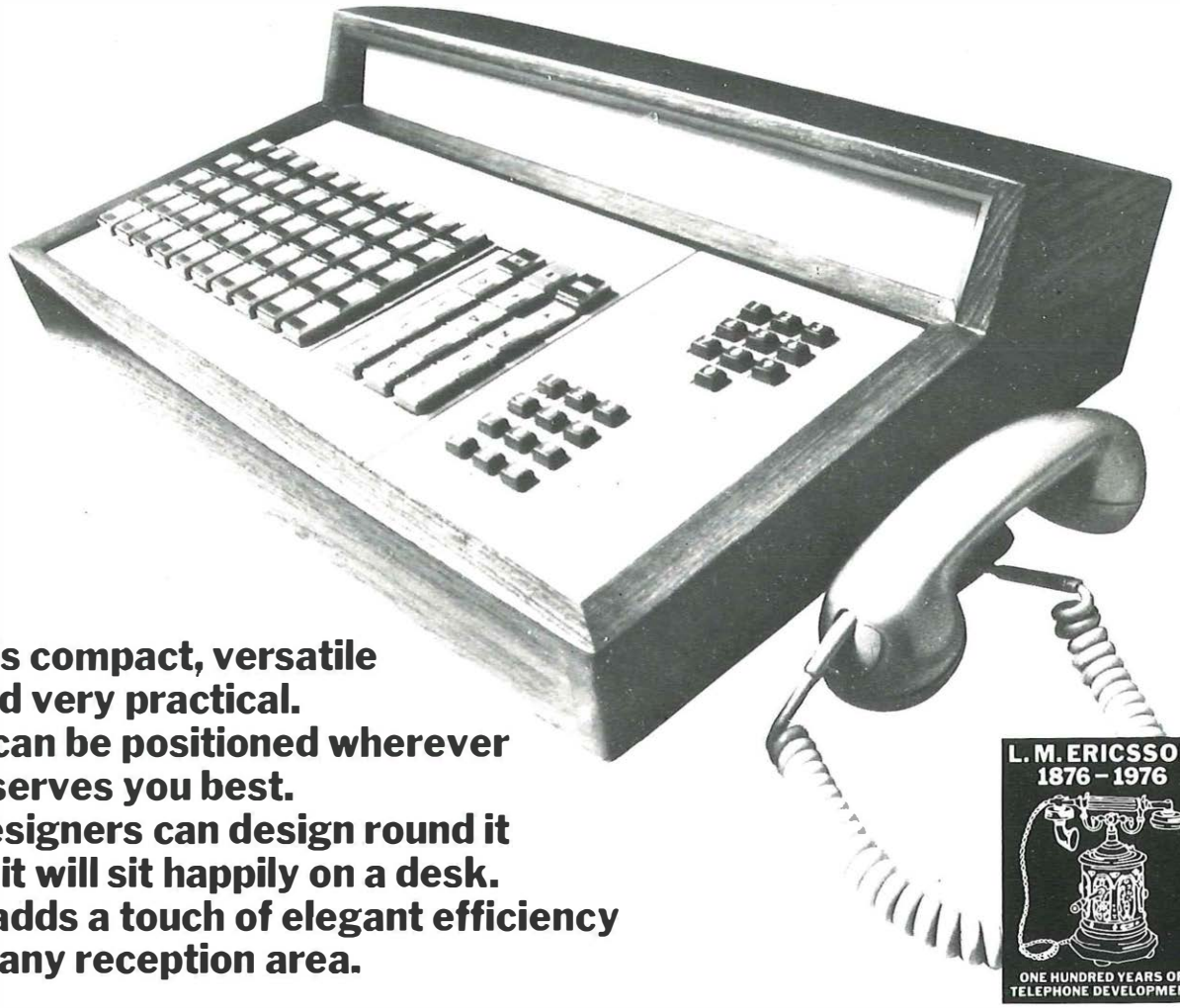
Post Office telecommunications journal

Spring 1977 Vol. 29 No.1 Price 18p

The Thorn Ericsson operator's console is a remarkable piece of engineering



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It is completely automatic and gives the operator finger-tip control of the superb ARD 562 PABX.
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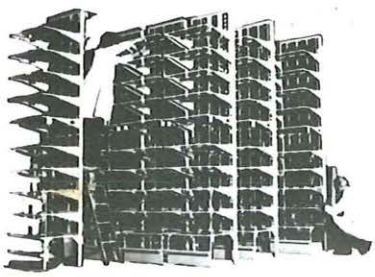

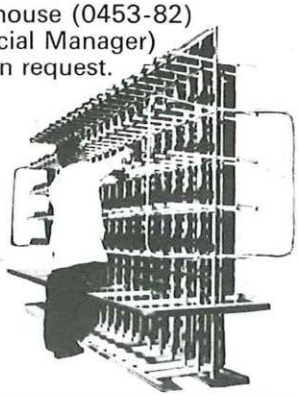

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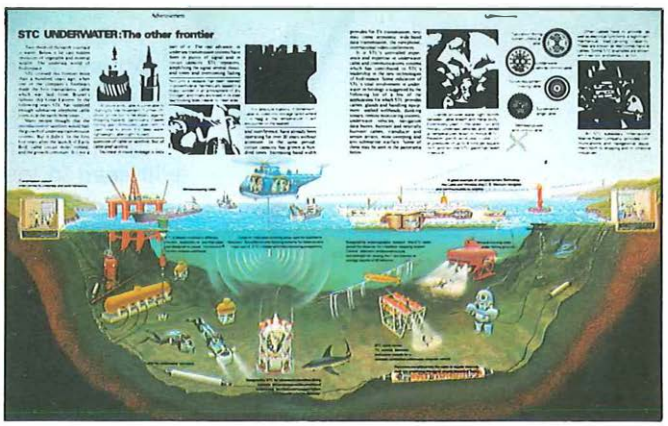
Why STC took in the Sunday

It occurred to us that although a lot of people to whom we speak, speak the same language as we do, many others don't.

These are people who, intelligent and successful in their own fields, may not know the difference between MHz, Mbaud and Mbit/s.



The people who can get a bit lost when we, at STC, talk about jitter reducers and dependent regenerative repeaters and multiplex-demultiplex equipments.

And not only when we do. When you do, as well.

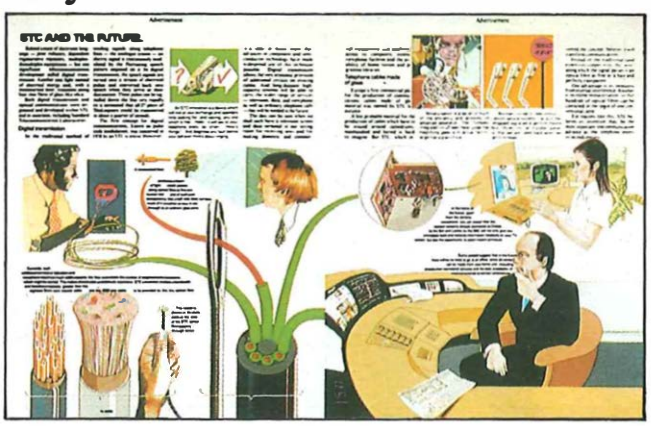
But they do make up a responsible audience. Responsible, quite often, for the wielding of immense influence and weight of

8 colour pages Times.

approval on the recommendations of people more technically sophisticated.

So it seemed a good idea to give them some kind of illustrated glossary.

It appeared, the other Sunday. Rather like we hint at here.



You probably saw it. Or if you didn't, we would like to think that someone who did has already mentioned it to you.

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From science fiction to fact

Imagine giant communications satellites with capacities about five times those now in use, assembled in space and powered by the sun or nuclear energy. Visualise, too, a space shuttle sent off to repair the satellites in orbit if a fault occurs. Only a few years ago such developments could simply have been attributed to the fantasy world of the science fiction writer. But today it is confidently predicted that they will become reality within as little as 20 years.

This fascinating glimpse of the technological revolution facing telecommunications was given to world experts by Sir Edward Fennessy, Deputy Chairman of the Post Office and Managing Director, Telecommunications. Addressing a meeting of the Royal Society in London to study changes in this field by the year 2000, Sir Edward also predicted that there would be a complete change in undersea cables. Optical fibre cables would be laid which, by the 1990s, could each carry up to 25,000 conversations at once across the world's oceans – a sixfold increase on the most modern submarine cables of today.

These new satellites and cable systems would pave the way for low-cost international Confravision – the Post Office's face-to-face conference service – to save both time and expensive air travel. If the costs were made sufficiently low, this could possibly attract one-tenth of the 12,000 or so people who fly the Atlantic each day, enabling them to conduct their business conferences by television 3,000 miles apart. And outside the peak business hours, the same equipment could be used to send letters across the Atlantic by facsimile.

By the end of the century, Sir Edward prophesied that there could be 1,500 million telephones around the world from which more than a million million calls were made each year. This growth would be accompanied by a major technological revolution that would transform developments so far achieved. Just as Alexander Graham Bell realised communication was not limited to the telegraph, so today's engineer recognised that modern technology was also the key to new horizons.

But on a note of caution, Sir Edward warned: "New developments will place challenging demands on engineering design teams and upon finances to support these projects".

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Cover: On the framework of Aerial 1 at Goonhilly earth station, Cornwall, rigger Don Harris checks the pointing angle of a small aerial which is used in cancelling interference from a French microwave station. (See page 15)

Towards the paperless office

DJW Jones

Mr Bill Dunne, of Long Range Studies Division in the External Telecommunications Executive, watches an operator at a major commercial group use a word processor to input part of a manual to a storage device for later easy reference. This eliminates the need to store bulky volumes of paper in the office.

PICTURE a paperless office without a secretary or notepad in sight: in their place special machines called communicating word processors which can transmit, receive and store data and messages via the public switched telephone network (PSTN) and tap large central memory banks for a dazzling array of information on any subject desired. It sounds like something from the world of science fiction but it will, during the next century, become fact.

At present word processors in the United Kingdom are still in their infancy but with technological developments likely to continue apace the future looks exciting. It can be envisaged that a letter dictated in London, for instance, could appear on a CWPin, say, Holland from where a reply within minutes would be transmitted and appear on a visual display unit in the London Office. The original, meanwhile, would be filed in a computer store – all without the help of secretaries and messengers.

Until now the teleprinter has been the primary means of business message transmission using telecommunications since it began replacing the morse key more than 50 years ago and even though electronic message transmission is at an evolutionary stage, telex is still likely to dominate as this means of message transmission during the next 10 years. It will probably, however, look and perform differently due to the challenges of new systems and facilities which will compete for telex type traffic.

The word processor (WP) is such a system. Basically it is an electric typewriter associated with a storage device using punched paper tape, magnetic tape, disc or magnetic card. A draft document is typed and at the same time recorded on the storage device. Any subsequent editing of the text is done by inserting changes from the keyboard into the storage device and an amended hard copy can be reproduced at high speed with correct spacing maintained. This also takes account automatically of the paragraphs moved forward, words changed or words or lines added.

When a visual display unit (VDU) is added to a WP, by pressing a button on the keyboard the required text from the storage device appears on a screen. Editing can then take place and can be seen as it will finally appear in hard copy. WPs can be linked to computers, they can be linked to each other via computers or directly to each other. It is when terminals telecommunicate via the PSTN or private wires that they are known as communicating word processors (CWPs).

CWPs transmit information in digital form and thus conform to the mode requirements of digital switching and transmission systems of the 1980s now being planned by the Post Office. The arrival of WP systems which telecommunicate is a significant development, and the potential as an alternative message media is great.

An important feature of CWPs is the relatively short line transmission time required. Using the Datel PSTN Service for example an A4 sheet of 45 lines with 65 characters per line and say, 8 bits/character can at 600 bit/s be transmitted in 39 seconds. At 1200 bit/s the time taken would be halved and so on. And a new 4.8k bit/s modem could be available later this year which would reduce transmission time to 4.9 sec/A4 sheet. This compares with speeds of six minutes, three minutes or one minute offered by the three generations of

facsimile now available and some six minutes for telex transmission.

The growth rate of WPs in 1975 was about 23.5 per cent internationally. In the United Kingdom it is estimated to have been about 15 per cent. Most WPs sold today operate independently and are not connected to other machines. It is, however, when machines are linked together in systems that the greatest automation gain is achieved.

It is a fact that word processing and data processing are moving functionally closer together. The CWP is equipped with the capabilities for data manipulation, storage and transmission and lacks only the ability to perform mathematical functions and data base retrieval. In the long term it seems likely that the CWP will interact increasingly with a central processing system.

The link with data communication is important, but as well as the ability to communicate directly with computers via a modern interface there is also the facility to transmit and receive messages. Predictions made in 1975 were that by 1982 40 per cent of the WP market will be telecommunications orientated.

Apart from making people's jobs easier, WPs also save on time, costs and staff. Their installation in system form in large offices requires a complete reappraisal of working methods. They are not simply replacements for electric typewriters. Their installation creates the need for a study into office practice. When utilised correctly they will bring large labour savings.

Applications for WP equipment within the Post Office have been found mainly in typing pools for reproduction of standard letters. There are about 32 units in use in Telephone Areas and Telecomms Headquarters. Most of these machines record information on paper tape. The machines have printout speeds of 240 words per minute compared with an average typist's speed of 60 words per minute on an electric typewriter. Faster reproduction and transmission speeds are now becoming available with new machine models.

CWPs are inherently computer terminal devices. Their use will be particularly adaptive to the digital System X computer controlled telephone switching system era of the 1980s. And microelectronics technology development is likely to reduce the cost of WP systems considerably in the next 5-10 years.

The forthcoming evolutionary change to digital hierarchies in telecommunications and the growing data traffic on the PSTN and PW networks produces the right environment for CWPs which are already at the development stage where they can readily be connected in the basic digital mode to computers or via a modem for digital to analogue conversion.

Although it is too early in the life of the CWP market to forecast the time scale of its likely impact on telecommunications, it is easier to envisage its role as part of an office communication system engaged in international communication in the 1980s. By then speed and code conversions will be available with system capability for store and forward generally in use. A great deal of study and debate is already taking place to develop the right environment for controlled international growth and development of such systems.

CWPs linked via the European Information Network (EIN); Euronet; the SWIFT banking network; Post Office Packet Switching Service (PSS), or the CCITT Integrated Services Digital Network (ISDN), will allow immediate retrieval of identified texts recorded on computers throughout Europe. Subject to the correct access protocol procedures being given, business will be transmitted from VDU to VDU. At a lower level inter-office memos will stay in magnetic form, never being printed in hand form; and subsequently outside correspondence will be stored in this manner. Although the thought of vital records being stored in a word processing media is unthinkable to many, it should be remembered the airlines already do it. Efforts now being applied in the development of optical character recognition should produce, in the late 1980s, the commercial results necessary to allow the WP to work direct from printed text.

Looking ahead to the end of the century we are already seeing the start of a new era in applied electronics probably as significant as the last 25 years. With the emphasis today on system development (with the packaging of the mechanical keyboard, VDUs, information storage and line modems) by the USA, West Germany, France and the UK, today's predictions for 1985 seem quite modest.

Already Large Scale Integration devices are becoming available for controlling VDU functions and the operation circuits of tape or disc stores. The difficulty lies in predicting the order of progress. Computer technology has developed to the point where software support has been left behind, so there could be some marking time until software standardisation catches up. The CRT, WP type terminals will become one of the most important activating devices in the communicating system development of the future.

There will be a great deal of activity during 1977 in the development of communicating word processing terminals. The potential of such computer/communication systems as a tool for meeting future business communications needs is truly enormous. The emergence of communicating word processors will require the Post Office to consider its role in this field since most CWP applications will fall within its monopoly.

Mr D. J. W. Jones is a head of group in Long Range Studies Division of the External Telecommunications Executive with responsibility for advising on new facilities and systems.

PO Telecommunications Journal, Spring 1977

A secretary at a London office prepares to transmit information from a communicating word processor to a distant unit or computer.

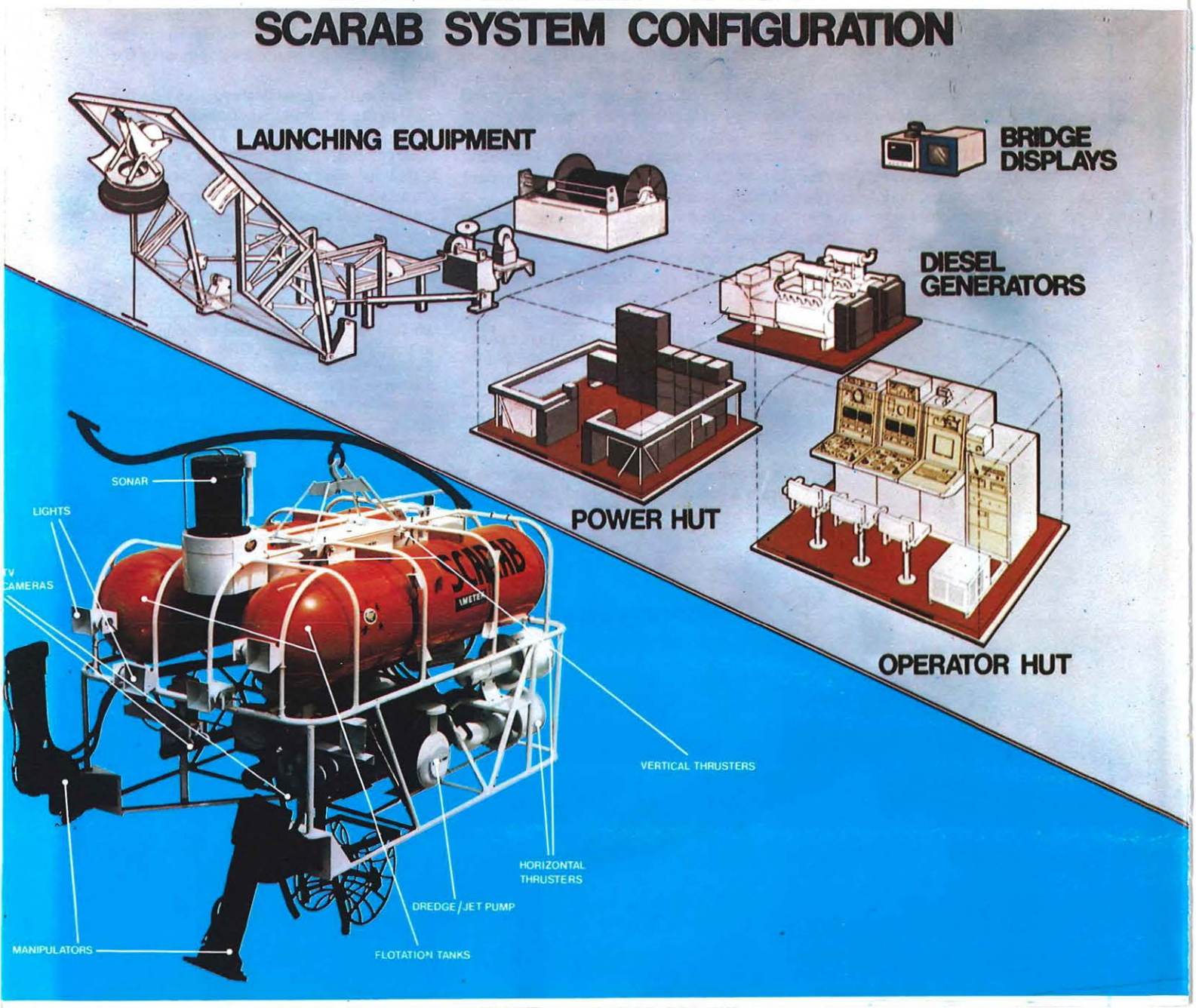
Unmanned craft attacks cable problems

MRG Rump and JA Pockett

An international consortium, which includes the British Post Office, is financing the development of an unmanned submersible craft, called SCARAB, specifically to assist in the recovery, repair and relaying of damaged undersea telephone cables which are buried in the seabed.

AS MORE and more submarine cable systems with increased capacities are provided to meet demand for international communications, protection of the cables assumes ever growing importance. For damage imposes considerable repair costs and may also cause vital communication links to be interrupted, resulting in lost revenue.

The problem of cable breaks, in fact, has a lengthy history that still awaits an entirely satisfactory solution. The trouble is caused mainly by commercial fishing gear which



accidentally fouls or shears the cable, and damage therefore invariably occurs in the relatively shallow waters of the continental shelves.

To counter this problem the most recently installed transatlantic telephone cable was armoured and buried to a maximum depth of two feet in the seabed by a newly-developed sea plough. These safeguards hold promise of significantly reducing cable damage, but at the cost of greater difficulty in repairing breaks that do occur.

Traditionally repair has involved a cableship grappling for each end of the broken cable, splicing the ends aboard and then dropping the cable to the seabed. This procedure becomes extremely difficult when retrieving armoured cable which is buried in mud or sand. Furthermore, the cable must be reburied when the repair has been completed.

These problems have provided the motivation for international co-operation in the development of an unmanned submersible craft which is capable of assisting in both the repair and survey of undersea coaxial telephone cables. Finance for the system's development and construction is being provided by a consortium comprising the American Telephone and Telegraph Company, the British Post Office, Cable and Wireless Ltd, the French PTT and Teleglobe (formerly the Canadian Overseas Telecommunications Corporation).

Known as SCARAB – Submersible Craft Assisting Recovery And Burial – the system will be remotely controlled from a "host" repair ship by means of a cable link. From on board the cableship a pilot and his assistant will drive SCARAB and operate its manipulator controls, and an observer will be responsible for craft and submarine cable location.

The operators are housed in a self-contained control room which, like the rest of the SCARAB system – including power supply and launching equipment – can be transported by air and is, therefore, relatively independent of the cableship. The launching and recovery equipment essentially comprises a launching frame, traction winch, control cable accumulator for removing slack and a cable stowage winch.

Operation and servicing of SCARAB will be carried out by Cable and Wireless personnel, and each administration in the consortium will prepare at least one of their cableships to accommodate the system. The Post Office vessel Alert was, in fact, prepared during its last refit and is now ready to receive the system when the need arises.

A prototype SCARAB, built in California, is currently undergoing sea trials. Following a refurbishment period, it is therefore expected that the system will be ready for use in a programme for the remainder of the current year.

In its repair capacity the craft will act as an extension of the "host" ship by accomplishing such tasks as locating, unburying and, where necessary, cutting damaged cable. It will then attach a lift-line from the ship and rebury the cable after repair. In its survey capacity, the craft is expected to travel along operational cable, determining the burial depth continuously and stopping to rebury exposed or shallow lengths to reduce the risk of breaks.

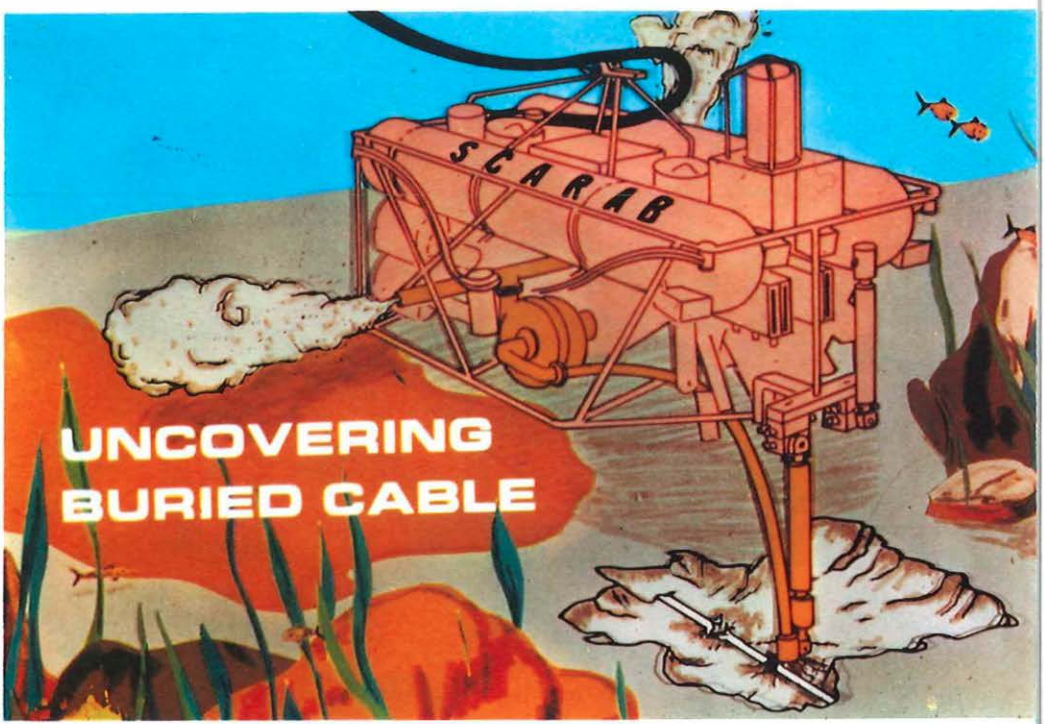
With a design depth of 1,000 fathoms, SCARAB is capable of "swimming" against a maximum current of three knots and setting down on the seabed. Positively buoyant, the craft is submerged by two vertically orientated propulsion motors and propelled horizontally by four fixed motors. A fifth steerable thruster with a large degree of horizontal movement is mounted in the centre of the craft.

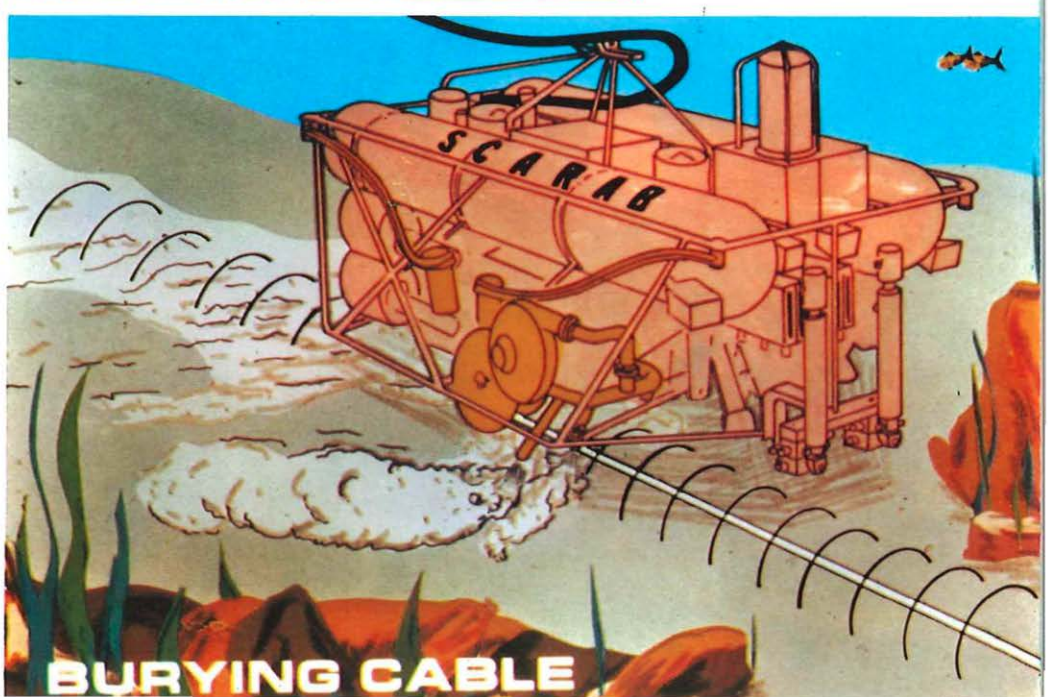
A separate motor drives the craft's hydraulic equipment, which includes two manipulator arms with grippers and cutters for cable handling, a dredger and a jet pump. For burying and uncovering cable, SCARAB uses a water jet which emulsifies the seabed material. In this way the cable sinks under its own weight or can be seized by a gripper as it lies exposed.

Power is supplied through the control cable from equipment on board the cableship. Communication, also established through the control cable, consists of a digital multiplexed system that allows commands to be sent from the surface and for acknowledgements and other information to be received from the craft.

Two craft-mounted television cameras on pan-and-tilt units are monitored in the operators' control room, and a sonar system is provided so that obstacles can be avoided in low visibility. The sonar system also enables SCARAB to be navigated to acoustic "pingers" or transponders dropped at points of reference – for example, at a previously located cable break. A continuously scanning visual display of obstacles and acoustic markers around the craft is given in the control room.

A separate locator system is provided in the control room which combines the functions of craft location in relation to the ship and cable fault location. A visual display of this information is presented both to the operators and the ship's bridge, showing the course taken by SCARAB, its position





and the position of acoustic reference markers dropped on the seabed.

The locator system also receives information from SCARAB's altimeter which accurately indicates its height above the seabed. Using the altimeter and cable location data, the system's mini-computer calculates the depth to which cable is buried. Other equipment fitted on SCARAB includes a depthometer, compass, inclinometer, seabed sensor, floodlights, still camera and magnetic sensors for cable detection.

Two independent magnetic sensing systems will, in fact, be installed aboard SCARAB. One system uses sensors to detect the magnetic field of a low-frequency alternating current (ac) which is injected on the telephone cable at the shore station. Signals from the sensing system are transmitted to the locator system's mini-computer where they are processed to locate SCARAB's position and heading in relation to the cable. This information, including cable burial depth, is visually displayed on the locator's display terminals.

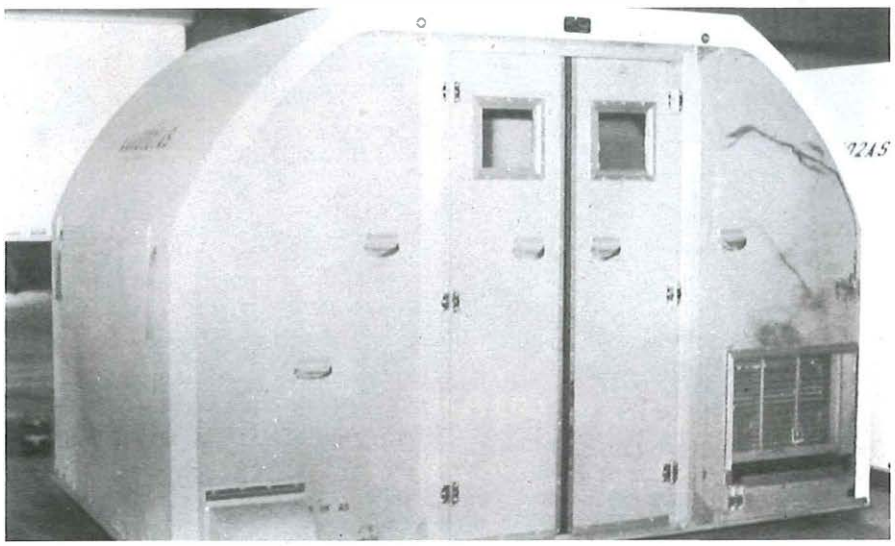
For technical reasons usefulness of the ac technique is limited to within a few hundred miles of the shore station, and is further reduced – or, on some systems, impossible – if the cable system is still in service. As most cable breaks occur on the continental shelves, use of this detection system normally encompasses the cable section between a break and the near shore.

For sections of cable between multiple breaks or between any break on a transoceanic cable and the far shore, the second magnetic sensing system must be used. This system detects the direct current (dc) magnetic gradient of the cable due to two sources – power current on the cable and permanent magnetisation of the cable's steel components. Unfortunately, this technique also has its complications, and SCARAB's dc cable locating system currently can do little more than present raw output to the operator, who must then use a combination of rules-of-thumb and ingenuity.

When using SCARAB in repair operations, a cableship will first sail to the approximate area of the cable fault by using surface navigation and/or towed electrical field detection probes. The submersible craft will then be launched, using its magnetic sensors to detect the cable. On initial location of the cable an acoustic marker will be deployed from the craft, followed by another when the fault is located.

If the cable is unburied and has parted, the television cameras will be used to locate specific damage. If the cable is buried, it will be necessary to dredge in order to attach a clamp and cut the cable. A gripper on one of SCARAB's manipulator arms will be used to connect a life-line from the cableship to the damaged cable. The gripper is ejected from SCARAB, which then moves away to prevent fouling the lift-line.

After the first cable section has been raised to the surface and buoyed off, the second acoustic marker is used to relocate the other section and repeat the lifting process. The cable will then be repaired and a new section spliced in for connection to the buoyed-off portion. Meanwhile, SCARAB will be retrieved and fitted with a jetting nozzle and pump for reburying the repaired cable when it is released from the cableship.



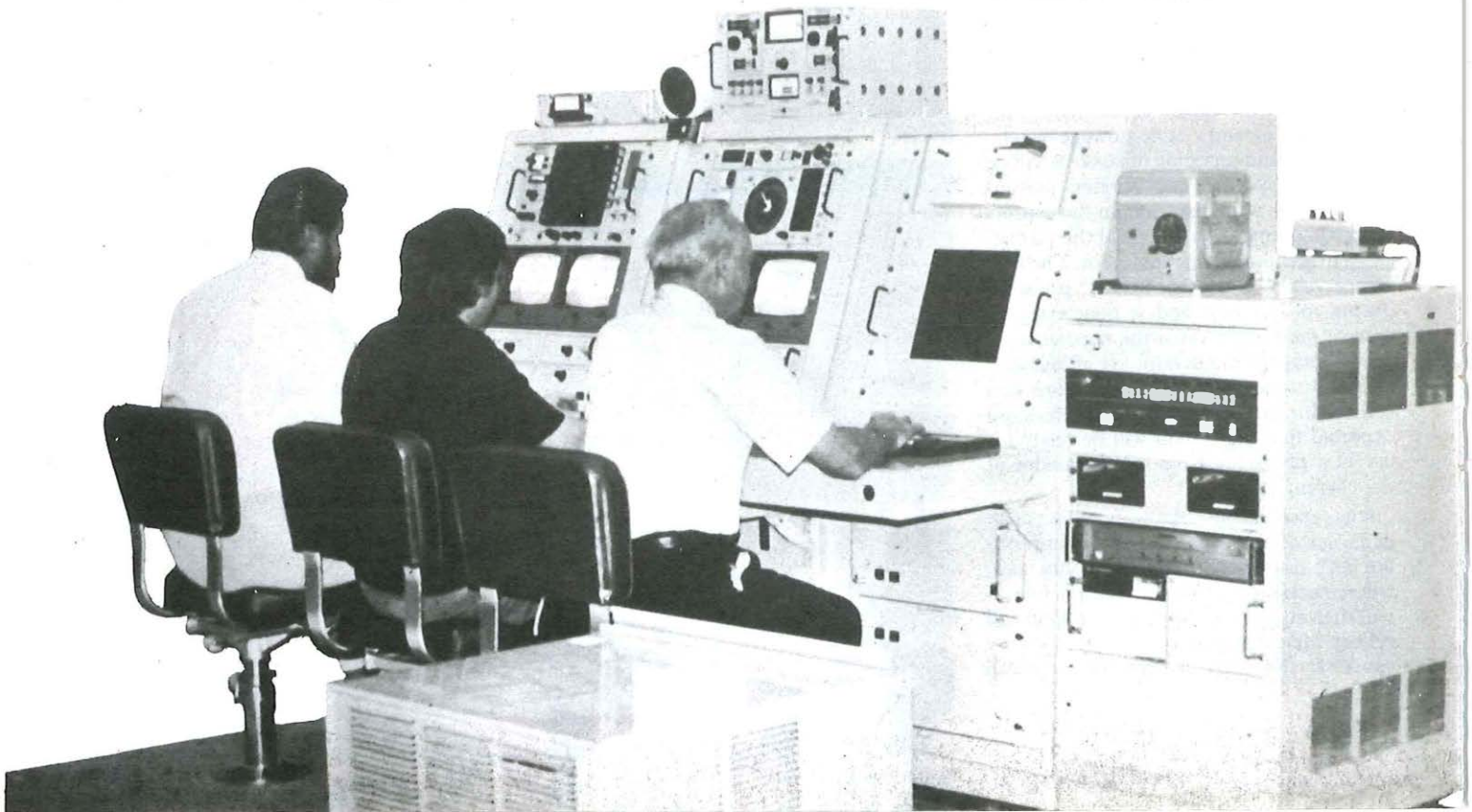
Mr M. R. G. Rump is head of the group in Marine Division of Network Planning Department responsible for mechanical engineering, and is a member of the operating and construction committees for the SCARAB project.

Mr J. A. Pockett is an Assistant Executive Engineer in Marine Division involved in the provision and maintenance of ships' radio and electronics equipment.

PO Telecommunications Journal, Spring 1977

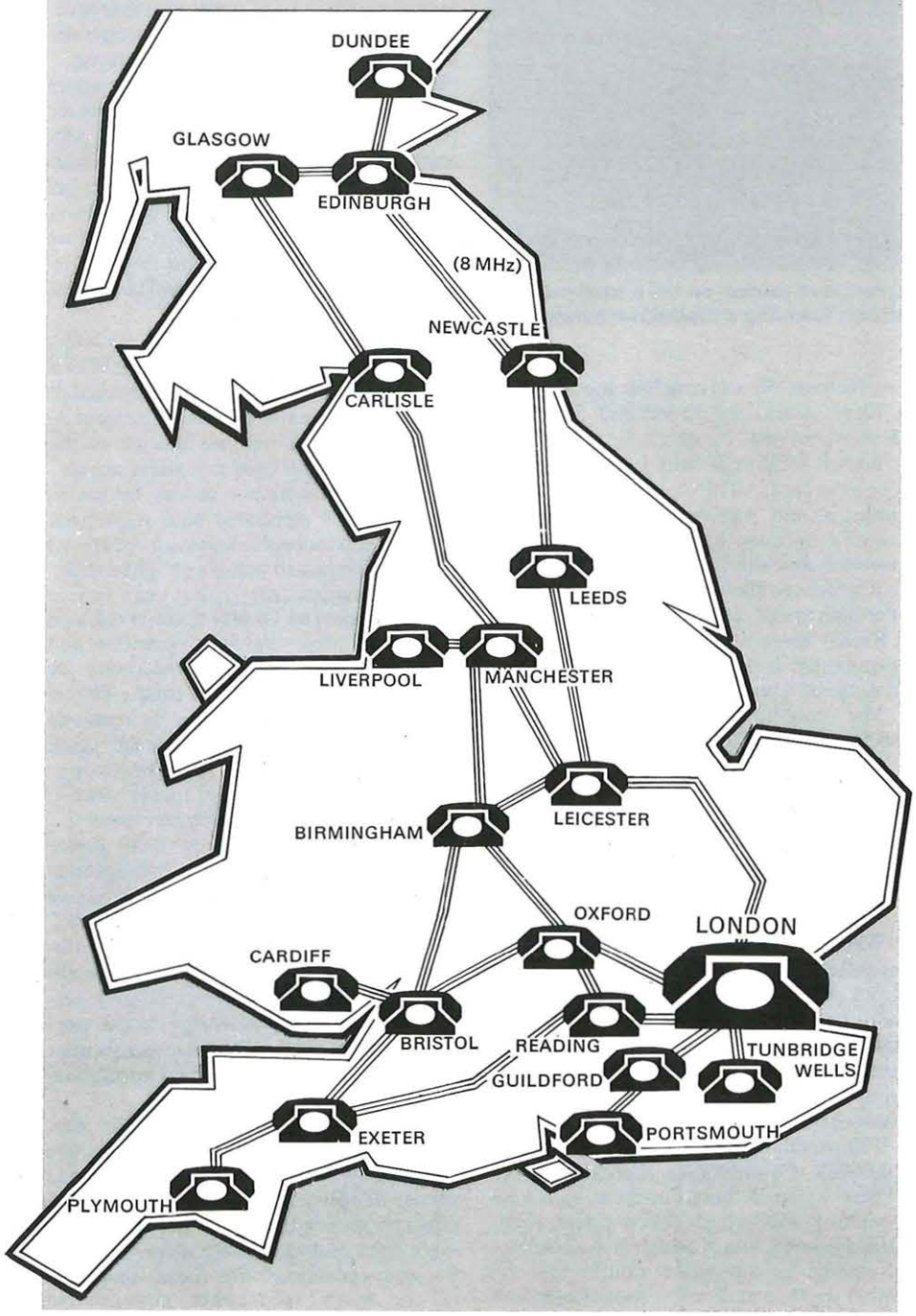
Left: The operators' self-contained control room which, like the rest of the SCARAB system, can be transported by air.

Below: The operating positions of the pilot, his assistant and the observer are tested during laboratory trials of SCARAB's control system.



THE STANDBY NETWORK

TS Farres



The main 12 MHz Service Protection Network which, together with a network of 4 MHz routes, allows various choices for re-routing working hypergroups.

TODAY 98 out of every 100 subscribers in Britain can dial their own trunk calls through the ever-expanding STD network – and by 1980 the service should be totally automatic. To make sure these calls get through such a large and complex network despite breakdowns which might be caused, for instance, by a contractor's shovel slicing through a coaxial cable, the Post Office operates a Service Protection Network (SPN) which is now almost complete. Whenever there is a breakdown the SPN comes into action re-routing calls away from the faulty line.

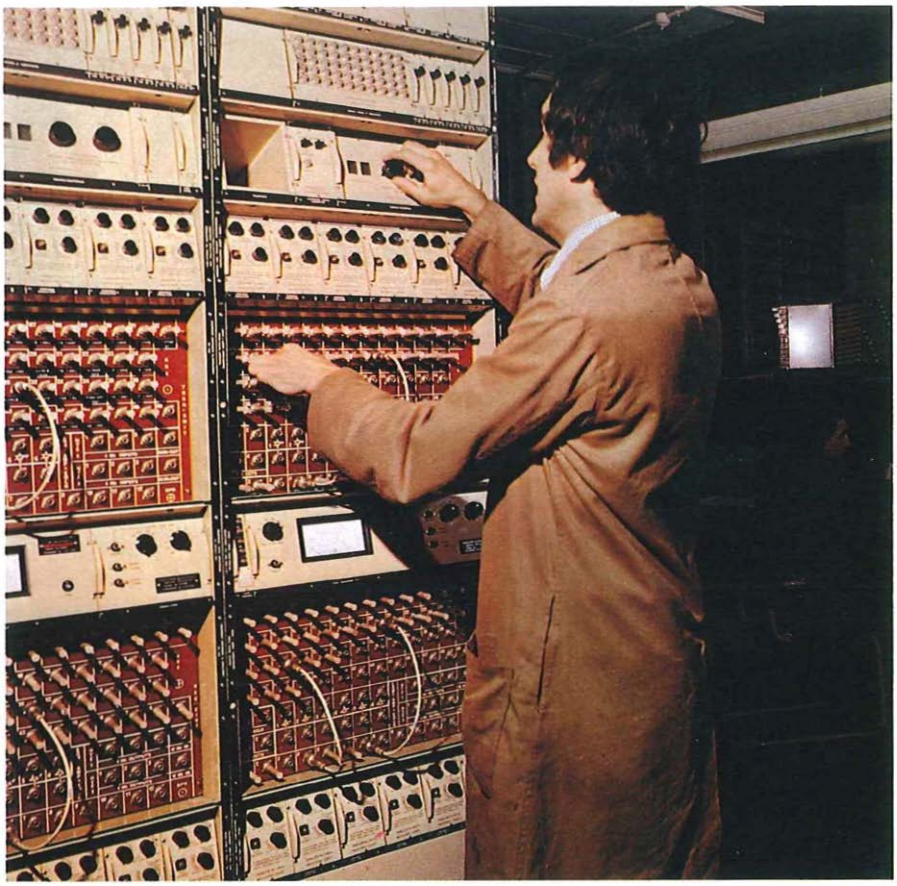
The basis of planning the trunk network is to provide sufficient circuits to carry the expected peak traffic on each route with an allowable small percentage of calls lost. To provide more circuits would be uneconomical, to provide fewer would cause more calls to be lost.

To draw an everyday comparison, sending trunk calls from A to B is rather like transporting eggs. Eggs are packed in papier-mache containers and these are bundled up into larger containers and then transported in lorries over the major part of their journey. At the destination the load is distributed to the various retail points for supply to the customers.

In providing transmission paths (circuits) for trunk calls, the circuits are "packed" together in dozens. These are called "12 circuits groups" or just "groups" for short. Groups are assembled in fives called supergroups and up to 16 supergroups are put together to form a hypergroup. Thus a hypergroup may contain up to 960 circuits.

The eggs in the analogy occupy space; telephony channels occupy "bandwidth". To transmit adequately the frequencies present in speech requires a bandwidth of 4,000 cycles per second (4 kHz) and to transmit a hypergroup of such channels requires a bandwidth of approximately four million Hertz (4 MHz).

Transmission paths for hypergroups are



Technical Officer Doug Macketis sets up an alternative routing on the broadband switching equipment at a terminal repeater station following a breakdown between London and Leicester.

provided by coaxial cable links and microwave radio links.

These links are of various types and may carry one, two or three hypergroups (that is with bandwidth of 4, 8 or 12 MHz) and if for any reason a link becomes unusable then up to 2,700 trunk circuits may be lost. This can cause several trunk routes to become congested resulting in inconvenience and frustration for subscribers as well as loss of revenue to the Post Office.

These main links may become unusable either because of faults in the equipment, or because of engineering work needing the temporary removal of plant from service. It was to reduce problems for the customer and to enable construction and maintenance work to be undertaken more economically that the SPN has been provided.

The SPN consists of coaxial cable broadband sections (4 or 12 MHz) provided for SPN use on the basis of one per transmission route. There are temporarily spare broadband sections (4, 8 or 12 MHz) which are available for SPN use until they are required for working circuits and there are radio protection channels (4 or 8 MHz) which, although provided primarily for the protection of main radio links, can be used as SPN links when not in use for that purpose.

Equally vital is the Access and Switching Equipment (ASE) permanently associated with working hypergroup links and broadband sections. This consists of a hybrid in the transmit direction at each terminal and a solid state switch in the receive direction allowing paralleling and high speed switching between the working link and SPN link.

There is also the Broadband Switching Equipment (BSE) on which the connections from up to 50 ASEs and 12 SPN links are concentrated. The equipment carries transmit and receive patching panels to allow connection to be made between the working and the SPN links. It also carries equipment to allow the remote operation of the high speed switch unit.

Finally there is Hypergroup Translating Equipment at terminal stations to facilitate the use of 8 and 12 MHz SPN sections.

The procedure for switching a working section to a protection section is to parallel the two sections by means of patching cords on the patching panels and then to operate the switch at the receiving end. The two directions of transmission are switched separately. The operation of the switch causes lamps to light on the BSE and the ASE to indicate the switch is off normal.

When the SPN routing is no longer required, further operation of the switch from the BSE causes it to restore to normal and the lamps to be put out. The patching cords can then be removed. The operate time of these switches is about 12 microseconds and therefore switching operations have little effect upon service.

The overall control of the SPN is with the Network Co-ordination Centres (NCCs). There is one of these centres at each Regional HQ, and two in Telecommunications Headquarters one of which is the National Network Co-ordination Centre and the other the International Network Co-ordination Centre in ETE. They operate within their respective Service Divisions and their main functions are to act as reporting points for major failures of service, and to vet and authorise proposals to withdraw plant from service for engineering purposes.

The NCCs are continuously in contact with each other through an omnibus loudspeaker network and are therefore readily able to co-ordinate activities in different regions. These centres can advise field staff about available re-routes, particularly in the more complex cases requiring interconnection of links through regions not directly concerned, and also when it is necessary to use temporarily spare links.

As a further aid, particularly for use outside normal office hours, repeater stations are provided with pre-planned re-routes using dedicated SPN links. These are prepared by National NCC in consultation with Regional NCCs and in most cases several re-routes are listed in order of preference, for each link to be protected, in case the first choice SPN links are already in use.

When a breakdown occurs the re-route plans are put into operation on whatever plant is available. Using dedicated SPN only, the time to restore service after a fault is about one hour. This figure includes call out time for unstaffed stations and is about one sixth of the time required to restore service for a cable fault affecting hypergroups for which no make-good routes are available.

As well as reducing the outage per fault, the use of SPN has the advantage that after a fault is cleared, the traffic can be restored to its normal route at any time convenient to maintenance staff because the use of the high speed switch does not affect service.

Before the introduction of ASEs the patching operations associated with restoration involved service breaks and such operations had to be limited to periods of light traffic.

A further advantage is that once service has been restored on SPN there is reduced urgency to clear the fault condition and therefore the work can if necessary be delayed to more convenient times. This is not to say that all urgency is removed because while SPN links are in use they cease to be available for other jobs which may arise and it is part of NCC's function to keep an eye on protracted use of SPN links.

During the year to March 1976, under breakdowns conditions 476 hypergroups were re-routed on SPN for a total effective duration of approximately 14,000 hours.

The SPN is also used extensively to maintain service when it is necessary to withdraw high frequency (HF) plant from service for planned engineering works purposes. Such work becomes necessary either for changes to the network or for maintenance operations.

Before the introduction of the SPN facilities, it was necessary to take the hypergroup links out of service in order to release HF plant, and in order to reduce the effect on service this work was confined to night time periods and Sundays. For long duration operations, this meant that most of the work was either confined to

weekends or had to be planned so that the hypergroup links could be restored to service each morning.

This involved the staff in a great deal of operational planning and also made it necessary to send out notification of planned work operations, well in advance of the work, to all the public and private circuit controlling stations concerned so that trunk circuits could have a busy condition applied and private circuit customers advised of the impending service breaks.

The whole procedure involved a large number of people, was slow and costly in man-hours and, above all, finally resulted in long service breaks.

With the SPN, about 95 per cent of the planned works takes place with short duration interruptions of only a few seconds and in the near future, when the ASEs come into service, any breaks that occur will not be discernable.

Because of this in most cases there is no need to notify the circuit controlling stations or the customers, consequently fewer people are involved.

The planning of the work has been simplified as the work can run through without interruption; the work can take place during normal office hours, with a resultant decrease in the need for overtime; and, equally important, the service to the customer is improved.

During the year ending March 1976 the SPN sections were in use to facilitate planned works for a total of approximately 159,000 hours. Of this about 91,000 hours can be considered as effective use of the SPN, of which 50,000 hours was for cable works and network rearrangement and 41,000 hours for maintenance purposes, such as the location of intermittent faults or the realignment of equipment. In total there were 927 jobs involving the re-routing of 2,181 hypergroups.

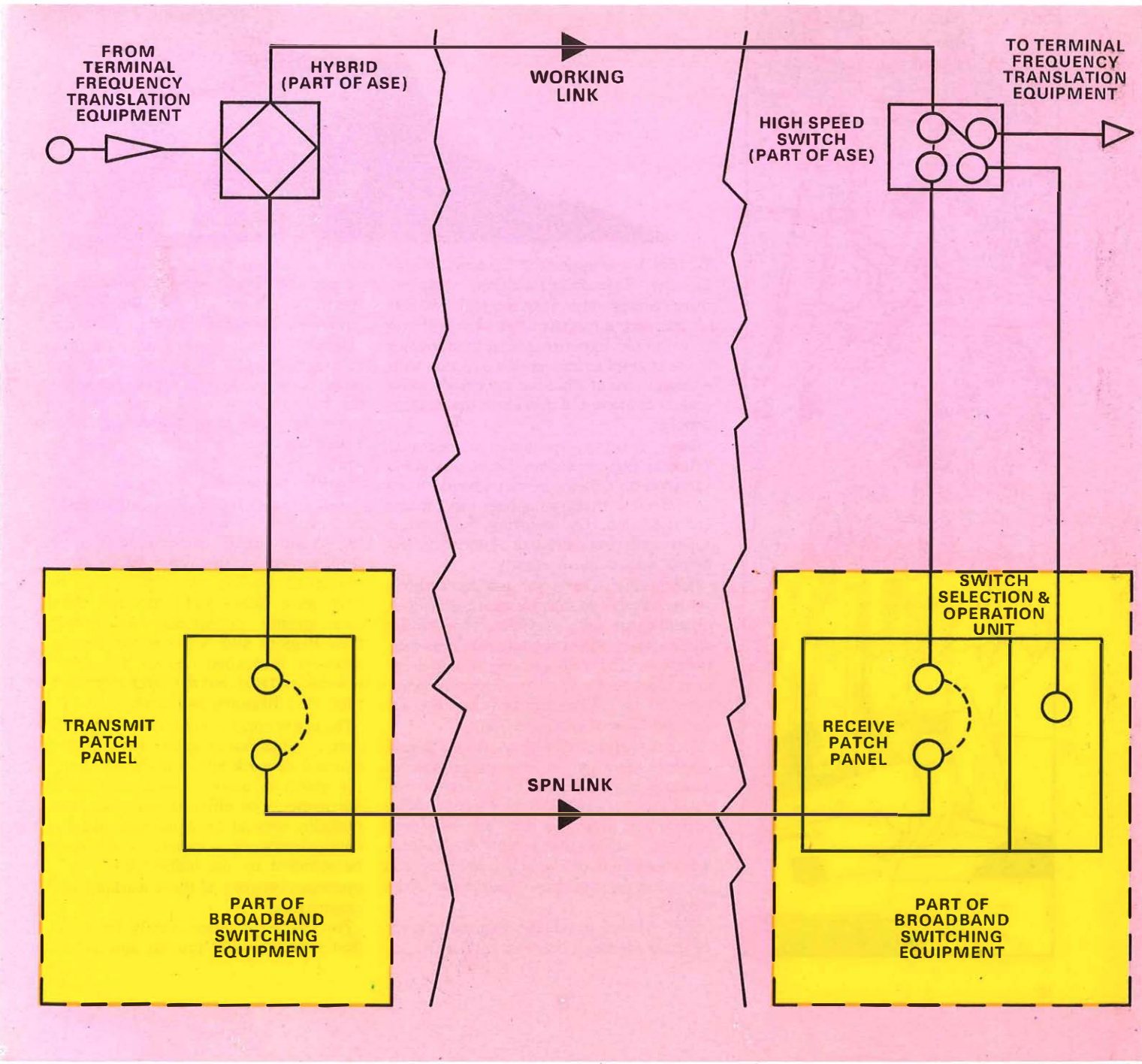
The SPN has effectively increased the availability of circuits routed on the HF network by reducing the mean time to restore service under breakdown conditions and by reducing the hypergroup link outage time resulting from planned works. The SPN also greatly facilitates both maintenance and works operations on HF plant and hence has significantly improved the efficiency with which this work is undertaken.

The introduction of the ASEs soon will further improve service to the customer by reducing the duration of the switching breaks, and this will also greatly assist the maintenance staff by giving them the freedom to carry out switching operations at any time of the day.

Mr T. S. Farres is an Executive Engineer in the National Network Co-ordination Centre, responsible for general operations.

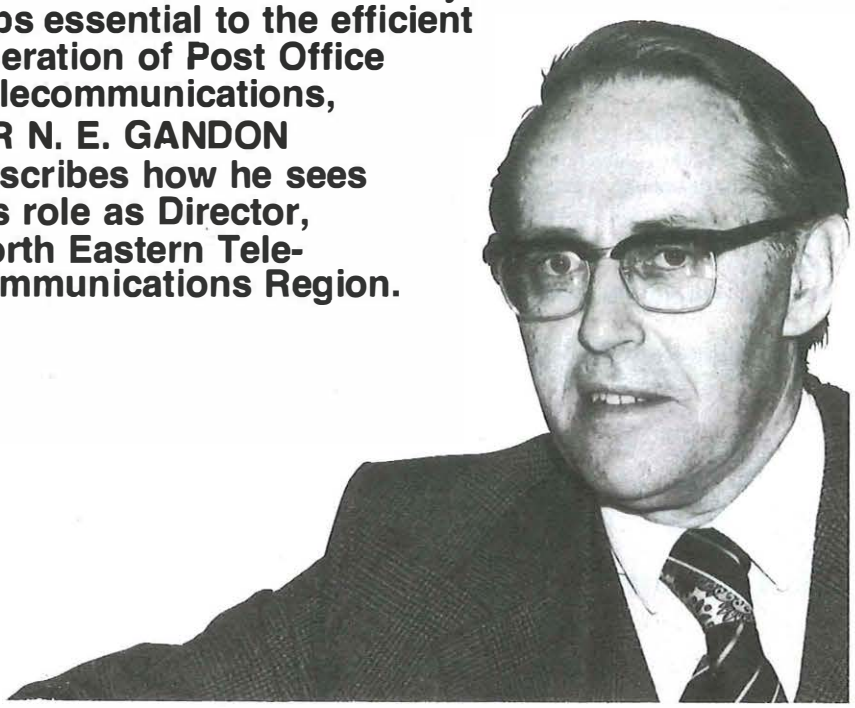
PO Telecommunications Journal, Spring 1977

The principle of SPN working between terminal repeater stations, showing one direction of transmission only.



Running a Region.....

In this the first of a series featuring the work of staff in some of the many different jobs essential to the efficient operation of Post Office Telecommunications, MR N. E. GANDON describes how he sees his role as Director, North Eastern Telecommunications Region.



WHEN I was appointed Director, North Eastern Telecommunications Region, three years ago my young son said: "Well it sounds very impressive but what will you actually do?" Experience since then enables me to attempt to answer that question with a clearer idea of what the job entails and a greater awareness of the factors that make it unique.

Each Telecommunications Regional Director (RD) would no doubt produce a variation on a theme as individuality has a considerable bearing on both job content and execution. The following, therefore, is a personal view although, hopefully, the theme will stand out clearly.

Organisation charts and job descriptions set boundaries to jobs by locating them in organisations and providing frameworks within which the occupant makes his contribution. The Telecommunications Business chart shows the line of responsibility between the Managing Director, the RD and the General Manager (GM).

An RD's job description speaks of "giving positive direction to telecommunications services in the Region to the customers' satisfaction; maximising revenue with minimum demand on all business resources, taking into account the reasonable aspirations of the staff; planning and providing for the future development of the service."

The split of provincial Regions (except Northern Ireland) between Posts and Telecommunications in 1969 was the first major change at Regional level for more than 30 years, but their location and functions within the Businesses remain unchanged.

Despite its two prime functions as a centre of expertise and advice, and as an audit point, some people still regard the RHQ as the fifth wheel of a coach between Telecommunications Headquarters (THQ) and Telephone Areas. The span of control between THQ and 60 or so Telephone Areas, however, needs some intermediate formation and I propose to concentrate on the job as it exists.

A second significant change was the development in the early 1970s of the "Reserved Powers Doctrine". This not only gave RDs – and, through them, GMs – greater opportunity for running their Regions and Areas as the Regional situation demanded (except for matters reserved to THQ), but also strengthened the need for a Regional formation.

The newly appointed RD takes charge of a complex organisation and an element of the national network which itself is linked to the global network of some 400 million telephones. For efficient operation, compatibility between local, national and international networks is essential and can only be achieved by the highest levels of co-operation between all those working in the organisation.

Post Office customers rightly demand the best service we can provide and certainly

expect to get value for their money. Equally, staff who work to provide the service expect adequate recognition of their efforts, not only in terms of pay, benefits and opportunities they receive, but also in the contribution they can make through their own efforts as well as through the consultative and participative processes established with their unions.

As a result, words like "choice", "priority" and "decision" must loom large in the RD's vocabulary. His choices will be limited by the resources available to him, which are usually considerably less than the demands, both reasonable and unreasonable, made upon him. His priorities will be determined by what is feasible and by how well this will fit both immediate real needs and expected longer term requirements in his Region.

The RD must be concerned with the past and the present for the lessons to be learnt. From that base, he must peer imaginatively into the future to guide his Region towards goals that he knows may change with the passage of time.

I believe that a Region should not be regarded as a number of separate Area offices and an RHQ, but an integrated whole in which the prime functions of the RHQ are best performed when it is helping the Areas to overcome their difficulties. In this way the RD gives first priority to the development and maintenance of a strong Regional team working cohesively to achieve agreed objectives. He needs good communications with his staff throughout the Region so that they are fully persuaded of the validity of proposals and are committed to the achievement of the required results.

The objectives to which he must be dedicated should include the quality of service given to existing customers, the provision of service for new customers and the provision of plant and equipment to meet future needs. These aims must also cover the performance – both qualitative and quantative – of plant, operations and staff and the general economic health of the Business.

As in the case of anyone in charge of a business, he will only be able to achieve results through many other people. His immediate support must come from the Controllers who with him (except in those Regions where there are non-executive Board Members) make up the Regional Board, and the GMs in the Telephone Areas into which the Region is divided.

I regard my senior management team as including Deputy Controllers in the Regional Office, who are the key functional staff in their Divisions, and Deputy General Managers as, in a provincial Region, a group of this size is small enough for the RD to influence effectively yet comprehensive enough to be able to extend that influence throughout the Region. It is significant, too, in that it comprises those for whom he must accept personal responsibility for management development, and this is another key task.

While the normal management chain must remain the main communication channel, in these days of developing industrial democracy the communication channels established through consultative machinery are equally important and the RD must give careful attention both to the formal and to the informal meetings that he has with various union representatives.

I believe that the RD's contacts with customers in his Region should be limited. Customers' needs, problems and complaints are generally of a day-to-day nature and are better handled directly from the General Manager's Office by people who have the relevant information to hand. This is not to say that he should cut himself off completely, but he will need to be well briefed when he talks to them.

Although much of what the RD does is out-going, his ability to listen is as important as his ability to inform and direct. He must be a channel of communication, collaborating with his colleagues in other Regions in influencing THQ policies – and, when they have evolved, disseminating and implementing them in his Region.

Between regular meetings, conferences and Regional reviews lie individual things, ranging from the pleasant task of informing someone of a well deserved promotion to the not so pleasant duty of refusing an appeal where the well being of the many must take precedence; from representing the Post Office on a University Court to presenting trophies on a tennis court; from wishing Godspeed to a retiring colleague to sharing the grief of relatives of one who has died in harness.

Post and telephone also bring the unusual or unexpected, calling for immediate or longer term attention and reminding the RD that he is the holder of an office in which "The rank is but the guinea stamp – the man's the man for a' that".

Some of the many and varied tasks in the life of a Regional Director:

Below: Mr Gandon in conference with members of his Regional board;
Bottom right: Examining damage following an explosion at a telephone exchange;
Top right: Greeting competitors at a Post Office golfing tournament.

CAT

COMPUTERS have many, varied and increasingly important roles today in the operation and management of Post Office Telecommunications. One of the latest and, perhaps, least known of these applications is in the field of education and training, for it was only last year that the first Post Office trial took place of a computer-aided training (CAT) system.

Use of CAT techniques were suggested by TMSD and part funded by the National Development Programme in Computer Assisted Learning. Following agreement by the Vocational Training Division at Telecommunications Headquarters, the trial was arranged in South Western Telecommunications Region on a new four-week course designed for technicians in the maintenance of customers' telephone apparatus.

The course chosen for the trial is of recent design and uses a variety of training aids which allow students to meet objectives at their own pace. It comprises six similarly structured teaching sessions covering circuit operation and lay out of equipment. Each session contains a short lecture and self-instruction texts, immediately reinforced by short practical exercises on different types of equipment. The sessions are followed by a faulting exercise which exposes the students to the wide range of equipment in current use.

About 40 different types of telephone and switchboard arrangements are provided for practical work, with a selection of 169 practical exercises and 233 faults for up 18 students per course. To manage the course the lecturer and instructors use a combined record which indicates the stages reached by the student, the next job to be done and the item of equipment on which it can be carried out.

The course allows slower students to have practical tasks deferred, and those who have progressed quickly may be given additional material by way of audio-tape programmes. Student assessment is based primarily on the number of faults found during the faulting session but the standard of practical skills and the accuracy of answers to practical exercises is also taken into account.

Although self-instruction and a degree of self-pacing were features of the original course, the authors realised that much restructuring was needed to make best use of the CAT facilities. Eventually the CAT version of the course maintained the same form but each session was changed to have a

Using different types of equipment, a group of technicians undertake practical exercises on the course chosen for the trial of Computer Assisted Training.

on trial with technicians

HE Smith

tutorial, a review test with any necessary remedial material, practical exercises and a fault simulation period.

The necessary restructuring of the technician's course for CAT was undertaken by the two-man training project team at SWTR Engineering Training Centre, and the RETC staff ran the computer and control courses under the general direction of Vocational Training Division. For the trial IBM's Interactive Training System (ITS) was used, which had achieved some marked success in the United States of America but had not been used to any extent in the UK.

The ITS computer package contains "sessions" sub-divided down through "items" to a sequence of labels, or addresses, within the computer. The tutorial material and other instructions are presented to the students on visual display units (VDUs) by the computer in a sequence determined by the authors.

The computer also ensures that each student works on an individual basis without interference, and also that students do not receive the same fault at the same time. Material is "written" into the computer by typing, from a keyboard on the VDU, the appropriate label followed by the text. A copy is produced on the screen so that errors can be corrected immediately.

The development of a logical approach to fault location is a major teaching problem in any maintenance training course, and the fault diagnosis feature of ITS was used to provide several different styles of faulting exercise. Typically, the computer was programmed to simulate a fault and present the apparent conditions, such as bell not ringing, to the student. He then took a step-by-step approach to finding the cause of the fault, progressively typing in each step to the computer for confirmation.

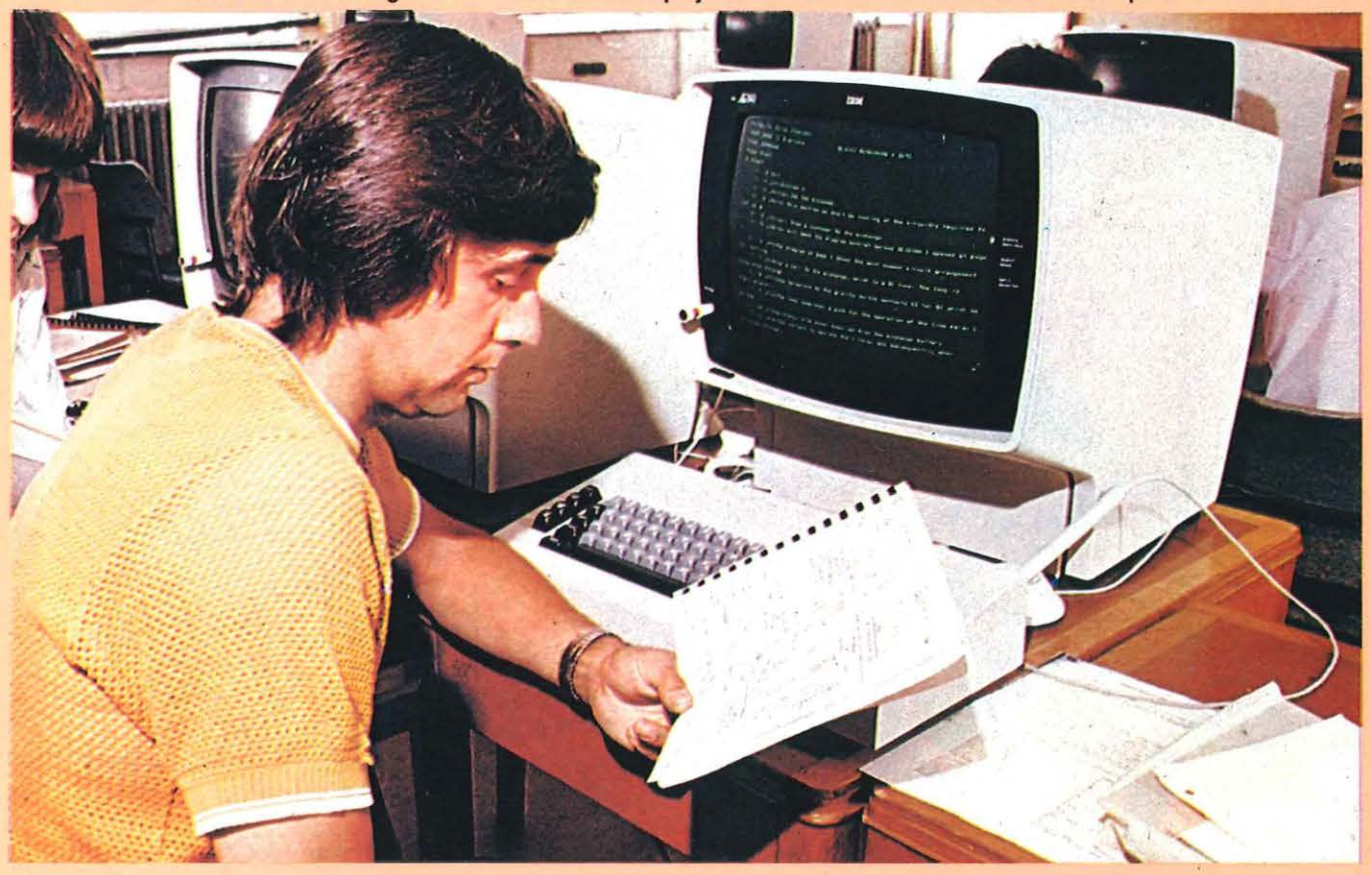
These exercises could be carried out either with or without the student being involved with the actual equipment. A variety of paths to the fault could be taken, and the number of steps taken were given to the student at the end of the particular exercise so that he was able to compare his performance with the optimum number.

A computer suitable to take ITS was the IBM 370/145 owned by the South Western Electricity Board. The Board gave permission for its use and it was connected by a high-speed private circuit to a control unit and 16 VDUs for students at the SWTR Engineering Training Centre.

Each student was allocated a VDU, mounted on a table in the lecture room, and given a pre-determined code which allowed him to "sign on" to the course. The students quickly became skilled in the use of the keyboard. When a student "signed off" the computer, his position in the course was automatically noted, and on "signing on" again he was able to pick up where he had left off.

Progress tests and practical exercises were featured, and remedial tuition was automatically given immediately if progress test questions were incorrectly answered. Pos-

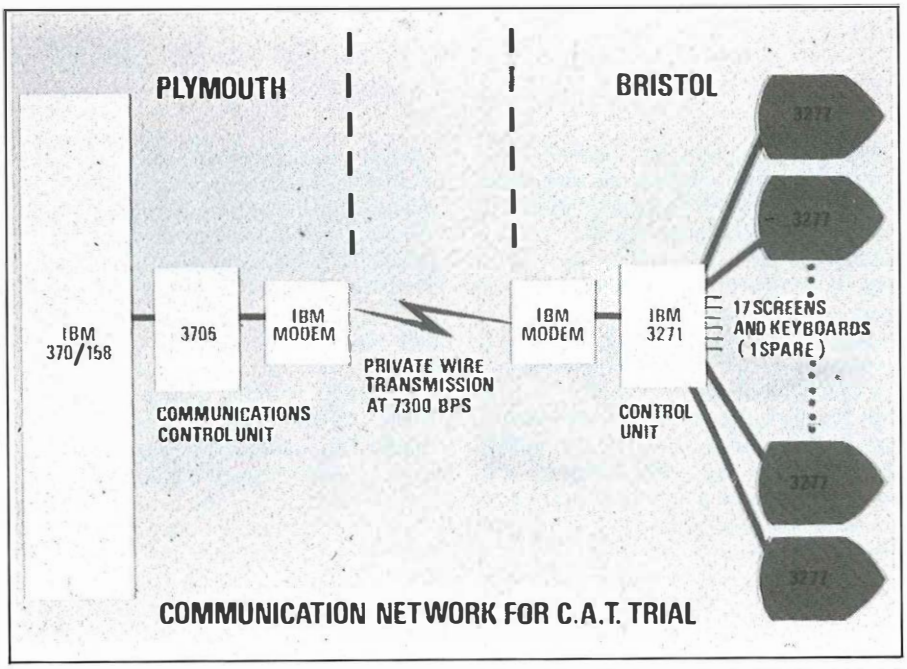
A student at work on a tutorial during the trial uses a visual display unit to "write in" his material to the computer.



sible student answers had to be anticipated by the authors and written into the computer so that the answers given could be compared with them.

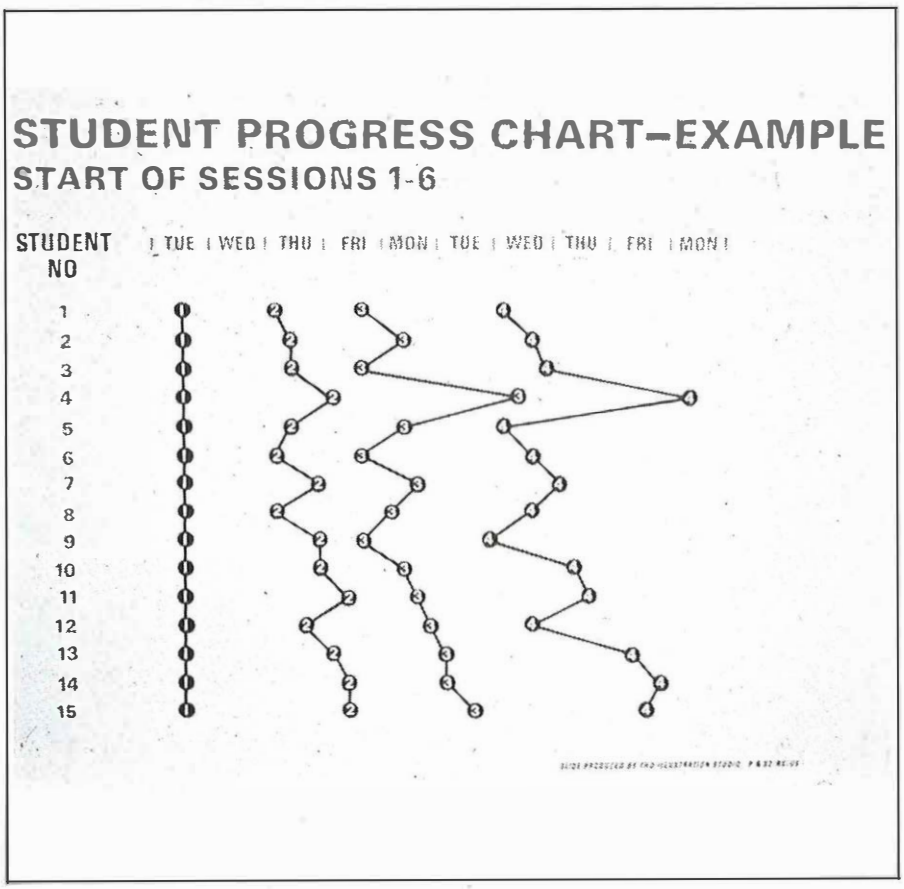
If a match was found, the correct answer was given to the student on the VDU; if not, the student was asked to try again. If he failed after several attempts, having also seen the remedial material, he was either given the correct answer or told to seek assistance from the training staff conducting the course. The success of this quiz or interactive feature depended to a large extent on the authors' ability to anticipate the various forms of a correct answer.

At the end of a tutorial the student was instructed to leave the VDU and carry out a practical task, and on completion of this he would "sign on" again to be questioned on his findings. In the event of a completely wrong answer, the student was directed to consult the training staff who played an important part in assisting the less able and slower students.



The CAT communication network set up between the South Western Electricity Board's computer in Plymouth and the Engineering Training Centre near Bristol.

A typical student progress chart, showing the effect of the computer aided training trial's self-pacing feature.



A total of 67 students attended the CAT course during the trial, and a further 58 on ordinary courses were used for control purposes. Students' overall opinion of CAT was favourable. Some who received more personal tuition than possible on an ordinary course thought they would have done better with lecturers, while others preferred exercises on equipment rather than fault diagnosis on the computer. The training staffs' opinions varied as the trial progressed but overall were favourable.

The ITS provided records of each student's response to each question and the time interval between responses. These highlighted student problems, and either the authors were able to amend the course material or the training staff gave extra attention to those needing it. The amendments were done from a VDU keyboard while the course was in progress and without interference to the students.

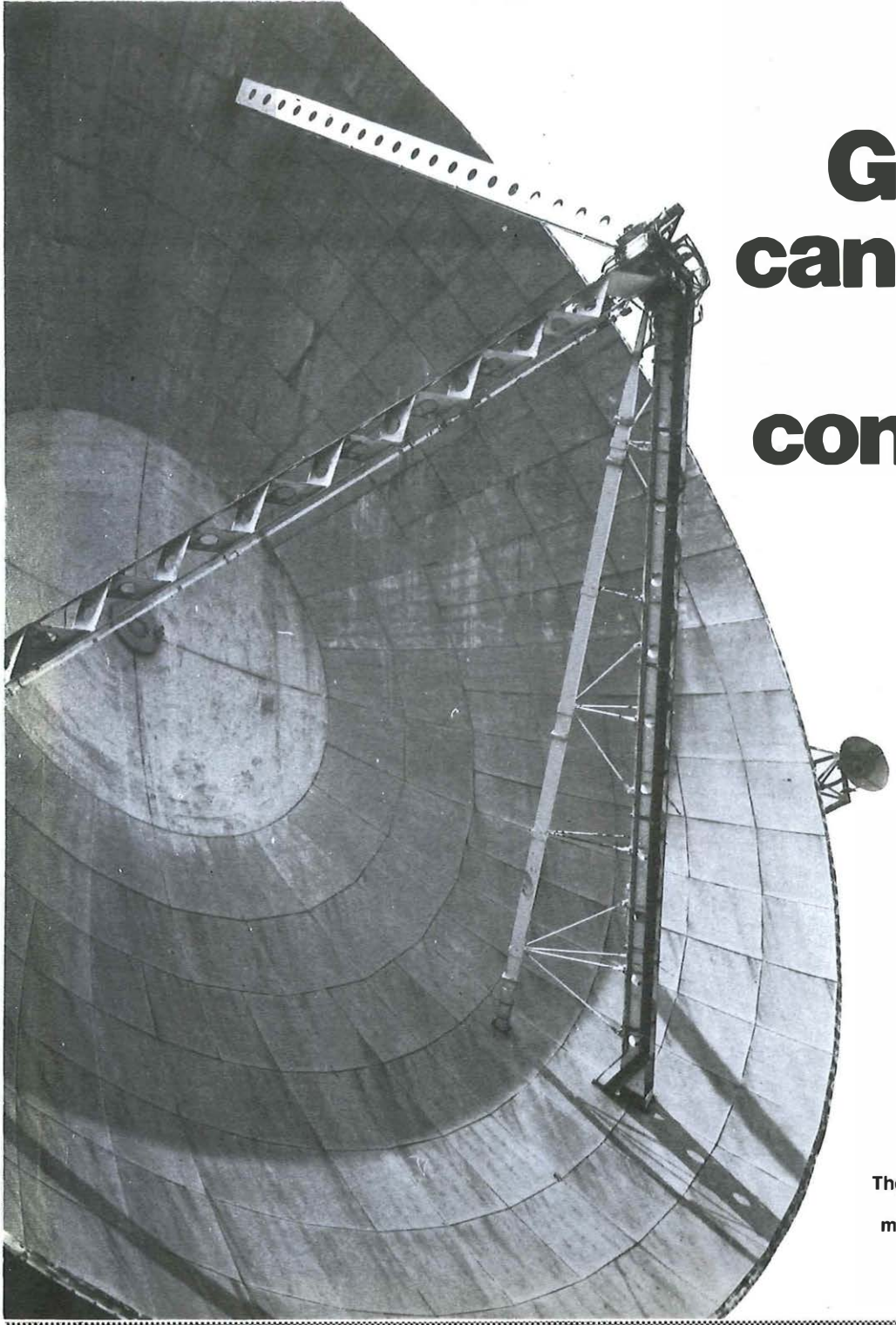
The trial was essentially a comparison of attainment on the CAT courses with that on the ordinary courses. The Post Office's Psychological Services Division helped by setting voluntary tests and questionnaires before, during and after the courses, but the final evaluation of the trial has yet to be completed.

There seems little doubt that CAT, and ITS in particular, can be an effective training method, but systems must be designed and documented so that their facilities are readily apparent and can be used by other than skilled computer programmers. CAT's main advantages over other training methods include the instant ability to provide training to suit individual ability, to offer on demand a scheme of training in a variety of arrangements, a continuous check on the course material and immediate updating facilities.

Cost effectiveness, however, is the key to the future. There can be a considerable saving in training time but little is yet known, for instance, about how CAT could be best used in the Telecommunications Business, the effect of system reliability on training, how much equipment would be required for the minimum effective system and what sort of organisation would be needed to support a CAT system. There is also the question of the resources needed to convert existing training methods.

An extensive study has been mounted to seek answers to these problems, and it is mainly on these that the use of computer aided training must depend.

Mr H. E. Smith is a head of group in Vocational Training Division at Telecommunications Headquarters, responsible for Regional engineering training.



Goonhilly cancels the French connection

KP Sams

The small auxiliary aerial used as part of the interference cancellation equipment is mounted at the three o'clock position on the edge of Aerial 1 at Goonhilly earth station in Cornwall.

Equipment has been installed at Goonhilly earth station to overcome the problem of interference to satellite transmission caused, under certain meteorological conditions, by signals from a microwave station in Northern France.

SEVERE interference to telecommunications circuits operating through Goonhilly earth station was first noticed towards the end of 1970. Several unidentified carriers – radio frequency signals used for telephone conversations, television and data transmissions – could be seen in the received frequency spectrum of both Aerial 1 and Aerial 2 systems. One of these unwanted carriers was close enough in frequency to a telecommunications carrier to cause loss of satellite traffic over a period of several hours.

When propagation conditions returned to normal the service was quickly restored but, because of the ever present threat of losing revenue-earning international circuits, it was clearly essential to find the source of the interfering signals. Preparations were therefore made to determine the direction of the interference source when abnormal conditions next prevailed.

This was a few weeks later and, with the aid of a standard horn aerial and a sensitive receiver system, an approximate bearing of the interference source was obtained. Maximum signals were received at a bearing of 128 deg East of North, indicating that the source was probably located in Northern France. Examination of the International Frequency Register showed that three French terrestrial stations lay in line of the measured bearing and of these Cesson-Sevigne, about 100 km south-west of Paris, appeared to be the most likely source as Goonhilly was almost directly in the "line-of-shoot" of this microwave link.

Positive identification of the source of interference was made a few weeks later with co-operation from the staff of

Cesson-Sevigne and an interpreter in the International Exchange. Under the direction of Goonhilly, traffic was transferred, from the appropriate carrier at Cesson-Sevigne to a spare carrier and the main carrier was temporarily switched off. This procedure was repeated for all four carriers used on the link from Cesson-Sevigne and at Goonhilly each carrier was seen to disappear in turn from the visual display.

A subsequent review of the frequency allocations for this mocrowave link showed that two auxiliary channels and a total of six network channels were likely to be put into full-time service. The effect that these potentially interfering sources could have on the earth station receivers depends on the bandwidth of the received carriers and the frequency separations between wanted and interfering carriers. The three aerial systems at Goonhilly carrying international telephone calls and television currently operate with the Atlantic Primary, Atlantic Major Path and Indian Ocean Region INTELSAT satellites in accordance with internationally agreed frequency plans.

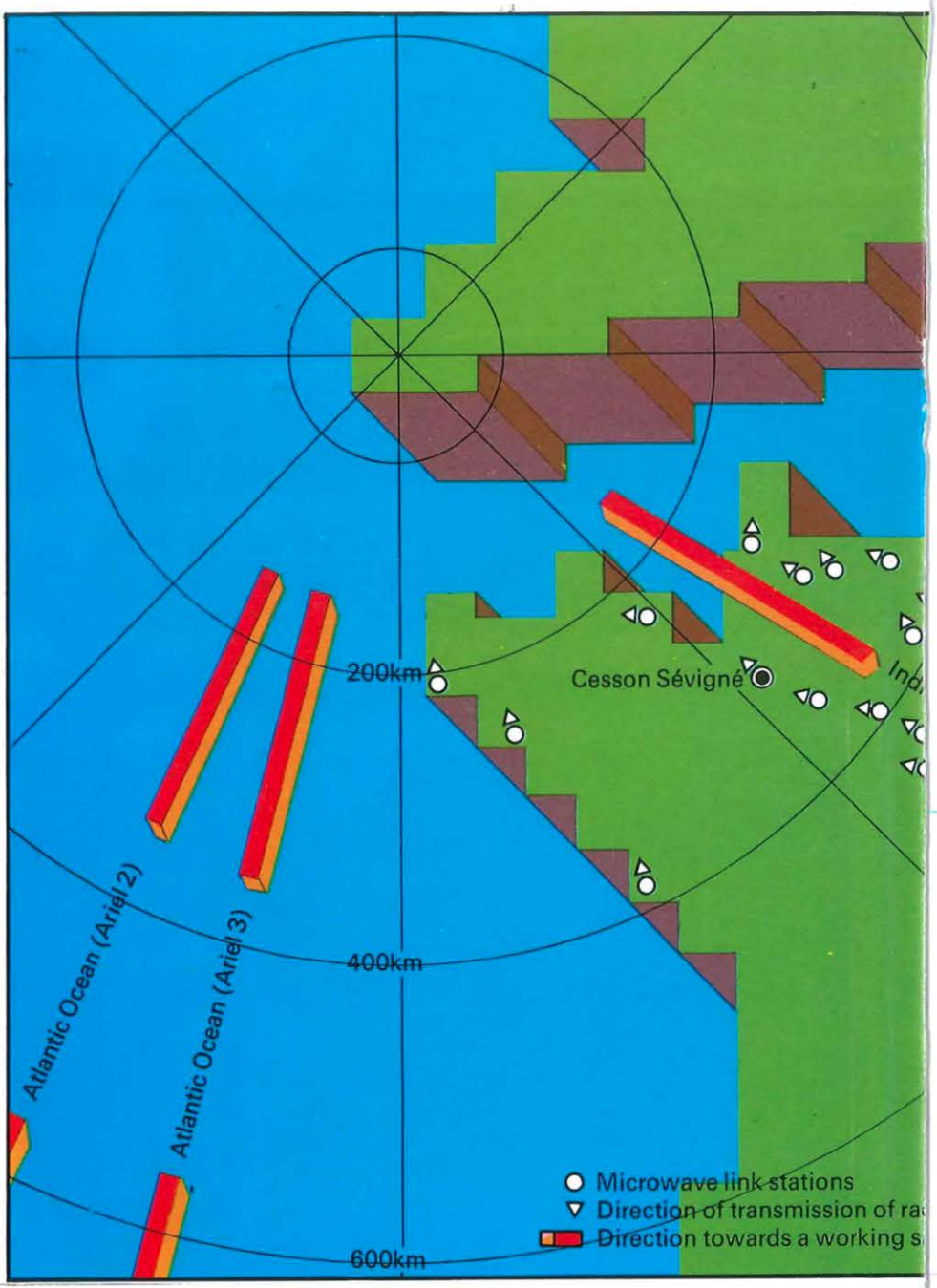
With the knowledge of this potential source of interference, efforts are now made when formulating and agreeing international plans to avoid Goonhilly having to receive carriers close to interfering frequencies. But, with Goonhilly receiving nearly 50 carriers, this is not always possible because a plan can involve more than 50 earth stations and more than 220 transmission paths.

Aerial 1, which operates at a low angle of elevation to a satellite positioned over the Indian Ocean, points more closely to Cesson-Sevigne than the other two aerials and is therefore most vulnerable to interference. Because of this it was decided that an attempt would first be made to reduce the effects of interference on this aerial.

It later became clear that the only effective method of reducing the interference was by using interferometry techniques – that is, receiving signals on an auxiliary aerial and subtracting them from the interference received on the main aerial. It was known that the Plessey Company had developed this type of equipment for use in other circumstances and Telecommunications Development Department commissioned a study to see whether the equipment could be adapted for use with Aerial 1.

Many factors had to be considered in this study, including the probability of achieving the desired interference suppression, the possibility of disturbance to the existing system and the period for which Aerial 1 would need to be out of service while prototype cancellation equipment was installed and commissioned. The probable cost, and the time required to develop the equipment also had to be taken into account, as did the likely reliability and ease of maintenance of the equipment. Finally, there was the need to avoid any distortion of the wanted signals which might be caused by the equipment.

It was essential that the cancellation system should be capable of suppressing interfering signals which could occur anywhere in the earth station receive band coinciding with Cesson-Sevigne frequency allocation.



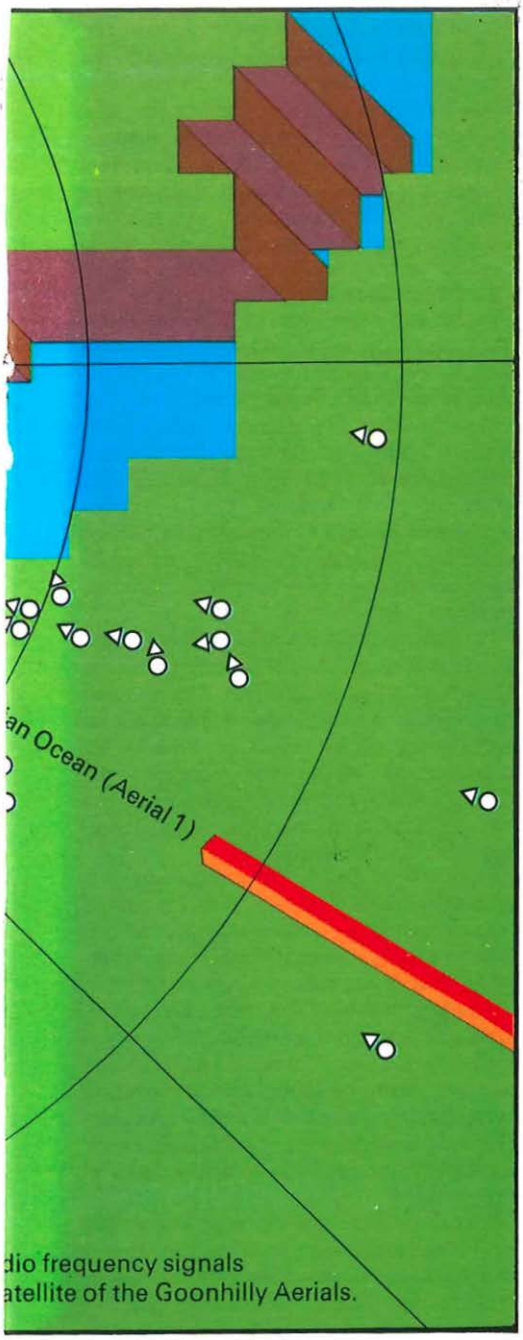
The study showed that some of the required information, particularly the way the interfering signals were modified on their journey from Cesson-Sevigne to Goonhilly, was not available. There seemed, however, to be a good chance of success and, as it would have taken a long time to collect the missing information, it was decided to go ahead with the development of prototype equipment.

The cancellation equipment, which has now been installed on Aerial 1, consists of four rack-mounted units and an auxiliary aerial of 1.2 m diameter fitted with a circularly polarised feed. To achieve good cancellation it is essential that the paths from the interfering source to the main and auxiliary aerials are as similar as possible, and means that the auxiliary aerial has to be mounted on or near the main aerial.

Ease of access to the earth station's broadband receiver and the need to keep the loss of interconnecting cables and feeders to a minimum led to the use of an existing cabin at the rear of the Aerial 1 reflector structure. This cabin houses the cancellation equipment apart from the main control unit, which is in the Operations Control Area (OCA) at Goonhilly.

No serious problems arose during installation. The main concern was to safeguard telecommunications traffic by planning the installation to fit in with operational requirements. By making use of special techniques for the installation of the auxiliary aerial, and by using the standby receiver path change-over facilities when principal connections were made, it was possible to complete the work without having to take Aerial 1 out of service.

The auxiliary aerial was mounted on a specially constructed angle-iron framework so that it could be positioned to point horizontally towards the interference source. Adjustments in both azimuth and elevation



The radio relay stations which are a potential source of interference to satellite communications at Goonhilly earth station, Cornwall.

bearings were provided to allow realignment of the auxiliary aerial if the operating angle of the main aerial needs to be significantly changed.

A permanent position for the auxiliary aerial was chosen on the edge of the main aerial at the three-oclock position and the installation technique consisted of attaching it complete with its feed to a framework while still on the ground and then lifting the whole assembly by crane. The remaining work of bolting the framework to the main Aerial 1 backing structure was carried out safely from the back of the aerial. This was necessary to ensure installation staff were not subjected to radiation from the high-power transmissions passing through the operational aerial.

The interference cancellation equipment is designed to be controlled normally from the main console in the OCA, but can be controlled for maintenance purposes from the auxiliary control panel in the equipment cabin. The facilities available at both positions enable the canceller to be connected to either the main or the standby traffic path of the earth station receiver. In addition one out of seven pre-set frequencies can be selected. One of these is preserved for an automatic test facility and the remaining six can be tuned to correspond to the allocated frequencies of the microwave link which is causing interference.

Normal operation is for the cancellation equipment to be completely isolated from the earth station receiver and switched to the "test mode". In this mode a locally generated signal is applied to the canceller to check whether it is "working" or "failed". In the event of interference, as indicated by the earth station alarms, the equipment is manually switched from the "test mode" to the "cancellation mode" by selecting the appropriate frequency and by removing the "isolate" condition.

The basic principle of the cancellation equipment requires a comparison to be made between the interference received along with the wanted signal and an independent sample of interference which is substantially free from the signal that is wanted.

In Goonhilly's system the auxiliary aerial pointing in the direction of the interference is used to provide the independent interfering signal input for comparison; the other input is obtained by taking a feed from the main communications channel.

The cancellation equipment installed in the cabin at the back of the aerial consists essentially of two units, a correlator and a vector modulator. The correlator compares the phase and amplitude of the interfering signal received on the auxiliary aerial with that received on the main aerial. The vector modulator, which is controlled by the correlator, operates on the signal from the auxiliary aerial to make it equal in amplitude and opposite in phase to the interference received by the main aerial.

Thus when the output of the vector modulator is added to the output from the main aerial the interference is cancelled. The auxiliary aerial receives virtually nothing of the wanted signal (compared with the level of the interfering signal), and the former is therefore unaffected by the cancellation process.

Accurate path matching between the main path and the auxiliary path is necessary to ensure acceptable cancellation over the full RF bandwidth. The main aerial path includes a long waveguide run between the aerial feed and the receiver, but it was impracticable to duplicate this waveguide run in the auxiliary aerial path. The method adopted, therefore, was to fit a section of special waveguide in the auxiliary path sufficient to provide the correct dispersion and then to add a length of coaxial cable to make up the total delay.

Only moderate interference has been experienced on a few occasions since the equipment was installed, so it has not yet been possible to make a full evaluation of the effectiveness of the canceller on signals received from Cesson-Sevigne. Successful cancellation was achieved, however, for a total of nine hours on four occasions, and in each case measurements on the affected carrier confirmed that channel noise was reduced to an acceptable level by use of the cancellation equipment.

The probability of prolonged periods of interference remains, however, and the cancellation equipment, developed and installed within 11 months, is a sound investment for the future as it plays a vital role in safeguarding Britain's revenue-earning international telecommunications services from the serious effects which interference can bring about.

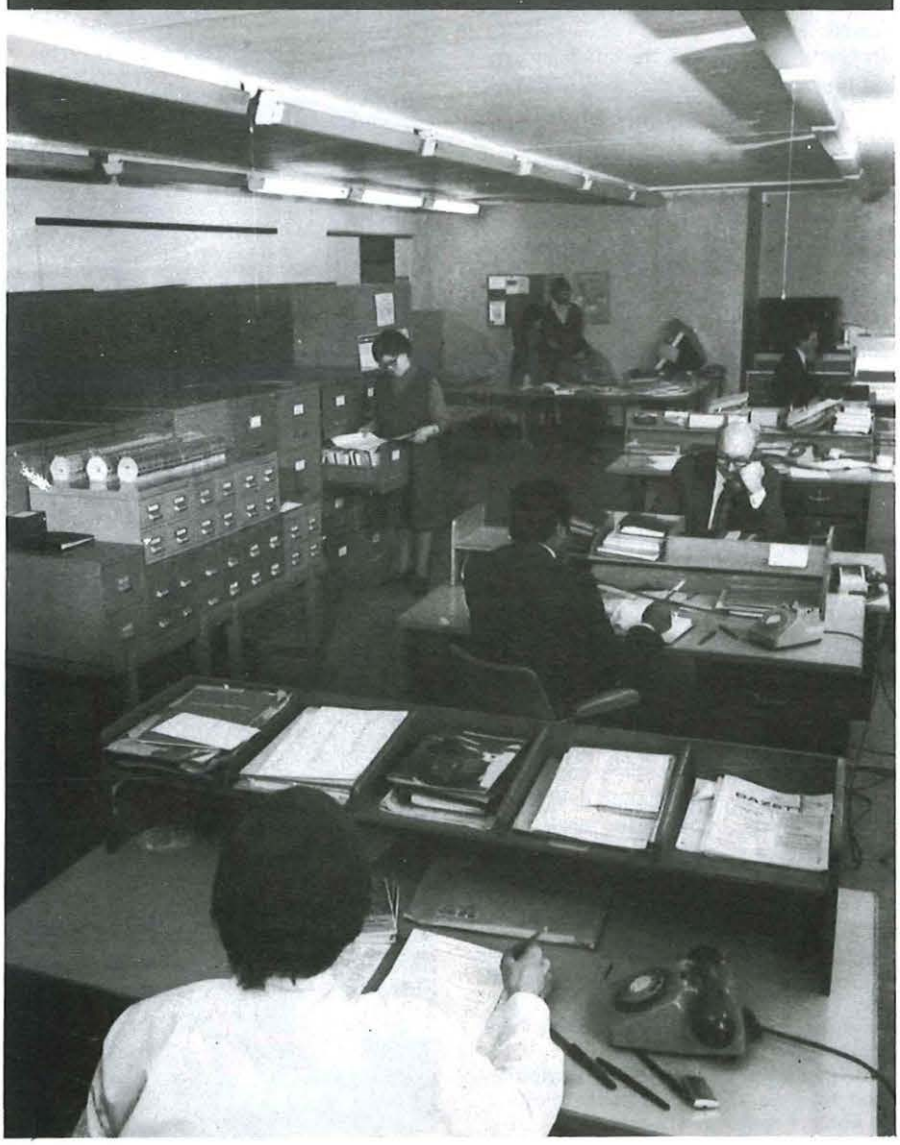
Mr K. P. Sams is an Executive Engineer in Telecommunications Development Department at Goonhilly responsible for experimental and development work for satellite telecommunications systems.

PO Telecommunications Journal, Spring 1977

Mr Terry Pascoe, a Technician at Goonhilly, adjusts the frequency of the cancellation unit housed in the equipment cabin which is situated at the rear of the Aerial 1 reflector structure.

Engineering information on tap

HP Stern



The Engineering Information Bureau at Telecommunications Headquarters.

EVERY working day Post Office planners, technicians and engineers throughout the country come face to face with the wide range of problems which maintaining and improving Britain's telecommunications services creates. It might, for instance, be a matter of checking a drawing reference for a telephone dial or it could be trying to locate a special component for a "one-off" job. It could simply be the date of issue of a Telecommunications Instruction.

Faced with this type of situation most staff probably set off on a lengthy local search. Yet the chances are that the information they seek is just a telephone call away in the Engineering Information Bureau (EIB) at Telecommunications Headquarters. The Bureau has a full-time staff of five headed by a senior draughtsman, and is open during normal office hours to deal with the many enquiries received each week by telephone, letter or personal visit.

The EIB was set up during the Second World War as part of the then Engineering Department's drawing office. The idea was to prevent wastage and duplication of engineering design effort by Post Office draughtsmen whose work covered the design aspects and drawing details of the whole spectrum of Post Office engineering components and equipment.

From these small beginnings the EIB gradually established itself as a vital part of telecommunications development, and it is now an excellent source of reference material for Post Office staff and is also used by an increasing number of outside contractors. Basically it provides up-to-date information in four broad areas covering THQ drawings of equipment, buildings and engineering components, British Standards specifications, commercial manufacturers' catalogues and in-house publications and instructions.

Bureau staff are willing to help with any problem, but contact at an early stage of a project is always encouraged. If this is done it often helps the provision of more effective assistance which can, in the long term, provide savings both in costs and effort. Over the years this has frequently proved to be the case.

While most enquiries could be fairly termed routine there is still the occasional "one-off" request which puts the detection powers of EIB staff to the test. A recent enquirer, for instance, wanted to trace the telephone number of a major London store – as it was in 1922. The records containing the information had been destroyed and nobody could be found who was able to recall the number. After some head scratching Bureau staff approached the British Museum Library and located a copy of "The Tatler" of the period which contained the required number in an advertisement.

Another example where staff were able to display their expertise concerned response to a request from a contractor for help in locating a special piece of pneumatic equipment in connection with postal mechanisation. No manufacturer of this equipment was known but a call to the Post

Office factory at Holloway, London, produced the names of a few firms who might be able to help. Eventually one of these firms produced the equipment as a "special". More recently an enquiry has been received for equipment for jointing optical glass fibres.

A recent survey provided useful data about who was using the Bureau and the type of information being sought. Almost two-thirds of enquiries were found to originate from within THQ. Of these, nearly half were from Purchasing and Supply Department while the rest were shared between Operational Programming, Development and Service Departments. Regional enquiries, including those from the External Telecommunications Executive, amounted to 12 per cent while Factories Division accounted for four per cent. Another 18 per cent came from miscellaneous sources which included outside contractors.

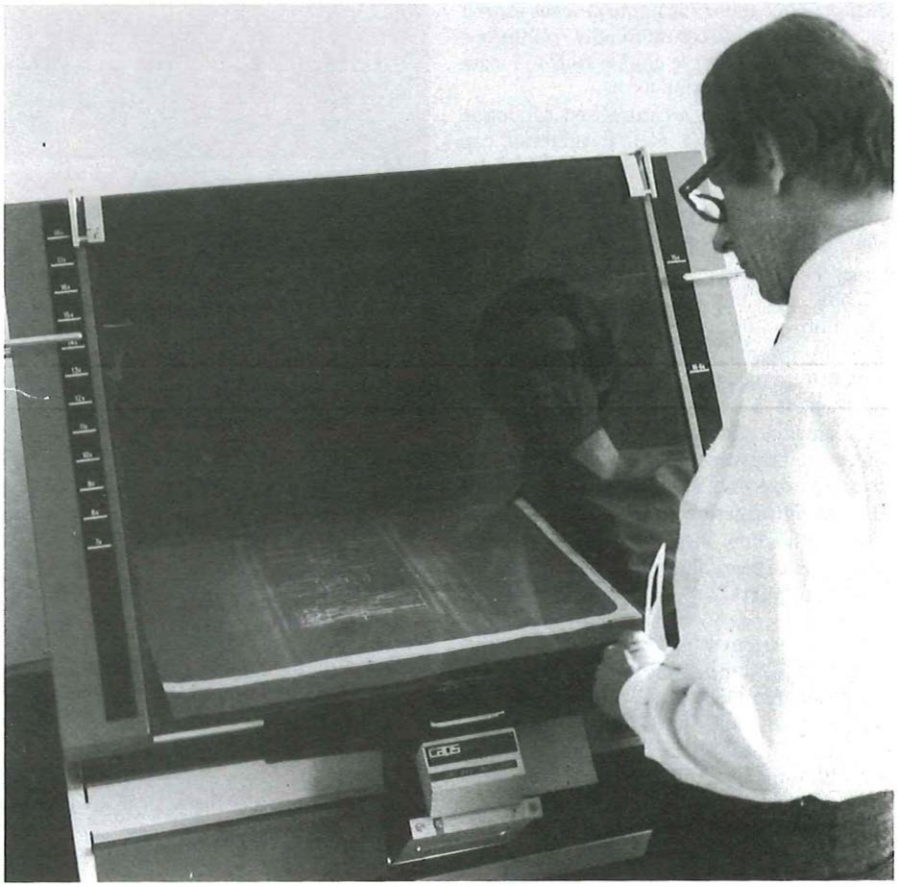
One in three of the enquiries were about details of drawings, just over a quarter concerned miscellaneous problems and the remainder were shared almost equally by questions about catalogues, British Standards and internal organisation.

The survey confirmed that problems surrounding drawings keep Bureau staff busiest. At present more than 100,000 drawings, ranging from details of special screws to plans of large exchange racks, have been microfilmed, and microcopies are filed for reference. Prints of these drawings are normally supplied by the Reprographics Section of Supplies Division, but in an emergency the EIB can provide single prints from the microfilms it holds.

As all the Bureau's staff have an engineering background, queries about drawings can usually be answered quickly. In more difficult cases the staff, if unable to provide the answers themselves can normally suggest a more profitable line of enquiry elsewhere. As well as drawings, the Bureau also holds an alphabetical index which enables drawing numbers to be found.

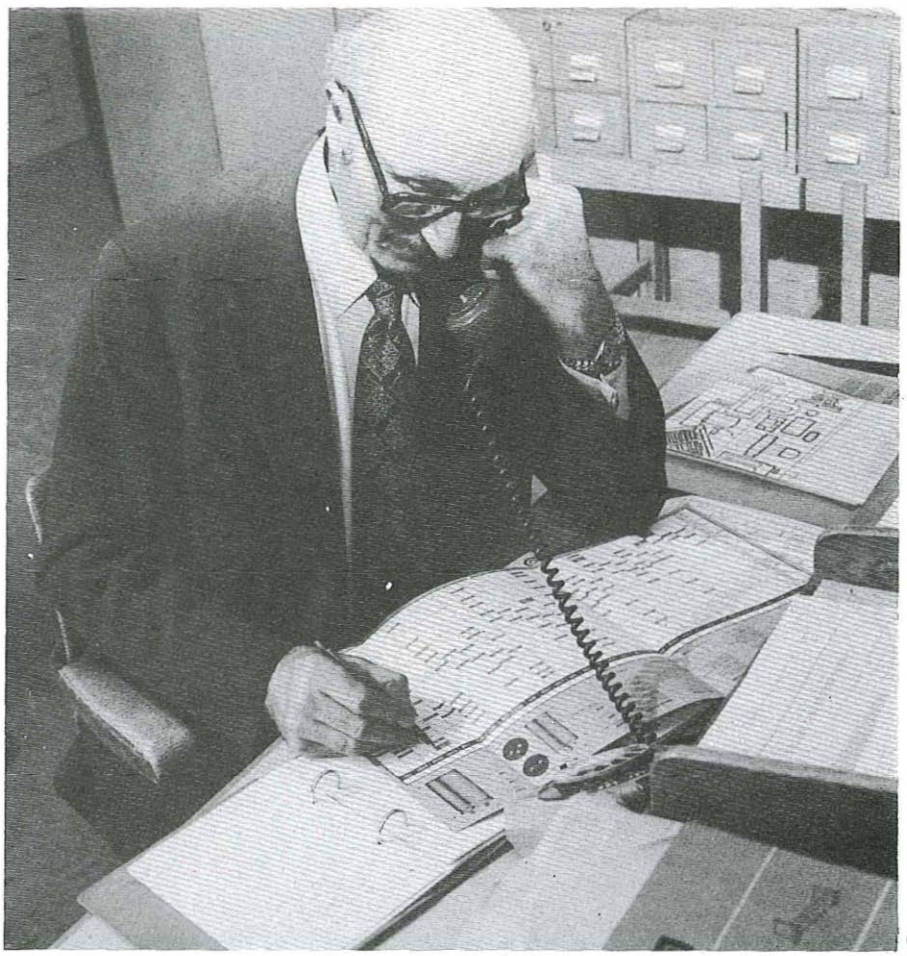
The EIB is responsible for holding and updating reference copies of all relevant British Standards Institution (BSI) publications such as specifications and codes of practice. This material is kept both in pamphlet form and on microfilm, and sometimes it is even possible to direct an enquirer to the particular Post Office representative who took part in the work of the relevant BSI technical committee. It is also a task of the EIB to prepare a bi-monthly list of new and revised British Standards and distribute them to those Post Office staff whose work necessitates keeping in touch with such developments.

Equally important is the EIB's library of 1,400 catalogues of commercially available materials, components and equipment. This is continually being updated and expanded with literature from fresh sources as, for instance, when new companies enter the markets in which the Post Office has an interest. In addition there are a large number of catalogues on microfilm supplied commercially. The Bureau also has its



The author, Mr Peter Stern, uses an enlarging machine to produce a copy of an engineering drawing stored on microfilm.

Leading Draughtsman Sid Cuthbert examines a manufacturer's catalogue to check the availability of a capacitor for an enquirer.



own product and trade name indexes as well as a number of commercially published buyers' guides. These enable staff to locate suppliers of particular items.

The advantage of a centralised catalogue library of this kind is that material can always be current and more comprehensive. Suppliers are often reluctant to part with expensive literature on an individual basis so that catalogues held locally tend to become obsolete.

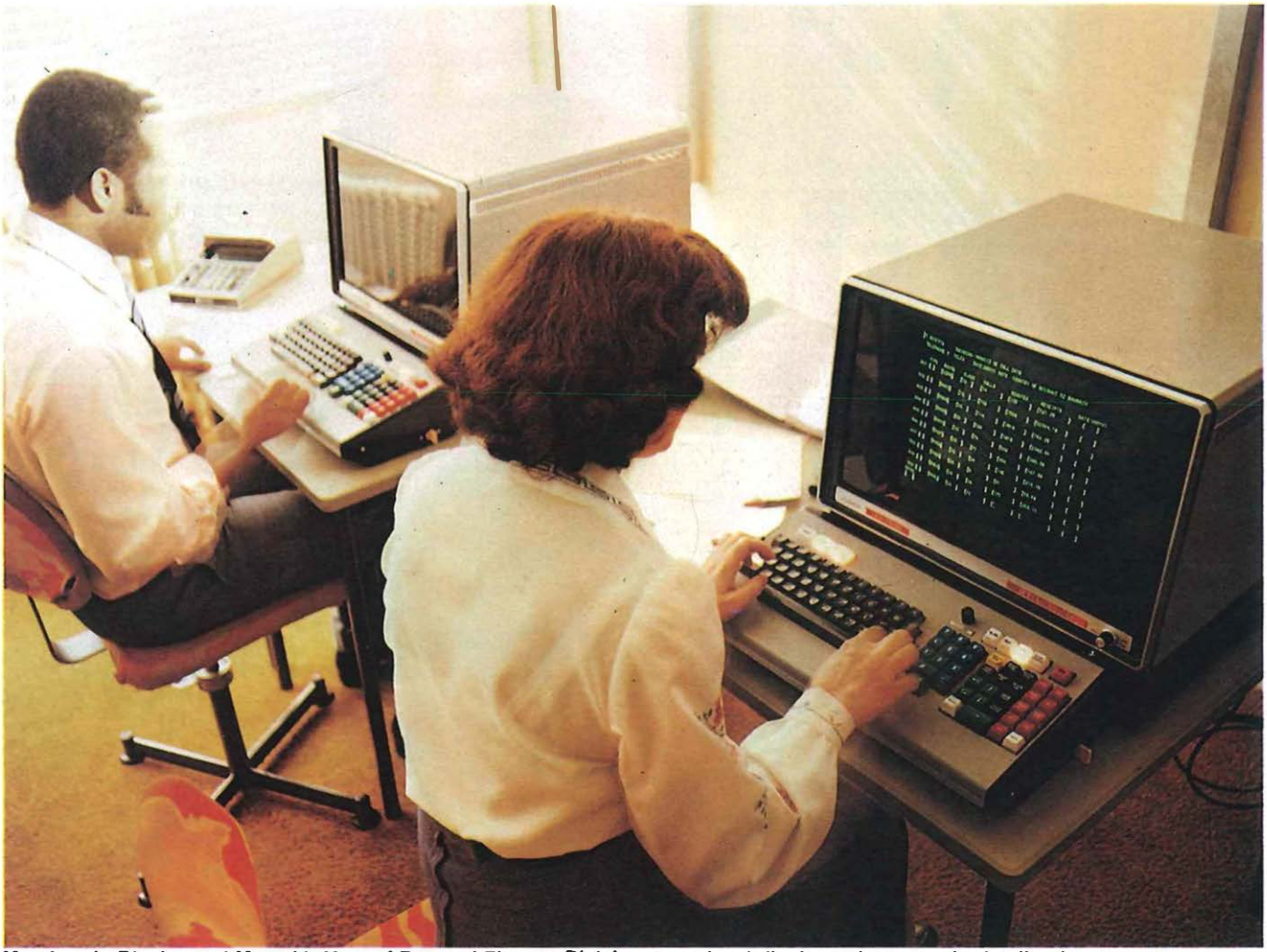
When any new project is undertaken selection of the most suitable materials is very important. While the cost of one particular item may be relatively low its quality could have a significant effect on system performance. Careful consideration should therefore be given to low-cost items as well as more expensive equipment. Reference to Bureau information will usually produce useful guidance. In addition, the EIB holds a number of general reference publications.

Over the years the EIB has been playing an increasingly important role in the Telecommunications Business. It has saved the Post Office countless hours in staff time as well as a great deal of expense and trouble. The Bureau is in Room 201, 207 Old Street, LONDON EC1V 9PS. Its telephone number is 01-739 3464 Ext 7730/1.

Mr H. P. Stern is a Draughtsman in Telecommunications Development Department, and was formerly a member of the Engineering Information Bureau staff for three years.

Assistant Executive Engineer Mrs Margaret Hammock checks a sample telephone cover against its drawing, helped by Mr Mehta Singh of the Bureau.

Using the Bureau's reader/printer, Mr Eric King makes a copy of a British Standard for cartridge fuses requested by an enquirer.



Mrs Angela Riseley and Mr Keith Moe, of External Finance Division, use visual display units to key in details of incoming accounts to a computer used in the ASSETTS system.

Accounting for international calls

AJ Walden and J Tate

A computer based system of accounting for international telephone and telex services which replaces tedious pen and ledger methods has been introduced by the Post Office.

FOR THE past decade Britain's international telephone and telex traffic has been growing at an average rate of about 20 per cent a year. With this expansion have come the complexities of international accounting, coupled with an increased demand for closer financial monitoring on a scale that could not have been foreseen years ago.

The current volume of international telecommunications traffic is, perhaps, most vividly indicated by the number of paid minutes – the basic accounting unit. Last year alone there were about 550 million telephone minutes and 230 million telex minutes flowing in and out of the United Kingdom. This means that every day Britain talked to the rest of the world for 20,000 hours, and it all had to be properly accounted for.

It was probably inevitable, therefore, that the Post Office's accounting procedures would have to become computer based, if only to accommodate the increasing complexities of the international accounting system. To this end a computerised system for international telephone and telex services has been brought into full operation. Its introduction marked the beginning of a new era in Telecommunications Finance Department (TFD) as visual display units replaced the former laborious pen and ledger system.

The new system is known as the Account-

Above: Executive Officer John Condron and Mrs Win Ball demonstrate the old pen and ledger system of extracting management statistics.

Above right: For the same task under the ASSETTS system, Mr Condron uses a visual display unit to interrogate the computer while Miss Lynn Newman checks the required information on a printout.

ing and Statistical System for External Telephone and Telex Services (ASSETTS). Basically it is designed to replace paper records in meeting all the requirements for international accounting, together with the Post Office Account, management information and financial studies.

Previously these tasks were the responsibility of three groups in TFD's External Finance Division and, apart from the use of electronic calculators, all the work was performed on a manual basis. Some 14 clerical staff were employed largely on extracting figures from one piece of paper, carrying out simple arithmetical calculations and recording the results on another – all tedious and repetitive tasks which required a high level of supervision to ensure accuracy was maintained.

With ASSETTS, clerical staff feed in data to the system from source traffic documents prepared by the International Area Offices and overseas administrations by using visual display units (VDUs). These units are connected to the Telecommunications On-Line Data (TOLD) system at the Post Office's Harmondsworth computer centre (see Telecomms Journal, Winter 1975-76).

The input covers all telephone and telex traffic except operator controlled calls, which are input direct by using magnetic tape from the Input System for Operator Controlled Calls (ISOCC) at Bristol computer centre. Computer-to-computer transfer is, in fact, the ultimate objective for all input.

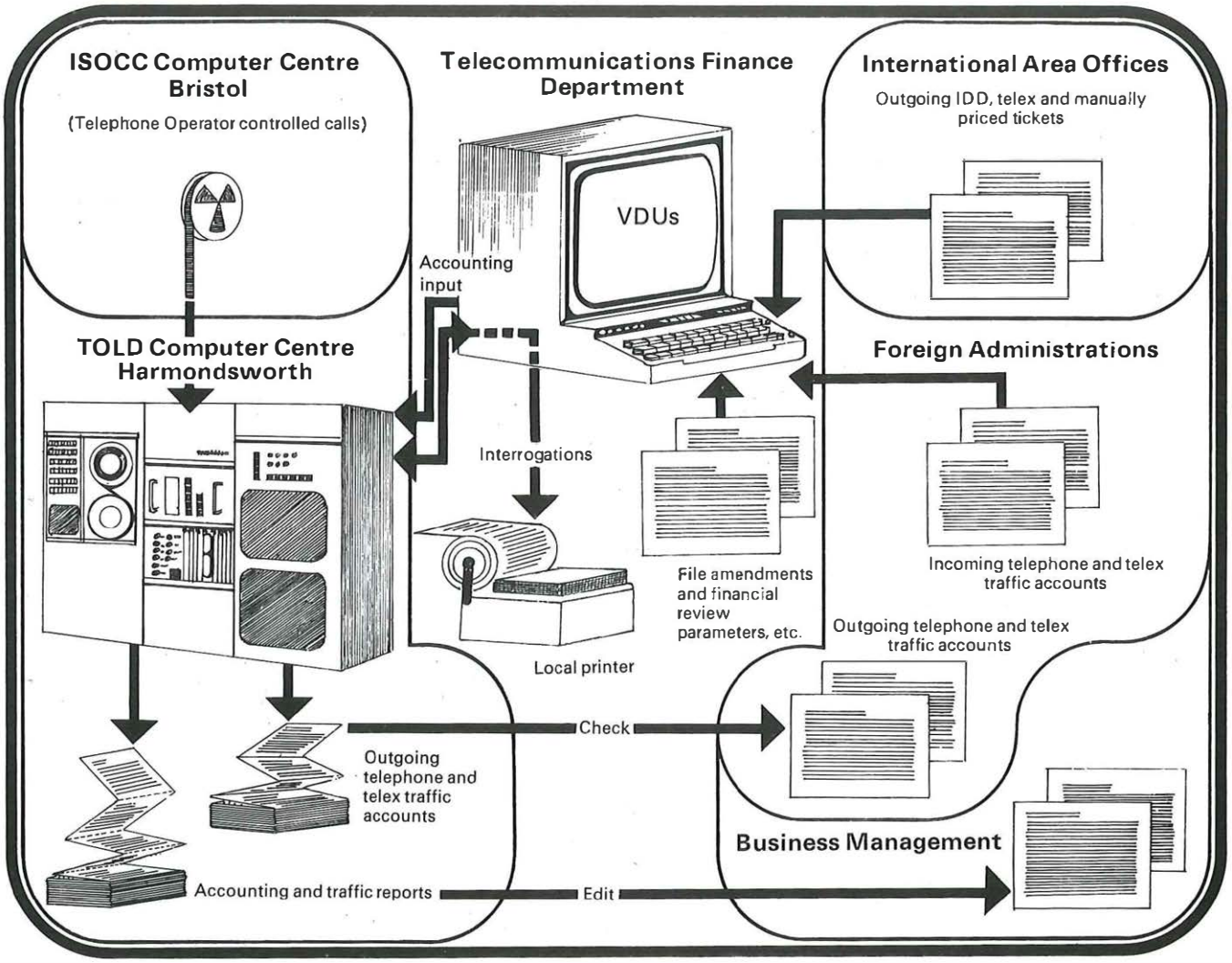
The VDU input is immediately verified and reconciled by the new system and, when accepted, is used to update a history record. The input is also held in an accounts file until monthly traffic accounts are required. The command to initiate this task is made over a VDU when all outgoing traffic for the month has been input to the system.

Accounts are produced by a line-printer at Harmondsworth and sent to TFD for checking before despatch to overseas administrations. When the accounts have been printed the contents of the accounts file are deleted to enable the file to accept traffic for the following month.

By using VDUs the system can be interrogated to check or change any of the 7,500 domestic collection and international accounting rates held or to examine the contents of the accounts or history files. If necessary the screen display obtained as a result of interrogation can be printed out on a small teleprinter associated with one of the VDUs. All these facilities are available to staff of both TFD and the External Telecommunications Executive (ETE) as they can be operated from a simple guide.

Development of the new system resulted originally from an investigation into the feasibility of putting both traffic and financial data into an electronic accounting machine or mini-computer. This was initiated following an internal report which was prompted by concern over difficulties experienced in providing TFD and ETE with ad hoc traffic and financial data on request. Demands from these sources invariably were urgent, and to produce figures accurately to the required timescale made demands on staff to the extent that requests could not always be met.

From the preliminary outline design of a management information system to meet the needs of TFD and ETE it became obvious that it should be extended to include production of monthly international traffic accounts. The Post Office Data Processing Service (DPS) subsequently made a bid for the project which was accepted on grounds of cost and guarantees of meeting the rigid timetable for its introduction. Also, the main frame computer that DPS would employ offered a more sophisticated system



than that originally conceived for an in-house mini-computer.

The target for the start of operations was regarded throughout as the key factor in the system's introduction. A joint TFD/DPS team began detailed work late in 1975 and soon produced an agreed schedule of requirements, the basic planning document. From there rapid progress was made, and operational trials, which included producing the international traffic accounts, began last summer.

The previous manual system was abandoned and total dependence on ASSETTS was demanded from the outset. Full implementation of the system followed soon afterwards on schedule, the whole exercise from conception to achievement taking only 14 months. This completion time is probably unique among computer projects of this complexity and is due to DPS professionalism and the consciously informal manner in which DPS and TFD worked together.

Staff reaction to the system has been enthusiastic and the ad hoc interrogation facilities, particularly, have been welcomed and used extensively. The self-checking nature of the input system has been well received by the auditors, as have other in-built audit controls.

The self-checking facility has, however, sometimes proved irritating to the VDU operators because keyed-in data cannot be input to the system if it contains an inherent error. The data therefore remains on the screen until a solution is found, and in this sense the old ledger system was an easier taskmaster. Operating staff, however, do appreciate that a system which will not accept erroneous input does prevent a build-up of difficulties for the future.

Implementation of ASSETTS has required a major reorganisation to bring telephone and telex accounting, international settlements and revenue functions into a single group. Clerical and executive staff have been given greater responsibility and staff savings have been achieved.

The system currently produces monthly traffic accounts, quarterly traffic statistics for forecasting purposes and primary analyses for quarterly financial accounts and financial reviews. The standing files already contain 18 months' monthly traffic data recorded route by route with each sub-divided into classes of traffic. ASSETTS, in fact, is now the second biggest subsystem in TOLD. The biggest is the Pay and Related Information System (PARIS) but ASSETTS could well overtake this soon.

Developments already being planned will extend ASSETTS to cover the external services' contribution to the Post Office Annual Account, the Commonwealth Accounts and the international settlement procedure. The latter is the means by which foreign administrations are reimbursed for handling outgoing traffic from the UK.

Further into the future is the exchange of international traffic accounts by data transmission. Already an international protocol to structure this exists, and trials should begin next year with Australia. Developments of the new family of digital international switching centres should enable ASSETTS to accept direct input from these centres without the intervention of an input VDU operator.

As a system for handling international accounts, ASSETTS is capable of being used by an international administration. Although the system operates on a main frame computer, it could probably be modified to run on a mini-computer and thus there is no constraint for most major operators of an international telecommunications service. It is a fact that the pioneer work by DPS and TFD may well have produced a marketable system that is capable of sale to the rest of the world.

Mr A. J. Walden is head of the International Accounts and Settlement Section at Telecommunications Headquarters, responsible for the ASSETTS system.
Mr J. Tate is a head of group in the same Section.

PO Telecommunications Journal, Spring 1977

PUBLIC RELATIONS bridges the gap

In this the second of his articles about the role of public relations in the Post Office PETER H. YOUNG, Director of Public Relations, develops his theme that the success of the Telecommunications Business depends largely on the ability to bridge the gap between a massively complex organisation on the one hand and the customer on the other.

IN MY first article on the perils and rewards of public relations for the Telecommunications Business I led one of my favourite hobbyhorses into the arena when I stated that everyone who works for the organisation is, willy-nilly, an ambassador for it and that PR work is not the exclusive preserve of a tiny group of professionals.

In a sense – and slightly changing the metaphor – this was putting the cart before the horse because I set out to describe the methods used without first answering the obvious questions: What is public relations and why does the Business need it?

There are any number of interesting and valid definitions of public relations. One of my own, which has the merit of brevity, will suffice: It is the concerted effort necessary to create a climate of respect and goodwill, based on first-class service to the customer.

Behind the growing importance of public relations is the fact that the business of managing a large organisation has become vastly more complex during the last few decades. We have long since passed the point at which the old rule-of-thumb methods that were successful with a smaller, simpler organisation have had to be discarded in favour of a much more sophisticated kind of approach.

As I see it, there are three main reasons for public relations in the Post Office:

First, much of what the Telecommunications Business does depends on marketing strategies. In turn, successful marketing relies heavily on a well-informed, sympathetic public. It is part of the public relations role to create a climate that can aid selling.

Second, to operate efficiently the Business needs public co-operation. Our customers will respond if they understand that by helping us they are helping themselves. They will not consider it worthwhile concerning themselves with what appears to them to be an impenetrable bureaucracy; they will if we show that we are an organisation sensitive to their problems and needs.

Third, and equally important, we have obligations as responsible employers. Our staff must believe in the Post Office, care about it and feel involved with it. They must identify with it, trust in its policies and act upon them with confidence.

Looking for a moment at that part of the PR function involving relations with our customers, I would say this: Any business that depends for its success on customer understanding must make a deliberate, concerted and sustained effort to foster this understanding. Without such an objective there is a danger of an increasing remoteness, a widening gulf between business and customer that may become impossible to bridge.

During its rapid expansion, the Telecommunications Business has become an organisation of a size and complexity that most customers find difficult to comprehend, seeing as they do only a tiny facet of its structure. Technology has progressively reduced the day-to-day need for human contact between customer and staff. As a result, the organisation has inevitably become more remote. The massively complex system that should be a bridge between customer and staff is tending to become more of a moat – and the bigger the system grows, the greater the sense of detachment.

Conscious of having doubled the size of the system in a commendably short space of time, of a fine productivity record and technical advancement, I am often asked: "Why don't we get more credit for our achievements?" The fact is that people generally these days are not easily impressed by technical progress. They encounter it every day in almost every aspect of their lives. They are accustomed to it and it no longer surprises them.

To give one example, when watching tele-

vision they may be prepared to comment on the quality of a programme they are viewing, but not on the advanced technology that brings the picture into their home. They feel no obligation to say publicly that a service is good. They will say when it is bad, because they feel cheated and let down. After all, when they are paying for service, good service is what they quite reasonably expect as a right.

I am also asked: "Can't you do anything to stop bad publicity in the press?" Thank goodness, in a free and democratic society, no PR man has the power to do that. Our job is to put the press right when they are seen to be wrong on points of fact, not to stop them from saying the things they feel it right and proper to say when they want to say them.

It is much better to tackle the problem at source. Our contacts with customers provide a golden opportunity for building up a relationship and enhancing our reputation. A good relationship, based on good service, will then find its reflection in the media. It is up to us all to make sure this opportunity is not thrown away.

Perhaps the process for the customer of finding the right person to talk to is not always as simple as it should be. Very few of our customers, for example, can walk into a telephone "shop" and talk about their problems. But customers' sometimes frustrated attempts to make contact are often claimed unfairly by our critics to be typical situations.

In any organisation as large as ours there are inevitably mistakes and oversights. But when something does go wrong – and Post Office people are only human – it is surprising how a bit of timely and sensitive personal contact takes the sting out of a customer's unhappy experience because we have shown that we care and are willing to try to do something about it.

Where does public relations fit in here? This is, I suggest, a prime illustration of my argument that, ultimately, public relations is in the hands of all staff. There is something for everyone to do in improving our relations with customers but, of course, it goes far beyond the initiative shown by the individual.

As I see it, one of the most urgent problems at present confronting us is a need to establish a new meeting point, to persuade the customer that we are human, too, and that we want what he wants. But we must all, as I said earlier, pursue a deliberate, concerted and sustained policy of improving customer relations and show people that we care, both as an organisation and as individuals.

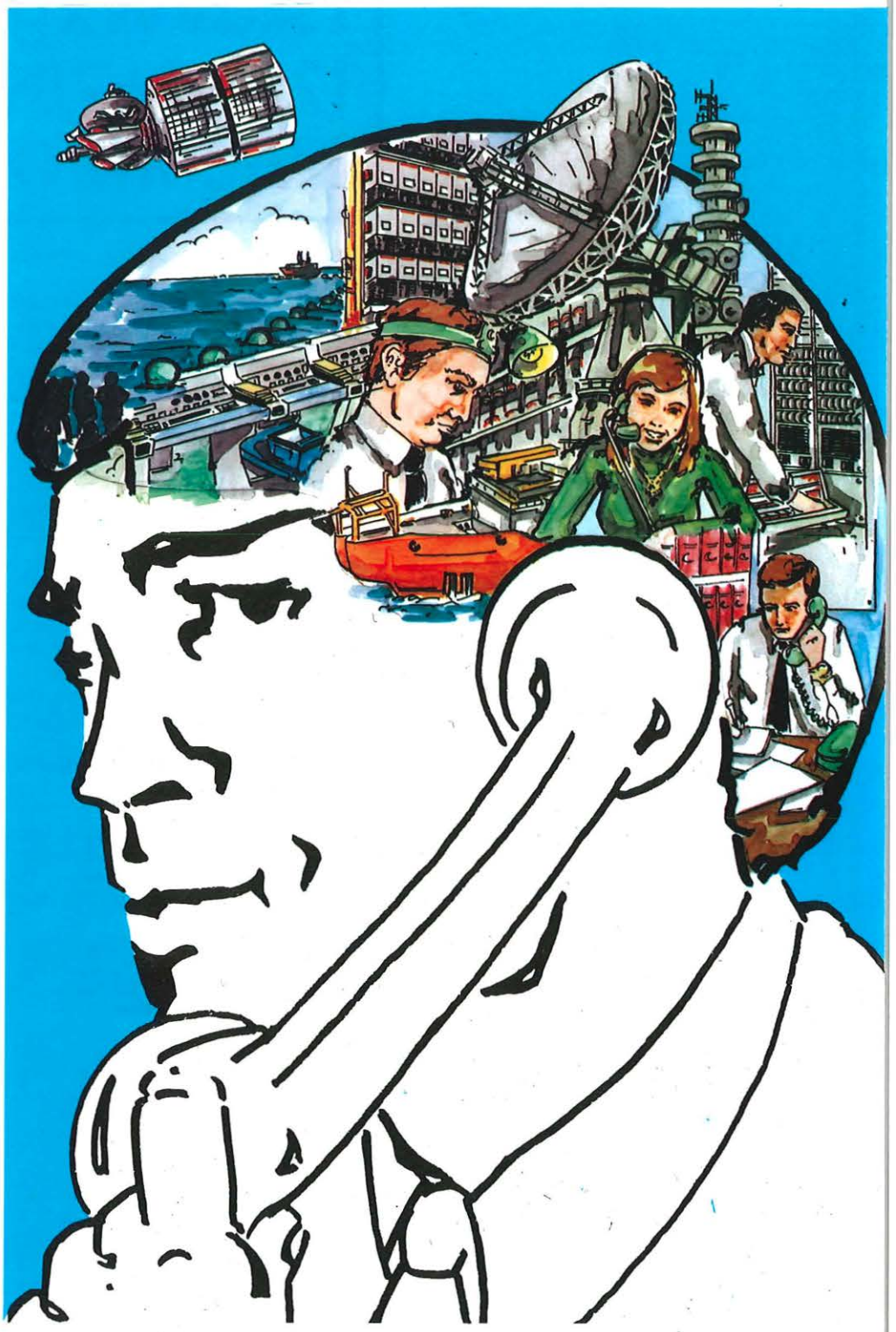
My comments as a whole represent some of the conclusions I have come to after taking a long, hard look at the PR problems of the Telecommunications Business. These conclusions can be summarised in the following way.

With the right kind of teamwork I am confident that the Business can win public understanding and goodwill and the reputation it deserves. This must involve constant reference to PR objectives which everyone – management and staff alike – recognise and accept as basic to everything they do. It is all about giving good service and being sensitive to the customers' needs.

Above all else in these two articles I hope to have underlined the fact that we all have a part to play in public relations. The Chairman, the Deputy Chairman and other Members of the Post Office Board play their parts on the national scene. Then there are such roles as the steady, day-to-day work in the Regions and Areas where our PROs are in close contact with customers, and the valuable contributions of the Publicity Division in fields like films, education and exhibitions. These are all different but closely interwoven aspects of presenting Post Office Telecommunications to the world.

PO Telecommunications Journal, Spring 1977

Most telephone users think of little more than the number they are dialling when they call a friend in the next street or perhaps a relative on the other side of the world. But there is, of course, more to it than that. This illustration gives some idea of the people and equipment which may be involved in ensuring the call gets through.



A VISUAL IDENTITY:

Spelling it out

RW Stevens

Post Office Double Line typeface, which has been specially designed for main headings and names of services on permanent items such as signs, vehicle liveries and equipment, as well as for printed matter, advertising, exhibitions and the like.

CONSIDER for a moment the words British Rail, the initials IBM . . . and the title Post Office Telecommunications. Each name immediately conjures up a mental image, an impression difficult to express in words, that is a distillation of all that is understood about the organisation.

Often there is a visual aspect, too, with most big organisations carrying an easily recognisable symbol or trade mark which has either been consciously developed or has simply just evolved. Equally interesting, perhaps, is the fact that someone not immediately concerned with a particular organisation will form a completely different picture from that gained by someone intimately involved.

Many modern organisations recognise that their outward image may not necessarily reflect what they consider to be their true image and, therefore, adopt a positive programme to project themselves in a favourable way. As this is also essentially an aspect of communications, attention is directed to graphicelements which are used to identify the organisations – those things regarded as contributing to the "house style". The British Rail symbol is a familiar example.

It is important to remember that these graphic elements are only contributions to the identity. In the case of British Rail there are powerful contributions from their new stations, trains and other features that have done much to encourage a more favourable climate of public opinion over the past decade.

But what about Post Office Telecommunications? Clearly things like the Post Office Tower, the Goonhilly aerials, new kiosks and Martlesham Research Centre contribute to an image of a dynamic organisation based on advanced technology for those who know about them. It is difficult, however, to be sure of the public viewpoint.

As part of a long-term programme to ensure that all things by which people identify Post Office Telecommunications reflect credit, agreement has been reached on the basic elements of a "house style" to be applied throughout the Business. The basis for such a style had already been agreed in a new alphabet intended for use throughout the Post Office and previously accepted by the Post Office Board.

It was decided that the name Post Office Telecommunications should be used in full, if possible in one line, to identify the Business. For display purposes the name will be set in Post Office In Line letters or Post Office Medium letters in the smaller sizes. The Royal Crown will be associated with the name on appropriate occasions, and no other symbols will be used to identify the Business except where specifically authorised.

The Post Office Alphabet will be used for titles and main headings when appropriate, such as the titles for directories, and two colours – Royal Mail red and Telecommunications yellow – will be used wherever possible, with yellow predominating.

It became apparent during development of the scheme that the question of an appropriate "house style" was a matter of general interest and many suggestions were carefully considered. Usually they concerned two aspects of identifying the Business – the name and a possible symbol.

One name that comes up fairly frequently is *The Phone Service*; it is short, sounds well and could look attractive as a logotype. As far as semantics are concerned, any name

Two examples of the use of Post Office typefaces to maintain a visual identity in advertising material.

can be given a new association quite unconnected with its original meaning – like Boots, Bell, His Master's Voice or even the Post Office, and it is fair to claim that Phone Service would soon outgrow its colloquial origin. The restraints with Post Office Telecommunications were, first, the name of the Business as it is and, second, the need to preserve an association with the Post Office as a whole.

Post Office Phone Service loses the impact of a shorter name; Post Office Telecomm, POTel or even POT are possible as they maintain a link with the Business name. POT is clearly unacceptable and, in any case, becomes just one more three-letter symbol. The others are more plausible, but *Telecommunications* as a word actually has advantages. Like *chrysanthemum* or *psychological,* it is instantly recognisable – even if the spelling may be in doubt.

In a world where three-letter logotypes are universal, the consistent use of the full name Post Office , preferably in one line, gives immediate distinction. On vehicles, advertisements and equipment it has been found to work very well in a distinctive way.

On the other hand, a long name is usually one reason for the introduction of a business symbol, and many suggestions for an appropriate device for Post Office Telecommunications have been made. There is, however, still a certain amount of doubt as to the effectiveness of this method.

But what is the alternative? It is to go back to the fundamental basis of a "house style" – a way of doing things that is distinctive and recognisable without the need always of a signature or rubber stamp. Only a national organisation can really do this, but once achieved the need for a symbol largely disappears.

The realisation that the Telecommunications Business was in just that position gave the clue. If a consistent style could be used for the livery of 60,000 vans and other vehicles and was related to the style of all telephone directories and maintained consistently through quarterly bills, letter heads, advertising, the marking of equipment, and so forth, then a strong identity would be achieved. Its strength would be based on its lack of dependence on a symbol.

A further aspect which finally decided against having a Post Office Telecommunications symbol was the long association of the Post Office with the Crown. The Queen had indicated that after the Post Office became a Corporation she would be pleased for use of the Royal Insignia to continue.

In the case of Telecommunications this meant the continued application of the Royal Crown, at present used mainly on vehicles, and it was seen that in appropriate circumstances the Crown and the name could complement one another particularly well. Nowhere is this better illustrated than in the livery for vans.

Although the essentials of the scheme are simple, a great deal of preparatory work has been necessary to ensure consistent and satisfactory implementation. The alphabets have been carefully drawn and artwork prepared. Furthermore, although normally there are only two alphabets, the In Line and Medium, each one is available in different forms for different purposes. A version for use on directory covers, for example, takes into account the type of paper used and is slightly more open than the standard version.

An extended trial in some regions demonstrated the effectiveness and flexibility of the scheme. It also required a limited development of the basic proposals and the consideration of a number of application problems on an ad hoc basis. Now that the scheme is being implemented on a large scale, guidelines are being prepared which draw on this experience and which will assist implementation.

The new "house style" must cost little and give good value for money. As the scheme essentially requires only that something needing to be done is done in a particular way, usually there is no reason why it should cost any more; indeed in some areas there should be significant savings. In stationery, for example, the rationalisation now possible should reduce costs.

It is also emphasised that the scheme is being introduced on the basis of normal replacement. No vehicles are being repainted specially, and stocks of existing letterheads must be used. Directories are only being changed as their new format is introduced.

The illustrations accompanying this article show how the scheme is being developed in some areas and the reinforcement that is derived from a widespread application of the alphabets. When all directories and vehicles carry the new design the Post Office Telecommunications "house style" will become well known and easily recognised throughout the country.

With this recognition, however, will come added responsibility. A "house style" only contributes part of an overall visual identity; the rest comes from the design and upkeep of all things connected with the Business – customer apparatus, radio masts, buildings, public call boxes, and so forth. The best interiors can be ruined by scribbled notices, untidy sites and dirty entrance halls.

Everyone in Post Office Telecommunications has a personal responsibility for the appearance of something connected with the Business, whether it is a notice on a desk or something much wider ranging. The new scheme provides an opportunity for everyone to take stock and consider if their part is making a positive contribution to the new identity.

Mr R. W. Stevens is Head of Design Division in Telecommunications Development Department, and has been closely involved in the creation of a "house style" for the Business.

PO Telecommunications Journal, Spring 1977

The way in which the name Post Office Telecommunications and the Royal Crown can complement one another is well illustrated in the new livery for vehicles.

Patents in the Post Office

PM Connor

WHY should the Post Office strive to get patent rights, copyright or rights in the design of its equipment? The simple answer is that it is policy to own such rights if the Post Office has paid for them, whether through in-house research or by a fully-funded research and development contract. But that is, maybe, only half the answer. It does not explain why the policy was formulated or why such rights are useful, or the possible disadvantages if they are owned by others.

Letters Patent for inventions are legal documents by means of which, in the United Kingdom, the Crown grants to the true and first inventor, or his assignee, the right to prevent others from using the claimed invention for a limited number of years. Patents have to be taken out country by country, and at present those covering the UK may only be obtained by one application route, through the UK Patent Office, through whom trade marks and designs may also be registered. Copyright is not registered.

As far as the Post Office is concerned, patents and other forms of what is known as intellectual (sometimes called industrial) property – such as registered designs, trade marks and copyright – enable the Corporation to influence the direction of progress in technology, particularly in telecommunications. They also provide a means through which it co-operates with companies in building a strong UK industry. The Post Office, in fact, has a considerable overseas patent holding enabling it to support its British licensees in their export markets.

The safeguarding of Post Office interests in this field is the responsibility of the Patents and Intellectual Property Licensing Branch at Telecommunications Headquarters. Broadly its work entails legal discussions with the Patent Office to protect Post Office inventions, designs and trade marks, and it also provides guidance and advice to all staff on the avoidance of infringement of the intellectual property rights of others.

In recent years the Branch has strengthened its patents portfolio by concentrating on licenseable technology and pruning "dead wood", enabling it to embark on a programme of positive exploitation. A considerable investment has been made in fibre optic patents and although potential British licensees have so far rejected Post Office advances it has had overseas approaches for licences.

As the Corporation is not in a good position to monitor infringement of its patents, particularly overseas, patents covering factory methods which are not detectable in the final product are generally not taken out unless the invention has considerable inventive merit and supports a Post Office know-how position. An increasing amount of work is now concerned with advice and assistance for Contracts Division, particularly in the setting up and administration of the intellectual property arrangement of System X – the switching system of the future.

There are plans to create a new Department with parts responsible for procurement, R&D contracts, patents and intellectual property licensing. This move will add a new dimension to what has so far been a chequered history of patents in the Post Office.

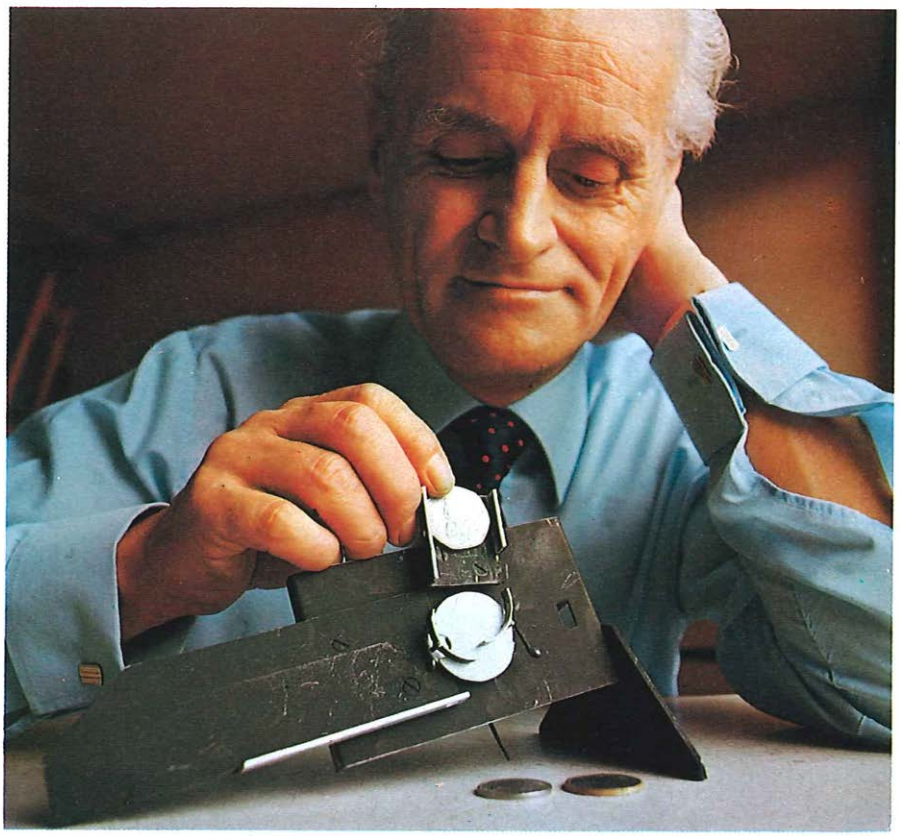
Until just after the Second World War all civil servants, including Post Office employees, were allowed to patent and exploit their own inventions. But then the Treasury, with national interest in mind, introduced new rules whereby intellectual property in any way relevant to the Post Office had to be assigned outright to the inventor's Department – the Postmaster General.

A group was therefore set up in the then Research Branch to liaise with private patent agents in the patenting of Post Office inventions. The patent agents took the technical descriptions and drawings prepared and vetted by the Patents Group in liaison with the inventor and recast them, using their professional skills and tight legal wording to create a patent specification defining the monopoly claimed for the invention.

The patent agents would argue the inventive merits of the specification with the Patent Office examiners with the object of obtaining a valid patent for the Post Office. They would also arrange for their associate patent agents and attornies in other countries to file and prosecute corresponding patent applications abroad.

The Research Branch patents group was also responsible for internal distribution of published third party patent specifications in areas of interest to the Post Office. This

A striking contrast in developments for which the



Mr D. A. E. Popham, of Service Department, demonstrates the simple but effective coinbox mechanism he has invented to accept 50p coins, for which a provisional patent has been obtained.

Intellectual Property Summarised

A PATENT is the result of a bargain between the State and an inventor in which a monopoly right is exchanged for a full disclosure – that is, a description and drawings – of a workable embodiment of the invention. There is no such thing as a "world-wide patent", but by the end of this decade the European Economic Community will have a single system, and an alternative European Patent System will involve at least 20 European countries and provide a single examination procedure to grant individual patents in any number of those countries specified by the applicant. The British patent system will also continue, most probably in the form proposed in a Bill now before Parliament.

COPYRIGHT generally runs for the life of the author plus 50 years. However, copyright in the industrial application of drawings or models – that is, industrial designs – lasts for only 15 years, in line with the maximum period of protection afforded to REGISTERED DESIGNS. A design may be registered at the Patent Office for almost any item which is made and sold separately, provided there is novelty in the shape, configuration, pattern or ornament of the item and the novel feature is not dictated solely by the function it is to perform.

A TRADE MARK is generally a word or device applied to goods or services in the course of trade to indicate a connection between those goods or services and a person or company. At present they may only be registered for goods, not services, and so the Post Office has relatively few. There is no time limit on the period of monopoly provided fees are paid regularly.

CONFIDENTIAL DISCLOSURE and KNOW-HOW are often related. Any information which is transmitted by one person and received by another "in confidence" is said to be a confidential disclosure. The information cannot be used by the recipient for any purpose other than that permitted by the donor and the restriction may last indefinitely. KNOW-HOW such as trade secrets and the valuable but unpatentable data often associated with an invention is generally only disclosed to a "licensee" in confidence so that its value may be realised again when it is passed to a second "licensee".

The protection of COMPUTER PROGRAMS and their exploitation is currently one of the most difficult problems faced by the software/computer industry. The Whitford Committee will soon report to Parliament on several issues, including rights in designs and computer programs and copyright generally, and the law may therefore be changed.

means of disseminating the latest technology and warning about avenues of research which might lead to infringement is still carried out today. Early warning of potential infringement situations is vital to the short and long term planning of service and equipment development.

In the early years the work of the Patents Group, which was attached to Dollis Hill Library, was largely taken up with protecting new switching techniques, submarine cables and postal mechanisation. As a result, a licenseable set of patents was soon built up for which the Building and Supplies Branch negotiated their exploitation.

Administrative responsibility for patents was later moved to the Accountant General's Department and commercial exploitation was taken over by Contracts Department. The Patent Group remained in Research Department, liaising directly with inventors and private patent agents.

This tripartite arrangement continued until reorganisation for Corporation status in 1969, when it was suggested that the Post Office should have its own qualified patent agents and that all patents, trade marks and so forth, should be handled by a single unit. The Patents Unit (now Branch) was therefore set up in the Purchasing and Supply Department, and a chartered patent agent was recruited to act directly for the Post Office and to train staff to qualify as patent agents.

The Unit became responsible for deciding which inventions should be patented and in what countries, for negotiating agreements for the use of Post Office intellectual property by industry, and for settling terms with other patentees for the use of their patents, designs, copyright, and so forth. It was also given responsibility for advising on the infringement risks of new equipment and new services with other people's patents.

The Post Office's change of status to a Corporation had far-reaching implications in relation to patents. It could no longer use any patented invention without first obtaining a licence from the patentee. To do so would be an infringement and could result in High Court proceedings, with the dramatic possibility that an injunction can now be granted which could stop an existing or planned service.

If a manufacturer owns a patent he can insist that the Post Office buys the patented "article" from him alone. As long as he has the manufacturing capacity, in this country and abroad, to satisfy the Post Office's needs he does not have to grant licences to

Post Office has obtained Patent rights

A working laboratory model of the processors for automatic call recording equipment (ACRE), the design of which uses modern computer techniques to simplify call handling for operators. A number of patents are involved in its development, and seen here are Technical Officer Alan Farmer, left, and Technician Dave Windsor who were responsible for certain elements of the circuit design.

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An operator's switchboard which has been adapted for use with the ACRE system. Dave Gladstone, left, and Pete Moldram, of Telecommunications Development Department, were responsible for the patented drive electronics of the display sub-system.

his rivals or a licence to the Post Office with the right to have similar articles made elsewhere.

This change in infringement prospects had repercussions in the contracts field. The Post Office now always tries to own or obtain a licence to all monopoly rights in any product of Post Office funded research and development work and in any such rights which arise from the contracted R&D. The Post Office does not always own the rights, but generally a licence is obtained from the R&D contractor so as to enable a competitive purchasing policy to be pursued together with an ability to recover costs from commercial sales of the product by the contractor and other licensees.

A second major contracts change was the decision to place patent, design and copyright infringement risks on the manufacturer, the Post Office only accepting responsibility when its requirements or instructions to the manufacturer left him no option but to infringe.

Another result of Corporation status was the loss of a provision in the Patents Act which enabled prior recording of an invention in a Government document, whether or not published – for example, a Post Office Research Report or even a dated entry in a laboratory note book – to give free licence under any subsequent patent for such an invention patented by a third party. The loss of this provision has meant that the Patents Branch now arranges for the publication of any Post Office inventions which it deems of nuisance value only as a patent, as public disclosure prevents subsequent patenting by anyone, even the first inventor.

A more positive approach is now being made towards licensing intellectual property, and engineers are being encouraged to advise the Patents Branch if they suspect that rights in a Post Office patent, design, trade mark or copyright are being infringed. While pursuing such infringers, or while negotiating with potential licensees who have been identified or who have approached the Post Office directly, heavy reliance is placed on the relevant Research or Development Division to help assess the market value for any associated know-how and to judge an equitable royalty.

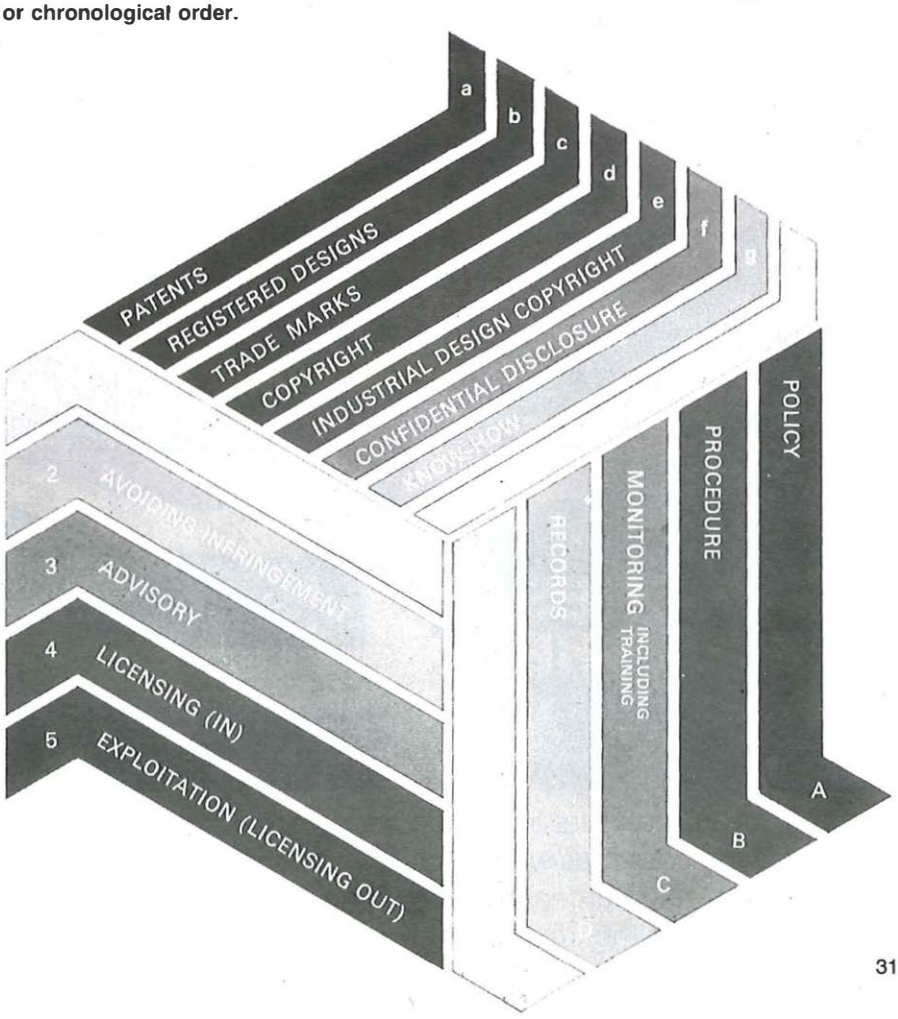
Of the many services now provided by the Patents Branch perhaps the most important is its advisory role, particularly in guiding the Post Office around infringement. This also involves the Branch in negotiating licences, or seeking to invalidate, if possible, the patents of others in those cases where Post Office use of the monopolised right is more expedient than a non-infringing alternative.

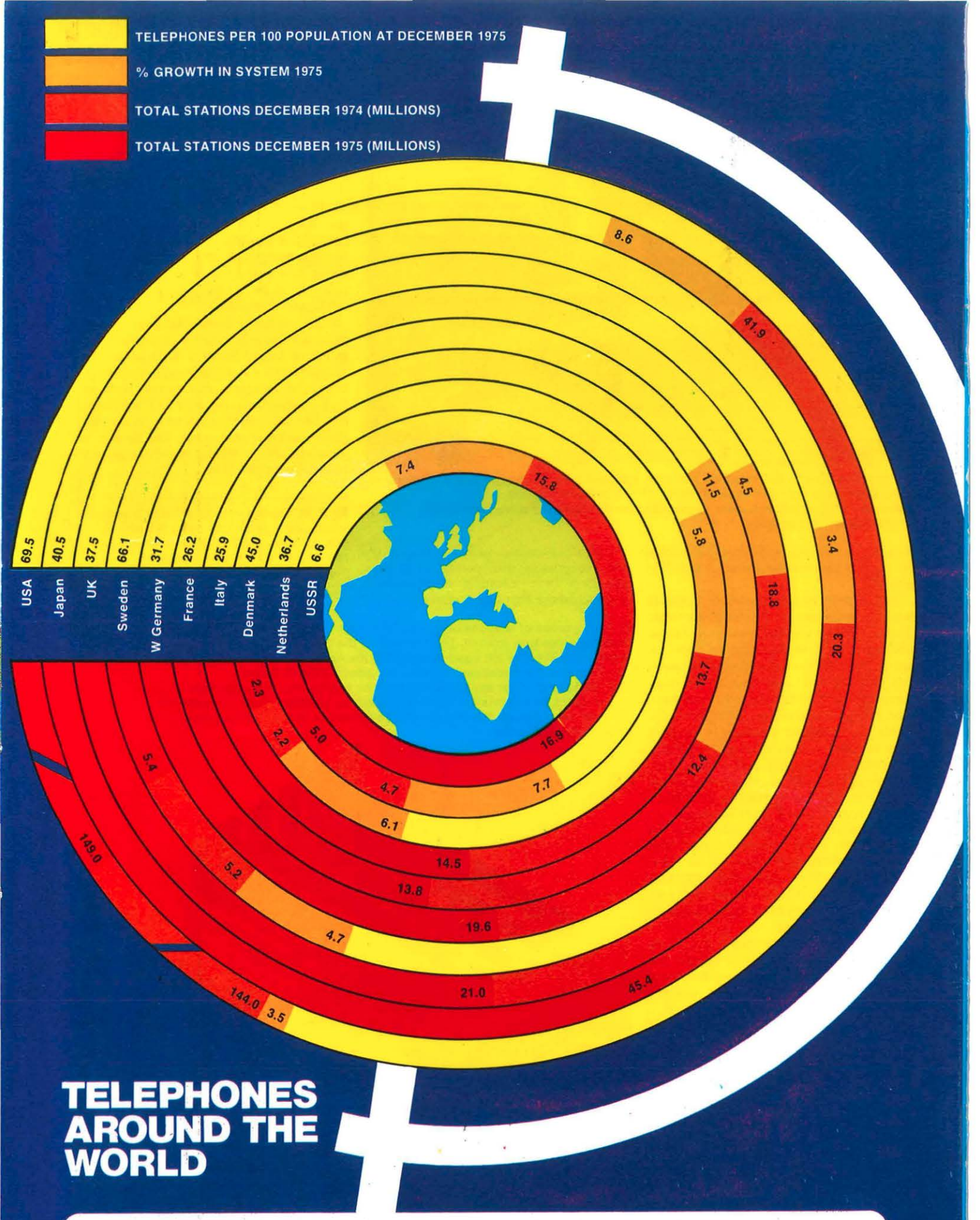
If this outline of Patents Branch services has also indicated a need for caution, then it will have helped to serve a purpose. For unless adequate and timely precautions and safeguards are taken, almost every decision staff make affecting a Post Office service may be frustrated by someone enforcing his intellectual property rights. The Branch is therefore always willing to advise in this rather specialised field.

Mr P. M. Connor is head of Patents and Intellectual Property Licensing Branch in Purchasing and Supply Department responsible for intellectual property matters in the Post Office.

PO Telecommunications Journal, Spring 1977

The work areas of responsibility and functions of Patents and Intellectual Property Licensing Branch. The top face of the cube lists the main areas of work responsibilities; the left hand face details the functions; and the right hand face contains the necessary items of the administrative set-up.
The capital and lower case lettering and the numbering of the sections of each face enables an information retrieval system to be effected and precedents followed even though the storage of information is in areas of technology or chronological order.





TELEPHONES AROUND THE WORLD

Here is our annual international comparison of telecommunications statistics. They show countries with the highest number of telephones, and include figures to indicate the percentage growth in their systems over the previous year. The source of the figures is the American Telephone and Telegraph Company.

MISCELLANY

Euronet advances

ANOTHER major step has been taken in establishing EURONET, the data communications network for the European Economic Community (see Telecommunications Journal, Summer 1976). Administrations of the nine EEC countries, including the British Post Office, have unanimously selected a consortium of six independent companies to act as the network's main system contractor.

The consortium is known as SESA-LOGICA-CARADATA-ITALSIEL-CHRISTIAN ROUSING-SAIT. The decision to award the contract followed an exhaustive consultative procedure during which three multinational consortia were invited to submit a number of proposals.

The final decision went to SESA-LOGICA because its network was being developed specifically for a public data service. Its proposal was based on an adaptation of the TRANSPAC network being developed to form the French public data network.

SESA-LOGICA will be responsible for providing equipment and software for EURONET's four computer-controlled switching exchanges, and also for smaller network access units. The packet-switching exchanges will be in London, Frankfurt, Paris and Rome, while other network access points will be in Amsterdam, Brussels, Copenhagen, Dublin and Luxembourg. The network management centre will be located in London.

EURONET is expected to be in operation at the end of next year, enabling research centres, public bodies and other organisations in the member-countries to have immediate access to scientific and technical information held on computer stores. Although it will initially be a private network, the system may eventually become a public data transmission network.

10,000 links

THE 10,000th international telephone link has been connected for dialling abroad. The latest circuit – by satellite – is to Teheran, Iran, a major trading partner.

These three new telephones which recently went on public display for the first time will become available generally within the next year or so. They are the Mickey Mouse model made by Plessey, the antique Classic produced at STC and the slimline Compact which is being produced in a special "Balmoral" blue version to mark the Queen's Silver Jubilee in advance of the introduction of a standard model.

In 1971, when direct dialling started between London and New York, nearly 40 million calls were made between Britain and the rest of the world. Now the annual total of calls to and from Britain is approaching 100 million, and of the 51 million originating in the United Kingdom, about 80 per cent are dialled direct.

Contracts

Pye TMC Ltd – Nearly £0.5 million for pulse code modulation systems, to be incorporated in the new high-capacity digital transmission systems for sending telephone calls over long distances in the United Kingdom network.

A 120 Mbit/s system successfully completed its field trials between Guildford and Portsmouth last year. More recently, 30-channel equipment successfully completed field trials based on the Brighton telephone exchange, with cable links to Lewes.

Delivery of the systems will begin later this year and are primarily intended for North Midlands and South West areas.

Belling & Lee Ltd – More than £130,000 for the supply and installation, now completed, of shielded enclosures to protect North Sea offshore platform communications network from RF interference. The enclosures, installed in North East Aberdeenshire and the South Shetlands, will be used to protect the Post Office trans-horizon microwave radio system which links offshore platforms to the British telecommunications network.

New-style greetings

THE first in a new style of greetings telegram form has been introduced. An all-purpose form with a design of flowers and butterflies, it replaces a design introduced 10 years ago, is smaller and its greetings message is framed in a window flap.

Loan for N. Ireland

An £18.5 million loan to help improve and extend the telephone service in Northern Ireland was signed in Luxembourg by the Post Office and the European Investment Bank (EIB), the European Economic Community's long-term finance institution.

During the next two years the Post Office will spend £58 million on expanding and modernising the telephone service in Northern Ireland. The EIB loan will contribute to the financing of the capital expenditure programme in the Province, which includes the provision of 17 new telephone exchanges, 134 extensions to existing exchanges and the provision of 73,000 new exchange lines.

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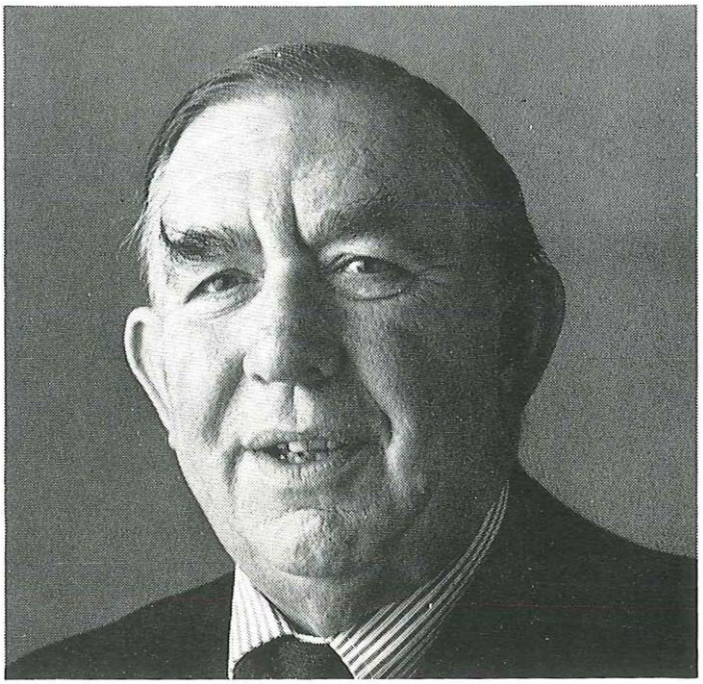

AVION CASE, CB, CBE, MBIM, General Secretary,
Hospital Saving Association.

A personal message to all HSA Contributors

The Hospital Saving Association's Standard Scheme (5p a week), to which many thousand members of the Post Office belong, was set up over 50 years ago to bring financial security to ordinary working people during times of sickness.

With the passage of time and with the recent onset of inflation, the Benefits that it is possible to pay under the Standard Scheme have become entirely inadequate for your needs.

The Hospital Saving Association's alternative CROWN PLAN, introduced a few years ago, provides much greater and a larger range of Benefits – Benefits that are in tune with your circumstances today.

For example, should you or your wife (or husband) become an In-Patient, CROWN PLAN pays out £21 a week; should you both be in Hospital at the same time, £42 a week is payable up to a maximum of £546 in any one year. Moreover, both husband and wife may enjoy separate memberships, and so by both claiming, benefit entitlement is effectively doubled.

Two new CROWN PLAN Benefits have been introduced from 1st January, 1977, a Dental Treatment Benefit, and a Recuperation at Home Grant which is payable after 14 nights or more in Hospital with an acute illness. There are also numerous other Benefits protecting you and your family which contribute towards the costs of Spectacles, Home Help and Maternity etc, etc.

Clearly, it is in your interests to transfer your membership NOW to the CROWN PLAN as 15,000 of your Post Office colleagues have already done, provided that you are eligible by health and age to do so; the 65 age limit will unfortunately preclude most Post Office Pensioners from eligibility to join CROWN PLAN.

The HSA Executive Council has, therefore, decided that Standard Scheme Group payroll deduction facilities should cease as soon as practicable, and all those Contributors who are willing to do so should transfer into the CROWN PLAN with an immediate entitlement to all CROWN PLAN Benefits from the date of transfer. Deductions from pay will then be at the CROWN PLAN rate only (25p a week or £1.08 a month). New payroll deduction mandates will be necessary.

Arrangements are being concluded with your HSA Honorary Group Secretary for this block transfer of Post Office Standard Scheme Groups to the CROWN PLAN. Not all Groups can be actioned immediately, and you will be receiving a personal notification of the arrangements for your Group in due course, together with full details of the CROWN PLAN. In the meantime, you may, of course, contact your HSA Honorary Group Secretary to arrange your individual transfer to CROWN PLAN as soon as you like.

If you wish to opt out of your Group transfer to the CROWN PLAN and remain in the Standard Scheme, you may do so by becoming a Direct Contributor to the HSA Head Office. All you need to do is contact your HSA Honorary Group Secretary and complete a Transfer Form sending it to the HSA Head Office with your annual contribution of £2.60, and cancel your HSA deduction authority.

I hope that all Post Office HSA Contributors will wish to join CROWN PLAN and enjoy the better benefits and security that it brings.

Avion Case.

HOSPITAL SAVING ASSOCIATION

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