells gave out very early. Instead we used melted snow. This water was first chemically analysed for the presence of chlorine, but was found to be sufficiently pure for the purpose.

The Aerial.

The main aerial consisted of a 60 metre 2-strand L aerial suspended between two 16 m. wooden masts running east—west, and with the down lead at the east end.

The situation of the masts in relation to the house was determined by the terrain. The house stood on a gravel terrace with its front facing south; on the east the terrace was limited by a brook, on the south side the ground fell towards the shore, on the north it rose, and here the aerial masts were erected so far behind the house that the nearer mast would not hit the house if it fell.

The masts were barded with 8 mm. steel wire, fastened at the lower end to crossed boards dug into ground and anchored with large stones. At the top of each mast was a block with a 6 mm. steel wire for raising or lowering the aerial.

Several types and lengths of aeriels were tried for both short-wave and long-wave transmitters, the result being that both transmitters were used in conjunction with a 40 metre two-strand L aerial with the down lead at the east end. The distance between the strands was 1.6 m.

As already stated, the original intention was that the telephony transmitter was to be used in conjunction with part of the divided big aerial. This could not be done, as the aerial for that transmitter would

thus be too long. Instead we hung up a separate aerial for this transmitter from the easterly mast to the 12 m. flagstaff southwest of the house.

Two-way telephony made it necessary to have a separate aerial for the receiver too, and this was suspended from the easterly mast to a window in the wireless room. Normally the receiver used the same aerial as the transmitter with which it was being used, as for the short and long-wave transmitters there was a send/receive switch for changing the aerial from transmitter to receiver.

With the telephony transmitter this change-over proceeded automatically by means of a relay when one-way telephony was being used.

At one time the short-wave transmitter had a directive aerial intended for correspondence with Lyngby Radio. As was stated under "Short-wave Transmitter", this aerial was a tension-fed Hertz aerial with a length calculated for a wave-length of 54 m. It was suspended between the 12 m. flagstaff and a pine-mast only 5 m. high, and it gave excellent results. This directive aerial was soon taken down, however, as it turned out that Lyngby Radio was not permitted to take our correspondence direct.

Immediately the station was established we set about arranging for an earth. A copper plate of 3 sq. m. was buried about a metre in ground at the northeast corner of the house. It was impossible to get lower, as the ground below was always frozen.

This earth was quite insufficient for the transmitters, and so we made a counterpoise, first consisting of three insulated wires suspended under the aerial at a height of 2 m. above the ground. This form was very good, but later it was replaced by another, consisting of twelve 3 mm. aerial wires, each 10 m. long. They lay direct on the ground and radiated fanwise from a point outside the wireless room.

When snow fell and the wires were covered by it, traffic round about the house proceeded unhampered by the counterpoise.

This form proved to be excellent in every way and, with the said size, which was arrived at after much experimenting, suited all three transmitters.

WIRELESS AND LIGHT INSTALLATION IN THE WINTER HOUSE

As will be seen from the plan, the winter house was divided into a large living room, and on three sides of this a number of larger and smaller rooms, some for the members of the expedition for sleeping and working, others for the kitchen, vestibule, etc.

All these rooms were lighted by electricity, the current for which was taken from the 32 volt accumulator battery, which was kept charged by a Delcolight set consisting of a 2 h.p. single-cylinder, four-cycle, single-acting petroleum motor coupled direct to a 32 volt. D. C. dynamo.

This plant was capable of an output effect of 850 watts and also had to serve as a source of supply for the wireless installation. There was a separate motor room, in which the walls inside were coated with 5 mm. sheets of cement-asbestos to reduce the danger of fire.

At about the middle of this room we cast a concrete base 450 mm. high, on which the motor with coupled dynamo on one base frame was bolted. Around the motor base was a concrete floor, insulated from the base and the ground with several layers of soft Insulite in order to prevent too much vibration passing from the motor to the house.

The motor exhaust pipe was taken vertically up through an iron ring in the roof; a packing of asbestos cord was laid between the pipe and the ring.

For the machinery there was an instrument panel with main switch, cut out relay and an ampere meter for both charging and discharging the accumulator. A 2 · 10 sq. mm. armoured lead cable with 35 amp. fuses led from the charging terminals of this panel to the accumulator.

From the supply terminals of the panel a 2 · 10 sq. mm. cable led to two main switches arranged in parallel and placed on the wall of the motor room. Through one of these switches the current was led to the wireless equipment through a 2 · 10 sq. mm. armoured lead cable, and from the other a 2 · 2.5 sq. mm. armoured lead cable ran along the outer wall of the house through the various rooms. In each of the smaller rooms there was a branch to a wall-socket, to which a small table-lamp or a ceiling pendant could be plugged as desired. In the

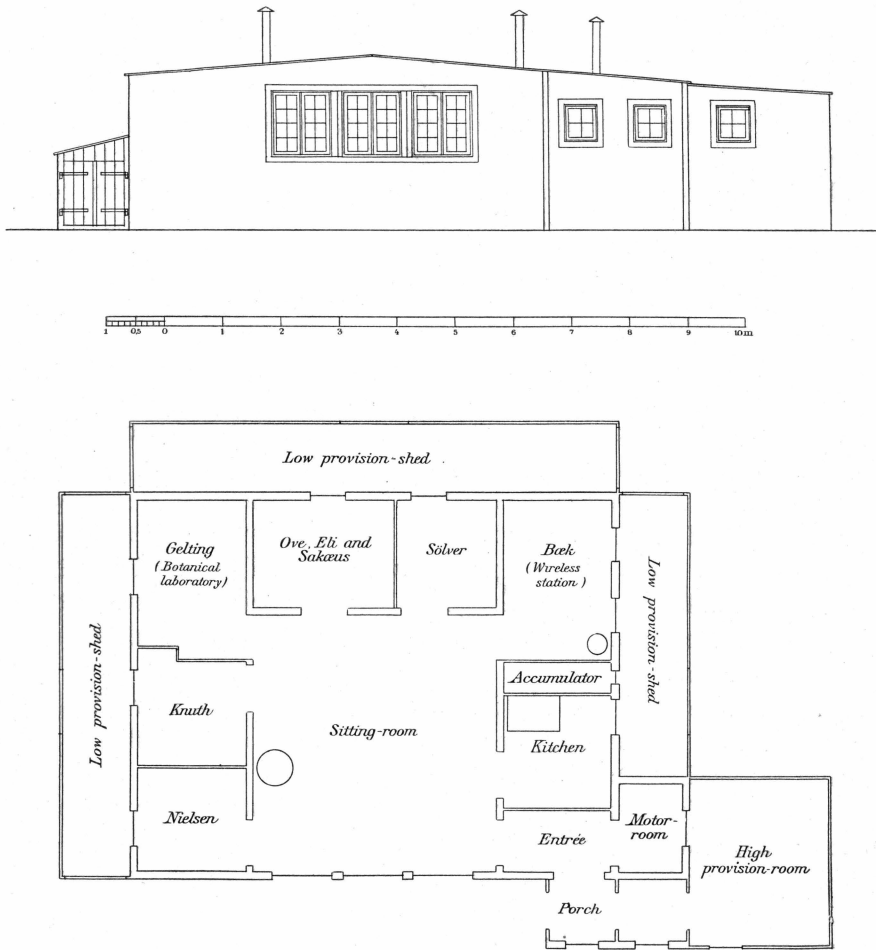


Fig. 11. Plan and elevation of the station house "Mørkefjord".

large living-room were two adjustable ceiling lamps. For lighting out of doors there was a hand-lamp on about 15 m. of cable. In the dark period this lamp was very useful for outside work near the station. With all lamps on the consumption was about 235 watts.

The electric light was of course a great convenience, and it was of particular importance that the danger of fire was reduced to a minimum.

In the wireless room there were a main switch with fuses for each of the three transmitters, as well as a smaller switch through which the current was led through an adjustable resistance for charging the filament accumulators of receiver and telephony transmitter.

As the photographs from the station show, transmitter and receiver were placed on the table in the wireless room; under the table were the

three transformers for the transmitters. It would have been better if these transformers had been placed in a separate room away from the wireless room, thus avoiding the mechanical noise—and presumably part of the electrical interference from these machines. We might have partitioned the machines off, or placed them in the shed outside the wireless room; but it was considered inadvisable to expose them to the cold, as there would be a risk of condensation in them during the unavoidable changes of temperature caused by their operation.

The dry cells for supplying the receiver with anode current were also placed under the table. The type used was HELLESEN'S "Kover", and they gave every satisfaction during the frequent and often protracted use of the receiver. It should be remarked that dry cells should preferably not be exposed to very low temperatures, as this causes a fall in their tension.

The handles necessary for starting the transmitters were all within reach of the telegraphist's seat at the table, on which, in addition to the Morse key, there was a send/receive switch. The telephony transmitter, originally placed on the table together with the other transmitters and the receiver, was afterwards hung on the wall to make more table room.

The petroleum motor could be started by means of a crank-handle connected with a claw-coupling on the fly-wheel shaft and also electrically by closing the cut-out relay.

Although the motor room received very little warmth from the rest of the house and therefore was very cold (-15°) for long periods, there was never any difficulty in starting if the motor otherwise was in order. In the coldest period of course we had to let the motor run slowly for a time in order to warm the oil.

This motor was an old machine that had been thoroughly overhauled; I cannot say that it satisfied all the requirements of a plant for use under such special conditions. It required frequent inspection and repairs, though these never took so long that it was necessary to cut off the electric light. Naturally it was unfortunate that the motor gave trouble so often, but nevertheless in itself the type was suitable for the purpose.

The motor room ought to have been about 50 cm. wider, whereby inspection and repairs would have been easier and quicker than actually was the case. In this connection there was a very definite drawback at the Mørkefjord station: we had no workshop with a solid filing bench and a powerful vice. With such a workshop we would have been able to make and repair material, and it would have been an excellent repository for the very comprehensive collection of tools required on an expedition.

RECEPTION

As a general rule reception in Mørkefjord was particularly good. Interference was only faint, so that weak distant stations could be heard well. Examples will be given in the log extracts.

Atmospheric disturbance such as we know it at home, for example when a thunderstorm is approaching, occurred only once in the course of the year. On the other hand there were two other forms of disturbance which on several occasions made it impossible to hear the surrounding world.

One of these was caused by drifting snow. For several hours before the drift itself was visible or perceptible it caused a characteristic rushing sound in the receiver. When the drift reached the station it set up a very high tension between aerial and counterpoise. The intensity of the noise it caused increased and decreased in time with the gusts of the wind.

This disturbance was most perceptible in the long-wave band. Even drifting with very low wind velocities would make listening impossible at wave-lengths of more than about 400 metres, whereas one could still hear satisfactorily on lower wave-lengths.

With higher wind velocities all work with the station was impossible, partly owing to noise and partly because the aerial came under such high tension that it caused sparking through the condensers in the aerial circuits.

The other form of disturbance mainly affected the short-wave band. On several occasions this band was quite "dead". In such periods, varying from a few hours up to five or six days, it was often impossible to hear a single short-wave station. Even fairly close transmitters like Scoresbysund and Godhavn disappeared. Eskimonæs, only about 300 km. from Mørkefjord, and whose transmitter was normally received with great strength, would disappear in these periods.

The dead region extended up to about 150 metres; above this we could hear the more powerful stations, and the higher the wave-length, the less was the reduction in strength. From about 600 metres and over reception was as good as normal.

Similar phenomena have repeatedly been observed in Denmark, and investigations have been started at several places for the purpose of

ascertaining the cause. The opinion has been formed that the phenomenon is due to abnormal ionization in the ionosphere, which comprises the layers from which the short waves are reflected—a fact that makes possible, and indeed conditions, the diffusion of these waves over great distances. If for some reason or other these layers lose their ability to throw back the electro-magnetic oscillations, the latter will be unable to travel over great distances as that part of the energy that is radiated under a small angle with the earth's surface are rapidly absorbed, especially if the wave length is small.

Ionization of the reflecting layers, which are at a height of 100 to 200 kilometres, is due to ultra-violet rays from the sun, and it varies normally with the time of the year and the time of the day. These factors can be calculated, but sometimes there are disturbances in these layers which destroy the transmission path of wireless waves. The disturbances are assumed to arise inter alia from the activities of sunspots, which occur over a period of eleven years; and in 1938 sunspot intensity was at its maximum. It is an obvious thought that the northern lights, which originate in the same layers, may have some influence on reception. Nothing of the sort was observed in Mørkefjord, though from the station we often observed the northern lights. For example, for a considerable period we photographed the phenomenon in collaboration with the Norwegian-French Michard Expedition. These photographs were taken simultaneously from three stations on the same object. Contemporaneity was obtained by directing the exposures by wireless from one of the stations. During this work, which of course was carried on when the intensity of the northern lights was greatest and often extended over many hours, there was ample opportunity for listening on various wave lengths to learn if the lights caused particular disturbance, but, as already stated, this was not the case. Naturally, this does not prove that the northern lights do not influence wireless reception, as the lights observed from our station may have come from parts of the reflecting layers not concerned in throwing back the wireless frequencies heard at the station.

The extremely low level of interference normally, as well as the geographical situation of the place, seems to me to make such a station very suitable for the undertaking of investigations of the aforesaid and related phenomena.

The wireless station Mørkefjord in the period from October 4th 1938 to July 3rd 1940 despatched 482 telegrams totalling 16,761 words and received 384 telegrams of a total of 6,336 words. In addition there was a great number of more or less local telephone calls. The total operational time for the station was about 1200 hours.

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List of Abbreviations.

q s a	Signal strength, scale 1—5.
q r m	Interference from other stations.
q r n	Interference from static atmospherical electricity.
q s l	Acknowledgment of telegram received.
L H C R	Micardburadio, belonging to the Norwegian-French Polar Expedition 1938.
O X B	Blaavand Radio.
O X M	Scoresbysund Radio.
O X Z	Lyngby Radio.
O Y A	Eskimonæs Radio.
O Y F	Julianehaab Radio.
O Z L	Angmagssalik Radio.
O Y V B	s.s. "Gustav Holm".
T F A	Reykjavik Radio.

Extract of Log.

Date 1938	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
4/10	0200	Lyngby/OXZ	36	36	5	Station opened. OXZ reports qsa 4 and promises inform Greenland stations.
3/11	0515	Blaavand/OXB	156,5	172	5	Telephone call established with EBBE MUNCK, Klampenborg. Duration 30 mins. Reception both ways excellent.
4/11	0105	OXB	156,5	172	5	Blaavand receiving us badly owing to atmospheric electricity, but promises listen for us 0505 hrs.
"	0505	"	"	"	"	Called Lyngby 1880. State tel. replies subscriber away but can be called Ruds-Vedby 10. Connection establ., but we are heard badly owing hail and thunder over Blaavand Radio
5/11	1225	Scoresbysund	36	36	3—4	Received 4 telegrams, despatched 6.
"	2215	s.s. "England"	150	150	4	Position: just NW of Øfjord.
6/11	0110	OXB	156,5	172	5	Arranged telephone 0505 hrs.
"	0505	"	"	"	5	Called Lyngby 1880. Subscriber no reply. Some fading.
"	1105	"	"	"	1—2	Listening.
"	1405	"	"	"	2	Listening.
"	1605	"	"	"	2	Listening.
"	1805	"	"	"	3—4	Listening.
"	2005	"	"	"	5	Listening.
"	2205	"	"	"	5	Message to us from Danish press news.
"	2305	"	156,5	"	5	Acknowledged receipt. OXB understands everything but has much qrm and qrn.
7/11	0505	"	"	"	5	OXB called us, has note to us from Norwegian-French Micard exped. He cannot hear our acknowl. but received it via s.s. "England", whom OXB hears very faintly.
"	1220	Scoresbysund	36	36	4	Sent 4 telegrams.
"	1815	"	"	"	4	..
"	1830	Michardbu	36	36	3—4	LHCH attempts telephony on 36 m., we answered on 150 m. OK.
"	2215	Fishing v.	150	150	4	Spoke with various fishing vessels off Iceland.
8/11	0505	OXB	156,5	172	4—5	OXB hears call but unable understand. Abandoned 0520.
"	1220	Scoresbysund	36	36	2	Connection failed.
"	1735	"	"	"	2—3	Connection poor.
"	1740	"	54	54	4	Despatched 1, received 2.
"	2130	Fishing v.	150	150	5	Connection with fish. ves. "Aksel Skov", "Mackenzie" and "England", all just NW of Iceland. Reception both ways 100 %.
9/11	0505	OXB	"	172	3	OXB faint, so do not call.
"	1220	Scoresbysund	36	36	4	Despatched 2, received 1.
"	1730	"	"	"	4	No correspondence.
"	2215	Fishing v.	155	150	5	..

Extract of Log (cont.).

Date 1938	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
9/11	2400	OXB	..	172	3—4	Listening.
10/11	1220	Scoresbysund	36	36	2—3	Connection failed.
"	1740	"	"	"	4	Received 2.
"	2215	Fishing v.	155	150	4	..
11/11	..	..	..	..	..	No connections owing powerful atmos. elec. caused by snow-drift.
12/11	1240	Scoresbysund	36	36	..	No connection, snow-drift.
"	1730	"	"	"	..	Despatched 1, received 2. Loud qrn from snow-drift.
13/11	0505	OXB	155	172	4	Attempt call, no reply. Loud qrn from snow-drift, but no interference on medium waves.
14/11	1730	Scoresbysund	36	36	4	Received 1.
"	1930	Michardbu	150	36	3—5	Telephony.
"	..	OXB	..	172	2—4	Listening regularly for Blaavand.
15/11	1730	Scoresbysund	54	54	2—3	Despatched 1. Connection difficult.
"	1930	Michardbu	150	36	2—3	Severe disturb. from snow-drift.
"	2400	OXB	..	172	1—2	Barely audible.
16/11	1730	Scoresbysund	36	36	4	Despatched 1.
"	1905	OXB	..	172	4	Listening.
"	1930	Michardbu	150	36	4	Telephony.
17/11	1730	Scoresbysund	36	36	3—4	..
"	1930	Michardbu	150	36	2—4	LHCR trying several transm. waves.
"	..	..	..	48	3—4	108 m. goes through best. He does not hear us well.
"	..	..	..	108	5	..
"	2130	s.s. "England"	150	155	5	Position: Øfjord.
"	2205	OXB	..	172	4	Listening.
18/11	1225	Scoresbysund	36	36	5	Received 1.
"	1730	"	"	"	5	Despatched 1.
"	1930	Michardbu	180	108	4	Telephony.
19/11	0130	Ingøi	182	182	4	Telephony.
"	0205	..	..	156	3—4	Hear s.s. "Stella"/OWYM, position north of Port Said, calling Blaavand on telephony.
"	"	OXB	..	172	4	Unsuccessfully tried call Blaavand.
"	1730	Scoresbysund	36	36	4	Received 1.
"	1930	Michardbu	180	108	4	LHCR hears us much better on 180 than on 150 m.
"	2115	s.s. "England"	155	150	5	Position Skagafjord.
"	2205	OXB	..	172	3—4	Listening.
20/11	0130	Ingøi	182	182	4—5	Telephony.
"	0145	..	..	..	5	Hear Scheveningen qsa 5. Attempt call, but no reply.
"	0205	OXB	..	172	3	Listening.
"	0305	"	..	"	3	Listening.
"	0505	"	..	"	3	Listening. Heard Denmark's short-wave transmitter 0300 hrs on about 31.5 m., but faint and unintelligible.

Extract of Log (cont.).

Date 1938	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
20/11	1220	Scoresbysund	36	36	4	No correspondence.
"	1730	"	"	"	"	No correspondence.
"	1930	Michardbu	180	108	"	Telephony.
"	2215	s.s. "England"	155	155	5	Telephony.
21/11	0305	..	..	139	3—4	Heard the two Danish ships "Jutta" and "Niobe" talking per telephony. No position.
"	0405	..	..	"	4—5	Heard the two Danish ships "Jutta" and "Niobe" talking per telephony. No position.
"	0408	OXB	..	172	4	Listening.
"	1220	Scoresbysund	36	36	1—2	No connection.
"	1224	"	54	54	2	No connection.
"	2215	"England"	150	150	4	"England" hears us badly owing to defective anode battery.
22/11	0505	OXB	156	172	4—5	Abortive attempts to connect.
"	0105	"	"	"	5	Abortive attempts to connect.
"	0205	"	..	"	3	OXB weaker, not calling.
"	0505	"	..	"	3	OXB weaker, not calling.
"	1220	Scoresbysund	36	36	1—2	No connection.
"	1225	"	54	54	3	Despatched 1, received 2.
23/11	1815	"	36	36	4	Received 1.
24/11	1220	"	36	36	5	Despatched 2, received 1.
"	1730	"	36	36	4	No correspondence.
"	1930	Michardbu	180	108	5	Telephony.
25/11	1220	Scoresbysund	36	36	4	Despatched 4.
25/11	1220	Scoresbysund	36	36	4	Despatched 2.
28/11	1220	"	36	36	2	No connection.
"	1230	"	54	54	4	Despatched 1, received 2.
29/11	1225	"	36	36	5	Despatched 4.
"	1730	"	36	36	5	Received 1.
30/11	1225	"	36	36	4	Despatched 2, received 1.
1/12	1230	"	36	36	5	Despatched 1, received 3.
"	1730	"	36	36	4	No correspondence.
"	1930	Michardbu	180	108	3—4	Telephony.
2/12	1230	Scoresbysund	36	36	4	Received 3.
"	1730	"	36	36	4	Despatched 2.
3/12	1230	"	36 & 54	36 & 54	..	No connection obtainable.
"	1730	"	54	54	3—4	36 m. cannot be heard.
"	1930	Michardbu	180	108	4	LHCR cannot hear us.
4/12	0015	Lyngby/OXU	..	34, 8	4	Listening in to correspondence to OYF, nothing to us.
"	2105	OXB	..	172	4—5	Listening.
"	0005	"	..	172	2—3	Listening.
5/12	1100	Lyngby/OXT	..	24	4	Listening in to correspondence to OYF, 2 to us.
"	1225	Scoresbysund	54	54	5	Received 2, despatched 4.

Extract of Log (cont.).

Date 1938	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
5/12	1930	Michardbu	180	108	4	LHCR hears us badly; try lowering the big aerial, which may have a screening effect in the direction of Michardbu; no better.
6/12	1230	Scoresbysund	54	54	4	Despatched 7.
"	1305	Eskimonæs	54	54	5	..
7/12	1230	Scoresbysund	54	54	3—4	Despatched 5, received 2. Snow drifting.
"	1730	"	36	36	4	Despatched 10. Heavy snow drifting and noise (qrn).
8/12	1100	Lyngby/OXT	..	24	2—3	Listening.
"	1220	Scoresbysund	..	..	..	No connection. Short-waves quite dead, can hear no station under about 120 m. OXB qsa 2 on 172 m. 2005 hrs.
9/12	..	..	..	..	..	No connection, conditions still being bad for stations up to about 600 m. Kalundborg fine reception. Slight improvement in evening.
10/12	1100	Lyngby/OXT	..	24	3—4	Listening.
"	1340	Scoresbysund	54	825	3	Despatched 1. Cannot hear OXM on 54 m.
11/12	..	Blaavand	..	172	..	Listening every hour, can only hear the carrier wave.
12/12	1230	Scoresbysund	36	36	4	Despatched 11, received 3.
13/12	1225	"	54	54	4	Received 1.
"	1730	"	36	36	4	..
"	2200	Kalundborg	..	..	4—5	Transmission of Xmas greetings to Greenland heard well, though there is much qrn owing to snow drifting. Closed 0300 G.M.T.
14/12	1220	Scoresbysund	54	54	5	Desp. 2, rec'd. 4.
15/12	1220	"	36	36	4	Desp. 12, rec'd. 4 (54 m. qsa 3).
"	2200	Kalundborg	..	..	..	Xmas greetings. Introduction taken via Iceland but reception very poor, whereas Kalundborg direct received well (qsa 5).
16/12	1220	Scoresbysund	54	54	4	Despatched 6, received 1.
"	1335	"	54	54	4	Despatched 4.
"	1400	"	54	54	4	Despatched 12.
"	1800	"	54	54	5	Despatched 3.
17/12	1220	Scoresbysund	54	54	5	Despatched 3.
18/12	1905	Blaavand	..	172	5	Listening.
"	2005	"	..	..	5	Listening.
"	2105	"	..	..	5	Listening.
"	2355	"	156.5	172	5	OXB hears us badly owing to qrn.
19/12	0305	"	156.5	172	3—4	Abortive call.
"	1220	Scoresbysund	54	54	5	Despatched 24. XLT. Received 3.
"	1930	Michardbu	180	108	4	Fading considerable.
"	2200	Kalundborg	..	..	5	Xmas greetings, all clear. Close 0225 hrs.
20/12	0305	Blaavand	156	172	4	Abortive call.
"	1220	Scoresbysund	54	54	4	Despatched 9, received 3.

Extract of Log (cont.).

Date 1938	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
20/12	1430	Lyngby/OXT	..	24	4—5	Blind transmission, nothing for us. Fading.
„	1745	Scoresbysund	36	36	4	No correspondence.
21/12	1220	Scoresbysund	54	54	4	Received 3.
„	1740	„	54	54	4	Received 3.
„	2200	Michardbu	180	36	2—4	Photographing Northern lights. Poor connection.
22/12	1220	Scoresbysund	54	54	5	Received 4.
„	1730	„	54	54	5	Despatched 4, received 8.
„	2205	Blaavand	..	172	4	Listening.
„	2305	„	..	„	5	Listening.
23/12	0805	„	156,5	172	5	Telephony, reception 100 %.
„	1220	Scoresbysund	54	54	5	Despatched 2.
27/12	1220	„	54	54	5	Despatched 1, received 6.
28/12	1230	„	54	54	5	Despatched 20, received 2.
„	1745	„	54	54	5	Despatched 5. Motor trouble, connecting-rod bearing melted, connecting-rod replaced.
29/12	0335	Blaavand	156,5	172	5	Telephone conversation with Damsø 1161 y and Lyngby 1880. Closed 0420 hrs. OXB reports qsa 2—5.
„	1225	Scoresbysund	54	54	4	Despatched 5, received 2.
1939						
1/1	0510	Blaavand	156,5	172	5	Telephone conversation with Varde 315 x. OXB reports some fading but reception now and then very powerful.
2/1	1220	Scoresbysund	54	54	5	Received 6.
„	1830	Angmagssalik	152	147	3—4	Telephony test, OZL trying send on 36 m., 950 m. and 147 m., the latter being best. OZL reports our telephony very fine quality as to both strength and modulation.
3/1	0210	Blaavand	156,5	172	5	Telephony. Experiment with two-way tel. OXB hears me despite strong qrn.
„	0520	„	„	„	5	Telephony, two-way experiments. Considerable fading.
5/1	1220	Scoresbysund	54	54	5	No correspondence.
„	1830	Angmagssalik	150	155	4	Telephony test.
6/1	0005	Blaavand	156,5	172	5	Telephony. OXB reports very loud volume. Asked OXB listen for OZL; after abortive attempt communicate with Angmagssalik Blaavand came in and we arranged call 0405 hrs.
„	0405	„	156,5	172	5	Called Ordrup 5107. When connection in order strong fading prevents conversation.
„	1220	Scoresbysund	54	54	5	Despatched 1.
7/1	0005	Blaavand	..	172	2—3	Listening.
„	0405	„	156,5	172	4	Telephony, strong qrn at OXB.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
7/1	1223	Scoresbysund	54	54	4	Despatched 1.
9/1	0105	Blaavand	..	172	2-3	Listening.
"	1220	Scoresbysund	54	54	3-4	Despatched 2, received 1.
"	1740	"	36	36	4	No correspondence.
"	1930	Michardbu	180	108	4	Telephony.
"	2200	"	150	108	4	Northern lights photography. Closed 2400 hrs.
10/1	0100	"	150	108	5	Arranged for more photography.
"	0220	Blaavand	156,5	172	3-5	Telephony. Considerable fading.
"	1220	Scoresbysund	54	54	4	No correspondence.
"	1745	"	150	825	2-3	Telephony test. OXM tried 156 m. and 825 m., the latter being better. Very faint but not distorted.
"	1930	Michardbu	150	108	5	Telephony.
"	2200	"	150	108	5	Telephony. No Northern lights.
"	2300	"	150	108	5	Telephony. No Northern lights.
11/1	0005	Blaavand	156,5	172	4	Abortive call.
"	1223	Scoresbysund	54	54	5	Received 1.
"	1730	"	36	36	5	Despatched 1.
"	1830	Angmagssalik	156	156	4	Telephony.
"	1930	Michardbu	150	108	4	Telephony.
"	2200	"	150	108	5	Telephony. No Northern lights.
"	2300	"	150	108	5	Telephony. No Northern lights.
12/1	0005	Angmagssalik	150	156	5	Telephony test.
"	0105	Blaavand	..	172	3	Listening.
"	1220	Scoresbysund	54	54	4	Despatched 1, received 1.
"	1720	"	36	36	4	..
13/1	0005	Blaavand	..	172	2-3	Listening.
"	1220	Scoresbysund	54	54	4	Despatched 2, received 1.
"	1720	"	36	36	4	No correspondence.
"	1930	Michardbu	150	108	3-4	Telephony.
14/1	0005	Blaavand	156,5	172	4	OXB answers immediately but has much fading and static.
"	1220	Scoresbysund	54	54	5	Received 1.
"	2000	Michardbu	150	108	5	Northern lights photography till 0100 hrs. G.M.T.
15/1	0205	Blaavand	156,5	172	5	Telephony reception very good.
"	2000	"	..	172	2	Listening.
"	2100	"	..	172	3	Listening.
"	2200	"	..	172	3	Listening.
16/1	0105	"	..	172	3-4	Listening.
"	0145	s.s. "Northern Princess" /GYVV	182	182	4-5	GYVV's position: 74° N., 18°18' W. Telephonic conversation with ship's captain and telegraphist. Reception 100 %. Closed 0215 hrs.
"	1220	Scoresbysund	54	54	3	Despatched 1.
"	1730	"	36	36	4	No correspondence.
17/1	1220	"	54	54	4-5	Received 1.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
17/1	1515	Lyngbyradio	..	24	3—4	Listening to long telegram to us.
"	1740	Scoresbysund	36	36	4	No correspondence.
"	1940	Michardbu	156	108	2	Poor connection qrn.
"	2340	Angmagssalik	156	150	5	Telephony, 100 % reception. Closed 0040 hrs.
18/1	0505	Blaavand	..	156	5	OXB complains of much disturbance.
"	1730	Scoresbysund	36	36	5	No correspondence.
"	2205	Blaavand	..	172	4	Listening.
19/1	0015	Blaavand	156	172	5	OXB very powerful; he reports qsa 4—5 but interference from Dutch trawlers.
"	0105	"	156	172	4—5	OXB reports qsa 3. Much fading. At 0008 OXB heard telephoning to s.s. "Niobe" in the middle of the Bay of Biscay. Both stations heard full strength on loud speaker.
"	1220	Scoresbysund	54	54	5	No correspondence.
"	1735	"	36	36	5	No correspondence.
20/1	0005	Blaavand	..	172	3—4	Much static, exactly as during approaching thunder at home. This is the first time I have heard it here, where usually there is only qrn from snow-drifting.
"	0107	"	156,5	172	4—5	OXB cannot grasp our name owing to atmospherics, but knows he is being called.
"	1220	Scoresbysund	54	54	4	Despatched 1. qrn ceased.
21/1	0010	Blaavand	156,5	172	3—5	Telephony. Much fading. We heard qsa 1—5.
"	1223	Scoresbysund	54	54	4	Despatched 1.
"	2005	Blaavand	..	172	3—4	Listening.
"	2205	"	..	172	4	Listening. During a very brief period about midnight conditions on medium-waves very good, but with much static. Lyngby Radio's telephony heard excellently on 188 m. s.s. "Esther" communicating with OXB heard loudly. Blaavand seems weak compared with the other stations.
22/1	0105	Lyngby Radio	..	188	4	Lyngby corresponding by telephony with the motor-ferry "Sjælland". Both stations heard excellently (100 % understood).
23/1	1220	Scoresbysund	54	54	3—4	Despatched 2. Motor trouble.
24/1	1220	"	54	54	..	No connection owing to qrn from snow-drifting.
"	1735	"	36	36	4	Despatched 1, received 1.
25/1	0010	Blaavand	156,5	172	5	Telephony. Try sending on 139 and 188 m. OXB reports 188 m. almost just as good as 156 m., 139 can be heard but difficult to judge owing to disturbance.
"	1310	Scoresbysund	36	36	4	Despatched 1, received 2.
26/1	1220	"	54	54	5	No correspondence.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
26/1	1730	Scoresbysund	36	36	2	No connection owing to qrn, snow-drifting.
27/1	1220	"	54	54	5	Despatched 1, received 1.
"	2005	Blaavand	..	172	2—4	Listening. OXB varies greatly in strength.
28/1	1220	Scoresbysund	54	54	5	Despatched 2.
"	2005	Blaavand	..	172	4	Listening. Lyngby heard qsa 3—4 on 188 m. Great-Belt ferry heard qsa 4.
29/1	2005	"	..	172	5	Listening. During the evening heard m.s. "Kronprins Olav", "Randa", "Drogden" and Lyngby Radio, all received excellently.
30/1	0005	"	..	"	1	Listening.
"	1220	Scoresbysund	54	54	5	Received 2.
"	1725	"	36	36	5	..
31/1	1220	"	54	54	5	Despatched 1.
"	1730	"	36	36	5	..
"	2005	Blaavand	..	172	4	Listening. Hear Danish route-ships corresponding on 154 m. qsa 4.
1/2	0010	"	156	172	5	OXB has considerable disturbance (qrn and qrm) so does not understand everything from here.
"	0105	"	156	172	5	Excellent connection, OXB understands everything but still has much disturbance and says there has been unusually much qrn this winter.
"	0305	"	156	172	5	OXB cannot understand us for disturbance.
"	1220	Scoresbysund	54	54	5	Despatched 2.
2/2	0105	Blaavand	..	172	1—3	Listening. Same result 0205 hrs. and 0305 hrs.
"	1220	Scoresbysund	54	54	3	Despatched 1.
3/2	1224	"	54	54	3	No correspondence.
"	1740	Angmagssalik	36	36	4	Received 1.
3/2	2140	Ingoi	600	600	4	Calling.
"	2143	"	151	182	4	Arranged telephone call to Oslo.
4/2	1224	Scoresbysund	54	54	4	Despatched 1.
"	1730	"	36	36	5	No correspondence.
"	2100	Ingoi	151	151	5	Telephony. Ingoi unable to put call through to Oslo owing poor land line.
5/2	0300	Aalesund	182	182	4	Arranged telephone call.
"	0330	Blaavand	156	172	5	Called Skodsborg 119. The call went through splendidly.
6/2	0108	Blaavand	156	172	5	Telephony. 100 % understood.
"	1225	Scoresbysund	54	54	5	Received 2.
"	1300	Eskimonæs	54	54	5	..
"	2300	Aalesund	182	182	3—4	Telephone call to Oslo. Aalesund hears us better than we do him.
7/2	1224	Scoresbysund	54	54	4	Despatched 3, received 2.
"	1730	"	36	36	1—2	..
"	1734	"	54	54	3	Despatched 2.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
8/2	0500	Aalesund	182	182	2-3	Connection unreliable.
"	0525	Blaavand	..	172	3	Listening.
"	1224	Scoresbysund	54	54	4	Despatched 1.
"	1730	"	36	36	4	Despatched 1.
"	1930	Michardbu	182	108	4	Received note from Aalesund.
"	2105	Aalesund	182	182	2-4	Telephone call to Oslo. Connection badly inter- fered with by fading and fails completely 2210 hrs.
9/2	0100	"	182	182	2	Called Aalesund without result.
"	0115	Blaavand	..	172	2-3	Listening.
"	1210	Scoresbysund	600	600	..	Called, no answer.
"	1223	"	54	54	5	OXM heard my call on 600 m. very loudly.
10/2	0020	Lyngby/OXU	..	35	4	Listening to correspondence to us.
"	1223	Scoresbysund	54	54	3-4	Despatched 4.
"	1730	"	36	36	4	Received 1. In the evening all listening impossible owing to noise from snow-drifting.
11/2	1225	Scoresbysund	36	36	3-4	Despatched 1, received 2. 54 m. qsa 2.
"	1310	"	660	825	3	Received 2.
"	2005	Blaavand	..	172	1-2	OXB very faint. Simultaneously heard s.s. "Jo- hanne" very loudly on 156 m. No position.
13/2	1223	Scoresbysund	54	54	3	Despatched 2, received 2.
"	2005	Blaavand	..	172	3-4	Listening.
"	2007	s.s. "Tjaldur"	..	156	4	Listening. Position near Faeroes.
"	2205	Blaavand	..	172	2	Listening.
14/2	1225	Scoresbysund	54	54	4	..
15/2	1220	"	54	54	3	Despatched 3, received 2. 36 m. qsa 5.
"	1730	"	36	36	5	Despatched 1. In the evening connection with Michardbu and "En avant" every half hour for Northern lights phot.
16/2	0005	Michardbu	150	108	4	Connection every half hour till 0640 G.M.T.
"	1220	Scoresbysund	54	54	4	Motor trouble. Connection failed.
"	1735	"	36	36	3-4	Despatched 1.
"	2100	Michardbu	150	108	4	Northern lights photography till 0100 hrs.
17/2	1225	Scoresbysund	54	54	3	Acknowledged 2 telegrams intercepted from Lyngbyradio.
"	1735	"	36	36	4	Despatched 2.
"	2100	Michardbu	150	108	5	Northern lights phot. Closed 0100 G.M.T.
18/2	1730	Scoresbysund	36	36	4	Despatched 1.
"	2200	"	180	825	2-3	Tried telephony. Much fading. Snow-drifting.
19/2	..	..	..	..	..	Snowstorm. Down-lead from big aerial broken.
20/2	1224	Scoresbysund	54	54	3	Despatched 2, received 1.
21/2	1225	"	36	36	4	Received 3. Snowstorm. Wind 10-11. qrn.
"	1730	"	36	36	4	Despatched 2. Snowstorm. Wind 10-11. qrn.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
$2^2/2$	1730	Scoresbysund	36	36	4	Despatched 1, received 2.
"	2100	Michardbu	180	108	3-4	Connection every half hour till 2400 hrs. for Northern lights phot.
$2^3/2$	0200	Blaavand	..	172	3-4	Listening. Hear s.s. "Esther" call OXB from Greek archipelago. qsa 3.
"	1224	Scoresbysund	54	54	3	..
"	1735	"	36	36	3	..
"	2100	Michardbu	180	108	4	No photography owing to mist.
$2^4/2$	1225	Scoresbysund	54	54	3-4	Desp. 2, rec. 1. Signals sound as if echoing.
"	2110	Michardbu	180	108	4	Telephony.
$2^5/2$	1225	Scoresbysund	54	54	3	Despatched 3, received 2.
$2^7/2$	1224	"	54	54	2-3	No correspondence.
"	2100	Michardbu	180	108	5	Telephony.
$2^8/2$	1225	Scoresbysund	54	54	2-3	No correspondence.
"	1730	"	36	36	4	No correspondence.
"	2100	Michardbu	180	108	5	Telephony.
$1/3$	1223	Scoresbysund	36	36	3	Despatched 1. 54 m. qsa 1.
"	2100	Michardbu	180	108	4	Telephony.
$2/3$	1730	Scoresbysund	36	36	4	Despatched 2.
"	2105	Michardbu	150	108	5	Telephony.
$3/3$	1225	Scoresbysund	36	36	3	Despatched 2.
"	2100	Michardbu	150	108	5	Telephony. Blaavand has long been faint and is still. qsa 1-2.
$4/3$	1220	Scoresbysund	54	54	..	No connection.
"	1730	"	36	36	..	No connection.
"	2025	Eskimonæs	54	54	5	..
"	2100	Michardbu	150	108	4	Telephony.
"	2300	Blaavand	..	172	1-2	Listening.
$5/3$	2015	Eskimonæs	54	54	5	..
"	2100	Michardbu	150	108	4	Telephony.
$6/3$	1225	Scoresbysund	36	36	3-4	Despatched 1, received 1. qrm.
"	1348	"	54	54	3	Despatched 2.
"	1740	"	36	36	3	Despatched 1.
"	1930	Angmagssalik	150	155	4	Telephony. 100 % understood.
$7/3$	1225	Scoresbysund	36	36	3-4	No correspondence.
"	2015	Eskimonæs	54	54	5	..
$8/3$	0105	Blaavand	..	172	1-2	Listening.
"	1223	Scoresbysund	36	36	5	Despatched 1.
"	1730	"	36	36	5	Despatched 1. qsl from OZL.
"	1930	Angmagssalik	150	155	4	Telephony trial.
"	2015	Ellao	150	54	4	Telephony.
"	2100	Michardbu	150	108	5	Telephony.
$9/3$	1223	Scoresbysund	36	36	4	Despatched 2, received 2.
"	2100	Michardbu	150	108	4	Telephony.
"	2300	"	150	108	5	Telephony.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
10/3	1223	Scoresbysund	36	36	4	Despatched 4.
"	1730	"	36	36	4	Despatched 1.
"	2015	Eskimonæs	54	54	5	..
"	2100	Michardbu	150	108	5	Telephony.
11/3	0005	Blaavand	..	172	3	Listening.
"	0105	s.s. "Grete"	150	155	2-3	Frederikshavn fishing-vessel "Grete" off north Iceland coast reports he hears us at full loud-speaker strength.
"	0205	Blaavand	..	172	2	Listening.
"	1330	Scoresbysund	660	54	3	Despatched 1. OXM cannot hear my 54 m.
"	2100	Michardbu	150	108	4	Telephony.
"	2300	"	150	108	4	Telephony.
"	2400	"	150	108	5	Telephony.
12/3	0005	Blaavand	..	172	2	Listening.
"	2115	Michardbu	150	108	4	Telephony.
13/3	0105	Blaavand	156	172	4	Attempt to connect abortive.
"	0205	"	156	172	4-5	Fading, no connection. Hear "Niobe" and "Carmen" talking per telephony on 139 m. Carmen arriving London to morrow evening. qsa 4.
"	1220	Scoresbysund	36	36	1	No connection.
"	1730	"	54	54	3	Despatched 1. 36 m. qsa 1.
"	2115	Michardbu	150	108	4	Telephony.
14/3	0005	Blaavand	..	172	1-4	OXB varies greatly in strength.
"	1220	Scoresbysund	36	36	3-4	Despatched 3, received 1.
"	1730	"	54	54	4	Despatched 1. 36 m. qsa 2.
"	1930	Angmagssalik	150	155	2	Telephony.
"	2115	Michardbu	150	108	4	Telephony.
"	2345	Angmagssalik	150	155	1-4	Telephony trial, much fading.
15/3	1228	Scoresbysund	36	36	3	No correspondence.
"	1730	"	36	36	1-2	Simultaneously connection with Angmagssalik on 36 m. qsa 4.
"	1735	"	54	54	4	Received 1.
16/3	..	..	..	..	..	No connections owing to snow-drifting (qrn).
17/3	1220	Scoresbysund	36	36	5	Despatched 1, received 1.
18/3	1220	"	36	36	5	..
"	2200	Blaavand	..	172	2	Listening.
"	2210	Reykjavik	..	148	3-4	Listening.
"	2400	Blaavand	..	172	3-4	Listening.
19/3	0010	Lyngby	..	188	3-4	Listening.
20/3	1235	Scoresbysund	36	36	4-5	..
"	1735	"	36	36	4	..
"	2115	Michardbu	180	108	5	Conclusion of Northern lights phot.
21/3	0005	Blaavand	..	172	2	Listening.
"	0105	"	..	172	2	Listening.
"	1220	Scoresbysund	36	36	5	Despatched 1.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
21/3	1730	Scoresbysund	36	36	5	..
"	2115	"England"	156	150	4	Telephony with vessel fishing north of Iceland.
"	2145	"Lord Lloyd"	156	150	4	Telephony.
"	2245	Reykjavik	182	148	3—4	Ordered telephone call to Copenhagen.
22/3	1230	Scoresbysund	36	36	4	Despatched 3, received 1.
"	1730	"	36	36	4—5	Despatched 1.
"	2215	"	182	148	..	Called TFA in order to establish call ordered yesterday, but no reply. Also tried 600 m. without success. Conditions in medium wave band much deteriorated since yesterday.
23/3	1230	Scoresbysund	36	36	4—5	No correspondence.
"	1725	"	36	36	3	No correspondence.
"	1730	Angmagssalik	36	36	5	No correspondence.
24/3	0005	Blaavand	..	172	1	Listening.
"	1230	Scoresbysund	36	36	4	..
"	1730	"	36	36	4	..
"	2115	Michardbu	180	108	4	Telephony.
25/3	1230	Scoresbysund	36	36	4—5	Despatched 2.
"	1730	"	36	36	4	Despatched 1.
"	1738	Angmagssalik	36	36	3	..
26/3	0005	Blaavand	..	172	..	Blaavand cannot be heard.
"	2130	Michardbu	180	108	4	Telephony.
27/3	0005	Blaavand	..	172	2	Listening.
"	1228	Scoresbysund	36	36	4	..
"	1730	"	36	36	3	..
28/3	1230	"	36	36	4	Received 1.
29/3	1230	"	54	54	4	Received 1.
"	1250	Eskimonæs	54	54	5	Notifying search for two trappers.
"	1700	Michardbu	180	108	4	..
"	1710	Eskimonæs	54	54	5	..
"	1730	Scoresbysund	54	54	4	..
"	1820	"	54	54	4	Despatched 1.
"	2030	..	150	..	..	Telephony. Communication to trapping stations at Gefionshavn and on Hochstetter re missing trappers.
30/3	1100	Scoresbysund	36	36	2—4	Fading.
"	1230	"	54	54	4	Despatched 1.
"	2030	Eskimonæs	156	54	5	Telephony.
31/3	0005	Blaavand	..	172	2	Listening.
"	1230	Scoresbysund	54	54	3	Fading. 36 m. qsa 2.
"	1615	"	36	36	4	..
"	1742	"	36	36	3	Received 4.
"	2015	Eskimonæs	150	54	5	Telephony. Poor modulation on OYA.
1/4	1100	Scoresbysund	36	36	5	Despatched 1, received 2.
"	1220	"	36	36	5	Despatched 1, received 2.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
1/4	1308	Scoresbysund	36	36	5	Despatched 7.
"	2015	Eskimonæs	150	54	5	Telephony.
3/4	0105	Blaavand	..	172	1	Listening.
"	1232	Scoresbysund	36	36	4	Despatched 3.
"	2130	Michardbu	180	108	3—5	Telephony.
4/4	1226	Scoresbysund	54	54	3	Despatched 2.
5/4	1220	"	54	54	4	Despatched 1, received 2.
6/4	1740	"	36	36	4	Received 3.
"	2130	Michardbu	150	108	4	Telephony.
8/4	1225	Scoresbysund	36	36	4	Despatched 4, received 2.
11/4	1245	Eskimonæs	54	54	3	OYA the only station audible on the shortwave band.
12/4	1230	Scoresbysund	36	36	2—3	Despatched 1, received 4.
"	1330	"	36	36	3—4	Despatched 9.
"	1740	"	36	36	2—4	Fading. In the evening, first powerful atmospherics, then suddenly a strong Föhn wind.
13/4	1230	"	36	36	4	..
14/4	1230	"	36	36	5	Despatched 1.
"	1730	"	36	36	4	Despatched 1.
15/4	1230	"	36	36	4	Despatched 1.
17/4	1230	"	36	36	..	Called OXM on 36 m. and 54 m., but make no connection. The short-wave band dead. Unusually much fading on long waves.
"	1730	"	36	36	..	Called OXM on 36 m. and 54 m., but make no connection. The short-wave band dead. Unusually much fading on long waves.
18/4	..	..	..	..	..	Short-wave band completely dead; cannot hear any short-wave station, not even Eskimonæs.
19/4	..	..	..	..	..	Short-wave band still useless. Long-waves good except for very considerable periodical fading.
"	1230	Isfjord	600	600	5	..
20/4	..	..	..	..	..	Still unable to communicate on short waves.
21/4	1248	Ellao	54	54	4	Called Scoresbysund on 36 m. and 600 m. without result.
"	1315	Eskimonæs	800	825	5	..
22/4	1228	Scoresbysund	36	36	4	Despatched 5, received 1.
24/4	1210	"	600	825	..	Short waves dead again. Hear Scoresbysund and Angmagssalik on 825 and 950 m. qsa 3. Called Scoresbysund without result.
25/4	..	..	..	..	..	Not a single station heard on short waves, even in the evening.
26/4	1300	Eskimonæs	600	625	5	Short-waves still useless, slight improvement in evening. At 2400 hrs. 35 m. fairly good, when Lyngby/oxu heard, qsa 3—4.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
27/4	1245	Eskimonæs	..	54	1—2	Can just hear OYA, which normally extremely powerful.
„	1717	Scoresbysund	36	36	5	OXM now heard excellently; call him in vain.
„	2005	Eskimonæs	54	54	5	..
28/4	1230	Scoresbysund	36	36	4	Received 1.
„	1615	„	36	36	4	Despatched 4.
29/4	1230	„	36	33	4	..
30/4	..	..	..	..	..	Short-waves dead, no connections.
1/5	..	..	..	..	..	Short-waves dead, no connections.
2/5	..	..	..	..	..	In evening slight improvement on short waves.
3/5	1230	Scoresbysund	36	36	1—2	No connection.
„	1310	Eskimonæs	660	725	4	..
„	1215	Isfjord/LML	600	600	5	..
„	1515	Lyngby/OXR	..	23	2	Listening.
„	1740	Scoresbysund	..	36	..	Cannot hear OXM.
„	2030	Lyngby/OXU	..	35	5	Listening.
4/5	1233	Scoresbysund	36	36	3	Received 2.
„	1330	„	36	33	3	Despatched 3. Considerable fading.
„	1740	„	36	33	2—3	Connection difficult. Despatched 1.
5/5	..	..	..	..	..	Short waves dead. No connection.
6/5	1730	Scoresbysund	660	630	3	Despatched 1. qrm. Short waves useless.
8/5	1230	„	36	36	..	No connection.
„	1730	„	54	825	3	Despatched 2.
9/5	1230	„	36	36	4	Despatched 5, received 1.
10/5	1230	„	36	36	4	..
„	1235	Isfjord	600	600	5	..
11/5	1100	Michardbu	600	600	5	..
„	1228	Scoresbysund	36	36	5	Despatched 2.
„	1742	„	36	36	5	..
„	2020	Michardbu	150	108	4	Telephony.
12/5	1226	Scoresbysund	36	36	4—5	Received 1.
„	1740	„	36	36	5	Despatched 4.
„	2200	Michardbu	150	108	5	Telephony.
13/5	1230	Scoresbysund	36	36	5	..
„	1740	„	36	36	5	..
„	2200	Michardbu	150	108	5	Telephony.
14/5	1705	Scoresbysund	36	36	5	..
15/5	1230	„	36	33	4—5	..
„	1730	„	36	36	5	..
16/5	1230	„	36	36	4	Received 4.
„	1730	„	36	36	4	..
„	2200	Michardbu	150	108	4	Telephony.
17/5	1228	Scoresbysund	36	36	4	Despatched 2.
„	1730	„	36	36	4	..
18/5	2200	Michardbu	150	108	5	Telephony.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
19/5	1230	Scoresbysund	36	36	5	..
"	1730	"	36	36	4	..
20/5	1226	"	36	36	4—5	Received 2.
"	1738	"	36	36	5	Despatched 1.
21/5	..	..	..	..	..	Regular listening on medium waves every hour from 1200 to 2400. Only few stations heard, and these too faint for identification.
22/5	1230	Scoresbysund	36	36	4—5	Received 1.
"	1730	"	36	36	4—5	..
"	2200	Michardbu	150	108	4	Telephony.
23/5	1248	Eskimonæs	54	54	5	..
"	2200	Michardbu	150	600	5	..
24/5	1230	Scoresbysund	36	36	4	Received 1.
"	1744	"	36	36	5	Despatched 1.
25/5	1230	"	36	36	5	Snowstorm.
"	1740	"	36	36	5	Snowstorm. Despatched 1.
26/5	1735	"	36	36	5	..
27/5	1226	"	36	36	5	Received 2.
"	1743	"	36	36	5	Despatched 4.
30/5	1220	"	36	36	5	Received 2.
"	1752	"	36	36	5	Despatched 2.
31/5	1740	"	36	36	5	Despatched 1.
1/6	1230	"	36	36	5	Despatched 1.
2/6	1228	"	36	36	5	Received 1.
3/6	1225	"	36	36	5	..
"	1750	"	36	36	5	..
"	1915	"	36	36	4—5	Despatched 2.
4/6	2350	S. P. 2 L. M.	41	41	RST 436	Contact with Polish amateur sender, who reports RST 558; audibility maximum, volume maximum, transmission frequency quite constant without modulation.
5/6	1229	Scoresbysund	36	36	5	Despatched 1.
"	1730	"	36	36	5	Despatched 2.
6/6	1230	"	36	36	5	..
"	1740	"	36	36	5	Despatched 2, received 1.
7/6	1230	"	36	36	5	Received 1.
8/6	1230	"	36	36	5	Despatched 2, received 1.
9/6	1222	"	36	36	5	Despatched 1.
"	1720	"	36	36	5	Despatched 3.
10/6	1232	"	36	36	5	Despatched 2, received 1.
"	1730	"	36	36	5	..
12/6	1227	"	36	36	4	Despatched 5.
13/6	1228	"	36	36	5	Despatched 5, received 2.
14/6	1230	"	36	36	5	Received 1.
"	1315	Michardbu	150	600	5	..

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
15/6	1222	Scoresbysund	36	36	5	..
16/6	1224	"	36	36	5	Despatched 4, received 4.
17/6	1230	"	36	36	5	Received 2.
20/6	1740	"	36	36	5	Despatched 2.
21/6	1108	"	36	36	5	Despatched 4.
"	1220	"	36	36	5	Despatched 1.
"	1740	"	36	36	5	Despatched 1.
22/6	1225	"	36	36	4	Received 1.
23/6	1225	"	36	36	5	Despatched 4, received 6.
"	1740	"	36	36	5	Despatched 2.
24/6	1220	"	36	36	4	Despatched 2.
26/6	1220	"	36	36	4	Despatched 2, received 5.
27/6	1230	"	36	36	4	..
28/6	1230	"	36	36	5	Despatched 3, received 5.
29/6	1230	"	36	36	4	Despatched 5, received 3.
30/6	1228	"	36	36	4	Despatched 5, received 4.
1/7	1230	"	36	36	5	..
3/7	1305	"	54	54	5	Received 1.
"	1725	"	36	36	5	..
4/7	1220	"	36	36	4	Received 2.
5/7	1230	"	36	36	3-4	Despatched 2.
"	1730	"	36	36	4	Received 3.
6/7	1220	"	36	36	4	Despatched 1.
7/7	1145	"Gertrud Rask"	36	36	5	..
"	1200	Scoresbysund	36	36	5	Despatched 1, received 1.
"	1746	"	36	36	5	Despatched 3.
"	1930	Michardbu	150	600	5	..
"	2008	Eskimonæs	54	54	5	..
8/7	1310	Michardbu	150	600	5	..
"	1740	Scoresbysund	36	36	5	..
9/7	2015	Eskimonæs	54	54	5	..
10/7	1228	Scoresbysund	36	36	5	..
"	1735	"	36	36	4	..
11/7	1224	"	36	36	5	..
"	1740	"	36	36	4	Despatched 2.
12/7	1222	"	36	36	4	..
13/7	1232	"	36	36	4	Despatched 4, received 1.
14/7	1227	"	36	36	3	Despatched 1.
15/7	1730	"	36	36	3-4	..
17/7	1222	"	36	36	4	..
18/7	1320	"	36	36	4	..
19/7	1230	"	36	36	2-3	Can hear no other s. w. station than OXM.
20/7	1740	"	36	36	3	..
"	2210	Eskimonæs	54	54	5	..
"	2300	Michardbu	660	600	5	..

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
21/7	1230	Scoresbysund	36	36	3—4	Despatched 1.
"	1730	"	36	36	2—4	Fading.
22/7	1230	"	36	36	3	..
"	1310	Michardbu	660	600	4	..
"	2235	OYVB	54	54	3—4	s.s. "Gustav Holm", carrying relief personnel to the station, left Iceland yesterday 1030 hrs. He hears my transmitter clearly.
23/7	2225	"	54	54	4	..
24/7	1225	Scoresbysund	36	36	4	..
"	2218	OYVB	54	54	4	Position: lat. 71°6' N., long. 13°0' W.
25/7	1234	Scoresbysund	36	36	3	Despatched 1.
"	2215	OYVB	54	54	3	..
26/7	1334	Scoresbysund	36	36	4	Despatched 1.
"	2212	OYVB	54	54	5	"Gustav Holm" lying at Cape Herchel.
27/7	1225	Scoresbysund	36	36	4	..
"	2210	OYVB	54	54	4	..
28/7	1230	Scoresbysund	36	36	4	..
"	1315	Michardbu	660	600	5	The Norwegian expedition ship "En avant" got through the ice three days ago and is now at Michardbu.
"	2208	OYVB	54	54	5	..
29/7	1232	Scoresbysund	36	36	3	Despatched 1, received 1.
"	2210	OYVB	54	54	5	qrm.
31/7	1230	Scoresbysund	36	36	4	..
"	1310	Michardbu	150	108	4	Telephony.
"	2225	OYVB	54	54	4	..
"	2230	Eskimonæs	54	54	5	..
1/8	1225	Scoresbysund	36	36	4	Despatched 1.
"	1305	Michardbu	150	108	4	Telephony.
"	2225	OYVB	54	54	5	..
2/8	1100	Lyngby/OXT	..	24	4	Listening.
"	1228	Scoresbysund	36	36	4	Despatching 1, received 2.
"	2215	OYVB	54	54	4	"Gustav Holm" on way from Ellæ to Sand- odden.
3/8	1225	Scoresbysund	36	36	4	..
"	2215	OYVB	54	54	4	..
4/8	1312	Scoresbysund	36	36	3—4	Despatched 1.
"	1320	s.s. "En avant"	150	108	5	Telephony. "En avant" lying at Danmarkshavn.
"	2210	OYVB	54	54	3—4	..
5/8	1230	Scoresbysund	36	36	4	..
"	1310	"En avant"	660	600	5	..
6/8	2215	OYVB	54	54	4	..
7/8	1230	Scoresbysund	36	36	4	Despatched 1.
"	2215	OYVB	54	54	4	..
8/8	1230	Scoresbysund	36	36	5	Received 2.

Extract of Log (cont.).

Date 1939	Hour G.M.T.	Station	Transm. wave-l.	Rec. wave-l.	Volume qsa	Remarks
8/s	2230	OYVB	54	54	3—4	Position between Cape Franklin and Hold with Hope.
9/s	1223	Scoresbysund	36	36	4	Received 7.
„	2215	OYVB	54	54	4	Position between Hold with Hope and Myggebugt.
10/s	1230	Scoresbysund	36	..	..	Short-wave band dead; cannot hear any station.
11/s	1310	Eskimonæs	600	600	5	S.-w. band still dead.
„	1315	OYVB	660	700	4	..
12/s	1000	„	600	600	5	S.-w. band still dead.
„	2200	„	660	660	5	S.-w. band still dead.
13/s	1000	„	150	54	4	Telephony from us.
„	1740	„	150	54	5	Telephony from us. Position 74°40' N., 18°10' W.
14/s	1224	Scoresbysund	36	36	4	Despatched 1, received 1.
„	1300	OYVB	150	600	5	Position: 20 miles from Danmarkshavn.
„	2200	„	150	600	5	..
15/s	1000	„	150	600	5	..
16/s	1225	Scoresbysund	36	36	4	Despatched 2.
„	1300	OYVB	150	600	5	..
„	1720	„	150	600	5	..
„	1725	Scoresbysund	36	36	4	..
„	1800	OYVB	150	600	5	“Gustav Holm” arrived Hvalrosodden.
17/s	1230	Scoresbysund	36	36	4	Received 1.
18/s	0740	..	..	..	..	“Gustav Holm” arrived Mørkefjord. Station taken over by relief party.

BD. 127, NR. 2.

Errata.

Pag. 11, 14d line from the top, for *throught*, read *thought*.