HELLSCHREIBER

Notes for Information Officers on the installation, working and general maintenance of printers for reception of the London Press Service.

1. Information Officers in a large number of overseas posts working to the Foreign, Commonwealth Relations and Colonial Offices are due to receive equipment for the reception of the London Press Service by the Hellschreiber system. Some posts have already received their equipment, notably in Latin America and the Caribbean area, and tests have shown continuous improvement.

The working party of the Central Office of Information and the Overseas Departments, charged with this matter, came to the conclusion that the success of this system would depend to a large extent on the care and understanding given by Information Officers to the introduction of the machines. With post Information Officers this understanding cannot be gained simply by reading a technical book of instructions. One is sent with the printer - but it will be of greater help to whatever technician you call in to assist with the installation, or the periodic "servicing" of the equipment.

The working party has therefore obtained from its technical members the following set of notes which explain in clear - and as far as possible, non-technical - terms exactly what the Hellschreiber system is and how it can be worked to give the best results. The notes are meant to answer as many as possible of the questions which will occur to you when you learn that your equipment has arrived. They are meant to relieve you of a large number of doubts and problems. They should help you to give the best aid to your technical staff in carefully setting and installing the relay and printer so that what is a relatively simple and reliable system of automatic transmission can work smoothly and cheaply after the necessary initial tests for improvement of reception.

2. The name "Hellschreiber" comes from a combination of the names of the inventor, Dr. H. Hell, and the German word "schreiber" meaning "writer". The principle of the system is similar to wireless photography - but much more simple and limited. At the transmitting end a keyboard perforator, and an electrically driven Hell-sender are used. The signals are transmitted in the same way as Morse, and are received on a wireless receiver in the ordinary manner. They are then passed to a relay which changes them into unidirectional electrical impulses. From the relay the impulses are passed to the printer where, by a series of ingenious mechanical devices, they activate an arm which causes letters appropriate to the signals transmitted to be inscribed on a tape.

3. Under normal conditions Hellschreiber is accurate, speedy and cheap. It serves as an ideal means of transmission for the material produced by news agencies and kindred bodies such as the London Press Service. Each letter is transmitted and reproduced mechanically and the signals will give a readable script in adverse conditions when Morse would fail. The strain of reception is put upon a machine rather than on an individual, as in Morse. Transmission is at 50 words a minute - the speed at which a good typist works. The machine can keep it up much longer, of course, and, though it wants oiling from time to time, doesn't break off for coffee and the operator can type from the tape at his leisure. Wireless transmitters are costly to construct and expensive to hire. The speed of Hellschreiber therefore, which is more than twice that of Morse now used on the
London Press Service, reduces the transmitting charges by about 50%. Economies can also be made at the receiving end. Furthermore for the cost of one transmission the material can be received at great distances by an unlimited number of people. The running expenses are small and the system is rapidly growing in popularity.

The following table, subject to modification, indicates the service which will be available:

<table>
<thead>
<tr>
<th>NO: OF TRANSMISSION</th>
<th>TIME G.M.T.</th>
<th>WORDS APPROXIMATELY</th>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0130-0300</td>
<td>2,700</td>
<td>Press summary and Feature article.</td>
</tr>
<tr>
<td>REGIONAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td>0315-0415</td>
<td>2,000</td>
<td>Latin (Latin America)</td>
</tr>
<tr>
<td>&quot;</td>
<td>0430-0500</td>
<td>800</td>
<td>Mec 1 (Middle East)</td>
</tr>
<tr>
<td>&quot;</td>
<td>0945-1015</td>
<td>1,000</td>
<td>Mec 2 (Far East)</td>
</tr>
<tr>
<td>&quot;</td>
<td>1245-1315</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1330-1430</td>
<td>1,100</td>
<td>Political</td>
</tr>
<tr>
<td>REGIONAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td>1430-1500</td>
<td>500</td>
<td>Svec 1 (East Europe)</td>
</tr>
<tr>
<td>&quot;</td>
<td>1800-1830</td>
<td>1,000</td>
<td>Svec 2 (Far East)</td>
</tr>
<tr>
<td>3</td>
<td>1830-1930</td>
<td>2,000</td>
<td>General, Reconstruction and Diplomatic.</td>
</tr>
<tr>
<td>REGIONAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;</td>
<td>2115-2145</td>
<td>1,000</td>
<td>Svec 2. (East Europe)</td>
</tr>
<tr>
<td>&quot;</td>
<td>2330-0100</td>
<td>3,000</td>
<td>Industrial, Economic, texts and speeches.</td>
</tr>
</tbody>
</table>

4. The keyboard perforator is similar to a typewriter both in speed and method of operation. Its function is to punch one to five holes in a tape according to the letter key used. The tape may be punched hours in advance of the transmission and stored for use later or the same tape may be used several times.

The tape is fed into the Hell-sender where, by the use of peckers, cams and other mechanical devices, the pattern of each letter is picked out and converted into electrical impulses. These impulses go through a roughly corresponding process in the opposite order at the receiving station and the letter transmitted is reconstructed as a series of small lines each one of which can be clearly seen on examination of the tape.

5. The signals, on leaving the Operating Room, go by line to the Central Telegraph Office whence they are sent simultaneously to several transmitters in different parts of the country.  The signal from the operating room to the transmitter, and thence to your receiver, is therefore direct and instantaneous.

6. Any good communications receiver can receive the London Press Service in any part of the world; but the Illinois CH100 Receiver is a type recommended by the Post Office Engineers. Only a few frequencies perhaps four or five need to be logged for reception of the London Press Service and to do this it will be necessary only to note the
number of the waveband and two figures clearly marked on the dial. Once the required frequency is logged accurate tuning to the appropriate programme can be guaranteed without trouble until the frequency is changed.

For tuning a tone like a whistle will be received. And this may be taken either on a loud-speaker or head-phones when CR100 is used. The loud-speaker, which should have a speech coil impedance of three ohms, must be connected to the terminals marked "L.S." at the back of the receiver. The phone must be plugged into the socket marked "Phones" in the front. When the phones are plugged full in, the speaker will be disconnected automatically. If the phones are only half plugged in reception may be obtained on both the speaker and phones at the same time. The operator will learn by experiment whether the speaker, or phones, or both at once, give the best results.

Two terminals marked "Line" will be found at the back of the receiver. These should be connected to the input of the relay. "Rift" may be partly prevented by placing the receiver on a rubber or felt pad.

Put your aerial high and use a screened lead-in. Earth the wireless receiver separately and switch on an hour or two before you begin reception in order to heat up the receiver.

7. That the Thermionic relay is not as lifeless as it seems is shown by the milli-ohm which, although designed to measure steady and continuous current, only tries to follow the rapidly fluctuating currents fed from the Relay to the printer.

The relay has an input volume control which makes it possible to cut out a high level of noise by reducing the input to a minimum consistent with the operation of the printer.

To avoid continual readjustment this control should be set when the signals are weakest. Then when bed conditions of fading or interference obtain tuning should help to produce better results. The function of the relay is to convert the wireless signals into uni-directional electrical impulses and pass them on to the printer. Do not tinker with the Relay unless you can pull an electric clock to pieces and put it together again in perfect working condition. A booklet, produced by the Post Office Engineering Department, which gives full technical details will accompany the apparatus to be sent to you. Switch off before dispersing any parts of the apparatus.

8. The Printer comprises: (a) a motor, (b) printing mechanism, (c) paper feed and (d) a start-stop device.

(a) The motor is of the universal type, designed to operate from 200 to 250 volts and it incorporates a governor. The speed of the motor in the printer should be the same as that of the speed of the motor in the transmitter, otherwise the words will run off the tape upwards or downwards according to whether the speed is too fast or too slow. A knob, which controls the speed of the motor, is fitted on the side of the printer and a little practice will show how it should be used to the best advantage. When the words run off another line is automatically brought in so that none of the transmission is lost. Here again, so long as the line is reasonably straight, avoid frequent turning of the knob.

(b) In the Printing mechanism a blunt edge, actuated magnetically by the impulses coming from the relay, pushes the tape against the teeth on the printing wheel. The printing wheel is
continuously inked and makes a small line each time it touches the tape. The pattern of the letter transmitted is thus traced on the tape by a series of small lines which can be seen on close examination, but which lose their separate identity and imperfections when seen from a reasonable reading distance — about 1.5 m's length.

(c) The motor which drives the printing mechanism also drives the paper feed. The paper is supplied in a roll about 4" diameter and is easily clipped on to the side of the printer. It moves anti-clockwise from the top of the roll through guides to the rollers which pull it at the appropriate speed. The tape leaves the rollers printed and ready for use. At the beginning of each transmission the tape should be secured under a convenient weight and the remainder allowed to run into a basket. At first much care will have to be given to tuning and motor adjustment; but familiarity will breed confidence, efficiency and respect for an ingenious system, which does a good job.

(d) The Start-Stop device, it must be confessed, cannot always be relied on in all places. Within a few hundred miles of London, under almost ideal conditions, it would prove quite reliable. It could be relied on where the transmitter was connected by line to the printer. In wireless communication, however, the mechanism could be started or stopped by interference. Experimental transmissions to South America show that in some cases the start-stop mechanism works fairly well; but the stage has not yet been reached when it can be relied on always and everywhere.

Wash the printer separately, keep the wheels clean, let the paper run easily and don't rely on the start-stop until you have proved it can work as you wish.

**TAPE GUIDE**

9. You will be supplied with a Tape Guide. This is a metal frame which can stand over and slightly towards the rear of the typewriter. That position appears to be the best for reading Hellschreiber tape. The tape runs in a groove from right to left and, when the operator moves the carriage of the typewriter, his left hand is in position to pull a fresh piece of tape into place.

**TAPE SPECIMENS**

10. Specimens of the perforated transmission tape and the reception tape taken from a printer are enclosed. In the latter the Printer motor has been deliberately made to go faster than the transmitter motor and then slower in order to show the effect on the tape. A join in the tape, which is referred to in paragraph 14, will also be noticed.

**THE AERIAL**

11. A receiving station for the London Press Service is, in most cases, in a rather unusual position in the sense that the receiving equipment is located within the Post or Mission. It is standard practice to site receivers in a rural area which is high and clear of physical obstructions and remote from industrial electrical equipment; specially constructed aerials are laid out, all lying on a great circle bearing to the transmitter, and the output from the receivers is "nipped" over land-lines to the city office.

A city may be seen as being covered with a low lying "fog" of electrical noise, the so-called "man-made" static, emanating from the multitude of industrial and domestic electrical equipment which is in daily use. This fog surrounds every building for about 30 feet. When the radio receiver is switched on, the first impression is one of loudspeaker noise, composed of clicks, buzzes, crackles and a
continuous rushing noise, sounding rather like a recorded version of a waterfall. Only when a strong broadcast is tuned in does the receiver become quiet. Then the received signal is strong enough to override this background noise; but most of the signals are drowned and can only be heard with difficulty at the best period of the day.

This noise enters the receiver by two parts, via the supply mains and in the aerial circuit. If the aerial is removed from the aerial terminal, the amount of noise entering the receiver from the supply mains can be ascertained. A mains suppressor filter unit will stop this entry. An efficient earth connection either direct to the surface of the ground and on to a long copper rod in the earth or to water pipes, rain or central heating, does a great deal to reduce noise, as well as providing a safeguard against electrical shock. Usually the receiver itself will filter out mains noise and most interference will enter via the aerial.

Thus for quiet reception the aerial must be put up in such a manner as to pick up the maximum of signal voltage and the minimum of noise voltage. An aerial system is composed of two parts, the antenna and the lead-in (or the radiator and the feeder, in the case of a transmitter). A well-designed receiver is entitled to a well-designed aerial system. The antenna, then, should be suspended outside the noise-zone of the building and well insulated at each end. It should be as high and clear as possible and as large as circumstances allow. The antenna is most efficient when its physical length is about one-quarter or one-half of the wavelength in use (depending upon where the down-lead is connected); this length is difficult to achieve in most cases in city locations and legislation usually restricts domestic receiving aerials to within 100 feet. The down-lead is connected at the centre of the antenna in the case of a half-wave aerial and at the end in the quarter wave case.

An excellent test aerial which is a favourite with wireless operators, is a horizontal wire the centre of which is cut to receive a small insulator. A long length of flex is connected to the antenna, one wire to each half of the antenna, the other end of the flex going to aerial and earth terminals on the receiver. The principle of this aerial is that the antenna is above the noise zone and the flex conducts the signal voltage down to the receiver without picking up any noise voltage on the way, because the twisted wires of the flex cancel out any local voltage picked up. Coaxial cable does the same trick more efficiently, being composed of a central wire surrounded by a spalled metallic tube of braid, screening the central wire. This cable requires some degree of skill and knowledge to obtain efficient connections at either end to the antenna and the receiver and also to ensure mechanical strength.

Horizontal antennas which may be directed to the transmitting station put up the best performance as a rule, because wireless waves are usually horizontally polarized and also because vertical rods or wires pick-up too much atmospheric Static noise.

If the aerial is slung high and clear above the building or out in the horizontal plane, the received signal strength is usually strong enough to override the local noise, especially if the receivers H.F. Gain Control is reduced and the L.F. Gain Control is kept high for optimum results. If noise is very bad, then a special aerial kit can be obtained and used with considerable success in the majority of city-type installations. This "anti-interference" or "anti-static" aerial consists of an antenna, centre box containing an aerial transformer, length of twin down-lead enclosed in metal braid usually served with weather-proofing and a receiver transformer.
box which is mounted close to the set. Those aerial kits are scale generally and the only point to bear in mind is that the receiver transformer box must agree in its electrical characteristics with the aerial circuit of the receiver. The impedance in each case must match and the impedance for the CR.100 and the JR.-68 receivers is about 100 ohms. Broadcast receivers usually require about 5,000 ohms matching, so there is a good deal to be gained by choosing the right transformer for the receiver because maximum energy is transferred when the figures agree and energy is lost in inverse ratio to the amount of mis-match.

12. Because every installation is different in some respects it is difficult to generalize on this point. Perhaps the only uniform installation exists in merchant-ships but even so there are differences which affect reception in same degree.

The Thermionic relay is a part of the printer installation and should be mounted conveniently near to the printer. This will permit the relay to be adjusted if unusually bad conditions of fading and interference occur......but it is important that the input control on the valve relay should be reduced to the minimum sufficient to operate the printer for stable reception.

It should be borne in mind that the G.P.O. Hell-printer was designed as a telegraph-line instrument and does operate best remote from the radio receiver on the end of a long pair of wires joining the two instruments. The radio receiver should be installed, where possible, in a position where it is comparatively far away from other electrical machinery, near the roof of a house or in an annex. The Hell-printer installation can be in the editorial office or newsroom, preferably connected by a twisted flex cable or lead-covered cable. The line between the receiver and relay must be kept electrical noise on the route. At each end of the line a good earth connection must be made, preferably to water pipes.

If the printer is operated adjacent to the receiver, some electrical interference will be experienced coming from the printer motor. The remedy here is a separate earth for receiver and printer but this is usually difficult to arrange. The printer is often located by the receiver because it is easier to adjust the receiver to obtain the best print.

It is important that the level of signal output from the receiver should not be excessive; the thermionic relay unit has a regulated action which holds the signal output at a fairly constant level but the relay is easily overloaded. The autotrace volume control on the receiver helps a good deal but it is also important that the input to the valve relay should only be sufficient to operate the printer when the signals are at their weakest. If the relay unit is overloaded the printing will become blurred and will fill the space between words on the tape. The I.F. Gain Control on the receiver should be set at about three-quarters of its travel and the overall volume controlled by the H.F. Gain. The maximum amount of selectivity must be used, and should never be more than 1200 cycles on the selectivity control.

Local noise from nearby electrical machinery will be audible from the loudspeaker and causes a spurious print on the tape, quite often a kind of "wall-paper" effect. This noise is usually eliminated by a supply mains filter or an "anti-interference" aerial, if the earth connection is not good enough to cope.

Where local noise is very bad, steps will have to be taken to suppress the interference at source but this is often very difficult.
to achieve and the owners of the machinery are not always very co-operative. Sources of interference are frequently very difficult to trace because the noise voltage can travel long distances over power lines and it is on record that dictaphone machines used in American hospitals have been heard in England around 25 metres wave-length.

It must be fully realised, however, that screening and suppression for electrical noise is useless without a good earth connection to act as a kind of drain for the unwanted voltages.

Sources of electrical noise may be traced by the help of the following descriptive table:

**Classification of Source**

- Generators, motors, rotary converters, voltage-regulators.
- Mercury rectifiers.
- Overhead power wires.
- Underground power cables.
- Switch-gear.
- Transformers.
- Battery chargers, air purifiers, industrial X-ray machines.
- Oil burners, water heaters, elevators, cinema projectors, flashing signs.
- Sewing, carding and spinning machines.
- Electric typewriters, traffic signals, elevators, sign flashers, car ignition, clocks.
- Neon and arc lighting.
- Dental machines, barbers clippers, dictaphones, dish washers, laundry plant, refrigerators, garage plant, beauty parlour apparatus, fans, printing presses, accounting machines.
- Fans, drink mixers, vacuum cleaners, polishers, hair dryers, razors.
- Refrigerators, cookers, heaters.
- Violet-ray apparatus.

**Characteristic noise in receiver**

- Whirring, droneing, crackling, whining.
- Low hum and buzzing.
- Crackling, buzzing, spluttering or rushing sound.
- Whirring, droneing, crackling or spluttering.
- Clicks, short buzzes, crackling, spluttering.
- Hurting droneing.
- Violent buzzing, humming or rushing sounds.
- Heavy violent buzzing of short duration.
- Intermittent violent humming, buzzing or crackling.
- Clicking, with or without short duration buzzes.
- Buzzing, whirring or crackling.
- Whirring, crackling, droneing, whining of continuous or intermittent nature.
- Whirring, droneing, crackling.
- Whirring, clicking, crackling.
- Violent buzzing.
Classification of Source | Characteristic noise in Receiver
---|---
Defective switches and connections. | Crackling, spluttering or buzzing of continuous or intermittent nature.
Bells, inter-communication telephones. | Violent buzzing of short duration.
Electric show models. | Whirring, droning, buzzing, crackling.
Tramways, trolley-buses. | Violent heavy intermittent buzzing, whirring and clicking, with persistent high scraping noise background.

A survey should be made of electrical machinery in the vicinity of the building in which the receiver is located in order that serious interference may be tracked down. Direct current supply is usually more noisy than alternating current supply and in most cases the only remedy is the use of an anti-interference aerial.

FREQUENCIES

13. The radio frequencies used for the London Press Service are chosen so as to provide the strongest possible signal at all reception posts. The strength of the received signals depend on the frequency selected for transmission. If this is too low attenuation losses are so great that very little energy is received and difficulty in reception is inevitable. Nothing at all will be received if the frequency is too high. Great care is taken in selecting the frequency for a particular area, the aim being to give the highest optimum frequency which will cover the whole area reasonably well. The ideal arrangement would be to have a separate frequency for each post but this is impracticable as separate transmitters would be needed in each case.

Frequencies of the order of 15,000 to 20,000 kc/s are suitable for long distance communication where the path of the wave lies in daylight. If darkness occurs along the path, much lower frequencies are needed. This is especially noticeable where the path lies through intense darkness such as that which occurs an hour or so before dawn.

Frequencies of the order of 10,000 to 15,000 kc/s are suitable for long distance reception where it is early morning or late afternoon at the transmitting end. This depends somewhat on the direction of transmission. These frequencies are also useful for medium distance communication over a daylight path. Frequencies of the order of 6,000 to 10,000 kc/s are useful for long distance communications during the hours of darkness and for comparatively short distances during daylight.

It will be seen from the foregoing that where daylight predominates along the path of the wave, much higher frequencies are needed than where darkness is present. Frequencies are closely linked with Aerials when propagation conditions are examined. Most of the aerials used for London Press Service are beamed so that the transmissions in a particular direction are strongest. This beam width is sufficiently wide in all cases so that a good signal is provided over the whole area of reception.
14. In order to preserve continuity of reception an effort has been made to find the best way of connecting a tape approaching its end with a new coil about to be fitted. Several ways have been tried and so far the most successful method has been found to be as follows: when the tape becomes red - which gives warning of its approaching end - detach it from the spool, open it out, and drape it over the empty spindle of the spool. Stick the paper of the old coil by gum over the new paper, overlapping about one eighth of an inch.

... The free end can easily be guided to the new coil which can then be clipped in position and the new and old tape rolled back on the spool. By this means it is found that a letter, or perhaps two, will be blotted; but in most cases, provided the tapes hold, any letters missed can be filled in from the context. It is hoped, moreover, that prolines and N and which will be run occasionally in each transmission, primarily for tuning and adjusting, will provide an opportunity of changing the tapes.

15. The Inking pads have to fit sufficiently tight to avoid slipping. It is found in practice that, although the greatest care is taken in their manufacture, they tighten up in some climates and difficulty is experienced in sliding them on to the spindle. It will be found that the hole in the pad can be enlarged slightly by inserting some convenient slightly tapering iron rod before the pad is placed in position. To avoid inking the fingers an old glove kept for the purpose of changing the pads will probably be found helpful.

16. When the equipment has been installed in working order its future life and efficiency is largely in the hands of the operator. The experiences of agencies, experts and operators throughout the world have been obtained and the following points, on which all are agreed, will be found conducive to good and effortless working.

1. The temperature of the room should be moderate, steady and dry.

2. The Printer should be covered when not working.

3. Sand or dust should not be allowed to get into the mechanism.

4. All parts should be kept clean.

5. Instructions for filing, which will be found in the booklet accompanying the apparatus, should be carefully observed.

6. Make adjustments and such minor repairs as are within your capacity.

7. When in doubt call on such expert advice and assistance as is available.

8. Log the frequencies of the transmissions you take and keep the tables, with which you will be supplied, up to date.

9. Operating Instructions, as in Appendix "A", should be kept on the circuit for reference.
17. Experience shows that when a long transmission has been received on the tape, after passing through the Tape Guide, spreads over the floor and is very untidy. It has been found that if the tape is wound on to a 400-foot 16 mm. film spool this confusion is avoided and the office is much neater. Two spools should be obtained on "permanent loan" from the local official film unit. The cleats holding one side to the center ring of the spool should be loosened so that the side can be slipped off. Erect a small stand containing a suitable spindle at a convenient height above the table on the left of the typewriter. As the tape, from which a typed copy is being made, comes through the Tape Guide it can be wound on to the spool by an occasional flick of the hand. When the transmission has been typed the tape should be cut and completely rolled on to the spool. You will, of course, have the end of the transmission at the top end, to remedy this, the tape can be wound back on to the second spool which should be on a second stand in a convenient place. This process need only take a couple of minutes. The material can be taken from the spool by removing the end which has been loosened. In some cases the Information Officer may wish to decide whether a transmission is suitable for his Post before having it typed. In that case the tape can be wound, as above on to the second spool and he can then read it off before he finally makes up his mind.

Difficulty is sometimes found in starting to wind the tape on the spool; but long experience with tapes of all kinds has provided us with a valuable dodge which you may find useful. Place the tape, about one foot from the beginning, between the forefinger of the left hand and some convenient metal edge. Pull the tape with the right hand putting pressure at the same time on the tape under the left forefinger. It will be found that this process curls the beginning of the tape in such a way that it readily grasps the core of the spool and a start is rendered extremely easy. The incidence of the curl depends on the pressure on the tape, the sharpness of the edge and the speed at which the tape is pulled. Try it.

18. One final note: The guidance given in paragraphs 1 - 17 is as full as seemed necessary - but of course it is true that the geography of each capital varies and each Post will have its own "snags". The Morse system which has been used for London Press Service so far, has brought out this fact just as clearly as Hellschreibers will. If you therefore have any further special point to clear up, will you please inform your Department, which will be able to get the necessary advice or information for you from the Post Office experts concerned. The fixing of a schedule of transmissions on frequencies most suitable for your area at different periods of the day is in addition a complicated matter, since all the transmissions on all the beams involved have to be arranged at the lowest cost possible to the Central Office of Information. Every effort will be made however as the extension of the new system proceeds, to bring the actual working-hours within as narrow a scope as possible. Totality of the service will not be overlooked in this process of course, but it may suffer slightly, in the interests of your work schedule.
SENDING POINT.

A. All tapes will commence with the usual CALL BAND punched three times, followed by the appropriate heading, i.e.
"LONDON PRESS SERVICE FIFTEENTH OCT TRANSMISSION ONE PARA----"

B. Where it is necessary, in the case of very lengthy transmissions, to employ more than one puncher to prepare the tape it will be run in sections, separated by a few "Prelims". In such cases each section will end with the indication "PARA CONTINUATION FOLLOWS", the next section commencing with the Call Sign once and the indication "TRANSMISSION ONE CONTINUED PARA". The final section will end in the normal manner as below.

Should transmission be interrupted for technical reasons and a rerun become necessary, the rerun will be preceded by "prelims" and the indication, "TRANSMISSION INTERRUPTED FOR TECHNICAL REASONS HERERUN".

C. ERRORS IN PUNCHING

Errors should be corrected by adding four letter "X" to the word wrongly punched, spacing, and recommencing at the last correct word.

D. END OF TRANSMISSION

The end of the transmissions will be punched as follows, i.e. "END TRANSMISSION ONE LPS de MIK GAV"

RECEIVING POINT.

This will be received on the printer tape as follows e.g.,
"CQ CQ CQ DE MIK GAV CQ CQ CQ DE MIK GAV LONDON PRESS SERVICE FIFTEENTH OCT TRANSMISSION ONE PARA --------"

Received on tape as follows,
"IS THE GOVERNMENTS INTENTION PARA CONTINUATION FOLLOWS. (at this point a series of "prelims" will be received) DE MIK GAV TRANSMISSION ONE CONTINUED PARA"

Received on tape as follows,
"TRANSMISSION INTERRUPTED FOR TECHNICAL REASONS HERERUN (This will be followed by a rerun of the traffic missed)

Received on tape as follows,
"ACCORDING TO OFFICIAL REPORTS" etc.