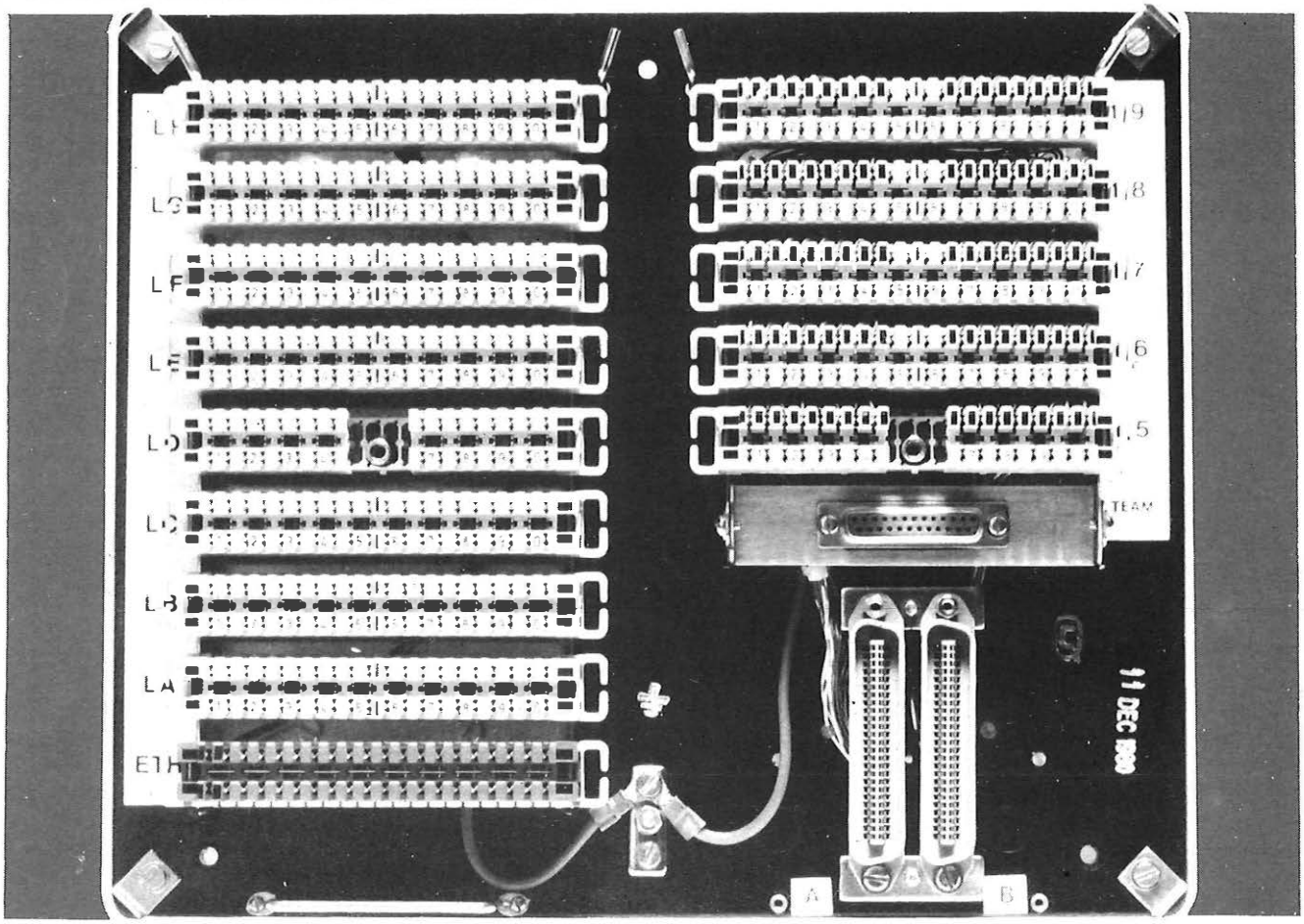
British TELECOM Journal

Spring 1981 Volume 2 Number 1 Price 30p

KRONE

The box connection. You'll have to look far to find a more convincing case of co-operation between British Industry and British Telecom.

Products featured: Box Connexion 101A



However good we believe our products to be, we're still firmly convinced that you, our customer, should have a say in the format our products take.
Box Connexion 101A (above) is an excellent example of how Krone has geared its UK production to meet British Telecom requirements. The box, which is assembled to British Telecom specification, contains Krone LSA-Plus modules – British Telecom coded as Strips Connexion 237.
Strips Connexion 237 are simply and quickly installed and offer – because of their compact size – a flexibility and cost-effectiveness that far surpasses conventional connection systems.
So if you want to talk over your next telecommunications project, give us a call. We'll be happy to co-operate.

First ideas make Technology

Krone (UK) Technique Limited, Unit 12, Eastington Trading Estate, Eastington, Nr. Stonehouse, Gloucestershire. Telephone: Stonehouse (045 382) 6866. (4 lines). Telex 43350.

Where is this conversation going to end?

It will be Britain's telephone users of the *future* who get the full benefit of the biggest change the telecommunications network of this country has ever known. As well as for ordinary conversations, they'll use it for a host of data services too; shopping, banking, information.

We're talking about System X – the unparalleled British achievement in telephone technology which can help build the integrated digital communications networks that the world needs. Right into the next century.

In this change to digital systems – which is now really gathering momentum – Plessey is helping to set the pace.

Plessey is one of the companies which joined forces with British Telecom to develop System X. It's a major factor in our national export strategy and Plessey is fully committed to promoting it worldwide, and selling it hard.

One of a series of advertisements for the general public about the achievements of the British telecommunications industry.

PLESSEY
telecommunications & office systems

Ahead in business communications

0690-2-0020

Nomination of candidates
is now invited for the

1982 AWARD

of the

LM ERICSSON INTERNATIONAL PRIZE

for notable contributions to

TELECOMMUNICATIONS RESEARCH AND DEVELOPMENT

The LM Ericsson International Prize was presented for the first time in May 1976, in connection with the celebration of the Company's 100th anniversary.

The Prize - which honors the memory of Lars Magnus Ericsson, founder of the Company - is designed to encourage and advance research and development within the field of telecommunications engineering.

The Prize is being awarded every third year in recognition of an outstandingly significant "scientific or technological contribution within telecommunications engineering" during the three-year period preceding the award year. Earlier contributions whose importance becomes established during the three years are also eligible for nomination.

The winner of the Prize is selected by an independent Prize Committee consisting of members appointed by the Royal Swedish Academy of Engineering Sciences, the Board of Directors of the Swedish Telecommunications Administration and representatives of leading Swedish institutes of technology.

Candidates may be nominated by members of the Prize Committee and by organizations or individuals active in the telecommunications field.

Nominations are now being accepted for the 1982 award. All nominations must be in writing and should be accompanied by all relevant supporting material. The closing date for nominations is October 1, 1981.

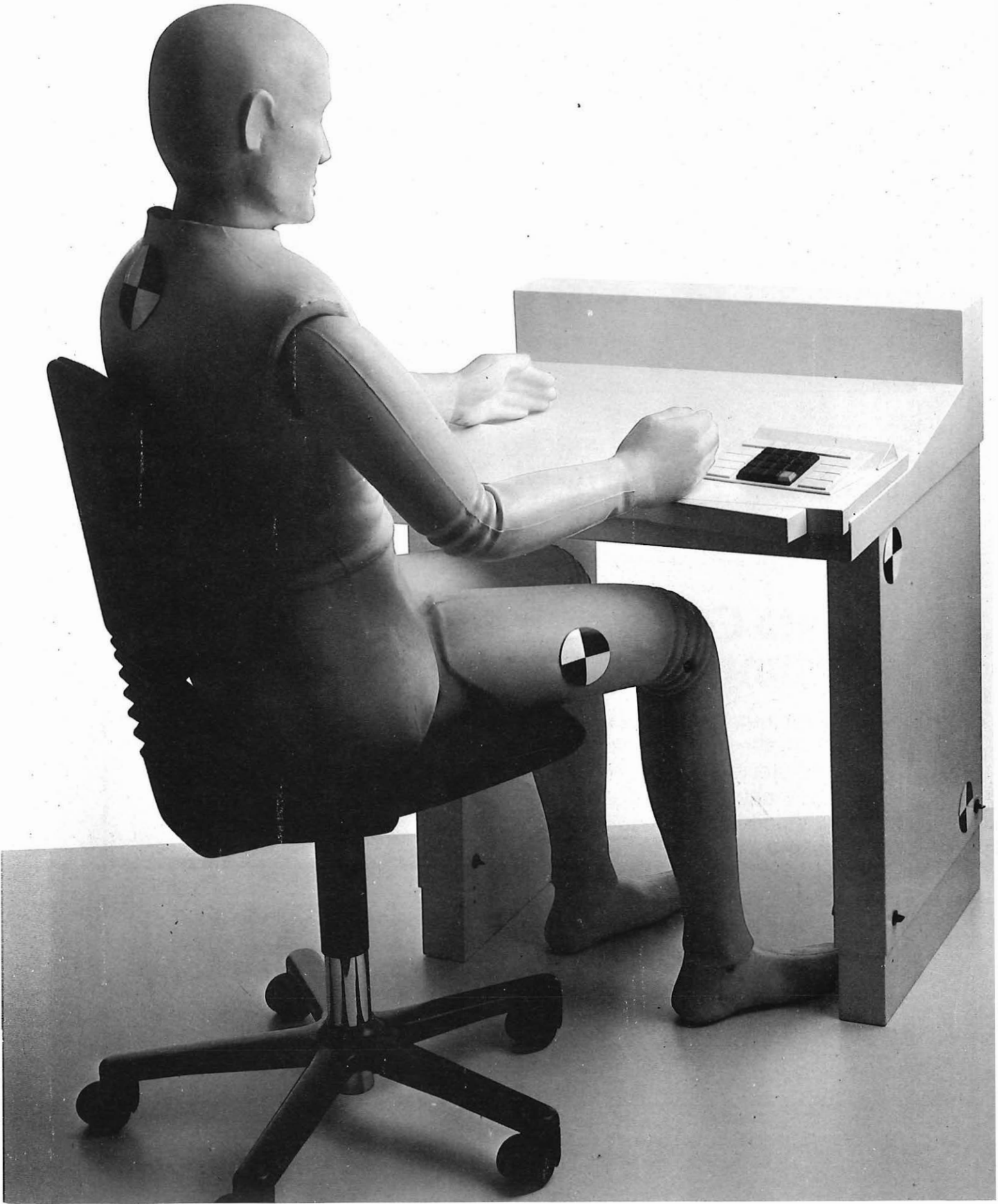
Only the winner's name will be disclosed. Where the Prize contribution results from the work of two or three people, the Prize may be awarded jointly.

Nomination of candidates, or requests for further information including the complete rules governing the award, should be addressed to: *The LM Ericsson Prize Committee, S-126 25 Stockholm, Sweden.*

Dr Charles K Kao and Dr Robert D Maurer, winners of the 1979 Ericsson International Prize, receive their award medals from King Carl Gustaf of Sweden at the presentation ceremonies in Stockholm in May, 1979.

Prize amount: 200,000 Swedish Crowns

Now your operators can add the human touch.



Some people see automation in general, and the microprocessor and electronic control in particular, as threats to human relationships.

STC sees them, used intelligently, as just the opposite: a promise.

Nothing could be more soul-destroying than some of the repetitive, time-consuming routines that telephone operators have been forced to handle. (They tell us that the 'ticket-writing chore' is one of the worst.)

And asking maintenance technicians to carry out essential line testing from a small, hot back room at a local exchange can't improve their job satisfaction and therefore their efficiency.

Which is why we have introduced a number of man-machine interfacing products which reduce the routine, improve working conditions and increase the time available for sympathetic handling of the people who pay the bills.

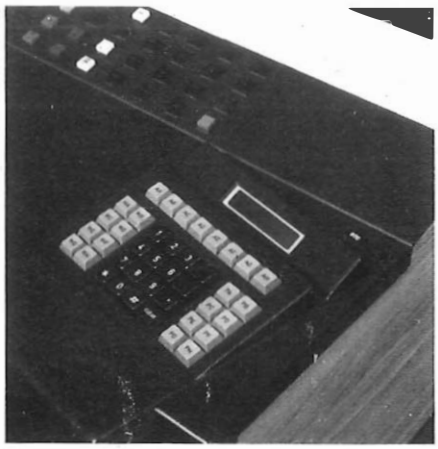
Spending time and care on ergonomic design of consoles is, we believe, just as important as spending time on electronic design.

So your staff give better service, with more satisfied subscribers, which all leads to extra revenue.

Here are two of STC's innovations.

Better service through operators

OPAS (Operator Position Assistance System), easily added on to all types of manual switchboards, automatically performs many tasks your operators previously had to



undertake, leaving them free to deal personally with callers' individual demands.

It can, in fact, save up to 30% of their time.

And more than this, OPAS will virtually eliminate paperwork and resulting errors. All call details are recorded, automatically, on magnetic tape for subsequent data processing, with visual displays for instant verification, and continuous monitoring for self fault-diagnosis.

Better service through technicians

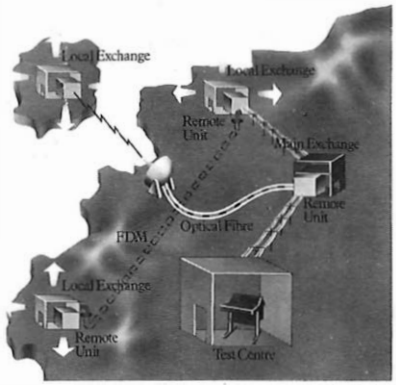
RLT (Remote Line Tester) is a microprocessor-based diagnostic system which rapidly detects and identifies faults in exchanges, subscriber lines and telephone sets.

Its great advantage over most existing apparatus is that it performs these functions over long distances to allow centralisation of testing, and can carry on doing so automatically, unattended.

From the management point of view, this provides for substantial economies in maintenance costs.

From your maintenance technicians' point of view, it allows for a test-desk environment as conducive to effective work as the front-office.

And, because there is no need to make expensive and time-consuming journeys to local exchanges to investigate suspected faults, your sub-



scribers can expect better, faster and cheaper service.

For more detailed information on how STC's telecommunications service systems can help you improve network and subscriber service, complete the coupon or attach it to your letterhead.

This advertisement is one in a series presenting STC's wide-ranging capabilities in telecommunications and electronics.

To STC, Dept. 810,
190 Strand, London WC2R 1DU,
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Please send more information about STC's leadership in telecommunications service systems.

OPAS_____ RLT_____

Name_____

Position_____

Company_____

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Address_____

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_____ G1/2

Standard Telephones and Cables Limited
A British Company of ITT

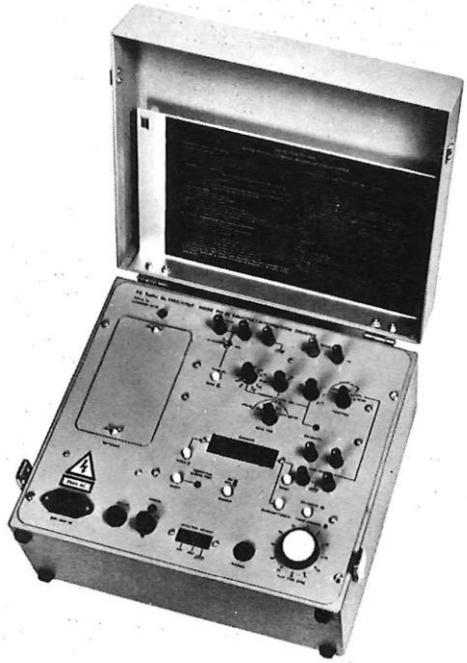
STC. We help people communicate.

THE MALDEN FILE (1)

APPROVED TELECOMS. & DATA TRANSMISSION TEST EQUIPMENT

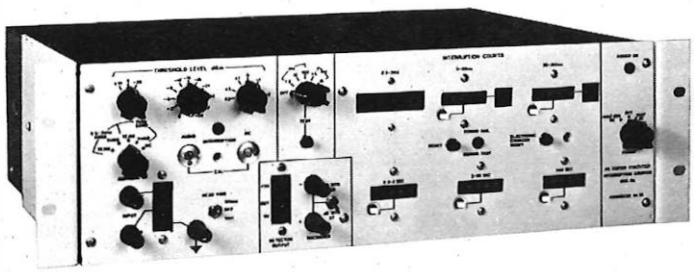
Noise Impulse and Interruption Counter

Model Number – 296/2
British Telecom (P.O.) ref. – 170C



- Designed to meet CCITT Recommendations 0·61 & 0·71
- Both noise pulse and interruption counter
- Ideal for audio and data transmission circuits
- Input impedance 600 ohm balanced or high
- Input thresholds from +12 dBm to −63 dBm
- Filters:- FLAT ±1dB from 275Hz to 3250Hz
  SBDC ±1dB from 750Hz to 2300Hz
  DCC ±1dB from 350Hz to 450Hz
  EXTERNAL Terminals fitted for external filter
- Dead times – Noise pulse counter 90µs, 125ms, 1 sec
  Interruption counter 3ms, 125ms, 1 sec
- Counter has 4 digit 7 segment LED display
- Internal timer adjustable from 1 min to 60 mins
- Operates from 200/250V ac and internal batteries. Power fail LED indicates when mains fails. Switchover to batteries is automatic and immediate.
- Bleeper indicates when count made (if selected)

A single instrument with three counters and threshold controls is available under the Commercial Reference 296/3. This enables three simultaneous counts at different thresholds (+12dBm to −63dBm) to be made from a single input



Interruption Counter

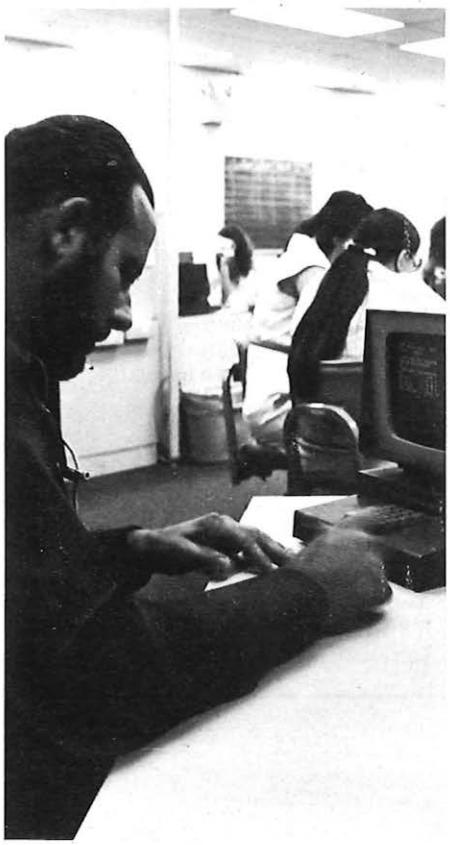
Model Number – 297
British Telecom (P.O.) ref. – 173C

- Designed to meet CCITT recommendation 0.62
- Times the duration for which audio frequencies or d.c. inputs are interrupted
- High impedance or 600 ohm inputs
- Wide range of input thresholds selectable from −53 dBm to +10dBm
- Six time categories – 0.3 to 3.0ms
  3 to 30ms
  30 to 300ms
  0.3 to 3 seconds
  3 to 60 seconds
  Greater than 60 seconds
- Internal test facility provides 5 test breaks
- Operates from 24 and 50V dc supplies and 200/250V ac
- Dead times of 125ms or 1 second can be selected

MALDEN

Test Equipment Division,
MALDEN ELECTRONICS LIMITED
Malden House, 579 Kingston Road,
Raynes Park, London SW20 8SD.
Tel: 01-543 0077. Telex: 262284

4TEL. PREVENT PHONE FAULTS RIGHT ALONG THE LINE.



Because 4TEL is the only maintenance system to test every single line every night, it's very good news for telephone administrations and customers alike.

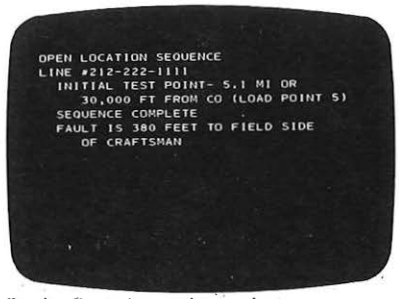
Using distributed computer control, 4TEL measures at unrivalled speed – 600 measurements a minute. In a service area with 100,000 subscribers, that means more than 2.5 million measurements in six hours.

In the daytime, 4TEL's line testing and line diagnostic capabilities allow faults to be distributed to the right faultsman first time. On each line test 4TEL is able to distinguish the nature and severity of the fault.

4TEL's powerful fault location capabilities then lead him quickly to the vicinity of the fault.

Great savings in costly cable repairs can be achieved by early fault detection through preventive maintenance programmes and by helping to eliminate wasteful changing over of pairs when faults cannot be found by conventional methods.

Installing this efficient, economical system means that the entire Repair



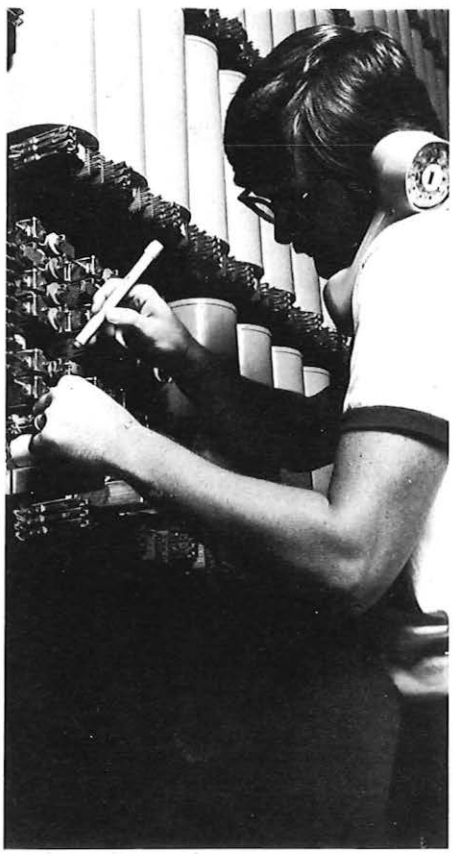
Service Control operation can be centralised and substantial improvements gained in the quality of customer service.

Test information is displayed on a screen or printer in the RSC in plain language so that it can be acted on immediately. A faultsman can not only be directed to the fault, but he can verify the repair while he's still on the scene.

4TEL immediately permits major improvements in responsive and preventive maintenance.

4TEL from Teradyne, one of the world's leading manufacturers of computer controlled test equipment, has been field proven in rural and urban environments and is testing 2½ million lines now.

For full data write or call:

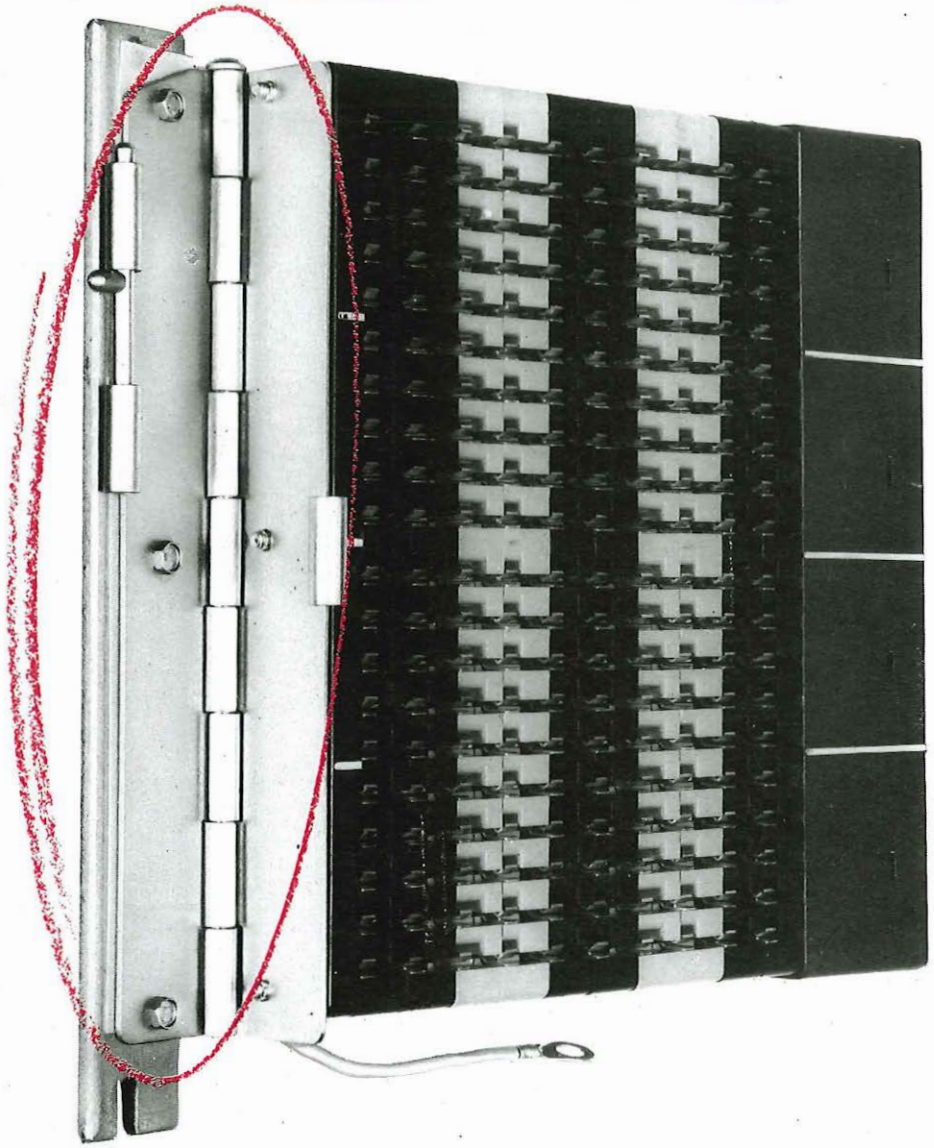


TERADYNE

Teradyne Ltd.,
Clive House, Queens Road, Weybridge, Surrey.
Telephone: 0932 51431.

4 TEL
TESTS EVERY LINE EVERY NIGHT.
AUTOMATICALLY.

Jacks Test with Hinges



Jacks Test 39/2A 39/2B 40/2A 40/2B 42B.

Hinged versions of the existing range of protected Jacks Test have been introduced to provide improved access for jumper wiring. The hinge is fitted between mounting bracket and fanning strip, with a secure latching facility.

An insulator foil protects wiring – fed through the fanning strip – from chafing against the hinge.

Hinge Kits 381A 381B

Available for retrospective modification of any protected Jacks Test.

Birkbys Plastics
a member of the **PLESSEY GROUP**

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Telephone: Heckmondwike (0924) 403721
Telex: 55332

NAME _____

TITLE _____

ADDRESS _____

_____

_____

Please send me further details of the hinged version of the Jack Test range.

Birkbys Plastics Limited, PO Box 2, Liversedge, West Yorkshire, United Kingdom WF15 6QA

0150 2 0042

British Telecom Journal

Spring 1981 Volume 2 Number 1

Published by British Telecom, part of the Post Office, to promote and extend knowledge of the operation and management of telecommunications.

Cover: At the heart of the total energy centre beneath the extension to Cardiff's main telephone exchange, technical officer Gareth James checks the pressure on a water pump. The energy centre generates the electricity supply for the exchange and its extension as well as using waste heat to warm the buildings.

The need to invest

Recent warnings from Chairman Sir George Jefferson that, unless British Telecom is allowed to borrow the money it needs for investment, an "intolerable" situation will develop, are probably the strongest yet expressed.

Speaking in March at the annual dinner of the Telecommunication, Engineering and Manufacturing Association (TEMA) in London, Sir George said that investment in the enlargement and modernisation of the telecommunications network was not vital just to Telecom but to British manufacturing and British economy generally. The situation was certainly not the case of a "lame duck" seeking survival money from the public purse.

"What we are looking for is finance for profitable investment – investment necessary to give Britain the communications system it needs and which will bring benefits for all," said Sir George who pointed out that without "substantial increases" in external borrowing, British Telecom would not be able to sustain even a minimum programme of growth and modernisation.

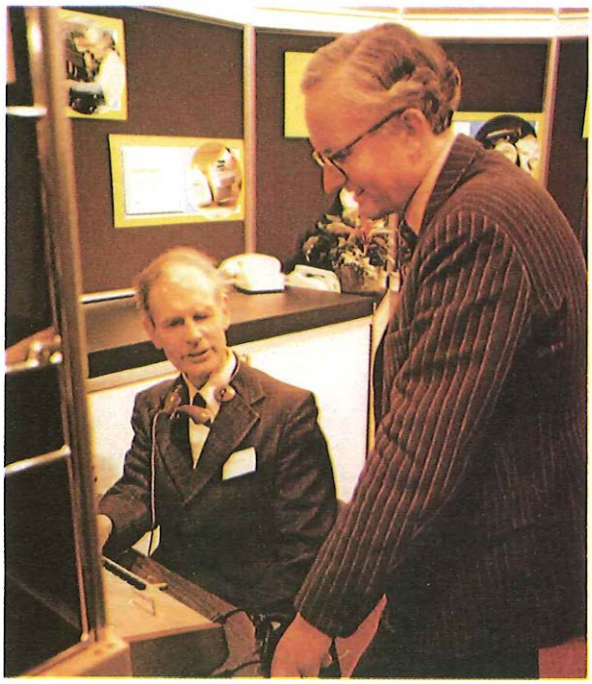
He went on to explain that if British Telecom was to remain a nationalised industry, two factors made it vitally important for a solution to be found for its borrowing requirements. The first was that the scale of growth and modernisation planned for this and next financial year called for buoyant revenues and the second that the Bill currently passing through Parliament put British Telecom in a potentially competitive situation on most of its business.

"In effect," said Sir George, "what the Secretary of State is saying to us is this: 'You must be market responsive. If you're not – and possibly, even if you are – I will license others to compete with you'. Those competitors will be free to go to the market for their finance and get it if the market thinks the prospect attractive."

Sir George continued that unless British Telecom could go to the market – or somewhere – and go to it outside the sort of constraints it was running into at the moment over the public sector borrowing requirement, it would be precluded from raising the money it needed to be market responsive even though that would be for sound, profitable business investment.

And Sir George stressed there was no time to be lost. "Major investment in our national telecommunications network can only be made really effective," he said, "through British Telecom where the network exists and is managed. Its effects will take three to five years to mature. So we need the investment *now*."

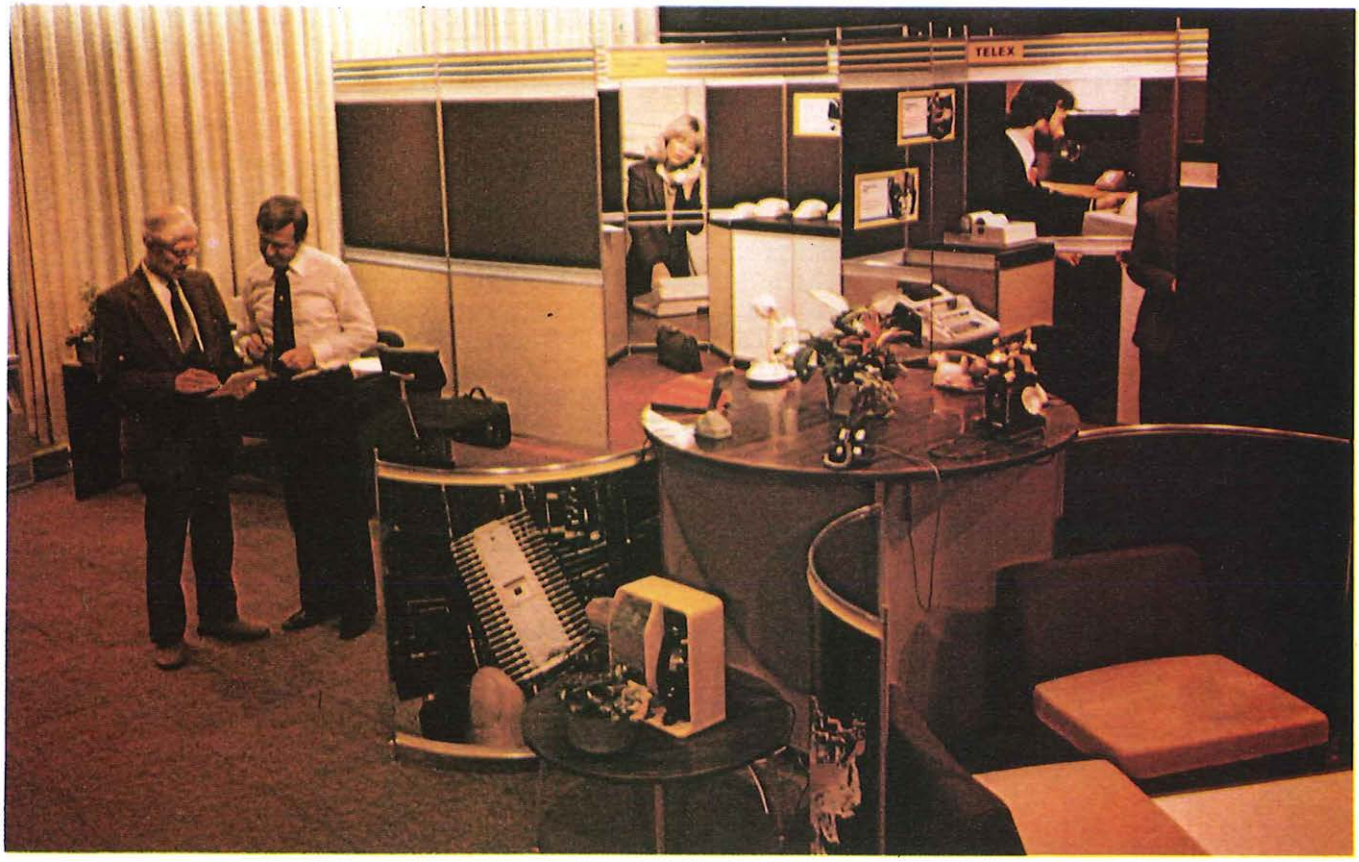
New area of initiative



Left: British Telecom managing director Peter Benton meets blind telephonist Michael Griffin of Barclays Bank during the official opening. Mr Griffin is demonstrating a four-line call-connect system.

PJ MacMahon & NC Cooper

Below: Norman Cooper and Gerry Saunders discuss final plans before the opening of Aldershot Business Centre.



The conversion by Guildford Telephone Area of a cold, brick-lined battery room at Aldershot exchange into a bright, up-to-the-minute business centre is a typical example of the bold new marketing approach being adopted by British Telecom.

It was in 1978 that the concept of a permanent business centre for Guildford Telephone Area was first proposed. Primarily, it was envisaged as a rendezvous for the general manager, sales staff and others to meet and entertain major local business customers. But even at this early stage, it was soon realised that such a centre had other uses.

It was seen as a suitable venue for presentations not only to customers, but also to staff, unions, and even to management. And although its prime use would be marketing-orientated, it was a place where staff could meet for training sessions and be used for other equipment familiarisation programmes designed to meet the needs of many divisions within the area organisation.

But first a suitable location had to be found. Top priority was to find a venue central to the area, and within easy reach of all staff. Then there was the question of the accommodation itself. Not only must there be plenty of space to display working apparatus and equipment, but there had to be the flexibility to change displays when required. An audio-visual facility and a hospitality area completed the initial specification.

The discovery of the rather cold and uninviting disused battery room in the Aldershot telephone exchange came as an unexpected boost to the project. With much imagination and hard work, it was realised that the room could be adapted to fit the bill. While the battery room itself could form the main exhibition area, extension wings could be built, housing conference rooms, a cinema area, kitchens, a full hospitality area, toilets, Business Centre staff accommodation and a reception area.

But it was soon felt that the project was too ambitious and too expensive for one telephone area, and after further discussion, the idea was soon shelved, even though there was increased interest from both regional and THQ sources. By now, Guildford Area was beginning to consider seriously a more modest centre which could be provided on a strictly limited budget.

In April last year, the general manager and head of sales got together in the Aldershot battery room; and despite the fact that the environmental conditions of a telephone exchange battery room did not readily fit the specifications of a sophisticated business centre, their ideas began to flow quickly. The bare unplastered brick walls were painted black while the unlovely frosted windows were completely screened by full-length curtaining. A single window was cleverly boarded and adapted for use as a cinema video screen and the existing high equipment doors were modified to provide an attractive entrance.

The battery room's functional high ceilings were hidden by a new false structure which neatly served to conceal light fittings as well as heating and ventilation equipment. And the cold quarry tiles, originally designed to withstand acid and heavy batteries, were ducted for electrical fitments, then lightly covered with concrete and finished with a layer of luxury carpet tiles. The finishing touch was provided by a small purpose-built car park.

With construction work completed, the next stage was to install as much of the latest equipment as possible. Prestel, radiopagers, the Monarch and Herald call connect systems, telex callmakers and many more were all installed by local engineers, and are now successfully working in the business centre. An important section of the centre is devoted to aids for the handicapped. Here the message to businessmen is that while some of these specialist products can be used at home, companies can, with the help of these products, very usefully employ many handicapped people, to the mutual benefit of the individual and the employer.

But it is not only local businessmen who stand to benefit from the centre. Staff too, now have a place to go to see equipment working and be fully trained in its use.

SETR regional director Brian Cross examines a radiopager from the executive case used in sales presentations. Also in the picture (from left) are Guildford Area's head of sales Norman Cooper, centre manager Gerry Saunders and area general manager Pierre MacMahon, whose idea the business centre was.

To this end, the centre has a full self-contained display unit which can provide a comprehensive look at new equipment and uses video and seminar facilities to help with practical training.

Following the formal opening of the Aldershot Business Centre in February by Telecom managing director Peter Benton, staff in Guildford Area are now using the centre to the full. Selected customers are being invited to both daytime and evening sessions as part of an overall business customer relations programme. They are usually either specific business customers brought in by individual sales representatives or groups such as the local Chamber of Commerce, Rotary Clubs, company management teams, and many other local clubs and institutions, invited for more formal presentations.

In time, it is hoped to introduce joint projects, involving British Telecom on one hand, and local private communication and computing companies on the other. This could mean real participation in the business activities of the area and would help to get more equipment into the community.

Through the Aldershot Business Centre, thought to be the first of its kind in the United Kingdom, Guildford Telephone Area is applying the philosophy of many of the leaders in the retail trade – active marketing. Indeed, by taking advantage of the current recession, and pushing forward British Telecom products into the new era of competition, the centre will join those at the spearhead of the long march along the economic road to recovery.

Mr P. J. MacMahon is general manager of Guildford Telephone Area.
Mr N. C. Cooper is head of the Area's sales division.

A plug for customers

MJ Devonport

A 12 to 18-month product trial of British Telecom-designed plug-and-socket telephone installations is now underway in Carlisle and Taunton exchange areas and could lead to a revolution in telephone equipment marketing strategy.

The master socket (left), a secondary socket and the plug which fits into either of them. As well as the standard cable terminations, the master socket contains the capacitor, the resistor and a gas discharge tube which protects the telephone from surge on the line.

Since service to residential customers was first offered 100 or so years ago the techniques used in installing and connecting telephones have remained substantially unaltered. With a few minor exceptions, customers' premises have been provided with a single instrument wired into a block terminal. When extension plans were introduced to give extra facilities, the same principles were used.

Eventually a type of plug-and-socket system was introduced – known as extension plan 4 – and this can normally be provided with between one and four portable telephones and a fixed bell. Another type of installation provides similar facilities except that the telephones are permanently wired into the wall-mounted block terminals.

All existing residential installations have two important similarities. First their 'transmission circuits' – that part of the circuit using the microphone and receiver – are connected in parallel between each telephone, and secondly, the incoming signalling circuit – traditionally called the 'bell circuit' – is a series circuit between telephones. As far as the circuit efficiency is concerned, they work perfectly well and require no technical improvement although they do present some important inter-related problems.

Because of the relationship between series and parallel connections, detailed design of the telephone circuit must be tailored to the actual position it occupies in the extension plan circuit. For example, an extension plan 4 using a single telephone is wired differently from one using more than one instrument. This means that telephone circuits must be dedicated to fulfil a particular circuit function and cannot therefore be readily interchanged with other telephones in similar circuits. Also, the variation in telephone circuits means that engineers have to use a large number of diagrams which increases the risk of maintenance problems. This makes more work for

An engineer demonstrates the installation of the plug-and-socket system at a customer's home.

The static display being used by British Telecom to promote the plug-and-socket trial in Carlisle exchange area.

engineering training centres and leads to higher installation and maintenance costs.

When British Telecom began to look at the feasibility of a residentially-based plug and socket system, one of the main objectives was to solve these problems, the root of which was the series/parallel relationship. Given a free hand to design a new system and by taking advice from other administrations in the USA and Canada, the solution became obvious – to connect 'transmission' and 'bell' circuits in parallel.

Effectively, the transmission circuit remained unaltered but to prevent the bell circuit from interfering with speech signals, the resistance of the telephone bell coils had to be increased from 1,000 ohms to 4,000. This new telephone can be installed as a single instrument on a direct line or as a multi-station (up to 4) installation without any modifications. The new parallel system has one new cost-saving advantage in that it overcomes a long-standing maintenance liability by having no break contact unit in the bell circuit of the socket.

When considering the trial plug-and-socket system, the objectives were to update the residential network technically which would lead to simpler installation procedures and a reduction in the number of diagrams required. This in turn would be reflected in a reduction in installation costs and could lead to the sale of more telephones.

The flexibility of the plug-and-socket system would also give British Telecom the opportunity to market a more varied range of instruments and the ability to respond more quickly to market changes and customer demands. And in association with the plug-and-socket trial, there would be the opportunity to establish a real marketing presence in the High Street to test whether plugs and sockets really do generate demand for additional telephones.

Associated with the new circuit is a newly-designed generation of plug-and-socket hardware. The plug is similar to those used by other administrations except that it is the only one with a safety seal of approval from the EEC. It is designed to take six pins, although currently only three are used for the plug-and-socket system. Incorporated into the body of the plug is a safety clip which pulls the plug from the socket in the event of a violent tug on the cord, such as caused by a customer tripping on it.

If, however, the cord is pulled slowly but firmly, perhaps by the customer walking slowly away from the socket while using the telephone, the plug will remain in position. Because all

telephones in the new system are plug-ended, and that, unlike the plan 4, no fixed bell is provided as standard, customers can if they wish, unplug all telephones in their system. Although callers hear ringing tone, the called customer hears nothing.

Unfortunately this same condition occurs if the called line is disconnected due to a fault on the line, so to prevent unnecessary fault reporting, a permanent circuit was required at the customer's premises which could not be disconnected when the telephone plug was withdrawn. As only one such circuit was needed for each installation it was realised that two types of socket would be necessary. The one with the test circuit was designated the master socket and the other the secondary socket. Each basic completed installation consists of one master socket and up to three secondary sockets.

Carlisle and Taunton exchange areas, each with between 15,000 and 20,000 residential customers, were chosen for their similarity in size and the fact that they were located in towns which were reasonably self-contained, and did not attract large numbers of Saturday shoppers from surrounding towns and villages. It was also considered necessary for the two towns to have a wide cross-section of residents.

A two-pronged attack was launched in both areas early this spring. On one hand, new demand for residential installations has been met using plug and socket installations, and on the other hand, all existing residential customers are having their installations systematically converted by teams of installers to plugs and sockets by using modern high-impedance telephones.

The basic offer made to all residential customers in the two areas is a four-socket system although reasonable variation is met. Customers asking for more than four sockets have to pay an additional installation charge. A mobile unit travels round with the conversion team and is used as a local store and showroom, and in the case of Carlisle, where the mobile unit is a single-decker bus, as domestic accommodation also. To encourage customers to accept the scheme, great care is being taken to hide as much of the installation cabling as possible, usually by mounting sockets back-to-back on adjacent sides of walls and using flat cable runs under carpets wherever possible.

A further fundamental aspect of the trial is the use of a High Street outlet in each of the trial towns. In Carlisle, the original sales bureau had a special window display fitted while in Taunton a shop-within-a-shop was set up in the town's biggest department store. The role of the shop is vital because it is here that the customer may browse around looking at all the telephones on display.

To publicise the new system a series of press features were written and the local general managers held press conferences. A static display was also used in both the towns showing the plug and socket system. Each existing customer received a letter explaining the detailed advantages of the new system followed by a second letter inviting them to make an appointment for the engineer to call and carry out the conversion work. Refusals or 'no replies' were followed up by a specially-developed monitoring system. If after further contact, the customer still refused to have the new system installed, their installation was left untouched.

Basically, the new system allows customers to buy a new range of phones for their extension sockets – including the new Ambassador range. Already staff associations have been consulted and will be kept informed about the installation programme which is based on similar services in Canada, the USA and many European countries.

After about 12 months, a report will be submitted to managing director, Peter Benton outlining the advantages and costs highlighted by the trial.

Mr M. J. Devonport is an executive engineer in the audio services and market management division of Marketing Executive's Residential and Customer Services Department. He is project manager for the plug and socket trials.

British Telecom Journal, Spring 1981

Yellow Pages mean business

R G Mortimer

Yellow Pages – those colourful directories full of other people's business – are now proclaiming their own. For with the information age truly launched, British Telecom's Yellow Pages are suddenly attracting imitators – and British Telecom and its contractors have no intention of taking a back seat.

Nearly 10 year ago, a small group of clerical workers and their managers settled into a rambling Post Office building in North London. Their mission was to test an idea that the Post Office was capable of creating a complete money-spinning business-within-a-business out of its 'classified telephone directories'. Little could they have visualised the scene a decade later with their numbers swollen into a formidable workforce, the arrival of VDU technology, and reprocessing of familiar directory information into new products.

The story behind alphabetical telephone directories has already been told (see *British Telecom Journal,* Autumn 1980). Yellow Pages in the UK

At GTE's Ealing studios, manager Steve O'Neill compares current British display presentation with other Yellow Pages directories from around the world.

British Telecom clerical officer Helen Smith checks account details on the new Edinburgh computer. Known as the Acorn file, the system is replacing microfiche equipment which is currently being used in British Telecom to record Yellow Pages advertisers.

on the other hand are comparatively new. The Post Office first put out classified-format directories in the 1930s – printed on yellow paper. In 1965 the business decided to back its confidence in this potentially distinctive product and quickly took it to 64 volumes to cover the entire country and gave it the name the world has come to know – Yellow Pages.

As the Post Office began planning its eventual control of compiling these directories, handling the finances, and marketing the product, it contracted an agent to fill the books with businessmen's advertisements. Combined with a listing of business telephone subscribers and arranged in the now familiar way under classified headings, the directories became steadily established as the 1960s drew to a close.

But Yellow Pages were not to stand still for long. By 1973, the Post Office introduced its planned takeover of advertisement processing and invoicing, as well as establishing commercial control. The agent continued to sell space, and helped fix policies. By 1975, Yellow Pages found themselves published as self-contained directories after many years as a supplement inside their 'white pages' counterpart. Today, only the slender Isle of Man directory remains as a memorial to what used to be.

The 1970s experience of real and increasing involvement in the running of a lively commercial operation quickly led to a realisation of the product's profit potential, and by 1979 it was obvious that the information age was very much alive. Opening the door to competitive applications for the renewal of the task of sales agent produced an overwhelming response.

In a doubly bold step, British Telecom decided not only to make a fresh start at the end of last year after 15 years with the same agent, but to divide UK sales responsibility between two directory experts – GTE Directories Ltd for London, southern, south eastern and East Anglian advertisers and ITT World Directories Ltd for customers in the rest of the UK. Part of the fanfare of publicity for this change has been a mailing of posters to all existing customers and a bold new national press advertising campaign.

In the face of growing competition, British Telecom's Yellow Pages products will have to convey a clear identity to the public and a ready answer to any competitor. The contents must be useful, attractive, valuable to advertisers and, of course, accurate. Directories must be issued regularly and delivered on time.

Resources to meet all these objectives are now available and professional ad-

visers are looking at both design and image. Inside the familiar covers, the arrangement of nearly 3,000 classification sections is constantly scrutinised, and plans to provide a new 'useful information' summary at the front of each directory are in hand, as is an index to the sections included in the body of the volume. A sharp eye is also kept on new trades and activities to see how best to list growth technologies such as video, viewdata and microelectronics, frequently against a background of intermingled products from the same tradesman. Video equipment can be obtained, for instance, from a television or hi-fi shop, while a calculator can be bought from an audio dealer, a camera shop, or even a typewriter specialist.

Explosive growth has strained every area of customer service and planning in the Yellow Pages business. So while concentrating on constructing a solid business future with all the sophistication of Yellow Pages' new regionalised sales organisation, time also had to be found to rebuild completely computer support facilities, which have now been 'switched on'. Taking advantage of a new generation of computer hardware, this new technology will offer immediate advances, and provide opportunities to incorporate further ones later.

Advertisement processing will immediately be improved. A businessman wanting an identical message in a dozen different area directories can be assured they all will read the same. Any attempt to enter advertising under a trade protected by legislation will automatically receive a sharp warning from the machine! Full invoicing and credit control will also be introduced at the outset as will improved support between British Telecom and the two sales agents. The agent's salesman will have the fullest information about potential advertisers and details of current ones. Directory rates and dates will be centrally stored for rapid retrieval.

Already work has started on the next stage of the computer revolution which will see the old-fashioned card-input methods replaced with visual display units. When introduced, all advertising in Yellow Pages will be tapped-in on keyboards, as will account payments. The computer will also cope with a barrage of instant interrogations on a whole spectrum of urgent day-to-day factual and statistical matters.

An intriguing technical development features in Yellow Pages plans for the next step – digitised graphics. Present methods mean physically handling graphic illustration material for 'display' advertisements all down the line to the printer, with all the risk and delay that involves. Soon, their plans should place Yellow Pages to the fore in developing ways of storing graphic material in digital form on a computer – an immense technological leap.

Growth itself brings printing problems in the directory business. Capacity would soon be exhausted on the established machinery of the main traditional press controlled by Her Majesty's Stationary Office at Gateshead and Harrow. Plans to introduce an extra printer in York will take effect this year. But expansion also means bigger directories, and before long, one volume will reach unmanageable proportions, at which point it will be necessary to redraw the boundary lines. A major study to look at communities of interest and customer buying habits is also imminent.

In the next year or so the new classified Local Pages will be launched – the 'coffee table' edition of Yellow Pages, compact in size and compact in truly localised coverage. At the other end of the scale, British Telecom's Yellow Pages will go international in 1982 with its Europage project – a collaboration with major continental Yellow Pages publishers that promises a very profitable future, beginning with a directory of the European import and export trade.

Technological flexibility will offer diversification. British Telecom knows a great deal about business telephone activities and Yellow Pages can market this vitally-needed information not only in traditional book form, but through mailing lists already in great demand by other businesses and through VDU technology such as Prestel. Competition will provide the impetus to take Yellow Pages rapidly into an aggressive new phase. With all the resources now available, the intention is to ensure that in future, all fingers walk the British Telecom way.

As Yellow Pages contracts come up for renewal, a copy of the current advertisement is cut from an existing directory and pasted on to new pre-printed contracts to be checked by the customer. Here GTE production clerk George Hill prepares a new batch of documents.

Mr R. G. Mortimer is a higher executive officer in the business planning group of the Yellow Pages and directory services division based at Manor Gardens, in North London.

British Telecom Journal, Spring 1981

Poles apart!

D Clark

Following field trials, hollow telephone poles made from steel and glass-reinforced plastic are beginning to replace some of the traditional wooden poles which carry the wires used to connect British Telecom customers to the network.

For more than 100 years, wooden telephone poles have been a familiar sight on housing estates and at roadsides throughout the country. The poles, fashioned in the main from Scots pine grown in Scandinavia, have proved themselves highly durable – some last as long as 80 years – and are a vital element in British Telecom's commitment to provide service for customers.

Increasingly in recent years, however, several factors have led to a quest to find an alternative material to wood – not least to reduce the dependence on imported products. One of the main concerns has been the question of safety. With a solid wooden pole an engineer has no choice but to climb it. Indeed, in a single domestic installation, he will probably have to make two or three excursions to the top and however careful, there is still more risk of injury than there would be working at ground level.

Secondly, there is sometimes difficulty in obtaining sufficient timber of the right quality. With between 60,000 and 70,000 new poles added to the existing four and a half million each year – together with an annual replacement rate of 40,000 – this can present a considerable problem.

Then there is the matter of handling.

One of the new-style glass reinforced plastic hollow poles distributes dropwires to houses on a residential estate in Aldershot, Hants.

Wooden poles are very heavy and with 40 per cent of installations carried out manually, the manpower used is costly. The production cycle is also long because of the stringent standards applied. Each pole is seasoned to ensure a low moisture content and is creosoted under pressure.

Preparation takes up to three years and British Telecom employs specialist inspectors to ensure high standards. And with safety so important, batch samples of poles are regularly tested to destruction by being bent under strictly-controlled conditions until they break.

Over the years, there have been a few experiments with other materials – cast iron and sheet steel, for instance – but these have proved generally disappointing. The first move towards the hollow pole technique can be traced back about 10 years when a then Post Office changes of practice committee expressed concern over the number of staff injured as a result of accidents involving telephone poles and asked if safer methods of using poles could be devised.

As a result of this request, the whole of British Telecom's work practices surrounding the use of poles was examined and from this study it was concluded that safety could only be improved if climbing was reduced or eliminated. It was also concluded that if the pole did not have to be climbed, the importance of routine pole testing would be much reduced. Currently as well as the need to test a pole every time it is climbed, British Telecom carries out routine testing on all wooden poles every six years.

Although in the British Telecom external cable network only a small percentage of cables is carried overhead, about 60 per cent of final connections to the customer are by overhead cable known as dropwire. It was essentially in this area that the study was concentrated with the object of eliminating pole climbing when making the final connection.

The part of the external network where final connection to the customer is made is called the distribution point (DP) and this may be sited underground or overhead. An overhead DP usually consists of a wooden pole fed by an underground cable which is terminated at the top of the pole. A dropwire is run from the termination via a ring at the pole top to the customer's premises where the dropwire is anchored to an external bracket and then led into the premises.

The hollow pole system eliminates all work at the top of the pole. The underground cable is led into the pole below ground level and terminated 1.5 metres above ground level. Dropwires enter at the top and are run down the inside to be anchored to a special ring and terminated to the feed cable.

In determining the design and the choice of materials for the development of the hollow pole, several criteria were necessary. The pole had to support a high working load applied at its top in one direction, overall length was to be 8.5 metres, its weight was not to exceed 75 kilogrammes, and the door opening was to be 2.6 metres from the pole butt to the base of the door, thus giving a convenient working height when the pole was in position. Also vital was that the inside and outside surfaces of the pole should be smooth and free from sharp edges.

Obviously one of the most important governing factors on any new material was cost. Initially the cost of a wooden pole is very low, and it is inconceivable that any fabricated pole could compete on a first-cost basis. Problems with the wooden pole system on an average life basis, however, are such as to allow the use of other pole materials if there is a distinct advantage over the conventional pole on a whole-life costing basis. And the only two basic materials to meet the specification and cost requirements have proved to be glass-reinforced plastic (GRP) and steel.

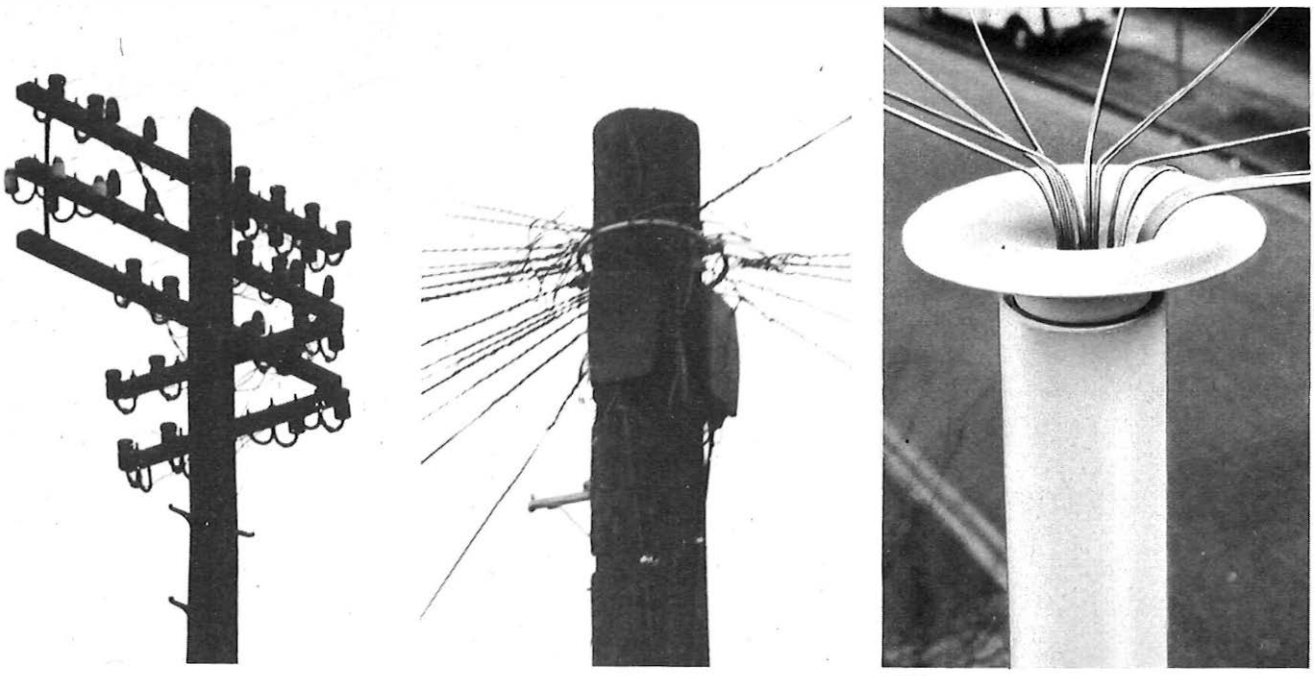
With GRP, effective utilisation of the expensive glass-fibre reinforcing material is critical and there is still scope for individual manufacturers to develop new glass lay-up formations and pole-production techniques. Future costs, therefore, could well reduce.

With steel, the cost of preservation is the most important factor, and a balance has to be reached between first cost and pole life. Although a pole may not become structurally unsound, a rusty pole would be unsightly.

A significant 'spin off' of the hollow pole technique is that it will be more acceptable aesthetically, especially on modern housing estates. In such situations, the pole shape is likely to match that of modern lighting columns. Three different shapes are available. And the pole-head assembly of the hollow pole is a neat arrangement when compared with the often untidy construction detail which can result from the use of a conventional wooden pole.

At present, only one shape of hollow

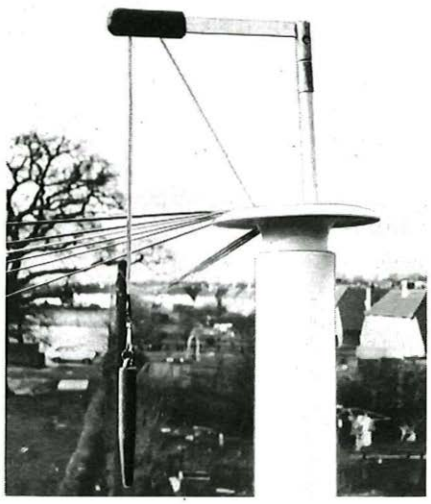
The changing face of the distribution pole . . . Left, a familiar type during the 1960s, centre, a typical but non-standard installation of the 1970s and right, a close up of the top of the new hollow pole.



With a hollow pole, technician Len Pullen can work safely at ground level to replace the jointing sleeve after terminating a new dropwire. The potential danger of the railings to a man working at the top of a wooden pole was one of the reasons for installing a hollow pole at this site.

Inspector Peter Gerrard measures the moisture content of untreated poles – just one of the problems in using wood.

Below: The rigging assembly used in providing a dropwire from a customer's premises.



pole constructed in GRP has proved successful. It has a circular cross-section and is tapered continuously throughout its length. Hollow poles constructed from steel are available in a tapered octagonal cross-section and circular cross-section where the pole is constructed from two parallel-sided sections of different diameter. The larger diameter section is used as the base of the pole.

All designs of hollow pole have four cable-entry holes, spaced at 90 degree intervals and one metre from the butt, and a door whose base is 2.6 metres from the butt. Almost three metres from the pole butt, inside the pole, a stainless-steel C-ring is fitted. This is fitted horizontally and, apart from its attachment point, has a clearance of 6 mm from the inside wall of the pole. A mushroom-shaped cap made of GRP is fitted at the top to provide a smooth cable-entry point.

The octagonal-shaped steel pole is made in a large knife press, which forms each side longitudinally. On the last pressing, sufficient space is left for the knife to be removed and the gap is then closed and welded together. The tubular-shape steel pole is made from two different size tubes which are jointed by belling out the end of the smaller tube into a cone shape and then reducing the end of the larger tube over the cone. The joint is then welded to improve appearance.

The GRP pole is made by laying glass fibres on to a mandrel, which is then placed inside a mould and spun. When the speed if sufficiently high, the fibres are thrown on to the inside of the mould and the mandrel removed. Resin and hardener are then introduced and the mould is heated and the pole allowed to cure while still rotating. The GRP pole is protected by a layer of resin, applied at the time of manufacture.

Protection of the steel poles is carried out either by galvanising both inside and out and adding a bituminous paint or by spraying aluminium on the outside and epoxy paint inside. As before, the butt end is treated with bituminous paint.

A number of new tools and a set of standard duct rods are required for the rigging operation. These include a sash line, a rigging head, a weight and a pulley. The whole rigging-head assembly is connected to a duct rod and then pushed through the door opening with the sash line held to prevent the weight moving away from the pulley. As each rod end is reached, another rod is added until the rigging head and weight emerge from the pole cap. The rods can then be rotated to align the weight in the correct direction. By paying-out the sash line, the weight falls to the ground, where it is removed.

By holding both ends of the sash line, the rods can be withdrawn and, once the rigging head is free from the door opening, be detached from the sash line. A bracket and pulley are attached to the customer's premises, and a draw rope is threaded through the pulley. This draw rope is used to tow dropwire from a dispenser through the pulley and over to the pole. A dropwire clamp is attached at the bracket at the house and a dropwire tensioned at the pole by hand against the house bracket and clamp.

Basically the hollow pole offers greater safety potential, simpler working methods and a more pleasing appearance. About 30,000 could be sited by the end of 1983 and although there is not the same need for using hollow poles in line-of-route situations, this aspect is now being examined. Other possible uses of hollow poles may be to house such plant as loading coils and pulse-code modulation regenerators or cable joints.

Mr D. Clark is a head of group in the external plant development division of the Network Executive's Transmission Department. His duties include responsibility for overhead plant design.

British Telecom Journal, Spring 1981.

Management training by computer

R N Fletcher

Using computers to help people learn is not new. The concept has existed since the early 1960s when it was used by the US Government to train the technical arms of its forces in areas of equipment maintenance and fault-finding procedures. And as early as 1964, the Post Office was engaged in converting telephonist initial training to a programmed-text format and examining the feasibility of converting the new material into a computer-based program. At that time the project was, as now, feasible, although not economically viable in terms of computer use.

The position has now changed. The advent of low-cost computer hardware in the micro-range, the increased sophistication of computer-based techniques in teaching and the availability of special aids such as word processing and the capability to produce graphics makes for a growing interest in the computer as an instructional medium. As an aid, computer-based training (CBT) can be used to great economical effect in simulating, for example, aircraft flight training and major civil incident exercises which are costly to mount as live situations; in medical diagnosis where time and decisions are vital and in areas such as keyboard training for secretarial work. It can also be used in fault-finding situations such as British Telecom's Shirehampton project where a computer-based course for technicians on maintaining customers' telephone apparatus is run (see *Post Office Telecommunications Journal,* Spring 1977).

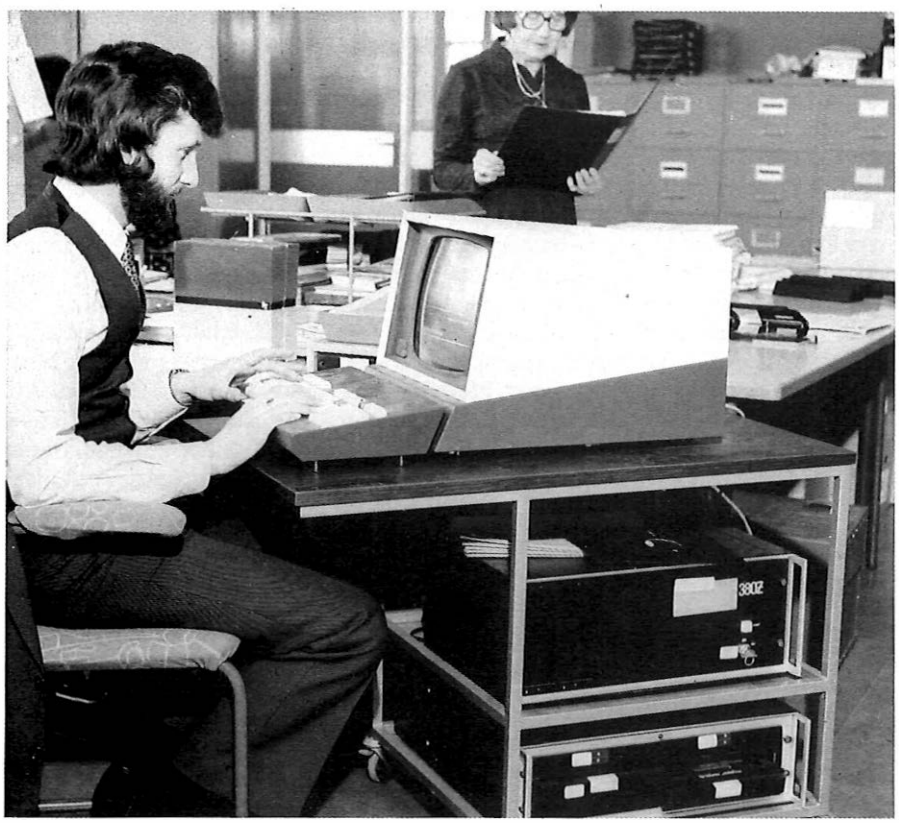
Among several computer-based training projects under current review by British Telecom is one under the aegis of the Telecom Management College to examine the feasibility of CBT in management training. This field of study was chosen as little research has been conducted either in Telecom or by outside bodies. Equally TMC were reviewing the content of two popular courses – Appraisement and Counselling and The Knowledge of Discipline – where managerial skills of decision needed to be sharpened.

Time was right, therefore, to research this field and terms of reference were to look at the feasibility of using CBT for management training, establishing whether it proves an effective learning medium, whether it is as effective as conventional techniques, and whether students are at ease with both it and formal course material. Other terms of reference were to look at the time students take to complete a CBT module, and to survey current and readily-available hardware to seek as simple a programming software as could be used speedily by tutorial staff. Finally the brief was to produce an appropriate CBT module.

The Appraisement and Counselling course for Telecom traffic management staff was analysed in depth, observing the conventional course in progress and recording the learning points made according to such categories as comprehension, reflex learning, attitude learning, memory learning and procedural learning. Such an in-depth analysis is essential since it discloses the need both for modification to course content and learning objectives and for improvement of course input.

Course analysis completed, consideration was given to modification of course

Telecom Management College tutor Terry Harper programs a change in a computer-based training (CBT) lesson.



content or learning objectives. Deficiencies were found in that training in actual skill or appraisement assessment of performance and standards to be applied needed improvement and, that training in the art of counselling required augmentation in the area of interviewing techniques.

With learning points recorded, a nominal two-hour CBT module using 'TRAINING' software and a small business computer (SBC) with floppy disk storage and surplus capability supplied by Data Processing Executive (DPE) was developed. DPE's 'TRAINING' software allows a tutor to write a CBT course using single or two-letter commands to control the presentation of course material. When running, the course information is determined by the student's responses to questions. A monitoring command allows answers to be recorded if required and a record-keeping facility enables a tutor to check student progress.

Thus there is a ready programming method that can give a direct input to the SBC via a standard editing package, and with the co-operation of the Society of Post Office Executives and South Eastern Telecom Region, the module went on initial study with a series of conventional Appraisement and Counseliing courses used as a control. The study made use of pre- and post-course questionnaires in a voluntary and anonymous form.

It comprised initial briefing sessions at which the aim and conduct of the trial were explained to those taking part. Volunteers for the CBT course are sought at this meeting – a 50 per cent response is ideal – and a pre-course questionnaire is completed by all students to determine pre-course knowledge. CBT students take the material in the three weeks before the conventional course, then complete a questionnaire. All students take the conventional course, with non-CBT students completing the second questionnaire after the first two sessions of the conventional course. The pre- and post-learning questionnaires of both groups of students are compared to determine whether the CBT system is as effective as the conventional classroom instruction.

As a safeguard to students during the trial, volunteers using CBT receive supplementary conventional instruction after appropriate completion of CBT questionnaires. Briefly the results of the study have shown that CBT has proved an effective learning medium comparing favourably with conventional methods in the rate at which students learn. Another real advantage is that most students find it acceptable.

Students took just over two hours to complete the CBT module compared with the four-to-five hour conventional course and assuming that SBCs will be introduced into the Business as planned by DPE, there are considerable financial savings. Thus CBT has advantages for both busy managers and the Business. In easing pressure on training resources – centralised accommodation, tutor time and cash – it is potentially an aid of great benefit.

It provides training opportunity to non-mobile trainees in their own time either as regular, one-off or refresher courses and without the need to 'collect up' sufficient numbers for a viable course. Where simulation techniques are required – call paths through an electronic exchange, for example – a graphics capability provides a cheap, relevant alternative to the production of light path models which are expensive to produce.

A text editing capability allows easy and rapid updating of course-ware. SBCs may be linked together via the public switched telephone network (PSTN) or disks may be despatched by post for updating to take place nationally. Also CBT makes for greater use of existing spare computer facilities by 'piggy-backing' on to existing in-house systems. And at a time of great technological change, CBT relieves the strain on expensive centralised training by minimising backlogs of applicants for courses, reducing students travelling and subsistence costs and time spent in centralised learning situations. It makes more effective use of training time by releasing the tutor from routine and repetitive tasks for more high-level tutorial work. CBT also provides an ideal one-to-one tutorial, giving the tutor immediate feedback on performance and progress.

Since normal computer facilities are to collect and store information in large quantities, SBCs may be used for computer managed training (CMT) to help training administration by measuring numbers of students and levels of performance and success rate of parts or whole of the course. Finally, system analysis for CBT, used in any training media but critical to the success of CBT, makes the tutor more aware of the learning points required to be made. In short, CBT is likely to become an increasingly effective technique in British Telecom management training.

Mr Harper changes a floppy disk program on a small business computer (SBC) used in computer-based training (CBT).

Mr R. N. Fletcher is Principal of the Traffic Training Wing at the British Telecom Management College at Manor Gardens in North London.

British Telecom Journal, Spring 1981

Europe from the rooftop

By the end of this year, British businessmen will be able to communicate on a trial basis with colleagues and companies at home and throughout Europe using small dish aerials at or near their offices.

British Telecom will supply the three- to 4.5-metre earth station aerials – the first two of which are to be supplied by Ferranti – in a commercial trial using the European Space Agency's orbital test satellite. British Telecom will also install the ground-level link using conventional cable, optical fibre or microwave radio to connect the aerial to the user's internal communications system. The trials pave the way to a new business satellite communications service with Europe, planned to start in 1983.

Announcement of the trial follows an agreement made last December at a meeting of the Eutelsat European Communication Satellite Council in Paris at which British Telecom played a key role. The Council decided to modify all but one of the five satellites now being built so that they can link up with these small dish antennae. Eutelsat will provide capacity in two satellite systems – the ECS (European Communication Satellite) made by a consortium headed by British Aerospace working for the European Space Agency, and Telecom 1, a French government project which will also provide domestic services for France. The combined Eutelsat system will cover Europe from the Shetlands to Gibraltar, and from Sweden to Greece.

The trial aerials will be used to develop and test the new communication techniques and devices needed for the new service which is expected to be used mainly by large business organisations with their own internal communication networks and by the news media with specialist requirements.

Managing director Peter Benton, speaking at a press conference, said that he believed these new small-dish services would prove of great value to customers, both for firms operating wholly within Britain, and those with interests elsewhere in Europe. The new services would, he suggested, demonstrate British Telecom's ability to satisfy tomorrow's sophisticated international telecommunications needs.

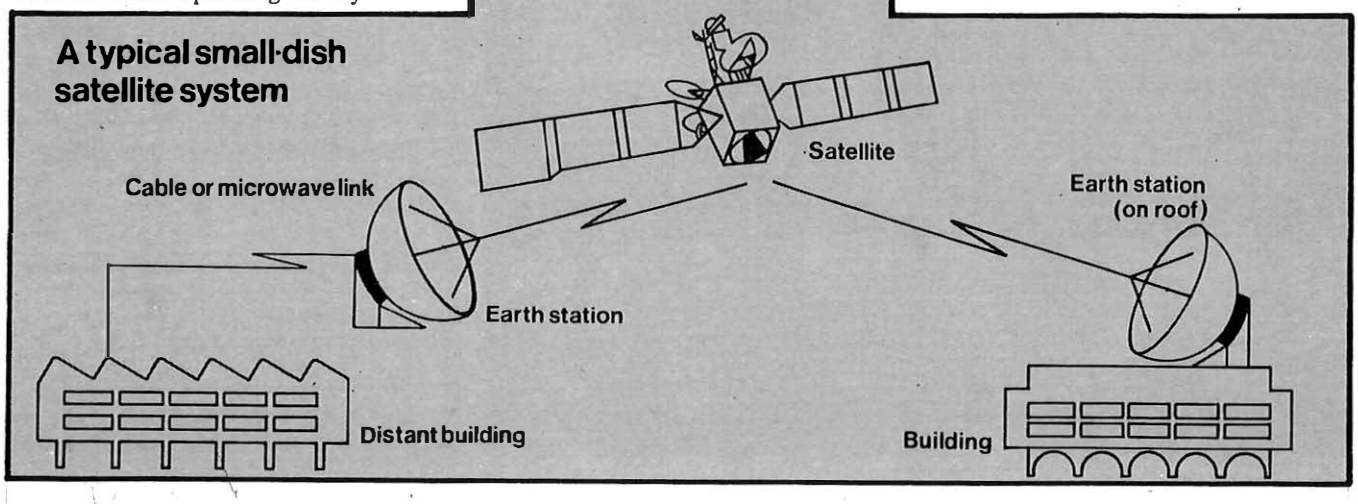
The new satellite service offers three major benefits, the first of which is flexibility. Service can be introduced at very short notice and can be expanded or reconfigured equally quickly. And for short periods, high-speed capacity can also be allocated. The second benefit is diversity: the system's use of digital techniques allows many different services – speech, telex, facsimile, or computer data – to be integrated on the same transmission path.

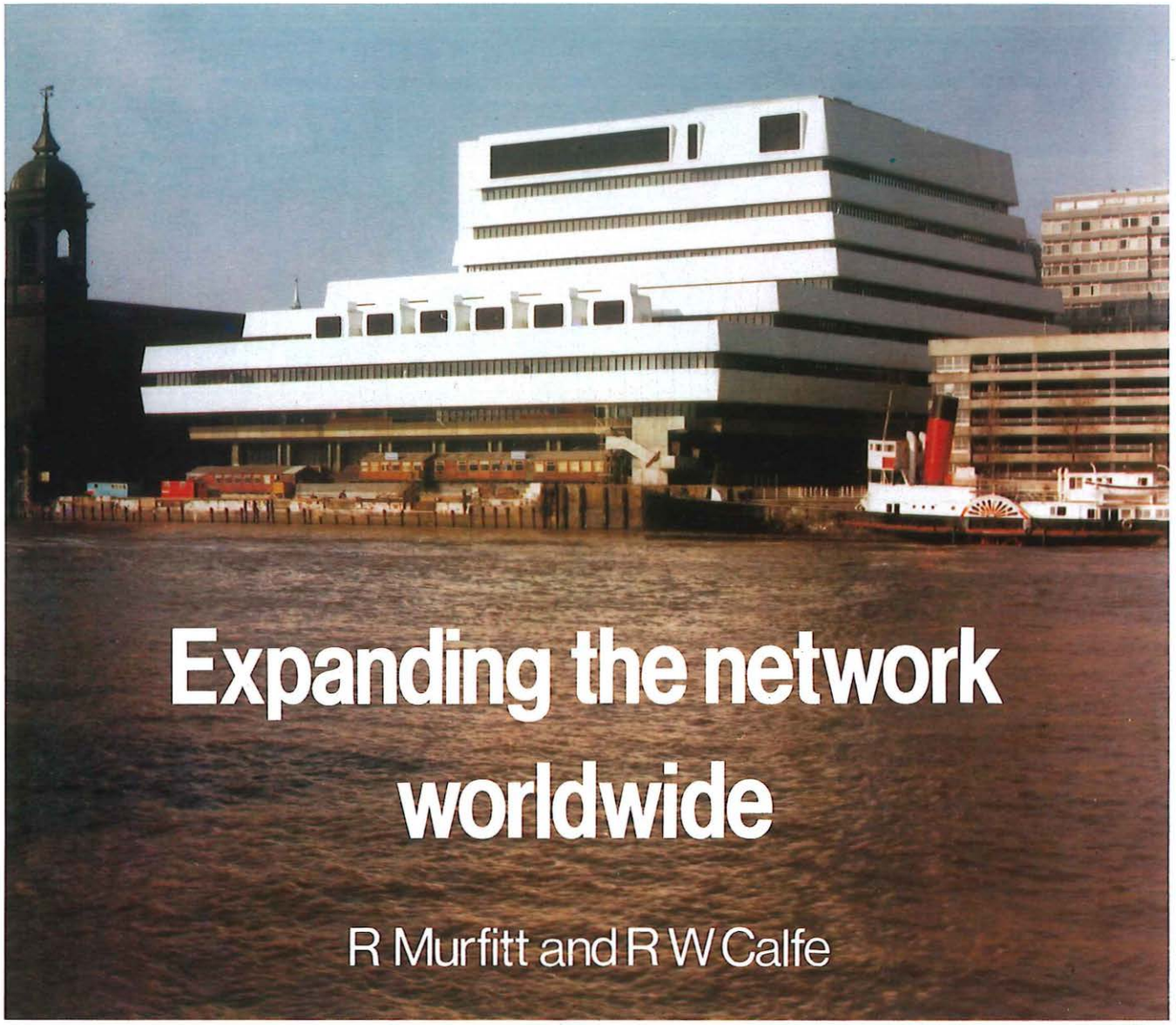
More advanced services such as video conferencing, word processing, electronic mail, high-resolution facsimile and high-speed data can be added quickly at comparatively little extra cost. Finally there is the facility for multi-destination broadcasting, particularly for one-way information flow such as disseminating news to widely-dispersed points for local distribution.

Cost of providing the combined satellite capacity for these small dish applications is expected to be about £50 million, of which British Telecom's share will be around £8 million. Small-dish earth stations costs will vary, but fully-equipped time-division multiple access terminals are likely to cost around £250,000 while frequency-division multiple access terminals could cost less than half as much – and be very much cheaper if only needed for receiving signals.

British Telecom Journal, Spring 1981

Above: An eye to the future. Within a few years aerials such as this may be commonplace on office rooftops and may play a vital role for companies with their own internal communication networks or specialised business needs.





Expanding the network worldwide

R Murfitt and R W Calfe

Two of British Telecom's international switching centres operate from Mondial House, the spectacular riverside development on the north bank of the Thames.

The expansion of the international network during the last decade or so has been one of the major growth areas of telecommunications. As technology helps keep unit costs down and wards off the worst effects of inflation, existing services become increasingly good value, and both business and domestic customers – now often spread worldwide – can contact each other by telephone without a second thought.

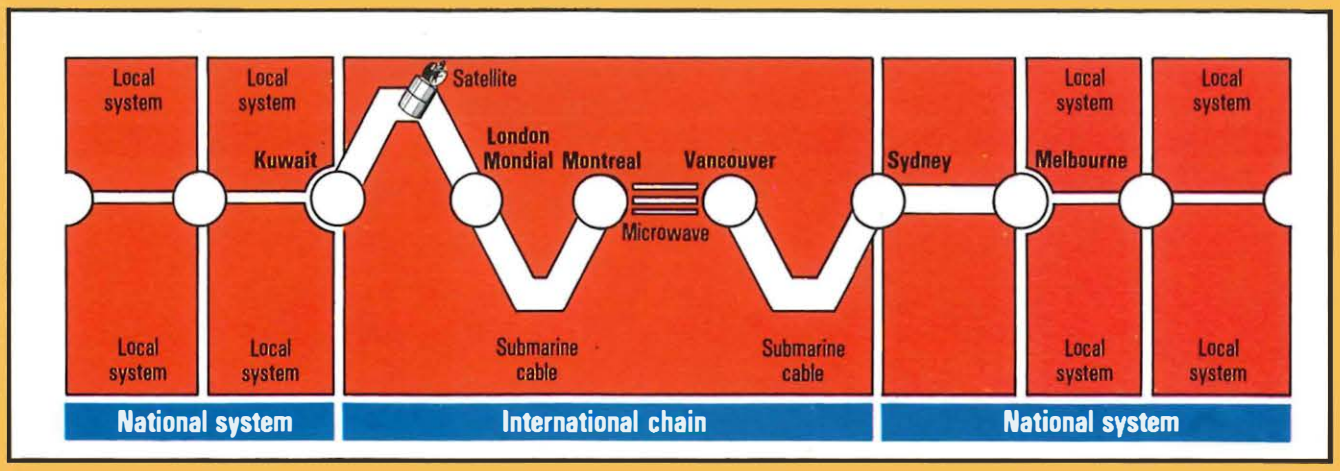
The international network, of course, carries all forms of traffic on different types of circuits, ranging from those forming part of the public switched network (PSTN), to the privately rented ones. These include circuits for telex, data, music, defence and services to oil rigs, and these have to be individually engineered to meet the appropriate needs, although there are several common principles.

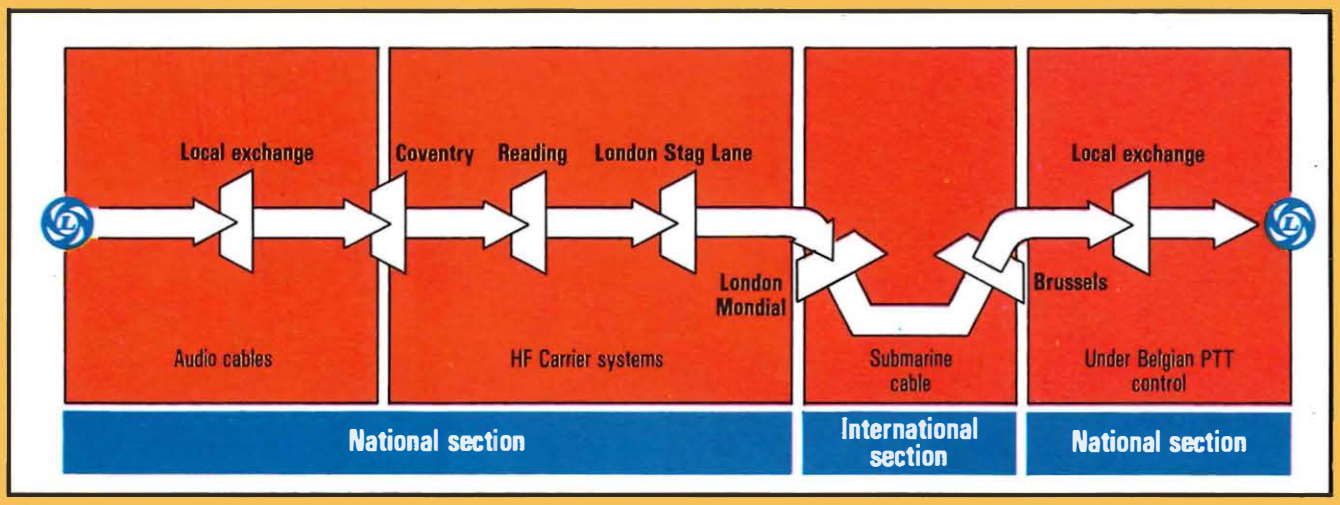
Currently, the UK has direct links to some 104 countries with the route to the United States as the largest with 3,000 circuits and that to Burma as the smallest with just one circuit. Major routes are Australia, Austria, Belgium, Canada, Denmark, France, German Federal Republic, Greece, Italy, Netherlands, Norway, South Africa, Spain, Sweden, Switzerland and the USA – four inter-continental and 12 continental routes.

The diagrams overleaf show how the international network is connected to the main London International Switching Centres and how in turn these are connected to the UK inland network. The DeHavilland and Mollison units are housed together about 10 miles north of the City, while Mondial and Thames are installed in Mondial House overlooking the River Thames.

The major routes, which carry the larger traffic streams are handled by Wood Street, DeHavilland, Mollison, and Thames international switching centres (ISCs) while the minor routes are connected to Mondial ISC. All ISCs are supported by international repeater stations which house the high-frequency line system terminal equipment and the multiplex equipment that ultimately produces the individual circuits for connection to the exchange switching and signalling equipment.

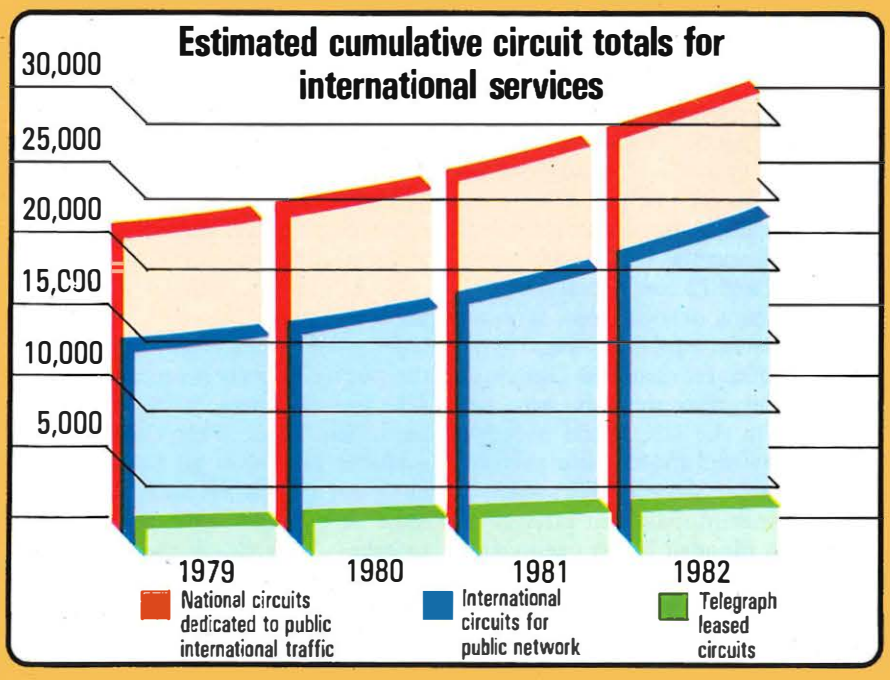
But instead of using the public switched network, some customers may find it more economical and convenient to rent their own circuits between a point in the UK and elsewhere in the world on a permanent basis. This circuit will be available for use at all times and will obviously bypass the switching centres since it will not have access to the switched network. It will, however, almost certainly make its way to one of the international repeater stations for connection to the international transmission network.

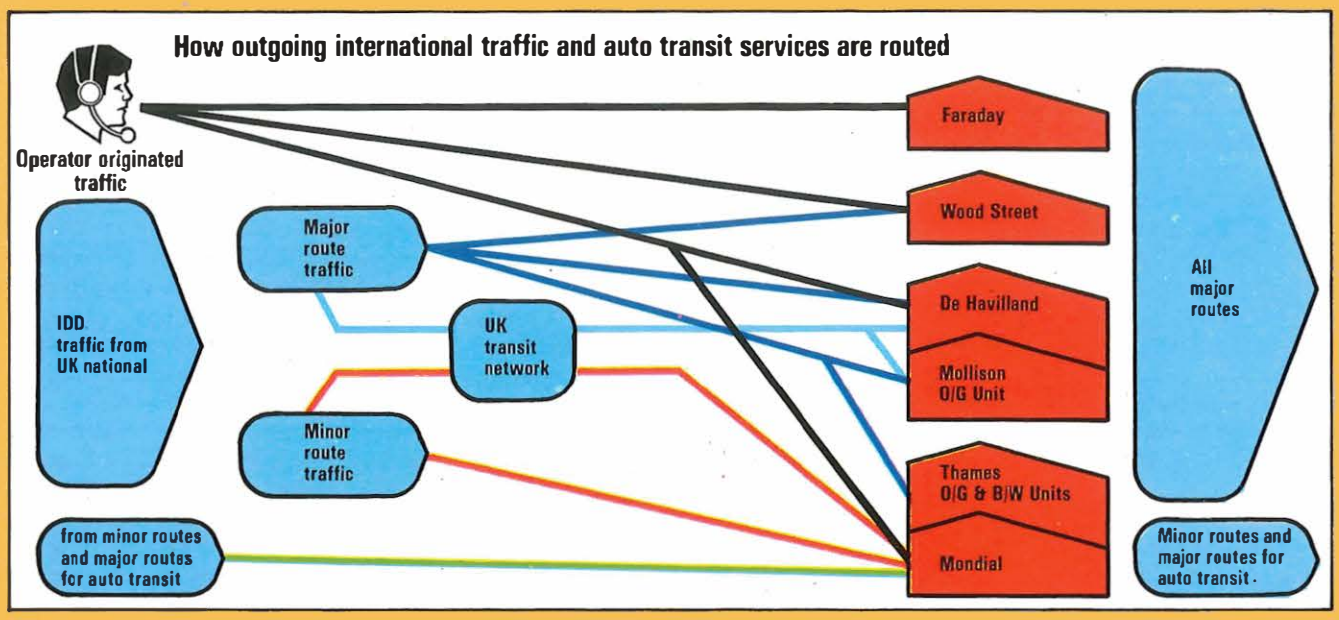


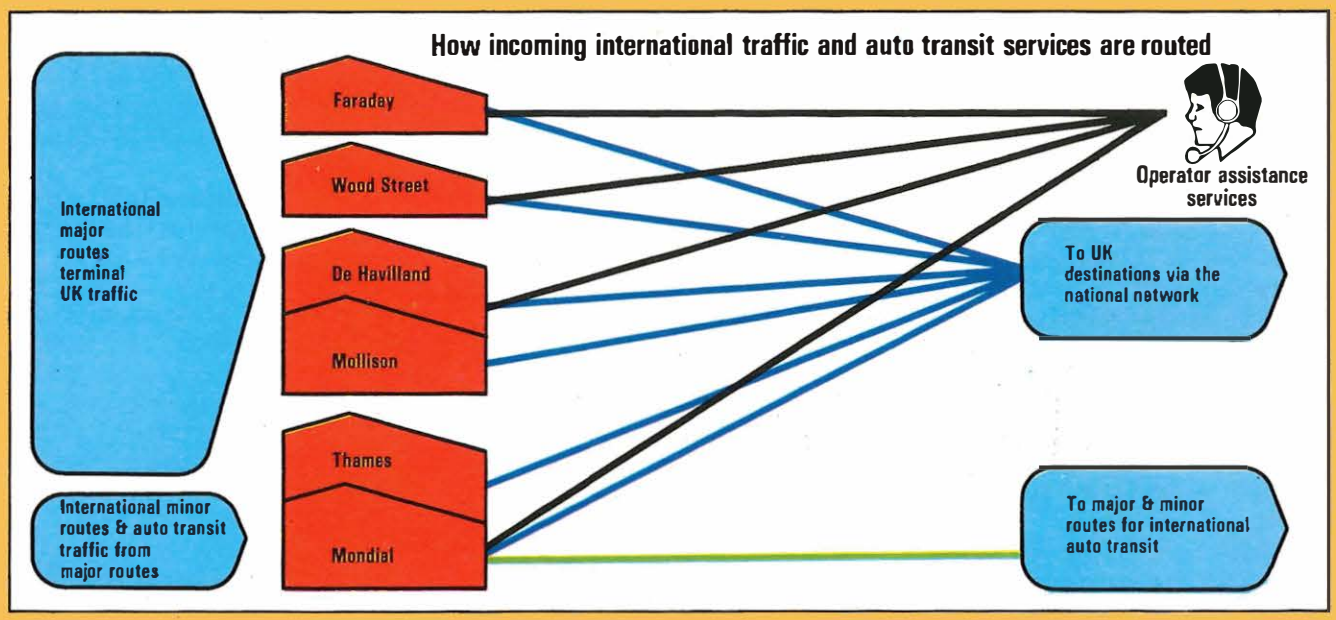


Top: A complete international telephone connection using the public network shows how a call from Kuwait is routed to Melbourne, Australia using satellite, submarine cable and microwave radio link.
Below: The connections and systems which might be used on a typical provincial leased circuit from Britain to the Continent.

Right: Consoles at a controlling international test centre can be used to access circuits for test or line up as well as for many other facilities.







An international circuit – in this case any circuit from an international centre to a destination in the UK or overseas, dedicated to carrying international calls – can be provided over land line, submarine cable, radio and/or satellite system depending on destination, and has to be engineered to meet necessary performance standards. Where possible, diversity of routing is used to reduce the effects of transmission failure, and restoration plans exist wherever possible to make good the failed circuits over alternative paths as quickly as possible.

The current growth of the international network means it will double in size every four to five years. Thus by 1985/86, it will be necessary to provide as many circuits again as already exist. Work is well advanced in the planning for another international service centre at Keybridge House and this will take the international services into the digital era. From early this year to early next, some 6,000 additional circuits are being added to the network to reach a target of about 55,000 circuits. This is not as straightforward as it may appear, however, since to achieve the effective increase, it is necessary to make adjustments and rearrangements to the network as it grows.

Each year, forward predictions are made of the likely number of circuits to be added to each route and this forms the basis for the economic ordering of new equipment to meet growth requirements. In the case of international circuits between the ISC and the UK exchanges, decisions rest wholly within British Telecom. In deciding the requirements between UK and overseas, bilateral discussions take place from time to time with the administrations concerned to agree both the routing of growth traffic, the signalling systems to be used, whether the circuits will operate uni-directionally or both-ways, and the quantities involved.

This information is assembled into an annual schedule of circuit estimates (ASCE) document which forms the basis for planning and implementation of the growth of the network. In the case of private leased circuits, it is not possible to make similar predictions on an individual route basis and instead an allowance is added to the switched network estimates to ensure that adequate margin exists for these and any other miscellaneous circuits which might be required.

While engineers will be planning the provision of transmission and switching equipment based on five or more years forecasts, the circuit providers will be

concentrating on the requirements for the first year as this forms their authority to provide and prepare a programme.

Although the ASCE document shows the authorised requirements for the provision year, the implementation programme takes account of line plant and terminating equipment shortages, particularly in the international field where foreign administrations have their own problems in meeting the demand for rapid expansion of their international services. The programme will set the boundaries, in practical terms, to what is likely to be achieved. It also sets the targets, on a quarterly basis, against which progress can be measured. It is the statement to circuit provision engineering groups in British Telecom International (BTI) of the size of the task to be met and is the starting point for the circuit ordering procedures.

The process leading to the setting up of a circuit is initiated by the issue of a circuit order form, the source of which is dependent on the terminal points of the circuit. In the case of circuits from the ISC to other provincial UK terminal points, the issuing authority will be the National Circuit Provision Control at Oswestry. In the case of circuits from the ISC to overseas administrations, the issuing authority is the Network Division of Telecom's International Executive. The order form details the engineering composition of the circuits and stipulates the necessary equipment as well as the transmission medium that will be used. And as the network is continually changing, the order may call for the provision, the cessation, or the rearrangement, of a circuit or group of circuits depending on the circumstances at the time.

Since the circuit will almost certainly involve a number of stations, one point will be nominated as control to make sure that the component parts come together in the way set out in the order. The culmination of these activities leads to transmission lining-up and switching tests from the controlling international test centre to the distant terminal centre.

Test centres are provided with consoles which allow the testing officer to access a circuit for test or line-up purposes. They provide the facility for intercepting a circuit at various points in the exchange and allow the testing officer to make signalling and transmission tests to line or into the switching unit. Also available is a variety of audio test equipment such as tone generators, audio measuring sets and frequency counters.

As far as switching tests are concerned, there is a facility for making switching tests within the ISC, test calls to distant ISCs and visual display for monitoring the various types of signalling conditions associated with both national and international signalling systems. Finally, direct speaker circuits and exchange lines are provided for communication with distant end and intermediate stations on any route.

It is, of course, important to monitor the network performance to check that the service being offered is in line with the plans and whether adjustments are needed to bring about improvements. Sudden changes such as a political coup or a major disaster like the recent Italian earthquake, also occur unpredictably and these obviously affect the demand between centres.

The ISCs are provided with automatic traffic monitoring equipment. Records are produced which analyse traffic flow and highlight difficulties. From this, judgements can be made as to whether or not the route was inadequately circuited or whether the cause was due to exceptional circumstances, not likely to recur.

Congestion is recognised as a serious matter because it affects quality of service and revenue, and sometimes creates 'knock-on' effects far beyond the immediately-affected route. Circuit provision procedures require that speedy measures be taken to relieve congestion, with priority being given to the new circuits. In this way the worst effects are softened, but a detailed check will also be made on the original forecasts to decide whether they should be revised or whether the year's provision programme needs re-timing.

Whereas the public network growth can be planned in a reasonably orderly way, leased circuits must be provided in accord with customer's orders and this means destinations, routings and timing are completely variable and have to be dealt with on an individual basis. The customers services organisation in British Telecom International is the interface point with customers requiring international circuits and will discuss customers' needs in detail. These requirements are then passed to the circuit design engineers who prepare a co-ordinated plan which will lead ultimately to the issue of the necessary order and then the overall line-up of the circuit.

Because as much work will probably need implementing at the overseas end as in the UK, liaison with the overseas administration is essential to ensure that the processing of the circuit order matches the overall programme. It is recognised, of course, that while in the public network case, international circuits usually begin and end in major centres, private circuits need to go beyond these centres direct to the customer's premises. Final testing will, in fact, be between circuit ends and is supervised by the controlling international centre before handover to the customer.

For circuits between British Telecom international centres and UK exchanges, the necessary line and terminal equipment is planned in association with inland network requirements and, therefore, wholly under BT control. For overseas circuits, however, successful provision depends heavily on good planning and co-operation with partner administrations. The failure of any administration to do its share of the work will inhibit completion.

And while it is probably true to say that working relationships between those involved in circuit provision and network design are good, problems which have to be faced include language difficulties, different philosophies, resources and lack of control. All can hamper attempts to provide the most speedy provision of circuits.

British Telecom International have set stringent targets aimed at ensuring that the public network is adequately but not over-provided to meet future needs and that customers' private orders are processed as quickly as possible. Examples of progress can be seen in recent achievement figures. Early last year the average number of circuits added to the international public network was 300 per month for UK inland and 160 per month for overseas. By the end of the year equivalent average figures were 650 and 350. A backlog of leased circuits built up earlier in the year had been almost cleared by the end of 1980.

Great efforts have been made and must continue to be made in BTI, regions and areas to respond to this growth, thus ensuring that the UK enjoys first class communications with the rest of the world. This means good business for British Telecom and provides for the future welfare of the country.

Mr R. Murfitt is head of the network integration and control division in British Telecom's International Executive.
Mr R. W. Calfe is an executive engineer on the project implementation and co-ordination group in the same division and has special responsibility for introducing Mondial and Thames international switching centres into the network.

British Telecom Journal, Spring 1981

The telephone's day of judgement

As British Telecom establishes its new identity more than a century after the invention of the telephone, **Mr R J Firestone** looks back to the time when the first ever legal decision to affect the role of the telephone in society was made.

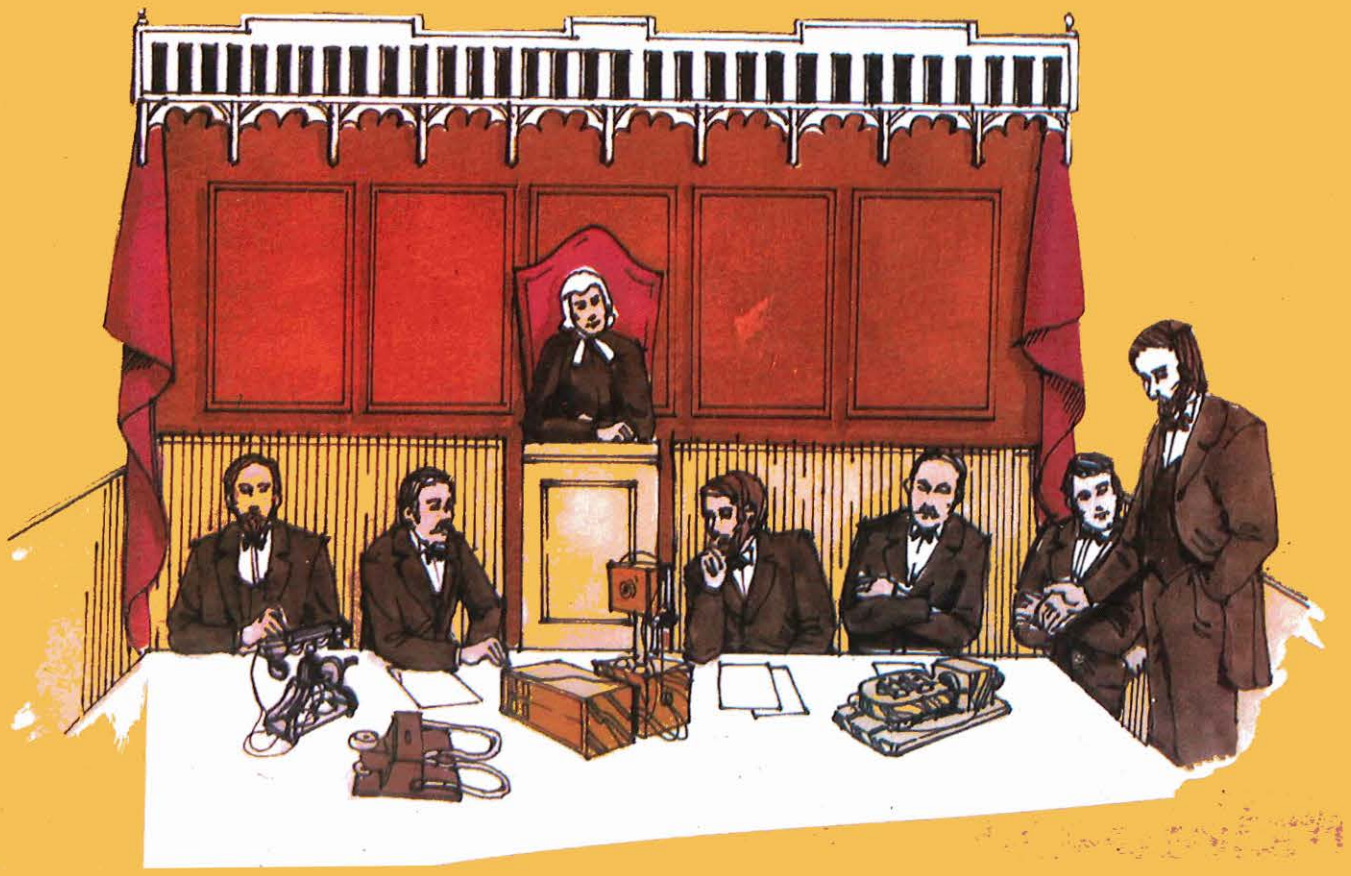
Just over 100 years ago a packed courtroom at Westminster Hall heard a High Court judge decree that the new 'speaking telephone' was really no more than an electric telegraph and as such should come under the control of the Postmaster-General's monopoly.

That single judgement, made before the Attorney General, the Solicitor General and a host of other eminent officials, proved one of the most important legal decisions ever made about the telephone and its future. Yet strangely the simple but novel instrument which was subsequently to revolutionise social, domestic and business practices throughout the world did not enjoy immediate success.

The story begins with W H Preece, that 'Victorian engineer extraordinary', who was later to become Sir William Preece, the Post Office Engineer-in-Chief. In 1877, Preece, after an official visit to America, returned with the first pair of practical telephones to this country. Over the next couple of years, a succession of American commercial adventurers crossed the Atlantic to try their luck in promoting the telephone, and eventually succeeded in forming telephone companies. June 1878 saw the formation of the Telephone Company Ltd (Bell's Patents) followed just over a year later by the Edison Telephone Company. Both companies set up their own exchanges and in the true competitive spirit of the age, adopted different rental charges, the former at £20 a year to the other's £12.

As these new telephone companies campaigned to make Victorian Britain telephone-minded, the Post Office began to take an ever-closer interest in the growth of this infant technology. It saw the telephone as a dangerous competitor to the well-established State monopoly of the telegraph and hence a threat to its telegraph revenue. Uncertain of its position, the Post Office consulted Government legal advisers who maintained the view that telephonic communications were no less than telegrams within the meaning of the 1863 and 1869 Telegraph Acts.

Consequently the Post Office informed the telephone companies that they were infringing the Postmaster-General's



monopoly if they did not first obtain a licence. To this the companies replied that they had no intention of doing so and in November 1879, the Attorney-General set in motion the litigation against the Edison company. With both of the companies facing the threat of litigation and the expense of competition, the two rivals amalgamated in May 1880 to form the formidable United Telephone Company.

Court proceedings eventually got under way on 29 November 1880, and were heard in the Exchequer Division of the High Court in Westminster Hall. Both Crown and defendants engaged a number of notable barristers of the day, with the Crown having the additional services of the Attorney-General and the Solicitor-General.

The courtroom took on a bizarre and unusual appearance, looking more like a scientific institution than a court of law. Cluttered with electric batteries, telephones, telegraph instruments and models, the courtroom was festooned with long lengths of bare wire stretching from the floor to the ceiling. A telephone line was connected from the court to the United Telephone Company's exchange close by in Palace Chambers, using Edison's loud-speaking telephone and Bell's new improved instrument. During the proceedings, demonstrations were given in court to explain the scientific principles involved. The case generated great public interest, so much so that the courtroom was frequently packed with barristers, businessmen and civil servants. Special accommodation even had to be provided for the many women who attended the hearings.

As the issues at stake were based on scientific principles, a clear exposition had to be given of the history and workings of both the electric telegraph and the telephone. The judges almost certainly had little idea of its significance and had almost certainly never used one. Many eminent scientists and businessmen were asked by the protagonists to put forward their opinions on this obviously fundamental and difficult matter. The Crown called among others, Sir Charles Tilston Bright, the telegraph expert, William Spottiswoode, the President of the Royal Society, Sir George Biddell Airy, the Astronomer Royal, and senior Post Office staff – Edward Graves, the Electrician-in-Chief, and W H Preece, who was the Electrician to the Telegraph Department.

Opposing this eminent and knowledgeable group were an equally eminent and knowledgeable array of experts – Lord Rayleigh, Professor of Experimental Physics at Cambridge, Baron Julius de Reuter, founder of the well-known news agency, Sir William Thompson FRS, Professor of Natural Philosophy at Glasgow, and from the defunct Edison Company, Edward Pleydell Bouverie and Arnold White both gave their views.

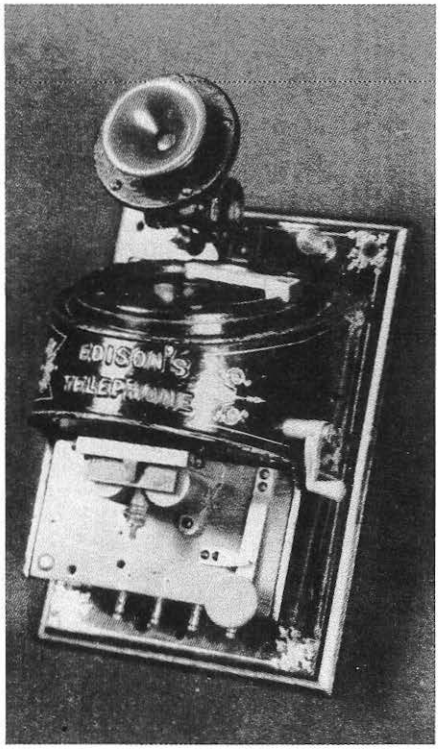
Opinions varied and conflicted in a court case that raised questions about scientific interpretation, Government monopoly, commercial enterprise and the safeguarding and encouragement of patent rights concerning new inventions.

Sir William Thompson caustically remarked: "I cannot conceive it to be possible that so entirely novel an application of electrical science as these instruments involve can be considered to have been included in the monopoly which Parliament gave to the Post Office Department". And he continued that: "when the Telegraph Acts were passed the telephone had not been invented and no-one concerned in that legislation had the slightest idea that it would be possible so to extend the power of speech as to enable persons at a distance to converse with each other".

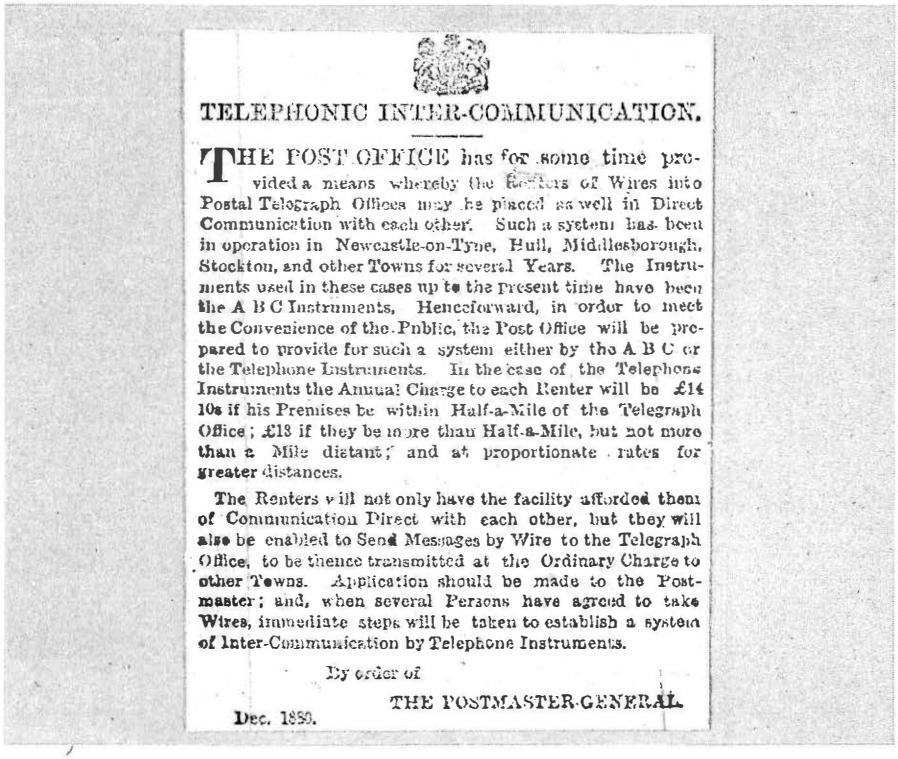
In contrast, the President of the Royal Society, referring to the Bell and Edison apparatus and associated lines in an affidavit held that: "It is my opinion that such wire when used in the manner and for the purpose above mentioned is a telegraph wire and part of a telegraph. And in my judgement, the whole apparatus is an electric telegraph in which the forms of transmitter and receiver only are different from those in other forms of telegraph".

Proceedings lasted for five days and judgement was given on 20 December 1880. The court held that Edison's telephone was a 'telegraph' within the meaning of the Telegraph Acts, 1863 and

This wall-mounted model of Edison's loud-speaking telephone was typical of the period.



Following the judgement, newspaper advertisements were placed by the Postmaster-General agreeing to interconnect groups of people renting 'Wires'.



TELEPHONIC INTER-COMMUNICATION.

THE POST OFFICE has for some time provided a means whereby the Renters of Wires into Postal Telegraph Offices may be placed as well in Direct Communication with each other. Such a system has been in operation in Newcastle-on-Tyne, Hull, Middlesborough, Stockton, and other Towns for several Years. The Instruments used in these cases up to the present time have been the A B C Instruments. Henceforward, in order to meet the Convenience of the Public, the Post Office will be prepared to provide for such a system either by the A B C or the Telephone Instruments. In the case of the Telephone Instruments the Annual Charge to each Renter will be £14 10s if his Premises be within Half-a-Mile of the Telegraph Office; £18 if they be more than Half-a-Mile, but not more than a Mile distant; and at proportionate rates for greater distances.

The Renters will not only have the facility afforded them of Communication Direct with each other, but they will also be enabled to Send Messages by Wire to the Telegraph Office, to be thence transmitted at the Ordinary Charge to other Towns. Application should be made to the Postmaster; and, when several Persons have agreed to take Wires, immediate steps will be taken to establish a system of Inter-Communication by Telephone Instruments.

By order of

THE POSTMASTER-GENERAL.

Dec. 1880.

1869, even though the telephone had not been invented or conceived in 1869. It also held that a conversation by telephone was a 'message' or at all events a 'communication transmitted by a telegraph' and was therefore a 'telegram' within the meaning of those Acts.

Further, that since the company made a profit out of telephone rentals, conversations held by subscribers through their telephones infringed the exclusive privilege of transmitting telegrams granted to the Postmaster-General by the Act of 1869. Following the judgement however, the Attorney-General gave the assurance that: "the Postmaster-General is quite alive to the advantage arising to the public from the invention and care shall be taken that no step shall be taken to stop it".

The judgement immediately posed a fundamental question for the Gladstone Administration. How should it now deal with the telephone service? Should the State take over the telephone development of the country in the same way that it had taken over the telegraphs some 11 years before, or should it, in defence of its telegraph monopoly, completely abandon the infant instrument? The Government and the Post Office were, however, in no position to undertake the first alternative, because of the enormous financial cost of doing so, and another difficulty was that the master telephone patents were exclusively held by the various telephone companies.

The second alternative was ruled out because public opinion would have been outraged and because the Postmaster-General had already undertaken not to do so. The Government decided on a third solution, and allowed the telephone companies to provide a limited telephone service. The Post Office issued licences to the private telephone companies, allowing them to provide service within a given radius, in return for a 10 per cent royalty on gross revenue to offset any loss in telegraph revenue.

A separate licence was granted for each place in which a telephone exchange was to be set up. In the principal cities, a radius of four to five miles from the exchange was authorised. At the same time the Government encouraged the Post Office to enter what was obviously deemed to be a lucrative field, and set up its own exchanges, the first of which was opened in March 1881, at Swansea.

Although the Post Office moved cautiously in promoting the telephone, private companies expanded rapidly during 1881. The United Telephone Company laid plans to build exchanges throughout the United Kingdom, reserving London and parts of the Home Counties that were within a 12-mile radius of St Martin's-le-Grand for its own ends. In February 1881, the Provincial Telephone Company Ltd was set up to establish provincial telephone companies on a strictly geographical basis and formed the National Telephone Company Ltd, in the north east of England and parts of Scotland.

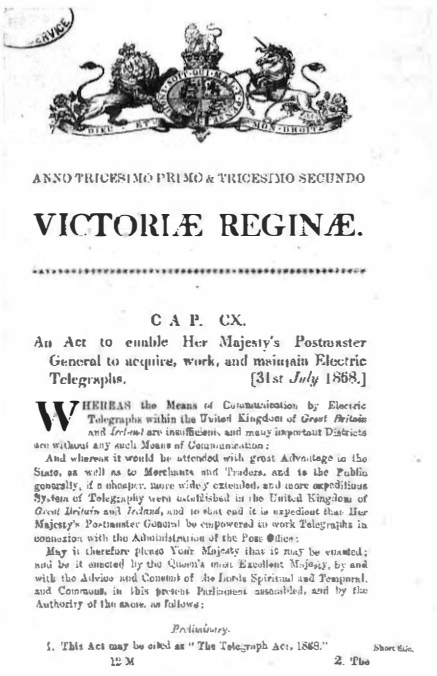
Later the same year, the Lancashire and Cheshire Telephonic Exchange Company Ltd was launched, covering the north west and parts of Wales. And in December 1881, the Northern District Telephone Company was formed covering further parts of the north and Scotland. In 1882 the Telephone Company of Ireland was formed. A further two years were to pass before the Western Counties and South Wales Telephone Company Ltd came into being and finally the remainder of the country was developed by the creation of the South of England Telephone Company in January 1885.

After a period of consolidation and amalgamation, all the various telephone companies were finally bought out by the Post Office in 1912.

Mr R. J. Firestone is a senior telecommunications superintendent in the Residential and Customer Services Department of THQ's Marketing Executive. He is currently studying for a PhD degree at London University on the early, social and economic history of the telephone.

British Telecom Journal, Spring 1981

This Act enabled the Postmaster-General to acquire, work and maintain the electric telegraphs. It was the first time the State took over private commercial assets in the United Kingdom.



ANNO TRICESIMO PRIMO & TRICESIMO SECUNDO

VICTORIÆ REGINÆ.

CAP. CX.

An Act to enable Her Majesty's Postmaster General to acquire, work, and maintain Electric Telegraphs. [31st *July* 1868.]

WHEREAS the Means of Communication by Electric Telegraphs within the United Kingdom of *Great Britain* and *Ireland* are insufficient, and many important Districts are without any such Means of Communication:

And whereas it would be attended with great Advantage to the State, as well as to Merchants and Traders, and to the Public generally, if a cheaper, more widely extended, and more expeditious System of Telegraphy were established in the United Kingdom of *Great Britain* and *Ireland*, and to that end it is expedient that Her Majesty's Postmaster General be empowered to work Telegraphs in connexion with the Administration of the Post Office:

May it therefore please Your Majesty that it may be enacted; and be it enacted by the Queen's most Excellent Majesty, by and with the Advice and Consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the Authority of the same, as follows:

Preliminary.

1. This Act may be cited as "The Telegraph Act, 1868." Short title.

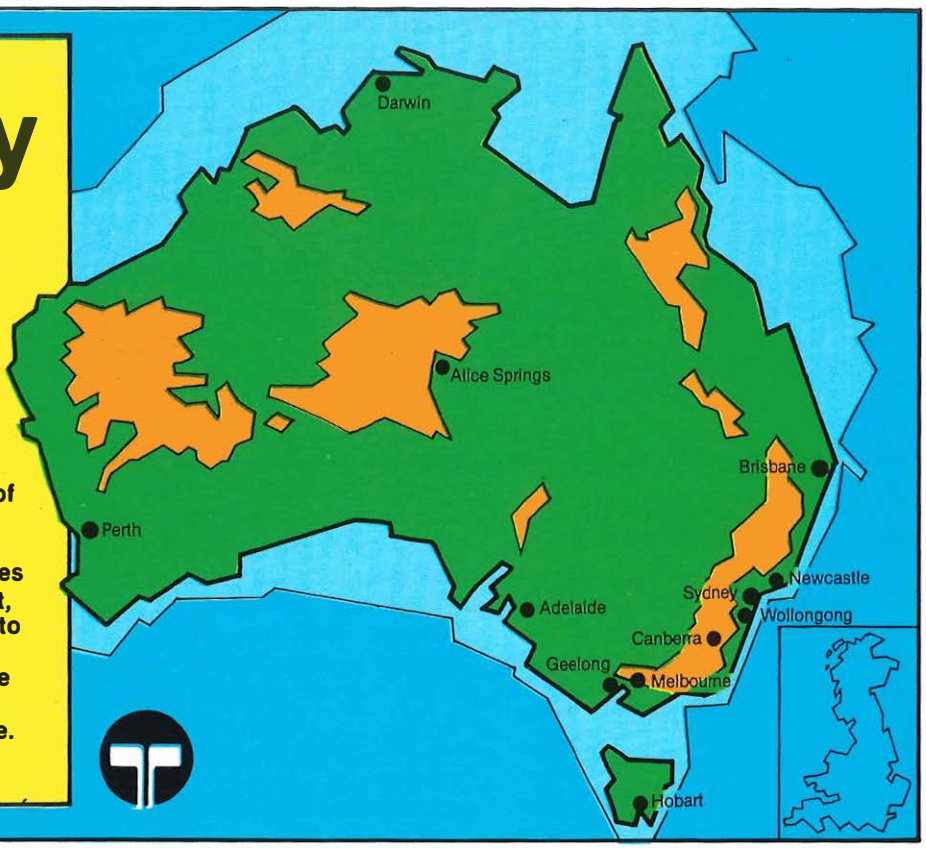
12 M 2. The

Mr W H Preece, later to become Post Office Engineer-in-Chief Sir William Preece, returned from an official visit to the United States in 1877 with two of the first practical telephones to be seen in this country.

The United Telephone Company helped to set up the practical demonstration for the court hearings in Westminster Hall, London. This page is taken from their directory of the times.

The way down under

The Australian Continent is more than 30 times the size of the United Kingdom, and on average, over 100 times less densely populated. It stretches 2,400 miles from east to west, and nearly 1,900 miles north to south. The island state of Tasmania, which looks on the map like Australia's Isle of Wight, lies 150 miles offshore.



This, the fifth in our series of articles on overseas administrations, looks at Australia where service is provided both in bustling city communities and remote settlements in the outback.

Despite Australia's vast area, most of the population live on or by the coastal strips, with about 70 per cent settling in the 11 major cities and towns, including the six state capitals. Only Canberra – the Federal capital – liesinland. The remaining population is thinly spread throughout the continent and generally employed in farming or mining. It is this isolation which has resulted in some famous solutions to the country's communications problems – the Royal Flying Doctor Service and schooling over high-frequency radio links are just two examples.

Yet in spite of the great contrast in area and population density between the two countries, the history of telecommunications in Australia has several surprising parallels with that of the United Kingdom. The first exchanges were opened in 1880, one year later than those in the UK while the first public automatic exchange went live at Geelong in 1912, the same year as the Epsom non-director, making it the second automatic exchange in the British Empire. Australia's STD service opened in 1956, two years before the same facility came to Bristol and finally, in 1975, the Australian Postmaster-General's Department was disbanded and two separate commissions, Australian Postal and Australian Telecommunications (Telecom Australia) were set up to run entirely independently of each other.

The split is not entirely complete, however, since the Postal Commission still accepts and delivers telegrams, and runs the smaller country manual exchanges usually sited in post offices on an agency basis. The independent Overseas Telecommunications Commission, established in 1946, is responsible for international services.

Like British Telecom, the Australian administration has a three-tier organisational structure – a headquarters, State and district offices. Its Melbourne headquarters formulates corporate policies and objectives, as well as planning, establishing, operating and maintaining inland telecommunications services. Generally, State boundaries match State offices, except where Telecom combines the Northern Territory with the State of South Australia, and where the Australian Capital Territory is combined with New South Wales.

State offices put headquarters policies and objectives into operation. The 82 district offices – the third tier in the hierarchy – were recently restructured and made largely autonomous. Their role is to relate field work to customer service in local areas, carry out day-to-day work of installing external plant, telephones and other facilities for customers, accounting, fault repair, handling customer complaints, service applications and smaller new works. They carry less responsibility than a British Telecom telephone area, although the State offices have more operational responsibilities than a British Telecom region.

Australia also distinguishes between 'metropolitan' and 'country' services. There are six metropolitan areas, Sydney, Melbourne, Brisbane, Adelaide, Perth and Hobart – the six State capitals – and it is these which are the object of many performance statistics as 68 per cent of all telephones are in these areas.

With 4.7 million connections and 7.2 million telephones by the middle of last year, the Australian system is much smaller than British Telecom. But these figures exclude non-Telecom-controlled high-frequency (HF) two-way radio, users of which can communicate with subscribers on the telephone network via typed messages between HF-controlled stations and the public switched telephone network. Telecom also runs its own HF radio links which interconnect with the public network, although there are some transmission problems. As far as telex is concerned, the Australian system with 29,700 lines is about one third the size of the UK's.

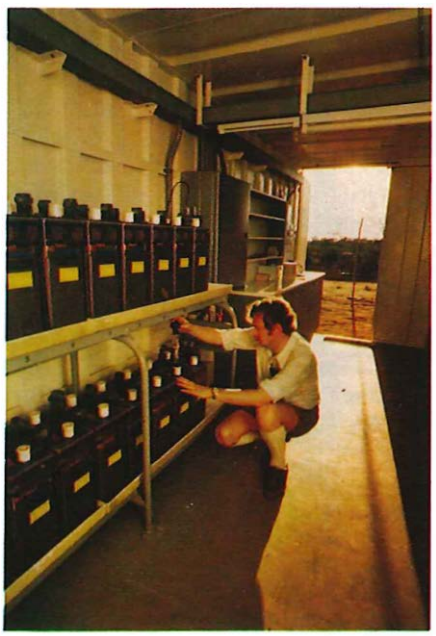
Already, the number of telephones per 100 people is higher than in the UK – 49.1 compared with 47.8, and HF users swell the number of people who can interchange information using the public network for at least part of the communication. Australia plans to introduce a domestic communications satellite to ease internal communication problems over long distances from 1985 and even now, microwave and coaxial cable is extensively employed in the trunk network.

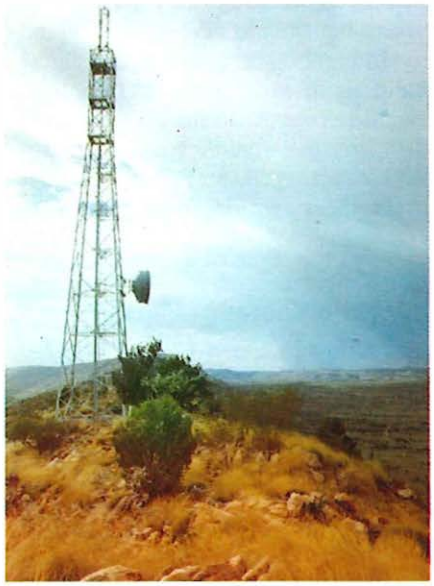
In contrast, there are still more than 70,000 manual connections in country areas – around 6,000 of them still served by about 400 small exchanges staffed only during the day. Even by 1985, Telecom Australia still expects to have 10,000 manual connections although these are all planned to disappear before 1990, probably by using UHF group radio systems.

As might be expected, the investment behind these plans is massive. Expansion during the 1980/81 financial year is expected to increase the total number of telephone services by seven per cent, telex connections by 14 per cent and data modems by 30 per cent – growth rates not dissimilar to those achieved by British Telecom in recent years. In all, current investment expenditure this year exceeds £550 million and equipment orders alone are running at about £4 million a week.

Financing for this level of expenditure comes from three sources, two of which – profit and retained provisions – are internal. The one external source comes from the public issue of medium to long-term loan stock and this accounts for about 20 per cent of the total. In general, stock issues have been successful, and a strong secondary market, which has been fostered by Telecom, has been built up.

Project engineer Tony Mencel checks storage batteries at a repeater station on the Alice Springs – Tennant Creek microwave system.





This isolated radio transmission tower stands at Rugged West Gap near Alice Springs deep in central Australia.

Underwritten by a syndicate, each issue is managed by a leading company, and placed by sharebrokers acting as marketing agents throughout Australia. One attraction is that both repayment of principal and payment of interest are guaranteed by the Commonwealth of Australia. This method of allowing individuals and particularly small investors to participate in the growth of a public corporation is one interesting solution to public sector funding.

Telecom Australia has also adopted a bold approach to revenue collection. In 1978, it took the unusual step of reducing dialled trunk call tariffs. Initially, it reduced the Sunday STD day rate by 20 per cent, and followed this with significant cuts in some shorter distance STD day rates, reductions in longer distance evening rates and introduced an 'economy rate' at 40 per cent of the day rate, operating between 9 pm and 8 am. All this was designed to give customers the advantage of lower costs associated with modern technology, while at the same time spreading the traffic. Connection charges for take-over were also reduced to encourage new owners or tenants of property to become subscribers for in-place services, to below £5.

Engineer Ed Johansen uses the research laboratory's scanning electron microscope to investigate the failure of a transistor.

A further change in the charging structure came with the introduction of 'Community Access'. The idea of this was to provide a timed call, charged at local rates, over any distance between a smaller country community and a service centre outside its normal local call range. Community Access is necessary in Australia, both because of large-scale suburban development around the major cities and the vast scale of the outback. To charge purely by distance would serve only to separate communities even further, and could make the use of a telephone much more expensive to isolated subscribers than to those living in the major cities. These tariff reductions, by taking into account the community interest of existing subscribers, are therefore more likely to encourage new subscribers. In the same

way, this philosophy provides for similar access between charging zones adjacent to the outer metropolitan zones and the inner metropolitan zone, and sets ceiling rates for calls which would be charged – on distance criteria alone – at higher rates, when they are within a single charging district, or to adjacent districts.

Telecom Australia has suffered similar soul-searching to British Telecom on the subject of itemised billing. It has already introduced call charge records from selected exchanges for international dialled calls, but for the existing inland STD network, the high costs of such a system and the different needs of users have led Telecom Australia to decide to offer STD call charge records only as an optional service as network modernisation proceeds. Current plans are to introduce the facility at selected metropolitan exchanges from 1984 and bring country exchanges into the scheme by 1986.

Other services provided by Telecom Australia include Telefinder – a radio-paging network – and this year a fully automatic mobile telephone service, which will eventually be extended to every state capital, is to open in Melbourne and Sydney. There is also a wide range of operator services including credit card calls, person-to-person, reverse charge, emergency, interception and call diversion, and alarm and conference calls.

Calls to fixed radio-telephone exchanges and to non-subscribers using other HF networks are a further feature of the Australian scene. Although Telecom offer only a few recorded services, they are amply supplemented by private concerns, bringing the total to about 30. Of these, about 10 are of a religious nature, including 'Bible gems with melody', 'Soultalk' and 'Amazing Bible facts'.

Quality-of-service statistics are as a general rule taken from traffic generated in the metropolitan areas. Only more recently has country area performance information become readily available.

Because of the physical separation and very different climatic and geographical conditions in each of the metropolitan areas, Telecom Australia does not feel that aggregated figures are particularly useful for management. But despite this, performances within each area are measured against pre-set national standards. These not only include Telecom-controlled indices such as switching error and plant congestion but also items outside Telecom's direct control such as 'customer engaged' and 'faults due to customer'.

Comparable national service levels are hard to estimate, but on STD calls, British Telecom's average of calls 'failed due to British Telecom' – at under three per cent – is probably better than Telecom Australia, which also has a higher fault report rate for telephone repair – six reports per 100 telephones over four weeks – compared with the British Telecom figure of less than five. Telecom Australia's peformance in fault clearance of 80 per cent cleared by the end of the working day following the report is a little better than that expected to be achieved by British Telecom in 1980/81. But none of these comparisons take into account Australian country areas, which are so isolated that comparison of results with those in the United Kingdom are of doubtful value.

On the question of approved private attachments, Telecom Australia already allows a wide range which can operate alongside their four basic telephones, which include the upright Ericofon. There are, however, rigid specifications applying to these 'permitted attachments', one of which is that users report faults initially to the instrument suppliers. This may explain why the connection of private attachments seems to have had little effects on maintenance or apparatus fault rates.

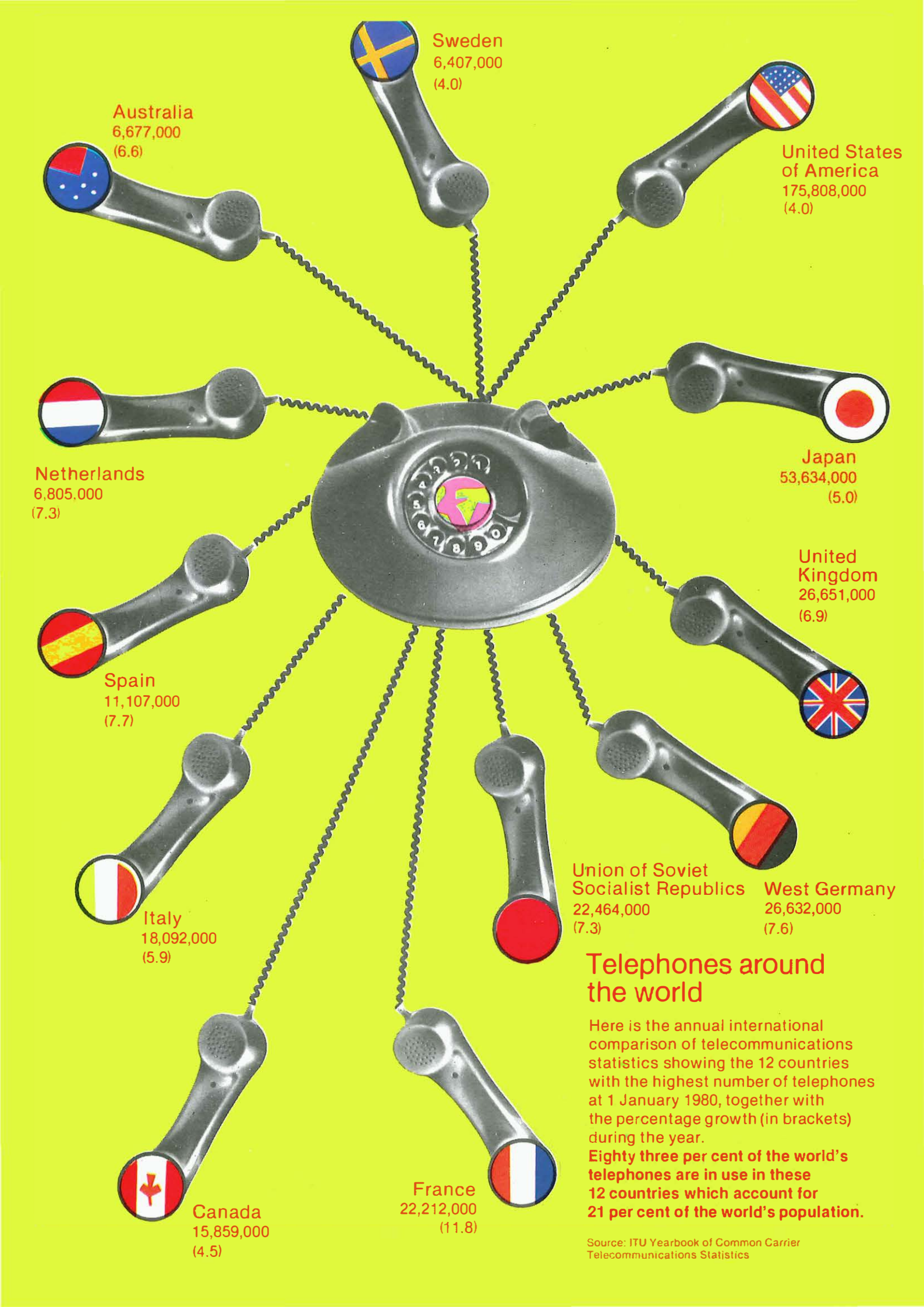
All in all, Telecom Australia controls a strange mixture of what to the European would be both familiar and unexpected. There is nothing unusual, for example, about microwave transmission, but in Australia it is often powered by solar and wind energy. One thing is certain: despite the vast and often inhospitable terrain it administers, Telecom Australia is undaunted in its efforts to provide first-class communications.

The next article in this series takes a look at Sweden.

Senior technical officer Peter Cumming examines the logic of a relay set in an ARE-11 exchange installed in Telecom Australia's Switching Equipment Laboratory based at Melbourne.

The authors – **Mr O. P. Sellars, Mr J. J. E. Swaffield, Mr J. F. L. Stubbs** and **Mr S. Lunt** – are all members of the international comparisons group in the service and performance department of THQ. They acknowledge the help of **Mr C. J. Devoy**, Secretary's Office, Telecom Australia.

British Telecom Journal, Spring 1981



Telephones around the world

Here is the annual international comparison of telecommunications statistics showing the 12 countries with the highest number of telephones at 1 January 1980, together with the percentage growth (in brackets) during the year.

Eighty three per cent of the world's telephones are in use in these 12 countries which account for 21 per cent of the world's population.

Source: ITU Yearbook of Common Carrier Telecommunications Statistics

Catering for everyone

B D Sheehan

The benefits of new technology have, in recent times, led to spectacular developments throughout the British Telecom network. System X, satellite communications and optical fibre techniques are good examples. But new technology does not apply only to telephone exchanges, switching equipment and the latest digital techniques.

Take British Telecom's in-house catering organisation for instance – the largest in the country – where every working day about 3,500 staff – of which nearly half are part-timers – provide 50,000 main meals and 126,000 snacks at 422 staff restaurants.

To help cope with this, a purpose-built, 16,000 sq ft cook freeze system, known as the Central Food Production Unit (CFPU), has been constructed at the former Supplies Depot in Ashford, Middlesex. It is due to opened officially by British Telecom managing director Peter Benton later this year.

Below: The customer's view of British Telecom's catering services. Lunch time at the staff restaurant in London's Gresham Street.

Above: A major boost to the catering service has been the installation of a new Central Food Processing Unit at Ashford in Middlesex. When fully operational, the unit can produce up to 100,000 portions a week, and will serve 80 London staff restaurants. Ruth Southall, foreground, maintains the supply of curry to containers which are quick-frozen and stored until required.

Its main benefits will be to provide high and consistent production standards and an efficient and speedy service for each of the 20 London staff restaurants taking part in a pilot scheme due to start shortly. Initial production quantities will be around 30,000 portions a week, although when the system is fully operational, it will be able to produce 100,000 portions weekly for some 80 London staff restaurants – food for thought indeed!

Capital costs of the CFPU are expected to be recovered within seven years. Por-

tions provided by the CFPU include the normally labour-intensive main dishes and sweets, and are prepared using production-line methods of cookery followed by rapid freezing. Strict compliance to both hygiene and medical regulations for staff, together with random stringent bacteriological testing of product samples will help to ensure the highest standards. Deliveries during the trial period will be carried out using a purpose-built refrigerated vehicle containing mobile baskets which will help reduce manual handling to a minimum. But in the end, the personal touch will still be important, particularly between staff and customers.

A special feature of the CFPU is the incorporation of a heat recovery system to extract energy normally expelled as waste. Energy generated by cooking and by the condensers for the blast freezer and cold stores is diverted to heat cold water to between 10 and 15 degrees Centigrade, and consequently should pay for itself within three years.

All this is a far cry from the days of staff-operated refreshment clubs, which were still in operation as recently as 1969. At about this time, Post Office Catering Services took over the running of the restaurants, and in April 1973, a management team was created in Central Headquarters which became responsible for all catering matters within the Post Office, including personnel, finance, operations, planning and purchasing.

The impending separation of the Postal and Telecommunications Businesses, and the consequent disbanding of Central Headquarters has resulted in far-reaching changes for catering management. Operational responsibility has been handed over to regional directors and local board chairmen throughout the country with the aim of maintaining a service best suited to meet local requirements. At regional level, it is the personnel controller and the regional catering officer (RCO) who are the essential links between the regional director and local catering services.

These services are controlled by the regional catering officer who has a deputy, and a small support group which includes a regional training instructor and relief staff to help run the service. The field management structure reporting to the RCOs is headed by a number of group

Below: Instructor David Blundell demonstrates the correct use of a knife during a craft training session, again at Manor Gardens.

Above: Catering executives receive extensive management training at Manor Gardens in North London. Here Denise Worlidge instructs a group on organisational skills.

Below: This basket of 'flowers' has been created from a variety of vegetables and was a presentation, exhibit designed by Brian Kraven, chef at Caroone House in London, and shown during the annual national cookery competition.

Part of the spread laid on for visitors to last year's Martlesham Open Week.

managers who have catering executives responsible for the staff restaurants.

The formation of British Telecom has brought about a rationalisation of the catering service at headquarters level. Now known as Catering Policy and Operational Services, the new division forms part of Telecom Headquarters Personnel Department. Responsibilities include national pricing policy and consultation with unions, training, and national purchasing arrangements for food and equipment. Also, of course, there is advice to all levels in the business on costs and operational aspects of this professional service including hygiene, nutrition, kitchen planning, environmental standards for kitchens and dining rooms and health and safety.

Training is vital to the efficient running of the catering organisation. All UK catering managers attend courses at the British Telecom Catering College in Manor Gardens, North London. Other London staff also attend the college, while those in provincial regions are trained locally by catering instructors. In all the courses, particular emphasis is placed on health and safety training, and all catering instructors are trained by and registered with the Hotel and Catering Industry Training Board (HCITB). With training meeting HCITB standards, British Telecom is exempted from paying the board's own levy, so saving around £160,000 a year.

The headquarters group responsible for purchasing took over these duties from the Procurement Executive and now places tenders for national food contracts to the value of £2.7 million annually for staff restaurants and cableships. They are currently considering tenders for automatic vending machines and are investigating the possibility of buying a new range of electronic cash registers. Micro cut-out switches in waste disposal units and the type of mechanical feed mechanism used to dispense ingredients in vending machines are typical of the detailed specifications required.

Following a detailed study by the National Data Processing Service, Data Processing Executive and Catering Services, a new project known as 'Cocoa' is to replace the present manual calculation of trading outturn and statistical information. Cocoa is an acronym for 'Catering organisation computerisation of accounts', and using the Data Processing Executive's main-frame hardware, was introduced in April this year. This computer-prepared information will help to speed the return of essential trading information and statistics to both regional offices and headquarters and will help in monitoring and updating performance targets, trading levels and price movements.

Another application for Cocoa may be the collection of data at the point of sale. Such a scheme would use information keyed into and stored by electronic cash registers before being programmed into the computer.

The catering service also provides a comprehensive kitchen planning scheme for RCOs who may need a detailed sketch plan, an estimate of equipment costs for a new building, or advice on major or minor refurbishments. And health and safety at work is, of course, of prime importance, particularly when selecting suitable equipment. Once a decision is made, equipment must be mechanically and electrically checked by headquarters engineers before approval to buy can be made. In some cases, manufacturers have to comply with special modifications required by British Telecom.

Open 24 hours a day, and seven days a week where necessary, staff restaurants provide a good standard of food at a fair price. Services provided include travelling food and beverage trollies, breakfast, lunches, high teas, fast food on demand, hot and cold snacks, vending services and licensed bars as well as serving around 45 million beverages each year. Advanced culinary expertise comes into its own when providing refreshments such as the luncheon arranged for the royal visit by Her Majesty the Queen to Martlesham Heath, or perhaps for important foreign visitors, some of whom have eating preferences dictated by religious belief. The service also catered for some 1,400 visitors to the Research Laboratories during last year's open week.

Another highlight in the catering year is the annual National Cookery Competition, normally held at Manor Gardens. A test of both professional expertise and to show just what can be done, the competition begins in each of the regions, where a series of eliminating heats are held. Entries are limited to non-management grades, although chefs and managers who want to demonstrate their culinary abilities may submit showpieces for display on the day of the final. The winner of the cookery competition is presented with a trophy and there are other awards for runners-up.

Business is currently booming — not least because of the good value and attractive prices. Pricing for basic items is agreed nationally with unions and is based on the cost of the food. Revenue from food and miscellaneous sales is around £10 million annually and so British Telecom subsidises its catering in excess of this amount to cover all the overheads which are accumulated.

Together, both managers and staff will continue to provide the best possible service within financial limitations. The British Telecom workforce needs to march on its stomach, and it is this philosophy which will ensure that this highly professional service will continue to cater for the future.

Mr B. D. Sheehan is head of the operations and efficiency group in Telecommunications Personnel Department's catering policy and operational services.

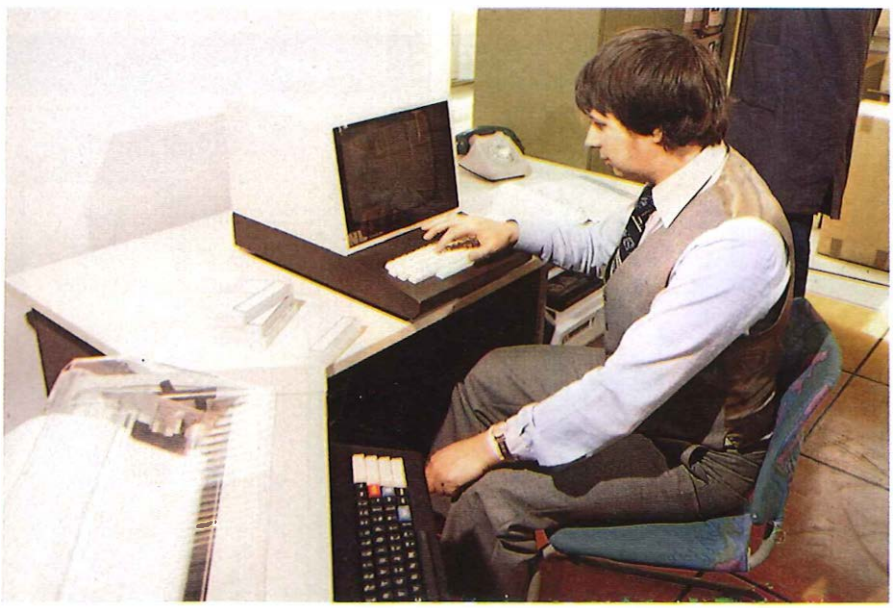
British Telecom Journal, Spring 1981

Go-ahead for better traffic records

D J Pomfret

Technical officer Malcolm Walker removes a cartridge from the traffic recorder at Great Dunmow exchange, Essex . . .

. . . and later it is read via the centralised information retrieval and cartridge update system (Circus) at the area trunking and grading office.



Following trials of a new microprocessor-controlled telephone traffic recording system at selected Strowger and TXE4 exchanges, British Telecom is aiming to expand the scheme during the next few years.

The rapid system growth of recent years and the continuing evolution of the telephone network have led to a need for more frequent and varied telephone traffic records than can be provided conveniently and economically by existing recorders. Because it is vitally important that improvements be made to the traffic recorders so that sound data is available for planning of replacement System X exchanges, a new traffic recorder known as the 'fully mechanised traffic recorder' (FMTR) is under development.

Information derived from telephone traffic measurements is the principal data on which the adequacy of switching equipment employed in telephone exchanges is assessed. Traffic measurements enable future trends to be identified and growth to be predicted for exchange extensions and new exchanges. The objective of good exchange design is to limit capital investment in switching equipment to that just sufficient to maintain a satisfactory grade of service.

Using microprocessor technology,

FMTR is designed to increase traffic recorder facilities and improve accuracy and reliability as well as eliminating laborious manual processes associated with present methods of measuring traffic. Basic traffic data is obtained as with existing recorders by periodically scanning each circuit to determine whether it is busy or free. To achieve the required accuracy the scanning interval must be less than twice the predicted average equipment holding time. A three minute scanning interval is used for equipment held for the duration of a call and an 18 second scan for equipment held only during the setting up period of a call.

The number of busy conditions encountered compared with the total number of scans during a given period shows the extent to which the circuit has been used or occupied. Adequacy of provision is determined by grouping together data from circuits providing the same function within the exchange – a particular outgoing junction route, for instance – and comparing this total with predetermined critical traffic levels.

The method generally employed by British Telecom to obtain circuit occupancy levels (or mean traffic levels) is known as 'time consistent busy hour' (TCBH). TCBH recording involves preselecting the 'busy hour' to be investigated – morning, afternoon or evening. Traffic data is collected and totalled for this hour from Monday to Friday. The mean traffic – measured in erlangs – is obtained by dividing the total number of busy conditions encountered during the record by the total number of scans. The TCBH process is normally repeated at monthly intervals.

There are several deficiencies in present methods of recording which FMTR will overcome.

- In Strowger and crossbar exchanges, present traffic recorders output traffic counts onto cyclic meters which are manually read at the beginning and end of recording sessions. This is a laborious task and prone to error which FMTR will eliminate.
- Existing methods allow traffic in only one busy hour to be investigated per week but FMTR will allow up to four busy hours to be recorded in the same week providing data on morning, afternoon, and evening busy hours and perhaps as well, a period of very light traffic during the night.
- At present, grouping of circuits onto a particular meter is achieved by links and cords on a cross-connection field. With the constant rearrangements of equipment which occur with growth within telephone exchanges, inconsistencies between cross-connection field configurations and actual in-service equipment are difficult to avoid, resulting in traffic record errors. Circuit grouping information in FMTR will be held in software.
- In TXE4 exchanges, conditions on individual circuits cannot be distinguished over much of the exchange because an analogue detection technique is used. Under this arrangement, circuits are connected to a common point via resistors and the number of circuits busy at any given time are determined by measuring electrical conditions at that point. Because traffic data currently needs to be sent away for national processing before essential checks for accuracy can be made, delays are incurred. FMTR will provide local processing facilities so speeding up traffic record availability and increasing its impact.
- If confidence in traffic record accuracy is low, planners tend to over-provide equipment to 'be on the safe side'. FMTR will boost confidence by giving trunking and grading duties greater control over traffic records.

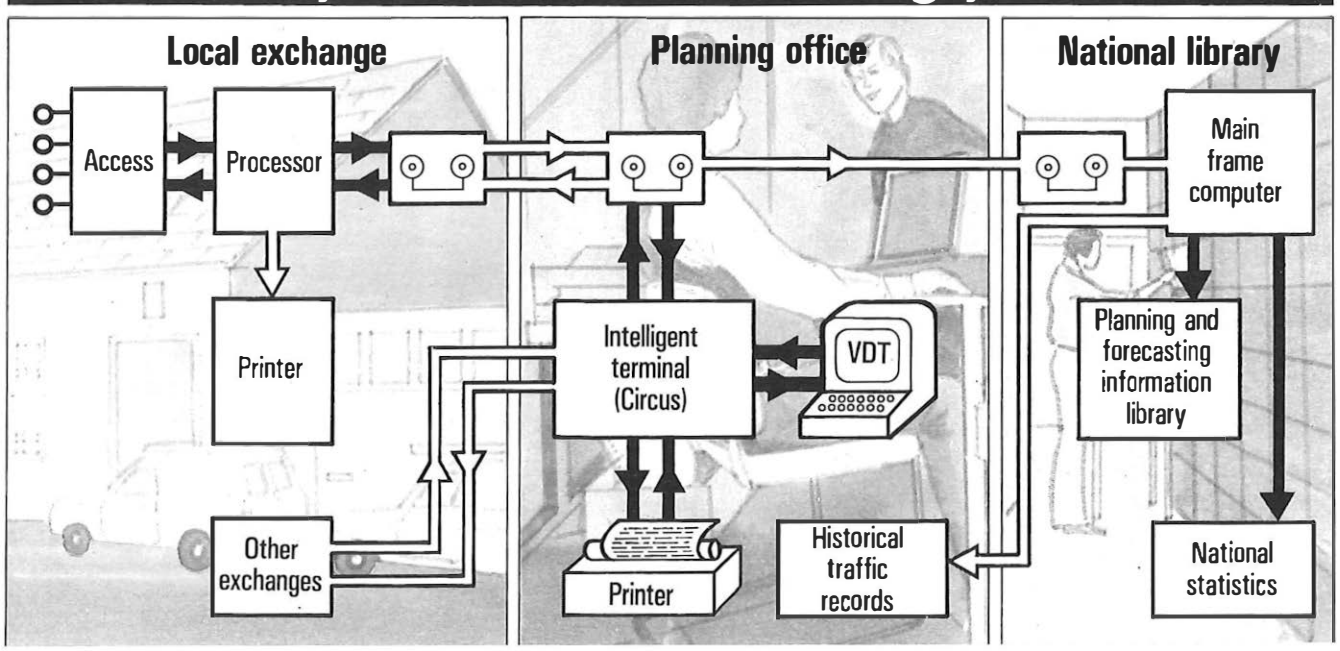
The FMTR scheme consists of equipment installed both in the exchange and in the area trunking and grading office. This office equipment is known as the centralised information retrieval and cartridge update system (Circus). Data is recorded on magnetic tape cartridge used for data transfer between the exchange and Circus, and subsequently between Circus and the national processing centre.

The Circus equipment comprises a proprietary microprocessor system and associated peripheral equipment together with the relevant software. It is designed to be used by area trunking and grading staff in conventional offices and consists of a desk unit with the processor system and cartridge recorder mounted beneath. A visual display unit (VDU) stands on the desk for use by the operator while hard copy is obtained from an associated line printer. Circus forms the hub of the FMTR system in providing the normal method by which traffic records are specified and by which the resulting data is processed for use by trunking and grading office staff.

Traffic records will be specified by loading details of recording sessions on to magnetic cartridge by means of Circus after VDU editing. This information will include start times and the type of record required. Among other information stored on the cartridge will be the exchange circuit group description file and the access grouping schedule.

Although TCBH records will normally be requested, other forms of standard record will be made available, such as extended records to identify possible changes in the 'busy hour', or special records formulated to suit particular local needs. The cartridge is loaded into the traffic recorder at any time before the start of the recording session which will then proceed automatically, dumping

Fully mechanised traffic recording system



data to the cartridge at appropriate intervals, recording sessions normally extending from Monday to Friday. At the end of the session, the cartridge will be removed and transferred to Circus, where the data is checked for accuracy before dispatch for national processing.

The design of the exchange installation makes use of microprocessor techniques using automatic call recording equipment (ACRE), the British Telecom-designed processor system. A basic 'hardware' design is employed which has the differing functions for individual exchange systems determined by software programs stored in programmable read-only memory (PROM). The processor is mounted together with power units and purpose-designed interface cards, cartridge drives and a display unit on a standard rack to suit any exchange system.

With the introduction of FMTR into Strowger and crossbar exchange systems, existing uniselector, relay, and crossbar switch traffic recorder access equipment will be retained. In TXE4 exchanges, however, the analogue portion of the access will be replaced by a new electronic scanner. When formulating design proposals for Strowger exchanges, a study was made to see whether a new electronic access could be provided as an alternative to retaining existing uniselector equipment. It was decided that cost as well as the inevitable disruption to service did not justify replacement, assuming checks on access equipment performance could be automatically made during recording. FMTR software performs such checks, rejecting data from scans where uniselector malfunction is detected. Similar techniques are used to validate access equipment in other systems.

National processing procedures will be similar to those used at present and existing facilities will also remain for updating national databases, such as the Planning and Forecasting Information Library.

Although normal traffic recording sequences will be automatically controlled, FMTR equipment will provide exchange staff with a wide range of facilities for setting up, maintaining and using equipment for special investigations. A keypad and printer are used for entering commands and recording responses. Among the functions provided are details of the recording session and grouping schedule; a program check to locate and test faulty access equipment; a capability to initiate local traffic records to aid investigations; and print out of circuits found permanently busy, permanently free or spare but carrying traffic.

Mr D. J. Pomfret was formerly head of the traffic recording development group in THQ's Exchange Systems Division. He now heads the database and charge control group in the System X launch unit.

British Telecom Journal, Spring 1981

Solar power for Highland link

The North of Scotland has never been noted for the amount of sunshine it enjoys so perhaps to the casual observer it might seem a strange place to conduct experiments with solar powered telephones.

British Telecom, however, know better. Even when the skies are heavy and grey enough energy from the sun is collected by simple solar panels to charge the batteries installed at either end of a special radio telephone link set up between the isolated hamlets of Tomdoun and Kinlochourn in Inverness-shire.

The experiment follows a similar trial which began two years ago on Soay Island and the technique has been used for several years at a bird sanctuary in Norfolk (see *Post Office Telecommunications Journal,* Winter 1977/78).

The sun-powered telephone at Kinlochourn is situated in a lodge house and works on a single-channel radio link. Seven miles of overhead wire lead from Tomdoun exchange to the radio station where signals are then beamed six miles along Loch Quoich to Kinlochourn where overhead wire runs the four miles to the lodge house.

Like the Welsh VHF radio link featured in the last issue of *British Telecom Journal,* the Kinlochourn phone is a boon for hill walkers and could prove a vital emergency lifeline.

Pictured braving the elements to check the Kinlochourn solar panel is linesman Dave Emery.

Bristol paves the way

As part of the British Telecom plan to streamline the UK Telegram Service, nine new main offices are being phased in during the next two years. The first went live at Bristol in April. Here **Mr P S Humphreys** looks at the developments which led up to its opening.

Bristol's new main telegraph office operates from Queen Charlotte House, a listed building whose frontage dates from the 18th century.

Telegraphists at work in Queen Charlotte House shortly before the merger of inland and international operations. The new main telegraph office uses the same layout.

Mr P. S. Humphreys is deputy controller in Service Division at South West Telecommunications Board Headquarters in Bristol.

British Telecom Journal, Spring 1981

The need to reorganise and modernise the telegram service is inescapable if the twin aims of reducing costs while offering acceptable standards of service to the public are to be achieved. Happily those aims go hand in glove because a reorganised and modernised service will better contain its costs, and thus help British Telecom towards its financial target. The main planks of the programme are the integration of the present inland and international offices and the subsequent introduction of visual display units (VDUs).

Before Bristol's new office was opened, inland international telegrams for the south west were handled in separate offices, with different grades of staff using different procedures. To some extent, however, subsequent integration was anticipated when the two operations were brought together under the same roof at Queen Charlotte House in 1977 with sufficient space provided to facilitate possible changes.

Having identified the need for integration throughout the country, one of the first tasks undertaken by the telegram service was to devise a scheme which brought the separate hierarchies into a common grading structure acceptable to the unions. The problem was not easy. In all, nine grades were involved covering three basic grades and three supervising grades and proposals to reduce these to two operating and three supervising grades were developed.

Operating procedures were also reviewed to take full advantage of modern developments. For some time, international traffic has been routed through a computerised message switcher housed in the telegram re-transmission centre (TRC) in London (see *Post Office Telecommunications Journal,* Autumn 1975) and this equipment was capable of handling inland traffic as well. Briefly, messages can be fed into the computer which automatically routes them to the distant delivery office according to the destination address. The opportunity was also taken to introduce the automatic billing of telegram charges against telephone and telex numbers.

The new ideas for integration and modernisation were put together in a package and discussed in detail with national union officials and subsequently placed before special conferences where the proposals were generally accepted.

In the south west, a steering committee comprising representatives of all the interested parties was set up and the proposals framed by SWTB service division were studied in depth. The plan for the Bristol main office had to account not only for the combining of two fundamentally different functions, but also the absorption of inland telegram traffic to and from South Wales. It also had to take account of further technical developments expected in 1982 which will be based on VDUs.

In anticipation of this further change, therefore, it was decided that the new main office would initially be set up using both existing offices. The previous International Telegraph Office (ITO) was rearranged so that the incoming positions would receive not only messages from overseas, but also from other inland offices. The former inland office was modified to accept all messages originating within the catchment area for transmission via the TRC to their ultimate destination. Later when the VDUs are introduced they will be fitted on the former international acceptance positions and all functions will be concentrated in the one instrument room.

From an engineering point of view, the work involved was fairly simple consisting mainly of moving teleprinters between floors and providing additional phonogram acceptance positions. The difficult part was organising the work so that it caused minimum interference with the service. This was achieved by pre-wiring operating positions and circuits wherever possible and by carrying out the actual changeover on a Sunday.

A major part of the exercise has been the need to train all the staff involved in new procedures for the handling of telegrams. Altogether, 134 staff including supervisors received more than 200 man-weeks of training in a four-month period. At the same time, enough staff had to remain available to maintain service standards.

Because of the differing traffic patterns it has been possible to effect significant savings in operating costs and improve the quality of service on phonograms, particularly on Saturdays. Saturdays have always been a problem in inland telegraph instrument rooms because it is not possible to employ enough staff to handle greetings traffic and fully employ them at other times, solely on inland duties. As a result, the liability for Saturday attendance has always fallen more heavily on inland telegraph operators and the merging of their grade with overseas staff has spread this more evenly.

By being the first to open, Bristol has set the pattern for the rest of the country. When the programme has been completed, all telegrams originated and received in the UK will be routed via the TRC in London. This has the advantage of a common operating procedure which can be used for handling all types of telegrams.

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Helping the disabled

British Telecom is playing a major role in recognising 1981 as the International year of Disabled People. As well as three new aids available to the handicapped, a travelling display now touring the country will also feature prototypes of new developments, aimed at revolutionising future communications for the disabled.

Included in the display is the Conquest telephone handset for the hard of hearing. This combines a volume control and a light to indicate incoming calls as well as special equipment to eliminate background noise and clarify incoming speech for wearers of hearing aids.

Another product is the coin aid, already in use, which, by using a system of levers makes the payphone easier to operate for the disabled or wheelchair-bound people. For those with hand tremor, a self-adhesive finger guide has been developed for use with the press-button telephone to guide and position the caller's fingers over the correct button.

British Telecom spends around £500,000 a year on research and development for the disabled. Among prototypes being developed are the stalk telephone – with the handset fixed to the end of a flexible tube and operated by means of a press button – a voice synthesiser producing artificial speech for the blind and a communication terminal linked to Prestel for the chronically deaf. And a new film entitled *Desire to work* has been released showing how British Telecom developments are helping job prospects for the disabled by providing them with the aids to enable them to do a job as competently as anyone else.

Contracts

Honeywell Information Systems Limited – £1 million for minicomputers to be used with three British Telecom projects: the key item monitoring (Kim) system; the administration of repair service controls by computer (ARSCC) system; and the forecasting of ordering requirements and transmission expenditure for long lines (Foretell) system.

Marconi Communication Systems Limited – £5 million to convert the British Telecom satellite earth terminal, Goonhilly 4, to a new standard compatible with Intelsat V, the new generation of operational communications satellites.

Standard Telephones and Cables Limited – £12 million for volume production of Herald, the microprocessor-controlled business telephone system. Herald will be manufactured at STC's Monkstown factory in Northern Ireland.

GEC Telecommunications Limited – £1.3 million for more equipment to expand the UK microwave radio network in preparation for the second independent television channel due to open in 1982. This brings to £5 million the value of orders to GEC for the ITV2 channel.

Ferranti Electronics Limited – More than £250,000 for two mobile satellite communications terminals. Each terminal and associated electronic equipment is mounted on a trailer and can be used with time-division multiple access equipment, enabling them to operate with satellites on a time-sharing basis.

Teleprinter Equipment Limited – More than £400,000 to supply 400 paper tape punch units to be used for traffic sampling and billing. All the units will be built at the company's Tring works in Hertfordshire.

Four more on IDD

The recent additions of Libya, the Bahamas, Iceland and Tonga to the list of countries which can be dialled directly by UK telephone users, bring 85 per cent of the world's telephones within reach – over 420 million of the total of 480 million telephones.

British Telecom is the world leader in cheap rate international direct dialling, and first introduced a service between London and Paris in 1963.

TXE4A goes live

Britain's first TXE4A telephone exchange has recently been brought into service at Leicester. The new exchange – Belgrave – incorporates a reed-relay design operating under stored program control and is an updated version of the original TXE4 design making it the most advanced analogue system in the world. With TXE4, it will form the basis of British Telecom's local exchange modernisation programme into the 1990s.

The introduction of this exchange was the culmination of five years development work aimed at reducing TXE4 system costs by using modern technology. Its development has been a great success and was demonstrated by the smooth changeover of 5,000 customers from an old electromechanical system.

History recorded

To mark the centenary of the first telephone to reach Norwich, a highly readable and well-presented book – *The first 100 years of telephones viewed from Norwich* – has been designed and printed by British Telecom. Written by the city's telephone museum curator Eric Clayton, the book is the culmination of research started 15 years ago. Mr Clayton, who has always had a keen interest in the history of telecommunications, was given three months' special leave to write

Top view for Chairman

There is nothing like experiencing a situation at first hand to know what is really involved. And that is just what British Telecom chairman Sir George Jefferson has been doing.

On a recent two-day visit to Cardiff he tasted life at the top of a telephone pole at the Telecom Training Centre at Coryton and later went below the streets to see the underground equipment serving the city centre.

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the book which seems destined to become a collector's item as well as a handy reference work.

Although the book is not for sale, it is hoped that it will help to raise funds for the museum. Anyone who donates more than £1 to the museum will receive a copy. The address is: The Curator, L1.6, NTA Museum, 41 St Giles Street, Norwich NR2 1BA.

Raising the alarm

British Telecom has agreed a new message format for its automatic 999 remote alarms service with police forces and the Home Office.

Messages may now include a special index number as well as existing information such as the emergency service required, whether the alarm has been raised through burglary, hold-up or fire, the telephone number and the location. This new number helps the police to determine the location and type of premises, the name and address of the keyholder and other information.

Automatic alarms are installed in shops, offices, warehouses or other premises to give protection when the buildings are unoccupied. Companies which supply and install these automatic alarms have been given the new recommended texts for recorded messages. The new format does not mean having to alter existing equipment.

Moving on

Frank Thomas, Director of Overseas Liaison and Consultancy, and for the past 11 years, a member of *British Telecom Journal's* editorial board, retired in April after 44 years' service. Mr Thomas's career included 26 years of research at Dollis Hill where he worked on the first transatlantic telephone cable; two years in LTR as deputy director of service and planning and a further period as director of network planning.

Mr Thomas hopes his retirement will give him more opportunities to travel.

He is succeeded as Director of OLCD by John Boag, formerly general manager of Telconsult.

Computers on schedule

The first five Argus 700E computers ordered by British Telecom for its International Leased Telegraph Message Service (ILTMS) have been installed on schedule by Ferranti Computer Systems Limited.

The installation is part of a £2 million plus contract to supply a computer-based message system to improve the British Telecom network. The project will help to provide a more flexible service with improved facilities in an increasingly competitive market.

ILTMS allows telegraph messages to be switched for UK companies requiring links with offices in the UK and in other countries. These links in many cases form private international telegraph networks. When completed, the installation will comprise eight computers, and will control the automatic switching of messages on these networks and will be able to handle 1056 telegraph and medium lines switching up to 10 messages a second.

Dial before you dig

Yet another new information service has been introduced by British Telecom – this time for the amateur gardener. Callers can hear television gardening expert Clay Jones, talking on a range of topics aimed at helping the gardener with an hour or two spare, but who may not be sure what his garden needs, or when to take action.

Now, for the cost of a telephone call, gardeners throughout the country can receive timely and closely-tailored information through the Woolworth Gardenline. Mr Jones, who is an adviser to Cuthbert's Seeds, can be heard 24 hours a day from five centres – London, Liverpool, Manchester, Blackburn and

Blackpool. Forty-four other centres will at first get a limited weekend service.

Although gardening hints have been available since 1971 and now generate about 700,000 calls a year, the service was only available at limited times. The new service aims to generate more than five million calls a year.

Telecom offers pay TV

Thousands of homes in Milton Keynes and Newport Pagnell will be able to receive pay TV over British Telecom's cable TV network this summer in one of the trial services recently announced by the Home Secretary.

The coaxial cable network was started in 1972 and now provides about 16,000 homes with five television channels and the full range of broadcast radio services including local community radio.

British Telecom has appointed SelecTV as its main contractor for the two-year trial. This London-based UK company has wide experience of pay television in the United States, and will supply all the operating equipment including the decoders which customers will need to receive pay TV programmes on their ordinary television sets. Subscription television customers will have the choice of a wide range of feature films as well as facilities for community television. It is expected that customers will pay a service connection charge plus a basic monthly rental of about £6.

Energy talks

Solar and wind power are among the many subjects to be discussed at the International Telecommunications Energy Conference (Intelec 1981) being held at the Royal Lancaster Hotel in London during May.

To be opened by British Telecom managing director Peter Benton, the conference, the third of its kind, is being organised by the electronics and power division of the Institution of Electrical Engineers in association with the Institution of Post Office Electrical Engineers and other professional groups.

A total of 65 papers are being presented by authors from 15 countries during the three-day conference and an exhibition of equipment and components from 30 companies, including British Telecom, will be on view.

Datel to Hong Kong

Firms sending computer data by phone to Hong Kong can now save time and money by dialling direct, instead of asking the international operator to connect their calls. British Telecom International has introduced automatic international datel services operating at 600 and 2400 bit/s made possible by the opening of a new exchange in Hong Kong exclusively for data customers.

The new service will be of particular significance for banking and trading organisations which regularly exchange financial information with Hong Kong.

Charges up

Charges for national and international telegrams rose on 1 April bringing the basic charge to £1.50 from the previous £1. And the price per word for inland telegrams has risen from 10p to 15p. New charges per word for international telegrams vary according to the destination and the service used.

The move is one of a number of measures aimed at putting the telegram service on a sound financial footing. The last time charges were increased was in April last year – but before that, they had not risen since 1975.

As part of the reorganisation and modernisation of the telegram service, the present 25 principal inland and international telegraph offices will be replaced by nine telegram offices handling both inland and overseas telegrams. Using microprocessor-controlled visual display units, the first of these offices opened at Bristol in April (see page 32).

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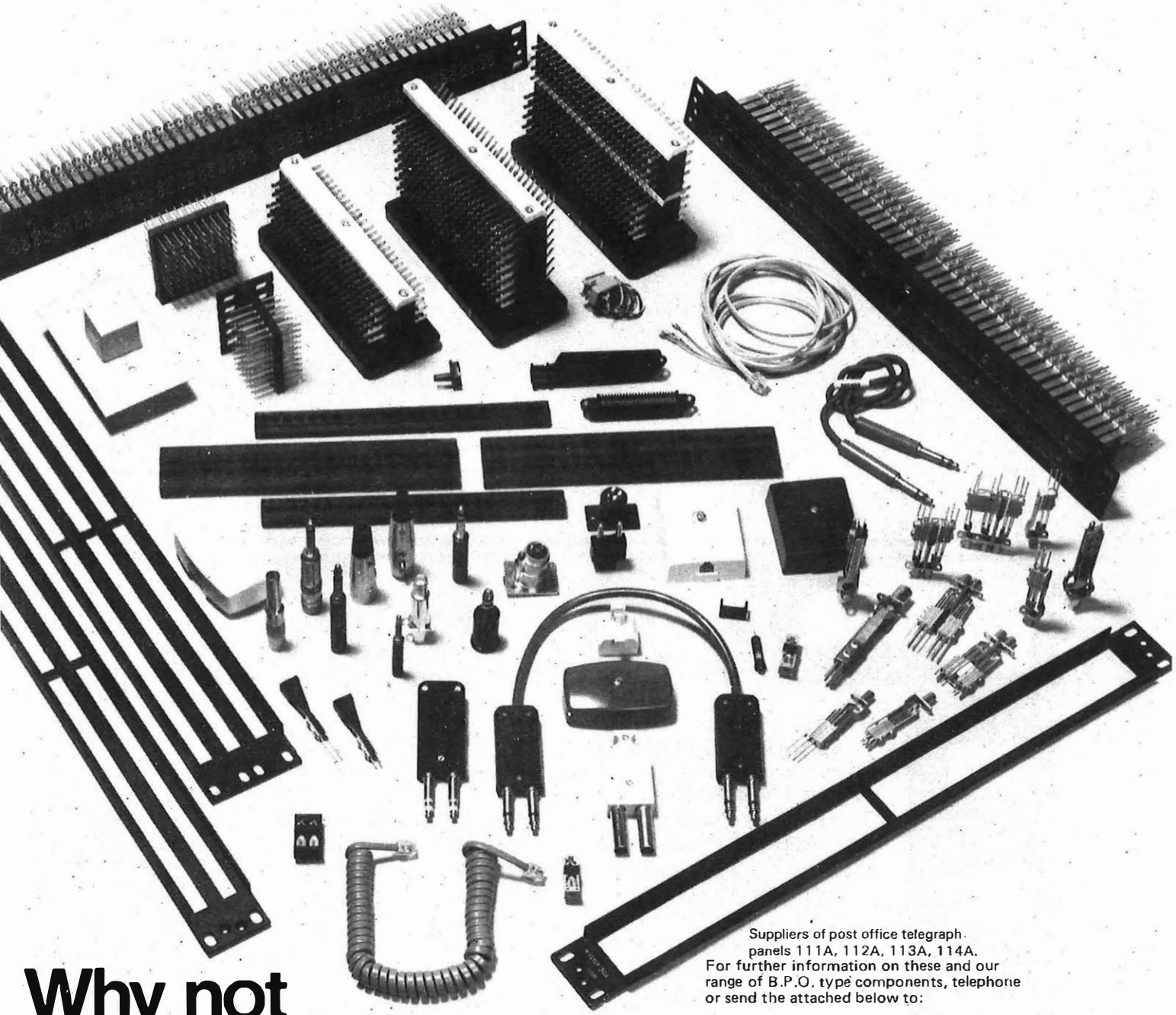

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